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SOCIOCULTURAL DETERMINANTS OF FERTILITY IN BOTSWANA

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ABSTRACT

This study examines sociocultural determinants of fertility in Botswana. Data are taken from Botswana's 1988 Demographic and Health Survey which consists of a national probability sample of 4368 women aged 15 to 49 years. The sample is divided into two cohorts, young women (aged 15-29 years) and older women (aged 30-49 years). The principal analytical technique used to examine the independent association between children ever born, the dependent variable and selected independent variables is multiple regression. The correlates included in the multiple regression model are child fostering, infant and child mortality, marital status, contraceptive use, breastfeeding duration, urban residence, education, age at first birth and age at time of survey.

All the variables included in the empirical model significantly influence fertility. There is a curvilinear relationship between education and fertility in that the fertility of women in Botswana first rises with education before it declines. For both cohorts, age at first birth, breastfeeding duration and education come out clearly as significant determinants of fertility reduction in Botswana; and of the three variables, age at first birth which increases by education emerges as the single most important variable

influencing fertility reduction.

Of remarkable notice is the finding that child fostering significantly reduces fertility among women in the young cohort, a phenomenon different from that found in most African countries. Contraceptive use also reduces fertility in the young cohort. Urban residence is associated with fertility reduction in the old cohort. Infant and child mortality and marital status are positively related to fertility.

The independent variables are used to test the characteristics hypothesis which states that fertility differentials of subgroups are a reflection of social, demographic and economic attributes that characterize them. Controlling for characteristics among women introduces major changes in their fertility, thus confirming the characteristics hypothesis.

The general conclusion of the thesis is that since sociocultural factors play a significant role in influencing fertility in Botswana, and because of the complex ways in which mechanisms operate to affect fertility, it is therefore important to consider existing social structures, norms and traditions when formulating policies related to fertility decline in the country.

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CHAPTER 1

INTRODUCTION

Human fertility is influenced by a mosaic of socio-cultural factors. These factors, when compared with a host of others such as biological, demographic, economic and behavioural, vary widely with respect to their relative importance in different geographical settings. For example, the generally acknowledged striking differences in the fertility characteristics of developed societies and those of developing ones reflect fundamental differences in their basic institutional structures and consequently in their socio-cultural conditions. Analyses of the World Fertility Survey data for several countries have shown evidence of remarkable sub-national and international variations in fertility rates (Susheela and Ferry, 1984; Cleland and Hobcraft, 1985). A lot of interest has therefore been focused on the mechanisms by which these variations in fertility rates are achieved.

Early studies of the causes of the variations in fertility rates have frequently offered socio-economic explanations. Consequently fertility levels and their changes were explained in terms of the impact of socio-economic factors on fertility. This approach commanded great appeal among policy-makers

because of its simplicity and straightforwardness. It also had the advantage of defining more or less precisely those mechanisms which could be subject to official policy manipulations to bring about desired changes. Its basic weakness, however, is the generally observed inconsistent spatial and temporal relationship between fertility and some of the socio-economic factors. Such has been the fertility scenario in many societies that the socioeconomic deterministic approach has not offered indubitable explanations to the study of fertility and fertility change.

In recent times, significant theoretical and analytical gains have been made through a shift from the traditional to a multi-disciplinary approach in the study of fertility change. This approach, spearheaded by sociologists has had many methodological and analytical inputs from economists, ethnologists, anthropologists, and social psychologists. Some theoretical inputs are now being made towards an integration of feminist perspectives into fertility explanations (McDaniel, 1996).

As a general framework for the sociological study of fertility, Davis and Blake (1956) developed the first systematic classification of the intermediate determinants of fertility through which economic, social and other factors

must operate to influence fertility. This model which has since remained influential marked a significant turning point in fertility analysis. Hobcraft and Little (1984) developed a model where measurement of the time spent in various fertility exposure states by women over a recent period is attempted at the individual level. Examples of these temporary exposure states are: m=never married; u=not in union; i=postpartum infecund; l=lactationally infecund and p=pregnant. Easterlin and Crimmins (1985) have also developed a framework allowing analysis of fertility determinants at the individual level.

In order to fully understand the demographic scenario, the mechanisms by which fertility is affected have to be properly identified. In doing this, attention has been focused on the salience of social and cultural factors in the determination of fertility. Because demographic analyses do not account for all of the variations in fertility, hypotheses have been developed that attempt to specify the variables and processes that intervene between socio-economic stratification indices and fertility. These hypotheses often deal with ways in which individuals may differentially perceive, interpret and react to their immediate social environment. These environmental factors and socio-economic and cultural structures impinge on fertility via a series of intervening factors which influence fertility directly and which have now become the major focus

of fertility analysis. Therefore, a thorough understanding of the mechanisms of the intermediate fertility variables would afford us the best explanations for the inconsistencies between modernization and the emerging patterns of demographic events in developing countries, such as Botswana.

1.1 STATEMENT OF RESEARCH PROBLEM

Botswana has recently become one of the first countries in sub-Saharan Africa to experience a fertility decline that exceeds the ten per cent reduction conventionally accepted as indicating the onset of an irreversible transition. According to the 1981 population census, the Total Fertility Rate (TFR), which is the average number of children a woman is expected to have over her lifetime, was estimated at 7.1 births.[1] The Botswana Demographic and Health Survey (BDHS) of 1988 indicated a TFR of 5.0 births per woman. This is the first time a fertility decline of this magnitude has been witnessed in sub-Saharan Africa. The 1996 World Population Data Sheet from the Population Reference Bureau (PRB), which uses data

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[1] The TFR of 7.1 was calculated by adjusting the raw estimate of 6.15 upwards to account for under-reporting of recent births based on the P/F ratio method originally developed by Brass, (1964). Diamond and Rutenberg, (1991) believe that the adjustment from 6.15 to 7.1 is too high and recommend a more conservative adjustment that results in a TFR for 1981 of 6.7.

From various sources, shows a TFR of 5.0 births per woman for Botswana, thus confirming Botswana's significant decline in fertility. It is also estimated that in real terms Botswana's Gross Domestic Product (GDP) growth has averaged around 13% per annum over the entire period since its Independence in 1966 until 1988/89 (Botswana National Development Plan 1991-1997); and according to the World Bank, Botswana has experienced one of the highest rates of growth in the world in the real Gross National Product per capita (World Bank: 1986). The Infant Mortality Rate (IMR) has also declined from 100/1000 live births in 1971 to 71/1000 in 1981 (1971 and 1981 censuses), to 41/1000 in 1996 (PRB, 1996), making it one of the lowest IMR's in Africa.

However, despite such remarkable strides in the decline of the TFR and IMRs, and a high average rate of economic growth, there exists in the country, very wide social and economic inequalities among the sub-populations of the country. Incomes of people vary widely around the average Gross Domestic Product. For example, the Gini coefficient which is the standard measure of inequality of income[1] was 0.56 in 1986 for all incomes. Also, the population of Botswana exhibits

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[1] Complete equality of income is reflected in a Gini coefficient of 0 and complete inequality in a coefficient of 1

substantial sub-regional variation in demographic dynamics. In the area of fertility for example, differences can be detected not only between rural and urban areas but also between rural districts (Vander Post, 1990). Also, while the family planning programme is hailed by some as a timely appreciation of the country's most immediate and pressing developmental problem, it is declared by others as an ungodly interference with fundamental human rights and cultural values regarding procreation. There are those who fall somewhere between the two extremes. Localized idiosyncrasies, cultural traits, world-views and extreme inequalities that exist in the social and economic realms within and between the geographic sub-regions of the country have created a formidable base for differences in the level of receptivity of modern life patterns.

In heterogeneous societies, where such differences are found, it is of the utmost importance to examine closely the fertility behaviour of the various sub-groups and to identify the mechanisms through which socioeconomic, cultural and other factors operate to affect fertility in the country, in order not only to understand the real meaning of such an average fertility measure as the TFR, but also to provide a clear contextual map of the country depicting its fertility behavioural concomitants in order that government policy

strategies that are culturally appropriate and acceptable to all can be formulated.

1.2 **RATIONALE FOR THE STUDY**

The rationale for the investigation of fertility behaviour in Botswana is rooted in the nature of the national character of the country. The existence of social differentiation and cultural heterogeneity is an undeniable social reality in Botswana. The demographic significance of social polarization and cultural heterogeneity derive from their implications for the social structure and consequently for fertility behaviour at the individual level.

Given the existence of socio-spatial heterogeneity in the country, it may be expected that the factors affecting reproductive behaviour will differ not only from one geo-cultural area to the other (both in terms of degree and patterns of influence) but also among different social sectors or sub-groups within the same cultural area. Thus, for example, it is useful to investigate both the spatial patterns of reproductive behaviour (regional and ethno-cultural differentials) as well as intra-societal or sub-group differentials (such as between educational categories, or

between the religious groups within the same cultural group or geographic area). The essence of this is the proposition that the persistence of inter-regional and intra-regional fertility differences seem to indicate that certain historical, cultural or behavioural factors have a role to play in determining the level of fertility and therefore, their influences ought to be taken into consideration when trying to understand the levels and the changes in fertility in the given society (or in sub-groups of the same society).

Secondly, the investigation of determinants of fertility differentials finds justification not only in the impact of the intermediate variables on the levels, patterns and trends of fertility in traditional societies but also because of their significant influence on potential fertility in a modernizing and transitional society (Lesthaeghe, 1989; Kocher, 1983). These biological and behavioural variables are very responsive to institutional changes that accompany modernization. The cultural norms regarding the values of reproduction and the acceptable patterns of family formation influence and determine individual orientations towards reproduction and fertility performance.

During the period of transition, such as the one Botswana is

currently undergoing, the coherence between the social support for high fertility and institutionalized practices that inhibit excessive and maximum use of reproductive potentials are destabilized. Various determinants may react to the same general set of factors, but their reactions may differ in magnitude and direction. During the process of modernization, not all the intermediate determinants necessarily shift in the direction of lower fertility through education, urbanization and industrialization. On the contrary, much research illustrates that changes occurring in countries with high levels of fertility, especially early in the process, may tend to push fertility up. For example, a reduction in the fertility inhibiting practices such as the observance of long postpartum sexual abstinence taboo, prolonged breastfeeding and long birth intervals, will push fertility up in the absence of effective use of contraception (Caldwell, 1981).

Opportunity now exists for a better understanding of the fertility processes in Botswana. This study can greatly clarify some existing contradictions and enhance our understanding of the determinants of fertility and fertility differentials among the social and geographic groups in a changing society such as Botswana, the dynamics of these determinants and how they are responding to the pervasive influences of modernization.

Lastly, the rationale for the investigation of the determinants of fertility differentials in Botswana is based on the exigence for the formulation of a population policy in the country. In the past decade, key government officials, political leaders and chiefs have become concerned about the implications of Botswana's rapid population growth in meeting overall development objectives. These government officials have attended international conferences, such as the World Population Conference in Bucharest in 1974, in Mexico in 1984 and in Cairo in 1994, where concerns about population and development were expressed. These conferences stressed the need for governments to develop population policies and to implement strategies.

Emanating from these conferences has been the acceptance by the Government of Botswana, and incorporation into the National Development Plan V11 of (1991-1997), of a mandate to develop and implement a National

> "population policy to intensify Family Planning, Health and Education, and assist in reducing the rate of population growth..."
> (Maganu and Khulumani, 1991 p 2093).

This study will provide an explicit contextual map of the country portraying its fertility behavioural concomitants, that will provide tools for the formulation of policy strategies culturally appropriate and acceptable to all.

1.3 OBJECTIVES OF THE STUDY

It is the objective of this study to analyse fertility behaviour of women in Botswana. The main purpose of the study is to explain the possible bases of variation in the levels of fertility and reproductive behaviour of the various socioeconomic groups, as a function of the biological, behavioural, economic, social, and cultural factors that affect, directly and indirectly, reproductive behaviour, such as nuptiality patterns, contraceptive use, and postpartum infecundability. Understanding the sources of this variation is important in that it will help policy-makers and programme managers to clarify issues and problems which need to be aggressively addressed.

To achieve this, first, fertility differentials of women in Botswana will be examined according to their socioeconomic, cultural, demographic and environmental background.

Secondly, an attempt will be made to examine fertility behaviour in order to investigate the major question: What factors explain the differences in fertility among women in each of the environmental regions, socioeconomic and cultural groups? For this purpose the intermediate variables most important to the population of Botswana, such as age at first birth, postpartum practices, and use or non-use of contraceptives will be examined. These intermediate variables, will help to explain the differentials in fertility in Botswana.

A major objective is to comprehend the manner in which the environmental, social, and economic heterogeneity of Botswana has expressed itself in reproductive behaviour, the influence of these factors on fertility, and how fertility levels can be modified through population policies.

This study, in addition to providing a better insight into fertility changes and an explanation of the observed fertility levels in Botswana, will contribute to the demographic knowledge of the reproductive behaviour of women in Botswana. This will provide a basis for more reliable predictions of fertility and its trends in Botswana.

1.4 ORGANISATION OF THE THESIS

As already mentioned, the objective of the thesis is to study the extent of fertility differentials as well as the factors that explain the variations in fertility behaviour of women in different sociocultural groups in the population of Botswana.

Chapter two presents an overview of the demographic, economic and socio-cultural characteristics of Botswana, the study population. The third chapter includes the literature review and an examination of micro-level economic theories of fertility, their limitations and applicability to Sub-Saharan countries of Africa. Some socioeconomic variables that affect fertility through the intermediate variables are outlined and the conceptual framework presented.

Chapter four deals with data source, methodology and the research hypotheses.

Chapter five is concerned with analysis of fertility differentials according to women's socioeconomic, environmental and cultural background. This provides the foundation for a better understanding of the variations in

fertility behaviour of women in Botswana. The analysis is then directed to the intermediate variables responsible for the differences in fertility behaviour in Botswana. Research findings are presented in chapter six. Regression methodology is used to assess the effect of all the independent variables on fertility in Botswana. Regression standardization is used to test the characteristics hypothesis, and the regression decomposition technique, to separate the contribution due to characteristics from that of age.

A discussion of policy implications is presented in chapter seven. This chapter also deals with summary and conclusions. Limitations of the study are stressed and suggestions for future research presented.

CHAPTER 2

DEMOGRAPHIC, ECONOMIC, AND SOCIOCULTURAL CHARACTERISTICS OF BOTSWANA

In order to put this study of sociocultural determinants of human fertility in Botswana into perspective, it is necessary to present a concise description of the geographic, sociocultural, economic and demographic characteristics of the country.

2.1 PHYSICAL FEATURES AND POPULATION DISTRIBUTION

The Republic of Botswana (formerly the Bechuanaland Protectorate) which attained independence on the 30th of September, 1966 is situated between latitudes 18 and 27 degrees South. It straddles the Tropic of Capricorn in the centre of the Southern African Plateau. The country is landlocked with a mean altitude of 1 000 metres above sea level. It is bounded by Namibia in the West, Zambia in the North, Zimbabwe in the North East and South Africa in the East and the South.

Botswana has a land mass comparable to that of France. While the population of France was 56.7 million in 1991, that of Botswana was 1.3 million in the same year, making it one of

the world's lowest average population densities. However, more than two thirds of Botswana is covered with thick sand layers of the Kalahari (Kgalagadi) Desert. The sand cover is up to 120 metres deep. The Kalahari supports scrub and grasses and there is an almost complete absence of surface water.

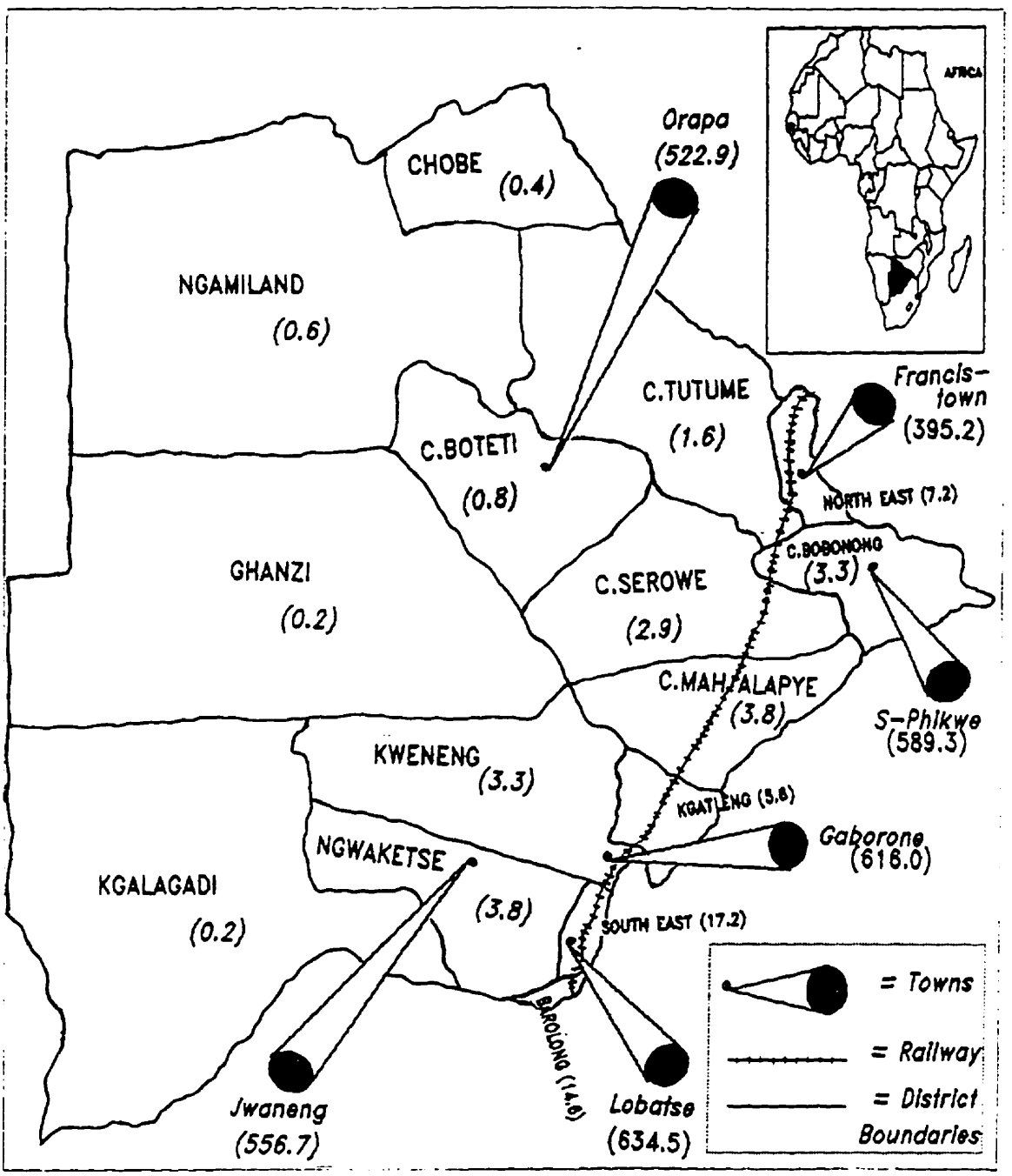
The availability of water is the dominant factor influencing human settlement patterns in Botswana. The population is unevenly distributed. About 87 per cent of the population lives in the eastern part of the country where rainfall is more regular, where ground water is available and the soil relatively fertile.

The following map (Figure 2.1) shows the population density by districts in 1981. The south-east district and Barolong were the most densely populated districts in the country with densities of 17.2 and 14.6 persons per square kilometre respectively. There are six major towns in the country, three of which are situated along the railway line. The remaining three towns which are not situated along the railway line, namely Orapa in the north-central district, Selibe-Pikwe in the east-central district and Jwaneng in the Ngwaketse district, are mining towns.

The highest concentration of the population is in the

FIGURE 2.1

POPULATION DENSITY BY DISTRICT, BOTSWANA, 1981



Source: Based on data from the 1981 Population Census

southeastern part of the country and along the railway line, which runs from the southeast to the northeast of the country. The population spreads, becoming thinner and more sparse as one travels both westwards and northwestwards. Thirty two percent of the western part of the country is constituted as game reserves.

Drought is a recurring hazard. High temperatures and hot sunshine especially in the summer growing season, exacerbate the difficulties of agriculture by raising soil temperatures and increasing the rate of moisture loss. Capricious rainfall makes arable agriculture a precarious undertaking. More than 90 per cent of the rain falls in the summer months between November and April. Mean temperatures vary according to the region. They may reach 38°C and seldom fall below 5°C. Maximum daily temperatures are lower during the drier winter months. There are wide diurnal variations and night-time frosts occur. Arable land is scarce. Much more of Botswana's land is suited to extensive beef production and this is reflected in the fact that the cattle population outnumbers the human population. For example the cattle population in 1981 was 2.97 million while the human population in the same year was only 941 thousand (1981 population census).

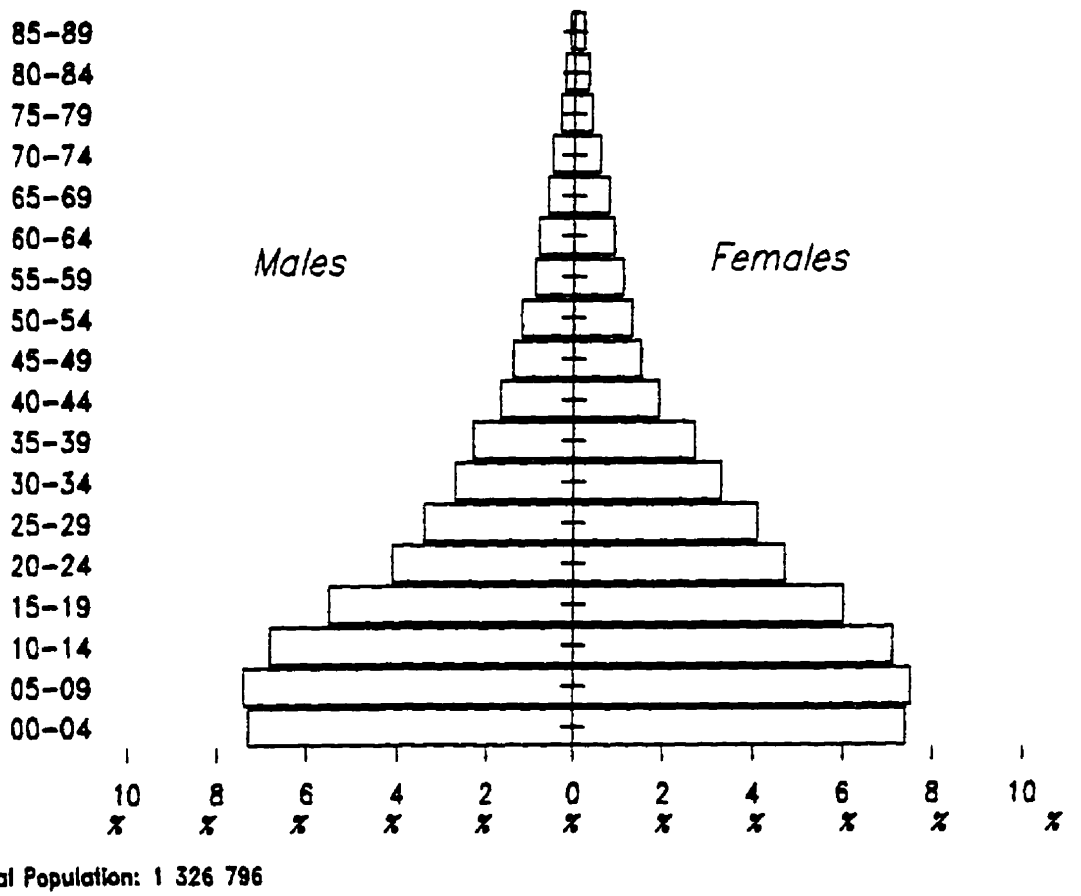
2.2 **DEMOGRAPHIC CHARACTERISTICS**

According to the 1991 census, the population of Botswana was estimated to be 1 326 796 (the PRB gave a figure of 1.3 million for the same year, 1991). In 1981 the population of Botswana was 941 027. This means that the population of Botswana was growing at a rate of 3.5 per cent per annum from 1981 to 1991, a high rate indeed. Such high rates of growth produce a very rapid increase of population. A growth rate of 3.5 per cent per annum produces a doubling of the population in a little less than twenty years. While the country has a small population, relative to its size, its rate of population growth is among the highest in the world.

This high rate of growth is found to be due mainly to high levels of fertility and declining mortality. Fertility has declined from a TFR of 7.1 births per woman as indicated by the 1981 population census (Botswana Government Central Statistics Office, 1987; Diamond and Rutenberg, 1993) to 5.0 births per woman in 1988 (1988 BDHS). The PRB (1996) confirms the TFR of 5 births per woman. However, the TFR masks the differences in fertility within the country. The population pyramid (Figure 2.2) is a graphical presentation of the age/sex distribution of the population of Botswana. The triangular shape of the population pyramid which narrows from

FIGURE 2.2

POPULATION PYRAMID, BOTSWANA, 1991



Source: Based on data from the 1991 Population Census

the base towards the top is a feature of high fertility countries. It reflects a history of high birth rates, a large proportion of children, a small proportion of elderly persons and a low median age i.e. a relatively `young' population.[1] However, Botswana's pyramid reveals signs of recent changes in the age distribution. The bar for the youngest age group is shorter than that for the next higher age. This is suggestive of a recent decline in the number of births.

A decline in fertility initially has the effect of narrowing the base of the population pyramid as the number of births falls. The narrow base observed in the population pyramid of Botswana is indicative of a sharp decline in fertility.

Age data from the last two censuses of 1981 and 1991 show that Botswana has a high proportion of children under 15 years of age, though the percentage share has dropped from 47.3 in 1981 to 43.6 in 1991. This further confirms that fertility might have declined in the period between the two censuses. The high proportion of children under the age of 15 years is a common feature of high fertility countries.

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[1] Botswana has a median age of 17.8 years

The age dependency ratio (the ratio of the number of children under 15 years and old persons 65 years or more to the population in the labour force, aged 15-64 years) was 105.1 in 1991. That is, on average, 105.1 (young and old) people need to be supported by every 100 persons in the economically active ages.

The economic dependency ratio depicts the ratio of economically inactive population to the economically active one and is used as an indicator of economic burden the non-working population exerts on those working. An economic dependency ratio of 197 observed in 1981 denotes that every 100 economically active persons have to support themselves plus an additional 197 inactive persons.

The sex ratio defined as the number of males per 100 females has slightly increased from 89 in 1981 to 91.6 in 1991. Nonetheless, females still outnumber males in the general population of Botswana.

Females also outnumber males in school enrolment. In 1996, 55 percent of females were enrolled in school while only 49 percent of males were enrolled in school.

The pattern of settlement is also changing rapidly: an increasing proportion of people are now living in urban areas and large villages. Botswana is now 46 per cent urban (PRB, 1996) compared to 9.5 per cent in 1971. An urban area is defined as a settlement of 5000 or more persons, with at least 75 percent of its labour force engaged in non-agricultural occupations.

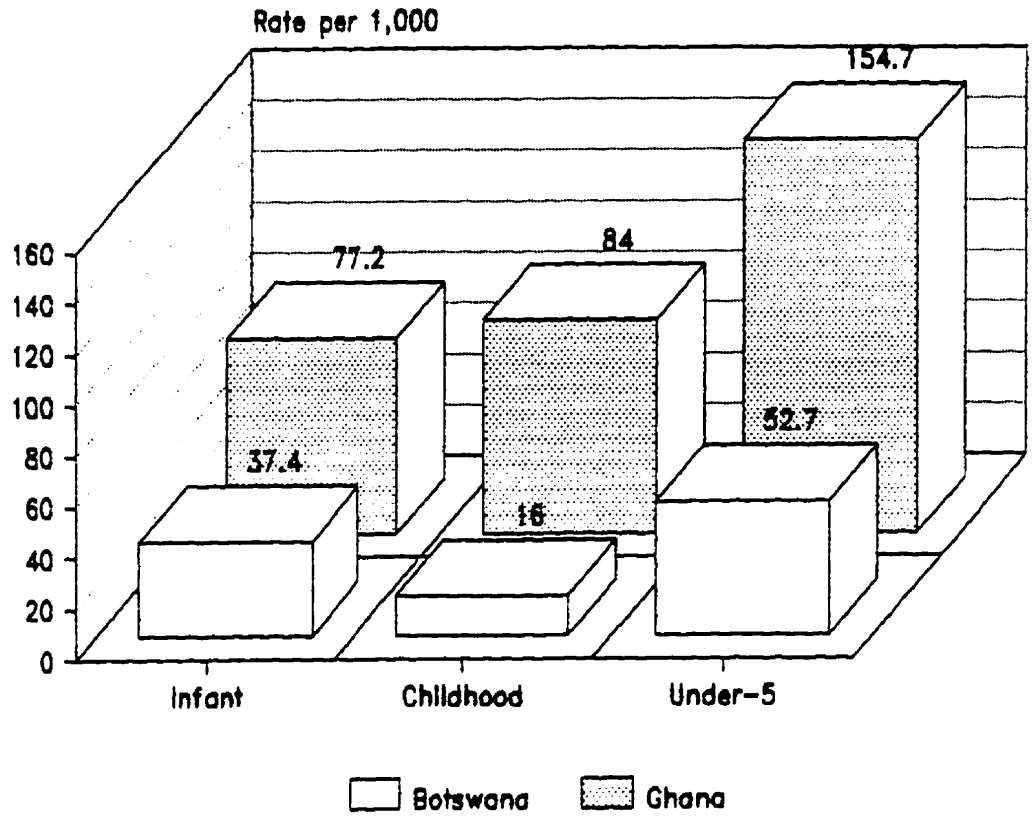
Infant mortality has declined from 100/1000 live births in 1971 to 41/1000 in 1996 (PRB, 1996). The following chart compares the infant and childhood mortality of Botswana with that of Ghana during the period 1977-1988.

Such low infant and childhood mortality rates in Botswana are attributable mainly to widespread coverage of immunisation programmes, extended duration of breastfeeding, general access to clean water and the high usage of oral rehydration therapy for diarrhoea.

In Botswana there is no significant difference between rural and urban rates of infant and childhood mortality. This is not surprising as health facilities in Botswana are well distributed throughout the country and, as a result, rural residents have nearly as easy access to health services as urban residents. Furthermore, during the drought, the

FIGURE 2.3

INFANT AND CHILD MORTALITY, BOTSWANA AND GHANA, 1988



Data Source: 1988 Botswana and Ghana Demographic and Health Surveys

nutritional status of children in the areas affected, predominantly rural areas, was closely monitored and supplementary foods were supplied for any children found to be nutritionally deficient.

However, there is a very clear difference in infant mortality by educational status, especially between the children of mothers who have no education and those whose mothers have at least some primary education. During the period 1978-1988 the mortality among infants of women with no education was 24 to 36 percent higher than among infants of women with some schooling. Women with no education are also the least likely to avail themselves of maternity health services. One consequence of this lower use of services among uneducated women is a higher mortality rate among their births.

Life expectancy at birth is 64 for males, 71 for females and 66 for both sexes (PRB, 1996). This means that a female child born in Botswana in 1996 can expect to live to 71 years on the average. Comparison with other developing countries, especially in Africa, suggests that life expectancy at birth for Botswana is enviably high, which evinces that the nation's efforts at improving the health and general living conditions of the people are paying dividends. Not only is the life expectancy relatively high, but it is also rising.

Higher female than male life expectancy is actually a common observation in many countries of the world and reflects the work, diet and leisure habits, lifestyles and physiological differences that make men more susceptible to dying than women. However, the male-female life expectancy differentials of about seven years, such as found in Botswana, are unusually large for a developing country in sub-Saharan Africa. Male-female life expectancy differentials of about seven years are found in North American countries such as Canada and United States, Finland and Norway in North Europe, Switzerland and Germany in West Europe, in Eastern Europe and none in Africa.[1]

Explanation of such high male-female differences may be sought in the nature of diseases and accidents that affect them and the way by which they utilize the existing health services. A significant factor in these differentials may be tuberculosis (TB) which is still endemic in Botswana. In 1982 tuberculosis accounted for 29 percent of all registered male deaths, and in 1993 it accounted for 13 percent of the same; whereas TB accounted for only 16 percent of female deaths in 1982 and for 7 percent in 1993. Further research on the causes of mortality and their variation is necessary to illuminate

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[1] Excludes the island of Mauritius and Reunion in the Indian Ocean.

this issue. The same applies to Infant Mortality Rates(IMRs). There is a large difference in IMRs between male and female children in Botswana. During the period 1978-1988 the IMR for males was 48 compared to a rate of 32 for females. While somewhat higher male than female infant mortality is to be expected, male infant mortality that is 50 percent higher than female mortality is very unusual. Table 2.1 gives a summary of demographic indicators for Botswana, 1971, 1981, 1991 and 1996. The table helps provide demographic trends in the country, over time.

2.3 **ECONOMIC CHARACTERISTICS**

At independence (1966), Botswana was one of the poorest countries in Africa. An overwhelmingly rural population, Batswana[1] depended mainly on agriculture for livelihood. Beef production was the mainstay of the economy in terms of output and export earnings, but both arable and livestock agriculture had been ravaged by a prolonged and severe drought. Over 30% of Batswana men between the ages 20 and 40 were working in South Africa. Apart from the railway line, communications and infrastructure were barely developed.

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[1] Citizens of Botswana are called Batswana, singular is Motswana

TABLE 2.1

DEMOGRAPHIC INDICATORS, BOTSWANA, 1971, 1981, 1991 AND 1996.

Population Characteristics	Censuses 1971	1981	1991	PRB 1996
Enumerated population:(000s)				
Total	596.9	941.0	1326.8	1566.6
Male	272.5	443.1	634.4	757.3
Female	324.4	497.9	692.4	809.3
Growth rate (% per year)	2.0	4.7	3.5	3.3
Population density:(per Km^2)				
Urban areas	204.6	409.0	747.9	(n.a.)
Rural areas	0.9	1.3	1.7	(n.a.)
All areas	1.0	1.6	2.3	(n.a.)
Population age distribution: (%)				
Aged 0-4	17.1	19.7	18.6	17.4
Under 15	46.1	47.3	43.6	43.0
Aged 65+	5.6	4.6	3.1	2.9
Females aged 15-49 (%)	42.8	43.5	44.0	45.5
Dependency ratio (per 100)	113.3	106.5	105.1	97.7
Child-woman ratio (per 1000)	759.0	854.7	815.3	739.0
Sex ratio (males per 100 females)	84.0	89.0	91.6	93.6
Proportion urban (%)	9.5	17.7	33.1	46.0
Crude birth rate (per 1000)	44.5	47.2	40.4	38.0
Crude death rate (per 1000)	13.7	13.0	9.7	11.0
Natural increase (% p.a.)	3.1	3.4	3.1	2.7
Infant mortality rate (per 1000 live births)	100.0	71.0	45.0	41.0
Total fertility rate (births per woman)	6.5	7.1	6.0	5.0
Life expectancy at birth(years)				
Males	52.5	52.3	57.0	64.0
Females	58.6	59.7	63.1	71.0
Total	55.7	56.2	60.2	66.0

Source: Population censuses (1971, 1981, 1991), estimates from the 1996 Population Reference Bureau Data Sheet and Botswana Government Central Statistics Office projections, low variant.

Remarkable economic transformations have taken place since 1966. Development efforts have increased the access to clean water, roads, health and education. This provision of a broad range of services has raised living standards for the whole population. The dominant sector of the economy is mining. Diamonds and copper-nickel are the main minerals mined. Diamonds alone accounted for 77 per cent of total export value in 1989. There was also a rapid expansion of the national cattle herd and the beef exports in response to the high export prices offered by the European Economic Commission (EEC). Botswana may be regarded as one of Africa's fastest growing economies at the moment with a Gross National Product of US$ 2800 per capita in 1996 (Population Reference Bureau, 1996).

Table 2.2 compares Botswana with three African countries in the region, namely Ghana in West Africa, Kenya in East Africa and Zaire in Central Africa. Botswana is also compared with the average for sub-Saharan Africa and the world. Botswana compares favourably with all three countries, as well as with average sub-Saharan African countries. While Botswana's GNP is 60 percent that of the world's average, life expectancy at birth for females, and the percentage of females enrolled in secondary schools are above the world's average. The infant and child mortality rate is also below the world's average.

TABLE 2.2

COMPARATIVE ECONOMIC AND DEMOGRAPHIC INDICATORS, SELECTED COUNTRIES, 1994 AND 1996

	Botswana	Ghana	Kenya	Zaire	AVERAGE FOR SUB-SAHARAN AFRICA	THE WORLD
ECONOMIC INDICATOR, 1994						
GNP per capita (US$)	2,840	430	203	220	550	4,740
DEMOGRAPHIC INDICATORS, 1996						
Population mid-1996 (millions)	1.5	18	28.2	46.5	597	5,771
Total Fertility Rate	5.0	5.5	5.4	6.6	6.1	3.0
Infant Mortality Rate	41	66	62	108	96	62
Life Expectancy at Birth (yrs)						
Males	64	54	49	46	51	64
Females	71	58	52	50	54	68
Total	66	56	51	48	52	66
Secondary School enrollment (%)						
Males	49	44	28	33	26	58
Females	55	26	23	15	21	50
Urban Population as % of Total	46	36	27	29	27	43
% Under 15 years	43	45	48	48	46	32

Source: Population Reference Bureau: 1996 World Population Data Sheet

Despite Botswana's economic progress since independence, many people are still very poor, there are not enough jobs for those seeking work and there is a continuing large gap between urban and rural living standards. The distribution of income in Botswana, as with most other countries in the region, is skewed. The Household Incomes and Expenditure Survey (Ministry of Finance and Development Planning, 1988) calculated a Gini co-efficient of 0.56 percent, as compared to Zambia (0.52), Tanzania (0.60) and Kenya (0.64). Since the closer the Gini co-efficient is to 1, the more unequal the distribution of income, these figures suggest that even though inequality of income is higher in Tanzania and Kenya than it is in Botswana, Zambia's income distribution is closer to equity compared to Botswana.

High income disparities are evident between the rural and the urban sectors. The public sector employment in the government is responsible generally for the high level of wages in the urban areas. The modern sector development in Botswana has created a salaried elite in terms of consumption patterns. The following table (Table 2.3) is a percent distribution of the number of employees in Botswana by location and economic activity in March, 1991.

TABLE 2.3

PERCENT DISTRIBUTION OF EMPLOYEES BY LOCATION AND ECONOMIC ACTIVITY, BOTSWANA, 1991

Location	Agr	Mining	Mnfct	Elctr	Constr	Comm	Trpt	Fin	Comty	Educ	TOTL
Gaborone	12.6	1.8	44.9	41.5	62.0	32.1	64.8	67.4	43.9	13.8	39.7
Francstn	5.0	2.6	15.7	7.2	14.0	11.6	4.9	8.5	8.7	3.4	10.0
S-Pikwe	1.5	58.5	7.5	19.1	3.5	4.8	12.1	6.6	6.1	2.5	7.6
Lobatse	10.1	-	10.7	2.6	2.1	6.9	6.3	7.0	4.7	2.3	5.5
Jwaneng	5.0	14.0	2.2	1.0	1.9	0.4	0.2	1.2	1.7	1.0	2.0
Kgatleng	1.6	-	2.4	-	2.8	2.8	1.7	0.3	1.8	5.0	2.6
South	0.9	-	5.8	-	0.00	6.3	7.7	1.1	6.2	16.8	5.5
Kweneng	1.0	-	1.4	-	2.3	2.8	0.00	0.2	-	10.7	3.1
Central	26.9	23.1	4.2	25.9	8.2	19.7	1.6	4.4	10.3	30.3	13.9
North	5.2	-	4.7	-	-	8.4	0.6	2.6	-	9.4	5.4
Chobe	5.1	-	0.5	0.6	1.4	2.1	0.00	0.7	0.7	0.7	1.3
Other	0.7	-	-	-	-	-	-	-	2.4	-	0.1
Total	100	100	100	100	100	100	100	100	100	100	100

Adapted from Labour Statistics; 1990/91, Table 1.17b

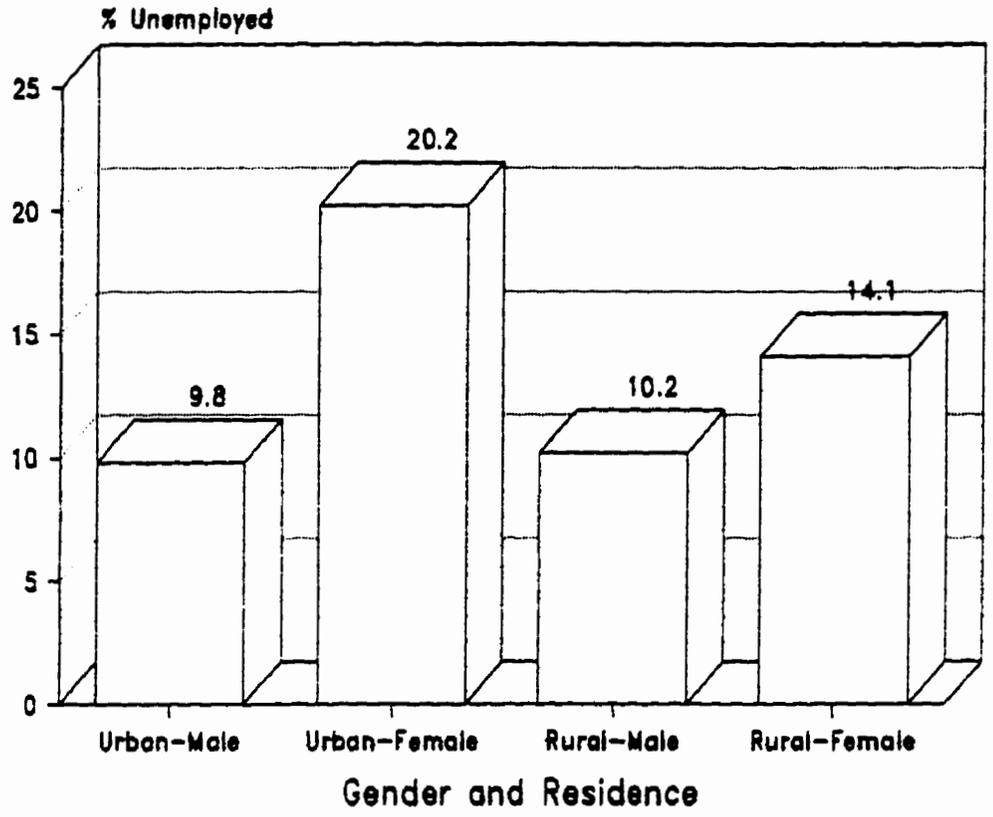
The distribution shows that most of the formal sector jobs are found in urban areas, with Gaborone, the capital city, accounting for 40 percent of the total employment, for March 1991. Central district accounts for 14 percent, whilst Francis town, Selibe-Phikwe and Lobatse each constitute 10, 8 nd 6 percent of formal sector employment respectively.

Nowhere is the growing inequity between urban and rural income levels illustrated more clearly than in the area of cattle ownership. In 1970, 29 percent of the rural population owned no cattle whatsoever, while another 21 percent had less than ten head each. Thus, half the population possessed only 5 percent of the national herd. On the other side of the coin, 6 percent of the cattle-owners possessed 40 percent of the national herd of one and a half million cattle. Not only is the national level in Botswana dominated by an economic elite of large cattle-owners, but local political structures also are controlled by a fairly tightly knit elite based on economic characteristics.

An examination of gender and location differentials in employment also reveals a strong relationship between gender and employment, especially in the urban areas where unemployment rate for females is twice that of males, as shown in Figure 2.4 below.

FIGURE 2.4

UNEMPLOYMENT RATES [b] BY GENDER AND RESIDENCE, BOTSWANA 1981



b Number of unemployed persons per 100 economically active population.

Source: Adapted from 1981 Population and Housing Census Analytical Report Table 12.11

Botswana, with its growth economy, has been able to achieve levels of social service delivery denied to many developing countries, particularly in Africa. Since 1966, stringent efforts have been made to see to it that everyone, however poor and wherever he lives can have his health looked after, see his children go to school, drink clean water and, in the extreme situation, obtain relief from actual starvation. However, little has been done to increase the level of rural productivity, create new sources of wealth in rural areas, or induce cattle owners to move into other areas of economic activity. Focus has been on infrastructure projects and social delivery services, rather than on agricultural productivity and rural industrialization. Mineral and urban development have received the lion's share of the development funds.

2.4 SOCIO-CULTURAL CHARACTERISTICS

The importance of the study of cultural variables in the explanation of fertility differentials has been documented by many researchers in the literature. Coale and Watkins (1986) for example, in their European Fertility study have reported that group characteristics such as religion, language and others account for variation and change in fertility, over and above that accounted for by the more traditional demographic variables such as mortality, urbanization, income and

industrialization.

2.41 Language and ethnicity:

In Botswana, English and Setswana are the official languages, the former being the main language in Government. Even though most Batswana are Tswana speaking, there are other languages spoken in the country such as those spoken by Bakalanga, Basarwa (with their various dialects), Baherero, Bambukushu, Bayeyi, Ovambo, Asians, people of European stock, Shona, Nama, Nguni and other people from the neighbouring countries. With data available, it would be good to analyse each individual ethnic group found in the country, which would shed some light into the values and norms that are specific to each ethnic group. Cultural orientation could promote or depress fertility in a given ethnic group. However, information on ethnicity is missing from all the censuses and national surveys in which the Government of Botswana has had a hand due to the fact that:

> `It is Government policy in Botswana, not to classify people (in a census) according to their ethnic groups. The stress is rather made on the oneness of the nation, the homogeneity and the unity of purpose of the state than on the forces which divide the nation.'
> (Botswana Government, Central Statistics Office, 1981, p.3)

2.42 Religion:

There are different religious systems, each with its own set of beliefs and practices in the country. Religion is the strongest element in traditional background, and exerts probably the greatest influence upon the thinking and living of the people concerned. Christianity, in its various images, is one of the dominant religions in the country. This includes denominations like the Anglicans, the Roman Catholics, the Lutherans, the Methodists, the Presbyterians, the Baptists, the Seventh-Day Adventists and others. Also found in the country are independent or separatist churches which broke off from missionary-led churches in quest for ecclesiastical freedom. There is the African Traditional religion with its own beliefs and practices which permeate all the departments of traditional life. There are other religions, though found on a smaller scale, such as the Bahai faith, Moslem and Hindu. There are also those who do not subscribe to any religion.

Religion may be associated with differences in childbearing. For instance various religious groups may have significant effects on childbearing through their teachings on contraceptive practices and abortions, value of children and differences in norms regarding age at first marriage etc. Religious background also rarely changes over one's life time.

2.43 The Family:

The family, for African peoples, has a much wider circle of members than the word suggests in Europe on North America. In traditional society, the family includes children, parents, grandparents, uncles, aunts, brothers and sisters who may have their own children, and other immediate relatives. In many areas there are, what anthropologists call, extended families, by which it is generally meant that two or more brothers (in the patrilocal societies) or sisters (in the matrilocal societies) establish families in one compound or close to one another. The joint households together are like one large family. It is the practice in some societies to send children to live for some months or years with relatives and these children are counted as members of the families where they happen to live.

In Botswana, a typical Tswana family is not a nuclear but an extended one. The extended family idea is common particularly in the rural areas. A traditional grandfather in Botswana does not discriminate between his very own children and his children's children. They are all his children as far as he is concerned. This is traditional. Urban dwellers are less rigid on this.

This has repercussions for the quality of data on women's fertility. Older women tend to forget to mention children who live away from home and to include as their own, children who are not biologically theirs, hence the need for additional questions and probing.

Extended families question the applicability of economic theories of fertility in African societies due to the fact that these theories have a built-in notion of a nuclear family or a conjugal household, a concept which may not be the norm in developing African countries.

An example of inclusion of grandchildren as ones own is depicted in the following distribution of women who reported having had births in the twelve months prior to the 1971 census in Botswana (Table 2.4).

The table shows that women beyond the ages of biological capability to bear children reported having given birth to a live child within twelve months prior to the census. It is highly probable that these women included as their own, children who may not have been biologically theirs, as is the custom in traditional societies.

TABLE 2.4

WOMEN AGED 15+ BEARING CHILDREN WITHIN TWELVE MONTHS PRIOR TO THE 1971 CENSUS BY FIVE YEAR AGE GROUP AND NUMBER OF CHILDREN EVER BORN, BOTSWANA, 1971

FIVE YEAR AGE GROUP	WOMEN BEARING CHILDREN 12 MONTHS BEFORE CENSUS	TOTAL CHILDREN EVER BORN
15-19	2 376	2 397
20-24	6 068	12 385
25-29	4 852	17 245
30-34	3 492	18 147
35-39	2 620	16 685
40-44	1 498	11 083
45-49	763	5 711
50-54	237	1 740
55-59	151	1 083
60-64	75	505
65-69	40	301
70-74	24	208
75-79	16	105
80+	16	160

Source: Adapted from the 1971 Census Statistical Tables: Table 44

2.44 Marriage and Childbearing:

Marriage:

Two types of marriage systems are recognized by law in Botswana: marriage under the customary law, and marriage under the common and statutory laws. The statutory marriage is essentially monogamous, while the customary marriage is potentially polygamous. The effect of marriage on the situation of women therefore depends on the type of marriage they choose, although both types of marriage treat women as junior partners to their husbands.

Customary Marriage:

The specific steps and consequences for a woman in a customary marriage sometimes vary from one ethnic group to another, and have become rather vague due to socioeconomic change, so it is often difficult to tell whether two people are married under customary law or merely cohabiting. Two essential requirements, however, generally characterise most systems of customary marriage: Agreement between the families of the prospective spouses; and transfer of **bogadi** or bride wealth by groom's family to that of the bride. Among groups such as the Bangwato, **bogadi** is no longer a legal requirement, although some families continue to give it. Even in those areas where

it remains a legal requirement, it is not always given at a single time; a promise to transfer ownership of wealth at some future date is often sufficient. The general consequences of customary marriage for the position of the wife are that her husband is the unquestionable head of the family, with final decision making powers in the family matters.

First, the potentially polygamous nature of customary marriage often inflicts economic hardship on women and their children, and sometimes the wife has little or no say in her husband's decision to take another wife. Even where a man does not take another wife, his infidelity is generally tolerated, whereas hers is prohibited to the point of providing her husband with grounds for divorce. Secondly, the institution of **bogadi** confers on men more control over the person of the wife. A man who has paid **bogadi**, for example, is apparently allowed to chastise his wife more freely than the one who has not. The most important consequence of **bogadi** is the transference of the woman's reproductive powers to her husband's family. Third, a woman married under customary law lacks legal capacity, as her husband is her guardian and must assist her in entering significant transactions. Fourth, although she has rights to her personal property, and is entitled to use family property such as fields and household implements, these rights

are often dependent on the whims of her husband. Finally, the fluidity in the definition of a valid customary marriage caused by social changes leaves the position of women in an uncertain state. In cases where marriage negotiations are not completed, or some steps in the process omitted, but the parties live together for many years and even have children, the legal status of such a relationship is unclear.

Marriage under General Law:

The essentials and consequences of marriage under general law are governed by both legislation and the Roman-Dutch law, and, contrary to popular belief, this type of marriage does not necessarily place women in a better position than a customary marriage. Under this system married women are denied a final say in fundamental issues affecting their personal and family lives. The husband possesses what is known as the marital power over his wife, making him the legal head of the family. This means that he makes decisions in the home, such as where and how the family shall live, and he alone is the legal guardian of the minor children of the marriage.

The effect of this is that, should husband and wife disagree on any family matter, the husband has the final say. His position as legal guardian of the children means that he alone can consent to any transactions affecting the children, such

as signing of important documents. This has sometimes caused inconvenience for children and women whose husband and father unreasonably refuses to assist them, or makes decisions which are not in their best interests.

The following table (Table 2.5) helps to illuminate what has been happening to the institution of marriage in Botswana since 1971.

TABLE 2.5: MARITAL STATUS OF WOMEN IN BOTSWANA, 1971, 1981 AND 1991

Census Year	Married	Never Married	Widowed	Divorced	Total
1971	77 088 (43.31%)	67 727 (38.05%)	21 391 (12.02%)	11 770 (6.62%)	177 976 (100.0%)
1981	114 567 (41.49%)	121 855 (44.12%)	30 410 (11.01%)	9 332 (3.38%)	276 164 (100.0%)
1991	159 052 (39.32%)	201 245 (49.75%)	34 345 (8.49)	9 882 (2.44%)	404 524 (100.0%)

Source: Adapted from 1971, 1981 and 1991 Census Statistical Tables 11, 9 and F1.

The proportion of women married in the population has been declining since 1971. There is a higher proportion of single women in the population compared to the proportion married since 1981, and the proportional differences between married and single women are widening. Proportions divorced and widowed have also declined.

Childbearing:

While most societies consider some form of marriage as the appropriate institution for childbearing and rearing, in Botswana marriage is not universal and childbearing is not restricted to within marriage or formal unions. In other words, marriage is not a precursor for childbearing. A substantial number of children are born outside of formal marriages. In 1981 for example, the fertility level of "never married " women was equal to 75 percent of that of "married" women; in 1991 it was 55 percent.

From a demographic point of view, the fluidity of the definition of marriage, and such high non-marital fertility implies that "age at marriage" cannot be considered an important variable for determining fertility.

CHAPTER 3

THEORETICAL BACKGROUND

INTRODUCTION

The explanation of the forces governing fertility performance has remained a major pre-occupation of demographers, sociologists and economists for a long time. Since Malthus (1798) started the debate of how human reproductive behaviour is kept under a condition of fluctuating equilibrium by what he called `positive checks' and `preventive checks', a lot of theoretical and analytical postulates have been offered to explain fertility and the forces behind its change. Where fertility has been noticeably stable over a long time, analysts have been trying to explain why there has been no change. At the same time attempts have been made to conjecture the circumstances under which fertility change may be expected. In those societies where changes in fertility have been perceived to have occurred, analysts have tried to identify factors associated with the change.

A number of approaches which emphasize different aspects are evident in the literature. There are theories which approach

the subject from the perspective of one discipline. For example, theories of fertility advanced by economists focus chiefly on the effects of economic factors on fertility. On the other hand there are interdisciplinary theories of fertility which combine sociocultural, bio-social and social-psychological perspectives. However, neither uni-disciplinary nor multidisciplinary theories of fertility specify all the relationships of fertility components and their changes over time and, consequently, a dominant and comprehensive theory of fertility is yet to emerge (Bulatao and Lee, 1983). Theories of fertility can also be classified into the macro and the micro level types. Macro theories focus on the aggregate fertility of the society as a whole while micro theories concentrate on the explanation of the differences in fertility of individuals or couples or households. Because of this clear distinction between micro and macro theoretical approaches, most fertility models necessarily fall into one or the other of these categories. A study of the sociocultural determinants of human fertility, which focuses on individual women in Botswana therefore, would benefit from a micro level approach.

3.1 **MICRO LEVEL THEORIES**

There has long been a general notion that economic factors play a central role in fertility decisions and consequent fertility behaviour. Lorimer (1969) stated that one of the conditions that can induce fertility reduction is adjustment to actual conditions of living. Brentano (1910) observed that a person discontinues procreation of children when an increase in the number of children gives him less satisfaction than other pleasures of life which otherwise would not be accessible to him. Ryder (1959) saw economy as the paramount determinant of fertility decisions.

Based on this general hypothesis of the relevance of economic factors, economists and demographers developed an economic model for the explanation of fertility variation. The economic model of fertility stresses individual's maximization of utility through choices between alternative possibilities with respect to scarce resources, and time.

Economists like Leibenstein (1957) and Becker (1960), have similarly presented their versions of the fertility debate, but purely on economic terms. Their concern was with the existing relationships between fertility and income. They approached the subject on the basis of cost-utility functions,

an analytical method which associates the cost of having a specific number of children with the corresponding satisfaction. Since children are regarded as a consumer good, parents would then have the option of comparing the utility of having them with other goods and services which might be needed. Such presumed economic rationality has led Becker to argue that parents with higher incomes are more likely to have both more and higher quality of children. His statement though, contradicts with Leibenstein's finding that due to greater spending on children, richer families have fewer children than others. In Leibenstein's words (1957):

> "As per capita income increases, there is less need to utilize children as source of income. At the same time, the level of education and the general quality of the population implied by a higher income per head mean that more time must be spent on child training, education, and development, and therefore, less time is available to utilize the child as a productive agent. Therefore, the higher the income, the less the utility to be derived from a prospective child as a productive agent." (Leibenstein, 1957:163).

On the other hand, the "Demand theorists" or "new Home Economists" emphasize the opportunity cost of women's time needed for child-care as the important consideration in fertility decision making (Schultz, 1974). It is rational then that the higher the wage they can earn, the less will be the number of children they will desire. The "new Home Economics"

postulation would be more relevant in the urban industrial economy where we are more likely to see provided for women, unrestricted opportunities for participation in wage labour.

As a refinement of these ideas, later development of economic theories of fertility deviated from arguments about the effects of income on fertility, to a "broad-based type" of analytical framework which is interdisciplinary in form. Among the numerous efforts made in this new direction, Easterlin's supply-demand theory could perhaps be singled out as one of the most discussed. This framework does not only dwell on the cost and demand for children as was the case with the earlier models, but elaborates on social, biological, and cultural factors affecting the supply of children as well. The theory basically involves three concepts: the demand for children (cd), as the desired number of children if fertility control were costless; the potential output of children (cn), as the total number of surviving children of parents under strict natural fertility; and the actual cost of fertility control. If cd is more than cn then the absence of family limitation is implied; when cn exceeds cd, the ultimate control will be practised accordingly, if the costs of regulation are less than the motivation to limit childbearing. The inter-relationships between these key factors of supply, demand and regulation are therefore largely responsible for any decline

in fertility levels (Easterlin, 1978:35).

The economic theories of fertility have been extensively criticized especially because of their western, and urban bias. They assume equal decision-making power between husband and wife, which may not be the case, particularly in customary marriages as well as in marriages under the Roman-Dutch Law.

Because the theories are culture bound, they add little to our understanding of the developing world. In many sub Saharan countries, where extended families still exist, and where decisions about the timing and tempo of childbearing for the young bride may still rest in the hands of her parents-in-law or other senior relatives, the individual or couple as a centre of reproductive decision-making, as propounded by Easterlin's theory, is affected.

Also, the concept of child fostering, i.e. acceptance of and rearing of other relatives' children as one's own, which is a common feature among African families, introduces ambiguity into the use of the biological family as the focus point of fertility analysis. This makes the economic rationality and the cost benefit aspect of the theory meaningless in an African situation. In other words, economic theory assumes that all women or couples who bear children make decisions

about their childbearing and take up the responsibility of bringing up the offspring until they reach adulthood, whereas in some societies, particularly in sub Saharan Africa, this may not be the norm. Therefore, the economic theories of fertility may not be applicable in such societies. Although the Easterlin framework is broad enough to encompass all the diverse factors impinging on fertility, its major weakness is that in achieving this breadth, it loses specificity to the particular factors which may be important in specific settings.

Jones (1976), observing the frustrating failures of the economic and other frameworks to explain fertility across cultures, came to a conclusion which must be considered very significant for conceptual formulation in fertility analysis:

> "...I believe we are forced to conclude that fertility theories and models, if they are to help very much in understanding and in particular, measuring the strength of factors influencing fertility, must be designed with the particular cultural, social and familial setting in mind. Cultural differences and value systems are not explicable merely by particular stages different economies have reached but rather have an independent history of their own and an independent effect on marriage patterns and natural fertility as well as on perceived value of children and hence on fertility levels and trends. There are general forces which influence fertility every where, but the way they influence it in a particular setting is so specific to that setting that we may do better for the present by down-playing the search for a general theory and instead contending ourselves with

> understanding better the determinants of fertility levels and trends." (Jones, 1976:31).

Jones was neither the first nor the only writer to recognize this need. Bourgeois-Pichat, (1967) had observed that:

> "...fertility in pre-industrial societies...is determined by a network of sociological and biological factors and when the network is known, the result can be predicted. Freedom of choice by couples is almost absent. The couples have the number of children that biology and society decide to give them." (Bourgeois-Pichat, 1967:163).

These two quotations underscore the salience of cultural factors in the determination of fertility levels, and as Kirk, (1971) observed:

> "although other social and demographic factors may play important role in bringing down fertility, their influence is felt within the constraints of cultural systems and norms." (Kirk, 1971:123).

The main components of individual reproductive behaviour are responsive to social organizational characteristics, basic social institutions and patterns of social and economic interactions.

How then, and in what ways, does the society, through cultural constraints on an individual determine the reproductive outcome of that individual's behaviour? In other words, what

are the demographic effects of social, cultural and biological factors on achieved fertility?

Davis and Blake (1956) proposed the first exhaustive and comprehensive analytical framework for the sociological study of fertility. They observed that reproduction in any human culture involves three necessary steps which are sufficiently obvious to be generally recognized, viz,
(i) intercourse, (ii) conception, and (iii) gestation and parturition.

Following from the above, they identified eleven factors which are directly connected with these physiological processes "through which and only through which cultural conditions can affect fertility". The eleven factors, called the intermediate variables are presented in Appendix A.

The model of intervening variables has remained popular because of its exhaustive nature. The authors are positive that each of the eleven variables may have either a negative or a positive effect on fertility depending on the prevalence and effectiveness of its use in any specified society.

3.2 SOCIOECONOMIC VARIABLES AND FERTILITY

Two types of determinants are used in this study, namely the socioeconomic, demographic, environmental and cultural factors on one side, and the intermediate variables on the other. The word environment is used here to refer to the urban-rural residential milieu, the socioeconomic factors include education, occupation, while cultural factors include religion and demographic factors, age. These socioeconomic, cultural, demographic and environmental factors do not have a direct effect on fertility, as it was thought in the past. They must operate through a set of intervening variables, first identified by Davis and Blake in 1956, which directly affect fertility.

Whenever an intermediate variable changes, there is a change in the dependent variable. A dramatic increase in the prevalence of contraceptive use for example, may result in a change in fertility (assuming that the other intervening variables remain constant). This may not necessarily hold true for a socioeconomic factor. As a result of this, differences in fertility levels among populations can always be attributed to changes in one or more of the intermediate variables.

3.21 Education and Fertility:

Education, particularly that of women, is the most widely reported variable which shows a consistent negative association with fertility. Fertility studies done in the west, as well as research in developing countries have cited education as the single most important variable leading to large scale fertility decline. Bogue (1967) examined the reasons for fertility decline in western Europe and found that education had the highest predictive power in explaining fertility differentials. Similarly, in many developing countries it has been observed that increasing women's education has lowered fertility substantially (Caldwell, 1981; Jain and Nag, 1985; Birdsall, 1977).

Cochrane (1979;1983), in his extensive review of empirical studies on the relationship between education and fertility, concluded that two types of relationships exist: first, a monotonic inverse relationship where, as education rises, fertility falls; and second, a curvilinear relationship where fertility first rises with education and then falls. Monotonic inverse education-fertility relationships were found to be most common in countries with relatively high levels of socioeconomic development, while curvilinear relationships were most common in countries with low levels of socioeconomic development.

To estimate the effect of education on fertility, it is necessary to control for the correlations between education and the other fertility determinants, such as age and residence. Cochrane (1983) states that:

> "In developed countries, younger women are generally more educated than older women, and of course age is highly correlated with number of children ever born. Therefore, if age is not controlled, the effect of education on fertility will be overestimated. Likewise, education tends to be higher in urban than in rural areas, and fertility is generally higher in rural than urban areas. Thus if residence has effects other than those through education and if it is not controlled, education's effect will be overestimated."

Educated women tend to use contraception more than less educated women, they marry later, and they have greater access to communication and other networks of social interaction as well as to sources of family planning services. Educated women also tend to breastfeed their children for shorter periods than less educated women because education tends to lead to the erosion of traditional customs and the introduction of western ideas and life styles. A study by Casterline et al. (1984) indicated that the combined effects of later marriage and greater use of contraception among highly educated women, more than compensates for the effect of shorter breastfeeding duration in all the 24 World Fertility Survey countries examined.

Education affects fertility through the dissemination of useful knowledge about health, hygiene and child care. It is expected that educated parents will provide better care for their children, thus improving the infant and child survival chance. It is also expected that they will be more receptive to new behaviour and more willing to adopt effective contraception.

3.22 Urbanization and fertility:

Urbanization, a phenomenon accompanying industrialization and economic development, may also contribute to the transition to lower fertility. Urbanization has forced rural people to shift from local self-contained institutions to large social, economic and political institutions (Freedman, 1979). Urban areas are the promoters of new ideas, new lifestyles and social change.

In general, cost of food and shelter are higher in urban areas of the developing countries, providing an incentive to limit the number of child dependents. In addition, urban employment is usually less compatible with childbearing than farm work. Moreover, education, health-care and exposure to new consumer goods and family planning services tend to be more widespread in urban areas. Knowing that the factors mentioned above tend to promote lower fertility, urbanization would be strongly

correlated with reduced birth rates.

Urbanization changes the operating mechanism of several family functions, and residency in the city reduces the pressures toward traditional behaviour exercised by the family and the community. Rural women do not have the attractive alternatives to being housewives and mothers that are available to urban women, such as those provided by employment in the non-agricultural sector. Attitude changes are more likely to be stimulated in the urban areas. The willingness to abandon traditional behavioural patterns will be greater in urban areas, thus affecting fertility more than in the rural areas where traditional behaviour is more likely to prevail.

The type of residence signifies potential exposure to different values, norms and economic opportunities that may be related to childbearing. Cochrane (1983) has pointed out that many of the factors affecting individual decision making regarding fertility are determined in part by the community of residence. These factors include the availability of contraceptive services, schooling opportunities, health facilities; economic opportunities, such as demand for labour of men, women and children; costs of food and housing; exposure to disease, etc. All these factors vary between urban and rural places, and may directly or indirectly impinge on

childbearing.

3.23 Culture and fertility:

Culture can affect fertility through several intermediate variables, prominent among which are the custom of prolonged breastfeeding, prolonged abstention from sexual intercourse, abortion, infanticide, contraceptive use and age at first marriage. In sub-Saharan Africa exposure to child bearing is further constrained by cultural norms regarding the age and patterns of terminal sexual abstinence.

The relationship of culture to fertility has interested researchers for many years. Carr-Saunders, (1922), after an extensive review of anthropological literature on societies at different technical levels in all parts of the world, concluded that the evolution of human culture brought a universal tendency toward the maintenance of an `optimum' population appropriate to the resources of each area and the economic technology of its occupants. He distinguished between two types of factors. He noted that there are practices which may not have been meant to deliberately limit or control human fertility, which `incidentally' limit the increase of population. Prolonged breastfeeding is mentioned as one of these practices. In addition to such practices there was

assumed to be an almost universal resort to explicit measures for the control of population.

> `There is another class of factors the primary and not the incidental function of which is either to reduce fertility or to cause elimination. These factors are prolonged abstention from intercourse, abortion and infanticide.' (Carr-Saunders, 1922:214)

Lorimer, (1969) dismisses the notion of cultural forces bringing a universal tendency toward maintenance of an `optimum' population appropriate to the resources within each area, and asserts that the record of famines, wars and migrations points toward recurrent maladjustment in the relations of people and resources rather than toward the maintenance of an `optimum' population in each tribal territory.

The limitation of the all-embracing theories, according to Lorimer, is that in these theories the reproductive practices of particular societies are treated apart from the total social structures within which these practices are operative. He concludes that an examination of cultural conditions affecting fertility in different non-industrial societies would be successful if carried out in the context of their

social organisation and cultural values - especially with respect to the organisation of the family and kinship relations.

A review of findings from the European Fertility Project on the role of regional and cultural factors in the decline of fertility in Europe pointed out the importance of non-socioeconomic variables such as those noted by Anderson (1986):

> "non-socioeconomic variables, such as religion, language, ethnicity and region explain much of the variability in marital fertility decline, even after conventional socioeconomic variables have been taken into account" (Anderson, 1986:293).

The importance of linguistic and cultural boundaries as determinants of regional fertility differentials, emerged as one of the most striking features from the European Fertility Study (Coale and Watkins, 1986). For example, Lesthaeghe (1977) in his study of fertility in Belgium for the period 1800-1970, demonstrates the importance of a set of cultural variables such as language and secularization in differentiating the timing and pace of the fertility transition by the historical experience of two areas of Belgium: Walloon, the French-speaking area; and Flanders, the Dutch-speaking area. Maps plotting fertility during the

transition period make clear that areas with high marital fertility and late decline are nearly all on the Flemish side, and those with an early and faster decline are on the Walloon side. Lesthaeghe compared the fertility of paired communities, with similar social and economic characteristics, never more than ten kilometres apart but on opposite sides of the linguistic border. The language boundary was a real demarcation line between the two regions. Lesthaeghe concluded that the language border within even a small country can serve as a cultural barrier to the spread of fertility transition.

Another example is that between English and French speaking Canadians. While fertility declined among English speaking Canadians, that of French speaking Canadians in Quebec lagged behind.

The European experience makes it clear that differences between cultures in terms of language, religion, customs or values may either inhibit or facilitate the adoption of family limitations or other forms of behaviour.

Cleland and Wilson (1987) indicated that in historical Europe, just as in the developing world today, the culture of subpopulations, loosely defined by religion, language or region, appears to exert a major influence on the timing of

reproductive change, independently of the levels of development, education or provision of family planning services.

The influence of culture, which may itself reflect fundamental religious beliefs or customs that have developed in a particular society over time, is pervasive and difficult to quantify. For example, some religions are more pronatalist than others, either in their doctrines or in the extent to which they help create a separate group consciousness or discourage the use of birth control. Membership in religious communities can have an appreciable impact on childbearing. The degree of commitment or intensity of religious feeling, is an important part of the influence that will act upon fertility.

In developing countries a review of findings from the World Fertility Survey on culture's influence on reproductive behaviour revealed the importance of regional and cultural factors which is similar to the findings obtained by Anderson for Europe, leading Cleland to conclude that:

> "just as in Western Europe, the culture of a population, loosely defined by religion, language or ethnicity, appears to exert a major influence on the timing of reproductive change, independently of development, education or provision of family planning services" (Cleland, 1985:243).

3.3 **THE CONCEPTUAL FRAMEWORK**

A graphic presentation of how some socioeconomic, cultural, demographic and environmental factors operate through the intermediate variables to affect fertility is presented below (Figure 3.1).

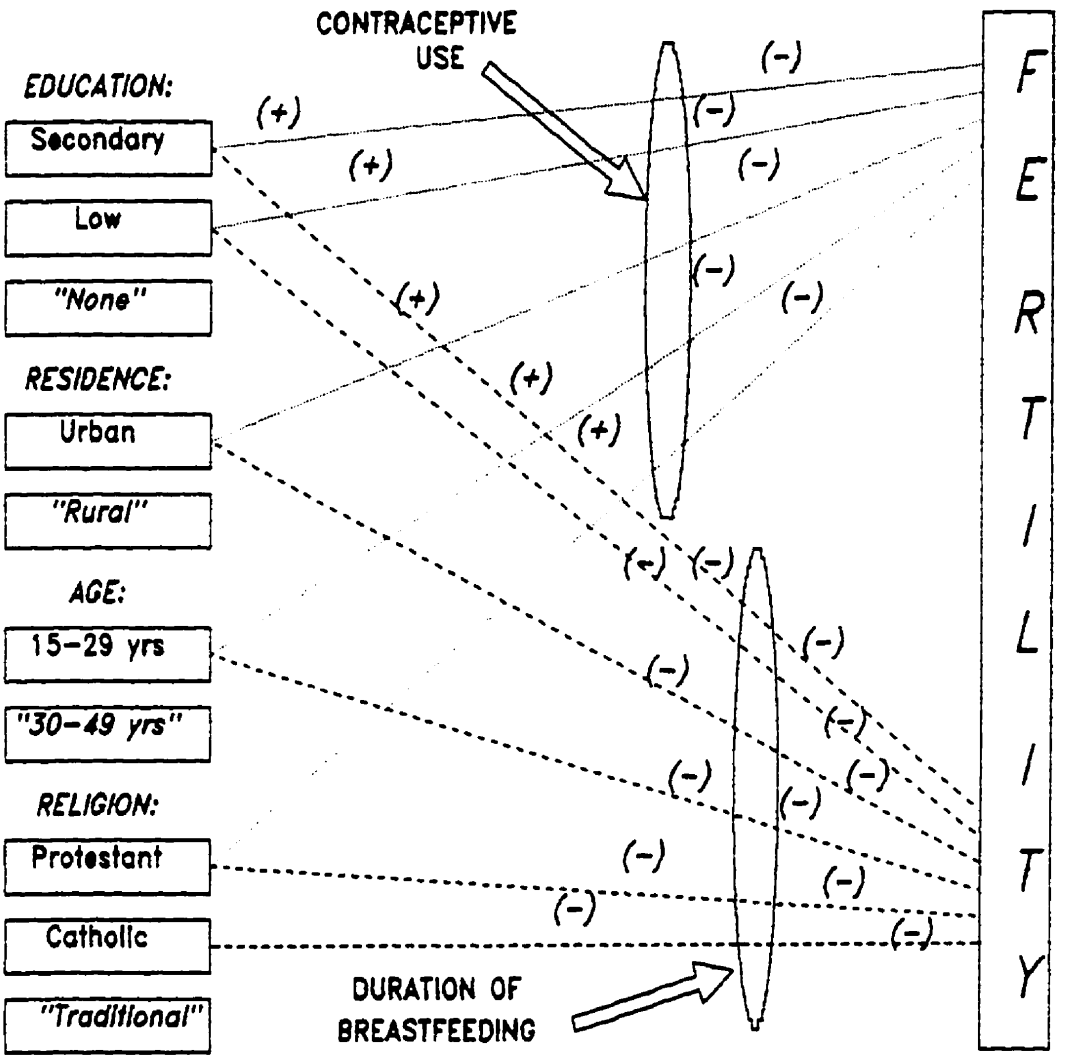
EDUCATION:

The following framework shows how the effect of education on fertility is transmitted through the intermediate variables viz. contraceptive use and breastfeeding duration. Contraceptive use is negatively related to fertility. Education, as opposed to none, is more likely to have a depressing effect on fertility because of the positive relationship education has with contraceptive use.

Following a birth, every woman experiences a period of time when she is unable to become pregnant due to suspension of her normal cycle of ovulation and menstruation. The length of this infecund period varies widely. The principal behavioural factor affecting the length of the post partum infecundable period is duration and intensity of breastfeeding. The sucking of the infant at the breast triggers the release of the hormone prolactin which in turn inhibits ovulation and

FIGURE 3.1

EDUCATION, URBAN-RURAL RESIDENCE, AGE AND RELIGION OPERATE THROUGH CONTRACEPTIVE USE AND DURATION OF BREASTFEEDING, TO AFFECT FERTILITY.



menstruation. Ovulation can remain suppressed as long as prolactin levels remain high. The frequency of breastfeeding and the duration of feeds operate jointly to inhibit ovulation. As supplementary foods are added to the infant diet, the intensity of breastfeeding declines, and the incidence of ovulation rises rapidly. Some societies, such as those found in sub-Saharan countries, observe sexual abstinence while breastfeeding, sometimes for periods of up to two years. This makes the woman insusceptible to conception throughout her breastfeeding period. By lengthening the interval between births, breastfeeding, especially when accompanied by abstinence, can contribute to an overall decrease in the number of children a woman may have, thus indirectly reducing fertility.

Education can also have an increasing effect on fertility. The most likely explanation for the initial rise in fertility may be that women with a few years of primary schooling are more likely to discontinue traditional practices such as the traditional fertility inhibiting postpartum sexual taboos and extended periods of breastfeeding, thus shortening the interval between births. This practice cuts down on the protection afforded by lactational amenorrhea (Leridon and Fery, 1985). Without the compensating act of contraceptive use, fertility rises.

Education therefore, depending on the intermediate variable through which it operates, may have a negative or a positive effect on fertility. The above framework shows that duration of breastfeeding has a reducing effect on fertility. The framework also shows that education has a negative relationship with duration of breastfeeding. Education therefore, by having a negative relationship with breastfeeding duration, which reduces fertility, may increase fertility.

URBAN-RURAL RESIDENCE:

Modernization, which is associated with socioeconomic development, has both positive and negative effects on fertility. At the initial stages of modernization, traditional norms and values may change quickly in one area but remain unchanged in others. One component of modernization is urbanization, and it is observed that once people move to urban centres they quickly adopt modern behaviour such as changes in breastfeeding patterns, changes in postpartum sexual abstinence, etc. On the other hand, social norms may prohibit couples from adopting contraception, so fertility may rise at the initial stages of modernization.

The above framework shows that the urban factor is likely to have a positive effect on fertility through abandonment of

traditional practices of long durations of breastfeeding. The urban factor is negatively associated with duration of breastfeeding. However, with adoption of contraceptive use, the urban factor is more likely to have a negative effect on fertility. The framework shows that the urban factor is positively associated with contraceptive use.

AGE:

The young generation of women aged 15 to 29 years, compared to their older sisters aged 30 to 49 years, is more likely to use contraceptives which depresses fertility. These young women are also less likely to adhere to traditional practices of prolonged breastfeeding with its accompanying sexual taboos. They are more likely to breastfeed for short periods, and that may enhance fertility.

RELIGION:

The framework also shows that religion may have a negative or positive influence on fertility. The Roman Catholic religion for example, with its teachings against contraceptive use and abortion in most cases, may have a positive effect on fertility in the absence of an alternative acceptable and effective fertility control mechanism. Exceptions include countries such as Italy, USA, etc. On the other hand, Protestant religions, which may not subscribe to the

restrictive teachings of the Roman Catholic religion, may permit their members to indulge freely in the use of contraceptives. This practice ends up exerting a negative influence on fertility. The African traditional religion, which serves as a reference category for this group, tends to be pronatalist in orientation. This means that African traditional religion would have a negative relationship with the use of abortion and modern contraceptive methods as means of deliberate fertility control. Increased fertility would therefore be expected among the adherents of African traditional religion. Notwithstanding, strict adherence to this type of religion may also be strongly associated with traditional practices of prolonged periods of breastfeeding accompanied by long periods of postpartum abstinence. These traditional practices increase intervals between births which in turn reduces fertility.

What can be concluded from the above schematic framework is that the young, educated, urban and religiously liberated women tend to be more liberal towards contraceptive use, which depresses fertility, while the old, uneducated, rural and religiously constrained ones will be less tolerant of contraceptive use, thereby experiencing higher fertility; unless they indulge more in prolonged duration of breastfeeding with its accompanying postpartum abstinence

which have an inhibiting effect on fertility.

Figure 3.2 shows how the above socioeconomic, cultural, demographic and environmental factors operate through a different set of intermediate variables to affect fertility.

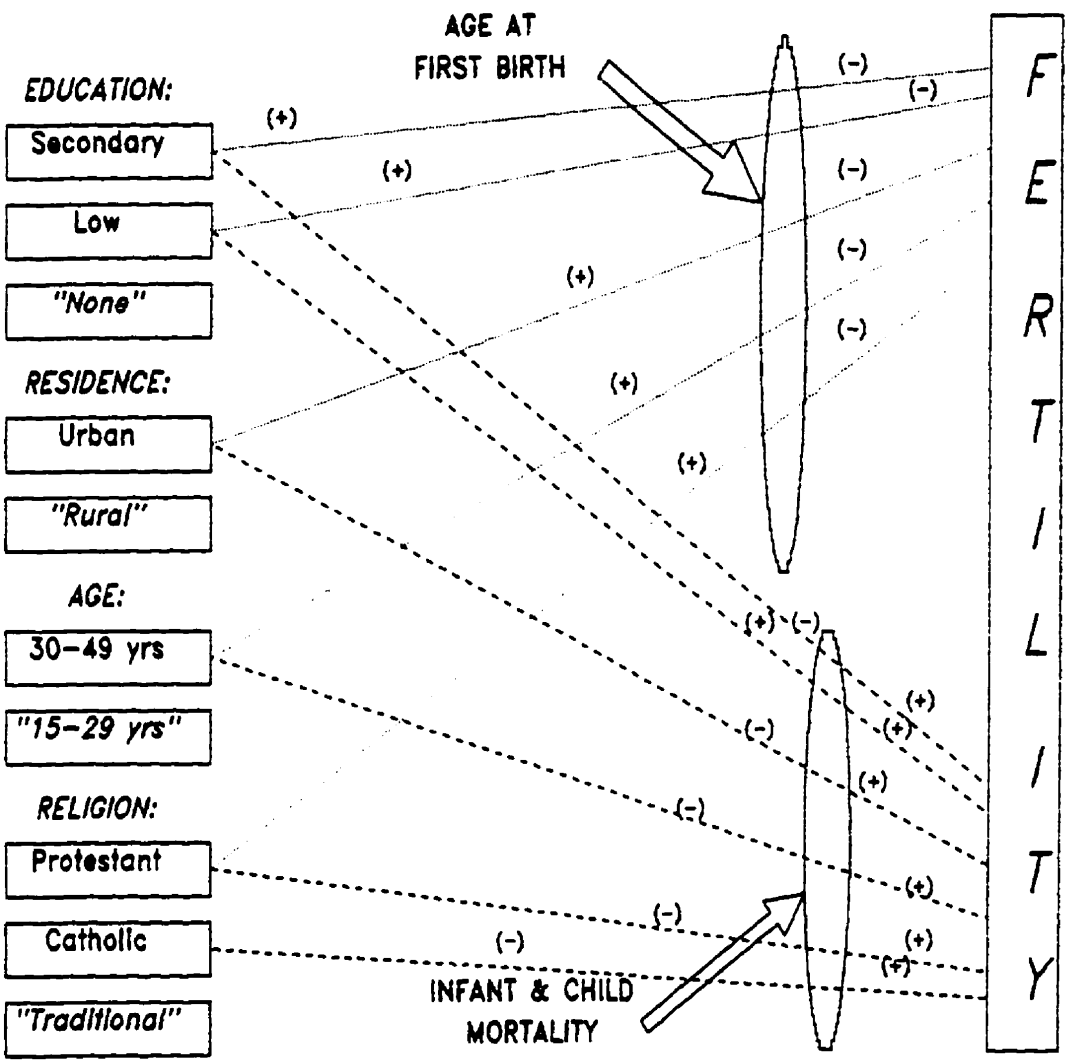
EDUCATION:

Educated women, compared to those who have never been to school, are more likely to have their first birth much later because the former get involved in education for longer periods of time and tend to develop other interests that compete with childbearing and child rearing.

Research shows that infant and child mortality are positively related with fertility, meaning that the higher the infant and child mortality, the higher the level of fertility. Infant and child mortality affect fertility through the intermediate variable of breastfeeding thus: The death of a child that is being breastfed shortens the duration of breastfeeding. That cuts short the period of amenorrhea during which the woman was infecundable and exposes her to another pregnancy and a shortened birth interval, resulting in a positive effect on fertility.

FIGURE 3.2

EDUCATION, URBAN-RURAL RESIDENCE, AGE AND RELIGION OPERATE THROUGH AGE AT FIRST BIRTH AND INFANT AND CHILD MORTALITY, TO AFFECT FERTILITY.



It has been argued that the findings that women whose children do not survive have higher fertility is not evidence of a one way causation from infant and child mortality to fertility, and that fertility itself may influence infant and child mortality significantly. High fertility and close spacing of births may contribute to high infant and child mortality. Therefore to understand the effects of infant and child mortality on fertility it is essential to isolate the effects of a reverse relationship between the two variables. The framework suggests that while secondary education, as opposed to none, is not associated with infant and child mortality, low education is positively associated with it.

AGE:

Old women, compared to young ones, are more likely to have a higher age at first birth. In the past, attempts were made to keep young girls chaste by restrictions against coitus, and heavy penalties were inflicted upon a girl who became pregnant or upon the boy responsible. The main mode of socialization into these strict codes of conduct towards sexual activities in most traditional African societies were imparted through initiation ceremonies organised around age regiments (Schapera, 1940). The traditional and cultural regime that governed sexuality and fertility has weakened. There is now greater sexual freedom among young people and greater public

acceptance of unwed motherhood. The social disorganization model of sexual activity (Cherlin and Riley, 1986) suggests that early childbearing results from a breakdown of traditional social controls by elders over the sexual behaviour of adolescents. Young women therefore, are more likely to have their first births earlier than their older sisters, all things being equal.

The framework suggests that the old generation of women aged 30 to 49 years, as opposed to the young generation of 15 to 29 years, is more likely to have an older average age at first birth. Infant and child mortality are also likely to be lower for older women.

URBAN-RURAL RESIDENCE:

Because of the breakdown of traditional restraints on sexual activity, women who live in urban areas, where there is a greater willingness to abandon traditional behaviour, would be expected to have their first births at a much younger age, unless they do something to avoid first births while continuing being sexually active, such as indulging in the use of contraception. Also available in the urban areas are more attractions outside childbearing such as economic opportunities in the modern sector, contraceptive services, school opportunities and recreational facilities for the

youth. These attractive alternative interests available in the urban area are likely to draw urban women away from the act of tying themselves down with an unattractive responsibility of childbearing and childrearing at an early age. Urban women therefore are more likely to postpone their first births to a later age.

The framework shows the urban factor being positively associated with age at first birth. Urban women are also negatively associated with infant and child mortality

RELIGION:

Catholics and traditional believers are not likely to prolong their waiting time to have their first births. Early age at first birth has an increasing effect on fertility. Protestants are likely to have their first births later, and that would have a negative effect on fertility. Protestants and Catholics are likely to have low infant and child mortality probably because they are more likely to utilize health facilities and consult medical personnel, while traditional believers may be utilizing the services of traditional birth attendants and healers who use charms and unhygienic equipment, resulting in high infant and child mortality and high fertility.

From the above schematic framework, it can be concluded that the old generation, the educated, urban and Protestant women are likely to have lower fertility through the higher age at first birth.

The following table (Table 3.1) shows the expected relationship of the intermediate variables with fertility by socioeconomic, environmental, demographic and cultural variables.

TABLE 3.1

EXPECTED RELATIONSHIP OF INTERMEDIATE VARIABLES WITH FERTILITY BY SOCIOECONOMIC, ENVIRONMENTAL, DEMOGRAPHIC AND CULTURAL VARIABLES

SOCIOECONOMIC ENVIRONMENTAL DEMOGRAPHIC & CULTURAL VARIABLES	I N T E R M E D I A T E V A R I A B L E S			
	CONTRACEPTIVE USE (-)	DURATION OF BREASTFEEDING (-)	AGE AT FIRST BIRTH (-)	INFANT AND CHILD MORTALITY (+)
EDUCATION				
Secondary	--	-	--	+
Low	-	-	-	++
None				
RESIDENCE				
Urban	--	-	--	+
Rural				
AGE				
Young	-	-	-	++
Old				
RELIGION				
Protestant	-	-	--	+
Catholic	NED	-	-	+
Traditional				

++ --> strong positive relationship;
-- --> strong negative relationship;
+ --> weak positive relationship;
- --> weak negative relationship;
NED --> no expected difference.

1. CONTRACEPTIVE USE:

Contraceptive use is expected to have a negative relationship with fertility. The relationship is expected to be strong for women who have attained secondary level education, and weak for those with low education. Contraceptive use is also expected to have a negative relationship with fertility for women residing in urban areas, for young women and for those women of Protestant religions. There is no expected difference between Catholics and Traditional believers as far as contraceptive use is concerned.

2. DURATION OF BREASTFEEDING:

Duration of breastfeeding is expected to have a negative relationship with fertility. The relationship is expected to be weak for educated women compared to women who have never been to school. Duration of breastfeeding is also expected to have a weak negative relationship with fertility for urban dwellers (compared to rural women), for young women (compared to their older sisters), and for Protestants and Catholics (compared to traditional believers).

3. AGE AT FIRST BIRTH:

Age at first birth is expected to have a negative relationship with fertility. The relationship is expected to be strong for secondary educated women, when compared with women who have never been to school. The relationship is expected to be weak for those who have low education. For urban women, compared to rural women, the relationship is expected to be strong. The relationship is expected to be weak for young women compared to their older sisters. Age at first birth is expected to have a strong negative relationship with fertility for Protestant women, and a weak one for Catholics.

4. INFANT AND CHILD MORTALITY:

Infant and child mortality are expected to have a positive relationship with fertility. The relationship is expected to be strong for women with low education and for young women. This positive relationship is expected to be weak for women who have secondary education, women who live in urban areas, Protestants and Catholics.

CHAPTER 4

RESEARCH DATA AND METHODOLOGY

4.1 DATA SOURCE

The main source of data that is used in this study is Botswana's 1988 Demographic and Health Survey (BDHS) which was conducted as part of the world-wide programme coordinated by the Demographic and Health Surveys Programme at the Institute for Resource Development, a Macro Systems Company, under a contract with the United States Agency for International Development (USAID), Washington. This survey consists of a national probability sample of 4368 women aged 15-49 years irrespective of marital status and living in non-institutional settings.

The nationally representative sample was chosen through a two-stage probability selection. In the first stage, the enumeration areas were systematically selected from the census enumeration areas with probability proportional to size in each of five strata (two urban and three rural). The second stage unit was the household. Individual households were selected with probability of selection inversely proportional to the enumeration area's size. Interviews were conducted in

both urban and rural areas of Botswana between August and December 1988.

Two questionnaires were used: a household and an individual questionnaire. The questionnaires were adapted from the DHS Model "B" Questionnaire, intended for use in countries with low contraceptive prevalence, with the addition of a modified version of the family planning section from the DHS Model "A" Questionnaire for high prevalence countries.

Information on the age and sex of all usual members and visitors in the selected households was recorded in the household questionnaire. This information was used to identify women eligible for the individual interview. In the BDHS a question on fostering of children aged 0-14 years was included in the household questionnaire to separate one's own children from the children of relatives. The individual questionnaire was used to collect data on all eligible women, defined as those aged 15-49 years who spent the night prior to the household interview in the selected household, irrespective of whether they were usual members of the household. The questionnaires were pretested in April and May, 1988. Fieldwork started on the 4th of August, 1988 and was completed on the 13th of December, 1988. In all, 25 female interviewers, 9 supervisors (6 female and 3 male), and 9 drivers

participated in the fieldwork. Fieldwork was conducted by nine teams composed of 2 or 3 interviewers and a supervisor. Each team was assigned a vehicle and a driver. The supervisor was responsible for the overall management of the team, including work assignments, locating selected households, and enlisting the cooperation of the community in the selected areas, as well as control of the quality of data collection. The latter was done through field editing all questionnaires, observation of interviews and re-interviewing women when necessary. Supervisors were in frequent contact with the Central Statistics Office (CSO) by telephone. Additionally, central survey staff from the CSO and DHS participated in fieldwork observation. The objective of these visits was to monitor the progress of fieldwork, to help solve problems, and to enhance the morale of the field-workers.

In this survey (BDHS of 1988), women were asked to give retrospective information about their marital birth history and contraceptive use histories. In addition to this retrospective information, a variety of characteristics at the survey date were obtained, such as the socioeconomic, cultural and environmental along with a variety of other factors linked to reproductive behaviour. The survey produced a household response rate of 97 percent and an individual response rate of 95 percent.

Since strict quality checks were followed in all phases of the survey, and re-interviews conducted where necessary to obtain reliable and high quality data, it can be concluded that, in terms of national coverage, quality of data, technical expertise and international comparability, this survey is the richest source of fertility data in Botswana so far which includes, among other things a full birth history for individual women. Furthermore, recent analyses of the DHS data quality have shown that response rates for reproductive questions such as age at first sexual experience, age at first marriage and age at first birth, were very good (Blanc and Rutenberg, 1990).

From the national probability sample of 4368 women mentioned above, a sample intended for this study, which includes all women who have had at least one birth in the last five years before the survey is selected. This restriction has been imposed on the sample to minimize conceptual and measurement problems. The Botswana Demographic and Health Survey provides full maternity history on births occurring only five years prior to the interview, and only limited information on births occurring before this cut-off point. The restriction on women who are childless is based on the fact that there will be no observations on duration of breastfeeding; and on age at first birth; if they were included in the sample. These

restrictions have generated a cohort of 2283 women. The inclusion only of these women in the analysis introduces an upward bias in favour of women with high fertility. These women are divided into two cohorts: a younger cohort aged between 15 and 29 years, and an older cohort aged between 30 and 49 years. At both ends of the age distribution there are fewer women who have had births in the last five years before the survey, however, the rest are reasonably distributed.

4.2 OPERATIONAL DEFINITION OF VARIABLES

This section defines the variables of particular interest in the empirical presentation. It is assumed that the variables included here are relevant and may reasonably explain the differentials in the fertility of women in Botswana. Twelve variables are used in the analysis. The dependent variable is the total number of children ever born to women aged 15-49 years. Independent variables are divided into two groups: the socioeconomic and the intermediate variables. Socioeconomic variables include education, religion, residence, labour force participation and child living arrangement. The intermediate variables include marital status, contraceptive use, duration of breastfeeding, infant and child mortality, age at first birth and current age of respondent.

4.21 THE DEPENDENT VARIABLE

The dependent variable is the total number of children ever born to women aged 15-49 years. This is one of the most frequently used dependent variables in fertility analysis.

4.22 INDEPENDENT VARIABLES

1. Education

It is commonly assumed that education has a strong and negative effect on fertility. Studies by Cochrane (1979), Graff (1979), Cleland and Rodriguez (1988), and Caldwell (1982) have all reported that education has a negative effect on fertility. Education is assumed to reduce fertility by increasing contraceptive use, by delaying entry into marriage either directly or by changing the alternatives available to women, and by lowering the demand for children (Cochrane, 1979). On the other hand one can argue that an increase in education can raise fertility initially as it leads to the abandonment of traditional practices such as prolonged breastfeeding, abstinence and polygamy, which have fertility-suppressing effects. Some studies have shown higher fertility among women with some few years of education compared with those without (Cochrane 1979; Graff 1979; Bongaarts, et al. 1984). This study examines whether attainment of education in Botswana is related to smaller family size.

Formal education comprises seven years of primary school and five years of secondary school in Botswana. The number of years of women's schooling in this study have been classified into four categories thus: 0 years = Never been to school; 1-7 years = Primary education; 8-12 years = Secondary education; 13+ years = Higher education. Because of fewer numbers in the highest category, women with 13 or more years of schooling have been included in the secondary education category. Women with less than seven years of schooling have not completed their primary school education.

2. Religion

Some religions are more pronatalist than others, either in their doctrines or in the extent to which they help create a separate group consciousness or discourage the use of birth control. Membership in religious communities can have an appreciable impact on childbearing. The degree of commitment or intensity of religious feeling, is an important part of the influence that will act upon fertility. To find out if membership in a religious group has any effect on fertility in Botswana, religion is included in the analysis as a categorical variable with four categories coded zero if the woman does not subscribe to any religion, one if she belongs to the Spiritual/African religion, two if she is Protestant

and three if she is Catholic.

3. Place of residence

Major residential sub-groupings in this study are classified into urban areas, big villages with the population of 2000-4999 people, and small villages with a population of less than 2000 persons. Urban areas have been defined as those areas with 5000 people and more. The type of place of residence signifies potential exposure to different values, norms, and economic opportunities that may be related to fertility. Cochrane (1983) has pointed out that many of the factors affecting individual decision making regarding fertility are determined in part by the community of residence. These factors include availability in the community of contraceptive services, schooling opportunities and health facilities; economic opportunities for women; the costs of food and housing; and exposure to disease. All of these factors vary between small villages, large villages and urban areas, and may directly or indirectly impinge on fertility. This is a categorical variable with three categories given the values of one, if household is located in an urban area, two if the household is situated in a large village of 2000+ persons, and three if the household is in a small village of less than 2000 persons.

4. Infant and child mortality.

This variable refers to children under the age of five. It is a categorical (dummy) variable coded one for women who have experienced child loss and zero for those who have not experienced child loss. Premature death of a child can shorten the length of breastfeeding and affect postpartum infecundability.

5. Labour force participation:

The relationship between labour force participation of women and fertility has been widely discussed in the literature (Standing, 1983; Harman, 1970). In some instances, women who are in the labour force have lower fertility than those who are not (Speare *et al.*, 1973). Kasarda, (1971) found an inverse relationship between the percentage of females employed in non-agricultural activities and fertility. Mauldin and Berelson (1978) found that fertility decreased as relative female participation in non-agricultural sectors increased. In some instances the two groups of women have the same fertility (Chaudhury, 1978) and in other instances those women in the labour force have higher fertility than those not in the labour force. In some cases where the inverse relationship between female employment and fertility is opposed, arguments put forward are that women who work earn income, whether in

monetary or non-monetary form, which enables the family to afford a large number of children. Further arguments are that in developing countries women's employment may be compatible with childbearing (Gadalla, 1978; Standing, 1983). This study examines whether in Botswana, labour force participation of women is associated with lower fertility. This is a categorical (dummy) variable which takes the value of one if the woman is in the labour force and zero if she is not.

6. Marital status

In many societies premarital sexual activity is tolerated, but fertility is generally confined to marital unions. Hence in many studies, fertility analyses are confined only to married women. Births occurring outside marriage are regarded as illegitimate and are sometimes excluded from analyses. In Botswana, however, marriage is not a precursor to childbearing and births occurring to both ever married and never married women are included for the analysis. Marital status is included to examine if fertility of the ever married is significantly different from that of the single. This variable is scaled as a dummy variable coded one if the respondent has ever married, and zero otherwise.

7. Child living arrangement (Fostering)

In many African societies, where extended families still exist, individual women may not carry exclusive responsibility for the support and upbringing of their offspring. Births to an unmarried woman, for example, are usually accepted by her lineage. Also, childless married women may be given a child or two by those of the kin who have more for being reared. Caldwell and Caldwell (1990), in their search for the primary cause of high fertility in sub-Saharan Africa observed that in West Africa (Nigeria, Ghana and Sierra Leone) up to half of all dependent children live with persons other than their own biological parents. Foreigners refer to this practice of delegating to other relatives the partial or full responsibility for child rearing as "fostering". The institution of child fostering may have a positive effect on fertility in that with shared responsibility, a woman may not feel the strain of rearing a large number of children which she would feel if she were to raise them single handedly or within a nuclear family, and therefore the number she gives birth to becomes unimportant to her. On the other hand fostering may have a negative effect on fertility in that the act of handing children over to relatives relieves some women of the responsibility and burden of child rearing and gives them an opportunity to advance themselves in other areas such as in education and /or career development. This is more

likely to be the case among young women whose education was interrupted by child-birth. To find out if fertility of women whose children live with relatives is significantly different from that of women who live with their own children, child living arrangement (or child fostering) is included in the analysis as a dummy variable coded one if one or more of the respondent's children live with relatives, and zero if they all live with their mother.

8. Contraceptive use

This variable includes both "efficient" and " less efficient" methods, including female and male sterilization. However it does not include breastfeeding as a method of deliberate fertility control since the basic motivation for breastfeeding is not fertility reduction. Although there is an indirect effect through postpartum infecundability, the basic determinants of breastfeeding are socio-cultural in nature rather than the outcome of rational decision-making concerning family size. Women who reported never having used a contraceptive method had their fertility control value fixed at zero, whereas those who have ever used were coded as one.

9. Average duration of breastfeeding in months

Since the Botswana Demographic and Health Survey provided a full maternal history on births occurring in the last five years before the survey, it was possible to extract information on all births occurring within this period. For each woman, duration of breastfeeding for each birth was extracted and the average calculated. For example a woman who gave birth to two babies within the five years, who breastfed her last child for 24 months and the previous child for 12 months, was given 18 months as her average duration of breastfeeding (24+12/2). Generally speaking, postpartum infecundability depends primarily on the intensity and length of breastfeeding, which in turn extends the birth interval. The postpartum non-susceptible period is, in most cases, approximated by the period of postpartum amenorrhoea. Its duration is usually associated with the prevalence and the intensity of breastfeeding. It is shortest where breastfeeding is hardly practised and longest where breastfeeding is common and is the sole form of feeding for a long time.

10. Age of respondent at first birth

Where deliberate fertility control is absent the number of children ever born is largely a function of the age at which women initiate childbearing. Holding average completed family size constant, younger childbearing implies higher aggregate

rates of fertility and of population growth (Coale and Tye, 1961). Younger ages at first birth are also associated with younger ages at the achievement of desired family size and therefore longer periods of exposure to unwanted births if fertility control is imperfect. Age of respondent at first birth is included as a continuous variable in the analysis.

11. Current age of respondent in single years

Botswana has experienced rapid changes in socioeconomic and cultural conditions, as well as in fertility behaviour during the past two decades. Since these changes tend to be related to the respondent's age, the variable "age of respondent" which is continuous and ranges from 15-49 years, has been included in the analysis as a control variable for both cohorts and differential exposure effects.

4.3 **METHODOLOGY**

This study examines determinants of fertility behaviour of women in Botswana, focusing on the biological, behavioural, demographic, socioeconomic, and cultural factors that directly and indirectly affect reproduction.

First, fertility differentials are explored according to all the socioeconomic variables included in the analysis. Simple descriptive statistics are used to describe fertility differentials and patterns among the various groups of women. To evaluate the discrepancies between sets of observed and expected frequencies of children ever born among different groups of women, the chi-square statistic is used.

Then the analysis turns to multiple linear regression, including the selected intermediate variables to explain variations in children ever born observed in the country. Child fostering, though not included originally in Davis and Blake's suggested framework as an intermediate variable, is included in this study because of the important influence it has on fertility in Botswana.

Multiple linear regression analysis is a method used for measuring the effects of several factors concurrently. This technique is suitable in the case when the dependent variable is continuous and the independent variables are continuous and/or categorical.

Regression standardization is used to test the characteristic hypothesis which states that fertility differentials of subgroups reflect social, demographic and economic attributes that characterize them.

Finally regression decomposition is used to separate out the proportion of the difference in cumulative fertility between the old and the young cohorts to the different values of characteristics variables, and the proportion due to the effects of age.

4.31 Multiple Regression

The functional relationship between the dependent variable and the independent variables is approximated by a linear multiple regression model. The regression coefficients are estimated through ordinary least squares (OLS) which minimizes the sum of squares of residuals. OLS assumes that residuals are normally distributed, have zero mean, equal variance and are uncorrelated. The linear multiple regression model also assumes linearity and has the following additive form:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 \ldots + \beta_n X_n + \varepsilon$$

where

Y = the dependent variable;

α = the constant;

β_1 through β_n = the partial regression coefficients for each of the independent variables mentioned above;

X_1 through X_n = the independent variables mentioned above; and

ε = the error term.

4.32 HYPOTHESES

From the literature reviewed concerning the above variables, and keeping in mind that "age" is the control variable, and therefore all the ensuing effects are controlling for age, it can be hypothesized that:

1. Infant and child mortality is positively associated with the number of children ever born ($\beta_1 > 0$);
2. Labour force participation is negatively associated with the number of children ever born ($\beta_2 < 0$);
3. Marriage is positively associated with the number of children ever born ($\beta_3 > 0$);
4. Fostering out children is positively associated with the number of children ever born to a woman ($\beta_4 > 0$);
5. Ever use of contraception is negatively related to the number of children ever born ($\beta_5 < 0$);
6. Duration of breastfeeding is negatively related to the number of children ever born ($\beta_6 < 0$);
7. Age at first birth is inversely related to the number of children ever born ($\beta_7 < 0$);
8. Age is positively associated with the number of children ever born ($\beta_8 > 0$);

9. Education is negatively related to the number of children ever born ($\beta_9 < 0$);
10. Urban residence is negatively associated with the number of children ever born ($\beta_{10} < 0$).

The equation with hypothesized directions would be:

$$E(Y) = \alpha_0 - \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 - \beta_5 X_5 - \beta_6 X_6 - \beta_7 X_7 + \beta_8 X_8 - \beta_9 X_9 - \beta_{10} X_{10}$$

Where:

$E(Y)$ = Expected number of children ever born;
X_1 = Labour force participation;
X_2 = Child fostering;
X_3 = Infant and child mortality;
X_4 = Marriage;
X_5 = Ever use of contraceptives;
X_6 = Duration of breastfeeding;
X_7 = Age at first birth;
X_8 = Current age of respondent;
X_9 = Completed education;
X_{10} = Urban residence.

4.33 DIAGNOSTICS

Assumptions necessary for linear regression were checked, using residuals. For the normality assumption a histogram of residuals was drawn and the dependent variable, although slightly skewed towards the left, had almost a normal distribution. For the homoscedasticity and linearity assumption the residuals were plotted against the observed and the predicted values of the independent variables. No particular pattern of the spread of the residuals was observed to suggest heteroscedasticity. This does not only satisfy the linearity assumption (the residuals do not deviate from zero systematically), it also satisfies the homoscedasticity assumption (the variance of the error term is constant for all values of X, the independent variable).

In multiple regression analysis independent variables should not be highly correlated with each other. If two variables co-vary it becomes difficult to disentangle their independent effects on Y, the dependent variable. The correlation matrix was used to diagnose collinearity among the independent variables. Explanatory variables are not highly correlated with each other.

Each independent variable was also regressed on all the other independent variables and the R^2 examined. The largest coefficient of multiple determination lies a good distance away from 1.0. Tolerance [$1-R^2$] and Variance Inflation Factors [$1/(1-R^2)$] suggest that strong multicollinearity is absent. Age, as mentioned earlier, is included as a control variable.

CHAPTER 5

FERTILITY DIFFERENTIALS

There is a consensus of opinion among demographers that the mosaic of the often contrasting features exhibited by the fertility of most populations and sub populations are the result of the direct influence of socio-biological and behavioural factors.

Studies have shown that there is individual variation in fertility. This chapter explores fertility variations among women in Botswana. The female population is classified or grouped into several categories. The computation of fertility differentials is examined in terms of children ever born for each category or group. The mean number of children ever born is the number of live births per woman as of the date of the survey. This measure is alternatively defined as current parity. Fertility differentials are also examined in terms of current fertility where necessary for comparison. Where significant category-to-category variation in fertility levels are found, an attempt is made to develop an explanation of how and why these differentials have emerged.

Most changes in fertility do not at once cover an entire population. They tend, instead, to originate within a particular segment of the population and to spread at varying rates from that group to other segments. Thus the predictions derived from differential fertility research may constitute an `early warning system' which heralds impending changes in fertility. The study of differential fertility can identify the `high fertility segments' of the population and can thereby direct the efforts of planners to the proper targets.

5.1 **SUMMARY STATISTICS OF SELECTED VARIABLES**

Summary statistics for the number of children ever born for women aged 15-49 years who have had births in the last five years before the survey are presented in Table 5.1. The average number of live births for the entire sample is 3.29. The data reveal substantial variations in this index when controls are introduced.

AGE:- Age differentials indicate highest fertility (6.48) for the oldest age category (35-49 years) and lowest fertility (1.46)) for the youngest age group (15-24 years), thus suggesting that fertility is positively correlated with age.

TABLE 5.1

AVERAGE NUMBER OF CHILDREN EVER BORN TO WOMEN AGED 15-49 YEARS, WITH SELECTED CONTROL VARIABLES, BOTSWANA, 1988

CONTROL VARIABLES	NUMBER OF CASES	CHILDREN EVER BORN
TOTAL	2283	3.29
AGE OF RESPONDENT:		
15-24	837	1.46
25-34	1025	3.47
35-49	421	6.48
EDUCATION:		
None	560	4.49
Primary Incomplete	549	4.03
Primary Complete	623	2.62
Secondary and above	551	2.09
RELIGION:		
None	566	3.33
Spiritual/African	1001	3.35
Protestant	502	3.23
Catholic	214	3.07
PLACE OF RESIDENCE:		
Urban (5000+)	1098	2.96
Village (2000-4999)	569	3.39
Village (<2000)	616	3.78
MARITAL STATUS:		
Never married	984	2.15
Ever married	1299	4.15
CHILD FOSTERING:		
None	1909	3.54
One or more	374	2.03
WORK STATUS:		
Working	697	3.17
Not working	1586	3.42
AGE AT FIRST BIRTH:		
<20	1509	3.44
20-24	676	3.04
25+	98	2.73

Data Source: 1988 Botswana Demographic and Health Survey

EDUCATION:-The effects of education on fertility show clear differentiation between those with or without education. Women with some education exhibit lower fertility than those without education. A fertility differential of 2.40 births is observed between women who have never been to school and those with secondary and higher education.

RELIGION:-Religious differences in fertility indicate that the mean number of live births for Catholic women (3.07) is lower than that of Protestants (3.23), Spiritual/Africans (3.35) and women with no religion (3.33). This is contrary to popular belief and expectations about Catholics because of the Pope's teachings and opposition to contraceptive use and abortion.

RESIDENCE:-There are noticeable differences in fertility by type of place of residence. The mean number of live births decreases with increase in the population size of place of residence. Residents of the small villages (<2000 population) have, on average 0.82 more live births than those in urban areas (5000+ population).

CHILD FOSTERING: 16 percent of children under the age of five live apart from their mothers. Women with one or more of their children under the age of five, living with relatives (or fostered out) have on average 1.51 less live births than women

who live with all their children who are under the age of five. These findings support the hypothesis that "fostering out" children is negatively associated with the number of children ever born to a woman.

WORK STATUS: Women who are employed exhibit lower fertility than those who are not.

MARITAL STATUS:-Fertility variations among women according to their marital status are also reflected in the data. Ever married women show higher fertility (4.15) than the never married (2.15). Never married women constitute 43 percent of the entire sample.

AGE AT FIRST BIRTH:-Women whose age at first birth is below age 20 clearly have the highest fertility and those who start childbearing at age 25 and above have fewer numbers of children ever born.

To see if the above observed fertility differentials are statistically significant the chi-square test was used. Six out of the eight variables analysed were found to have fertility differentials that are highly significant at .001 level. Fertility differentials among religious and work status groups are not statistically significant.

5.2 **FERTILITY DIFFERENTIALS BY AGE**

Since fertility is a cumulative process, older women would naturally have a larger parity size, on average, than the younger ones on account of longer exposure to childbearing. The number of children ever born are expected to increase across age cohorts. Among women aged 45-49 years, children aver born are measures of completed fertility for this age cohort.

To have a measure of real cohort experience, the average numbers of children ever born by women's ages are presented in Table 5.2. As expected, average parities increase with increasing age of mother. However, women from small villages show lower fertility at the last age group (45-49 years) compared to fertility of the preceding age group (40-44 years). This could be attributable to one of two reasons: the higher degree of omission by older women of births occurring a long time ago, as explained by Chidambaram *et al.* (1980) or that the sample size in this group may be small. Besides this group, under-reporting of children ever born in the last age group (45-49 years) does not appear to be significant since there is no other drop in parity compared to the preceding groups. This indicator shows the good quality of the data reported for children ever born.

TABLE 5.2

AVERAGE NUMBER OF CHILDREN EVER BORN TO WOMEN AGED 15-49 YEARS, BY AGE AND SELECTED SOCIOCULTURAL VARIABLES, BOTSWANA, 1988

	15-19	20-24	25-29	30-34	35-39	40-44	45-49
TOTAL	1.11	1.58	2.90	4.28	5.81	7.40	7.96
COMPLETED EDUCATION							
None	1.13	1.77	3.48	4.71	5.99	7.62	8.38
Pr Inc	1.15	1.79	3.18	4.77	6.21	7.00	7.65
Pr Com	1.11	1.58	2.77	4.17	5.77	6.25	6.63
Sec+	1.00	1.38	2.27	3.02	4.16	5.50	6.00
PLACE OF RESIDENCE							
Urban	1.10	1.54	2.73	4.08	5.27	7.05	8.21
Big V	1.10	1.61	3.05	4.26	6.14	7.50	8.50
Smal V	1.14	1.65	3.10	4.61	6.28	7.69	7.48
MARITAL STATUS							
Never	1.09	1.45	2.52	3.66	4.87	6.44	6.56
Ever	1.21	1.81	3.13	4.48	6.05	7.48	8.29
CHILD FOSTERING							
None	1.12	1.63	3.05	4.33	5.84	7.36	7.84
1/More	1.03	1.41	2.40	3.66	4.30	7.50	8.00
AGE AT 1ST BIRTH							
<20	1.11	1.77	3.43	4.85	6.69	8.13	9.50
20-24		1.13	2.18	3.63	5.16	7.08	8.00
25+			1.17	1.93	2.87	4.67	5.64

Data Source: 1988 Botswana Demographic and Health Survey

The range of variability of children ever born among women aged 45-49 years is noticeable. Completed fertility ranges from a high of 8.50 children among women from big villages of 2000-4999 persons to a low of 6.00 among those with secondary and higher education.

5.3 **FERTILITY DIFFERENTIALS BY AGE AND EDUCATION**

When age and education are considered together one notices that at all ages, women with secondary and higher education have the smallest parity size, followed by those who have completed their primary school education. Also the differences in fertility between uneducated women and those with secondary and higher education become consistently wider as the age increases from 15 to 49 years. The fertility of uneducated women at age group 45-49 years is 40 percent higher than that of women who have obtained secondary and higher education.

Women who have not completed primary education deviate from the pattern observed in the other education groups where fertility declines with increasing education. They show higher mean number of children ever born at ages 15-24 and 30-39 years compared to those with no education as well as compared to women with 7 years of schooling and above.

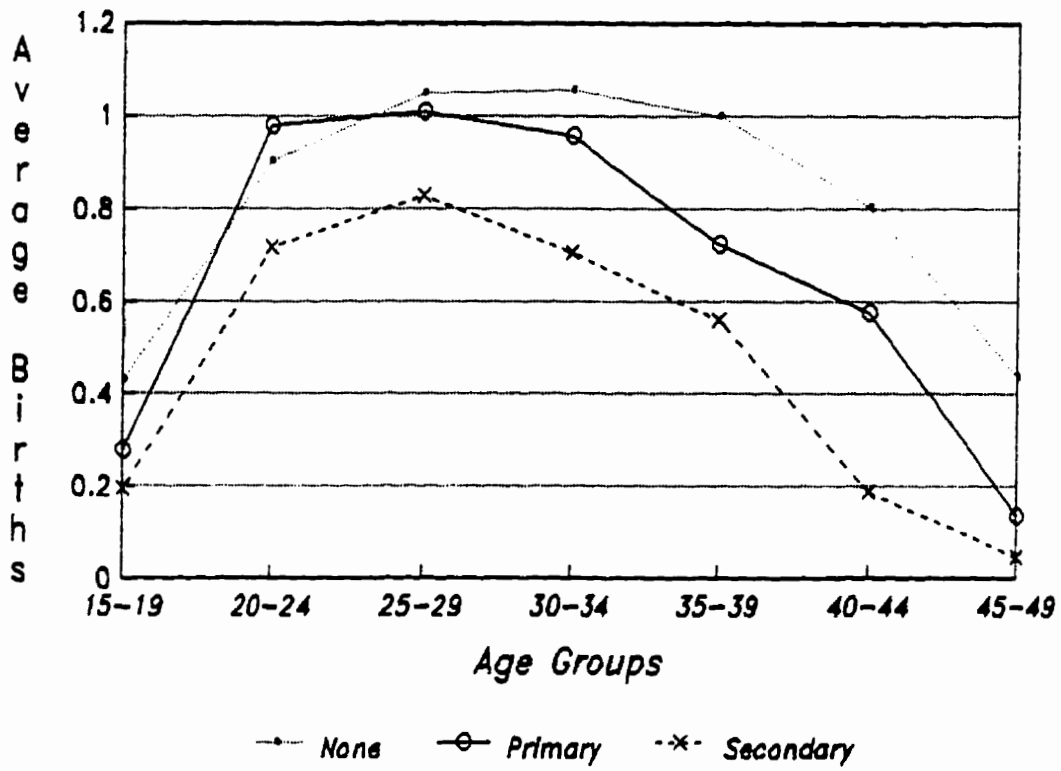
Current fertility also reveals a similar pattern to the one observed above between the fertility of women who have never been to school and that of those who have been, but did not go higher than primary school education.

In the following figure (Figure 5.1), the highest age specific curve is that of women who have never been to school, and the lowest curve is that of women with secondary and higher education. The curve for women with primary education falls between the two, but at the age group 20-24 years, the curve crosses over and goes beyond that of women who have never been to school, meaning that their age specific fertility at that age group is higher than that of women who have never been to school.

What keeps the fertility of uneducated women at a level lower than that of primary educated women at some age groups may become clearer after a more detailed analysis which includes intermediate variables.

FIGURE 5.1

AVERAGE NUMBER OF BIRTHS IN THE LAST FIVE YEARS BEFORE THE SURVEY BY EDUCATIONAL STATUS, BOTSWANA, 1988



Data Source: 1988 Botswana Demographic and Health Survey

These results indicate that the relationship between women's education and fertility in Botswana is irregular and similar to that observed for Sri Lanka and Pakistan (Cochrane, 1983). Thus the monotonically inverse relationship between a woman's education and her fertility often observed in many developed nations does not hold for Botswana. Fertility in Botswana first rises with education at some ages before it declines. The results are consistent with the work of Graff (1979) and others (Cochrane, 1979; Jain, 1985) that, in developing countries, increasing amounts of education are not always associated with lower fertility.

5.4 FERTILITY DIFFERENTIALS BY AGE AND RESIDENCE

There are noticeable differences in fertility by type of place of residence. In all age groups, the mean number of live births decreases with increase in the population size of place of residence. The exception is in the last age group for women from small villages. Their fertility is lower than that of women from big villages. It is even lower than that of women from urban areas.

The differences in fertility between small villages and urban areas increase with age from age 15-39 years, then they decrease with age from age 35-49 years. The largest difference

in the mean number of children ever born between the two groups is in the age group 35-39 years (1.01 live births per woman).

5.5 FERTILITY DIFFERENTIALS BY AGE AND CHILD FOSTERING

It was anticipated that in the young age groups women whose children live with relatives would have lower fertility than those who live with all their children on account of the tendency for young unmarried mothers to place their children with relatives while they live and work else-where or while they pursue their education, which was interrupted by childbirth, and other interests such as career development.

The data reflect this tendency in that young women aged 15-39 with one or more children living with relatives show lower fertility compared to those who live with all their children. It is older women aged 40-49 years who are more prolific than their counterparts who live with all their children.

5.6 FERTILITY DIFFERENTIALS BY AGE AND MARITAL STATUS

Table 5.1 showed that never married women constitute 43 percent of the entire sample. Controlling for age (Table 5.2) reveals that the fertility level of "never married" women equals 80 percent or more of that of ever married women from age 15-44 years. This means that there are exceptionally high proportions of children born outside marriage in Botswana. For women aged 45-49 years, the fertility of never married women is 79 percent that of ever married ones.

There are several reasons for the existence of high proportions of never married women, and of a substantial number of children born outside marriage in Botswana. First, there is a sex ratio imbalance in the population. The overall sex ratio was 89 men per 100 women in the country, and the same was 72 in the marriageable ages of 20-29 years according to the 1981 census. (In the 1991 census the same was 91.6 and 84.9 respectively). This means that in the entire population, there were only 89 men for every 100 women, and in the marriageable ages of 20-29 years there were only 72 men available for every 100 women.

In order to handle such a shortage, polygyny used to be practised in Botswana in the past, but modern thoughts and practices highly discourage that and the practice is being discontinued under modern pressure. Also, in the past, an unwed young woman who became pregnant or the boy/man causing the pregnancy could be forced into marriage. It is clear, however, that the "forced marriage" concept is now a relic of the past in Botswana.

The laws in Botswana that discriminate against women might be another contributing factor to high proportions of "never married" women and of children born outside wedlock. First there is the Citizenship Act. The presumption of this law is that there are certain privileges conferred on an individual as a citizen and one of these privileges is to pass one's citizenship to one's child. Citizenship as it is in Botswana, is conferred through the father. If one is a man, it does not matter where one lives, e.g. Canada or Britain; if one marries a foreign woman and one has a child, that child becomes a Motswana, even if one still lives outside Botswana. If a person is a Motswana woman, however, and if she is married to a foreigner, her children born in Botswana, are not citizens of Botswana even though they are born in Botswana, because a woman cannot pass or confer her citizenship to her children.

However, if a Motswana woman has a child by a foreigner but does not marry him, she has essentially more rights than the woman who marries in that she can pass on her citizenship to her children. It is only when she is married that she becomes a non-person, an appendage of her husband, and not a person in her own right. The Citizenship Act is currently under review.

Secondly, the customary marriage and the statutory marriage under the Roman-Dutch law, both of which were described earlier in chapter 2, have not only led to high rates of marriage dissolutions, but have also led to a higher proportion of women who opt not to enter into a marriage contract. This has a tremendous contribution to the high proportions of children born to "never married" women in Botswana.

Thus far, fertility differentials have been examined by major demographic, social and economic variables. Of all the variables treated, educational status, type of place of residence and child fostering are shown to be the most important socioeconomic variables. Therefore, having

summarized differential fertility by these variables, it seems appropriate to examine educational differentials in fertility within the various types of places of residence and within the two types of child living arrangement.

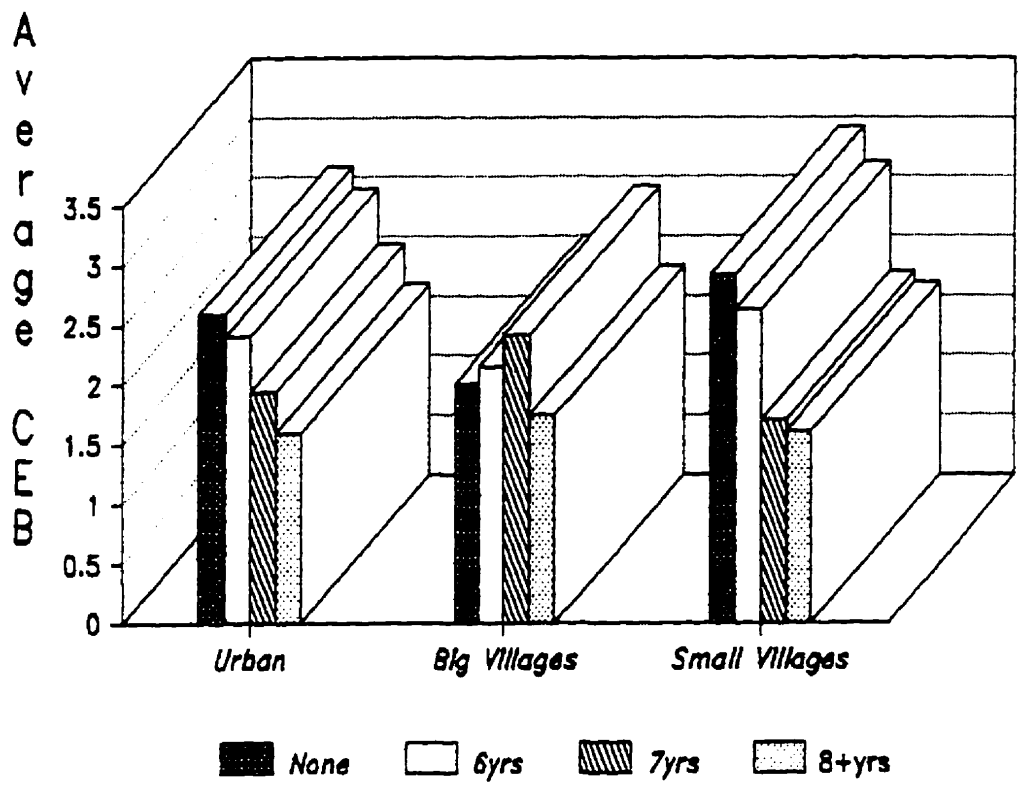
5.7 FERTILITY DIFFERENTIALS BY FOSTERING, RESIDENCE AND EDUCATION

Figures 5.2, 5.3 and Table 5.3 show the mean number of children ever born to women aged 15-49 by child living arrangement, by major types of place of residence and by education of women.

Both figures and the Table show that regardless of socioeconomic variable, women with secondary and higher education have lowest fertility, followed by those who have completed primary school education, except for women from big villages of 2000 to 4999 people who have `fostered out' one or more children under the age of five.

FIGURE 5.2

AVERAGE NUMBER OF CHILDREN EVER BORN BY FOSTERING, RESIDENCE AND EDUCATION (WHERE ONE OR MORE CHILDREN ARE `FOSTERED OUT'), BOTSWANA, 1988



Data Source: 1988 Botswana Demographic and Health Survey

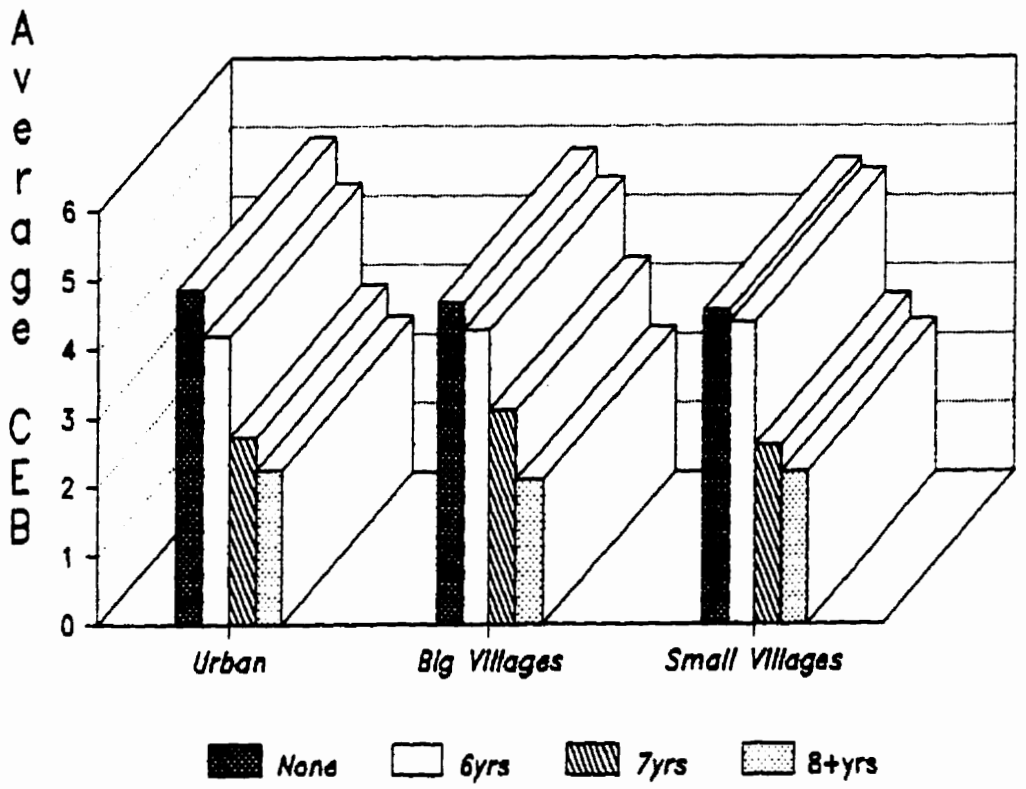
For women with one or more of their children `fostered out' fertility appears to be inversely related to education only in two residential areas: the urban area and small villages of less than 2000 persons. The fertility of women from big villages of 2000-4999 people shows a positive relationship with education. Fertility of these women rises with increasing education, with an abrupt reversal at the highest educational level.

This reflects the transitional state of women from big villages. They are neither in classical traditional societies where strict adherence to traditional practices which have suppressing effects on fertility are practised, nor are they in modern urban societies where contraception is said to be highly practised.

Figure 5.3 shows that, for women who live with all their children under the age of five, fertility tends to be inversely related to education in all types of residential areas.

FIGURE 5.3

AVERAGE NUMBER OF CHILDREN EVER BORN BY FOSTERING, RESIDENCE AND EDUCATION (WHERE CHILDREN ARE NOT `FOSTERED OUT'), BOTSWANA, 1988



Data Source: 1988 Botswana Demographic and Health Survey

Table 5.3 shows that educated urban women with children under the age of five living with relatives, have the lowest fertility (1.60 live births per woman), while urban uneducated women who live with all their children under the age of five have the highest fertility (4.86 live births per woman). Urban fertility of uneducated women is higher than rural fertility of uneducated women from villages of all sizes, among those with unfostered under fives (4.86 live births for urban women, compared to 4.55 and 4.68 live births for women from small and big villages respectively). Even among women with secondary and higher education, urban fertility is higher than rural fertility of women in the same educational category (2.25 live births for urban women compared with 2,11 live births for women from big villages and 2.21 live births for women from small villages). Also, urban women who have completed primary school education have higher fertility than women in the same educational category from small villages (2.72 live births for urban women versus 2.59 live births for women from small villages).

Several studies have tried to explain, sometimes with very little success why education, western education at that, could provoke a rise in fertility among women instead of bringing it down, or why fertility should be higher in the urban than in the rural areas, contrary to the theory of demographic

TABLE 5.3

AVERAGE NUMBER OF CHILDREN EVER BORN TO WOMEN AGED 15-49 YEARS BY FOSTERING, RESIDENCE AND EDUCATION, BOTSWANA, 1988

	WOMEN LIVING WITH ALL THEIR CHILDREN	WOMEN WHOSE CHILDREN LIVE WITH RELATIVES	TOTAL WOMEN
URBAN AREAS			
No education	4.86 (138)	2.59 (29)	4.46(167)
Prim. Incomplete	4.18 (200)	2.41 (49)	3.83(249)
Prim. Complete	2.72 (227)	1.94 (111)	2.46(338)
Secondary+	2.25 (262)	1.60 (82)	2.10(344)
BIG VILLAGES			
No education	4.68 (124)	2.00 (6)	4.55(130)
Prim. Incomplete	4.28 (125)	2.15 (13)	4.08(138)
Prim. Complete	3.11 (141)	2.42 (19)	3.03(160)
Secondary+	2.11 (117)	1.75 (24)	2.05(141)
SMALL VILLAGES			
No education	4.55 (250)	2.92 (13)	4.47(263)
Prim. Incomplete	4.39 (154)	2.63 (8)	4.30(162)
Prim. Complete	2.59 (115)	1.70 (10)	2.51(125)
Secondary+	2.21 (56)	1.61 (10)	2.14(66)
TOTAL	3.54 (1909)	2.03 (374)	3.29(2283)

NOTE: Number of cases are shown in brackets

Data Source: 1988 Botswana Demographic and Health Survey

transition.

Studies in many parts of the world have found that urbanisation and employment in the modern sector are directly related to the level of education, but inversely related to desired family size. These factors are also shown to be positively related to the attitude and use-effectiveness of contraception. It is expected then that (holding all the other factors constant), women with these characteristics would have lower fertility relative to those who do not. It has been shown that the educated, urban women are those who possess those characteristics that often tend to erode their beliefs concerning the practices that are traditional and normative inhibitors of fertility - the practice of prolonged breastfeeding and postpartum abstinence, and strict adherence to normative inter-birth intervals. It may be argued that these women are those who are more prone to use modern and reliable methods of family planning, marry later (or not at all), and they are those whose kinds of jobs are incompatible with raising very large families.

The extent to which these contradictions are reconciled within a particular individual is very significant in determining that individual's reproductive behaviour. This inherent

contradiction in the marriage of the traditional and the modern in individuals undergoing the process of change has been held responsible for the `hump backed' fertility patterns observed in transitional societies.

To have a better understanding of the differentials in the levels of fertility among the various groups of women in Botswana, it is necessary to study the biological and the behavioural variables which are assumed to have a direct influence on fertility. In the next chapter, the impact of these intermediate variables is assessed.

CHAPTER 6

RESEARCH FINDINGS

A model for the sociocultural and behavioural determinants of cumulative fertility among women in Botswana is attempted in this chapter. In addition to the socioeconomic variables discussed so far, intermediate variables, assumed to have a direct effect on fertility are also included in the model.

6.1 A LOOK AT DESCRIPTIVE STATISTICS

The averages and standard deviations for each variable used in the analysis are presented in Tables 6.1 to 6.4. The first two tables include all women between the ages of 15 and 29 years at the time of the survey who have had a birth in the last five years before the survey, classified by educational attainment and by residential status. The remaining two tables refer to the category of women aged 30 to 49 years. This will help distinguish the cohort effects in educational and residential fertility differentials in Botswana.

The averages for each variable used in the analysis provide the basis for the observed fertility differentials. It is

TABLE 6.1

AVERAGES (AND STANDARD DEVIATIONS) OF SELECTED VARIABLES OF ALL WOMEN AGED 15 TO 29 YEARS WHO HAVE HAD A BIRTH IN THE LAST FIVE YEARS BEFORE THE SURVEY BY EDUCATIONAL ATTAINMENT, BOTSWANA, 1988

SELECTED VARIABLES	NEVER BEEN TO SCHOOL	PRIMARY INCOMPLETE	PRIMARY COMPLETE	SECONDARY AND ABOVE
CHILDREN EVER BORN	2.795 (1.545)	2.251 (1.228)	1.952 (1.047)	1.643 (0.878)
PROPORTION FOSTERING OUT	0.152 (0.359)	0.181 (0.386)	0.245 (0.430)	0.240 (0.428)
PROPORTION HAD CHILD MORTALITY	0.090 (0.287)	0.052 (0.222)	0.056 (0.231)	0.034 (0.181)
PROPORTION EVER MARRIED	0.602 (0.490)	0.494 (0.501)	0.413 (0.493)	0.342 (0.475)
PROPORTION USED CONTRACEPTION	0.561 (0.497)	0.601 (0.491)	0.723 (0.448)	0.796 (0.403)
PROPORTION LIVING IN URBAN AREAS	0.311 (0.464)	0.450 (0.498)	0.561 (0.497)	0.619 (0.486)
BREASTFEEDING FOR 2 OR MORE YEARS	0.139 (0.347)	0.085 (0.279)	0.074 (0.261)	0.044 (0.205)
RESPONDENT'S AGE AT FIRST BIRTH	18.107 (2.657)	17.937 (2.365)	18.370 (2.075)	19.165 (2.391)
RESPONDENT'S AGE AT SURVEY	25.000 (3.266)	23.295 (3.626)	23.069 (3.448)	22.973 (3.350)
NUMBER OF CASES	244	271	462	412

very clear from table 6.1 that young women who have attained secondary education and more, compared with each of the educational groups have the lowest fertility (1.15 children less than those who have never been to school); they constitute the highest proportion of women who have ever used contraception; they have the lowest infant and child mortality; they constitute the highest proportion urban and breastfeed for the shortest duration. They also start childbearing later than all the other women and constitute the lowest proportion of women who have ever married.

At the opposite end of the scale are women who have never been to school whose characteristics are an exact opposite of those with secondary and higher education. These uneducated women have the highest fertility of the four educational groups. They have the lowest proportion of women who have ever used modern contraceptive methods; the lowest proportion urban and the highest proportion of women who have ever married. They breastfeed for the longest duration and they are generally older than all the other women.

The data show that women who have been to school, but did not complete primary school education, start their childbearing at a much earlier age of 17.9 years on average.

There is a marked difference between the infant and child mortality of secondary educated women and that of women who have never been to school. These women with high infant and child mortality are those who are less likely to avail themselves of the available health services such as those obtained from maternal and child health (MCH) centres scattered throughout the country.

Differences in sociocultural and behavioural characteristics are also observed among young women from the three different types of places of residence selected as shown in the following table (Table 6.2). From this table, it becomes evident that women from urban areas, compared with women from other residential groups, more educated, more likely to use modern contraceptive methods and are more likely to foster out their children. They have, on average 0.236 children less than women from small villages. There is not much difference in breastfeeding duration and age at first birth among women in all residential groups.

TABLE 6.2

AVERAGES (AND STANDARD DEVIATIONS) OF SELECTED VARIABLES OF ALL WOMEN AGED 15 TO 29 YEARS WHO HAVE HAD A BIRTH IN THE LAST FIVE YEARS BEFORE THE SURVEY BY PLACE OF RESIDENCE, BOTSWANA, 1988

SELECTED VARIABLES	URBAN AREAS (5000+)	BIG VILLAGES (2000-4999)	SMALL VILLAGES (<2000)
CHILDREN EVER BORN	1.975 (1.135)	2.119 (1.276)	2.211 (1.274)
PROPORTION WITH FOSTERING OUT	0.319 (0.466)	0.139 (0.347)	0.069 (0.254)
PROPORTION HAD CHILD MORTALITY	0.052 (0.222)	0.058 (0.234)	0.057 (0.233)
PROPORTION EVER MARRIED	0.483 (0.500)	0.333 (0.472)	0.464 (0.499)
PROPORTION USED CONTRACEPTION	0.761 (0.427)	0.678 (0.468)	0.560 (0.497)
RESPONDENT'S EDUCATION	7.051 (3.358)	6.194 (3.625)	4.654 (3.672)
BREASTFEEDING FOR 2 OR MORE YEARS	0.079 (0.269)	0.078 (0.269)	0.078 (0.269)
RESPONDENT'S AGE AT FIRST BIRTH	18.577 (4.413)	18.484 (2.315)	18.247 (2.373)
RESPONDENT'S AGE AT SURVEY	23.473 (3.405)	23.409 (3.578)	23.334 (3.620)
NUMBER OF CASES	712	345	332

There are also small differences in infant and child mortality among women in all the residential groups. This does not come as a surprise since health facilities in Botswana are well distributed throughout the country. Residents in villages have equal access to health services as urban residents. Those residents who live in remote areas with scattered populations are visited regularly by mobile health clinics. While infant and child mortality differentials are small among women in all residential groups, these differences are more pronounced between secondary educated and uneducated women. This shows the importance of education on child survival in Botswana. Schooling enhances knowledge about effective ways to recognise, treat and prevent childhood diseases and death.

Table 6.3 shows the means and standard deviations of selected variables for women classified by educational attainment and aged 30 to 49 years who have had a birth in the last five years before the survey.

For the older cohort the difference in the mean number of children ever born between women with secondary and higher education, and those who have never been to school is 2.373 which is about twice the difference that was found between the two groups for women in the younger cohort.

TABLE 6.3

AVERAGES (AND STANDARD DEVIATIONS) OF SELECTED VARIABLES OF ALL WOMEN AGED 30 TO 49 YEARS WHO HAVE HAD A BIRTH IN THE LAST FIVE YEARS BEFORE THE SURVEY BY EDUCATIONAL ATTAINMENT, BOTSWANA, 1988

SELECTED VARIABLES	NEVER BEEN TO SCHOOL	PRIMARY INCOMPLETE	PRIMARY COMPLETE	SECONDARY AND ABOVE
CHILDREN EVER BORN	5.862 (2.322)	5.857 (1.957)	4.928 (1.778)	3.551 (1.641)
PROPORTION FOSTERING OUT	0.017 (0.130)	0.054 (0.227)	0.087 (0.283)	0.087 (0.282)
PROPORTION HAD CHILD MORTALITY	0.345 (0.476)	0.278 (0.449)	0.225 (0.419)	0.134 (0.342)
PROPORTION EVER MARRIED	0.769 (0.422)	0.830 (0.376)	0.804 (0.398)	0.709 (0.456)
PROPORTION USED CONTRACEPTION	0.510 (0.501)	0.784 (0.412)	0.833 (0.374)	0.898 (0.304)
PROPORTION LIVES IN URBAN AREAS	0.300 (0.459)	0.440 (0.497)	0.493 (0.502)	0.654 (0.478)
BREASTFEEDING FOR 2 OR MORE YEARS	0.193 (0.395)	0.212 (0.410)	0.181 (0.387)	0.094 (0.294)
RESPONDENT'S AGE AT FIRST BIRTH	19.590 (4.118)	19.197 (2.789)	19.601 (2.463)	21.417 (3.681)
RESPONDENT'S AGE AT SURVEY	36.269 (5.097)	36.093 (4.671)	34.442 (3.396)	33.449 (3.466)
NUMBER OF CASES	290	259	138	127

Older women with secondary and higher education also show the lowest infant and child mortality, the shortest breastfeeding duration, the highest proportion ever using modern contraceptive methods, the highest proportion urban and the highest age at first birth, while women with no education have the highest fertility (5.862 live births compared to 3.551 live births per woman for secondary educated women). They have the highest infant and child mortality, the lowest proportion urban and the lowest proportion of women ever using modern contraceptive methods. However, unlike in the young cohort, in this group it is women who have been to school but did not complete their primary school education who breastfeed for the longest duration.

What is evident from the analysis is the fact that women who have been to school, but did not complete their primary school education start childbearing at younger ages in both the young and the old cohorts.

Table 6.4 shows the means and standard deviations of selected variables for all women aged 30 to 49 years who have had a birth in the last five years before the survey by place of residence.

TABLE 6.4

AVERAGES (AND STANDARD DEVIATIONS) OF SELECTED VARIABLES OF ALL WOMEN AGED 30 TO 49 YEARS WHO HAVE HAD A BIRTH IN THE LAST FIVE YEARS BEFORE THE SURVEY BY PLACE OF RESIDENCE, BOTSWANA, 1988

SELECTED VARIABLES	URBAN AREAS (5000+)	BIG VILLAGES (2000-4999)	SMALL VILLAGES (<2000)
CHILDREN EVER BORN	4.929 (2.113)	5.493 (2.153)	5.786 (2.227)
PROPORTION FOSTERING OUT	0.074 (0.262)	0.034 (0.182)	0.035 (0.184)
PROPORTION HAD CHILD MORTALITY	0.244 (0.430)	0.268 (0.444)	0.307 (0.462)
PROPORTION EVER MARRIED	0.815 (0.389)	0.722 (0.449)	0.794 (0.405)
PROPORTION USED CONTRACEPTION	0.801 (0.400)	0.780 (0.415)	0.537 (0.500)
RESPONDENT'S EDUCATION	5.392 (4.385)	4.468 (3.794)	2.237 (3.090)
BREASTFEEDING FOR 2 OR MORE YEARS	0.179 (0.384)	0.171 (0.377)	0.195 (0.397)
RESPONDENT'S AGE AT FIRST BIRTH	19.881 (3.595)	19.512 (2.788)	19.767 (3.826)
RESPONDENT'S AGE AT SURVEY	34.940 (4.266)	35.610 (4.579)	36.062 (4.971)
NUMBER OF CASES	352	205	257

Older women from small villages show fertility that is 0.857 live births higher than that of women from urban areas. Women from small villages have the highest infant and child mortality. This could be attributable to the low levels of education women from small villages have. Women from small villages breastfeed for the longest duration and have the lowest proportion ever using modern contraceptive methods. However among women in this cohort, it is women from big villages who begin their childbearing at much earlier ages, on average.

Education appears to have a great impact on child survival. For both young and old cohorts and in all the different educational and residential groups, where education levels are low, infant and child mortality are high, and where infant and child mortality are low, fertility levels are also low.

Tabular analyses of fertility differentials showed no differences in the fertility of women classified by labour force participation and religion. Regression analyses also showed that the two variables do not exert any significant influence on fertility. Therefore, labour force participation and religion are excluded from the following regression models.

6.1.1 NULL RELATIONSHIP BETWEEN WOMEN IN THE WORK PLACE AND FERTILITY IN BOTSWANA

There are many possible explanations for the null relationship observed between female employment and fertility in Botswana. Literature reviewed suggests that in instances where the type of work performed by women is typically compatible with child care activities, including breastfeeding, such as in a traditional subsistence economy, an inverse female employment-breastfeeding relationship with fertility would not be found. In contrast, where female employment involves regular and sustained separation between mother and infant, such as in the modern sector, an inverse female employment-breastfeeding relationship with fertility could be found.

In Botswana, mothers working in the modern sector are allowed by the government one hour a day additional time off, for breastfeeding until their child's first birthday, thus making modern sector female employment compatible with breastfeeding. This could be important in accounting for the observed null relationship between female employment and fertility in Botswana. However, breastfeeding being only one factor in widely divergent life style situations cannot fully explain the null relationship between female employment and fertility observed in Botswana.

6.1.2 NULL RELATIONSHIP BETWEEN RELIGION AND FERTILITY IN BOTSWANA

Membership in a religious community can have an appreciable impact on childbearing. However, it is the degree of commitment or intensity of religious feeling that is the important part of the influence that acts upon fertility. For example, in the presence of a strong commitment to the teachings of the Catholic Church, Catholic women would not use contraceptives and would not commit abortion. The intensity of their religious feeling toward abortion and contraceptive use would manifest itself in high levels of fertility for Catholic women, compared with women who adhere to those religions which allow liberal use of contraceptives, all things being equal.

The absence of significant differences among women of various religious groups observed in Botswana could be attributable to the absence of a high degree of commitment to religious teachings, such as those of the Catholic Church regarding contraceptive use and abortion.

6.2 **REGRESSION MODELS**

In this section, the multivariate regression analysis technique is used to isolate the factors significantly associated with the number of children ever born among women in Botswana.

The correlation matrices of all the variables used in the model for the young and old cohorts are presented in the appendix in Tables A.6.1 and A.6.2. For both cohorts, correlations between the dependent variable (children ever born) and independent variables are modest, with the highest being respondent's age at survey (.653 for the young and .581 for the old cohorts). The signs of the correlations in the young cohort are in the hypothesized direction and are significant, except the correlation of children ever born with breastfeeding duration, X_7 , and contraceptive use, X_4, which have signs opposite to the ones hypothesized. This may be indicative of the abandonment of traditional practices of prolonged breastfeeding by young women without adequate contraceptive use to negatively affect fertility. For the older cohort the correlation between breastfeeding duration and children ever born is neither in the right direction nor significant whereas those for the other independent variables are in the hypothesized direction and are significant.

Out of the 36 correlations among the independent variables in each cohort, correlations are generally low, suggesting that multicollinearity may not be a problem.

The following two tables (Table 6.5 and 6.6) present partial regression coefficients from the regression of children ever born on child fostering, infant and child mortality, marital status, contraceptive use, place of residence, respondent's education, breastfeeding duration, respondent's age at first birth and respondent's age at the time of the survey for the young and the old cohorts.

TABLE 6.5

REGRESSION OF CHILDREN EVER BORN ON CHILD FOSTERING, INFANT/CHILD MORTALITY, MARITAL STATUS, CONTRACEPTIVE USE, PLACE OF RESIDENCE, BREASTFEEDING DURATION, RESPONDENT'S EDUCATION, AGE AT FIRST BIRTH AND AGE AT SURVEY FOR THE YOUNG COHORT, BOTSWANA, 1988

INDEPENDENT VARIABLES	B	SE B	BETA	SIG T
CHILD FOSTERING (None=0, 1+ =1)	-.3214	.0398	-.1092	.0000
INFANT MORTALITY (None=0, 1+ =1)	.6834	.0704	.1287	.0000
MARITAL STATUS (Never=0, Ever=1)	.1783	.0344	.0733	.0000
CONTRACEPTIVE USE (Never=0, Ever=1)	-.1253	.0370	-.0479	.0007
PLACE OF RESIDENCE (Rural=0,Urban=1)	-.0536	.0333	-.0222	.1082
BREASTFEEDING (<2yrs=0,2+yrs=1)	-.3902	.0606	-.0843	.0000
RESPONDENT'S EDUCATION (yrs)	-.0200	.0048	-.0601	.0000
AGE AT FIRST BIRTH (yrs)	-.2711	.0075	-.5344	.0000
AGE AT SURVEY (yrs)	.2768	.0056	.8014	.0000
CONSTANT	.8131	.1410	-	.0000
Multiple R	.8792			
R-Square	.7730			
Adjusted R-Square	.7716			
Number of cases	1389			

THE YOUNG COHORT:

The adjusted R-square value of 0.7716 in Table 6.5 implies that 77 percent of the total variation in children ever born is explained by the variables included in the model. (Component contributions to the R-square are shown in Appendix A, Table A.6.5)

The results show that for the young cohort aged 15-29 years, eight of the variables included in the model contribute significantly to the variation in fertility. Of the eight significant variables five are associated with a significant reduction in fertility. These are age of respondent at first birth, breastfeeding duration, respondent's education, contraceptive use and child fostering. All the significant variables in the model are in the hypothesized direction. All the results control for age at the time of survey.

The coefficient on children fostered out is negative, suggesting that, for young women, sending out children to live with relatives reduces the total number of children ever born per woman. This lends support to the hypothesis that child "fostering out" is negatively related to fertility. However, this finding is in contrast to the findings of Meekers (1991); Isiugo-Abanihe (1991) and Caldwell and Caldwell (1990) in West African countries such as Ghana, Nigeria and Sierra Leone,

where child "fostering out" was cited as one of the main contributors to persistent high fertility in sub-Saharan Africa. This finding suggests that, for young women in Botswana, unlike in West Africa, child "fostering out" is not associated with high fertility, instead it has a reducing effect on it. The number of children ever born to women with one or more children under the age of five living with relatives is about 32 percent less than those born to women who live with all their children.

Reasons for child "fostering out" are many and varied. First child rearing is a big responsibility which adds an additional strain on young women trying to advance themselves educationally, secondly the types of jobs available to young women in the modern sector are not compatible with profuse childbearing both of which could force young women to foster out their children in order not to let education or job opportunities pass them by. In other words child "fostering out" provides convenience to young women returning to school or entering the work force. However, child "fostering out" is not without cost, which may be psychic and/or economic.

In a changing society, such as Botswana, many traditional institutions, such as the extended family system with its advantages of shared childrearing get eroded and replaced by

new ones such as the nuclear family and Day Care Centres which are fee charging, kinship ties get weakened and the pool of willing acceptors of relatives' childrearing responsibility disappears. Child "fostering out" then becomes emotionally and economically costly to young women, forcing them to reduce their fertility.

The strong significance of this variable reflects that deterioration of traditional extended family system, emotional and economic costs of child "out fostering", both of which indirectly force young women to curb their childbearing in order to have the convenience of pursuing other interests outside childbearing, such as labour force participation in the modern sector and higher educational levels. Gradual disappearance of traditional extended family system may be one of the distinguishing factors between the level of transition of Botswana and that of West African societies where child fostering within the extended family system is still at the stage which reinforces high fertility.

The negative regression coefficients on breastfeeding duration indicates that young women who breastfeed for two years and longer, have about 39 percent less children than those who breastfeed for less than two years. This is attributable to the fact that in Botswana breastfeeding is traditionally

associated with various sexual taboos among which is observance of sexual abstinence by nursing mothers. These traditional practices serve to protect the nursing mother from becoming pregnant and thus increase the average interval between births. By lengthening the interval between births breastfeeding contributes to an overall decrease in the number of children a woman may have.

The negative coefficient on respondent's age at first birth indicates that the older the respondent at first birth, the fewer the number of children ever born per woman. Postponement of one year of the respondent's age at first birth decreases the number of children ever born by 27 percent, holding all the other variables in the model constant.

The standardized coefficients suggest a clear hierarchy in fertility determination. In descending order of importance the coefficients are: respondent's age at first birth, which is by far the most important, infant and child mortality, child fostering, breastfeeding duration, marital status, respondent's education and contraceptive use.

Women who have ever used modern contraceptive methods have about 13 percent less children ever born than those who have never used any method at all. Child loss, as opposed to none,

increases the number of children ever born by about .68, more than half a child per woman, on average. Significant differences are observed in fertility by education. The model shows that the higher the education, the lower the number of children ever born. However, one year's increase in respondent's education reduces young women's fertility by only 2 percent, all things being equal.

THE OLD COHORT

Table 6.6 shows partial regression coefficients from the regression of children ever born to women aged 30 to 49 years, on child fostering, infant and child mortality, marital status, contraceptive use, residence, education, breastfeeding duration, age at first birth and age of respondent at the time of the survey. For older women, four variables are associated with significant reduction of cumulative fertility. They are respondent's age at first birth, respondent's education, urban residence and breastfeeding duration. Women who breastfeed for two years or longer have about 30 percent less children ever born than those women who breastfeed for periods shorter than two years. While a delay of one more year of the age of the respondent before first birth reduces the number of children ever born by 29 percent on average, an increase of one year in respondent's education reduces the number of children ever born by only 7 percent, holding all the other independent

TABLE 6.6

REGRESSION OF CHILDREN EVER BORN ON CHILD FOSTERING, INFANT/CHILD MORTALITY, MARITAL STATUS, CONTRACEPTIVE USE, PLACE OF RESIDENCE, BREASTFEEDING DURATION, RESPONDENT'S EDUCATION, AGE AT FIRST BIRTH AND AGE AT SURVEY FOR THE OLD COHORT, BOTSWANA, 1988

INDEPENDENT VARIABLES	B	SE B	BETA	SIG T
CHILD FOSTERING (None=0, 1+ =1)	-.1737	.2041	-.0176	.3951
INFANT MORTALITY (None=0, 1+ =1)	.7117	.1055	.1444	.0000
MARITAL STATUS (Never=0, Ever=1)	.8340	.1098	.1566	.0000
CONTRACEPTIVE USE (Never=0, Ever=1)	.1212	.1054	.0251	.2506
RESIDENCE (Rural=0,Urban=1)	-.2771	.0937	-.0627	.0032
BREASTFEEDING (<2yrs=0,2+yrs=1)	-.2957	.1186	-.0512	.0128
RESPONDENT'S EDUCATION (yrs)	-.0682	.0124	-.1275	.0000
AGE AT FIRST BIRTH (yrs)	-.2910	.0136	-.4635	.0000
AGE AT SURVEY (yrs)	.2809	.0108	.5898	.0000
CONSTANT	.6581	.4236	-	.1207
Multiple R	.8185			
R-Square	.6699			
Adjusted R-Square	.6663			
Number of cases	814			

variables constant. While contraceptive use and child fostering play a significant role in reducing the total number of children ever born per woman for the young cohort, their influence is not significant for the old cohort. Unlike in the young cohort where urban residence had no effect on the fertility of young women, it has a significant fertility reducing effect in the old cohort. Old women who live in urban areas have about 28 percent fewer children than their rural counterparts.

Child loss and marital status are associated with an increase in fertility. For the old cohort, a standardized regression coefficient of -.4634 confirms that the respondent's age at first birth is the single most influential variable in the reduction of fertility in this group. All the independent variables in this model together explain about 67 percent of the variation in children ever born (The Adjusted R-square is .6663). Component contributions to the R-square are shown in Appendix A, Table A.6.6.

Three variables emerge as the most important factors in reducing fertility in Botswana. For both cohorts, age of respondent at first birth, breastfeeding duration and education come out clearly as significant determinants of fertility reduction in the country. Of the three, age of

respondent at first birth emerges as the single most important variable influencing fertility reduction. As mentioned earlier, respondent's age at first birth serves as a proxy for the age at sexual union or marriage. In addition to the above three important variables, contraceptive use, and child fostering emerge as important variables which reduce fertility among women in the young cohort. These are major factors requiring policy and programme attention in Botswana.

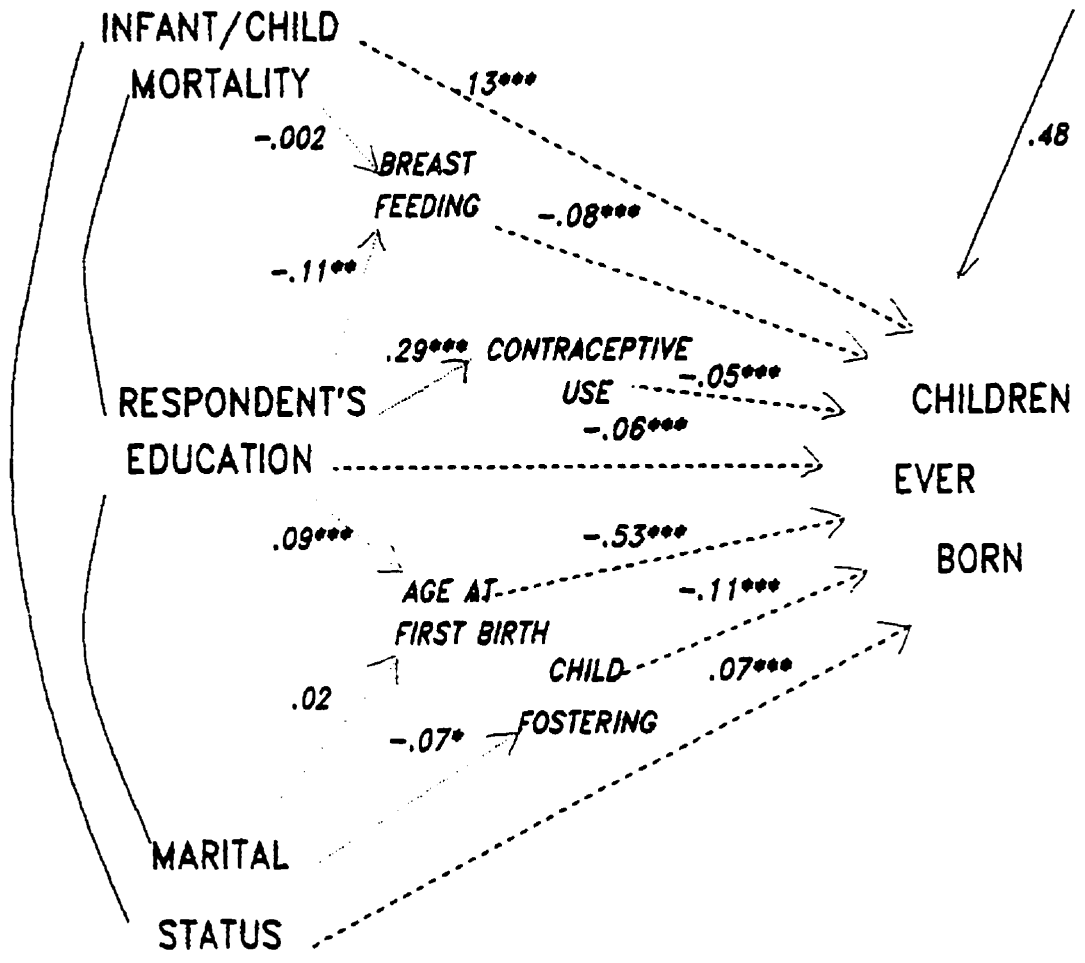
6.3 **PATH MODELS**

THE YOUNG COHORT

The following path diagram is a graphic representation of a hypothesized causal model. The model shows that all variables affect children ever born directly, however, infant mortality, respondent's education and marital status also do so indirectly by way of their influence on breastfeeding, contraceptive use, age at first birth and child fostering. The curved lines on the left indicate that while there is a relation between infant mortality, education and marital status, no causal assumptions are made about it. The numbers on the lines are beta weights (path coefficients) expressed in z-scores. For example the -.53 on the line between age at first birth and children ever born means that every 1.0 standard deviation increase in age at first birth leads to a

FIGURE 6.1

PATH DIAGRAM FOR THE YOUNG COHORT, BOTSWANA, 1988



*** P<.001; ** P<.01; * P<.05

.53 standard deviation decrease in children ever born. The figure .48 on the line coming from outside the system is the residual `e'. It is the part of the dependent variable not explained by the independent variables. Squaring the residual coefficient gives the percentage unexplained by the total model. This means that 23 percent of the total variance is unexplained by the model pictured in this diagram. Indirect effects are obtained by multiplying path coefficients. For example indirect effect of infant and child mortality on children ever born we multiply the effect of infant mortality on breastfeeding (-.002) times the effect of breastfeeding on children ever born (-.08). This will give an indirect effect.

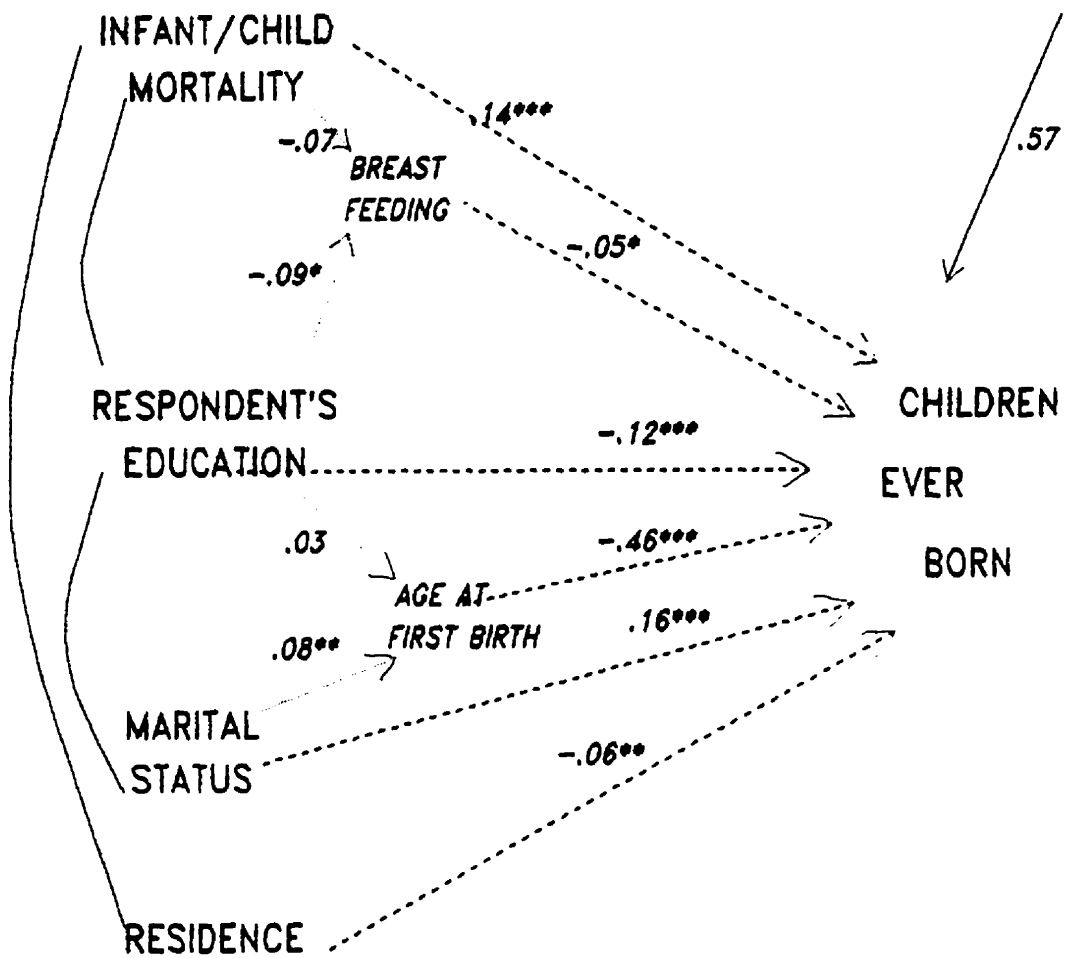
That education increases age at first birth, which in turn decreases fertility confirms what was hypothesized in the theoretical framework on chapter 3.

THE OLD COHORT

The following path diagram (Figure 6.2) for the old cohort is interpreted along the same lines as the one for the young cohort. For the old cohort, education operates through breastfeeding and age at first birth only. It has no influence on contraceptive use. Residence is added to the model, and only has a direct influence on children ever born.

FIGURE 6.2

PATH DIAGRAM FOR THE OLD COHORT, BOTSWANA, 1988



*** P<.001; ** P<.01; * p<.05

6.4 REGRESSION STANDARDIZATION

Variations of the regression standardization technique are many and varied and dependent upon the focus of the researcher (Coleman, Blum, Sorenson and Rossi, 1972; Althauser and Wigler, 1971). While researchers such as Winsborough and Dickenson (1969) use a four-fold regression decomposition, which divides the fertility difference into four components, viz intercepts component, coefficient component, means component and the interaction component, the decomposition technique employed in this research separates the observed fertility difference into two components, namely the characteristics component and the age composition component.

The main focus of this section is to test the characteristics hypothesis. This hypothesis claims that fertility differentials of subgroups are mostly a reflection of all the social, demographic and economic attributes that characterise them. This approach would lead one to expect fertility differences to disappear once such factors (characteristics) are controlled. The study of the background characteristics, expressed as averages of all the independent variables included in this study, allows us to test for the characteristics approach.

This procedure actually tests for the possible assimilation effects on the assumption that once all the characteristics differences between two groups are equalized, their fertility difference would be expected to disappear under the postulates of the assimilation thesis (often referred to as the characteristics assimilation hypothesis.

In this section an attempt is made to find out if the distinct fertility of the old and the young cohorts of women in the study merely reflects the matrix of social, demographic and economic attributes that characterize these two groups. This will be accomplished through the use of regression standardization. It is expected then that the observed fertility differences will disappear once the factors are controlled.

REGRESSION STANDARDIZATION PROCEDURE

Let

Y_o =cumulative fertility of old cohort (average CEB)

Y_y =cumulative fertility of young cohort (average CEB)

X_{ic} =characteristics of old cohort
(average of the ith explanatory variable)

X_{iy} =characteristics of young cohort
(average of the ith explanatory variable)

α_o =regression intercept for old cohort

α_y =regression intercept for young cohort

b_{ic} =regression coefficient for the ith explanatory variable for old cohort.

b_{iy} =regression coefficient for the ith explanatory variable for young cohort

REGRESSION EQUATION FOR OLD COHORT

$$Y_o = .6581 - .1737(\text{child fostering}) + .7117(\text{IMR}) + .8340(\text{marital status}) + .1212(\text{contraception}) - .2771(\text{residence}) - .2957(\text{breastfeeding}) - .0682(\text{education}) - .2910(\text{age at first birth}) + .2809(\text{age at survey}).$$

$$= .6581 - .1737(.052) + .7117(.270) + .8340(.785) + .1212(.713) - .2771(.432) - .2957(.173) - .0682(4.163) - .2910(19.752) + .2809(35.463).$$

$$= 5.3415$$

REGRESSION EQUATION FOR YOUNG COHORT

$$Y_y = .8131 - .3214(.215) + .6834(.055) + .1783(.441) - .1253(.693) - .0536(.513) - .3902(.073) - .0200(6.265) - .2711(18.475) + .2768(23.424)$$

$$= 2.0673$$

Then:

A. Cumulative fertility of old cohort with its own characteristics

$$Y_o = \alpha_o + \Sigma b_{io} X_{io}$$

$$= .6581 + 4.6834$$

$$= 5.3415$$

B. Cumulative fertility of young cohort with its own characteristics

$$Y_y = \alpha_y + \Sigma b_{iy} X_{iy}$$

$$= .8131 + 1.2542$$

$$= 2.0673$$

C. Cumulative fertility of old cohort with young cohort's characteristics

$$Y_o = \alpha_o + \Sigma b_{io} X_{iy}$$

$$= .6581 + 1.0661$$

$$= 1.7242$$

This is the expected number of children the old cohort would have if they took on the characteristics averages of the young cohort, while maintaining their regression coefficients (i.e., the way in which they translate unit changes in characteristics variables into fertility).

D. Cumulative fertility of young cohort with old cohort's characteristics

$$Y_y = \alpha_y + \Sigma b_{iy} X_{io}$$

$$= .8131 + 4.5059$$

$$= 5.3190$$

This is the expected number of children the young cohort would have if they took the characteristics averages of the old cohort, while maintaining their regression coefficients (i.e., the way in which they translate unit changes in characteristics variables into fertility).

The above results support the characteristics hypothesis in that when all the background characteristics are controlled, the differences in fertility between the old and the young cohorts are equalized. When the cumulative fertility of the old cohort was standardized against the characteristics of the young cohort the fertility of the old cohort was brought down to a low level of 1.7242 from a high of 5.3415 children; and upon standardizing the cumulative fertility of the young cohort against characteristics of the old, the young cohort's cumulative fertility rose to 5.3190 from 2.0673 children.

We can now decompose the 3.2742 cumulative fertility average difference observed between the old and the young cohorts. The following section attempts to disentangle the factors producing the observed differences. The aim is to separate out the proportion of the difference in cumulative fertility between the two cohorts due to characteristics effect, and the proportion due to age effect.

E. Change in old cohort due to characteristics

$$\mathbf{A} - \mathbf{C} = 5.3415 - 1.7242$$

$$= 3.6173$$

This is the reduction in fertility of old cohort if they took on the average characteristics of the young cohort. That is 68 per cent reduction in fertility.

F. Change in young cohort due to characteristics

$$\mathbf{B} - \mathbf{D} = 2.0673 - 5.3190$$

$$= -3.2517$$

This means an increase in the young cohort's fertility and therefore a rise of 157 per cent.

G. Best estimate of characteristics effect

$$(E + F)/2 = (3.6173 + 3.2517)/2$$

$$= 3.4345$$

H. Change in old cohort due to age

$$A - D = 5.3415 - 3.4345$$

$$= 1.9070$$

I. Change in young cohort due to age

$$B - C = 2.0673 - 1.7242$$

$$= .3431$$

J. Best estimate of age effect

$$(H + I)/2 = (1.9070 + .3431)/2$$

$$= 1.1251$$

Standardization produced a total decrease of 4.5596 children, contributed by a change in characteristics which decreased cumulative fertility by 3.4345 (see **G** above), and a change in age composition which decreased cumulative fertility by 1.1251 (see **J** above).

From a policy standpoint this makes it clear that equalizing background characteristics of women would bring about a considerable reduction in cumulative fertility in Botswana.

CHAPTER 7

SUMMARY, POLICY IMPLICATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

7.1 SUMMARY OF FINDINGS

The study has focussed on the social, cultural, economic, biological and behavioural factors that directly and indirectly affected the reproductive behaviour of women in Botswana. The measurement description and explanation of these factors have been attempted at the individual level.

Principal analytical techniques used were chi-square tests for categorical data and linear multiple regression analysis was used to examine the independent association between children ever born, the dependent variable, and selected independent variables.

It was hypothesized that several well accepted variables would be associated with children ever born. Differentials in fertility by education and residential status were computed.

The analysis indicated that the negative relationship often presumed to hold between fertility and level of education is not necessarily monotonic. Fertility differentials by education shifted from positive to negative as the transition occurred.

A multivariate analysis was performed with child fostering, infant/child mortality, marital status, contraceptive use, place of residence, breastfeeding duration, respondent's education, age at first birth and age at the time of the survey, to explore the fertility variation among women age 15 to 49 who have had births in the last five years before the survey. The respondents were classified into two age cohorts, 15 to 29 and 30 to 49 years.

Results indicate that age at first birth, breastfeeding duration and education were significantly associated with fertility reduction in Botswana for all women. However, for young women, contraceptive use and child fostering in addition to the above three were significant contributors to fertility reduction. Marital status and child loss were associated with an increase in fertility. Age at first birth, which increased with increasing education, emerged as the single most important determinant of fertility in Botswana.

It is an important finding of this thesis that child "fostering out" is negatively related to fertility in Botswana. Although this finding is unexpected, it is not implausible. It can be attributed to the changes in the sociocultural and behavioural profile of young women in Botswana, as well as the improvements in the socioeconomic institutions offering young women alternatives to childbearing and opportunities to pursue interests such as education and job opportunities outside home.

7.2 **IMPLICATIONS FOR POLICY**

Population policy may be defined as a governmental statement of demographic goals and identification of specific measures designed to change demographic behaviour in order to meet these goals. Many government actions or non-actions influence demographic trends and levels but population policy includes only actions which are established with the intent of affecting population trends.

The concern of the government and the people of Botswana is the high rate of population growth which is estimated to be about 3.6 per cent per year. The demographic significance of this high rate of population growth is the shortening of the number of years it will take the population to double itself.

Growing at the present rate, the population of Botswana will double itself in about 20 years. Granted the already existing built-in momentum for rapid growth of the population, an acceleration of this growth pattern, is not desirable for the country because of the developmental problems it may pose, as well as the quality of life it may produce. It is the realization of this problem that calls for an urgent need for a population policy to avert or cushion some of the diseconomies of this pattern of growth.

The formulation of policies related to fertility requires great caution because of the complex ways in which mechanisms operate to affect fertility. Also, many of the obstacles that fertility policies encounter are traceable to inadequate analysis of the problem at the outset. When introducing changes, especially in social contexts, it is always important to consider existing social structures, norms and traditions. There are countries in the developing world for example where monumental financial investments in family planning technology and contraceptive merchandising have not yielded the desired results. The reasons may be traced back to the neglect of details of the social organisation and of those biological and social factors affecting fertility. Often times family planning programmes are initiated by foreign "experts" who may not only know little about local customs, but also give no

thought to the effect the innovation might have on the society. A clear understanding of the socio-cultural, economic, biological and behavioural factors would enhance an understanding of the fertility problem and consequently aid in the formulation of appropriate policy intervention programmes.

Increasing formal education, for example, has been cited by many theorists as playing an important part in fertility decline; and results from this study support this contention. Women who have secondary and higher education have smaller families and are more likely to use contraception than their less educated counterparts. However, a closer look at the data suggests that rising education may not be a cure for high fertility. The inverse relationship between parental education and fertility exhibits variation. Modest increases in exposure to formal schooling do not always lead to lower fertility. Results from this study showed that women who have been to school but did not complete their primary school education have fertility that is higher than that of women who have never been to school. The reason is not that these women are less ready to use contraception. On the contrary they report higher levels of contraceptive use than uneducated women. The reason for their high fertility lies partly in shortened lactation which offsets the contraceptive effect. It is only when women have achieved secondary or higher schooling that

reduced fertility becomes evident. Women with secondary schooling have fewer children largely because of delayed age at first birth and greater contraceptive use.

The findings about education raise a major policy issue concerning the type of policy that should be pursued in Botswana where education is unlikely to reduce fertility immediately and may in fact increase fertility in the short run. The negative coefficient on respondent's education suggests among other things that women's education should receive priority. It then becomes imperative that emphasis should be placed primarily on universal secondary education for women. Included in the curriculum should be all aspects of family life education. This should be coupled with diffusion of facts about family planning and advantages of use to those with little or no formal education. Studies by Cochrane (1979), on the relationship between female education and fertility from least literate countries indicate that secondary education has more immediate negative effects on fertility. Diffusion of family planning to those with little or no education has successfully worked in countries such as Indonesia and Thailand where a large proportion of couples have received little or no formal education. In Latin America fertility reduction is occurring among the least educated sectors of the population. This serves to prove that lack of

formal education cannot be regarded as an unconquerable impediment to radical changes in reproductive behaviour.

On the other hand, favourable attitudes toward greater use of contraception, especially modern contraceptives, can play a major role in further declines of fertility in Botswana. Special emphasis should be placed on women from small villages of less than 2000 persons who, the study shows, are the least educated and least users of contraception. To accelerate the decline in fertility, it is necessary to improve their status and condition.

Another factor which came out as significantly affecting fertility in Botswana is breastfeeding duration. The study showed that although the average duration of breastfeeding is shorter for women who are younger, more educated and living in urban areas than for the more traditional groups, the practice is widely observed and cuts across all sectors of the population of women. These findings strongly suggest that modernisation is accompanied by a decline in breastfeeding. A substantial reduction in duration of breastfeeding which is unaccompanied by increased contraceptive use would raise fertility.

When formulating a policy related to fertility, it may be more appropriate, in the context of Botswana, to adopt an approach which uses people's traditions as an ideological basis. In this respect it will be much easier to convince them to use those traditional methods which have a suppressing effect on fertility. Practices, such as breastfeeding which is traditionally associated with various sexual taboos, among which is the observance of sexual abstinence by nursing mothers, could be emphasized alongside modern methods of contraception and should be seen not as inferior substitutes, but as complements until such times when the practice of modern contraception has gained ground.

Until contraceptive prevalence rates in Botswana reach levels comparable with developed countries, breastfeeding, with its accompanying contraceptive practices, remains one of the most important variables affecting birth intervals and thus indirectly, fertility levels.

Age at first birth, which is increased by increasing education, thus reducing fertility, is the single most important factor which emerged from the study as significantly affecting fertility in Botswana. An increase of one year of respondent's age at first birth reduces young women's fertility by 27 percent, holding all the other independent

variables constant. From a policy point of view, this means that planners need to come up with strategies that will encourage young women to postpone the age at which they give birth for the first time.

Postponement of age at first birth can lower fertility substantially. When the social, the economic and the cultural climate change, and other factors which reduce the level of fertility are in operation, age at first birth is likely to be raised. Among socioeconomic measures contributing to postponement of age at first birth as a determinant of fertility decline are education, vocational training, improved employment opportunities outside the home, and other social and economic opportunities for women. To the extent that age at first birth is raised in this way, it may at the same time reinforce other social changes which tend to reduce fertility, such as the transformation of the extended to nuclear family patterns. Provision of more child-care centres will afford women opportunities to pursue interests such as education and job opportunities outside the home, thus reducing fertility.

The conclusions presented above indicate that the formulation of policies related to fertility requires great caution because of the complex ways in which various mechanisms operate to affect fertility.

7.3 **NEED FOR FUTURE RESEARCH**

The need for further research in the field of fertility determinants and differentials in Botswana is manifested, since not all the variables closely related to fertility were available for examination in this thesis. Men, for example were not interviewed and many of the important characteristics which are closely related to fertility were not available. With reference to breastfeeding, the questions should be directed to all women and not only to those who have had a birth in the last five years. This will help diminish the upward bias in the consideration of women with high fertility. Men should also be included because of the important role they play in fertility

More importantly, there is a great need for the incorporation into the questionnaires of qualitative questions that will help interpret the answers to some of the quantitative data. This can be done by asking women about the rationale of their behaviour. Further research will permit us to have a better understanding of reproductive behaviour as it relates to culturally determined beliefs and practices concerning fertility.

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APPENDIX A

TABLE A.6.1

CORRELATIONS OF SELECTED VARIABLES FOR WOMEN AGED 15 TO 29 YEARS WHO HAVE HAD A BIRTH IN THE LAST FIVE YEARS BEFORE THE SURVEY, BOTSWANA 1988 (N=1437)

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}
X_1	1.00	-.105***	-.110*	.141***	.248***	.077**	.043	.003	-.009	-.151***
X_2		1.000	.023	.042	-.026	-.067*	.014	-.081**	.128***	.246***
X_3			1.000	.060*	.085**	-.067*	.051*	.026	.360***	.366***
X_4				1.000	.154***	.222***	.038	.023	.260***	.126***
X_5					1.000	.207***	.005	.037	.007	-.078**
X_6						1.000	-.114***	.214***	-.140***	-.321***
X_7							1.000	-.060*	.130***	.077**
X_8								1.000	.340***	-.285***
X_9									1.000	.653***
X_{10}										1.000

Variables are: X_1 =child fostering; X_2 =infant/child mortality; X_3 =marital status; X_4 =contraceptive use; X_5=urban residence; X_6=education; X_7=breastfeeding duration; X_8 =age at first birth; X_9 =age at survey; X_{10} =children ever born.

*** p<0.001; ** p<0.01; * p<0.05

TABLE A.6.2

CORRELATIONS OF SELECTED VARIABLES FOR WOMEN AGED 30 TO 49 YEARS WHO HAVE HAD A BIRTH IN THE LAST FIVE YEARS BEFORE THE SURVEY, BOTSWANA 1988 (N=846)

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}
X_1	1.000	-.008	-.094**	.063*	.096**	.117**	.030	.035	-.092**	-.128***
X_2		1.000	.083*	-.041	-.051	-.181***	-.020	-.125***	.246***	.375***
X_3			1.000	.008	.069*	-.032	.021	-.049	.102**	.247***
X_4				1.000	.168***	.329***	.002	-.055	-.160***	-.101**
X_5					1.000	.263***	-.007	.047	-.097**	-.164***
X_6						1.000	-.099**	-.176***	-.226***	-.371***
X_7							1.000	-.017	.131***	.044
X_8								1.000	.182***	-.403***
X_9									1.000	.581***
X_{10}										1.000

Variables are: X_1 =child fostering; X_2 =infant/child mortality; X_3 =marital status; X_4 =contraceptive use; X_5 =urban residence; X_6 =education; X_7 =breastfeeding duration; X_8 =age at first birth; X_9 =age at survey; X_{10} =children ever born.
*** p<0.001; ** p<.01; *p<.05

The following Table indicates how much each independent variable contributes towards the .7730 R-square of the young cohort

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TABLE A.6.5 CONTRIBUTION OF INDEPENDENT VARIABLES TOWARDS THE R-SQUARE OF THE YOUNG COHORT

INDEPENDENT VARIABLE	R-SQUARE CHANGE	CONTRIBUTION MADE BY INDEPENDENT VARIABLE
RESPONDENT'S AGE AT SURVEY	.43042	.43042
RESPONDENT'S AGE AT FIRST BIRTH	.71935	.28893
CHILD FOSTERING	.73886	.01951
INFANT/CHILD MORTALITY	.75422	.01536
BREASTFEEDING DURATION	.76016	.00594
RESPONDENT'S EDUCATION	.76651	.00635
MARITAL STATUS	.77058	.00407
CONTRACEPTIVE USE	.77260	.00202
URBAN RESIDENCE	.77303	.00043

Table A.6.6 indicates how much each independent variable contributes towards the .66994 R-square of the old cohort.

TABLE A.6.6 CONTRIBUTION OF INDEPENDENT VARIABLES TOWARDS THE R-SQUARE OF THE OLD COHORT

INDEPENDENT VARIABLE	R-SQUARE CHANGE	CONTRIBUTION MADE BY INDEPENDENT VARIABLE
RESPONDENT'S AGE AT SURVEY	.32881	.32881
RESPONDENT'S AGE AT FIRST BIRTH	.59994	.27113
INFANT/CHILD MORTALITY	.62427	.02433
MARITAL STATUS	.64703	.02276
RESPONDENT'S EDUCATION	.66290	.01587
URBAN RESIDENCE	.66664	.00374
BREASTFEEDING DURATION	.66911	.00247
CHILD FOSTERING	.66911	.00000
CONTRACEPTIVE USE	.66994	.00083

APPENDIX B

DAVIS AND BLAKE'S INTERMEDIATE VARIABLES

1. Factors Affecting Exposure to Intercourse ("Intercourse Variables"):

   A. Those governing the formation and dissolution of unions in the reproductive period

      (1) Age of entry into sexual unions
      (2) Permanent celibacy: proportion of women never entering into sexual unions
      (3) Amount of reproductive period spent after or between unions

         (i) when unions are broken by divorce, separation or desertion
         (ii) when unions are broken by death of husband

   B. Those governing the exposure to intercourse within unions.

      (4) Voluntary abstinence
      (5) Involuntary abstinence (from impotence, illness, unavoidable but temporary separations)
      (6) Coital Frequency (excluding periods of abstinence)

11. Factors Affecting Exposure to Conception ("Conception Variables"):

      (7) Fecundity or infecundity, as affected by involuntary causes
      (8) Use or non-use of contraception

         (i) By mechanical and chemical means
         (ii) By other means

      (9) Fecundity or infecundity, as affected by voluntary causes (sterilization, sub-incision, medical treatment etc.)

111. Factors affecting Gestation and Successful Parturition ("Gestation Variables"):

      (10) Foetal mortality from involuntary causes
      (11) Foetal mortality from voluntary causes.