THE IMPACT OF DEVELOPMENT PROJECTS ON SOME SOCIO-DEMOGRAPHIC VARIABLES: A COMPARATIVE STUDY OF ATAT HOSPITAL'S WOMEN'S GROUPS IN RURAL ETHIOPIA

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LIST OF ACRONYMS:

AIDS	Acquired Immuno Deficiency Syndrome
HIV	Human Immuno Virus
NFPP	Natural Family Planning Programs
TBA	Traditional Birth Attendant
CHA	Community Health Agent
PH	Public Health
CSA	Central Statistical Authority
NOP	National Office of Population
PA	Peasant Association
TGE	Transitional Government Of Ethiopia
UN	United Nations
CEB	Children Ever Born
FPM	Family Planning Method

ABSTRACT

A growing consensus on the demographic impact of development projects began to emerge in the international community that economic growth alone was not enough and that the demographic and social objectives of development should be addressed. The fertility impact of development projects, which has acquired increased importance since the last two and a half decades, has now gained the attention of policy makers and program initiators particularly in developing countries.

This thesis is an empirical study on some socio-demographic impact of development project, namely Atat Hospital's Women's Groups in two comparative communities (community receiving project and the one not receiving it) in rural Ethiopia. Twenty one women's groups in beneficiary community and four Peasant Associations in non-beneficiary community in Cheha wereda of Gurage zone constitute the study material with representative ever-married sample women of 348 and 400 respectively.

Various socio-economic and demographic situation of the project and non-project communities are elaborated based on empirical data. Religion, education, self perceived economic well-being, child loss experience, a woman's decision-making autonomy, age, age at first marriage, current and life-time fertility, marital status and marriage type, maternal and child health care, water, sanitation and hygiene are included. Besides, the duration of staying of participation in women's groups, knowledge and use of natural and modern family planning are treated in detail.

The objectives of the study include to examine, analyze and compare: the knowledge and practice of family planning; the fertility of ever-married women; the variation, if any, in environmental sanitation, maternal and child health care in the project and non-project communities using some of the health indicator variables. It was also meant to determine the relative importance of each of the explanatory variables on life time fertility. Finally, on the basis of the findings to identify issues relevant for program intervention, policy formulation and further research. Towards these end bi-variate, Multiple Classification Analysis (MCA) and Ordinary Least Square (OLS) multiple regression techniques were employed.

The results of bi-variate analysis show that in spite of the socio-cultural and demographic similarities, the beneficiary ever-married women have much higher levels of maternal and child health care, access to potable water, sanitation and hygiene. They also have more knowledge of family planning, lower estimated total fertility rate (TFR), and attitude towards small family size; higher unmet need for contraception, higher decision-making autonomy and perceived economic well-being .

The results of OLS regression analysis revealed that age, age at first marriage, two and at least three children loss through death, above grade seven education, perceived economic well-being, current use of modern contraception, decision-making autonomy, and five years and above participation in women's groups were found to have significant relationship with fertility in the project group. About 41% of the variation in fertility (CEB) was significantly explained by the above-stated variables. For the non-project ever-married women, age, age at first marriage, two and at least three children loss through death, grade seven and above education and current use of modern contraception were significantly related to fertility. About 62% of the variation in fertility was significantly explained by these stated predictors.

Based on major findings of the study, the thesis indicates major areas for further research, policy and program intervention. These include more combined quantitative and qualitative research on the effects of development projects in other parts of Ethiopia including the Atat Hospital's Programs; and more comprehensive and effective family planning, reproductive and child health program. These can lead to the reduction in fertility, maternal and child mortality, upgrading the status of women through decision making autonomy which in turn contribute to attaining the fertility and mortality objectives of the National Population and Women Policy of Ethiopia.

1.0 INTRODUCTION

1.1 BACKGROUND

Ethiopia is currently experiencing an unprecedented increase in population size as a consequence of which it is becoming increasingly vulnerable to all the problems associated with an imbalance between population growth and the resources necessary to sustain it. Available archival materials show that the population was growing at an annual average rate of 0.2 per cent per annum at the turn of the century but rose to 2.0 per cent by 1950 and to 2.9 per cent at the time the 1984 census was taken (TGE, 1993; Assefa, 1994). In 1994 Ethiopia had a total population of 50.325 million excluding the population of Somali Region (Abdulahi and Strong, 1997). Currently, the country has a total population of 58.7 million with an estimated growth rate of 3.1 per cent per year (World Population Data Sheet, 1997; TGE, 1993). It is also estimated that the population will exceed 81 million by the year 2010 and reach as high as 112 million by the year 2025 (World Population Data Sheet, 1997). The present demographic trends suggest that if appropriate measures are not taken at the right time, Ethiopia will have to bear the burden of rapid growth of population which is unmatched with its resources and socio-economic development in the years ahead. At the present rate of growth, the time required for the population to double is about twenty three years.

Two demographic factors responsible for such dramatic growth are increasing high fertility rate on the one hand and slowly declining mortality rate on the other. Available data

indicate that the total fertility rate (TFR), which is the average number of children an average woman will have during her reproductive years assuming that she experiences the age specific fertility rates of the current or present period, increased from 5.8 children per woman in 1970 to 7.7 children per woman in 1990 (TGE, 1993; Assefa, 1994). However, fertility varies considerably by place of residence. In urban areas fertility increased from 4.7 children per woman in 1970 to 6.3 in 1984 but moderately declined to 5.8 in 1990. On the other hand, the total fertility rate in rural areas seems to have continuously increased from 5.8 children per woman in 1970 to 7.5 in 1984 and to 8.1 in 1990. Since the majority (about 85%) of the Ethiopian population lives in rural areas, total fertility for the country is mainly determined by the rural total fertility rate.

Mortality levels showed a moderate decline, as measured by crude death rates, infant mortality rates and life expectancy, for the past two decades. For instance, the crude death rate declined from 20 deaths per 1000 population in 1970 to 16.4 in 1990. The infant mortality rate declined from 153 deaths per 1000 live births in 1970 to 110 in 1990; and life expectancy at birth increased from about 44 years in 1970 to about 54 years in 1990 (CSA, 1991; Assefa, 1994). The adverse consequences of high population growth on development have recently attracted the attention of not only researchers but also planners and policy makers. Studies made by the UN, 1988; Kosiniski, 1985; Ekanem and Arowolo, 1994, Kebede, 1994; Bilsborrow and DeLargy, 1985 show that development projects are important in changing the socio-economic conditions of the population. There is also evidence to suggest that changes in population variables are caused by changes in socio-economic factors. Therefore, development projects can be useful in reducing high population growth by changing the socio-economic conditions of the population. Various programs and projects have been undertaken in many developing countries aimed at improving the general welfare of the population through development of infrastructural

facilities (like irrigation, dams, roads, etc.), provision of services such as health, education, credit, family planning, and rural agricultural extension.

1.2 THE NEED TO ASSESS THE DEMOGRAPHIC IMPACT OF DEVELOPMENT PROJECTS

When allocating scarce resources, it is useful for planners to know the indirect demographic benefits (or costs) which may result from certain types of project and to consider how desired effects can be enhanced and undesired effects minimized. As Barlow (1982) argued:

> irrigation projects, by raising rural incomes, may conceivably cause a rise in fertility. This could happen if, for example, children were viewed as a normal consumption food, or if the improved nutrition and health permitted by higher incomes lowered the frequency of miscarriages. A rise in fertility may eventually cancel out the economic improvement initially achieved. It seems logical to argue that project planners should be aware of the demographic impact of the development projects should be designed to optimize this impact.

Policy decisions based on cost-benefit analysis that does not take full account of interactions between demographic and socio-economic factors will therefore tend to be biased, constructing the achievement of development objectives (Oberai, 1992). Policy makers can theoretically consider the potential impact of development on migration and fertility during the planning process, such explicit consideration rarely takes place, partly because of the absenceof empirical information required to quantify the demographic impact of development interventions (Barlow, 1982).

Very little is currently known about the demographic impact of most development projects and about the ways in which the country setting and the historical and cultural context intervene between the development projects and demographic outcomes. As a result, planners lack methodologies for projecting, monitoring and analyzing the probable

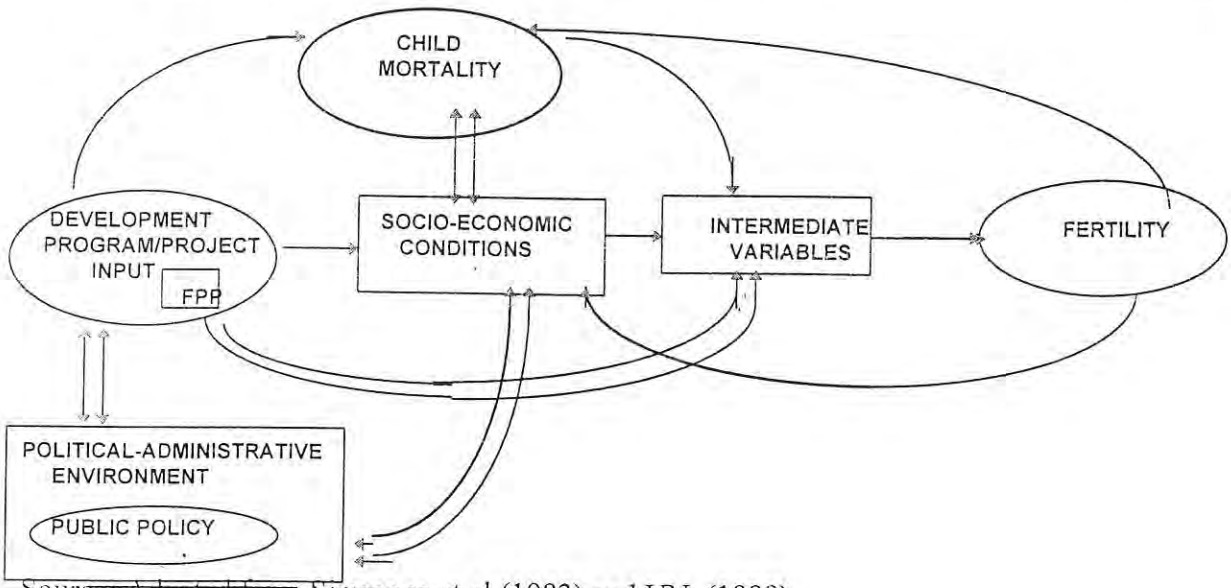
demographic consequences of development projects.

The usefulness of demographic impact assessment, for planners, lies not only in investment allocation or priority ranking of development projects-which are often primarily based on socio-economic benefit and cost considerations - but also in the improvement of project design so that the impact on fertility will tend in the direction prescribed by national policy, downwards in almost all developing countries.

1.3 CONCEPTUAL THEORETICAL FRAMEWORK

A theoretical conceptual framework linking development project input, socio-economic conditions and some demographic variables of fertility may be represented by the logical flow chart below.

Figure 1.0 A Theoretical Framework For Assessing Some Demographic consequences Of Development Programs/Projects



Source: Adapted from Simmons et al (1983) and UN (1988)

Generally, the impact of development program/project input upon fertility is viewed as indirect, operating through changes in the socioeconomic conditions (improvements in income and health due to acquisition of pure water, use of health services, use of latrine, improvement in decision making autonomy of women, etc.) that affect the demand for children which in turn affects fertility. It should be clear that even projects/programs designed to affect fertility could work either directly on the intermediate variables or indirectly through changes in social and economic structure. Family Planning Programs operate directly; projects/programs designed to modify fertility by influencing infant/child mortality work indirectly as shown by the arrow from development program/project to infant/child mortality or to the socio-economic conditions in Figure 1.0.

The child mortality impact of development project operates either directly, for instance, provision of health (medical) services to the target population directly affects the infant/child mortality; or indirectly through the socio-economic changes in the population. Infant/child mortality affects and is affected by the socioeconomic conditions and a low condition of the latter has an adverse effect on the former. Child mortality also affects fertility (CEB) by influencing the intermediate variables. For example, high child loss experience through death motivates people to have more children in order to replace the dead ones and this operates by modifying the norms and values concerning reproduction.

The political-administrative system and the socio-economic conditions play independent roles and each has some impact on the other. The political-administrative system (though not treated in the present study) is a key determinant of policy development, program implementation, and thereby fertility decline. The political-administrative system refers to the authoritative system for mobilizing and allocating public resources. It includes the government and its administrative structure, political parties or ruling coalitions that

participate in the authoritative allocation of resources in society. This system establishes long-term goals, articulates interests, directs public action, and maintains order. Public policy here refers to the strategic decisions concerning population goals, program organization, and the allocation of resources. The specific policy adopted by a given country affects program implementation. The important conditions in this variable set include the nature of demographic goals and their stated relationship to individual and collective welfare, the timing of an explicit antinatalist policy statement, the organizational strategies adopted, and the changes that occur after the policy introduction.

It should also be noted at this juncture that development programs/projects affect many areas of social welfare, not only fertility and mortality. They may have implications for health, gender roles, reproductive freedom, etc. which are not the subject of this paper.

1.4 THE RESEARCH DESIGN

One of the most critical aspects of demographic impact assessment is the selection of an appropriate *study design*. The *classical experimental design*, whose major features are the randomization in selecting treatment and control groups, and collection of data related to periods before and after the specific development intervention for ascertaining that observed differences are attributable to the project or program. But it is known that an experimental research protocol in the context of operational projects is all but impossible. Implementing a Quasi-experimental(or 'before' or 'after') design that doesn't include control groups but involves collection of survey data before project implementation (which is not-existent in the present study project of Atat) and after project maturation also often takes too much time and resources (Oberai, 1992). It also has met with only limited success in controlling for negative and positive confounding variables which have taken place in the experimental

area.

Very often, then, researchers are left with the option of using *non-experimental or 'with' and 'without' design*, i.e. comparing areas receiving a project with those not receiving it. In the present study this research design is employed. I have selected the comparison group (non-beneficiary) using my own judgment based on approximate pre-project similarities between the two groups in terms of socio-economic, cultural, geographic, ethnic and religious characteristics.

1.5 METHODOLOGICAL PROBLEMS

The present study is conducted with the following major methodological problems which are common to other demographic impact assessment studies. First to the extent that development projects/programs influence demographic behavior mainly indirectly through changes in variables such as income, employment, health and education it is often difficult to trace out the demographic effects through changes in these intermediate variables. Another major methodological problem in specifying a model is the difficulty in ascertaining the degree to which observed changes in socio-economic conditions are due to the introduction of the project input and the extent to which these changes are due to exogenous factors. Without being able to isolate changes in the social and economic factors due solely to the introduction of the development project, it is often difficult to conclude that the changes in the demographic variables are purely the consequences of the development project.

At any particular point in time, many developmental project activities may operate simultaneously in a given area. As a result, it is necessary to ascertain the extent to which

observed changes in the socio-economic variables are due to the project input and the extent to which these changes are due to other development inputs that are not considered. Without linking observed changes in socio-economic variables to the specific development project, it is again difficult to conclude that changes in the demographic parameters are the consequences of the development project.

In undertaking an assessment of the demographic effect of a development project, one will rarely find two population groups identical (in the strict sense/meaning of the term) in every respect at the time when the input was given to one population group and not to the other. Consequently there may be a selection bias in the choice of areas or households which receive a project. As a result of this it may not be correct to assume that observed demographic differences are due to the project rather than the result of other underlying differences. The variables that are not studied explicitly, therefore, disturb the internal consistency between the two groups. The unavailability of demographic and socioeconomic (baseline) data for the two selected communities (beneficiaries and non beneficiaries of the project) before or during the time of establishment of the project at *Sise* village adds to the above stated problems and hinders the examination of longitudinal (time trend) analysis.

Short-term effects are usually different from long-term effects. In a demographic impact assessment study, measured effects depend on the time-frame used, and different periods of time between the initiation of a development programs/projects and the time when its (the expected occurrence of the demographic) effects are evaluated will give different assessments on the dependent variable. If too short a time-frame is selected, the demographic effect under study may not be manifested. If the time frame is too long, its inputs may be diffused in to the non beneficiary communities. Diffusion might be due to the spill-over of development inputs into the unserved areas - if these are particularly adjacent

to the beneficiary areas - or to other exogenous factors occurring over the longer term. Therefore, the difficulty of controlling the 'diffusion effect' between and among communities, further affects the demographic assessment of development projects. Besides the methodological problems, to the writer's knowledge no comprehensive study on the topic has been made in Ethiopia. As a result lessons that would be drawn from other similar studies could not be used. Nevertheless, some of the indicated problems that are usually encountered in demographic impact assessment studies, are used as a final to the design of the present study generally and in the analysis of the findings in particular.

1.6 LITERATURE REVIEW

1.6.1 DEVELOPMENT PROJECTS AND FERTILITY

The formulation of development policies and their implementation through programs and projects are primarily concerned with issues related to the social and economic development of a country. The second order effects on the demographic variables are rarely considered (Kosinski, 1985; Kebede, 1994). The United Nations Population Fund (UNFPA), however, initiated steps to facilitate the incorporation of population concerns in development activities (Jain and Stoeckel, 1986). Following the World Population Conference of 1974, work in the field of population generally and that of a number of international organizations concerned with population passed through a period during which the basic premise underlying population activities was reexamined. This led to a number of attempts to integrate population concerns fully into development planning.

Studies of the demographic effects of development projects in Thailand, the Philippines and Bangladesh showed that villagers of project areas generally had lower fertility ideals; they were less traditional with respect to son preference; contraception was much more prevalent and fertility was considerably lower (UN, 1988). Increased (informal) education and outside contacts also helped to ameliorate the constraints of women in the project area.

The effect upon fertility of development projects with no specific demographic target is hypothesized to operate indirectly through their effect on socio-economic conditions of the community in the project areas. This indirect effect of development projects operates on socio-economic structures such as increased employment opportunity and income; these in turn affect family planning use (UN, 1988). Oberai (1987) wrote that development projects influence demographic behavior only indirectly through changes in variables such as income, employment, health and education.

Three studies on the impact of development projects on fertility in Sri Lanka concluded that development projects do affect fertility (Stoeckel and Jain, 1986; UN, 1988). They identified two statistically significant linkages within this relationship, i.e., the effect of development projects upon socio-economic structure and the effect of changing structure upon family planning and fertility. They also found that the magnitude of the effects reflecting the former linkages are greater than the magnitudes of the effects reflecting the latter linkages.

Almost all correlation coefficients measuring the total effects of development projects upon fertility were found to be statistically significant. In the Sri Lanka study cited above, except for the land settlement scheme, the average current fertility (during five years prior to the interview) for couples who benefited from other projects (rural electrification and the guaranteed price scheme) was lower than that of couples who did not benefit from any of

the three development projects. A similar result was obtained in Thailand where current fertility was lower for couples in households with electricity than for couples in households without electricity (UN, 1988; Mueller and Anderson, 1982).

An investigation by Pramote Prasartkul and colleagues in Thailand, found that substantial positive socio-economic and demographic changes occurred as a result of an irrigation project. The socio-economic changes included increased multiple cropping, more regular employment, and higher levels of production. The demographic changes seemed to occur through improved health, changes in the perceived cost of children, and, most clearly due to increased use of family planning (Bilsborrow, 1988).

Vlassoff (1988) noted that the impact of the Comilla Agricultural Program in Bangladesh resulted in considerably lower fertility in Sreebollobpur village compared to the national average. i.e., in the study village women aged 40-44, for instance, had borne 6.0 children on average in 1979 compared to 7.1 for Bangladesh. Vlassoff further indicated that Sreebollobpur villagers generally had lower fertility ideals and were less traditional with respect to son preference than had been found in surveys conducted elsewhere in Bangladesh.

Development projects often offer an opportunity to introduce ancillary informal educational programs, taking advantage of the good-will and the sense of moving forward created in the project area. Mueller and Anderson (1982) argued that if formal education has a negative effect on fertility, the same should be true for informal education systems. In this category one may include the Women's Program (which is the focus of this study), youth clubs, the dissemination of various educational materials and agricultural extension education. These efforts have a common aim - to make new knowledge available to the village people and to modernize their attitudes and behaviors.

1.6.2 CHILD MORTALITY AND FERTILITY

It is reported that a reduction in infant and child mortality may lead to a reduction in fertility (UNECA, 1981; UN, 1988). Improvements in infant and child health resulting from access to health facilities, health education, credit programs, and mothers' education reduce the positive effect of infant and child mortality on fertility (Caldwell, 1986; Frankenberg, 1995; Rosenzweig and Schultz, 1982; Hossain, 1989).

Theoretical studies and empirical evidence suggested that there are at least five possible ways through which infant/child mortality affects fertility. These are replacement effect, biological effect, insurance effect, dependency burden effect and community effect (Chaudhury, 1982; Chandran, 1989; Sufian and Johnson, 1989, and Oslen, 1980).

The *replacement* effect is the one whereby couples are motivated to have additional births in order to compensate the loss of infants and children due to mortality. This is quite common in countries where infant and child mortality is high. A decline in child mortality could lead to a decline in fertility in societies practicing family planning and where there are clear and specific reproductive goals, because the need to replace children who have died will occur less frequently (Chaudhury, 1982).

The *biological* effect is the strongest and the most direct one particularly in a population with low prevalence of contraceptive use and high prevalence of the practice of breast feeding. Women, generally, have a very low probability of getting pregnant after child birth due to lactational amenorrhea during the breast feeding period. Lactational amenorrhea varies from 10 to 17 months under certain conditions (Bongaarts and Potter, 1983). If breast-feeding is discontinued, ovulation is likely to resume sooner or later so that if contraception is not used, an earlier pregnancy may be expected, keeping other

factors constant. Infant mortality resulting in cessation of breast feeding will thus tend to compress birth intervals in a non contracepting society. A decline in infant mortality may, therefore, result in wider inter-birth intervals and bring about a fall in fertility. This mortality-induced shortening of intervals between births is called the biological effect. The biological effect, therefore, operates by reducing the duration of breast feeding thereby leading to the earlier resumption of ovulation and more frequent pregnancies (Chandran, 1989; Boldion, 1981 as cited by UN, 1984a).

Regarding the *child dependency burden* effect, the reduction in infant/child mortality that stimulates fertility decline appears to be empirically doubtful. This arises from the fact that despite the declining infant/child mortality in many developing countries (due to the advancement of medical technology and services) fertility remained either constant or even increasing.

In relation to the *community effect*, societies may develop either a pro-natalist or anti-natalist norm to increase or decrease fertility, respectively based on their level of mortality (Ruzicka, 1978). However Chaudhury (1982) noted that such a situation is not observed in all high or low mortality societies.

Many studies have shown the existence of a positive association between infant/child mortality and fertility (Abdulahi, 1989; UN, 1987; Chandran, 1989).

Female education is also an important factor to reduce infant/child mortality. Women who have some formal education are associated with lower levels of infant/child mortality than women without formal education. Of course, there are other factors which interact with the effect of education in determining these demographic process and linkages. From the estimates of infant mortality rates classified by educational status of women in nine

countries of Africa (Egypt, Sudan, Ghana, Senegal, Tanzania, Zambia and Zimbabwe) it has been observed that infant mortality rates (IMRs) were highest for women without any formal education in all countries. Next to them were women with a couple of years of schooling and women who did not complete the primary level of education (UN/ECA, 1993).

The same source further suggests that higher levels of education such as completing secondary school and higher training are associated with very low levels of infant mortality. since education is an avenue for higher social status, it is very likely that these categories of women have better conditions of living, have greater access and better utilization of health services, etc., that allow them to provide better prenatal and child care. Poor infant/child health has been found to be positively related to infant/child mortality (Caldwell, 1979).

1.6.3 DEVELOPMENT PROJECTS AND FAMILY PLANNING

In the late 20th century, fertility declined due to the establishment of an increasing number of formally organized institutions providing family planning information and services.

Numerous other studies have also attempted to assess the impact of development projects on family planning programs in developing countries. Vlassoff (1988) in studying the impact of the Comilla Agricultural program in Bangladesh noted " Contraceptive use was much more prevalent in Sreebollobpur than in Bangladesh as a whole, the pill and condom being the most popular methods".

Similar studies in Rural Thailand indicate that in addition to encouraging couples to accept family planning, the workers of the project attempted to influence contraceptive use by providing contraceptive information and advice as well as recommending ways of fertility

regulation on health grounds (Bilsborrow and Delargy, 1985).

Schuler and Hashemi's (1994) finding also suggests that the credit program of Grameen Bank in rural Bangladesh influences contraceptive use by promoting family planning norms. It is found that Grameen Bank field workers promoted family planning norms by giving preference to contraceptive users and women with small families over non users and large families in low approval. Non-members of the program may use family planning methods. However, the use of contraception among non-members is likely, at least in part, to be a diffusion effect, the result of changing fertility norms in the program villages. When the number of contraceptive users in a community increases, it becomes easier for all women to adopt family planning. When women see others using contraceptive methods, their fear of side effects and of being criticized for violating social norms is reduced.

An electrification project in Philippines found a wide range of positive economic changes made possible by the availability of electricity. In this project, the separate effects of household electrification and community electrification on household demographic behavior was investigated. Household fertility was found to be negatively influenced by electrification of the area but not by the electrification of the particular households, showing area-level effects to be more important for fertility behavior than individual-level effects (Bilsborrow and DeLargy, 1985). Moreover, both individual and community use of electricity were found to be positively associated with a woman's use of modern family planning methods, as expected, but were not related to whether she desired more children (which was unexpected).

The irrigation project of Pramote and colleagues in Thailand found substantial positive socio-economic and demographic changes as a result of irrigation. The hypothesized demographic effects, i.e., improved health, increases in the perceived cost of children, and

most clearly declines in fertility and increases in family planning use did seem to occur (Bilsborrow and Delargy, 1985).

Family planning programs benefit the health of mothers and children and may also provide free or reduced cost access to birth control methods. The past few years have produced evidence of fertility reductions in some countries of sub-Saharan Africa. For instance, in Kenya fertility declined from the previous high of over 8 births per woman to about 6.7 by 1989 (Bongaarts et al, 1990) and the current fertility level of Kenya has further declined to 5.4 (DHS, 1997). This fertility decline is largely attributable to the rapidly spreading practice of contraception.

Phillips (1988) showed that in Bangladesh a decade before the Matlab project was established, most of the Matlab villages had a contraceptive prevalence rate of less than 10 per cent. However, after the introduction of the project services the treatment areas now have prevalence rates well in excess of 50 per cent. Though in 1977 data from the project comparison area were not available, evidence from the treatment area showed that by 1984 desire for no additional children had increased to over half of all women.

Regarding the knowledge of clinical and non-clinical contraceptive methods Alauddin (1979 as cited in Mueller and Anderson, 1982) noted:

> "While within each group of low and high knowledge villages the educated women know more methods than the non-educated, the non-educated women in high knowledge villages have a higher level of knowledge than the educated women in low knowledge villages."

According to Ekanem and Arowolo (1994) fertility decline is largely a function of socio-economic development and that unless some "threshold" of development was achieved, family planning Programmes could possibly have no more than modest success.

1.7 STATEMENT OF THE PROBLEM

The importance of integrating population variables into development planning has been increasingly recognized since the World Population Conference held at Bucharest in 1974. It was given particular attention at the International Conference on Population held at Mexico City in 1984 which recommended that "national development policies, plans and programs, as well as international development strategies should be formulated on the basis of an integrated approach" taking into account the interrelations between population, resources, environment and development (UN, 1988). In line with this proposal a substantial literature has evolved on the interrelationship between population and socio-economic factors in the process of development. In actual practice, however, often population factors are only tangentially considered in the general development efforts and processes.

It is true that in some cases projected levels and trends in population size and settlement patterns are used as the bases for projecting the magnitude of services to be put in place at a given time period in the future. But seldom do we find situations where the consequences of demographic trends and patterns for the social and economic spheres of life are considered. This is partly due to the lack of appreciation of the significance of such considerations for nation building efforts. In addition, the prevailing data constraints in the effort to measure the effects of development projects on demographic outcomes in developing countries constraints the slow development of methodologies applicable to the conditions of scarce human resources (Ekanem and Arowolo, 1994).

Another aspect of the problem is the lack of appreciation of the significance of continuously assessing the effect of development on demographic factors. A case in point is the likely

impact of large scale irrigation schemes on such factors as settlement patterns, the level of morbidity and mortality, etc. (Oberai, 1992).

In view of these difficulties, a project like the Atat Hospital's women's groups represents a valuable opportunity to study the socio-demographic effects resulting from specific developmental inputs. Such inputs of the project as a natural family planning program; empowering the women by providing credit for its members; health education; maternal and child health care; as well as sanitation, water and hygiene are likely to affect the social and fertility characteristics of the target population. The study is mainly intended to assess the effect of development project on fertility level because this variable is major determinant of population growth

1.8 SIGNIFICANCE AND JUSTIFICATION

As observed in section 1.1, the Ethiopian population is growing at a high rate of 3.1% per annum. If the current fertility rate continues and mortality declines as would be expected under normal conditions for some time to come, it will be in increasingly difficult for the government to realize the objectives of its development projects.

For the first time in the Ethiopian history a national population policy came into effect as of April 1993 with the major objective of "harmonizing the interrelationship between population dynamics with the carrying capacity of the national environment (natural resources)". Equally significant is the promulgation of a National Policy on Women. The policy is designed, among other things, to raise the socio-economic status of women by removing the cultural and legal impediments preventing them from being effective agents and beneficiaries of economic, social and political development.

The present study is, therefore, expected to contribute towards implementing the population policy of Ethiopia by suggesting to planners and policy makers a better way of treating the demographic outcome as a factor to be taken into consideration in the design of, or decision to initiate, specific development projects. This is of great importance because the demographic consequences may well feed back to enhance or restrain social and economic improvements. Such consideration would also promote increased consistency between efforts to attain the goals of population policy and those of development policy. Better understanding of the effect of development projects on fertility and on socio-economic characteristics of a population can provide basis for formulating and improving effective policies and programs.

In modern times, rapid growth of population is generally said to have a deterrent effect on economic development. In many developing countries rural development projects are undertaken to curb the high growth rate as well as reduce infant/child mortality. Thus, studying some of the socio-demographic effect of a development project like the Atat Hospital's Women's Groups is highly relevant since the project was expected to have an effect on fertility. It is also expected to bring about a positive effect on the socio-economic status of the target population.

Part of the present study focuses on issues concerning population by examining the social, economic and demographics of two sets of Gurage communities-the beneficiary groups of different communities and a reference group, with respect to various questions relating to the demographic indicator of fertility.

The choice of Gurage communities for the present study arises mainly from my personal interest and the presence of Atat Hospital's Integrated Development Program which is expected to have played some role in enhancing the socio-economic and demographic conditions of the study community. Like many rural areas of Ethiopia, the study area is also far from being touched by demographers.The promised cooperation by the Atat Hospital was also essential for preparations to conduct a pre-test and main surveys by using the hospital's vehicles and for acquiring cooperation among the target population..

1.9 OBJECTIVES

The general objective of the present study is to examine, analyze and compare some socio-demographic, particularly of fertility, conditions of the two groups from a number of rural Gurage communities, i.e. the group comprising participants in the development projects and the group comprising non participants. In examining this, the role of women's groups and socio-demographic factors on fertility is emphasized. Specifically, the present study has the following objectives:

1. To compare the level of women's knowledge and practice of family planning in the communities covered by the Atat Hospital Project and the level of knowledge and practice in the non-beneficiary communities.
2. To analyze the variation, if any, in actual fertility in the two groups.
3. To examine the variation, if any, in environmental sanitation, maternal and child health care in the two groups using some of the health indicators variables.
4. To determine the relative importance of each of the predictor variables on children ever born.

5. On the basis of the study findings, to identify issues relevant for program intervention, policy formulation and further research.

1.10 THE STUDY AREA

The Atat Hospital's Integrated Development program in the Gurage Zone of Southern Nations. Nationalities and Peoples' Region was established in 1969, under the auspices of the Catholic Archdiocese of Addis Ababa and is managed by the Medical Mission Sisters. Atat Hospital provides most of its community with health services and promotes development in and around the project area, which is densely populated with 210 persons per square kilometer (CSA, 1996). The hospital is specifically situated in a rural Gurage area about 175 kilometers south of Addis Ababa, and about twenty kilometers from Wolkittee town where there is telephone service, a bank, hotels, a post office and a secondary school.

The Atat Hospital's Integrated Development Program provides services in the following areas:

1. Hospital Based Activities: These comprise antenatal and under five clinics, maternity unit, nutrition rehabilitation unit, supervision and training of community health agents (CHAs), epidemic control, and both a static and a mobile expanded program for immunization (EPI).
2. Water And Sanitation: 104 safe water sites serving 105,000 beneficiaries and 1,569 latrines in use.
3. Village Development Committee: Leadership training for village activities such as water maintenance, payment of community health assistants/traditional birth attendants

(CHA/TBA), construction and maintenance of village health posts, pit latrine, etc.

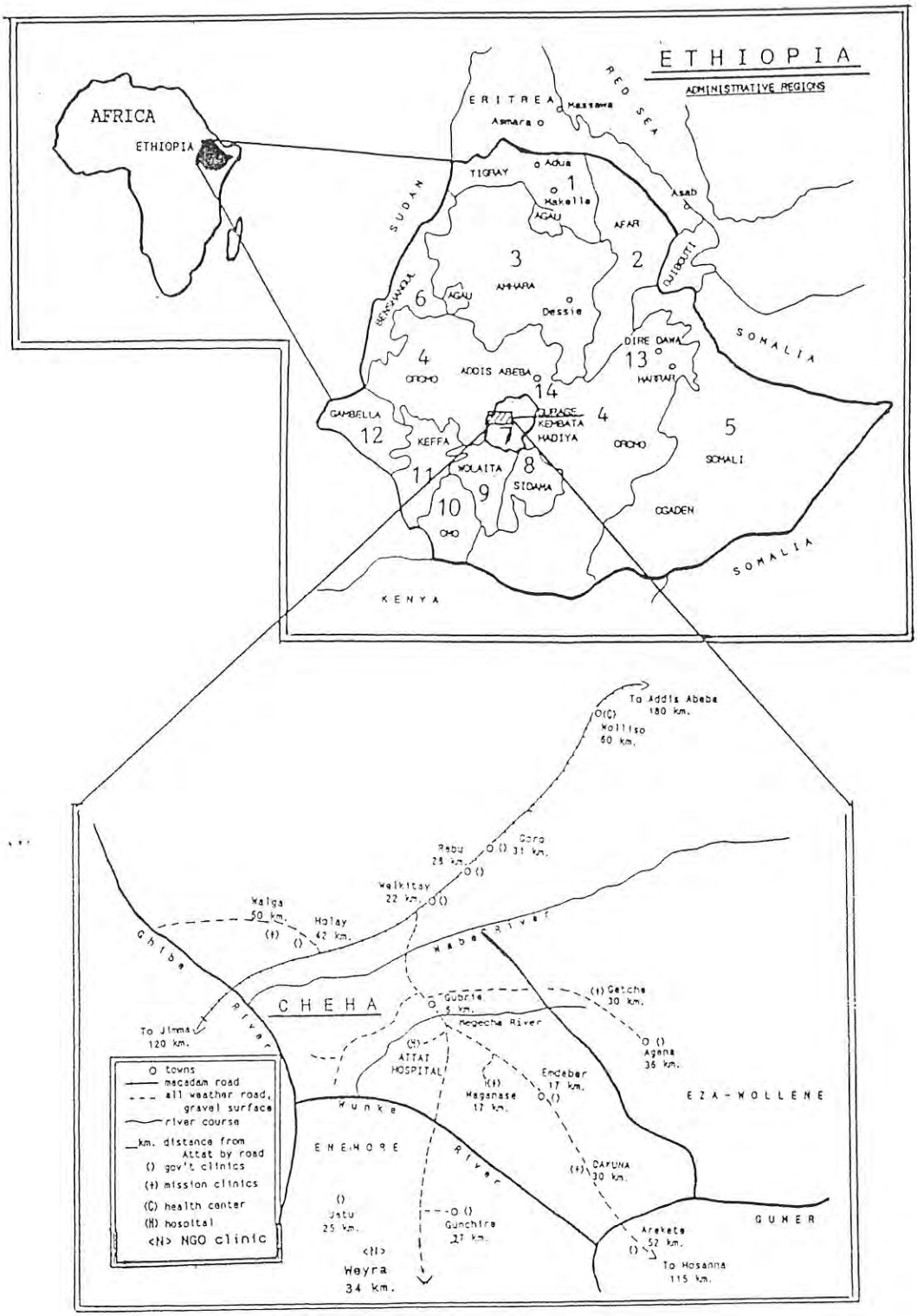
4. Village Health Posts: CHA/TBA; Community based activities such as follow-up health checks, weight monitoring, and supervising kindergartens.
5. Agriculture: This includes tree planting and backyard gardening.
6. Community Health Assistants and Traditional Birth Attendants Training; and
7. Women's Groups: This component of the Hospital's Integrated Development Program is the focus of the present study. There are twenty-two Women's Groups with two thousand eight members at present (Atat Hospital Annual Report, 1995; Personal Interview with Heads of Women's Groups). They function in small groups of about six women who live near one another and there are 316 of these units. Membership is open to all interested married women in their reproductive years who will abide by the by-laws of the women's groups.

The aim of the women's groups is to help themselves recognize their worth, their abilities and dignity and to develop their leadership potential. The women discuss their role and importance in the family, their rights and duties, making them more aware of their situation, their difficulties as women and as mothers. Activities in women's groups include health education, promotion of income generating activities through micro-enterprises financed through a revolving fund created for this purpose . In the sphere of family life education attempts are made by Hospital staff to increase the awareness of participants about problems of high fertility. However, since Catholicism does not permit the use of artificial birth control methods the hospital staff, who are mainly followers of Catholic religion encourage participants to practice natural methods. Some members of the Women's Groups are also trained as TBAs, CHAs and PH workers and are responsible for providing

information about health education including AIDS/HIV, the merits of natural family planning and how to use it effectively.

The present study focuses on two sets of Gurage communities (namely, project beneficiaries and non-beneficiaries) in *Cheha wereda* of Gurage Zone, Southern Nations Nationalities and People's Region of Ethiopia, covering an area of about 552 square kilometers. Based on the 1994 census result, the total population of Cheha is estimated at 115,864 with overall sex ratio of 95 males per 100 females (CSA, 1996 : 13). With an average population density of 210 persons per square kilometer area, it is among the most densely populated *wereda* in Ethiopia. About 97 per cent of the population of Cheha live in rural areas and the remaining 3 per cent live in the wereda capital *Emdibir* and the other small Gubre towns. The wereda capital with a population number of 2239 and Gubre had a population of 1454 in 1994 (CSA, 1996).

The rural population of Cheha wereda depends on mixed cultivation and production of some cash crops for their livelihood. The principal economic activities of the population in rural Cheha is dominated by the cultivation of *ensete (ensete abysinica),* which provides a staple food for their diet. Since the socio-economic life of rural Gurage population rests upon the cultivation of *ensete* which satisfies many of their essential needs, other activities assume secondary importance. Coffee, eucalyptus tree, chat, banana (mainly for marketing), maize, potato, *godare*, vegetables, and raising of livestock's are also widely practiced in the area. Variation is, however, observed in the production of *ensete* crop between and among farmers depending upon the fertility of the soil, size of land holdings and extent of use of natural fertilizer, etc.


ETHIOPIA
ADMINISTRATIVE REGIONS
AFRICA
ETHIOPIA
ERITREA
Asmara
Massawa
RED SEA
SUDAN
TIGRAY
Adua
Makelle
AGAU
AFAR
Assab
DJIBOUTI
AMHARA
Dessie
BENISHANGUL
OROMO
ADDIS ABEBA
DIRE DAWA
HARRARI
SOMALIA
GAMBELLA
KEFFA
KEMBATA
HADIYA
SIDAMA
WOLAITA
SOMALI
OGADEN
KENYA
To Addis Abeba
180 km.
Mallisa
60 km.
Robu
28 km.
Gore
31 km.
Walkitay
22 km.
Kalga
50 km.
Holay
42 km.
Ghibe River
Wabe river
CHEHA
Gubrie
5 km.
Negeche River
Getche
30 km.
Agana
36 km.
To Jimma
120 km.
ATTAT HOSPITAL
Emdeber
17 km.
Hagenase
17 km.
EZA-WOLLENE
Kunke
ENEMORE
DAYUNA
30 km.
Jatu
25 km.
Gunchire
27 km.
GUMER
Arekete
52 km.
To Hosanna
115 km.
Weyra
34 km.
towns
macadam road
all weather road, gravel surface
river course
km. distance from Attat by road
() gov't clinics
(+) mission clinics
(C) health center
(H) hospital
<N> NGO clinic

The rural Gurage homestead and garden comprise an inseparable unit. In the words of Shack (1966:246)

> The Gurage fields may vary considerably in size but seldom from the rectangular shape of their unmistakably over crowded vegetation. This side by side with the arrangement of fields is important in the system of cultivation.

According to the 1994 Population and Housing Census results, Southern Nations, Nationalities and People's region in general is characterized by high fertility (unadjusted TFR of 4.3) which is the third highest in the country after Tigrai and Oromia, by the highest Infant mortality rate (IMR of 128 per 1000 live births) and consequently in lower life expectancy at birth (eo of 48.6 years). The level of total fertility rate and infant mortality rate for both sexes in Gurage Zone where the study wereda, Cheha, is located were estimated at 3.9 (unadjusted) children per woman of reproductive age and 145 deaths per 1000 live-births, respectively.

Cheha has one hospital (Atat) located at *Sise* village, a health center in *Emdibir* town and two clinics located at *Dakuna* (which is established and owned by the *Atat* Hospital) and *Megenase* villages, respectively. Currently, Cheha is administratively divided into 53 Peasant Associations and two Urban Dwellers' Associations.

1.11 METHOD OF ANALYSIS

1.11.1 Variables Used In The Study:

The following variables are considered in the analysis for ever-married women aged 15-49: Dependent variable is children ever born to ever married women in their reproductive life

span (ages 15-49) and the independent variables include group membership (i.e., being in beneficiary or non-beneficiary women's group), child loss experience, women's level of education, religion, marital status, decision making autonomy, perceived income status, age at first marriage, and family planning (natural and/or modern) use. Details of some of these variables are presented below:

a) **Group Membership**: This variable is categorized into beneficiary and non-beneficiary. The former includes those women who are members of the Atat women's groups and are beneficiaries of the project while the later not. The Project women are also divided into two based on the duration of their stay (1-4 years and 5-9 year) in the project.

b) Child loss experience: The child loss variable which is the actual number of children dead is categorized into: no child dead, one child dead, two children dead, and at least three children dead. The analysis of this variable is limited to women with at least one live birth.

c) Women's level of education: It is classified into illiterate, primary level and secondary and above categories.

d) Religion: Respondents religious affiliation was earlier classified into five categories: Ethiopian Orthodox, Catholic, Protestant, Muslim and Traditional. However, for the latter analysis this variable is re-coded into two groups as Christians and Muslims. The remaining traditional believers are omitted due to its few cases.

e) Age at first marriage: This demographic variable is classified into less than 20 years and above 20 years.

f) Family planning use: Respondents are categorized into ever use of family planning (natural and modern) and those never use of the method; and current use of family planning and currently non-users.

g) Women's Decision Making Autonomy: Women's are classified into "high", "medium" and "low" on the basis of their decision making autonomy on management issues by group

membership.

h) Perceived Economic Well-being: The self assessed economic well-being variable is categorized into 'Inadequate', 'moderate' and 'sufficient'.

1.11.2 Descriptions of Techniques Of Analysis

Various techniques are available for dealing with the relationship among different demographic variables. Descriptive statistics (such as frequency distributions, cross tabulations, and difference of means are used to compare the demographic situation of the two communities in the study areas).

In order to study the relationship between selected socio-economic, demographic and project variables and fertility, Analysis of Variance (ANOVA) technique of Multiple Classification Analysis (MCA) was employed. MCA techniques are applicable to one dependent variable and two or more predictor (explanatory) variables. The dependent variable should be either an interval scale or a dichotomous classification. Predictor variables being as weak as nominal measurement, is one of the most distinguished advantages of MCA. Most of the multivariate methods require predictors stronger than nominal variables. Furthermore, MCA deals not only with linear but also non-linear relationships among predictors and the dependent variables (WFS, 1980). The purpose of the analysis is to partition the variance of the dependent variable into component units attributable to each of the influencing variables.

Technically, the MCA prediction model can be described as having the overall mean as its constant term and main effects, or a series of additive coefficients for the category. The additivity assumption implies that differences according to one predictor are the same for all values of the other predictors included in the model. Based on this justification this

model is selected and can be expressed by the following equation (WFS, 1980):

$$Yij = Y + ai + bj + ... + eijk$$

Where: Yij = score of a particular individual who falls into i^{th} category of predictor A, j^{th} category of predictor B, etc;

Y = grand mean;

ai = added effect of i^{th} category of predictor A (= difference between Y and the mean of i^{th} category of predictor A);

bj = added effect of j^{th} category of predictor B (= difference between Y & the mean of j^{th} category of predictor B);

eijk = error term.

The adjusted and unadjusted effects reveal the closeness of the relationship between the predictors and the dependent variable. For instance, the eta *(n)* coefficient is a correlation ratio, which shows how well a given predictor can explain the variation in the dependent variable, while the eta^2 (n^2) coefficient indicates the proportion of the variation in the predictor alone. These statistics are applicable to the unadjusted means. On the other had, the beta (β) coefficient measures, on the basis of the adjusted means, the ability of a given predictor to account for variations in the dependent variable. In the present study age of a women is used as a covariate as it obviously has a greater effect on life-time fertility.

The choice of technique is to a large extent determined by the scale of measurement of the available data. The multivariate ordinary least square regression is used for data measured on continuous scale for the dependent variable (CEB) and predictor variables measured on a nominal or ordinal scale.

Multivariate regression analysis is used here to identify the relative contribution of each independent variable to the total variance in fertility level. In assessing the project effect on fertility, a fertility indicator children ever born becomes the dependent variables, and social, demographic and program indicators constitute the independent variables. In this case the categorical variables will be represented by dummy variables. An Ordinary Least Square multiple regression model can be expressed by the formula as:

$$Y = \alpha + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_k x_k + e$$

$$= \alpha + \Sigma \beta_i x_i + e$$

In the present study, Y is the number of children ever born by a woman. X1...Xn are independent variables and e is the error term. In the model ßi's represent the partial regression coefficients, which can be interpreted as the change in E(Y), (the expected value of Y) associated with a one unit increase in x_i, when all other independent variables in the model are held constant. α, on the other hand, is called the intercept, and represents the value of E(Y), when all the independent variables are equal to zero.

Moreover, the statistical procedure to estimate the model yields a measure of goodness-of fit (R^2). It can be interpreted as the proportion of variation in Y (fertility) 'explained' by all the independent variables. However, due to limitations of R^2 , adjusted R^2 is usually preferred to measure the goodness-of-fit of the model.

For the purpose of the present study the dependent variable (CEB) is continuous and all the independent variables but age are nominal scale variables, dummy or indicator variables are created. When the new categories are formed, the number of categories constructed are one less than the number of categories of the original variable. For instance, if there are three categories in a given variable then two indicator variables are constructed with the one left

as reference category. If the variable is, for instance, woman's decision making autonomy it is categorized into 'high', 'medium' and 'low'. The 'high' decision making category may be treated as the reference category and the remaining two should have associated with them two dummy variables each assigned a value of 1 or 0 depending on which category the woman belongs to. Thus, the dummy variable for 'medium' takes the value one if the mother reported to have a medium decision making autonomy and zero if otherwise. Generally, in this study, religion, marital status, age at first marriage, duration of stay in the project, ever and current use of natural and/or modern family planning and type of marriage have one category of each; women's education, decision making autonomy and perceived economic well being do have two categories for each and child loss experience has got three categories. A total of 18 for women in the beneficiary and 17 for non-beneficiary categories in the independent variables were created in the regression equation. The regression coefficients are interpreted with reference to the reference category. The value of the 'α' coefficient shows how much the fertility of the woman in that particular category of the variable is raised or lowed if 'α' is negative relative to the fertility of woman in the reference category.

Dichotomous variables like contraceptive use (0,1), and non- interval variables with multiple categories (nominal) such as religion, group membership, etc. and ordinal like education are incorporated into multiple regression analysis model through dummy variables techniques. For the dummy variables, interpretations of the coefficients are expressed as a deviation from categories not included in the model (i.e. reference category).

$$Y = a_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + \ldots b_ix_i + e_0$$

With regard to this study, Y = fertility as measured by children ever borne, x_1-x_n represents predictor variables mentioned above.

CHAPTER II

DATA SOURCE AND SAMPLE DESIGN

2.1 DATA SOURCE AND SURVEY DESIGN

In order to meet the objectives of the present study, primary data was collected by the researcher in June 1997 from two sets of Gurage communities (project women and non-project women), in *Cheha wereda* of the Southern Nations, Nationalities and Peoples' Region, Ethiopia.

The target population of this study is ever-married women aged between 15-49 years who are usual residents of a specified study areas and are members and non-members of the women's groups. The survey questionnaire consisted of questions on some of the socio-economic and demographic characteristics of the households. The first draft of the questionnaire was prepared in English. The English version was translated into *Amharic* (official language of Ethiopia) to avoid free translation and thus misinterpretation of the questions by the enumerators.

Twenty eligible women were randomly identified from *Yeterek and Wosherbe* Peasant Association in the study wereda and a pre-test of the draft questionnaire was administered to them before the actual field work. The purpose of the pre-test was to discover

ambiguities, omissions, misunderstandings, irritation to some sensitive questions and address problems of sequencing and other weaknesses, if any, on the original draft. It was also useful to accurately estimate the interview time and logistics. The study instrument was, therefore, modified based on the pre-test results before commencing the main survey.

2.2 SAMPLE DESIGN

In order to obtain data from the two communities, a purposive sampling design was first employed. Rural Peasant Associations (RPAs) were the sampling unit to reach at the population. From the purposely selected communities, eligible women (in their reproductive age) who were non-members to the beneficiary groups were randomly selected.

Sampling Procedure: The study area is divided into two categories: the area (25 kilometers from the Atat hospital inhabited by population groups not serviced by the Atat hospital and the area where the Atat project is operational. The two selected Gurage communities of this study are similar in their ethnic background, religious composition, educational levels, socioeconomic conditions, linguistic and cultural characteristics (Shack, 1966). RPAs constituted the ultimate sampling units each of which contained unequal elementary units (eligible women) due to unequal size of total population. Until the required sample size was reached the randomly selected eligible women living in the selected areas were interviewed.

The total size of the sample for the present study is determined to be 748 that is 348 ever married women from the project community and 400 ever married women from the non-project community.

2.2.1 SAMPLE SIZE

A variety of plans are available to select a sample. For each plan that is to be considered, rough estimates of the sample can be made from a knowledge of the degree of precision desired, time and costs involved. The sample size for this survey is calculated based on the formula adapted from Cochran (1977) with 95 percent confidence intervals. The formula is:

$$n = \frac{4PQ}{d^2}$$

Where,

P = the sample proportion (here 0.5 is given for P value)
d = precision level which is determined to be 0.05
Q = 1 - P
= 1 - 0.5
= 0.5
α = 1 - C.I
= 0.05

$$n = \frac{4(0.5)(0.5)}{(0.05)(0.05)}$$

$$n = \frac{4(0.25)}{(0.0025)}$$

$$n = 400$$

This sample size was used to randomly select women from the groups that are not beneficiaries of the program. In selecting the sample from the program participants (beneficiaries) the finite population correction (fpc) was needed because the total population of the program beneficiaries group is only 2008, and we find:

$$n = \frac{n_0}{1 + \frac{n_0 - 1}{N}}$$

$$n = \frac{400}{1 + \frac{399}{2008}}$$

n = 333.69, which is about 334, i.e., the sample size used to randomly select women from the beneficiaries of the women's groups is 334. The total size of the sample for the present study is, therefore, determined to be 734. Based on the experience of similar studies conducted an additional 5 per cent of the total sample size is added to cover the estimated non response. In line with this, the 5 percent of the total sample size that is 37 cases (17 for beneficiary and 20 for non-beneficiary group) is included for the aforementioned reason.

2.2.2 FIELD ORGANIZATION

2.2.2.1 RECRUITMENT, TRAINING OF FIELD STAFF AND FIELD WORK: For the field work 8 enumerators (five females and 3 males) and 2 male supervisors were recruited. All interviewers were selected from candidates who were residents of the respective study areas. However, for interviewer's post preference was given to those candidates who have completed 12th grade education with a minimum grade point result of 2.2 in the Ethiopian School Leaving Certificate Examination (ESLCE), known to be honest, successfully performed their training, knows the study area quite well, and with previous experience in demographic data collection. Two male supervisors who are familiar with the community and its administrative set-up and have previous experience in survey/census supervision were recruited. Coordinating the activities of the enumerators, timely supply of the necessary materials to the enumerators, random spot checking of the interview process and checking the filled questionnaires were among the main responsibilities of the supervisors.

Ten days of training was organized by the principal investigator and one public health officer working in Atat Hospital for enumerators and field supervisors to ensure that they were completely familiar with their duties. The content of the training included the aim of

the survey, how to approach and ask respondents, question wording and sequencing, and problems that may arise during the survey. The training methods comprised theoretical class room lectures (at the Atat Hospital) and demonstrations on the techniques of interviewing, mock exercise and field pretest. Detailed discussion on each question were held in order to make them understand the questions and take necessary cautions while asking. The pre-test and main field work were conducted in May and June 1997, respectively, immediately after completing the training.

To minimize non-response rate and ensure the quality of data, a mechanism of controlling the interview process and of individual interviewers (for instance, re-interviewing of a sub sample of respondents, observation by supervisors of interviewers, edit checks) which included systems of revisits and random spot checks was devised. Some in-built key questions were also included in the questionnaire itself as a means of internal consistency checks such as the Brass type fertility questions..

After completing the field work, manual data editing was carried out. Then the data was entered using the Statistical Package for Social Scientists (SPSS FOR WINDOWS). After data cleaning, data analysis was done using the same package but by its dos version.

2.3 RESPONSE RATE AND SAMPLE DISTRIBUTION

A total of 748 ever-married women who are members and non-members of the women's group were successfully interviewed out of the originally anticipated 771 eligible respondents. This yields a response rate of 97 per cent. Seven women in non-beneficiary group and two in beneficiary group could not be available for interview on repeated visits. Twelve cases of the questionnaire in non-beneficiary group and two in beneficiary group were found to contain incomplete information and were excluded from the analysis.

Table 2.1 Farmers' Association Covered and their sample size in non-beneficiary group.

	Farmers' Association	Population Size	Number of households	Number of ever married women*	Sample Size
1	Borana Tuba	1915	429	376	132
2	Jatuna Aradashe	1762	452	337	119
3	Dubisana Kersa	1417	334	289	102
4	Dubisana Kafa	944	210	191	67
Total		6038	1425	1193	420

Source: CSA, 1996 and * Obtained from the 1994 Census of Ethiopia, CSA.

The present study based on primary data collected from a sample of ever-married women in beneficiary and non-beneficiary groups in June 1997 by the main researcher. The sample was obtained first on the basis of purposive sampling procedure. Women of the project group are married apart from being beneficiary. Taking socio-economic, cultural, geographic and religious characteristics into account, married women were chosen from four PAs in the non-project group. Based on the reclassified PAs for the 1994 census four of them due to their socio-economic characteristics were chosen for the present study in non-project group. From these PAs 420 married women were randomly drawn without replacement using lots though only 400 were successfully interviewed. Sampling of respondents was done by using the list of head of households prepared by the researcher in collaboration with PA officials and data collectors at the initial stage of field work. The 420 non-beneficiary women sample size was distributed to each PAs proportional to the number of ever married women in each PA.

On the other hand 21 out of the 22 women's groups were selected but one women's group was left because of its urban location and was expected to have differences in socio-economic characteristics with other rural dwellers) during the survey. Distribution of the sample to each 21 Women's Group was done using proportionally to size. All Women's Group have lists of its members. From these prepared lists of names of women in each group 351 of them representing the sub-sample were distributed to each of the 21 Women's Group using the principle of proportionality to size. Finally married women of the beneficiary group that served as subjects for the study were randomly selected without replacement using random numbers.

Table 2.2 Women's Group Covered and their sample size in beneficiary group.

Name of Women's Group	No. of women	Sample taken
Huranda I	73	14
Hurunda II	72	13
Azer I	121	23
Azer II	53	10
Gubre Village	85	16
Sise I	133	25
Sise II	71	13
Sise III	65	12
Sise IV	77	14
Buchach I	102	21
Buchach II	90	19
Buchach III	85	16
Atat	158	29
Deneb	142	26
Koremea I	77	14
Koremea II	71	13
Dagag Wonzire	70	13
Werdene I	112	21
Weredene II	103	19
Weredene III	64	12
Yetrik Boto	62	12
Gubre Town	122	0.00
Total	**2008**	**351**

Source: Unpublished document of the Atat Hospital's Women's Group.

CHAPTER III

SOCIO-ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

3.1 General Characteristics of Respondents

In this chapter attempt is made to present a bi-variate distribution of the total 748 respondents (beneficiary and non-beneficiary of the Atat Hospital's women's groups) by selected demographic and socio-economic characteristics.

Beneficiary women of the Atat Hospital's Women's Groups accounted for 46.52 percent of the total sampled women and the remaining 53.48 percent being non-beneficiary women. The following table shows the general characteristics of respondents by group category. All respondents are drawn from rural areas. In spite of the similarity the two groups have in terms of place of residence, women of the beneficiary group are members of the Atat Hospital's Women's Groups and live in and around the location of the hospital while the non-beneficiary group women live far from the project area by at least about 25 kilometers.

Table 3.1 Percentage distribution of respondents by selected socio-economic and demographic characteristics according to beneficiary or non-beneficiary category.

Characteristics	Group Membership		
	Beneficiary (N=348)	Non-Beneficiary (N=400)	Total N=748)
Age			
15-19	2.00	2.90	2.40
20-24	10.0	12.4	11.1
25-29	22.5	21.6	22.1
30-34	23.3	23.3	23.3
35-39	24.8	27.0	25.8
40-44	13.3	9.80	11.6
45-49	4.30	3.20	3.70
Religion			
Ethiopian Orthodox	34.8	45.3	40.4
Catholic	13.8	0.3	6.6
Protestant	1.7	0.8	1.2
Moslem	49.7	51.5	50.7
Traditional	0.00	2.3	1.2
Level Of Women Education			
No & non formal educ.			
1-6	87.1	85.8	86.4
7+	4.0	7.0	5.6
	8.9	7.3	8.0
Husband's Level Of Education			
No/non formal educ.			
1-6	81.2	81.0	81.1
7+	6.0	9.5	7.9
	12.8	9.5	11.0
Marital Status			
Currently in union	87	91.8	89.6
Formerly Married	13	8.2	10.4
currently married Women's Decision making autonomy			
Low	39.4	80.6	62.3
Medium	48.5	7.3	31.2
High	12.1	2.1	6.5
Parity			
1	7.80	7.9	7.9
2 - 3	29.2	24.7	26.9
4 - 6	45.1	41.6	43.3
7+	17.9	25.8	22.0
Self perceived income status			
Inadequate			
average	47.5	51.3	49.6
sufficient	23.3	35.9	30.2
	29.2	12.7	20.2
Child loss experience			
None	86.1	72.1	78.8
One dead child	8.7	13.7	11.3
Two dead children	3.5	6.6	5.1
At least three dead children	1.7	7.6	4.8
Age at first marriage			
Less than 20 years	91.3	76.5	83.5
More than 20 years	8.7	23.5	16.5
Number of years stayed in women's groups			
1-4 Years	24.7	----	---
5-9 Years	75.3	----	---
Mean age at first marriage	20.16	23.51	21.94
Median age at first marriage	17	19	18
Current Mean Age Of Respondents	31.22	32.03	31.65

Source: Computed by the author from own survey data, 1997.

Slight variations in the age distribution of the beneficiary and non-beneficiary respondents is seen as one can easily detect from Table 3.1. The mean current age of respondents is found to be 31.22 and 32.03 years for the groups of beneficiary and non-beneficiary ever married woman, respectively.

As the study areas are located in the Gurage Zone the overwhelming majority (98.8%) of the overall respondents are *Gurages* and the remaining ethnic groups (1.2%) are Amhara and Sidama. Of the total (98.8%), 45.99 and 52.8 percent of all respondents belong to Gurage in the beneficiary and non-beneficiary groups, respectively. The reported mean age at first marriage was found to be 20.16 and 23.51 years in the beneficiary and non-beneficiary women, respectively. The median age at first marriage for the beneficiary women's group is lower (17) years in comparison with the 19 years median age of the non-beneficiary counterparts.

About fifty one percent of the total respondents are followers of Islam religion of which 49.7 percent are in the beneficiary group and 51.5 percent in the non-beneficiary group. The second largest religious group is Orthodox Christian (40.4%) of which about 35% are found in the beneficiary group and the remaining 45% in the non-beneficiary group. The relative high proportion of Catholic respondents (13.8%) in the beneficiary group as compared with only 0.3% in the non-beneficiary group category is due to the presence of the Catholic Church hospital in the area. Not even a single respondent is found to be a follower of Traditional beliefs in the beneficiary group while 2.3% of women are a follower of it in the non-beneficiary group.

All the surveyed women were asked whether or not they had attended school and, if so, the highest level of school they attended. Based on the responses to these questions three categories of educational level were formed, i.e., those who have no and non formal education (illiterate), primary level (1-6 grade), and above Junior High School education. The majority (86.4%) of respondents in both groups have no and non formal education, only 5.6% have primary education (grade 1-6) and 8.0% are in the junior secondary or above category. Literacy differentials by beneficiary/non-beneficiary groups were found to be very minimal as clearly seen from Table 3.1 Out of the total beneficiary women, 87.1%, 4.0% and 8.9% were illiterate, grade 1-6 and above grade seven, respectively. The corresponding figure for the non-beneficiary group women was 85.8% illiterate, 7% primary level and 7.3% above grade seven.

Similarly, husband's level of education is found to be more or less the same by the two groups. The majority of husbands (81.1%) have no education, 7.9% of them have attended primary education (grade 1-6) of which 6.0% and 9.5% were from beneficiary and non-beneficiary groups, respectively. The remaining 11% are above grade seven of which 12.8% belong to the beneficiary group and 9.5% are the non-beneficiary group men as shown in Table 3.1.

Sampled women in the reproductive ages were also asked about their current marital status at the time of the survey. The results in Table 3.1 reveal that 89.6% of the total women were recorded as currently in union and 10.4% are formerly married. From the same table, one can easily depict that currently in union (married) women are the majority in both beneficiary (87%) and non-beneficiary (91.8%) groups. No woman was found to be in the never married status in both groups. The reason for this is that a woman can be a member of

the Hospital's Women's Groups if she is married and is willing to be obeyed by the bi-laws of the women's groups. Accordingly, ever married women were selected in the non-project areas.

Currently married women were asked a number of questions related to their relative decision making autonomy in their respective households. Valid responses obtained for questions dealing with who decides on such issues as consumption pattern; savings (if any), renting or leasing land for sharing crop; the timing of *ensete* processing; when to spend money on health care services for a sick man, woman, daughters and sons; joining of women's groups; send a boy and/or a daughter to school; the number of children to be born to a family; and age at which a girl and a boy should get married and whom to marry, were all compiled to make an index for women's decision making autonomy on management issues. The average score ranges between 1 (if all the decisions were made by the husband) and 3 (if all the decisions were made by the woman). All scores below 1.5 were considered as 'LOW', 1.5 to 2.5 as 'MEDIUM' and scores beyond 2.5 as 'HIGH' in terms of women's autonomy in decision making (DTRC and PSTR, 1998). Based on the above, women who score high are regarded as having high level of autonomy and those who score between 1.5 to 2.5 are said to be exercising some degree of equality with their husbands in decision making on management issues. Those who score low are those who wait their husbands to decide on the above stated issues on their behalf.

Table 3.1 further shows that 31.2 % of the total currently-married woman have medium level autonomy on management issues, while the largest percentage (62.3%) of women have low and only 6.5 % have reported as having high autonomy. By group membership substantial differences are observed, that is, in beneficiary group only 39.4% have low autonomy, 48.5% have medium level and 12.1% reported having high decision making

autonomy on management issues. In non-beneficiary women, the majority (80.6%) of them said that they have low autonomy 7.3% medium and only 2.1% of them have high autonomy.

A qualitative approach which is based on self-evaluation of perceived income sufficiency to cover household needs by the respondents themselves was employed as an indicator for income status. Ideally three alternative approaches can be followed to obtain an indicator that serves to measure income status (absolute, relative and subjective). Given the strengths and weaknesses of each method, the choice of a particular procedure largely depend upon the nature of the source data and the objective of the study. In this study all sampled women were asked to ascertain if their yearly household income, in their opinion, is sufficient to make the family's ends meet or not. Responses were then recorded on the basis of three pre-coded non numeric responses provided along with the attitude question. In order of their prominence these responses were, namely, 'inadequate or too little', 'average or moderate'. and '(more than) sufficient'. Studies that have made use of this procedure found strong relationship between actual and self-declared income status (Yohannes, 1995; Ravallion, 1995).

Accordingly, 49.6 percent of the total respondents declared that their family yearly income is not adequate to fulfill family needs while 30.2 and 20.2 percent said 'medium' and 'sufficient', respectively. The responses obtained from the question discriminates between the two groups of women. From the project group, 47.5%, 23.3%, and 29.2% of women declared that their family yearly income (both in kind and in cash) is inadequate, average, and (more than) adequate to fulfill their family needs while the corresponding respective figures for non-project women was 51.3%, 35.9% and 12.7%.

Of the overall study women about 7.9 percent of them are of parity 1, about 27% parity 2-3, about 43% parity 4-6, and 22% had given birth to 7 or more live births. About 18 percent of the high parity women (7 or more children ever born) were sampled from the beneficiary group whereas 26 per cent being from non-beneficiary group.

The percentage distribution of respondents with regard to child loss experience through death show significant difference between the two groups of women. Women in project group are better in that about 86 percent of them reported as experiencing no child death, 8.7 percent experience one dead child, 3.5% two dead children and only 1.7% at least three dead children. The corresponding figure for the non-beneficiary women are 72.1% still alive, 13.7% experience one dead child, 6.6% two and 7.6% at least three dead children.

The percentage distribution of ever married women by age at first marriage depict the higher proportion of non-project women married at more than 20 years. About 91% of the project women reported that their age at first marriage was less than 20 years while only about 9% of them got married for the first time at more than 20 years. In non-beneficiary group the percentage of women whose age at first marriage was less than and more than 20 years was 76.5% and 23.5%, respectively.

Beneficiary respondents were also asked about the number of years they stayed in women's group. The data in Table 3.1 shows that three-fourths of the beneficiary women stayed in women's group for 5-9 years and the remaining one-fourth stayed for 1-4 years.

3.2 Maternal and Child Health

The health care that a mother receives during pregnancy and at the time of delivery is important to the survival and well-being of the mother and the child. To obtain information on the maternity care that women receive, respondents who had given birth in the five years (between May 1992 and May 1997) before the survey were asked whether they had seen anyone for a check on the pregnancy, whether they received medical care within 6 weeks of birth and who had assisted with delivery. For those receiving antenatal care or delivery assistance from more than one provider, the most qualified provider was recorded by the interviewer. Since neonatal tetanus continues to be a major cause of death among infants during the first month of life, respondents were also asked for each birth if they had received an injection during pregnancy to prevent the baby from getting tetanus ('convulsion') after birth.

Table 3.2 shows the existence of great difference in the percent of births whose mother received antenatal care from health institution: almost for every births (99.5%) of the project group mothers compared to only 9.8 % for the unserved once. 5.4% births whose mothers are of the non-project group get antenatal care from pharmacy/drugstore. From the table it is vividly shown that births to mothers of beneficially (project) group are most advantageous over the non-project group in terms of antenatal care.

Tetanus Toxoid Injections are an important component of antenatal care. Almost three fourth of births to mothers in the project group reported receiving two or more tetanus toxoid injection during pregnancy. That is to say, the proportion of births whose mothers

receive at least two tetanus taxoid injection (TTI) also greatly varies by group membership. Among the project women who live in and around the Atat hospital where the Tetanus Taxoid Immunization rate was the highest, 72.1% percent of babies were born to mother who reported having had atlas two TTI injection during pregnancy compared to only 27.9 % in the non-project group.

A significant disparity by place of birth between the two groups is also evident from the table. 89.2 percent of births to project mothers were delivered in a health care facility (hospital, health center, or clinic) compared to only 10.8 percent to non-project mothers.

Table 3.2 shows that these is greater variability between the two groups in the percentage of deliveries attended by person assisting the mother at delivery. The percentage distribution of birth by type of assistance during delivery portrays that about 20% of live births born since May 1992 were assisted by a doctor, nurse, or health assistant in beneficiary group compared to only 1.6% in non-beneficiary group; 58%, 3.6% and 18.8% were assisted by a trained midwife, untrained midwife and others (relatives, self, friends) respectively in project group while the figure was only 10.3%, 25.5% and 62.6% in non-beneficiary group.

Respondents were also asked in the questionnaire about postnatal care they received within six weeks after the birth of each child born in the five year preceding the survey. Overall, 63% of birth had mothers who received postnatal care. Again major difference in post natal care is observed between the two groups. 91.5 percent of births had mothers who received post natal care from health institution with in the first six weeks in project group compared to 29.1% in their counterparts. About 14% of birth had mothers who received postnatal care from pharmacy or drug store in non-project group compared to only 0.3% in project group.

Table 3.2 Among Births in the five years before the survey (May 1992-May 1997), Percent Distribution by Person Providing Antenatal Care for the Mother and Percent whose Mother received Antenatal Care, a Tetanus Toxoid Injection and Postnatal care, according to group membership.

Maternal and Child Health (MCH) Indicators	Group Membership	
	Beneficiary (N=385)	Non-Beneficiary (N=465)
Received antenatal care From		
Health Institution	99.5	9.8
Pharmacy (Drugstore)	0.00	5.4
Received Two or more Tetanus Toxoid Injection	72.1	27.9
Institutional Delivery	89.2	10.8
Person Assisting at Delivery		
professional (medical)	19.6	1.6
Trained midwife	57.9	10.3
Untrained mid-wife	3.6	25.5
Others (self, friends, relatives)	18.8	62.6
Received Postnatal care from		
Health Institution	91.5	29.1
Pharmacy or Drug shop	0.30	14.3

Source: Computed by the author from own survey data, 1997.

3.3 Childhood Vaccination

To obtain information on vaccination coverage women with children under five (between May 1992 and May 1997) were asked about the vaccination program (i.e., poliomyelitis, diphtheria persussis-tetanus, tuberculosis (by BCG) & measles) for these children. If a mother was able to present a card for a child on which vaccinations were recorded, the interviewer copied information on vaccinations from the card. If the mother was not able to show a card for the child, the interviewer asked the mother if the child had ever received vaccinations. The Table 3.5 below is a rough coverage estimates obtained both from the mothers' report and from the card .

The results in Table 3.3 show that immunization coverage for project group is very high: 96.6 percent of children born in the last five years preceding the survey have received BCG vaccinations, 95.5% Measles, and 99.6% and 99.4 percent of children of this age have received the third doses of DPT and Polio, respectively in beneficiary group. For non-project children only 0.7 percent have received BCG vaccinations, 24.1 percent Measles, 1.7% and 97.7% have received the third doses of DPT and Polio, respectively.

Table 3.3 Percentage distribution of children born between May 1992 and May 1997 G.C, by combined mothers reports and card verified vaccination status and by group membership

[illegible]	Beneficiary (N=385)	Non-Beneficiary (N=465)
Polio Doses		
0	O.6	2.3
3+	99.4	97.7
DPT DOSES		
0	0.0	1.6
3+	99.6	1.7
BCG	96.6	0.7
Measles Vaccination	95.5	24.1

Source: computed by the author from own survey data, 1997.

3.4 Water, Sanitation and Hygiene

3.4.1 Sources of Drinking Water

The health of a population, among others, is determined by the availability and access to safe potable water. In the present study, information on main sources of drinking water during wet (rainy) and dry seasons were collected and the data is presented in Table 3.4.

The single major source of drinking water for the beneficiary population is from pumped source. The data in Table 3.4 shows that 97.4% and 97.1% of the project population are getting their potable pumped water during wet and dry seasons, respectively. For non-beneficiary population, the major source of drinking water is unprotected spring (63.0%) followed by unprotected well (17.4%) and pond/river (12.4%) during the wet season. On the other hand only 5.2%, 1.3% and 0.7% of the non-beneficiary population during the wet season are getting their drinking water from pumped, protected well and protected spring sources. respectively. Similarly, most people in non-beneficiary group (60.1%) get their drinking water from unprotected springs followed by unprotected well (19.7%) and pond/rivers (10.2%) during dry seasons. The Table also portrays that about one in every five (19.7%) and one in every ten (10.2%) in non-beneficiary group reported using unprotected well and pond/river sources of drinking water during dry seasons, respectively. Only 1.5% and o.4% of the population in non-beneficiary group reported using protected spring and protected well respectively as main sources of drinking water during dry seasons.

From the Table 3.4 it can be inferred that everyone (97.4% and 97.1%) in the project group during both wet and dry seasons respectively depend on pumped water. Besides, the low percentage of people using water from unprotected sources in both wet (1.0%) and dry (1.0%) seasons indicates that the overwhelming majority of the project population has an ease access to safe drinking water compared to less than ten percent for non-beneficiary people.

Table 3.4 Sources of drinking water during wet and dry seasons according to group membership.

Characteristics	Group Membership		
Sources of drinking water	Beneficiary	Non-Beneficiary	Total
During wet season			
Pimped	97.4	5.20	47.2
Protected well	1.0	1.30	1.20
Unprotected well	0.5	17.4	9.70
Protected spring	0.0	0.70	0.40
Unprotected spring	0.5	63.0	34.6
Pond/river	0.5	12.4	7.00
During Dry Seasons			
Pumped	97.1	8.00	48.5
Protected well	0.3	0.40	0.40
Unprotected well	0.5	19.7	11.0
Protected spring	0.0	1.50	0.80
Unprotected spring	0.5	60.1	33.0
Pond/river	1.6	10.2	6.30

Source: computed by the author from own survey data, 1997.

3.4.2 Sanitation and Hygiene

In order to assess the sanitary conditions of households information was gathered from the sampled respondents on place of waste disposal and toilet type used by the households.

In project group a sizable percentage of the households were using a recommended places of ground (28.5%) and burn/bury (3.5%) for household waste disposal compared to only 0.4% in non-beneficiary group. A large proportion of households reported using open field outside compound (44.4%) and yard in compound (20.8%) as the places for household waste disposal in beneficiary group. The corresponding figure for non-beneficiary group was 42.4% yard in compound and the majority 53.2% using open field outside compound. Thus, almost every household was using a non-recommended places for waste disposal in

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During wet season			
Pimped	97.4	5.20	47.2
Protected well	1.0	1.30	1.20
Unprotected well	0.5	17.4	9.70
Protected spring	0.0	0.70	0.40
Unprotected spring	0.5	63.0	34.6
Pond/river	0.5	12.4	7.00
During Dry Seasons			
Pumped	97.1	8.00	48.5
Protected well	0.3	0.40	0.40
Unprotected well	0.5	19.7	11.0
Protected spring	0.0	1.50	0.80
Unprotected spring	0.5	60.1	33.0
Pond/river	1.6	10.2	6.30

Source: computed by the author from own survey data, 1997.

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non-beneficiary group.

A great variation in the type of toilet used by the household between the two groups is evident from the table. About 86 percent of the households of beneficiary group had a pit latrine and the remaining 14 percent did not have any toilet facility. Almost all (98.9%) of the non-beneficiary group households did not have any toilet facility but only about one percent reported having a toilet . From the above it can be deduced that the project at Atat has considerably changing the health condition of the project population through provision of potable water, toilet type used and place of household waste disposal.

Table 3.5 Place of Waste Disposal and Toilet Type used by Group Membership.

Characteristics	Group Membership	
Place of Waste Disposal	Beneficiary	Non-beneficiary
Ground Hole	28.5	0.40
Yard in compound	20.8	42.4
Open field out side compound	44.4	53.2
Burn /Bury	3.5	0.00
Others	3.5	4.00
Toilet Type Used		
Don't have any	14.3	98.9
Pit Latrine	85.7	1.10

Source: computed by the author from own survey data, 1997.

CHAPTER IV

FERTILITY REGULATION AND FERTILITY LEVELS IN THE BENEFICIARY AND NON-BENEFICIARY RESPONDENTS

This section focuses on issues relating to knowledge of family planning methods and use of natural as well as modern fertility regulation methods.

4.1 Knowledge and use of Family planning

Data on knowledge of family planning methods were obtained by first asking respondents if they had heard of any family planning methods. Descriptions of various methods were included in the questionnaire for seven modern methods (Pill, Intrauterine device, injectable. vaginal method i.e., foam/jelly/cream, condom (male), female sterilization and male sterilization) and two traditional methods (Periodic abstinence [safe period] and withdrawal). Thus, family planning knowledge in this study refers to either spontaneous or prompted knowledge.

Table 4.1 Percentage Distribution of Ever Married Women (15-49) who have heard of at least one Family Planning Method, by Specific Methods and by Group Category.

Knowledge by Method	Beneficiary Group (N=348)	Non-Beneficiary Group (N=400)	Total (N=748)
Any Modern Method	**100.0**	**89.7**	**94.0**
Pill	100.0	35.5	63.9
IUD	2.9	3.0	2.9
Injectable	98.1	40.8	65.9
Diaphragm, Jelly, Cream	2.6	3.0	2.8
Condom	95.9	66.5	80.1
Female sterilization	13.8	11.0	12.3
Male sterilization	1.7	1.5	1.6
Any Natural (Traditional)	**100.0**	**79.3**	**88.9**
Periodic Abstinence (Rhythm)]	96.8	28.0	60.0
Withdrawal	96.0	25.0	59.0

Source: Computed by the author from own survey data, 1997.

As table 4.1 indicates knowledge of at least one method of natural family planning was reported by 89% of the overall women with periodic abstinence (rhythm) being the most widely known natural family planning method. Generally 94% of the respondents reported that they had heard of as least one method of modern family planning method. Among all women, the most widely known modern method is the condom (80.1%), followed by injectable (66%) and pill (64%). The least known modern methods were the male sterilization (1.6%), diaphragm/jelly/cream (2.8%) and the I.U.D. (2.9%).

The level of knowledge of family planning, however, shows considerable difference by the beneficiary and non-beneficiary women. As shown by the data in Table 4.1 knowledge of any natural method of family planning is very high (100%) among beneficiary women, while it was reported by 79.3% of the non-beneficiary women. The difference in knowledge of any traditional (natural) family planning method was substantial between the two groups of women. All the beneficiary women (100%) and 90% of the non-project women reported that they had heard of at least one modern family planning methods.

4.2 Ever and Current Use of Family Planning

All women interviewed in the survey who said that they had heard of a particular method of family planning were asked if they had ever used that method. Table 4.2 shows that 14.6 percent of the respondents have used a modern method and 54.1 percent have used a traditional method some time in the past. There appears to be a slight difference between the two groups in ever use of modern family planning, ranging from 17.6 for non-beneficiary to 11.1 percent for beneficiary women. The difference is wider in ever use of natural family planning, i.e., 98.3% for the beneficiary women compared only to 15.8% for the non-project group as shown in Table 4.2. The method most commonly used at present

by the total respondents are periodic abstinence (38.6%), and the withdrawal (6.4%).

Table 4.2 Percentage Distribution of Ever Married Women (15-49) who have Ever Used, and are Current Users of a Family Planning Method, by Specific Methods and by Group Category.

Ever use of FPM	Beneficiary women	Non-Beneficiary Women	Total	No. of cases
Any Modern Method	**11.1**	**17.6**	**14.6**	108
Pill	7.2	11.5	9.5	71
IUD	0.0	0.00	0.0	0.0
Injectable	1.4	2.8	2.1	16
Condom	2.6	9.1	6.0	45
Diaphragm, Foam, Jelly	0.0	0.0	0.0	0.0
Female sterilization	0.0	0.0	0.0	0.0
Male sterilization	0.0	0.0	0.0	0.0
Any Traditional	**98.3**	**15.8**	**54.1**	405
Current Use of FPMs				
Any Modern Methods	**7.6**	**8.3**	**8.0**	59
Pill	6.0	6.0	6.0	45
IUD	0.0	0.0	0.0	0.0
Injectable	0.6	0.5	0.5	5.0
Condom	0.9	3.5	2.3	17
Diaphragm, Foam, Jelly	0.0	0.0	0.0	0.0
Female sterilization	0.0	0.0	0.0	0.0
Any Traditional	**95.1**	**7.3**	**48.1**	360
Periodic Abstinence	77.0	5.3	38.6	289
Withdrawal	12.1	1.5	6.4	48

Source: Computed by the author from own survey data, 1997

As shown in Table 4.2 above 8 percent of the respondents are using modern family planning methods currently, 8.3 percent by the non-project women and 7.6 percent by the women of the beneficiary group. From the table it can also be seen that currently natural family planning is highly used by the project women (95.1%) compared to only 7.3% of the non-beneficiary women.

4.3 Unmet Need For Family Planning

Currently married women who had wanted no additional children or who want to wait at least for two years for their pregnancy and who were exposed to the risk of pregnancy but not using contraception were considered here to be in need of family planning services.

Table 4.3 presents the distribution of currently married women by their need for contraceptive services. There is a total unmet need of 25.3 percent, of which 12.7 percent is for limiting and 12.6 percent for spacing. From these figure it can be inferred that most women do not want to stop child bearing but about one eighth want to wait for at least two years and another one eighth want to stop child bearing.

The beneficiary - non-beneficiary differential in unmet need is clearly observed from Table 4.3. Unmet need for limiting is higher in beneficiary currently married women (27.0%) than their non-beneficiary counterparts (0.3%). Similarly, unmet need for spacing is much higher in beneficiary currently married women (22.4%) compared to only 4.0% of non-beneficiary women. This gives a greater total unmet need for beneficiary currently married women (49.4%) compared to the non-beneficiary counterparts (4.3%).

The total demand for contraception for the overall respondents was 33.3 percent of which 8 percent was reportedly met. In beneficiary group, the reported total demand for contraception was 57 percent of which only 7.6 percent was met while in the non-beneficiary currently married women, total unmet need was only 12.6 percent of which about 8.3 percent was met. The higher proportion of project women with unmet need for limiting and spacing is an indication of attitudinal change brought about by the Atat Project compared to the non-project women. However, the majority of the beneficiary respondents

are currently using a natural family planning which has less effect on fertility in comparison with modern contraception.

Table 4.3 Percentage Distribution of Currently Married Women (15-49) who have unmet need for and total demand for contraception, and contraceptive prevalence by beneficiary or non-beneficiary group category.

Group Category	Percent With Unmet Need [1]			Contraceptive prevalence	Total demand for Contraception[2]
	Limiting	Spacing	Total		
Beneficiary	27.0	22.4	49.4	7.6	57.0
Non-beneficiary	0.3	4.0	4.3	8.3	12.6
Total	12.7	12.6	25.3	8.0	33.3

Source: Computed by the author based on own survey data, 1997.

[1] Unmet need is the proportion of currently married women who reported that they do not want any more children (limiting) or would like to delay their next birth by at least two years (spacing) and who were not practicing any modern contraceptive method at the time of the survey.

[2] Total demand for contraception is the sum of total unmet need and contraceptive prevalence rate (CPR).

4.4 Ideal Family Size and Fertility Preference

4.4.1 Ideal Family Size

Information on the measure of ideal family (preferred) size was obtained through two questions. Respondents who had children were asked, 'if you could go back to the time you did not have any children and could choose exactly the number of children to have in your whole life, how many would that be?'. For respondents who had no children were asked, 'if you could choose exactly the number of children to have in your life, how many would that be?'.

The results in Table 4.4 indicate that 83.3 percent of the project women were able to give a numeric answer to this question while only 16.7% of them gave non-numeric answers such as "It is up to God/Allah", "Any number" or Do not Know". For the non-beneficiary women about 44% gave numeric response and the majority of them (56%) gave non-numeric answers.

The mean number of children desired provides an index of ideal family size that is based on respondents who gave numeric responses. The average ideal number of children was 4.9 for beneficiary woman and almost 2.5 children higher for non-beneficiary woman (7.5 children). From the acquired result it can be inferred that the project at Atat has brought about an attitudinal change on beneficiary women regarding fertility. However, the family planning they are taught about to exercise is less effective in comparison with the long-acting modern contraception methods.

Table 4.4 Percentage Distribution of Currently Married Women (15-49) giving numeric responses to Ideal family size and Mean Ideal Family Size by Group Membership.

Group Membership	Percent of respondents giving Numeric response to Ideal family size	Mean Ideal Family Size	Number of respondents giving only numeric response to mean ideal family size
Beneficiary	83.3	4.9	290
Non-Beneficiary	44.1	7.5	176
Total	61.9	5.9	466

Source: Computed by the author based on own survey data, 1997.

4.4.2 Fertility Preference

In the present survey information on the fertility preferences of currently married (in union) women was collected. The question "Would you like to have another child or not to have any more children? was addressed to all currently married women. But for the pregnant women the question on the desire for additional children was rephrased as "After the child you are expecting now would you like to have another child or would you like not to have any (more) children?". Those women who answered a 'no more/none' to the abovestated questions were considered here to see if there is variation between the two groups.

Table 4.5 shows the percentage distribution of currently married women who want to space for at least two years and who want no additional children by group membership. The table indicates that about one third (33.2%) of currently married beneficiary women do not want any more children compared to only 2.6 percent of women in non-beneficiary. This indicates that the preference for limiting has considerably began among women of beneficiary group.

Information was also collected from currently married women by asking "How long would you like to wait from now before the birth of (another) expecting child?" for a non-pregnant or unsure women. For pregnant woman the question was put as " How long would you like to wait after the birth of the conceived child and before the birth of another child?". Those who wanted to wait for at least two years were selected to see the situation between the two groups. Table 4.5 shows similarity between the two groups that is, about 62 percent of the project women wanting to space for at least two years compared to about 58 percent in non-project women.

Table 4.5 Percentage Distribution of Currently Married Women (15-49) who want no more children and to space at least for two years by Group Membership.

	% wanting No more Children (N=106)	% wanting to space for at least two years (N=268)
Beneficiary	33.2	61.5
Non-Beneficiary	2.60	57.7
Total	16.7	58.8

Source: Computed by the author based on own survey data, 1997.

4.5 Fertility Levels

One of the objectives of the present study was to measure fertility levels in the study areas. In the survey information was accordingly collected on both current and retrospective fertility from every sampled women in their reproductive age. This section presents the fertility levels of the beneficiary and non-beneficiary groups.

Each respondent was asked to provide a birth history, including information on the month and year, sex and survival status of all the births that occurred during the last five years preceding the survey . Generally, data collected on birth history of developing countries are not usually free from error due to low level of literacy, a tendency to omit reporting early neonatal deaths, absence of birth registration and other socio-cultural factors. There also is misstatement about the timing of births and misstatement about ever married women's age. Due to these problems, each ever married women of reproductive age in the survey was asked to provide information on the number of sons and daughters ever borne, the number living with her, the number living elsewhere and the number of sons and daughters who died.

4.5.1 Current Fertility

Based on the question asked about number of births in the year preceding the survey, reported age specific fertility rates (ASFR) and total fertility rates (TFR) by beneficiary and non-beneficiary groups are presented in Table 4.6 below.

Table 4.6 Reported TFR for Beneficiary and Non-Beneficiary groups

Group Category and Age Group	Number of Ever married women	Number of Births	ASFR
Beneficiary	348	64	0.184
15-19	10	1	0.100
20-24	43	21	0.488
25-29	75	9	0.120
30-34	81	26	0.320
35-39	94	6	0.064
40-44	34	1	0.029
45-49	11	0	0.000
TFR			5.610
GRR*			2.737
GFR			178.1
Non -Beneficiary	400	73	0.183
15-19	8	1	0.125
20-24	40	10	0.250
25-29	90	14	0.156
30-34	93	15	0.161
35-39	99	25	0.253
40-44	53	7	0.132
45-49	17	1	0.059
TFR			5.68
GRR*			2.798
GFR			227.8
Total	748	137	0.183
15-19	18	2	0.111
20-24	83	31	0.374
25-29	165	23	0.139
30-34	174	41	0.236
35-39	193	31	0.161
40-44	87	8	0.092
45-49	28	1	0.036
TFR			5.74
GRR*			2.828
GFR			199.9

Source: Computed by the author from own survey data, 1997.

Note*: GRR = TFR x (1/(1+SR)), where SR = Sex Ratio at birth (assuming SR = 1.05).

The computed data show that reported TFR was 5.61 and 5.68 children per ever married woman for the beneficiary and non-beneficiary groups, respectively. The reported TFR was 5.74 for the two groups combined which is higher than the figure obtained from the 1994 census for the rural Gurage Zone of 3.9 children per woman (CSA, 1996). This is mainly because the present study takes into account only ever married women in their reproductive age while the census considers all women aged 15-49. The gross reproduction rate (GRR) which is the average number of daughters a woman would have if she experienced a given set of age specific birth rates throughout her child-bearing span is 2.737, 2.798, and 2.828 for the project woman, non-project woman, and for the overall woman combined, respectively. The general fertility rate (GFR) which represents the total number of live births occurring per 1,000 women in the childbearing ages (15-49) is 178.1, 227.8, and 199.9 for the beneficiary, non-beneficiary and for the total women of the study area, respectively.

Table 4.7 presents life time fertility by age of women and beneficiary or non-beneficiary group membership. Life time fertility reflects the number of births cumulated over the reproductive life of a woman and is a measure of completed family size. In the absence of any error of omission of children ever born or recent increase in fertility, mean number of CEB per ever married woman is expected to increase with age until the end of the reproductive life span of a women.

Table 4.7 Reported Number of Children Ever Born and Average Parity for Beneficiary and Non-Beneficiary groups.

Group Category and Age Group woman		Number of Respondents	Number of CEB	Average Parity per ever married
Beneficiary	**15-49**	**348**	**1492**	**4.287**
	15-19	10	11	1.100
	20-24	43	86	2.000
	25-29	75	244	3.253
	30-34	81	350	4.321
	35-39	94	509	5.415
	40-44	34	206	6.059
	45-49	**11**	**86**	**7.818**
Non-Beneficiary	**15-49**	**400**	**1810**	**4.525**
	15-19	8	4	0.500
	20-24	40	52	1.300
	25-29	90	262	2.911
	30-34	93	405	4.355
	35-39	99	586	5.919
	40-44	53	360	6.792
	45-49	**17**	**141**	**8.294**
Total	**15-49**	748	3302	**4.414**
	15-19	18	15	0.833
	20-24	83	138	1.663
	25-29	165	506	3.067
	30-34	174	755	4.339
	35-39	193	1095	5.674
	40-44	87	566	6.504
	45-49	**28**	**227**	**8.107**

Source: Computed by the author from own survey data, 1997.

For the beneficiary and non-beneficiary groups the mean number of CEB consistently increased with age until the end of the reproductive life span, suggesting little of no differential omission by age group.

As it is observed from Table 4.7 that by age 45, an ever married woman in the study areas has on the average a completed family size of 8.11 children. The table also vividly reveal a distinct differential in beneficiary and non-beneficiary fertility. Completed family size on average is 7.82 children per ever married woman for beneficiary group while the corresponding figure for the non beneficiary group is 8.30, that is a difference of about 0.5 child. The relative higher completed family size in the present study is acquired because of the ever married sampled respondents. The mean number of CEB is 4.29 for the project woman, 4.53 for non-project woman, and 4.41 for the two groups combined. This figure is higher than the SNNPR-CFS mean CEB of 3.6 of the Gurage zone.

4.5.2 Estimated Fertility Levels

In the preceding sections attempt was made to examine the current and cumulative fertility rates using reported fertility data. However, from the experience of most developing countries, the collected data through censuses or surveys may not be of sufficient quality to depend on these direct measures. As a result of this, demographers have developed various techniques of estimating or adjusting the fertility measures indirectly. As a result of this, the adjusted age specific fertility rates was computed by using the P/F ratio method. Table 4.8 shows the adjusted age specific fertility rates and total fertility rates for the project, non-project and for the two groups combined. The adjusted age specific fertility rates provide the best estimate of current fertility in the study areas.

The current level of fertility has been derived from information on births in the last 12 months prior to the survey date. Generally, in less developed countries this type of data may be distorted due to the misunderstanding of the length of reference period (reference error) resulting in reporting of births that occurred longer than a year. The Brass P/F ratio method is employed here to estimate the level of current fertility and to compare it with the

reported life time fertility of a woman younger than 30 or 35 years, assuming the reporting of the number of children ever born by younger woman to be fairly reliable. The P/F ratio method developed by William Brass is chosen because under certain assumptions regarding the reporting of retrospective fertility and births in the last twelve months makes possible a consistency check on the two sets of data and also provides a procedure of adjustment for cases where the data are distorted by errors. To apply this technique EASWESPO FERT software is employed. For adjusting the fertility pattern, different combinations of the P/F ratios for age group 20 to 24, 25 to 29, or even 30 to 34, or an average of any combination of the three age groups are used.

Table 4.8 presents results of the application of P/F ratio method to the present sample data. It is shown in Table 4.8 that the value of P/F ratios generally differ from the expected value of unity or 1 and also show changes from one age group to the other leading to variations in the estimated or adjusted fertility rates according to the factor chosen. The adjusted total fertility rate ranges from 4.73 to 5.46 for the beneficiary woman, from 5.16 to 8.02 for the non-beneficiary, and from 5.35 to 6.46 for the two groups combined.

Since the number of cases in the sample is small no births were registered for woman in the age group 45-49 for the beneficiary women and only one birth was reported for women in the non-beneficiary group.

The P/F ratio for the 15-19 age group of women is unreliable due partly to the high risk of mortality of children of this group in comparison with children of women in the other age groups and the observations in this age group are often few. As a result of this the P/F ratio, in most cases, of this age group is considerably higher than unity as is portrayed in Table 4.8.

The P/F ratio considerably deviates from unity when all respondents are considered together and as age increases the ratio exceeds unity indicating either life-time fertility is over-reported partly because foster children or relative(s) residing in the house may be reported as their sons/daughters.

In a nutshell, the reported total fertility rate of 5.61 seems to be closer to the adjusted figure of 5.46 children per woman for the project group. However, the reported TFR of 5.68 is low when compared to the adjusted TFR of 7.50 by taking the adjustment factor of age group 25-34. The discrepancy between the reported and estimated TFR is an indication of data errors (omission and/or underreporting or over reporting) in the period and/or life-time fertility data that necessitated the reported data to be adjusted indirectly.

Table 4.8 Estimation of Total Fertility Rates by P/F Ratio Method, Beneficiary and Non-Beneficiary Groups, 1997.

Age Group	P	F	P/F Ratio	Age Specific Fertility Rates based on Adjustment Factors for age Groups				
				20-24	25-29	30-34	25-34	20-34
	Beneficiary Group							
15-19	1.100	0.175	6.294	0.1354	0.1417	0.1470	0.1361	0.1347
20-24	2.000	2.122	0.943	0.4400	0.4605	0.4780	0.4539	0.4492
25-29	3.253	3.214	1.012	0.1113	0.1165	0.1209	0.1193	0.1181
30-34	4.321	4.627	0.934	0.1800	0.1884	0.1956	0.3027	0.2995
35-39	5.415	5.352	1.012	0.0562	0.0588	0.0610	0.0564	0.0558
40-44	6.059	5.579	1.086	0.0233	0.0244	0.0253	0.0240	0.0237
45-49	7.818	5.612	1.393	0.0000	0.0000	0.0000	0.0000	0.0000
TFR				4.73	4.97	5.14	5.46	5.40
	Non-Beneficiary Group							
15-19	0.500	0.283	1.767	0.1333	0.1805	0.2071	0.1938	0.1737
20-24	1.300	1.429	0.910	0.2227	0.3015	0.3459	0.3237	0.2900
25-29	2.911	2.364	1.231	0.1412	0.1911	0.2193	0.2052	0.1838
30-34	4.355	3.082	1.413	0.1514	0.2050	0.2352	0.2201	0.1972
35-39	5.919	4.250	1.393	0.2290	0.3101	0.3558	0.3329	0.2983
40-44	6.792	5.085	1.336	0.1082	0.1465	0.1681	0.1573	0.1410
45-49	8.294	5.608	1.479	0.0467	0.0632	0.0725	0.0678	0.0608
TFR				5.16	6.99	8.02	7.50	6.72
	Total							
15-19	0.833	0.225	3.707	0.1324	0.1548	0.1597	0.1573	0.1490
20-24	1.663	1.783	0.932	0.3361	0.3928	0.4054	0.3991	0.3781
25-29	3.067	2.814	1.090	0.1318	0.1540	0.1590	0.1565	0.1483
30-34	4.339	3.857	1.125	0.2200	0.2571	0.2653	0.2612	0.2475
35-39	5.674	4.797	1.183	0.1444	0.1687	0.1741	0.1714	0.1624
40-44	6.504	5.367	1.212	0.0790	0.0923	0.0953	0.0938	0.0889
45-49	8.107	5.608	1.446	0.0269	0.0315	0.0325	0.0320	0.0303
TFR				5.35	6.23	6.46	6.36	6.02

Source: Computed by the author from own survey data, 1997.

The data in Table 5.6 reveal differences in reported TFR between the two groups , that is, the TFR in beneficiary group is slightly lower (by 0.07) when compared to the non-beneficiary group. The peak age of fertility is the 20-34 age group. Women in this age group contributed over three-fourth, about half, and well over half of the reported total fertility rates for the beneficiary, non-beneficiary and for the two groups combined, respectively suggesting broad peak fertility schedule. The adjusted TFR using the adjustment factor of 25-34 age group for the beneficiary and non-beneficiary groups were 5.46 and 7.50, respectively. These two groups which had a difference of 0.07 reported TFR per ever married woman now differ by 2.04 in the adjusted TFR per ever married woman. The non-beneficiary group which had 5.68 reported TFR, had the highest TFR (7.50) per ever married woman after adjusting.

CHAPTER V

FERTILITY DIFFERENTIALS

In this chapter attempt is made to assess whether there are differences in fertility (measured by mean number of children ever born) among ever married women differentiated on the basis of group (project or non-project) membership, socio-economic and demographic characteristics. In the analysis, the effect of a given socio-economic, demographic or project variables on life time fertility is examined by taking each independent variable at a time and often controlling for age using (a bi-variate approach) of Multiple Classification Analysis (MCA) and Analysis of Variance (ANOVA) procedures.

5.1 Beneficiary /Non-beneficiary group and Fertility

As Shown in Table 5.1, before adjusting mean children ever born (CEB) for age and independent variable (beneficiary or non-beneficiary group member), woman of the beneficiary group has the lowest mean CEB (4.50) while woman of the non-beneficiary group has the highest (4.87). In similar way, when mean CEB is adjusted for the independent variable and for age of woman (covariate variable), woman in beneficiary group is also found to have low mean CEB of 4.57 and woman of the non-beneficiary group has the highest mean CEB of 4.80.

The difference in the mean number of CEB between the beneficiary and non-beneficiary women is 0.37 and 0.23 children per woman before and after adjustment, respectively. The observed difference in the mean CEB among beneficiary and non-beneficiary woman could be explained partly by the existing disparity in the knowledge and usage of natural family planning methods as indicated in chapter V of this paper. Other socio-economic and demographic situation such as child death experience, decision making autonomy, etc. could also add to the above stated difference. These observed differences in the mean CEB among woman of beneficiary and non-beneficiary group, however, is not statistically significant since the acquired P-value is of 0.112 as confirmed by the F-value. The total variation explained by the independent variable is about 43.6 percent ($R^2 = 0.436$). The relationship between beneficiary or non-beneficiary group category and fertility is presented below.

Table 5.1 Relationship between Mean Number of Children Ever Born (CEB) to all ever married women and predictor variables, controlling for Age.

Variable and Category	No. of cases	Mean Number of CEB		F-Sign.	Grand Mean
		Unadjusted	Adjusted		
Beneficiary-Nonbeneficiary Category (η^2 = 0.006; β^2 =0.003; R^2 =0.436)				0.112	4.67
Beneficiary	346	4.50	4.57		
Non-beneficiary	380	4.87	4.80		
Education (η^2 =0.02; β^2 =0.004; R^2 =0.437)				0.456	4.69
No and non-formal education	632	4.79	4.71		
1-6 grade	40	4.65	4.78		
7+	54	3.56	4.40		
Age at first marriage (η^2 =0.07; β^2 = 0.03; R^2 =0.32)				0.0000	4.640
Less than 20 years	659	5.03	4.90		
20 or more	67	3.75	4.05		
Child Loss experience (η^2 = 0.17; β^2 = 0.08; R^2 = 0.511)				0.0000	4.690
No child dead	572	4.28	4.40		
One child dead	82	5.12	5.10		
Two children dead	37	7.14	6.26		
Three or more children dead	35	7.83	6.86		

Continued from 5.1 ...

Variable and Category	No. of cases	Mean Number of CEB Unadjusted	Adjusted	F-Sign.	Grand Mean
Religion (η =0.15; β= 0.08; R^2 = 0.435)				0.004	4.664
Christian	349	5.024	4.864		
Muslim	368	4.324	4.474		
Marriage Type (η=0.04; β=0.05; R^2 =0.485)				0.1060	4.477
Polygamy	84	4.467	4.397		
Monogamy	541	4.707	4.717		
Perceived income status (η =0.17; β= 0.06; R^2 0.432)				0.940	4.686
More than Adequate	95	4.436	4.606		
Average	440	4.586	4.636		
Inadequate	140	5.436	4.976		
Marital status(η =0.06; β= 0.09; R^2 =0.449)				0.002	4.771
Currently In union	639	4.734	4.754		
Formerly Married	77	4.244	4.084		
Ever used modern (η =0.04; β= 0.01; R^2 =0.434)				0.636	4.700
No	614	4.74	4.71		
Yes	103	4.49	4.62		
Current Use of Modern (η =0.07; β= 0.06; R^2 =0.438)				0.036	4.700
No	662	4.74	4.74		
Yes	55	4.16	4.22		
Ever use of Natural FP (η =0.03; β= 0.01; R^2 =0.436)				0.827	4.690
No	329	4.76	4.71		
Yes	397	4.63	4.68		
Current Use of Natural FP (η =0.07; β= 0.03; R^2 =0.437)				0.312	4.690
No	372	4.85	4.75		
Yes	354	4.53	4.62		
Woman's decision making autonomy. (η =0.05; β= 0.17; R^2 =0.513)				0.020	4.724
High	45	4.001	3.031		
Medium	215	4.641	4.651		
Low	424	4.861	4.831		

Source: Computed by the author from own sample data, 1997.

5.2 Education and Fertility

The existence of inverse relationship between education and fertility is well documented. However, the results of these studies lack consistency. Some research findings reveal a consistent inverse relationship while others point out a curvilinear association that is, women with primary education have higher fertility when compared to those with no education, and those with non-formal education and who have higher levels of education. The data in Table 5.1 show that education of women is inversely but insignificantly related to fertility. The results reveal that illiterate woman have the highest mean CEB (4.79), while literate woman of primary and above junior secondary has 4.65 and 3.56 with a difference of 1.09 children per woman in the unadjusted cases. On the other hand, mean CEB for illiterate, primary and above Junior secondary women are 4.71, 4.78, and 4.40, respectively after adjusting mean CEB for education and age of the women. This gives a difference of 0.07 and 0.38 children per woman between the illiterate and primary and primary and above Junior secondary, respectively with statistically insignificant relationship as the P-value associated with the F-value is 0.456.

5.3 Age at First Marriage and Fertility

Age at first marriage is one of the major predictor variables affecting the number of children ever born. Age at first marriage has been categorized into two categories, namely, less than 20 and above 20 years by taking the respondents mean age at first marriage. In Table 6.1, it is noted that age at first marriage of less than 20 years contributes to larger mean number of CEB, as expected both before and after making adjustment. The results show that in the unadjusted case women's age at first marriage of less than 20 years have a mean CEB of 5.03, and those whose age at first marriage is 20 or more years have a mean CEB of 3.75. If

the highest and lowest mean CEB are taken into account, there is a difference of 1.28 children per woman between less than 20 years and 20 or more years of age at first marriage women. Similarly, after adjusting mean CEB for age at first marriage and age of the women. Mean CEB for woman whose age at first marriage is less than 20 years and 20 or more years are 4.9 and 4.05, respectively with a difference of 0.85 children per woman between the two. The result also reveals that low age at first marriage is a relatively powerful predictor of high fertility as documented by findings of several research. The relationship between the two variables is also statistically significant as the P-value associated with the F-value is 0.000.

5.4 Religious Affiliation and Fertility

Religion is believed to have considerable influence on fertility. The present study examines the relationship between mean number of children ever borne per ever-married woman categorized by religious affiliation. These data are presented in Table 5.1 above.

An examination of the unadjusted means in Table 5.1 generally shows high mean number of children ever born among Christians (5.02) and lower fertility among Moslems (4.32). The mean unadjusted figure presented in the third column of Table 5.1 indicate that Christians continue to be the most fertile with 0.36 children per ever married woman higher than the grand mean. Muslim ever married women still have the lower fertility of 4.32 mean CEB which is lower by 0.70 from the mean Christian CEB per woman. These differences in mean CEB among women with different religious affiliation are due mainly to the influence of religion.

5.5 Child Death Experience and Fertility

The review of previous studies documented the existence of positive relationship between fertility and child loss experience of couples. The likelihood of women with child loss experience to proceed to higher order parity is higher due to the physiological and replacement effect. However, there are some studies indicating that parents reproductive response to mortality is not only a result of their own mortality experience but also a reflection of the mortality situation of the community at large in which they are living in. Such studies usually associate the high fertility levels in many traditional societies to the presence of high levels of mortality in those areas (Yohannes, 1994). The present study investigates whether loss of a child or children through death has any significant influence on fertility performance of the respondents.

Table 5.1 presents the average number of CEB to an ever married woman by number of children dead controlling for age of the mother. It is important at this point to note that examination of the relationship between fertility and child mortality exclude ever married women who had no live birth, as actual mortality experience (or the lack of it) cannot be a factor determining the fertility of childless women. Unadjusted mean parity figures presented in the third column of Table 5.1 show a rise in mean CEB from 4.28 children per woman for ever married mother who had had no dead child through 5.12 children per woman for ever married mother with exactly one dead child to 7.14 and 7.83 children per woman among ever married woman who had experienced two and three or more children deaths, respectively. This, on the average, shows a difference of 0.84 children per ever married woman between no child dead and one dead child categories, a difference of 2.02 children per ever married mother between one and two dead children categories and a difference of 0.69 children per woman between two and at least three dead children

categories. The results of the data also reveal a difference of 3.55 children per woman between those who experienced no child death and those who experienced at least three children deaths.

It is further noted from the unadjusted rates that mean CEB per ever married mother increases progressively with the increase in the number of dead children. Mother who had experienced one dead child over compensate the lost child through death by 0.43 children and the figure is 2.45 and 3.14 for mother who had two and at least three children death experience, respectively. Adjustment of the mean CEB for the effect of age distribution also significantly raises the average parity of at least three child death experienced woman (6.86) and the figure is 6.26, 5.10 and 4.40 per woman who experienced deaths of two children, one child and no child death, respectively.

5.6 Marital Status and Fertility

Marital status is one factors that plays an important role in affecting the fertility of a given society. In the present study about 89.6 percent of the total respondents are currently in union. Women are exposed to the risk of childbearing from the age of 15 to about 50 years which is the duration of about 35 years. In a society where marriage is a potent factor for child bearing marital status considerably influences the fertility level especially in a population where family planning practice is not wide spread.

Table 5.1 illustrates the relationship between fertility and marital status controlling for age. The unadjusted and the adjusted means indicate that marital status contributes to lower fertility. Currently in union woman on average would have 4.734 and 4.754 children while formerly married woman has 4.244 and 4.084 children in the unadjusted and adjusted cases,

respectively. This would mean that women currently in union would have on the average about 0.5 and 0.7 children higher than the formerly married woman in the unadjusted and adjusted cases, respectively and this is statistically significant with a P-value of 0.002.

5.7 Perceived income Status and Fertility

Income status of an individual is one other factor influencing the number of children ever born. Thus lower fertility has been associated with women in higher self-perceived economic well-being category.

In order to see the effect of perceived economic well-being on fertility a multiple classification analysis was run controlling for age. The results of the analysis portrays that the predictor variable contributes to the fertility variation but statistically insignificant as the P-value associated with the F-value is 0.94. Woman who perceives herself as economically poor have 5.4 children compared to 4.6 and 4.4 children of woman in the medium (average) and above average (well to do) income status category in the unadjusted cases, respectively. When adjustment is made for age and the independent variable the number of children born by the inadequate (poor), medium (average) and above adequate woman is about 4.98, 4.64 and 4.61 respectively.

5.8 Decision Making Autonomy of Woman and Fertility

The introduction of a development project in a given area has been said to bring about a change in woman's status, which is explained here by their decision making autonomy (Simmons and Young, 1995). Variation in the level of fertility is noticed in the present study among the study population differentiated on the basis of their decision making autonomy on management issues.

A brief look at Table 5.1 portrays a substantial and statistically significant differences in mean parities between woman of varied decision making autonomy on management issues. Unadjusted overall mean parities vary from 4.86 to 4.64 and 4.00 children per woman for those women who perceive themselves as belonging to the low, medium and high decision making autonomy category, respectively. Adjustment of the mean CEB for the effect of age distribution also significantly affect the average parity and results in 4.83, 4.65 and 3.03 mean CEB per woman for those belonging to the low, medium and high decision making autonomy category, respectively. The mean parity for the medium and high decision making autonomy category is highly affected by the adjustment for age.

5.9 Family Planning Use and Fertility

Research findings in some developing countries have shown that family planning programs affects women's fertility, other things being equal. Table 5.1 also presents the mean number of children ever born by ever and current use of natural and modern family planning.

The Table indicates that overall mean parity is inversely but insignificantly related to both ever use of natural and modern family planning methods. The unadjusted mean CEB shows that ever use of at least one natural family planning method decreases fertility by 0.06 children per woman while for ever use of at least one modern contraception methods decreases the overall mean parity by 0.21 per woman. When mean CEB was adjusted for age composition, ever use of at least one natural and at least one modern FP methods lower fertility by 0.01 and 0.08 children per woman, respectively. The difference in the observed mean parity between those who never used and ever users of at least one natural FP

methods was 0.13 and 0.03 children per woman in the unadjusted and adjusted cases respectively. Similarly, between those who never used and ever users of at least one modern methods the difference in mean CEB was 0.25 and 0.09 children per woman in the unadjusted and adjusted cases, respectively.

Current use of natural and modern FP is also negatively correlated with mean parity. The results from both unadjusted and adjusted deviation from the grand mean indicate that current users of natural FP method have 0.32 and 0.13 children lower than the currently non-users, respectively. The observed differences, however, are statistically insignificant at less than 5 percent level. Similarly, a pronounced difference in mean parity is observed between current users of modern contraception and those who are not. The unadjusted and adjusted deviation from the grand mean indicates that current users of modern contraception have lower fertility by 0.58 and 0.52 children per woman when compared to the current non-users respectively. The F-test carried out using ANOVA procedure shows that the observed differences are statistically significant at less than 5 per cent level (P- value 0.036).

5.10 Type of marriage and Fertility

Polygamous marriage is negatively but insignificantly related to fertility. The unadjusted and adjusted results show that woman in the polygamous marriage have 0.24 and 0.32 lower children than woman of monogamous marriage.

5.11 RELATIVE CONTRIBUTION OF SOCIO-DEMOGRAPHIC AND PROJECT FACTORS TO FERTILITY VARIATIONS: MULTIVARIATE ANALYSIS.

The fertility behavior of an individual and its out come is not only a function of age and one other independent variable as discussed previously but is also the result of varied socio

economic, project and demographic variables all of which are inter-related in one way or another. The interrelated nature of the variables means that some of the effects observed in the previous analysis could be confounded by the effects of other uncontrolled factors. The main purpose of this section is, therefore, to investigate if each of the variables examined in the previous section individually continues to have significant influence on life-time fertility. Besides, it is also meant here to examine the relative contribution of each of the independent variables to fertility variation and identify the factor or group of factors which are the most important in determining fertility differences in the study areas. Towards this end, an ordinary least square linear multiple regression (OLS) technique using enter method is employed (for the detail refer method section of this paper).

Table 5.2 presents the regression output which show the mean number of children ever born by the different predictor variables for women in the beneficiary and non-beneficiary groups. The first column of the table reveals lists of independent variables and the categories under each variable. Column two shows the unadjusted regression coefficients (β - values) representing the change in the number of children ever born associated with a one unit increase in the independent variable when all other predictors included in the model are held constant. Column three displays a βeta values (adjusted regression coefficients). These values show estimates of the amount of change that occurs after adjustment in the dependent variable (CEB) for a unit change in the independent variable with holding the effect of all other independent variables in the equation, and column four portrays a standard error of β.

Based on the values of unstandardized regression coefficients (β-values), every one year increment of a woman's age increases total live birth per woman by 0.1873 and 0.2327 for beneficiary and non-beneficiary groups, respectively. Their relationships are statistically significant at 0.0000 level of significance. With regard to child lost experience through death, the regression result indicates a positive and significant relationship (for two or more children loss through death) with fertility as compared to the reference (no dead child) group. The death of one child increases fertility by 0.092 and 0.418 children while the death of two children increases the average parity by 0.8298 and 1.743 children per woman in the beneficiary and non-beneficiary groups, respectively. On the other hand, mother with at least three dead children tended to have 1.51 and 2.42 excess children than woman who has no child dead for the above stated respective groups. The positive relationship between two and at least three dead children and fertility is statistically significant at $P < 5$ percent.

Table 5.2 Regression Of CEB On Demographic, Project And Socio-Economic Variables For Ever-Married Beneficiary and Non-beneficiary Respondents.

Variable and Category	MODEL I (BENEFICIARY) β Values	βeta values	SEβ	T-Sign.	MODEL II (NON-BENEF) β Values	βeta values	SEβ	T-Sign.
Constant	-.7420		1.1817	.5305	-1.2641		.6255	.0440
current age	.1873	.5799	.0153	.0000	.2327	.6068	.0131	.0000
Child Loss Experience								
* No child loss	RC	RC	RC	RC	RC	RC	RC	RC
One child loss	.0920	.0078	.8540	.9143	.4177	.0418	.4348	.3374
Two children loss	.8298	.0933	.4054	.0413	1.7429	.2419	.3672	.0000
At least three children loss	1.5047	.2375	.6157	.0280	2.423	.4370	.3165	.0000
Religious affiliation								
* Muslim	RC	RC	RC	RC	RC	RC	RC	RC
Christian	.2722	.0623	.1910	.1552	.1132	.0227	.1699	.5056
Women's Education								
*No formal education	RC	RC	RC	RC	RC	RC	RC	RC
1-6 grade (Primary)	-.1462	-.0133	.4765	.7592	.1207	.0123	.3211	.7071
Above grade seven	-.5502	-.0680	.2573	.0321	-.6314	-.0621	.3032	.0367
No. Of Years stayed in women's groups *1-4 Years	RC	RC	RC	RC	------	--------	-------	--------
5-9 years	-.0557	-.0485	.0206	.0372				
Ageat first marriage								
*20 or more years	RC	RC	RC	RC	RC	RC	RC	RC
Less than 20 years	.8841	.1344	..2885	.0024	.3942	.0713	.1838	.0326
Decision-Making Autonomy								
*Low	RC	RC	RC	RC	RC	RC	RC	RC
medium	-.8320	-.0360	.2916	.0216	-.9785	-.1066	..6073	0.1016
High	-.9217	-.1334	.2287	.0102	----	------	----	-----

Continued from table 5.2...

Variable and Category	MODEL I (BENEFICIARY) β Values	βeta values	SEβ	T-Sign.	MODEL II (NON-BENEF) β Values	βeta values	SEβ	T-Sign.
Ever Use of Natural FP								
*No	RC	RC	RC	RC	RC	RC	RC	RC
Yes	-.5956	-.0359	.8719	.4950	.3595	.0511	.3010	.2331
Current use of Natural FP								
*NO	RC	RC	RC	RC	RC	RC	RC	RC
Current Users	-1.0132	-.1010	.5326	.0580	.7335	.0721	.4397	.0962
Ever use of Modern FP								
*No	RC	RC	RC	RC	RC	RC	RC	RC
Yes	-.7348	-.1047	.5226	.1631	-.0306	-.0046	.2727	.9106
Current use of Modern FP								
*No	RC	RC	RC	RC	RC	RC	RC	RC
Yes	-1.4492	-.1761	.6158	.0192	-1.4482	-.2391	.1972	.0000
Perceived Economic Well-being								
*Sufficient	RC	RC	RC	RC	RC	RC	RC	RC
Average	.4327	.0529	.2105	.0340	.0130	.0020	.2744	.9621
Inadequate	.7218	.1335	.2827	.0112	.2986	.0573	.2299	.1949
Type of Marriage								
*Monogamy	RC	RC	RC	RC	RC	RC	RC	RC
Polygamy	-.2217	-.0434	.2874	.4409	-.0875	-.0155	.2086	.6752
Marital Status								
*Formerly married	RC	RC	RC	RC	RC	RC	RC	RC
Currently Married	.0803	.0124	.3670	.8269	.5580	.0692	.2978	.0618
Adjusted R2				.4132				.6231
F-Value				13.56				37.56
Sign. F				0.0000				0.0000

Source: Computed by the author based on own survey data, 1997.

Table 5.2 also shows that women's above Junior secondary education has statistically significant and negative relationship with life-time fertility variation in the study areas. The probable reason for this could be partly due to the proportion of formally educated women are more likely to practice modern contraception as a result of which it brings statistically significant influence on fertility variation.

Fertility differences by perceived economic status is statistically significant for the group covered by the project. Table 5.2 shows the mean CEB per woman is higher (by 0.7218 children) for low self perceived income status woman than the reference high self perceived income woman in the project group. Table 5.2 further indicates that modern contraception has a significant influence on fertility in both groups and this may be associated with its long acting and less failure rate effect on fertility compared to the natural family planning. The *B*-value also shows that current users of natural family planning are less fertile (by 1.01) than the reference currently non-users of natural FP in the project women but its effect on fertility is statistically insignificant.

Polygamous marriage is negatively but insignificantly correlated with fertility. The possible explanation for the observed variations in fertility could be due to the lower coital frequency on average for polygamous women, and this affects the risk of pregnancy and fertility performance.

The regression analysis also illustrates significant fertility variation on the basis of age at first marriage. Compared with the average fertility experience of woman who married at ages 20 or older the mean parity for less than 20 years at first marriage mother was higher by 0.88 and 0.39 children for beneficiary and non-beneficiary woman respectively. This

observed variation in fertility could be attributed to the differences in the timing of marriage which exposes early married women to the risk of pregnancy and to the state of motherhood.

As it is discussed in the bi-variate section of this paper marital status had a significant effect on fertility of the beneficiary and non-beneficiary women's groups and controlling the effect of age only. When the effect of all other independent variables included in the model are held constant and its effect is assessed for each group separately in the multivariate OLS analysis, marital status has an insignificant effect on life time fertility. This could partly be due to the fact that the proportion of currently married is similarly high in both beneficiary and the non-beneficiary communities.

One of the important predictors, decision making autonomy, has an effect on fertility. The variable is found to play important and significant role in explaining the fertility variations in the beneficiary group. Table 5.2 reveals that woman in the high decision making category on average has lower mean CEB and is on the average less than the mean CEB for the reference group by 0.92 for the beneficiary group.

The regression result also depict that longer duration of staying in women's group significantly reduces fertility. A beneficiary woman who stayed in women's group for 5-9 years on average has about 0.1 child less than the reference group.

The regression model for the beneficiary women demonstrated that 41.3% of the variation in the level of fertility is significantly explained by child loss experience, current use of modern family planning, above grade seven education, high decision making autonomy, longer years of staying in women's groups, perceived economic well-being, age and age at

first marriage. For the non-project women 62.3% of the variation in life time fertility is significantly explained by predictors of age of women, age at first marriage, above grade seven education, child death experience and current modern contraception use.

CHAPTER VI

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Summary

Available data shows that the Ethiopian population is growing at a high rate of 3.1 percent per annum (TGE, 1993). The major factors for such rapid growth rate of the population are increasing high fertility rates and slowly declining mortality rates. The total fertility rate of the country increased from 5.8 children per woman in 1970 to 7.7 children per woman in the early 1990s. However, fertility varies considerably by place of residence. In urban areas TFR increased from 4.7 children per woman in 1970 to 6.3 in 1984 but moderately declined to 5.8 in 1990. In rural areas, TFR seems to have continuously increased from 5.8 children per woman in 1970 to 7.5 in 1984 and to 8.1 in 1990. Since about nine-tenth of the Ethiopian population are rural dwellers, the country's TFR is determined mainly by the rural TFR.

The present demographic trend is, therefore, indicative of the fact that Ethiopia will have to bear the burden of unprecedented rapid population growth beyond its resources in the years ahead unless effective measures are taken to moderate the fertility trend of the country (TGE, 1993). Towards this end, a population policy was formulated in 1993. This policy has for its major goal of "the harmonization of the rate of population growth and the

capacity of the country to develop and utilize natural resources". Another important policy is the National Policy on Women aimed at enhancing the socio-economic status of women thereby to be effective agents and beneficiaries of economic, social and political development. The present study is, therefore, expected to contribute towards implementing the population policy of Ethiopia because studying the effect of a development project like Atat Hospital's Women's Group was expected to have an effect on fertility levels and on socio-economic characteristics of the target population.

In Ethiopia in general and in the Gurage community in particular no in-depth research, to the writer's knowledge, has been made on the effect of development projects on the level of fertility and other socio-demographic characteristics. The major objectives of the present study were to assess the variation, if any, in fertility level; to examine women's knowledge and practice of natural and modern family planning; to determine the socio-demographic and project variables influencing fertility and their relative importance in explaining the variation in fertility for women in the project and non-project groups; and based on the study findings to identify issues relevant to policy formulation and further research.

The primary data of the present study was collected in June 1997 from a sample of 748 women (of which 348 were from the project group and the remaining 400 from non-project women group). The quality of the collected data was evaluated using Myer's Index of terminal digit preference for age of respondents and parity - cumulative fertility (P/F) ratio for the quality of reporting of period and retrospective fertility data.

Comparison of reported parity (retrospective births- P) per ever married woman with the corresponding F-values, constructed from the current fertility rates portray above unity value in almost all age groups though the acquired value was very high at youngest (15-19)

and relatively lower in the middle age groups. The observed above unity P/F ratio values are an indication of the prevalence of distortion in reported current and/or life time fertility data. This may arise either due to over-reporting of life-time fertility (such as the inclusion of foster and relatives' children with their own, still births with live births, etc) or under reporting of current fertility that might be a result of misunderstanding of reference period error. Evaluation of mean parity data showed that the average number of children ever born (CEB) consistently increases with the age of the mother and is an indication of a fairly good reporting of CEB.

The reported total fertility rate (TFR) for the overall respondent is 5.74 and the corresponding figure for woman in the beneficiary and non-beneficiary groups is 5.61 and 5.68, respectively. The GRR is 2.737, 2.798 and 2.828 for woman in the beneficiary, non-beneficiary and the overall groups, respectively. The GFR is 178.1, 227.8 and 199.9 for the project, non-project and total groups, respectively. The mean number of CEB per woman at the end of her reproductive life-span is 7.818, 8.294 and 8.107 for beneficiary, non-beneficiary and for the two groups combined, respectively. It is worth noting here that the current high mean parity in comparison with other rural areas figure is a result of the ever married marital status of the respondents. Results of the age specific fertility rates show that births are concentrated in the age group 20-39 producing a broad peak which is a typical characteristics of developing countries. The results of sex ratio at birth portrays that the figure varies very little by age of the women but for only 30-39 age groups the sex ratio at birth is very near to the expected range of 1.02 to 1.07. The computed sex ratio of dead children shows that with increasing age of mothers sex ratio suffers from sex specific omission of dead children.

As a result of the abovestated reason fertility data was adjusted (estimated) indirectly using Brass P/F ratio technique. The reported total fertility rates were 5.61, 5.68 and 5.74 for woman in the beneficiary, non-beneficiary and in the over all groups, respectively. The estimated level of fertility (TFR) based on the Brass P/F ratio method on adjustment factors for age groups of 25-34 and 20-34 respectively was about 5.5 and 5.4 for woman in the beneficiary group; 7.5 and 6.7 for non-project woman ; and 6.4 and 6.0 for a woman in the overall group. The adjusted TFR which is the best estimate of current fertility in the study area show a difference of ranging between about 1.3 (for age group 20-34) and 2.0 (for age group 25-34) per woman in the beneficiary group in comparison with that of non-project woman.

In examining the differentials of fertility between the target population, the socio-economic, project and demographic variables were taken into account. These predictor variables were group membership to the project or non-project women, education, age at first marriage, religion, child loss experience through death, type of marriage, marital status, perceived economic well-being, natural and modern family planning and decision making autonomy of women and the dependent variable is the number of children ever born. The relationship between the socio-economic and demographic variables on the one hand and the dependent variable on the other were analyzed using Multiple Classification Analysis (MCA) and Analysis of Variance (ANOVA) by taking one predictor variable at a time and often controlling for the effect of age. Attempts were also made to determine the relative contribution of each of the independent variables. The multivariate Ordinary Least Square (OLS) regression technique is employed for this purpose.

The results of OLS analysis of the present study revealed that woman who stayed longer in the project of the Atat Hospital have lower fertility than a woman who entered the women's

group recently and the differences in the mean number of children ever born is statistically significant.

Among socio-demographic variables education was negatively related to fertility. The statistically significant relationship showed that women with no and non formal education have the higher fertility than the literate (particularly Junior Secondary School) women. The relationship between current age of a woman, age at first marriage, child loss experience, decision making autonomy of woman, and fertility were found to play important and statistically significant roles in fertility variation in the study area. Women with higher age (20 or more years) at first marriage have the lower fertility than those married at ages lower than 20. The strongest and most significant relationship was found between child loss experience and children ever born. Women with no child loss experience had lower fertility than women who experienced one, two or at least three child loss through death in their degree of increasing importance. This indicates that due to the 'replacement' and/or 'biological' effect child loss leads to high fertility. High child loss experience might also result from high fertility performance by a women.

The multivariate OLS analysis, in a nutshell, portrayed that 41.3% and 62.3 percent of the variations in fertility levels in the project and non-project groups were attributed to the abovestated significant predictor variables, respectively

6.2 Conclusion

Some socio-demographic and project variables were found to be significant in explaining the fertility differences in the study area. The fertility level of the study groups is generally very high. Such a high level of fertility in the present study area is due partly to the ever

married composition of the sampled women. Other contributing factors include low status and educational level of women, and low participation of women in the modern sectors of the economy. From the findings it appears that a significant change in the life-time fertility in the beneficiary group compared to non-beneficiary counterparts was not found at present. Significant fertility decline would occur when the socioeconomic and cultural factors that encourage high fertility are changed. This is, however, the remotest possibilities to achieve in short period of time in countries like Ethiopia. An alternative approach towards the reduction of fertility could be through behavioral change. This is realized through awareness creation towards small family size by applying a culturally appropriate information, education and communication (IEC) programs and the introduction of more effective modern contraceptives instead of relying only on natural family planning methods with all its de merits.

The women's group project at Atat is too temporally short to have a decisive impact on life time fertility. On the other hand, it could be difficult for rural women to exercise sufficient discipline and rigorous scheduling to make the natural method of family planning to work effectively. Socio-economic development of the area is another major factors to reduce the fertility level. Although the Atat Hospital's Women's Group project up to now doesn't significantly alter life-time fertility it affects well the current fertility level of the project women in the study community as has been revealed from the lower estimated TFR in comparison with the non-beneficiary group.

The project at Atat has brought about an attitudinal change on the part of its members. As is clearly observed 33.2% of the beneficiary currently married women reported wanting no more children compared to only 2.6% of the non-project women. The project, there for, stimulated desire for small number of children. The percentage distribution of ever-married

women giving numeric responses to the ideal family size is very high (88.3%) in project group in comparison with only 44.1% of the non-beneficiary counterparts. Besides, the mean ideal family size of 4.9 and 7.5 for beneficiary and non-beneficiary woman, respectively further strengthened the disparity between the two groups.

The project women are highly benefited by potable water, sanitation and hygiene, maternal and child health care (MCH) and health service (of antenatal and postnatal care, birth place of a child, professional (medical) delivery assistance and childhood vaccination) coverage. These variables are expected to greatly alter the risk of dying of children.

Members of the women's group are also able to borrow up to 200 *Birr* from the revolving fund. No interest is charged when repayment is done in ten weeks except the regularly contributed amount to their fund. This and the non-formal education given to the women from the Atat Project for the past nine years have given the project women to exercise a relatively better decision making autonomy on management issues as shown in the bi-variate analysis thereby to affect fertility compared to the non-project women.

Substantial variation in the level of knowledge and use of particularly natural family planning prevailed between the project and non-project women. The natural family planning is found to play a negative but insignificant role on life-time fertility in the present study. This might be due to the natural fertility awareness of the women's groups commenced its function some nine years ago and due to this shorter temporal dimension the births a woman would have before the establishment of the project could not be affected by it. In addition the failure rate of natural family planning methods has contributed to it. In spite of this, however, it brings about a change in the current fertility as is shown by the adjusted TFR of 5.5 in beneficiary group compared to 7.5 for the non-project woman.

Furthermore, sizable proportion of project women who have unmet need for limiting (27.0%) and for spacing (22.4%) are in need of a better long acting and effective contraception in view of the population and development perspective.

6.3 Recommendations

If the currently underway natural family planning program in the beneficiary group is expanded to the unserved non-project area along with all other socio-economic vantages, women of non-beneficiary group would have been benefited by the project inputs thereby may alter their socio-economic and fertility behavior gradually.

Along with the natural family planning method, efforts (by the government organizations and/ or other non-governmental organizations) should be made to provide the merits of comprehensive and effective modern family planning, reproductive and child health program along with its services within the reach of the population . Such programs are more likely to bring significant reduction in fertility and maternal and child mortality in the area with in a relatively short time period. These can contribute to attain the fertility and mortality objectives of the National Population Policy of Ethiopia The unserved population should also be made cognizant of the socio-economic problems associated with high fertility through appropriate folk and/or modern media.

Since the present study is only an assessment of the short-term effect of the socio-economic programs introduced by the Atat Hospital, more in-depth quantitative and qualitative studies would be required on the effect of development projects in a number of other places including the Atat in the country. The determination of the effect of socio-economic projects on fertility, maternal and child health, child and maternal mortality should rely on a

longitudinal rather than on cross sectional study design of this type. This would permit a comparison of served and non-served areas over a specified period of time. The longitudinal research I am recommending can be of great use in generating time series data for planning, designing strategy and implementing population and development related policies.

GLOSSARY

Development: is a process of interrelated economic, social and political changes the ultimate aim of which should be to promote an improvement in the well-being of the entire population (Ekanem and Arowolo, 1994).

PROGRAM: is a formally or deliberately organized set of activities (interventions) designed to affect some aspects of social life including demographic outcome and is executed at different levels such as in the form of experimental, pilot or demonstration projects or much larger public seetor intervention at local, regional or national level. It encompasses deliberately designed interventions in the public, non-governmental or private-commercial sectors with the intention of bringing some desired changes in human behavior and living conditions (Simmons and Young, 1995).

Development Project: Refers to a specific development intervention with specific objectives. time-frame, and a clear geographic boundary of operation (ibid).

Family Planning: is a conscious effort of couples or individuals to control the number and spacing of births (Pressat, 1985:78). Lucas (1980 : 240) defines family planning program as all organized efforts to provide birth control information and services (of various types) to a target population with a view of lowering fertility.

Age Heaping: A tendency for enumerators or respondents to report certain ages instead of others; also called age preference or digit preference. Preference for ages ending in 0 or 5 is widespread.

Age-Specific Fertility Rate: The number of live births occurring to women of a specified age or age group per year divided by the number of women of that age or age group.

Reproductive Life Span: The span within which women are capable of bearing children, generally taken to be from age 15 to age 49.

Children Ever Born (CEB): The number of children ever born alive by a particular woman; synonymous with parity. Still births are specifically excluded.

Fertility: The actual child bearing performance of individuals or couples.

General Fertility Rate (GFR): The total number of live births occurring per 1,000 women in the childbearing ages (15-49 years) in a given year.

Gross Reproduction Rate (GRR): The average number of daughters a woman would have if she experienced a given set of age specific birth rates throughout her childbearing span.

Marital Fertility: Any measure of fertility in which the births (in the numerator) are births to married women and in which the number of person-years-lived (in the denominator) also pertains to married women. In some instances, the designation "married" includes persons in consensual unions.

Mean Children Ever Born: the average number of children ever born alive to women at specific age or age group.

Total Fertility Rate (TFR): The average number of children that would be born per woman if all women lived to the end of their childbearing years and bore children according to a given set of age-specific fertility rates; also referred to total fertility. It is frequently used to compute the consequence of childbearing at the rates currently observed.

Annex 1 DATA QUALITY

Annex 1.1 Evaluation of Single Year Age Data

Accurate data is highly important in demographic analysis and socio-economic planning. The computation of fertility requires an accurate age distribution of the population. In order to ensure better quality data effort has been made from the start of the questionnaire design up to data cleaning. Training of enumerators and supervisors has been conducted and mock interviews were made before the commencement of the actual data collection. The questionnaire was also designed in a way that permits adequate check for internal consistency. In spite of these efforts made, data collection in most developing countries like Ethiopia where the majority of the population is illiterate and agrarian is far from being to the desired degree of accuracy. In view of this, evaluation of the data to determine the levels and differentials of fertility is undertaken. The types of data that are assessed due to their relevance to the present study include age of respondents (15 - 49 years of age), current and retrospective fertility and sex ratio.

Mis-reporting of age is a common problem in developing countries which may be caused by the respondent and/or the enumerator. Due to socio-cultural factors and/or ignorance the respondent may fail to report his/her age or the ages of others about whom questions are asked. This is true especially when one member of the household provides the majority of the information about other members of the household (Ewbank, 1981, cited in Assefa, 1990). The respondents may intentionally falsify their ages or may report ages ending in some preferred digits and deficiencies in ages ending in others. Interviewers also cause age errors by making guesses based on physical appearance, the number of children ever borne to the respondent, etc. or by failing to probe the reported age. The tendency of enumerators

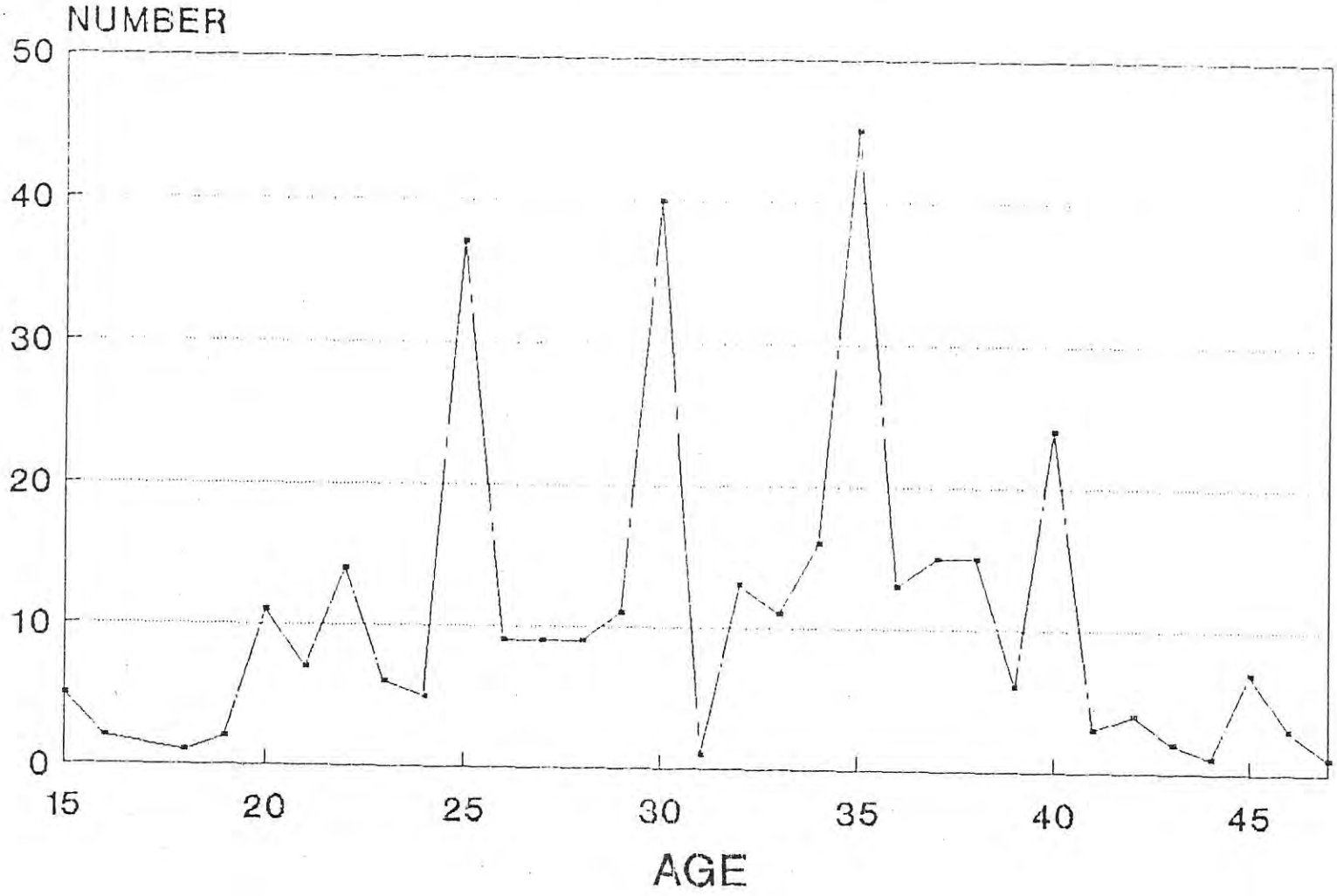
or respondents to report certain ages at the expense of others is termed as age heaping, age preference or digit preference (Siegel and Shryock, 1976). In order to measure the extent of age heaping based on the collected survey information Myer's Blended Index of terminal digit preference is applied to the age distribution of the respondents.

Table 7.1 Myer's Blended Index of Terminal Digit Preference for Ages of Women covered by the Study (For Ages 20 to 49).

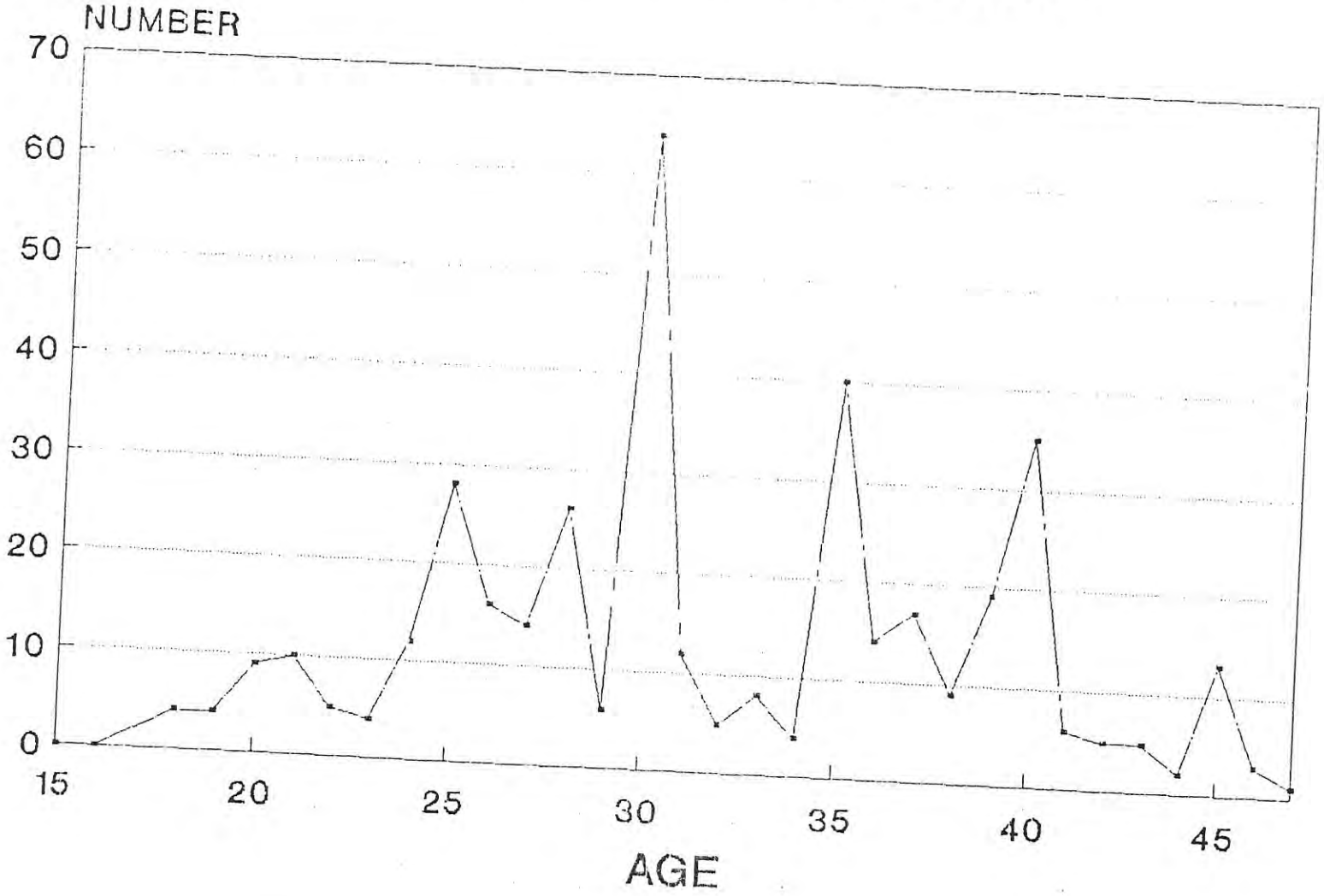
	Population With Terminal Digit 'a'					Weight for		Blended Population			Percent			
Terminal digit (a)	Starting at 20+a			Starting at 30+a		Column 1	Colm 2	Number						Deviation of percent from 10
	Ben.	Non-Ben	Total	Ben	Non-Ben Total			Ben	Non-Ben	Total	Ben	Non-Ben	Total	Ben Non-Ben Total
	(1)			(2)		(3)	(4)	(5)			(6)			(7)
0	75	108	183	64	99 163	1	9	651	999	1650	22.7	29.2	26.3	12.7 19.2 16.3
1	11	28	39	4	18 22	2	8	54	200	254	1.9	5.8	4.1	-8.1 -.4.2 -5.9
2	31	15	46	17	10 27	3	7	212	115	327	7.4	3.4	5.2	-2.6 -6.6 -4.8
3	19	17	36	13	13 26	4	6	154	146	300	5.4	4.3	4.8	-4.6 -5.7 -5.2
4	22	18	40	17	6 23	5	5	195	120	315	6.8	3.5	5.0	-3.2 -6.5 -5.0
5	89	81	170	52	53 105	6	4	742	698	1440	25.9	20.4	22.9	15. 10.4 12.9
6	25	33	58	16	17 33	7	3	223	282	505	7.8	8.2	8.0	-2.2 -1.8 -2.0
7	25	32	57	16	18 34	8	2	232	292	524	8.1	8.5	8.3	-1.9 -1.5 -1.7
8	24	35	59	15	9 24	9	1	231	324	555	8.1	9.5	8.8	-1.9 -0.5 -1.2
9	17	25	42	6	19 25	10	0	170	250	420	5.9	7.3	6.7	-4.1 -2.7 -3.3
Total								2864	3426	6290	100	100	100	
SUMMARY INDEX														28.6 29.5 29.2

Source: Computed by the author from own survey data, 1997.

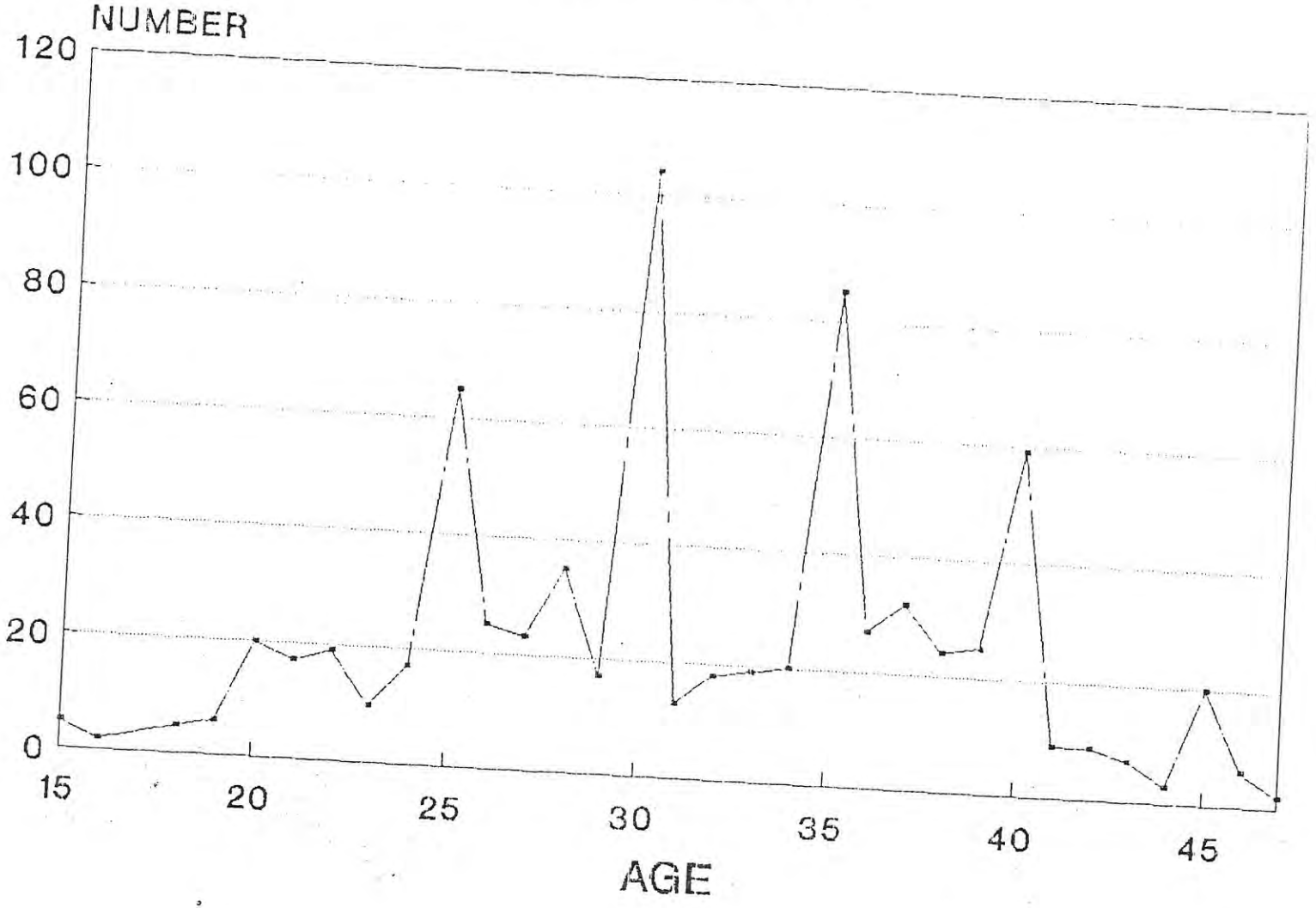
Single age distribution of Beneficiary Respondents



Single age distribution of
Non-Benefeiciary Respondents



Single age distribution of
all respondents



Myer's Blended Index is a test usually used to measure preferences (or avoidance) for each of the ten digits from 0 to 9 and it provides summary preference index for all terminal digits. The method assumes that if there are no systematic irregularities in age reporting, the blended sum at each terminal digit should be approximately equal to 10 percent of the total blended population. If the sum at any given digit exceeds 10 percent of the total blended population, it indicates over-selection (digit preference) of ages ending in that digit. A sum which is less than 10 percent of the blended total or a negative deviation on the other hand is indicative of under-selection (digit avoidance) of ages ending in that digit. An overall measure of the extent to which there is digit preference and/or avoidance in an age distribution is the Index of preference which is half the total of the absolute deviations relating to the ten terminal digits. The theoretical range of Myer's Index value is between 0 and 90. The nearer the index value to 0 the more accurate the age data and the closer its value to 90 the higher the degree of net digital preference. The results of Myer's blended index for the total respondents of 29.2 which indicates the fairly accurate age data in the present study which is given in Annex Table 7.1 and graphically displayed in Figure 3.0 to 3.2.

The data in Table 1.0 shows a tendency of respondents to report ages ending in '0' and '5'. It is vividly observed that 29 percent of all respondents or 28.6 percent of beneficiary and 29.5 percent of non-beneficiary women have reported their ages at an incorrect terminal digit. Both the beneficiary and non-beneficiary women, however, have more or less similar pattern of preference and dislike for the terminal digits (see Table 3.3). Digits '0' and '5' are the most preferred digits by both groups with a sizable deviation from 10.0 percent. Digits '1', '3' '9' and '4' are the most avoided digits in their order of degree of avoidance.

Generally, in relative terms, age heaping as evaluated by the Myer's Index is found to be

slightly higher among non-beneficiary women than women of beneficiary group. Due to this problem of age heaping in digits '0' and '5' rather than adjusting the single years, respondents are categorized into broad age groups for subsequent analysis and the values are taken as reported.

Annex 1.2 QUALITY OF FERTILITY DATA

Annex 1.2.1QUALITY OF PERIOD AND RETROSPECTIVE DATA

In developing countries like Ethiopia censuses and surveys are the major source of data information for the estimation of vital rates. The basic data of concern here for the estimation of fertility rate are the number of children ever borne alive and births in the last 12 months preceding the time of the survey. These two pieces of information are obtained from a sample of married women in their reproductive life span could be affected by the omission of births and reference period errors. It is, therefore, necessary to evaluate these data before making further analysis.

In order to evaluate the current and retrospective fertility data of the present study, the P/F ratio method is used. This method adjusts the observed level of Age Specific Fertility Rates, which are assumed to represent the true age pattern of fertility, to agree with the level of fertility indicated by the average parities of women. The method assumes constant fertility in the past and involves interpolation of fertility rates using a model fertility schedule (Brass, 1975; Coale and Trussel, 1974). The P/F method compares the age specific parities (Pi) with the cumulated current fertility or parity equivalent (Fi) that each age group women would have if they had been subjected throughout their lives to the reported age

specific fertility rates. If fertility remained constant and the data are accurate, the value of the P/F ratio would be closer to unity. Any deviation of the P/F ratio value from one indicates the presence of errors in the total number of children ever born and births in the last year.

If the value of P/F ratio is under unity, the parity data (P) might have been under reported in comparison with the current fertility data; and above unity value of the P/F ratio may show an under reporting of the cumulated current fertility. P/F ratios for the present study are presented in Annex Table 7.2 below.

Table 7.2 Comparison of Cumulative Fertility Rate, F, and Mean Parity, P, Using P/F Ratio Method for the overall sampled respondents.

Age of Women	Index (i)	No. of ever married Women	Children Ever born (CEB)	Mean CEB per Ever Married woman (Pi)	Births in Last year (BLY)	Age specific Fertility Rate (ASFR)	F*	P/F Ratio
15-19	1	18	15	0.833	2	0.1111	0.225	3.707
20-24	2	83	138	1.663	31	0.3735	1.783	0.932
25-29	3	165	506	3.067	23	0.1394	2.814	1.090
30-34	4	174	755	4.339	41	0.2356	3.837	1.125
35-39	5	193	1095	5.674	31	0.1606	4.757	1.183
40-44	6	87	566	6.506	8	0.0920	5.367	1.212
45-49	7	28	277	8.107	1	0.0357	5.698	1.423

Source: Computed by the author from own survey data, 1997.
Note: * Obtained Using Coale Trussel Interpolation Multipliers (UN, 1983:33-34).

From the above Table it is observed that average parity consistently increases with the age of mother indicating fairly good reporting of children ever born. On the other hand, the age specific fertility rate shows that the births are concentrated in the age range 20-39 producing a broad peak, a feature peculiar to developing countries.

Besides, Table 7.2 shows comparison of the reported parity (retrospective births, i.e., P-value) per ever married woman with the corresponding F values, constructed from the current fertility rates. The P/F ratios indicate considerable variation with age of women. With the exception of the age group 20-24, the P/F ratios are above one in all age groups although the values are very high in the age groups of 15-19 and 45-49 and lower in the middle age groups (25-29). The ratios for the age range 20-44, on average, is 1.11. Demographers consider a P/F ratio of 1.2 or less an indication of reasonably good data (Venkatacharya, 1992 cited in Yohannes, 1994). The P/F ratios for the youngest (15-19) and oldest (45-49) ages deviate abruptly and markedly from 1.2. The highest P/F ratio value for the youngest age group (15-19) is obtained as a result of their ever married marital status which inflate their parity as compared to the parity of all women in that age group. The observed above unity P/F ratio values are an indication of the prevalence of distortion in current fertility and/or life time fertility data.

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DECLARATION

I, the undersigned, declare that this thesis is my original work and that all sources of materials used for the paper have been duly acknowledged.

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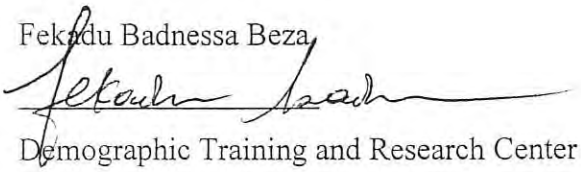
Signature 

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