INTRODUCTION

1.1 Role of Vital Statistics
1.2 Objectives
1.3 Methodology
1.4 Collection of Data
1.5 Demographic Concepts
1.6 Literature Survey
1.7 Organization of the Thesis
1.1 Role of Vital Statistics:

In popular perception, the data on human mortality, morbidity and demography captured through either Census or through Registration of birth/death/marriage is just a little more than a population enumeration exercise. Actually, it is much more. It is the best report card that captures the living conditions and progress of millions of Indians over decades. Economic indicators tell us only about GDP, income, stock market condition; but demographic indicators tell us as to how birth rate, death rate, infant mortality rate, marriage age, literacy rate, gender gap, female sex ratios and fertility rates etc are changing and therefore, reflect real ‘progress’ more than just abstract GDP growth or poverty reduction figures.

Presently, India are facing double digit inflation and increasing unemployment despite rapid growth in GDP. It is because policy makers lack proper understanding of the demographic diversity of India and its ripple effect on social and economic planning. As a result, we have two India: one “rich & affluent India” having all luxuries and second “resource scarce India” that is struggling to meet two ends.

If India has to sustain economic growth, it needs to slow down the rate of population growth which in turn, leads to equitable social and economic development. Consistent high rate of growth in Indian population for six decades has already translated into manifold increase in labour force in the productive
age group (15-60 years). As even the high rate of economic growth is not leading to expansion of employment opportunity for millions of people every year, caste like "gujjars" in Rajasthan are demanding reservations which, in turn, are posing a threat to the nation.

The science of demographic indicators is called "Vital Statistics (VS)" which is part of biometry statistics that, in turn, deals with data and the laws of human mortality, morbidity and demography. Biometry deals with the changing pattern of the population of any region, community or country in terms of the number of births, deaths and marriages. It deals with mankind in the aggregate. It is the science of numbers applied to the life history of communities and nations. Vital Statistics are being extensively used in almost all the spheres of human activity.

To be precise, the term VS refers to the numerical data occurring in the given diction of the population. By Vital Statistics, we mean such events of human life as fertility and mortality (births and deaths), marriage, divorce, separation, adoptions, legitimating, etc. Sir Arthur Newsolme defines Vital Statistics as "The whole study of mankind as affected by heredity or environment in so far as the results of this study can be arithmetically stated".

The study of Vital Statistics - in form of population estimation, population projections and other allied studies together with birth and death statistics according to age and sex distributions - provides indispensable fundamental
tools to any administration for the overall planning and evaluation of economic and social development programmes. Likewise, mortality and nationality statistics also provide milestones for use of researchers in medical and pharmaceutical profession.

Apart from policy makers, Vital Statistics facts and figures related to births, deaths and marriages are also of extreme importance to various executing agencies for a variety of administrative purpose. For instance, mortality statistics serve as a guide to the health authorities for sanitary improvements, improved medical facilities and public cleanliness. Similarly, the data on the incidence of disease are of paramount importance to health authorities in taking appropriate remedial action to prevent or control the spread of the disease. To illustrate, abnormal death rate signal epidemic and arrangements can be made for inoculation or vaccination by local governance.

In world of trade & commerce, entire actuarial Science, including life insurance is based on the mortality or life tables. The vital records concerning all possible factors contributing to deaths in various ages are indispensable tool in all life insurance schemes.

1.2 Objectives:

In India, policy orientation towards economic prosperity has overshadowed public health for decades. Consequently, the nation has well liberalized economy, but
lack adequate social security acts. The Acts such as the PCPNDT and the age of marriage are result of people’s demand rather than government thinking. When sex ratio decreased at an alarming rate, a policy framework has been put in place to curb female foeticide. The objective of this thesis is, therefore, to undertake threadbare analysis of core demographic indicators of Vital Statistics such as foetal wastage, gender preference, missing female, fertility ratios, housing needs etc and put findings in right perspective before policy makers so as to facilitate decision making before these issues assume alarming proportions. Most of these issues are already posing problems in developed economies such as Singapore, EU-27, the USA etc. and sooner or later, India would also have to address it. Hence, the study undertaken will be helpful to the society at large and to the government for planning and decision making purpose.

1.3 Methodology:

The thesis focus on trends & changing composition in child sex ratio, fertility, population, housing needs, still birth rate etc. For this purpose, data and information has been sourced through primary and secondary sources. The secondary data pertaining to population figures, number of live and still births, deaths etc was collected. This apart, Focus Group Discussion (FGD) was conducted by research student in Ahmedabad and Gandhinagar. Information was also gathered regarding method of data collection, usage, data gaps etc. This was done through both personal observation as well as group discussion.
Field visit was undertaken to collect secondary information from the office of (i) Chief Registrar, Gandhinagar (ii) Census Bhavan, Gandhinagar & Ahmedabad (III) Bureau, Gandhinagar, (iv) Health care Department, Gandhinager, (v) Civil hospital, Gandhinager. In addition, primary information was collected from patients in Civil Hospital, Gandhinagar using structured questionnaire.

Analysis: The collected data was compiled, tabulated and analyzed using statistical packages like SPSS. Considering diversity of demographic indicators various statistical tools & models were applied on data. Before examining the results of the analysis, it is important to deliberate on pros and cons of data sources.

1.4 Collection of Data:

The vital Statistics data are usually obtained by the (i) Registration method and/or (ii) Census method.

Data captured through “Registration method”:

“The Registration of Birth & Death Act, 1969” in India provides for compulsory registration of birth & death and matters connected therewith such as marriages, immigration etc. According to the act, each state/UT needs to appoint Chief Registrar & records in the office of Chief Registrar are the most important source
of obtaining vital statistics data. At the time of registration on birth, a person has to provide information on place of birth, sex, age and religion of the parents, legitimacy, number of previous issues and their sexes, father’s occupation and birth place of parents. Similarly, for registration of death one needs to furnish information on place of death, sex, age, marital status, number of issues, birth place, occupation and cause of death. Similar information is also obtained with respect to marriages and migrants. In addition to their statistical utility, these data also have their value as legal documents.

The problem with this data is that the Union Government has enacted the legislation, but left the onus of implementing the legislation to the state. Consequently, the registration of births is non-existent in remote parts of the country and incomplete in varying degrees in all parts of the country. At state level, office of Chief Registrar has been created at state capital and cities, but beyond that point, the task is entrusted to local governing bodies such as village “patil” which fail to appreciate seriousness of the issue. This is affecting both the availability as well as the quality of the data. As a result, the statistics of births suffer from the error of under estimation.

Data captured through “Census Method”:

Another source of information is usage of data collected under “The Census Act, 1948”. It is very authentic and reliable source of information regarding age, sex,
marital status, occupation, religion and other economic and social characteristics. But the main drawback of the census method is that it provides vital statistics only for the census years and fails to give any information about the vital events in the interim periods. Moreover, the release of all this data took five years or more, by which time these had ceased to have much practical relevance.

1.5 Demographic Concepts:

In every study, there are certain basic concepts, which should be carefully and properly understood. Without their proper understanding, the whole study will lead to misleading conclusions. The basic demographic concepts relevant to the present study are explained below:

Population Projection:

Population projection is a theoretical concept. Projection are neither estimate, nor forecasts or predictions but in between forecasts and predictions. It is also equally wrong to think that projection is only guess work and nothing beyond that. Projections are less precise than scientific quantities. According to H. P. Dorn² ‘Projection should be treated as only statements about the size and age composition of population, which would be at some distant future date, if fertility, mortality and migration follow a particular line’.
Population Forecast:

Population forecast is a projection in which the assumptions are considered to yield a realistic picture of probable future development of a population.

Migration:

The happenings of certain events may oblige or influence people to move to a new place, and movers may have various aims in mind, when they go. Such a movement of a people is called migration.

Family Planning:

Family planning refers to use of modern contraceptives or natural techniques to limit or space pregnancies. Modern methods of contraception include the pill, female and male sterilization, IUD, injectables, male and female condom, diaphragm, foam/jelly and emergency contraception. Traditional methods include periodic abstinence, withdrawal and folk methods.

Fertility and Fertility Preference:

Fertility is the standard of measuring the capacity of the woman to produce children. In the words of Thompson and Lewis\(^3\), ‘The term fertility is generally
used to indicate the actual reproductive performance of a woman or group of women. The crude birth rate is only one measure of fertility.' Fertility of a woman continues till she reaches menopause stage. Usually this stage reached at the age of 45 to 50. For getting a better idea of the fertility situation prevailing in a community it is necessary to compute the fertility rates for different age groups of mother's separately.

**Fertility Rate:** The number of live births during a year per 1000 female population aged 15-49 years at the mid point of the same year.

**AGE Specific Fertility Rate (ASFR)** gives the number of live births in a particular age group per 1000 of mid year female population of the same age group.

**The general fertility rate (GFR)** gives the number of live births occurring to 1000 females during their reproductive span (15-49 years) in a given year.

**The total fertility rate (TFR)** gives the average number of children a woman can produce during her child bearing years (i.e. 15-49 years).

**The gross reproduction rate (GRR)** gives an idea of the capacity of a woman to produce female children during her fertility period.
**Growth Rate:** The exponential average annual rate of population growth, expressed as a percentage.

**Annual Population Growth Rate:** The annual average rate of change of population size for a given country, territory or geographic area during a specified period.

**Crude Birth Rate:** The Crude Birth Rate (CBR) is defined as the number of live births in a year per 1000 of the mid year population.

**Infant Mortality Rate:** Infant Mortality Rate (IMR) is defined as the number of infant deaths in a year per 1000, live births during the year.

**Maternal Mortality Rate and Maternal Mortality Ratio:** The maternal mortality rate is the number of maternal deaths to women age 15-44 / 15-49 per 1,00,000 women of the respective age group, during pregnancy, childbirth or within 42 days after termination of pregnancy due to complication of pregnancy or childbirth.

**Fecundity:**

Fecundity is that stage in the life of a girl, by which she becomes capable of becoming a mother, no matter whether she has actually become mother or not. If she is capable of giving birth to a child, she is called fecund. In the words of
Thompson and Lewis, ‘Fecundity dents the physiological capacity to conceive and bear children. Thus it is quite obvious that a fecund woman may be fertile, but a fertile woman must be fecund because if she is not fecund, her fertility has no meaning’.

**Marriage:**

Marriage has been defined by the statistical commission of the U. N. O. as, ‘The legal union of persons of opposite sex. The legality of such a union may be established by civil, religious or other means as recognized by law of each country and irrespective of the type of marriage, each should be reported for vital statistics purpose’.

**Live Birth:**

In some countries including Spain and Cuba, a child who expires within 24 hours of his birth is not considered a live birth, but is included in abortion. In other words he is not included in the category of death either. In some countries only such children are considered as live ones who are alive on the day of their registration and not others and in these countries, registration of children is permissible even many days after the birth of the child. According to U.N.O., ‘Live birth is the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy, which after such
separation, breathes or shown any other evidence of life, such as beating of the heart, pulsation of the umbilical cord or definite movement of voluntary muscles, whether or not the umbilical cord has been out or the placenta is attached’.

**Still Birth:**

According to U.N.O., ‘A still birth is a fetal death occurring late in the gestation period. Late is usually defined as after 28 completed weeks of gestation’.

**Fetal Death:**

According to U.N.O., ‘Fetal death is a death prior to the complete expulsion or extraction from its mother of a product of conception irrespective of the duration of pregnancy, the death is indicated by the fact that after extraction, the fetus does not breathe or show any other evidence of life’.

**Semi-natal Death and Neo-natal Death:**

Death which occurs within a period of 7 days from the birth of a child is known as semi-natal death. Death which occurs within a period of 4 weeks from the birth of a child is known as neo-natal death.
**Post-Neo-natal Death:**

Those deaths which take place between periods of 4 weeks from the birth of a child to 12 months are known as post-neo-natal deaths.

**1.6 Literature survey:**

Guillot, M (2002) has reconstructed the trend in the population sex ratio in India between 1971 & 1996. According to him, the mortality of females relative to that of males in India has increased since 1968. However, the population sex ratio increased between 1971 & 1981, stayed constant between 1981 & 1991, and started to decrease only after 1991. This means that the recorded decrease and increase in the periods 1971-81 and 1981-91 respectively were both spurious and were the results of under counts of females in 1971 and 1991. Another implication of this finding is that owing to the lagged effect of past mortality on current trend in the population sex ratio, this ratio is a bad proxy for use in the study of changes in differential mortality by sex.

Wiji Arulampalam and Sonia Bhalotra (2004) in their paper entitled “Inequality in Infant Survival Rates in India: Identification of State-Dependence Effects” investigate whether on top of these correlated risks, these is a causal process at work within families, whereby the death of a child elevates the risk of death of the succeeding sibling, borrowing language from the unemployment literature, the
causal process is termed state dependence or scarring. To the extent that scarring exists a social multiplier comes into play raising the payoff to policies that reduce infant mortality. Acknowledging scarring effects is also potentially relevant to understanding the relation of mortality & fertility behavior within families.

Arunkumar Acharya (2004) has considered the study to show the effect of gender preference causing the missing of total number of female in Indian society, which has considered as a fact of intolerance and violence against the women. He also suggested that gender preference closely associated with the decline sex ratio, infant & child mortality. If female become scarce, the situation may improve the status of women in the long term.

S. P. Bhardwaj, S. P. Singh & G. C. Sharma (2005) in their paper entitled “An Analysis of Birth Intervals by considering hazard rates” attempted to look into the phenomenon of parity progression from reliability or survival point of view based on the models for hazard rates obtained by Panchal (1992), wherein it has been assumed that fertility rates decline uniformly by parity. The hazard rates decline gradually with advancement in parity. Distribution of women in the first parity with respect to the time of birth and hazard rates of birth for first parity has been obtained from a cohort of 313 females. Later on, a comparative analysis between observed mean & standard deviation to the expected mean and standard deviation of time interval also has been done.

R. L. Bhat and Namita Sharma (2006) discussed that the growth in incomes and education of women are the two variables that would grant women equal status in society, have actually worked in a reverse direction in states like Punjab, Haryana and Himachal Pradesh. Discrimination against females is engineered even before birth through female foeticide. It seems that education and incomes, which were supposed to result in the emancipation of women, have actually increased, not lowered, the bias in favor of the male child.

Rubiana Chamarbagwala and Martin Ranger (2007) suggested that an urgent need for policies that attempt to lower son preference. While economic growth and resultant changes it will bring about - such as higher levels of education and wealth - are much needed to improve human development levels in India, these
changes can be detrimental to survival of females. Moreover, even though policies that control fertility are of utmost importance to curb India’s spiraling population, fertility decline may dramatically deteriorate of spring sex ratios in the country. Thus policies targeting daughter preference and the economic returns to raising daughters are essential in order to restore more balanced sex ratio in India. Some policies need to make daughters more economically attractive to parents by providing education to girls, not only in school but also in college as well as reserving skill jobs for women may help raise the economic return to investing in daughters relative to sons. Further strict enforcement of the minimum age at marriage for women and anti-dowry legislation may make daughters a more attractive option for parents.

Nathanael Lauster (2007) discussed the most common demographic method for measuring the effects of imbalances in the sex of family behaviors is through use of variation in sex ratio. The sex ratio is commonly defined as the number of men per 1000 women.

Henriene Engelhard and Alexia Prskawetz (2007) found that country and time heterogeneity with respect to female labor force participation may explain the change in the cross country correlation between FLP and TFR. They also presented the clear evidence of the modifying effect of regions of the female participation rate has changed over time. Hence any analysis on the macro level requires to control for country heterogeneity but also for time varying country heterogeneity.
1.7 Organization of the Thesis:

The chapter 1 serves as an introduction to the thesis. It defines important basic demographic concepts relevant to the thesis. Different measures of mortality like CDR, IMR, MMR, SDR, STDR etc and different measures of fertility like CBR, GFR, TFR, ASFR, GRR etc are defined.

In recent years a big demand has been developed for estimation of future population. The main reason for this demand is probably economic plans for the production of food, the supply of power and the manufacture of goods which are to be based on advance knowledge of likely changes in the number of people for whom the production is designed. Our constitution recognizes housing as a basic necessity and provision of housing facility has been one of the main concerns of our policy makers. Realizing the importance of housing, the policy makers and planners, included home sites for landless laborers as one of the items in the minimum needs programme. Better housing is essential, for a better economic and social future, which not only increases the standard of living and health of individuals but also improves the overall development. In chapter 2 an attempt has been made to estimate the population of Gandhinagar for the period 2000-2020 and to estimate the housing needs in Gandhinagar.

In chapter 3 an attempt has been made to examine the crude impact of Sex, Maternal Age and type of delivery on still birth rate, on one hand and the relative
effect of each of these factors individually, in the absence of the influence of other factors on the other hand. The analysis has direct bearing on population policies – for instance, in Singapore the fertility rate has dropped to 1.16 per cent in 2010 as against asking replacement rate of 2.1 per cent and therefore, the Singapore Government has introduced “Baby bonus” scheme paying out whopping $ 230 million incentive to parents. Even Government of India could make Integrated programme of health and family planning of more realistic if policies are backed by adequate research on foetal wastage and infant mortality rates. Further it has been noted that the causes of still birth and abortions are multiple and the importance of each of those causes is not implicitly determined.

In chapter 4, we considered the study of different attempts made for reducing Birth Rate, study of fertility trend in Gujarat and the comparative view of various fertility rates of Gujarat and India as well as their trend between 1981 & 2007. Further, the Projection of important Key Fertility Indicators like CBR, GFR and TFR of Gujarat for 10th and 11th Plan Period is also considered. Some meaningful conclusions emerging from the study are mentioned.

In chapter 5 an attempt has been made to study the trend of child sex ratio of 0-6 year age group in the State, as if the whole family for the reasons of transfer or any economic profession is migrating even then only 0-6 year age group
population migrates. It highlights that the effect of migration due to other reasons on the child sex ratio is nominal.

In chapter 6, we discuss the efforts initiated to curb the trend of population growth in rural Gujarat and analyze the reasons for failure in achieving the targeted rates and suggest possible remedies.

In chapter 7, an attempt has to be made to show and to study the effect of gender preference which, in turn, leading to the missing of total number of female in Indian society. It also paints the picture of intolerance and violence against the women in right perspective.

In chapter 8, an attempt has been made to examine the determinants of decline child sex ratio in India. The results suggest that the child sex ratio is inversely related to spatial socio economic characteristics, in particular, female literacy rate and female economic activity rate; with relatively higher elasticity coefficients for urban India. The spatial spillover effects associated with juvenile sex ratio is controlled in the models, however the spatial dependence of the phenomenon was found insignificant. The monotonic decline in the juvenile sex ratio over the last four decades despite the improving socio economic characteristics reinforces the existence of gender discriminatory practices which starts even before birth, which require urgent attention of public policy, as improving literacy
and economic value of women is necessary but not sufficient enhancing the relative life chances of girl child.

Reduction of maternal mortality (MMR) is one of the major challenges to improve the overall quality of life. Death due to pregnancy and child birth are common among women in the reproductive age groups. Reduction of mortality of women has thus been an area of concern and governments across the globe have set time bound targets to achieve it. The International Conference on Population and Development in 1994 had recommended reduction in maternal mortality by at least 50 percent of the 1990 levels by the year 2000 and further one half by the year 2015. The Millennium Development Goals (MDG) have set the target of achieving 200 maternal deaths per lakh of live births by 2007 and 109 per lakh of live births by 2015.

Earlier efforts have been constantly made by the Government to meet the challenge of rapid reduction in maternal mortality by launching appropriate interventional strategies. The programme on Reproductive and Child Health (RCH) initiated in 1997 has been one such effort to ensure that women have access to information and services for reproductive health care.

In India the proportion of institutional deliveries is low (less than 4) percent as per the National Family Health Survey III [NFHS-III]. Every seven minutes a maternal death occurs, leading to more than 77,000 Indian women dying each year.* Most
maternal deaths can be prevented if deliveries are attended by Skilled Birth Attendant (SBA) and proper Antenatal Care (ANC) and Post Natal Care (PNC) is received. Furthermore, institutional deliveries are encouraged for women with potential complications since home deliveries lack the type of emergency obstetric care (EmOC) that trained health professionals in an institution can provide. As part of an effort to reduce the nation's MMR, the Government of India (GOI) has developed programmes promoting safe and healthy deliveries for pregnant women.

In general, women belonging to socially excluded groups such as BPL, Scheduled Tribes (STs), and Scheduled Castes (SCs) have the highest MMR because of limited resources and lack of access. Since socially excluded women are particularly susceptible to poor maternal health, additional efforts must be made by the government to reach these women. Targeted efforts must be made by the government to reach these women. Targeted efforts are being made at both the national and state levels. In this chapter 9 case study will analyze these efforts aimed at promoting institutional births especially among socially excluded women in Gujarat, India.

The chapter 10 deals with the development of information network for vital statistics for generating, collating and analyzing the data. Presently there is no mechanism in place, to regularly monitor and evaluate vital statistics in our country as to facilitate further research. Therefore, there is an urgent need to
establish a information network for collection, tabulation and analysis of vital statistics on a regular basis with the help of internet technology. A system is suggested in this chapter. Conclusions of all chapters have been given in chapter 11 and light has been thrown on the areas of future research.