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CHANGING BASES FOR HOUSEHOLD ECONOMY AND FAMILY FERTILITY RESPONSE IN THE HADO AREAS KONDOA DISTRICT

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BY

NDALAHWA FAUSTINE MADULU

A DISSERTATION SUBMITTED FOR PARTIAL FULFILLMENT OF THE DEGREE OF MASTER OF ARTS (DEMOGRAPHY) IN THE UNIVERSITY OF DAR ES SALAAM

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DECLARATION

I declare that this dissertation is my own work and has never been submitted for a degree in any other University.

Signature ..... Date 29/05/1999

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ABSTRACT

This study aimed at investigating the impact of changing basis for household economy from pastoralism to pure crop farming on family formations and fertility performance in the households. The study was conducted in the HADO Areas in Kondoa district.

Seven villages were randomly sampled out and grouped into two clusters namely the "HADO Area" and the "Periphery HADO". A total of 359 women aged 15 years and above were interviewed from the 240 sampled households. Analysis of data was at cluster level only.

This dissertation is divided into four chapters. In chapter one the problem of the study has been introduced. Three hypotheses were formulated after a thorough review of literature. Also the significance of the study has been explained.

Chapter two provides an explanation of the methodological aspects of the study. A clear description of the study area, the sampling procedures, sample size, data collection procedures and statement of the major problems encountered has been given.

Chapter three deals with data presentation and analysis. The major focus has been centered on household size, age at first marriage, age at first

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maternity, and fertility levels and differentials. In most cases comparison has been made between the "HADO Area" and the "Periphery HADO" clusters.

Chapter four gives a summary of the findings, conclusions and recommendations to policy makers and planners. The major findings of the study are summarized below:

(i) Fertility levels are higher in the HADO Area than in Periphery HADO. The younger age groups (15-29) demonstrates the highest age specific fertility rates.

(ii) Households of cultivators had a mean size of 6.4 people and the households belonging to agro-pastoralists had a mean size of 4.7 persons only. Among the households of cultivators the HADO Area exhibited higher mean size as compared to the Periphery HADO cluster.

(iii) Although in most age groups the HADO Area exhibited higher age at first marriage as compared to the Periphery HADO cluster, a rapid decline was observed in the former cluster after destocking to the extent of being lower than that of Periphery HADO. The data also demonstrated an increase in age at marriage in

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age group 20-25 as a result of abrupt change in the socio-economic status. The increase was followed by a rapid decline in age group 15-19.

(iv) A declining trend in age at first birth was particularly rapid in the young age groups and in the HADO Area than in the Periphery HADO.

(v) Children were engaged in the labour force from age six to ten. Time consuming activities such as firewood collection, fetching water and cooking were assigned to children.

The recommendations of the study are summarized here as:

(i) The ministry of Lands, Natural Resources and Tourism should take consideration of the population in the planning and implementation of land conservation programmes.

(ii) The best alternative strategy for checking the ever increasing fertility in the HADO Area is to encourage practise of modern family planning methods through education and improved supply and accessibility of the services. UMATI (the Family Planning Association of Tanzania) is responsible in implementing this aspect.

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High population growth in an area which has scarcity of arable land leads to under-employment and rural urban migration. There is a need for the district and regional authorities to seek possibilities of securing new lands, modernizing agriculture, and encouraging off-farm employment in the rural sector.

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CHAPTER ONE

INTRODUCTION.

1.1. Background to the Study:

Environmental degradation has been a major ecological problem in many parts of the world. Among the issues of major concern are land degradation in the forms of soil erosion, deforestation, desertification and rapid population growth especially in developing countries. The realization of the problem of environmental degradation prompted the United Nations Conference on Desertification which took place in Nairobi in 1977 (Tanzania, 1977). The reason for this concern on environmental degradation is the fact that, the problem strike at one of the basic elements for survival of mankind, namely productivity of the land.

In Tanzania, ecological crisis has been serious in the semi-arid areas in the northern and central parts of the country in regions like Arusha, Dodoma, Singida and Shinyanga. Among these regions, Dodoma has the most severely degraded lands. The most classical example of land degradation in Dodoma region and possibly in the whole of Tanzania is the Kondoa Irangi Highlands in Kondoa district. The major problem in these highlands is severe land degradation

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caused by deforestation, rapid population growth, overgrazing and faulty agricultural practices (Christiansson, 1988; Mbegu and Mlenge, 1984).

Evidence from the Kondoa Irangi highlands shows that large areas of the landscape have been seriously eroded and stony surfaces and very deep gullies dominate the physical features today. Man's diversified activities have been responsible for deterioration of soils in the region. Man has also been responsible for land degradation due to rapid rates of population increase. A more direct and visible effect of increasing population on the land is the clearing of the natural vegetation and intensive cultivation on the hill sides due to increasing demand for more arable land, fuelwood, charcoal and building poles. Further, the increase in population has been associated with the increase in the number of livestock.

In 1973, the land conservation project for Dodoma region (Hifadhi Ardhi Dodoma - HADO) was launched not only to stem further deterioration of the environment, but also to take all necessary measures towards full rehabilitation. The prime responsibility of the project was to conserve soil and water, and reclaim the already depleted land (Mbegu and Mlenge 1984). Although the project was supposed to cover the whole of Dodoma region, most of

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its activities have so far been concentrated in Kondoa district, in the Kondoa Irangi highlands in particular. It was in this area where land degradation was so alarming that immediate corrective measures were required.

Various activities have been carried out by the HADO project in Kondoa district in its efforts to realise its objectives. These activities include protection of grazing lands, planting of grass, trees and sisal fences, construction of contour banks, construction of check dams in the gullies, and total destocking. All of these measures are related to man's activities. No attempt has been made to deal with the problem of rapid population growth. It was thought necessary to remove the livestock which were seen as the immediate constraint in the efforts to reclaim and conserve the already degraded land.

Part of the impact of total destocking was the rapid recovery of the severely eroded soils and badly depleted natural vegetation. However, destocking also caused both social and economic changes in the area, especially at the household level. For example, the basis for household economy completely changed from livestock dependence to pure crop farming, and social status ceased to be determined by the number of livestock one has (Osteberg, 1986). Coupled with rapid population growth, total dependence on the land

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not only led to the spread of the cultivated land to the marginal areas, but also put enormous strain on the land through tree felling.

The impact of destocking was not restricted to environmental, social, and economic spheres. It is hypothesized that effects were felt even in various demographic variables such as migration, fertility, marriage behaviours, and child mortality through changes in nutritional status. However, although there is evidence in the Kondoa Irangi highlands that population has not only been one of the major causes of land degradation, but also one of the affected areas, details of population have never been deeply investigated in order to link them with the HADO project's activities.

Most of the studies done in the Kondoa Irangi Highlands have concentrated on social and biophysical aspects of land degradation (Christiansson, 1986; Mbegu and Mlenge, 1984; Banyikwa and Kikula, 1980). Exceptions, however, include the most recent study by Osteberg (1986). But even Osteberg missed out the most fundamental demographic variables which are important in guiding the past, present and future conservation efforts of the eroded areas. His major concentration was on the social impact of total destocking to the people. Understanding of the population is an integral part of the successful

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development of a project like HADO which deals with man/environmental linked problems. Lack of detailed studies in population leaves the project with a serious information gap.

Three interacting factors have been observed in the Kondoa Irangi highlands namely; severe land degradation leading to scarcity of arable land, total dependence on land for subsistence, and rapid population growth. The linkages of these factors need to be investigated. The present study aims at forming a point of departure by investigating these linkages.

1.2. The Problem:

Complete removal of the livestock in the HADO area imposed new social and economic patterns to the traditionally bound society. Such new patterns were likely to influence fertility behaviours. Therefore, this study will investigate the extent to which a change in the basis for household economy from pastoralism to pure crop farming, influenced family formations and fertility in the HADO areas in Kondoa district.

1.3. Conceptual Framework:

The conceptual framework utilised for the study is summarised in figure 1.1. This framework assumes that the output of the HADO project influence

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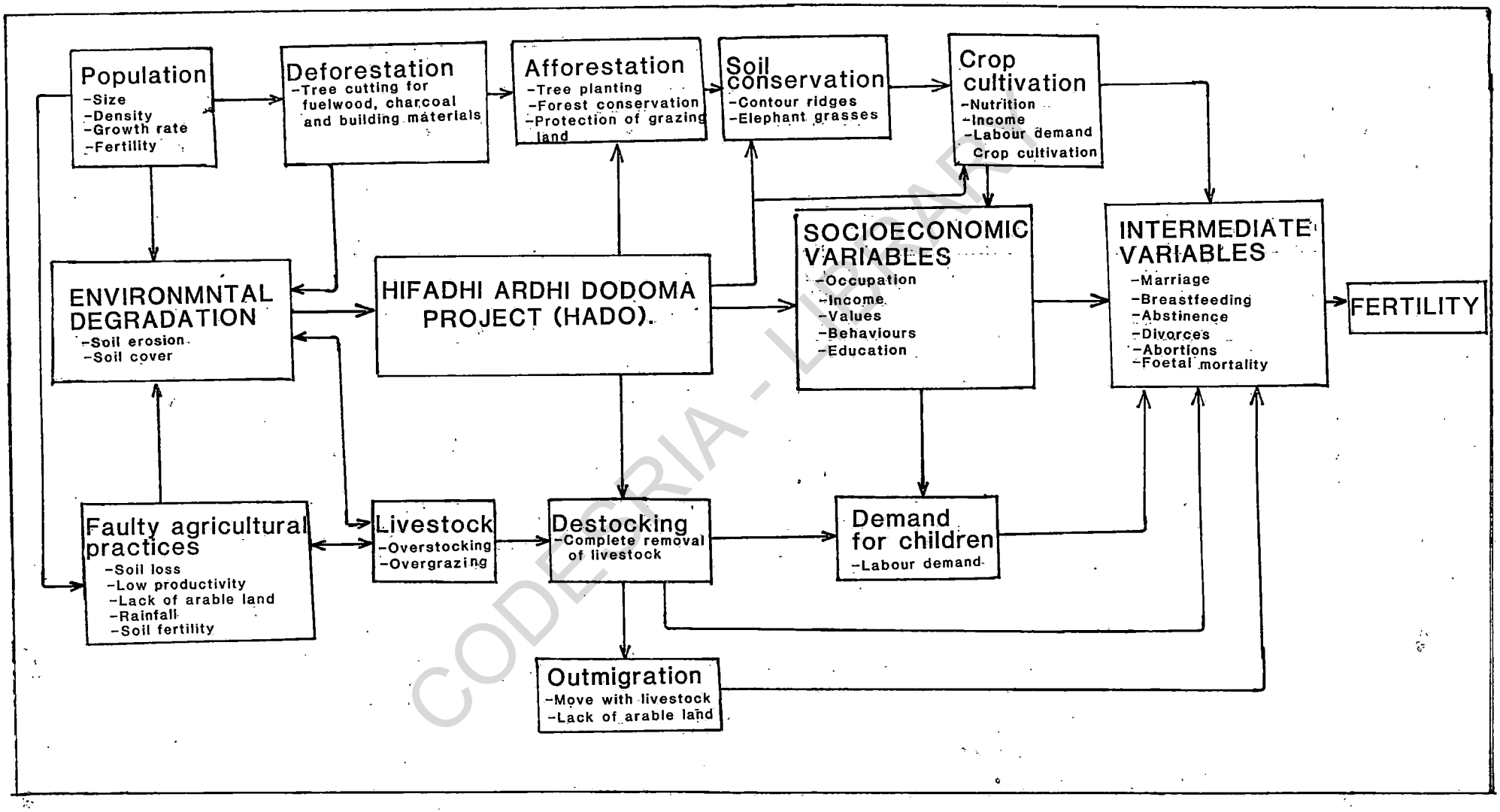
FIGURE 1.1: CONCEPTUAL FRAMEWORK FOR FERTILITY ANALYSIS IN THE HADO AREAS - KONDOA DISTRICT.



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occupational and income status of the families which in turn affect fertility through alteration of the intermediate fertility variables such as marriages, postpartum abstinence, divorces, coital frequency and fetal mortality.

The framework begins by showing the various factors which caused environmental degradation in Kondoa. These factors include rapid population increase, faulty agricultural practices, overstocking, overgrazing and deforestation (Mbegu and Mlenge, 1984). The framework went further to show that the establishment of the HADO project imposed some influence on social, economic as well as demographic variables through its activities such as destocking and afforestation.

Stockel and Jain (1986) used almost a similar framework in assessing the impact of development projects on fertility in Asia. Their observation indicated no direct effect of the outputs of development projects on fertility. Instead, the changes in socioeconomic structure resulting from whatever project, were actually translated into fertility through alteration of the intermediate variables.

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1.4. Review of Related Literature:

The populations of many developing countries have been growing at rapid rates often exceeding 2.0 percent. In most cases, the increase in population has occurred at the expense of resource conservation and effective utilization. As a result, there has been a rapid degradation of the environment, deforestation and overpopulation in various developing countries. Both population and environmental degradation have been identified as global problems (Glantz, 1977; Tanzania, 1977; U.N., 1977; UNESCO, 1980).

The physical link between population growth and environmental degradation have been analysed by various researchers. Many authors seem to agree that the main agent for environmental degradation is actually man. Man has been at the heart of the problem in tropical Africa, Asia, and Latin America. Evidence from the Sahel countries in West Africa, Ethiopia, Tunisia, Kenya, Botswana and Tanzania supports these observations (U.N., 1977; Glantz, 1977; UNESCO, 1980; Mbegu and Mlenge, 1984). It is man's actions that have degraded the land through misuse and overuse, as he seeks essential requirements for livelihood. Evidence also seems to suggest that the more fragile the environment is, the more delicate is the balance between population and

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ecological resources (Ware, 1977). It is therefore evident that the continuance of rapid population growth leads to further degradation and destruction of the vegetation and soils.

The above discussion shows that no assessment of environmental degradation and prospects for eliminating its effects is complete without understanding the population placed at risk by environmental, social, as well as economic changes. However, management strategies adopted in different countries underrate the importance of the population variables. The strategies start with the assumption that vegetation must be conserved and improved, only then production can be optimised to meet the requirements of the population (U.N., 1977). The HADO project in Tanzania used the same base in its attempt to solve the land degradation problem in Kondoa.

The relationship between population growth and socioeconomic variables has been examined for a long time. Many studies have focused not only on the consequences of population growth but also on its development. According to Stockel and Jain (1986), various development policies and programmes are not neutral with regard to effects on demographic behaviours and that they do have effects on individual decisions about family size, child spacing and fertility control behaviours.

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Demographic trends in developing countries tend to suggest that, the population/resource imbalances can be expected to increase especially in rural areas due to steady high rates of population growth. In the course of examining the relationship between population and resources, various theories and approaches have been developed.

Malthus (1798) described a model of population growth in which he argued that with time, no spot of earth can support an arbitrarily large population. This is because man's capacity to increase his means of subsistence is much less than his capacity to multiply. He postulated that, whereas population has a tendency to increase at a geometric progression (i.e. by having a constant rate of increase as does the series 1, 2, 4, 8, 16, ...), food supply expands roughly at an arithmetic progression (i.e. by a constant amount like the series 10, 20, 30, 40, ...). Malthus suggested introduction of "preventive checks" (i.e. postponement of marriages and sexual abstinence combined with virtuous behaviours) in limiting family size or otherwise "positive checks" (i.e. diseases, famine and wars) can inevitably operate to provide moral restraining force of population growth.

The thought of Malthus seem to be relevant to the studies of land conservation because it involves man/resource interactions. Rapid increase in

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population would put pressure on the food supply and may necessitate expansion of the cultivated areas to the extent that even the marginal lands can be put into cultivation sooner or later.

Theory of Demographic Transition:

Another theory which attempts to explain the historical relationship between population and development is the theory of demographic transition. Nag (1980), assigns the change from high to low mortality and fertility (especially in Europe) to social and economic changes.

Structural change of the economy is considered to have negative effects on fertility. This observation is justified by the experience of radical structural economic changes in the developed countries which were accompanied with industrialization. Fertility and mortality changed with time as the society developed from hunting and gathering to present industrial structures. The decline in fertility was a result of the decline in the labour value of children, increase in both direct and indirect costs of children, and decline in the value of children as an old age supporters.

However, such changes has in Africa not yet reached the critical threshold at which a decrease in the demand for children will occur. The factors which prompted the European demographic transition are

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different from the existing situation in the contemporary low income countries. For instance, rapid decline in death rates in the current developing countries, is a result of imported modern medical technologies and improved public health services, which are neither indigenous nor adequate to change the long established norms and values favouring high fertility.

Consequently, an increase in fertility in the early stages of modernization has been observed in some countries in Latin America, Africa and Asia. According to Nag (1980), the increase has been a result of four factors namely; an early postpartum resumption of ovulation and menstruation as a result of decreased breast feeding, decline in the practice of postpartum abstinence, reduction in the loss of reproductive performance of women caused by early widowhood, and reduction in the incidence of sterility as a result of improved treatment of the venereal diseases.

Henin (1968) observed the link between fertility and the change of the economy from nomadic pastoral life to sedentary agriculture in Sudan. His findings indicated that fertility levels almost doubled with the introduction of permanent settlements and settled agriculture to the pastoral population. He further observed that those communities that had been

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practicing settled agriculture for two or more generations, had higher fertility than those who had practiced settled farming for about a generation. This type of structural economic change is common in many parts of Africa, the HADO area in the Kondoa Irangi Highlands being one of them.

The Microeconomic Theory of Fertility Decline:

The third theory which tries to explain the relationship between population growth and development is the Microeconomic Theory of Fertility Decline. The theory asserts that the number of children is determined by a given set of tastes and preferences which maximize the individual's satisfaction subject to his income constraints (Todaro, 1981). The theory views children as a special kind of goods and fertility as a rational response to consumer's demand for children relative to other goods (Easterlin, 1975). A rise in the household's income enables the household to attain a higher level of satisfaction by consuming more of both commodities and children. Logically, large families would prevail in rich countries and among rich people and the poor would get no children. However, evidence seem to suggest that the household income is inversely related to the number of children. Todaro (1981) argues that:

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"While increased income may enable the family to support more children, the higher the income parents will tend to substitute child quality for quantity by investing in fewer, more educated children whose eventual earning capacity will be much higher."

It is common in many poor societies to find poor families having large numbers of children. For the poor, every extra child will be fed by charity. Having children is a pleasure that cost nothing and so family size is rarely determined by family income. It seems to be true that couples get more satisfaction in children regardless of their economic might in peasant societies. Also, it is true that age-old traditions which favour the persistence of high fertility stand firm in the way of modernization. Dyson and Murphy (1985) argues that fertility will only decline when the social support to high fertility are weakened.

According to Ware (1977), the continuance of large families and high fertility among rural populations in developing countries is a result of their incapability of making and acting upon cost-benefit analysis. Some people have gone to the extent of arguing that, poor families would be much better off if they had fewer children and that, significant higher rates of economic growth could only be achieved with lower population increase (Coale and

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Hoover, 1969; Taylor, 1987). But such arguments are unfounded because high fertility is not an accidental practice to most couples. More recent authors have indicated that children do make contributions to the household at an early age (Todaro, 1981; Caldwell 1980, 1982, 1984; Kamuzora, 1984; and Boserup, 1985). To these scholars, high fertility is viewed as a rational response to relative gains couples enjoy by having many children.

Moreover, the evolution in the economic function of the family plays an important role in determining family size. Coontz (1961), indicated that fertility differentials is determined by economic role of the family. For the wealthy, the family have evolved from an economic unit of production to a non-production unit obtaining its income through monopoly of the means of production. Additional children in the wealthy families not only increase the family's expenditure but also fail to augment the family income for a relative long period. Such a situation encourages family limitation as it has been the case in most developed societies today.

For the poor societies, the family have remained to be a joint economic enterprise, united in production and consumption. It (the family) is viewed as the major source of wealth and children supplements the family income at tender age. To put it in Coontz's (1961) language, "children are

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wealth". This joint household structure provides no incentive for family limitation, and hence is conducive for high rates of reproduction. Division of labour by age and sex also encourages high fertility. Women and children are extensively used in agricultural as well as domestic activities. Their contribution to economic production in the family provide men an economic motivation for early marriages, polygamy, and for demanding many children (Kamuzora, 1980; De Tray, 1983; Boserup, 1985). This is because children at a very early age, are an important labour force at the disposal of the parents.

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The Value of Children and Wealth Flow Approaches:

The demand for children in traditional peasant societies is high because of the value which children have. Various scholars have emphasized that children are highly valued because of their important contribution to both economic and social welfare of the family (Caldwell, 1984; Kamuzora, 1984; Stockel and Jain, 1986). Sauvy (1969), postulated that:

> "Peasant families not only lack a negative inducement against children, but feel a positive inducement for having them."

These views tally with that of Todaro (1981) that children are considered as an economic asset. The number of children in a family explains the family's wealth and gave it social satisfaction.

Boserup (1985), argues that subsistence agriculture which dominates much of tropical Africa, is labour intensive. Agricultural technology is still primitive. The land tenure systems and family organizations are conducive to large families since most of the work in the field is usually done by women and children. Children are put into some work as soon as they are six or seven years old. Discussing the same issue, Kamuzora (1984) emphasized that because of the labour intensive nature of the peasantry mode of production, children are highly valued as the best alternative source of family labour. In fact, the value of their labour is more than what they cost. Such views suggest that as far as children continue to be highly valued by the parents, possibilities of fertility decline are uncertain.

Accepting the value of children approach, Caldwell (1980) introduced the "Wealth Flow Theory of Fertility Decline". He argued that fertility behaviours are determined by the inter-generational wealth flows. In high fertility societies, the wealth flow has been from the younger to the older generation. Such trends make it possible for economic rationality to dictate high fertility. Parents are assumed to want children because of the satisfaction which children provide. Easterlin (1975), identified three basic types of satisfaction:

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(i) Income utility (labour, income and wealth).

(ii) Security utility (economic, emotional and old age support).

(iii) Consumption utility (personal enjoyment and satisfaction from children).

Applying Caldwell's formulations in studying prospects of fertility decline in rural Kenya, Dow and Werner (1983) proposed development of emotional and economic nucleation among couples in order to reduce the current high fertility rates. Such nucleation have been realised in most of the developed countries which are characterised by low population growth rates. But, the experience of European societies cannot be generalized anyway. There are examples of some societies like Japan which, apart from having an extended family system, have managed to reduce the fertility levels through application of modern fertility limitation technologies.

Investigations from various parts of the world indicate that different economic activities or occupations influence fertility levels differently. For example, labour demands differ between crop cultivators and pastoralists, between traditional and modern farming systems, and between different land uses. A comparative analysis of the 1960 population census of Upper Volta shows that the Fulani

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(pastoralists) had lower fertility (total fertility rate of 5.5) as compared to the Mossi (cultivators) who had a total fertility rate of 6.6 (Courel and Pool, 1975). A similar fertility differential was observed in Senegal (1957), where the Tuculor (cultivators) had higher fertility rate as compared to the Moor and the Fulani (pastoralists) who had lower fertility rates. Further, Ngallaba (1983) observed that in the 1978 Tanzania population census, the mean number of livebirths of women in the homes of cultivators was above those of women in households engaged in other occupations.

Proximate Determinants of Fertility:

The theories discussed above explained the socio-economic determinants of fertility. It is however important to note that the social, economic and cultural factors influence fertility only indirectly through the intermediate variables (Davis and Blake, 1956). Bongaarts (1978) defined the proximate determinants (intermediate determinants) of fertility as the biological and behavioral factors that immediately affect fertility and through which all other influences (social, economic, cultural and environmental variables) must operate. The primary characteristics of the intermediate variables is their direct influence on fertility. Figure 1.2 summarizes the relationships among the determinants of fertility.

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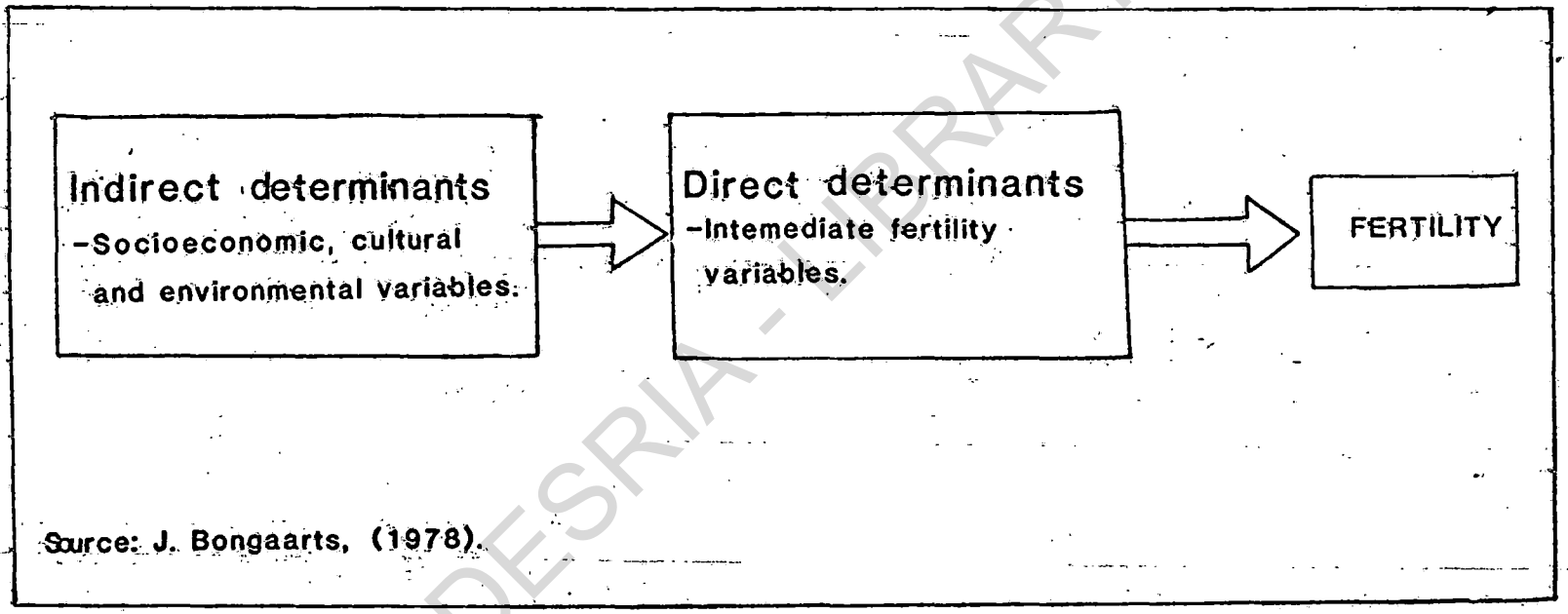
FIGURE 1.2: RELATIONSHIPS BETWEEN THE DETERMINANTS OF FERTILITY.



Source: J. Bongaarts, (1978).

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According to Bongaarts et. al. (1984), the principal proximate determinants of fertility levels and differentials in tropical Africa are early marriages, prolonged breastfeeding, postpartum abstinence and pathological infertility. Hill (1985), observed the persistence of similar factors in the West African Sahel countries.

Marriage has been recognized as one of the principal determinants of fertility. Various studies have observed that early marriages are responsible for high fertility which leads to rapid population growth (McCarthy, 1982; Casterline, 1980; Hill, 1985; Smith, 1985). Demographers are interested in knowing the age at first marriage in order to ascertain the portion of the reproductive period during which a woman is exposed to regular sexual intercourse. It has been used as an approximate indicator of woman's exposure to the risk of childbearing. Nag (1980), argues that increase in age at marriage has been an important factor in reducing fertility in both developed and developing countries. Generally, the average age at marriage and the proportion of never married women are found to be lower in least developed countries than in developed countries.

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Observations from various parts of Africa indicates that, in most cases the age at marriage range between 20 and 25 years for men and between 15 and 19 years for women (UNECA, 1975). Given that each birth interval is approximately two years, most women can easily reach the parity of six children before the age of 35. Also, an increase in the proportion of married women and a decline in the age at first marriage result into rise in fertility levels unless contraceptive use becomes wide spread. Casterline (1980), argued that the total number of births a woman bears through the reproductive period is a function of the age at which childbearing begins. Since in most African societies marriage is early and pre-marital births are prohibited or discouraged, most of the births occur within marriages. Under such marriage patterns, women spend a larger part of the reproductive lifespan into sexual unions.

Moreover, a decline in the duration of time that women abstain after birth also influence fertility positively. Page and Lesthaeghe (1981) observed that postpartum abstinence is wide spread in most African societies, and that in some cultures abstinence is observed as a sexual taboo. Decline in the duration of breast feeding and decrease in the level of sterility may also lead to an increase in fertility levels. Prolonged periods of intensive breast feeding

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is important in determining the level of fertility because it has an inhibitory effect on ovulation and therefore in the absence of effective contraceptive use, it lengthens the birth intervals. However, with modernization the duration of lactation has declined dramatically for most women.

But it is also important to note that all these determinants of fertility are only operative for fecund women. Dyson and Murphy (1985) observed that in virtually no human population has the level of fertility ever approached the potential biological maximum. Bongaarts (1978) set the maximum fecundity at 15.3 births per woman. Discussing the same issue, Nag (1980) stressed that, prolonged breast-feeding and prolonged postpartum abstinence perhaps are the most important factors in keeping fertility lower than its maximum biological potential.

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Destocking in Tanzania:

Destocking and culling of livestock was introduced into Tanganyika early in 1950's in the densely populated Mbulu highlands (Holloway, 1954; Meek, 1963). The purpose was to make sure that the number of livestock matches with the estimated carrying capacity of the areas concerned for soil conservation and stock improvement.

From the Mbulu highlands, the practice spread to other districts including all districts of the Dodoma and Singida regions, the major portion of the Lake zone and Nzega district in Tabora region. Destocking rules were drawn in 1951 by the Native Authorities for the compulsory sale or removing the minimum of five per cent of the stock in excess of the carrying capacity (Holloway, 1954).

The previous destocking campaigns were unsuccessfully practiced because they only aimed at reducing the size of herds to keep the stock number in correct relationship with the available grazing. Moreover, destocking led to rapid breeding of the remaining stock due to availability of more grazing and improvement in water supply and medical services (Tanzania, 1977). Destocking of the HADO areas in 1979 was successfully practiced because all livestock were removed from the area. This had never been done anywhere else in Tanzania. However, its demographic impact has never been studied so far.

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1.5. The Hypotheses:

The following hypotheses were formulated in an attempt to investigate the impact of changing bases for household economy on fertility.

(i) Complete destocking of the HADO area influenced changes in the marriage patterns and decline in the age at first marriage among women.

Justification:- It is easier to pay dowry in monetary terms or in other forms than by livestock. Large numbers of cattle are required for one to be able to marry.

(ii) Age at first birth of women who entered childbearing lifespan after destocking is lower than that of women who entered the reproductive period earlier.

Justification:- Early age at first marriage exposes women to conception early in the childbearing lifespan.

(iii) A change from livestock keeping to pure crop cultivation encourages high fertility performance in the HADO area.

Justification:- Livestock keepers have lower fertility because they spend much time moving with their livestock seeking for pastures. In most occasions women and children are left behind in the permanent settlements. The movements affect women's exposure to regular sexual intercourse and chances of conception.

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1.6. The Scope of The Study:

The present study aimed at investigating on the impact of changing bases for household economy on the family fertility performance. In the investigation the family was used as the level of analysis. The aim was not to determine the exact level of fertility, but rather to look at the magnitude of the fertility differentials between the destocked and stocked areas and particularly in the young ages.

1.7. Significance of the Study:

The findings of the present study provide a framework of operation for further demographic studies in the HADO Areas in other districts of Dodoma region and other regions which have similar environmental problems.

Further, the experience obtained from this study may be useful in understanding the relationship between bases for household economy and fertility performance. This understanding can be extended to much higher levels such as village, ward, district, region or country.

The study also provides information which may be useful in further planning of the HADO project and other similar projects elsewhere. The study forms a demographic evaluation of the project with regard to fertility.

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Moreover, it is likely that the study will alert policy makers and planners that, there is a need for a clear understanding of the two-way relationship between development projects on the one hand, and demographic components on the other. Various development projects and policies are not neutral with regard to effects on demographic behaviours, and that they do have impacts on demographic variables. The population component therefore is of great importance and should be incorporated in the planning, designing, and implementation of development projects.

1.8. Definition of Terms:

For the purpose of this study, the following terms are clearly defined as follows:

(i) Cluster:

This term was used to refer to two major groupings of the villages used for analysis, i.e. the "HADO Area" and the "Periphery HADO". A third cluster, the "Outside HADO" is proposed to be used in further studies in future.

(ii) HADO Area:

This term is used to mean the area where the HADO project has a definite concentration of resources, manpower and

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activities in Kondoa district. The area includes all villages which are completely inside the destocked areas. No livestock are supposed to be found in this particular cluster.

(iii) Periphery HADO:

Refers to all villages in the study area which lie on the margins of the destocked areas. The common characteristic of the villages in this group is that all of them are partly inside the destocked areas. Some livestock keeping is allowed only in that part of the villages which is outside the boundaries of the HADO Area.

(iv) Outside HADO:

Refers to villages which are completely outside the HADO Area which may be used for further studies in the study area for control purposes. Villages in this cluster are found in the lowlands and livestock keeping is the dominant economic activity.

(v) Destocking:

This term is used to mean total removal of all livestock in the study area. "Livestock" here refers to cattle, goats, sheep, and donkeys.

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CHAPTER TWO.

METHODOLOGY

In the previous chapter, the theoretical work of the study have been discussed. It gave the background information to the problem, the problem and hypotheses, conceptual framework, literature review and the significance of the study. This chapter addresses itself to the methodoly of the study. It provides a clear description of the study area, research design, data gathering procedure, data processing and an explanation of the major problems encountered during the study.

It is important to note that this study is a part of a much broader study termed the "Socio-Demographic Studies in the HADO Areas". The data used in this study complements the data gathered during the pilot survey. A follow-up study will therefore be conducted on a much larger scale to cover all villages in the study area and with a much larger sample.

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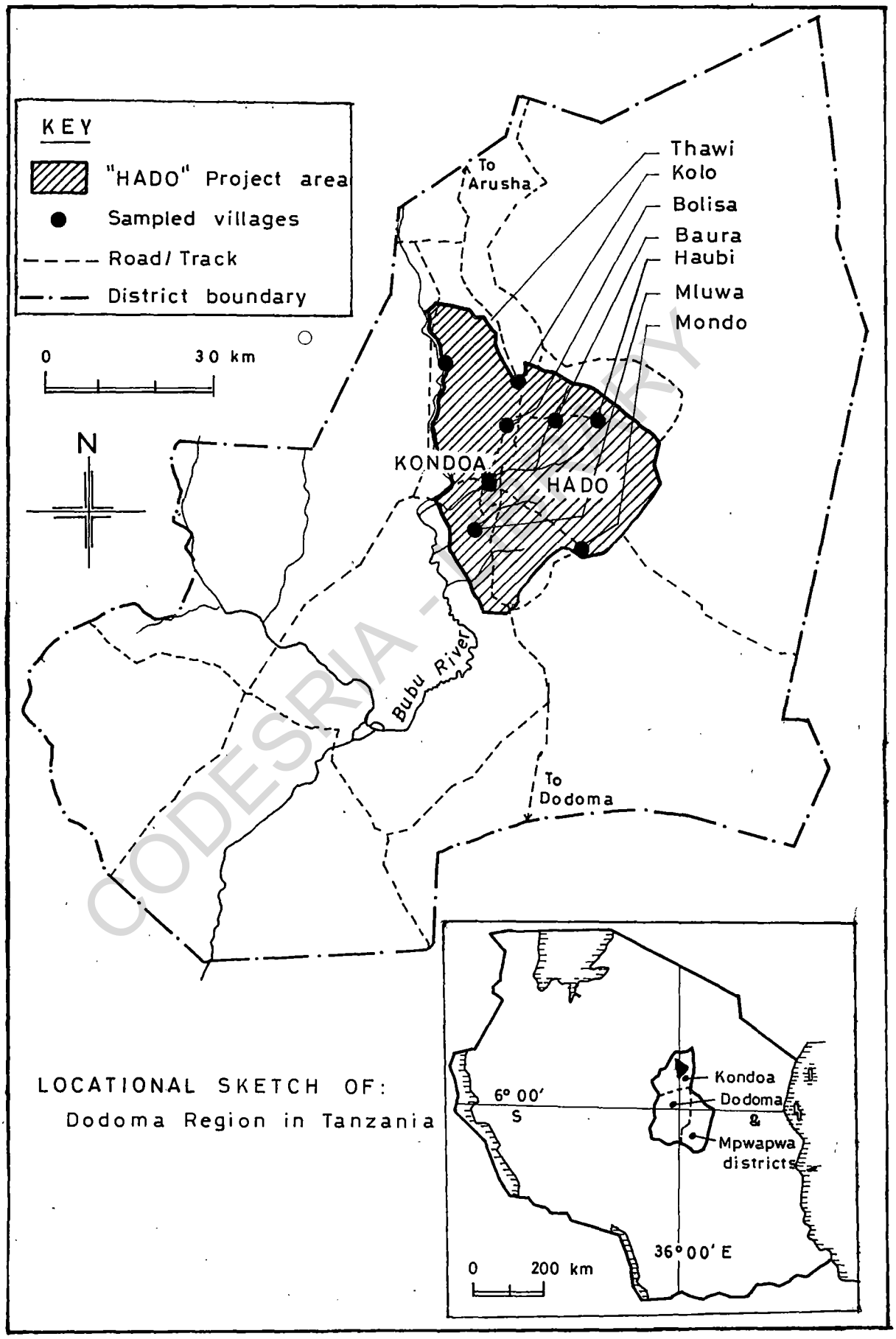
2.1. The Study Area:

2.1.1. Location, Size and Its Characteristics:

The study area is the HADO areas in Kondoa district (Figure 2.1). The HADO areas comprise all villages in which the HADO project has initiated land

FIGURE 2.1: THE HADO PROJECT AREA KONDOA DISTRICT.



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conservation activities and corrective measures in its attempt to tackle the problem of environmental degradation and particularly soil erosion. The villages are either wholly or partly inside the destocked areas in the Kondoa Irangi highlands. This area is sometimes loosely referred to as the "Kondoa Eroded Area (KEA)" and it extends approximately 1256 sqkm. (or about 10 percent of the total district area). The northern and eastern boundary of the HADO areas is the escarpment of the Kondoa Irangi Highlands. The southern boundary is formed by the Kelema river whereas the western margin is marked by the Bubu river.

The Kondoa Irangi highlands cover the northern part of Dodoma region in Kondoa district. Relief is high with an altitude of between 1000 and 2000 meters above sea level. The dominant features of the landscape are steep sloping pediments punctuated with inselbergs, deep and wide gullies, and broad sandy rivers spread all over the study area. Soil profiles are virtually non existent on the hilly slopes due to severe soil erosion. Also, there are internal drainage basins in the study area such as lake Haubi, lake Bicha, and the Seese swamps. With the exception of the former, all of these basins have silted because of deposition of the eroded materials from the highlands.

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The area is characterised by a short single wet season between December and April (with the heaviest rains occurring in January), and a long dry season lasting between April and December. The mean annual rainfall ranges between 600 mm. and 800 mm. The paucity of rainfall combined with dry winds and low humidities during the dry season exacerbates the already serious problem of soil erosion in the district. The amount of rainfall received during the rainy season determine the pattern of man's activities in the study area.

The original or natural vegetation in the study area has been subjected to human activities since 1920s. Some of these activities are expansion of agricultural lands, forest clearing for tsetse flies eradication, bush fires, and fuel wood cutting (Banyikwa and Kikula, 1980; Mbegu and Mlenge, 1984). Since the establishment of the HADO project in 1973 and particularly after the completion of total destocking in 1979, some regeneration of the natural vegetation has occurred.

Landuse in the study area is typically of subsistence nature. Crop farming has been the dominant occupation in the villages especially after complete removal of the livestock. The main crops are maize, millet, sorghum, cassava and oil seeds. Livestock keeping has been restricted to the

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peripheral parts of the destocked areas and the lowland areas despite the fact that the Kondoa Irangi highlands were formally dominated by pastoralists. A survey conducted at Kolo for the 1973 National Demographic Survey indicated that 90 percent of the livestock owning households had an average of 5 cattle (Henin, 1973). Shifting cultivation was formally practiced with land abandoned after a few years due to soil exhaustion. This agricultural system coupled with a livestock population far greater than the land can support, led to serious and widespread soil erosion, with some areas beyond reclamation.

Conyers (1971), divided Dodoma and Singida regions into agro-economic zones. He identified five zones in Kondoa District. Zones 1, 2 and 3 covered the northern tsetse fly infested areas which were sporadically used by the Maasai herders for grazing. Zone 4 covered the Kondoa Irangi Highlands (the study area). It suffered from very heavy soil erosion, as a result there was an acute shortage of arable land resulting in an increased emphasis on cattle raising, which in turn led to greater erosion (CDA, 1976). Zone 5 covered the whole southern part of the district, and livestock keeping, honey collection, hunting and to a lesser extent subsistence crop cultivation were practiced.

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2.1.2. Population Characteristics:

The population of Kondoa district has been growing at a rapid rate exceeding 2.0 percent per annum (see Table 2.1). According to the Central Statistical Bureau (1958, 1969, 1982), the total population for Kondoa district were (with years in brackets) 145800 (1948), 158800 (1957), 212195 (1967), and 275278 (1978). The population is not evenly distributed within the district. There is more concentration of the population in the Kondoa Irangi Highlands than in other parts of the district (Osteberg, 1986; Mbegu and Mlenge, 1984). For example, about 72.3 percent of the district population in the 1967 population census, was concentrated in four divisions (out of seven rural and one urban) which covers the Kondoa Irangi highlands. Further evidence from the 1978 population census suggest that, the HADO areas which cover approximately 10 percent of the total district area, contained 26.2 percent of the total district population.

Consequently, the population density in the highlands is comparatively higher than that of the lowlands. The density in the highlands is more than twice as much as the district population density. Whereas the average density for Kondoa district in 1978 was 25 persons per sqkm., the density for the highlands was 59 persons per sqkm. The density in the lowlands was only 20 persons per sqkm.

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The population is dominated by the Irangi tribe who composed 60 percent of the total population in 1948, 62 percent in 1957, and 65.5 percent in 1967. The Irangi are concentrated in the Irangi Highlands. According to Egero and Henin (1973), the growth rates of the Irangi population (the dominant tribe in the highlands) exceeds the district average growth rate as indicated in the table below.

Table 2.1: Population Growth Rates For Kondoa District and the Irangi Tribe (1948-1978):

	1948/57*	1957/67*	1967/78**
Kondoa District	1.0	2.9	2.4
Irangi tribe	1.6	3.1	-

Source: * Egero and Henin (1973),

** Sembajwe (1980)

Fertility levels in Kondoa district are high. Sembajwe (1980) indicated that the total fertility rates for 1967 and 1978 were 7.0 and 6.2 respectively. Although these figures show a slight decline, they are still high on international standards. No, tribal counts were done in the 1978 population census.

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2.1.3. Selection of the Study Area:

The rationale of selecting the HADO area in Kondoa district for the study are four fold. Firstly, the Kondoa Irangi Highlands is one of the most damaged fragile ecological zones in Tanzania. Secondly, the area provide a point of reference for various land reclamation programmes initiated in Dodoma region and Tanzania at large during the colonial and post-independence periods. It is in the Irangi Highlands where total destocking was successfully effected for the first time in Tanzania. This offers an opportunity to learn for the future land conservation efforts. Thirdly, since its establishment in 1973, HADO has concentrated much of its activities and resources in the Kondoa Irangi Highlands. Hence, much of the impact of the project is more likely to be found in Kondoa where the project has operated for a much longer period than other areas of Dodoma region. The HADO project in Kondoa is a unique case in Tanzania and probably in Africa where land conservation has been taken very seriously. Lastly, the HADO area in Kondoa is a live example where successful land conservation practices can be observed.

2.2. Preparation For Data Collection:

Prior to the data collection exercise, a reconnaissance visit was done in December 1987. The purpose of the visit was to assess the kind of data

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which were available at the village, ward, and district levels, and to make a general observation of the socioeconomic characteristics of the households in the study area. Further, the visit was intended to familiarize the researcher with the study area.

2.3. The Target Population:

The target population for the study was all women aged 15 years and above in all households in the study area. The intention was to observe the fertility performance of women in relation to the economic activities in the households and the activities of the HADO project.

2.4. Sample Design and Sampling Procedures:

A three staged stratified sampling design was utilized for the study to minimize the effect of selectivity bias. In the first stage, the villages in the study area were grouped into two clusters namely the "HADO AREA" and the "PERIPHERY HADO". The content of each of these clusters have already been discussed in section 1.8 above. A total number of 17 villages (63.0 percent of the total villages in the study area) belonged to the former cluster and 10 villages (37.0 percent of the villages) to the later.

In the second stage, a simple random sample of 25 percent of the villages in each cluster was drawn for the study. This formed a total sample of 7

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villages, out of which 4 belonged to the HADO area (Baura, Bolisa, Haubi and Kolo), and 3 villages to the Periphery HADO (Mondo, Muluwa, and Thawi Madukani).

The third stage was the selection of households for the interviews. A 5 percent random sample was selected. In order to have a total coverage of the whole village areas, the list of ten cell leaders in each village was obtained and 5 percent of them were selected randomly. Then, the households to be interviewed were selected from the list of households under each sampled ten cell leader.

2.5. Sample Size:

A 5 percent sample size of the households was used because the study was part of the pilot survey of a much broader study in the same area. The purpose of the pilot study was to test the methodology which will be used during the main study, to provide background information of what can be expected in the main study, and to describe and update the existing demographic data for the HADO Areas in Kondoa District. Moreover, a small sample was inevitably selected due to time and financial constraints. On the basis of these basic reasons the size of the sample comprised a total number of 240 households and their distribution is summarized in the table below.

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TABLE 2.2: Village Population, Number of Households and Sample Size:

Area	Villages	Popn (1987)	Hhs No. (1987)	Sample (5 %)	% of Sample
HADO	Baura	1440	280	14	5.8
AREA	Bolisa	3612	737	38	15.8
	Haubi	5393	925	46	19.2
	Kolo	2206	514	25	10.4
PERIPHERY	Mondo	3713	1125	56	23.3
HADO	Muluwa	1656	411	21	8.8
	Thawi	4593	806	40	16.7
TOTAL		22613	4798	240	100.0

Source: Survey, June, 1988.

All women aged 15 years and above who were present in the sampled households were interviewed. A total of 359 women were found in the households. Among these women, 55.4 percent belonged to the HADO area and 44.6 percent to the Periphery HADO. The distribution of the respondents by five year age groups is presented in Appendix 1. However, it is important to mention here that, the proportion of women in the reproductive age groups was 77.9 percent in the former cluster and 88.1 percent in the latter.

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2.6. Data Gathering Procedures:

2.6.1. Permission for Research:

Permission to conduct the survey in the villages was sought from the District Commissioner's office in Kondoa. Further assistance was sought from the HADO head office which is also in Kondoa. From the district level, the research team proceeded to the respective wards and reported to the Ward Secretaries who in turn introduced them to the village authorities.

2.6.2. Selection and Training of Interviewers:

Most of the fieldwork was done by the researcher himself with the help of four field assistants who were recruited from the study area. Initially, eight assistants were identified and were given practical training on how to administer the household questionnaire. The final selection of the four assistants was based on their performance in the training sessions. Four days were used for the training purposes.

2.6.3. The Primary Data:

Primary data were gathered from the villagers by using structured interviews. The "household questionnaire" was administered to the heads of household and to all women in the household aged 15 years and above. The purpose of using the

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questionnaire was to gather socio-demographic data at the household level, and fertility information for the individual women in the households.

The questions in the questionnaire were grouped into three categories. The first group comprised questions seeking general demographic information about the head and the household in general such as household size, age and sex composition and distribution. These questions were asked to the head of household. The second category dealt with fertility data. The questions in this group were directed to individual women aged 15 years and above who were found in the sampled households. Information on age distribution of women, educational levels, marital status, age at marriage, age at first birth, children everborn and desired number of children were gathered through questions in this group. The third category of questions dealt with socioeconomic aspects of the households. Questions on occupation, labour demand, involvement of children in the labour force, availability of land and economic activities in the household were directed to the head of households and to each of the interviewed women.

Additional primary data were gathered through direct observation and unstructured interviews with the village leaders and HADO project officials with

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the purpose of collecting overall information of the socioeconomic characteristics of the villages and the study area in general.

2.6.4. The Secondary Data:

A wide variety of secondary data sources were explored. The major ones were the 1967 and 1978 population census documents. From the 1967 census, population data for the period before the establishment of the HADO project were obtained. The 1978 census provided information for the period after the establishment of the project. Other secondary data sources were the HADO reports, district reports, documents from the archives, and village and ward reports.

2.7. Data Analysis:

Analysis of the data has been done on the basis of the broader groupings of the villages (i.e. the HADO area and Periphery HADO). No attempt was made to analyse the data at village level. Comparison was also made between the two clusters with the aim of identifying differences in fertility variables between the villages in the destocked and stocked areas. More specifically, the analysis has been centered on fertility performance of women belonging to purely agricultural families (crop cultivators), and those from agro-pastoral families with much interest being centered on the young age groups (i.e. age group 15-29).

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Since the major purpose of the study was to examine fertility performance and differences between the stocked and destocked areas, village level data analysis was not necessary. The data for all villages which had similar characteristics were grouped and analysed together as a single category.

2.8. Problems Encountered During Data Collection:

The most striking problem was inadequacy of research funds. Availability of funds determine the length of period spent in the field, the sample size, the scope of the study and the number of research assistants employed. It was not possible to have a large sample which would have meant more money which was not available.

Another problem was related to time limit. The study was done under a specified time limit which included fieldwork, data analysis and dissertation writing. The researcher was supposed to comply with a pre-determined time schedule regardless of other intervening factors.

Moreover, there was a problem of transport. The sampled villages are sparsely located all-over the HADO project area. It was completely impossible to reach all the sample villages without having a reliable means of transport. A vehicle was provided

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by the Institute of Resource Assessment for the field work, but the researcher had to work under a specified time limit because the vehicle was required for other tasks.

Further, the study was conducted during the harvesting season. During the time of the survey, a large number of villagers were engaged in farmwork. It was thus difficult to find the respondents in their homes. Sometimes, the researcher was forced to follow the respondents to their working places for the interviews. This was a very difficult experience which was time consuming and disturbed the working families.

Lastly, the data on fertility were collected from women found in the sampled households only. There might be some sampling errors which may be reflected in the computation of the fertility measures.

These problems were complementary to each other. It was extremely difficult and it was unhelpful to try and deal with only one or two of them.

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CHAPTER THREE

DATA PRESENTATION AND ANALYSIS

In chapter two, the methodological part of the study was discussed. This chapter deals with presentation and analysis of the data. The major focus has been centered on family size, age at marriage, age at first maternity, fertility levels and trends, children everborne and on the examination of differentials in the above mentioned variables in relation to age and main occupation in the households. In most occasions, a comparison has been made between the HADO area and Periphery HADO clusters.

3.1. Size of Households:

According to U.N. (1958), a household has been defined as a socio-economic unit consisting of individuals who live together. The study of household composition is an important component because it influences various household characteristics such as dependence ratio, income distribution, labour force and resource demand and utilisation. Sometimes it is used as a measure of fertility.

In the present study, a comparison was made between HADO area and Periphery HADO to examine the differences in size of households by main occupation. Two major occupations were used namely, cultivators

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and agro-pastoralists. Whereas only cultivators existed in the HADO area, both occupations were found in the Periphery HADO cluster. Table 3.1 compares the size of households by main occupation in the two clusters.

Table 3.1: Percent Distribution of Households by Main Occupation.

Size of Households	HADO AREA (Cultivators)	PERIPHERY HADO Cultivators	PERIPHERY HADO A/pastoral
1	4.9	4.2	8.7
2	7.4	4.2	10.2
3	10.7	6.3	17.4
4	9.0	12.5	14.5
5	7.4	14.6	10.2
6	12.3	12.5	14.5
7	13.1	8.2	8.7
8	8.2	14.6	11.6
9	6.6	6.3	1.4
10	5.7	8.2	1.4
11	4.9	6.3	1.4
12	6.6	2.1	-
13	0.8	-	-
14	1.6	-	-
15	0.8	-	-
TOTAL	100.0	100.0	100.0

Source: Survey, June 1988.

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Generally, the median size of households for the whole sample was 6.0 persons. However, there were variations between the HADO area and the Periphery HADO clusters. On the one hand, the median size of households in the HADO area was 6.5 persons. About 52.0 percent of the households had sizes lower or equal to the median size and 48.0 percent had sizes higher than the median size. On the other hand, the Periphery HADO cluster had a median size of 5.0 persons. About 53.0 percent the households had sizes less than or equal to 5.0 persons and 47.0 percent had sizes larger than the median size. Some variations were observed between the households of cultivators and those belonging to agro-pastoralists. The cultivators had a median size of households of 6.0 people and the agro-pastoralists had a median size of 4.0 persons only. These observations provide a rough picture of the distribution of the households by size in the study area.

This type of analysis suggests that the agro-pastoral group had lower household size as compared to the households of cultivators in the Periphery HADO. The observed proportional differences in the distribution of households by size for cultivators in the HADO area and Periphery HADO (Table 3.1) may be a result of destocking the HADO area and hence changing

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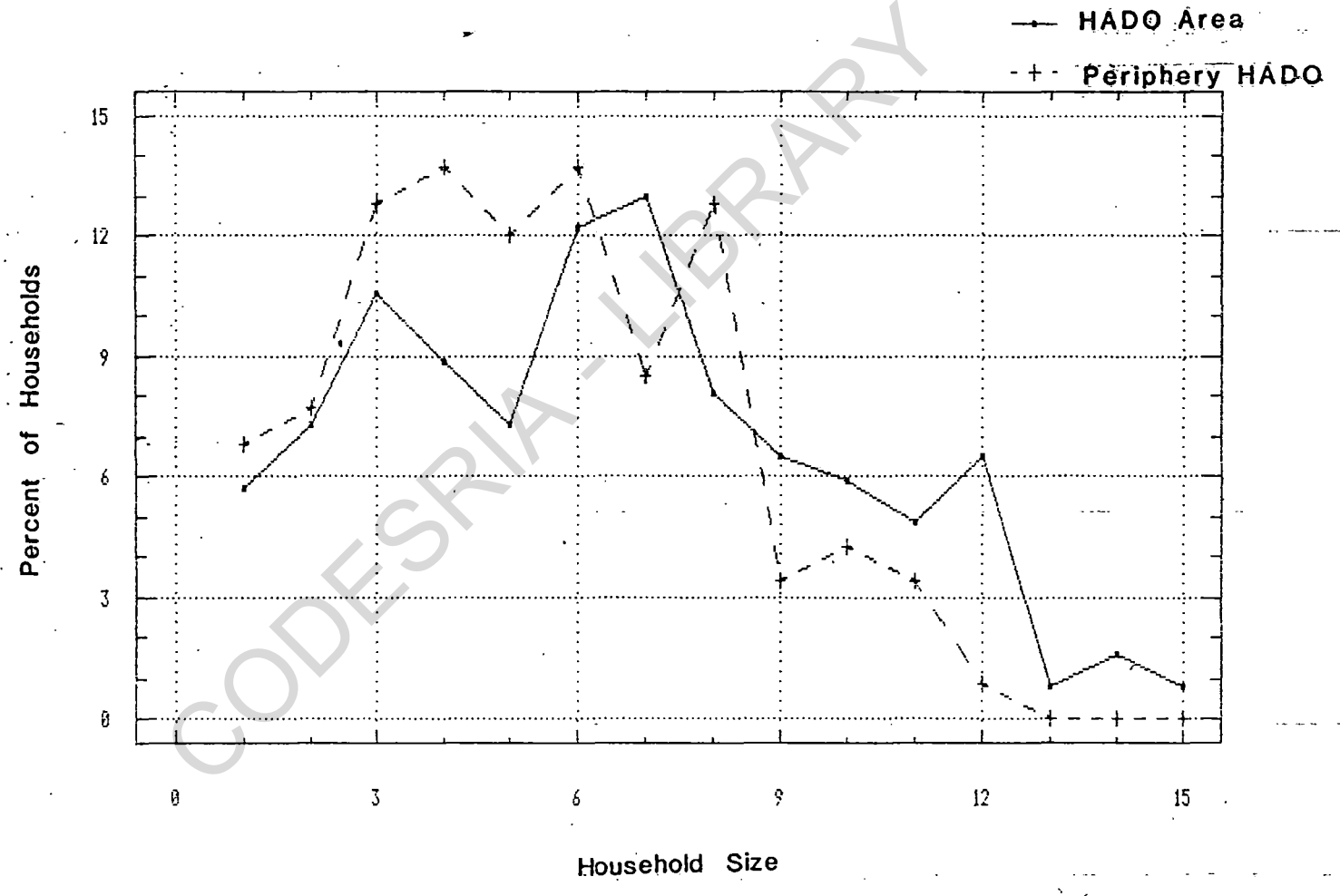
FIGURE 3.1: PERCENT DISTRIBUTION OF HOUSEHOLDS BY SIZE.



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it completely to a purely an agricultural cluster as compared to the Periphery HADO which was still an agro-pastoral cluster.

Concerning the distribution of households by size, a great diversity was observed within and between clusters. The size varied between 1 and 15 members. The greatest variation was found in the HADO area cluster where the standard deviation was 3.4 as opposed to 2.7 in the Periphery HADO. Figure 3.1 shows the differing patterns in size of households in the two clusters. It is observed that the HADO area had larger families (i.e. between 7 and 15 persons) while the Periphery HADO had smaller families (i.e. between 1 and 6 members).

3.2. Age at First Marriage:

Marriage is one of the important proximate determinants of fertility (Davis and Blake, 1956; Bongaarts, 1978). The differences in marriage and in the proportion of women married causes fertility differentials among populations. Henin (1973), observed that the prevalence of polygamy, frequencies of divorces and early widowhood are factors which reduce exposure of female population to pregnancy during the potential fertile period. These factors may have negative effects on fertility performances of women.

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In the present study, information on marriage was gathered through the household questionnaire. All respondents were asked to indicate their marital status, age at first marriage, and number of times married. The object of these questions was to observe changes in marriage behaviours and in age of entry into marital unions over time. More specifically, the aim was to examine the influence of the HADO project on marital unions, and hence on fertility.

The proportion of respondents who were still single was found to decline with increasing age. The decline in the HADO area was from 64.7 percent in age group 15-19 to 0.0 percent in age group 45-49. A similar decline was observed in the Periphery HADO cluster where the proportion single declined from 80.8 percent in age group 15-19 to 7.7 percent in age group 45-49. The proportion single at age group 45-49 may be a result of difficult conditions of marriage among pastoralists than sedentary people living in the HADO areas. These differences can lead to fertility differential between the two clusters.

A similar observation was found after examining the proportion of single women by age groups. In age group 15-19, the proportion single was 47.7 percent in the HADO area and 55.0 percent in Periphery HADO. For age group 20-24 it was 36.4 percent in the former cluster and 20.0 percent in the latter. These

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observations show that marriage was almost universal in Kondoa area. This emphasizes the fact that marriage is one of the main determinants as observed by Komba and Kamuzora (1988) in Kibaha district where non-marriage alone suppressed fertility by about 28 percent.

Observing the age at first marriage by age of mothers, an increasing trend was realized in both clusters. However, the rate of increase was higher in the HADO area than in Periphery HADO. In the former cluster, a net increase of 3.1 years was observed from 16.4 years in age group 15-19 to 19.5 years in age group 45-49. The latter cluster exhibited a net increase of 1.2 years only, from 16.5 years in age group 14-19 to 17.7 years in age group 45-49. The median age at first marriage of women aged 50 years and above in this latter cluster was as high as the highest level in the HADO area.

Table 3.2 compares the median age at first marriage of the two clusters in the HADO areas with that of Tanzania as observed in the 1973 National Demographic Survey. While the median age at marriage for Tanzania indicated a decrease of 0.8 years from 17.7 years in age group 20-24 to 16.9 years in age group 30-34, an increasing trend was observed in the study area. The upward trend was particularly evident and rapid in the HADO area. The abrupt

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decline in age at marriage observed in age group 40-44 is thought to be a result of memory lapse in older age groups and hence misreporting of the age at first marriage.

Table 3.2: Median Age at Marriage By 5-year Age Groups of Women.

Age Groups	Tanzania (1973)	HADO Area	Periphery HADO
15-19	-	16.4	16.5
20-24	17.7	18.1	17.1
25-29	17.5	17.5	16.6
30-34	16.9	17.6	16.5
35-39	17.2	18.4	17.8
40-44	17.2	17.4	17.9
45-49	-	19.5	17.7

Source: Henin, 1973; Survey, June 1988.

The rapid reduction of the age at first marriage in the HADO area may be a result of changing economic base of the families. Women in age groups 15-19, 20-24 and 25-29 entered childbearing age after destocking in 1979. They were in one way or another directly affected by the complete removal of livestock and hence the influence of the HADO project (destocking in particular) on age at marriage and marriage behaviours, can be examined through them.

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The difference in median age at first marriage between the older and younger age groups may be due to differences in the economic base after destocking. Removal of livestock was accompanied by structural change of the economic base in the households and hence changes in the marriage behaviours. Cattle were no longer available in the HADO area for marriages. Dowry is in most occasions being paid in monetary terms. Henin (1973) argued that late marriage in pastoral societies is a result of a demand for many heads of cattle in marriages. Unless the parents have the ability to pay the bride price, marriages were delayed.

A change in the level of age at first marriage between the two clusters was observed in age group 15-19. The rate of increase was higher in the HADO area than in Periphery HADO. For example, while there was an increase of 1.7 years between age group 15-19 and 20-24 in the former cluster, the increase was only 0.6 years in the latter for the same age groups. A possible explanation of the rapid increase in the HADO area is the fact that, the whole cluster was destocked and completely changed from pastoral to pure crop cultivation. A larger part of the Periphery HADO cluster remained agro-pastoral and cattle continued to play a major role in the household economy and are central in marriages.

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FIGURE 3.2: MEDIAN AGE AT FIRST MARRIAGE BY AGE OF WOMEN.

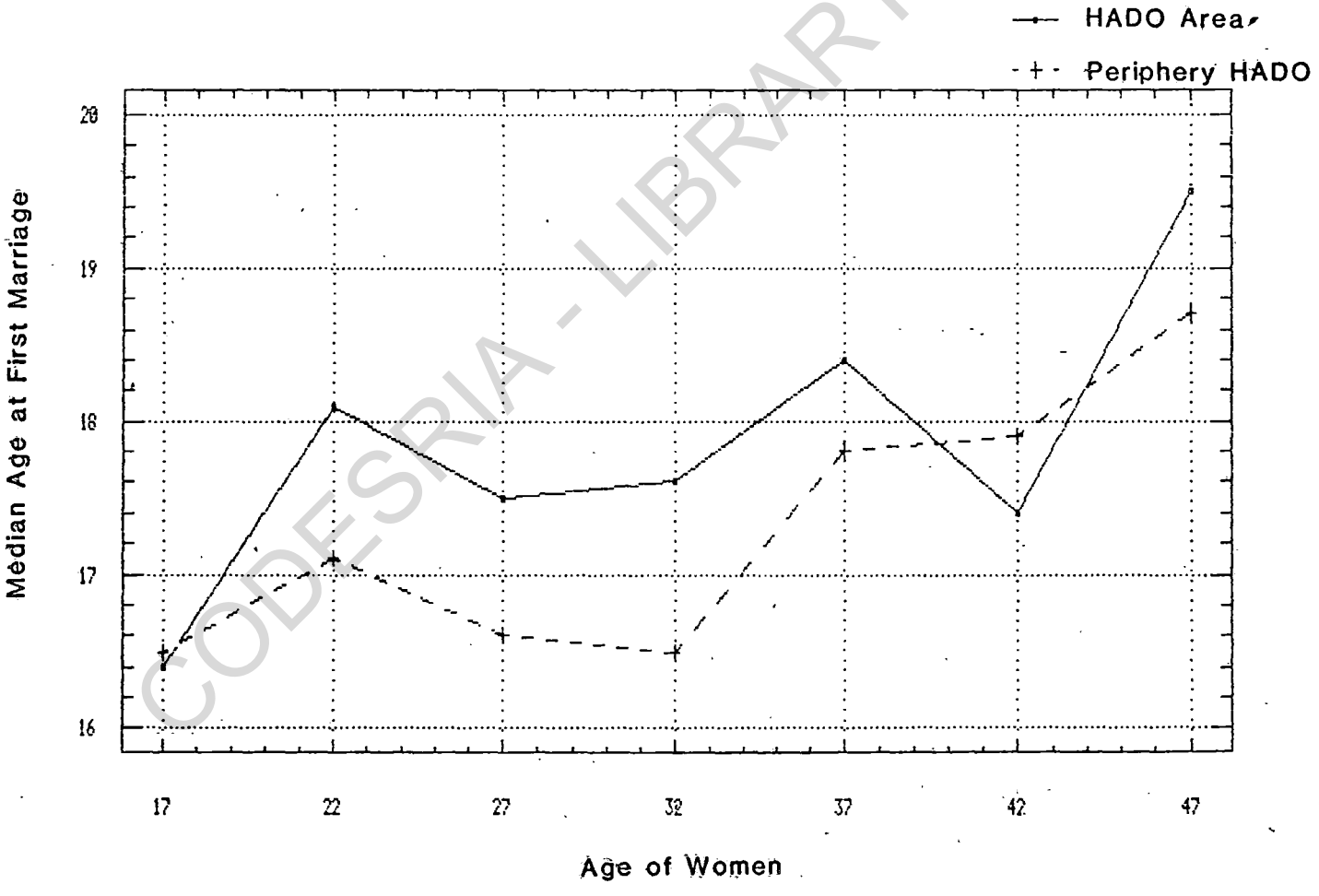

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Figure 3.2 shows the upward trend in age at first marriage as observed in the study area. The graphs illustrate an increasing declining pattern in both clusters. Moreover, the trends show clearly that age at first marriage was higher for the age cohorts which entered childbearing age before HADO. The expectation was to observe almost a similar level and trend in age at first marriage in both clusters for the older age groups because they experienced almost similar social as well as economic conditions before destocking. The graphs for the two clusters indicates that although there were minor fluctuations, the difference was small as compared to the younger age groups. The observed difference between the two clusters was lowest in age group 15-19, probably due to the fact that even the Periphery HADO cluster was partly destocked and hence some re-organisation of the society occurred. Further, lower difference was also a result of rapid increase of the age at first marriage in the HADO area to the extent that it bypassed the age at marriage in the Periphery HADO.

The abrupt increase of the median age at marriage in age group 20-24 in the HADO area can be explained by a possibility of delayed marriages immediately after destocking in an attempt to accommodate the new socio-economic situation. With the removal of the livestock in 1979, people in the

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HADO area were forced to adjust their marriage behaviours because the livestock which were very important in the marriage institution were no longer available in the area. A similar rise was experienced in Periphery HADO although at a lesser extent. Such a situation is a result of the fact that some parts of the Periphery HADO were also destocked. This observation is justified by a further decline in age at marriage in age group 15-19. Although the difference is very small between the HADO area and Periphery HADO, at least the level of age at first marriage in the former cluster which in all age groups (except age group 15-19) was higher than in the latter, has shown a possibility of going further below that of the latter cluster (Figure 3.2).

Women who were 35 years and above during the present study, entered childbearing age before the establishment of the HADO project. This group of respondents was used as an indicator of marital behaviours before the commencement of the project. Women in the young age groups (i.e. age groups 15-19, 20-24, and 25-29), started their childbearing age after the establishment of the HADO project. Respondents in age group 30-35 were included in this category on the ground that by 1973, they were just starting their childbearing.

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The increasing trends of age at first marriage with increasing age of women (Table 3.2 and Figure 3.2) suggest that women of young ages who married earlier than those in the older age groups, were exposed to chances of pregnancy for much longer periods of the reproductive lifespan. Under natural fertility conditions, such situations may lead to rise in the fertility levels.

3.3. Age at First Maternity:

The respondents were also asked to indicate whether they had ever had a live birth in their lifetime. The purpose of this question was to screen out women who had never given a live birth. About 24.1 percent of the respondents in the HADO area and 15.6 percent in the Periphery HADO had never had a live birth. A total number of 286 respondents answered this birth question. After screening, the respondents in the HADO area were reduced from 199 to 151 and from 160 to 135 women in Periphery HADO.

The respondents were further divided into two sub-groups. Women who were in the reproductive ages during the survey formed the first subdivision, and women 30 years and over formed the other. Table 3.3 summarizes the median age at first maternity for women aged 15-49 years.

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Table 3.3: Median Age at First Maternity by Age Groups of Mothers.

Age Groups	HADO Area	Periphery HADO
15-19	16.2	18.3
20-24	18.2	19.5
25-29	19.5	20.9
30-34	19.8	21.2
35-39	20.9	21.3
40-44	21.1	21.5
45-49	21.5	20.4

Source: Survey, June 1988.

The data on median age at first maternity shows an upward trend in both clusters. In the HADO area, the increase was from 16.2 years in age group 15-19 to 21.5 years in age group 45-49 with a net increase of 5.3 years. The Periphery HADO cluster exhibited a net increase of 3.2 years from 18.3 years in age group 15-19 to a maximum level of 21.5 years in age group 40-44. It was also indicated that, the difference in age at first maternity between the two clusters was higher in the younger age groups, particularly in the 15-19 age group where the difference was 2.1 years. Figure 3.3 shows the trends in age at first maternity in the two clusters.

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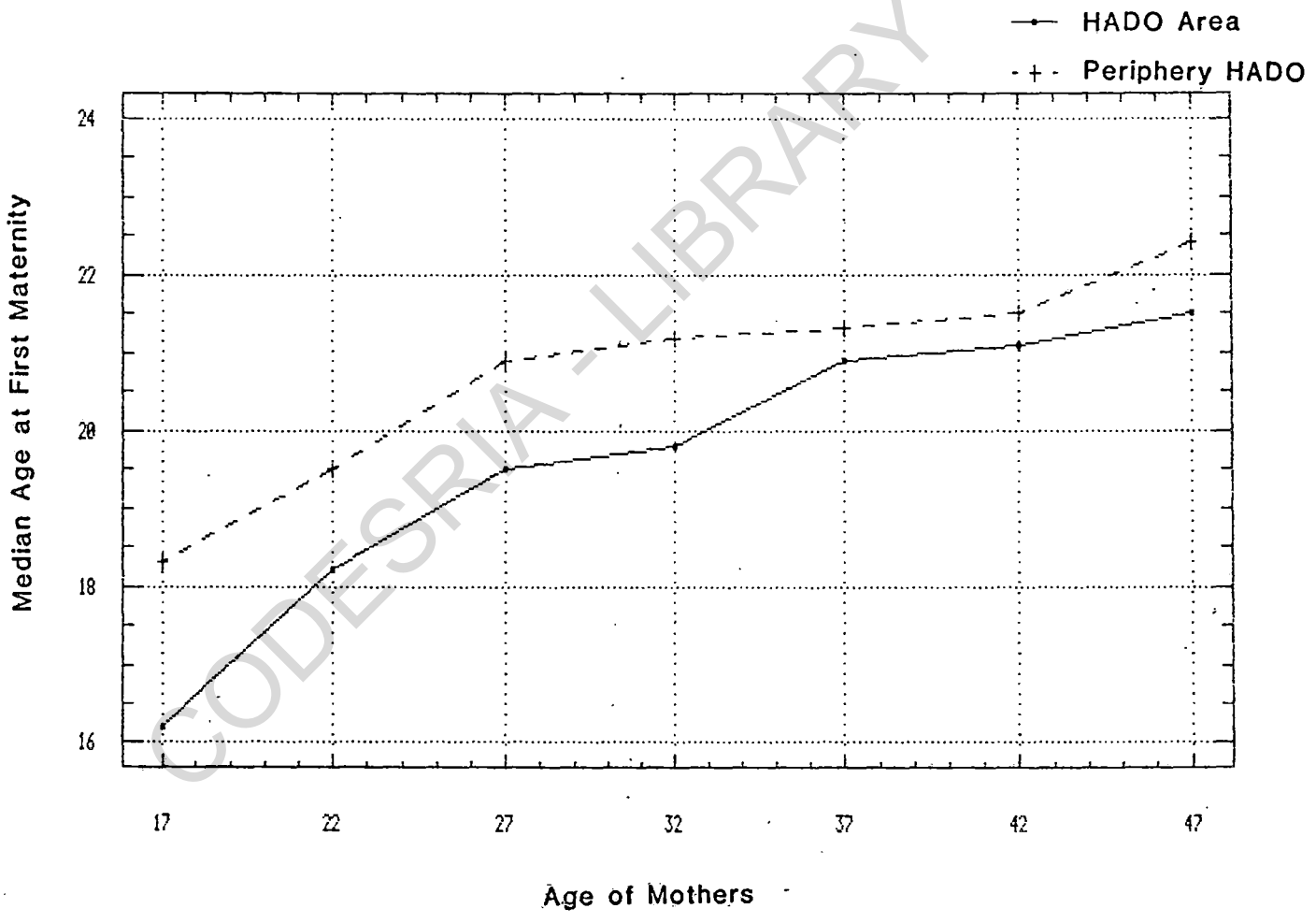
FIGURE 3.3: MEDIAN AGE AT FIRST MATERNITY BY AGE OF MOTHERS.



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The above analysis shows a higher net increase in the HADO area than in the Periphery HADO with increasing age of mothers. This may be a product of structural changes in the economy of the HADO area after destocking. Moreover, women in the higher age groups experienced similar conditions before destocking in 1979. However, a general observation indicates that age at first birth for the respondents who entered childbearing age groups after destocking was lower than in the other age groups and was much lower in the HADO area than in the Periphery HADO.

Conventionally, childbearing commences at age 15, but in reality some extreme cases exists where first maternity occurs before age 15. About 1.3 percent and 0.7 percent of the mothers in the HADO area and Periphery HADO clusters respectively, had had their first maternity while in age group 10-14. Although the proportions are very small, the observation suggests that, the median age at first birth presented in Table 3.3 do not show the exact variations which exists between individual women in different age groups.

3.4. Fertility:

Two measures of fertility were computed using the data on births during the 12 months preceding the survey. These measures are Age Specific Fertility Rate (ASFR) and Total Fertility Rate (TFR). Each of

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these measures has been discussed in this section. In order to try and examine the influence of the HADO project on fertility performance, the respondents were subdivided into three subdivisions. First, women who were in the childbearing age groups during the survey. Secondly, women who entered the reproductive ages after the establishment of the HADO project in 1973, and thirdly, women who entered their reproductive lifespan after destocking in 1979. Females in age groups 15-19, 20-24, 25-29 and 30-34 were examined under the second category. The proportion of respondents in the sample who entered reproductive age groups after 1973 was 50.8 percent in the HADO area and 55.6 percent in Periphery HADO. The first three age groups (i.e. age groups 15-19, 20-24, and 25-29) entered the third category. It was expected that the respondents in this last group would exhibit changes in their fertility performance as compared to other groups because they were directly affected by the destocking exercise. Women who were 35 years and above during the survey, were already in the childbearing age groups by the time the project was launched in 1973.

Age differences in fertility is an important component in examining and analysing fertility performance. It was therefore necessary to compute

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the age specific fertility rates of women in different age cohorts for comparison purposes. Women in age group 15-49 were used for this purpose.

Age Specific Fertility Rate (ASFR) is defined as the number of births to women of a given age group per 1000 women in that age group (Shryock and Siegel, 1976). This measure gives some sort of a central rate which measures the relationship between the number of live births in a particular age group and the age of mothers. In other words, the measure provides information about the level of fertility of women of specified ages.

The computed ASFRs for the two clusters in the study area are presented in Table 3.4. These rates were compared to similar rates for Kondoa district (1967) and Dodoma region (1978). The 1967 values were used in comparison because they provide an indication of the fertility levels before the establishment of the HADO project. The 1978 fertility rates were used to show a rough indication of the fertility levels before destocking. The data for 1978 were compiled only at regional level.

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Table 3.4: Age Specific Fertility Rates For Kondoa District (1967), Dodoma Region (1978), and the HADO Areas (1988)

Age groups	Dodoma Region	Kondoa District	HADO Area	Periphery HADO
15-19	.1340	.1708	.1923	.1176
20-24	.2801	.3500	.3846	.3200
25-29	.2947	.3346	.3448	.2857
30-34	.2115	.2338	.2500	.2105
35-39	.1950	.1694	.2105	.2069
40-44	.1089	.0896	.1364	.1667
45-49	.0562	.0518	.0769	.0909
TOTAL	1.2804	1.4000	1.5955	1.3983
Indices (Dodoma 1978=100)				
15-19	100	127	144	88
20-24	100	125	135	114
25-29	100	114	117	97
30-34	100	111	118	100
35-39	100	87	108	106
40-44	100	82	120	153
45-49	100	92	137	162

Source: Sembajwe (1980), Survey (June, 1988).

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Table 3.4 shows that ASFRs in the HADD area cluster were higher than that of the Periphery HADD, the 1967 Kondoa district and 1978 Dodoma region rates. Despite the fact that there was a time lag between the 1978 regional ASFRs and the 1988 rates in the study area, almost a similar pattern of the ASFR schedule has been observed for the two clusters and the regional pattern, with the HADD area rates being higher than both the Periphery HADD and regional ASFRs. This situation implies that there was higher fertility levels in the destocked areas as compared to the stocked areas.

Further, although the peaks of the ASFR in all groups presented in Table 3.4 were in age groups 20-24, it was the highest in the HADD area than in both the Periphery HADD and the Regional average ASFRs (1978). Such a situation may be a result of destocking the HADD area which caused both behavioral and economic changes in the households.

There was a small difference observed in levels of ASFRs for the older age groups in the two clusters. A possible explanation for such a trend is that, women in the higher age groups experienced similar socio-economic conditions before and after the establishment of the HADD project up to 1979, when, on the one hand, the HADD area was completely destocked and therefore changed completely to pure

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crop cultivation, and on the other hand, the Periphery HADO was partly destocked and livestock keeping continued to a larger extent.

Also, it is observed that fertility performance in the younger age groups was higher in the HADO area than in the Periphery HADO. A comparison of the ASFRs of the younger age groups in the two clusters (i.e. between age 15 and 29) shows clearly that the rates were higher in the HADO area and the reverse was true for the older age groups (i.e. age group 40-49). The rates in age group 30-34 and 35-39 were almost similar in both clusters.

An attempt was made to standardize the age specific fertility rates of the two clusters for comparison purposes. Standardization serves the purpose of eliminating extraneous sources of variation in the data (such as age composition) that may seriously affect the analysis of the subject under investigation (Shryock and Siegel, 1976). The age specific fertility rates for Dodoma Region (1978) were used as a base for standardization. But, even after standardization the HADO area maintained its upper position. The observed differences were particularly broader for women under 30 years of age. These observations suggest that there were differences in fertility levels between the two clusters. Figure 3.4 compares the standardized ASFR

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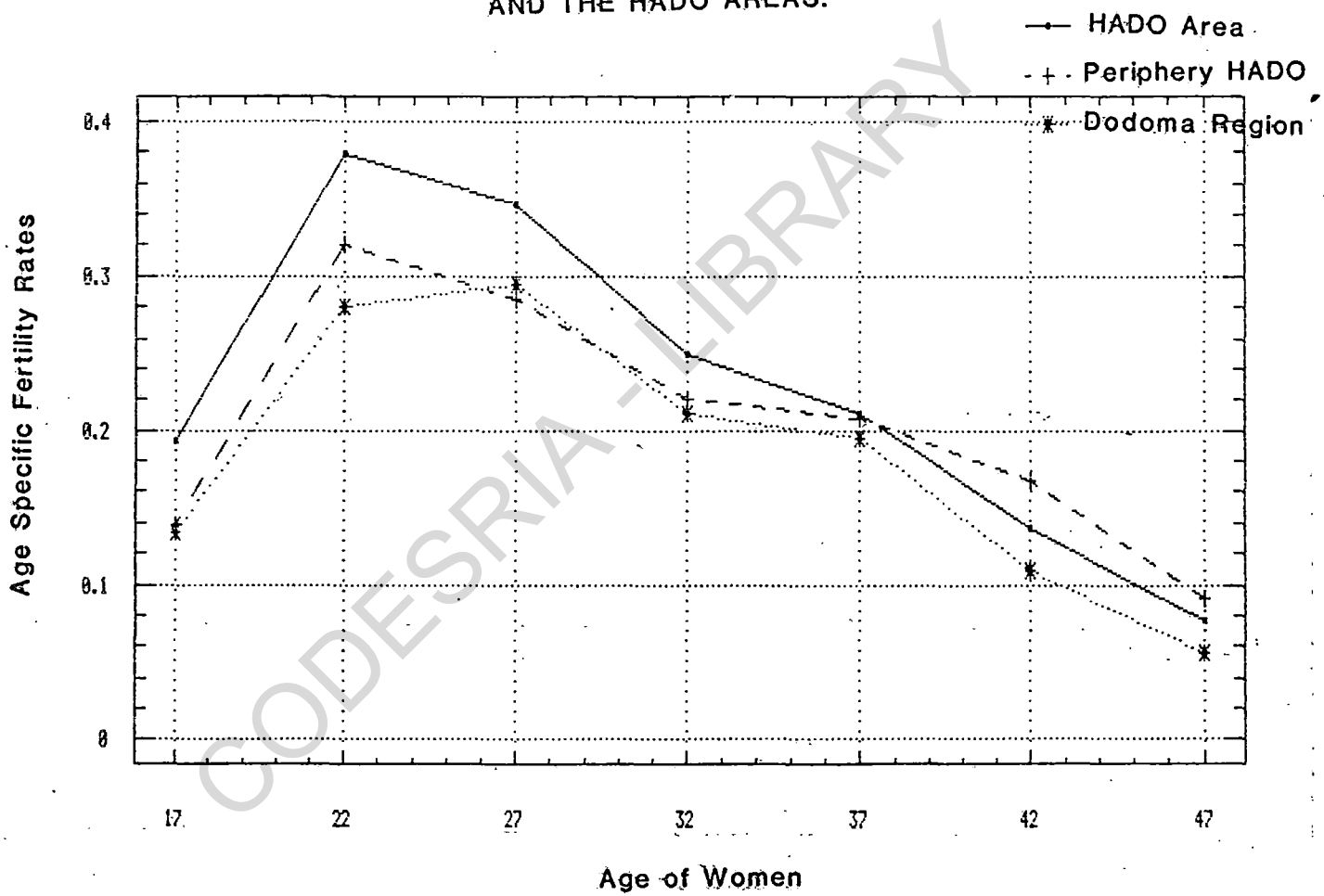
FIGURE 3.4: AGE SPECIFIC FERTILITY RATES FOR DODOMA REGION AND THE HADO AREAS.



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schedules for the two clusters in the HADO area with that of Dodoma region (1978). The pattern of the graphs seem to be shaped alike despite the fact that the graph for the Periphery HADO showed lower levels than those of the HADO area.

The observed ASFRs were used to compute the Total Fertility Rates (TFR) for the two clusters. TFR has been defined as the average number of children that would be born alive to a woman (or group of women) during her lifetime if she were to pass through her childbearing period conforming to the ASFR of a given year (Shryock and Siegel, 1976). TFR takes into consideration the distribution of birth during the 12 months period preceding the survey among women of different ages. It is a useful measure of the level of fertility and serves as an adequate approximation of the average, actual, and completed family size.

The computed TFRs for the two clusters gave an average TFR of 8.0 births in the HADO area and 7.0 births in the Periphery HADO. These rates are comparatively higher than the average TFR for Kondoa district which were 7.0 births in 1967 and 6.2 births in 1978 (Sembajwe, 1980). The standardized TFR for the two clusters (using the 1978 Dodoma Region age structure) were 7.9 births in the former cluster and

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7.0 births in the latter. The contribution of each age group to the computed TFR is summarized in the table below.

Table 3.5: Percent Contribution of Each Age Group to the Computed Total Fertility Rates in the HADO Areas.

Age Group	HADO Area	Periphery HADO
15-19	12.1	8.4
20-24	24.1	22.9
25-29	21.6	20.4
30-34	15.7	15.1
35-39	13.2	14.8
40-44	8.5	11.9
45-49	4.8	6.5
TOTAL	100.0	100.0

Source: Survey, June 1988.

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In both clusters, age groups 20-24 and 25-29 contributed more to the TFRs. Further, it is clearly observed that, the contribution of the young age groups (i.e. 15-19, 20-24, and 25-29) to the computed TFRs was 57.8 percent in the HADO area and 51.7 percent in Periphery HADO.

Apart from the observed differences in total fertility between the two clusters, the rates suggest prevalence of very high fertility in the study area especially in the destocked areas (i.e. the HADO area). The HADO area which is purely an agricultural cluster exhibited a higher fertility rate with a TFR of 8.0 children per woman as compared to the Periphery HADO cluster (which is an agro-pastoral cluster) which had TFR of 7.0 children. A difference of 1.0 birth in TFR, demonstrates existence of a noticeable difference in fertility between the two clusters. These findings are similar to those of Henin (1968) who compared fertility levels of the settled agriculturalists in the Gezira and Managil irrigation schemes to those of the pastoral nomads in Sudan. He found a TFR of 8.2 children per woman in the settled (agriculturalists) populations and 3.5 children in the nomadic (pastoralists) populations.

3.5. Children Everborn and Desired Number of Children:

One of the important sources of information about fertility is the reported total number of live births of a woman (i.e. the average parity). The number of children everborn to a particular woman is an aggregate measure of her lifetime fertility experience up to the moment at which data are collected (U.N., 1983). The information on children

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everborn which was gathered from the respondents was used to compute the average parities. Table 3.6 provides a summary of the parity distribution for women in different age cohorts in the two clusters.

Table 3.6: Parity of Mothers by 5-year Age Groups and Area.

Age Groups	HADO Area	Periphery HADO
15-19	0.4538	0.3529
20-24	1.7308	1.5600
25-29	3.5864	4.1429
30-34	4.8000	5.4211
35-39	6.5263	5.6207
40-44	7.3182	6.5000
45-49	6.8462	5.9091

Source:Survey,June 1988.

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The data shows that the parity for women aged 45-49 years was 6.8 in the HADO area and 5.9 in the Periphery HADO. These rates are lower than those of women in age group 40-44. The main factor which may be responsible for the lower parities in age group 45-49 is the ever-present reporting errors due to memory lapse. Thus, the parity for women in age group are taken as the indicator of the average completed fertility. The difference of the parities in age group 40-44 to the average total fertility rates was

small. Whereas the average parities for age group 40-44 were 7.3 and 6.5 in the HADO area and Periphery HADO, the computed total fertility were 8.0 and 7.0 for the two clusters respectively. The difference was 0.7 births for the former cluster and 0.5 births for the latter. The median number of children ever born alive was 6.2 in the HADO area and 5.1 in Periphery HADO. All these rates lie below the computed total fertility rates in the two clusters due to underreporting of the children everborn especially in the higher age groups.

The data on children everborn alive was further analysed by plotting the number of children everborn by the proportion of women having a particular number of children as illustrated in Figure 3.5. The trends in the two graphs show that the proportion of women who had 1-3 children was higher in the Periphery HADO (34.9 percent) as opposed to the HADO area (30.5 percent). The group of women having 4-6 children comprised 25.1 percent in the HADO area as compared to 33.4 percent in the Periphery HADO. The proportion of women having 7 children or more was 44.4 percent in the HADO area and 31.7 percent in the Periphery HADO. This comparison shows that a larger proportion of mothers in the HADO area had many live births as opposed to the Periphery HADO which was dominated by women who had fewer number of children.

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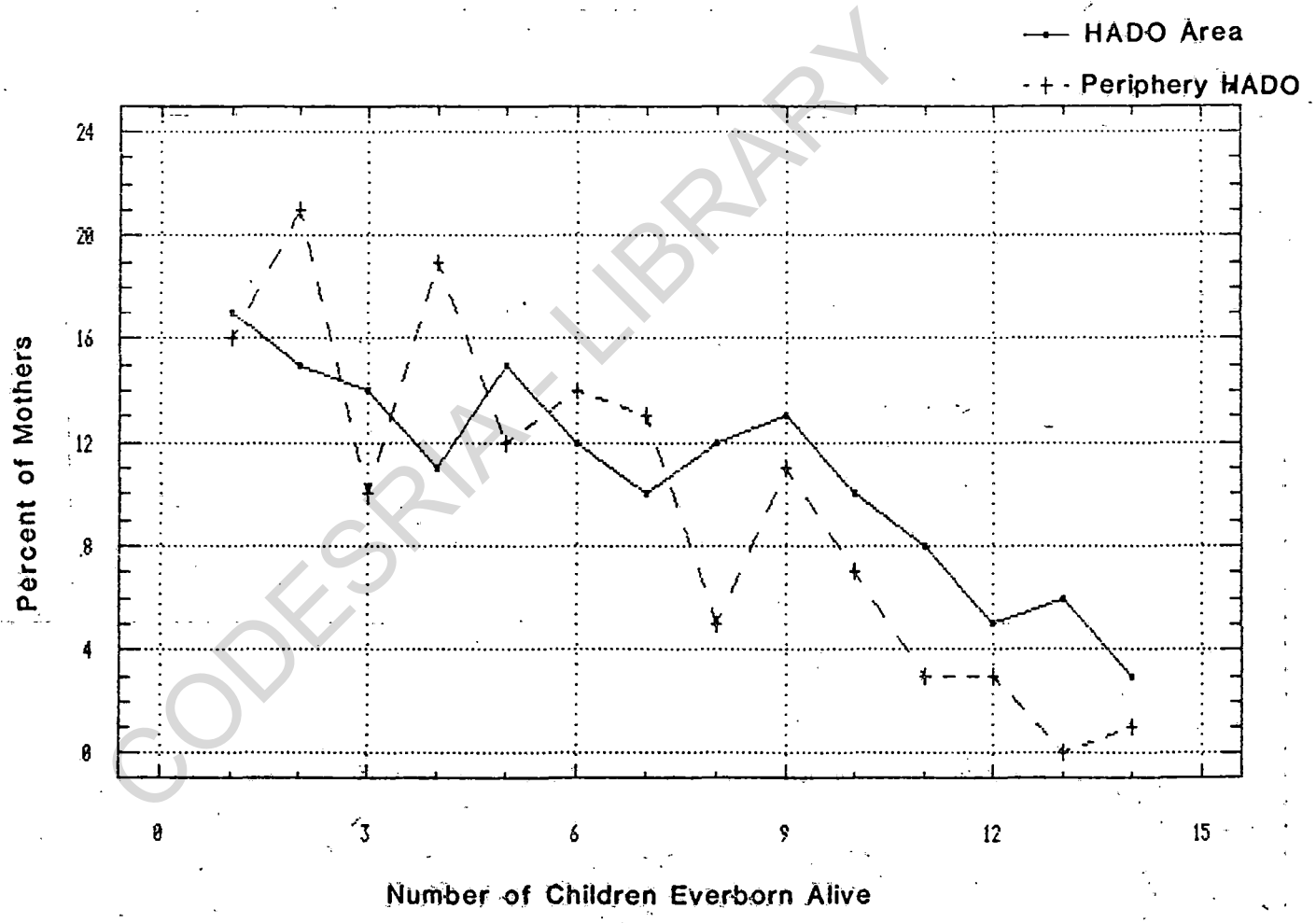
FIGURE 3.5: PERCENT DISTRIBUTION OF MOTHERS BY CHILDREN EVERBORN ALIVE.



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Also the respondents in both clusters were asked to state the number of children which they thought were appropriate for them. Table 3.7 summarizes the percent distribution of mothers by desired number of children.

Table 3.7: Percent Distribution of Mothers by Desired Number of Children:

Children Desired	HADO Area	Periphery HADO
1-3	12.7	11.3
4-6	38.7	55.0
7-9	24.3	21.2
10-12	21.0	11.9
13-15	3.3	0.6
TOTAL	100.0	100.0

Source: Survey, June 1988.

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Almost a similar pattern was observed in both clusters with most mothers desiring 4-6 children. However the proportion of mothers in each group for the two clusters differed. In the HADO area, 38.7 percent of the mothers preferred 4-6 children as opposed to 55.0 percent in Periphery HADO. The median desired number of children was 6.4 in the former cluster and was 6.1 in the latter. The difference in desired number of children between the two clusters

suggests that women in the HADO area appeared to prefer higher parities than women in the Periphery HADO. About 46.6 percent of the mothers in the HADO area cluster preferred many children above the median while only 33.9 percent did so in the Periphery HADO. These observations provide some indication of the pattern of child preference in the two clusters.

Relating the desired number of children to age of mothers, the responses were almost similar to the observed children everborn (CEB) especially in the older age groups (Table 3.7). The major reason for such similarity was due to misunderstanding of the question on desired number of children. Table 3.8 compares the median desired number of children with the median children everborn by five year age groups of fertile women.

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Table 3.8: Median Desired Number of Children and Children Everborn by 5-Year Age Groups of Mothers.

Age Groups	HADO AREA		PERIPHERY HADO	
	CEB	Desired	CEB	Desired
15-19	1.5	5.0	1.0	5.0
20-24	2.0	5.0	1.0	5.0
25-29	4.0	5.0	3.0	6.0
30-34	5.0	7.0	4.0	6.0
35-39	7.0	7.5	7.5	6.0
40-44	7.0	8.5	8.0	7.5
45-49	6.0	8.0	8.5	6.0

Source: Survey, June 1988.

The data shows that in the younger age groups (i.e. 15-19 to 30-34) the median CEB was higher in the HADO area than in the Periphery HADO. However, the pattern changed for the higher age groups (i.e. 35-39 to 44-49) where the median CEB was lower in the former cluster as compared to the latter. The data also indicates that the median desired number of children were almost similar in the younger age groups. This is because desired number is not the actual fertility level. One can mention any number of children as he/she likes.

Despite the observed pattern that the median desired number of children was higher than the median CEB in the younger age groups, there was evidence of increasing desire for children with increasing age of women in both clusters. In the HADO area, the increase was from the median number of 5.0 children in age group 15-19 to 8.5 children in age group 40-44. The increase in the Periphery HADO was from 5.0 children in age group 15-19 to 7.5 in age group 40-44. A rise in desired number of children was observed in the older age groups (i.e. age groups 40-44 and 45-59). A possible reason for this rise is that women in the higher age groups initiated their childbearing periods before the establishment of the HADO project and most of them have reached or were approaching menopause. For them, the desired number was in most

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cases equal to the completed family size or the number of children everborn. Moreover due to underreporting of the children everborn, the gap between desired and actual births was broad.

3.6. Demand for Children:

The political system in Tanzania discourages individual farmers to employ other people (hired labour) in agriculture (Nyerere, 1968). Implicitly, this policy encourages utilization of family labour in agricultural production. In the African context, family labour, to a larger extent, means women and children (Boserup, 1985).

The labour value of children is one of the factors which cause high fertility in peasant communities (Caldwell, 1980; Todaro, 1981; Kamuzora, 1984; Boserup, 1985). Entry into the labour force was taken as an indicator of demand for children. The respondents were asked to indicate the type of activities which are assigned to children and state the age at which they (children) enter into the labour force. Table 3.9 provides a summary of the various activities which are most often given to children in the households. The values in the table show the percent of mothers who assigns particular activities to their children in the two clusters.

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Table 3.9: Activities Assigned to Children and Percent of Mothers Giving the Activities to Their Children.

Activities	HADO Area	Periphery HADO	Total HADO
Fetching water	88.6	60.7	75.0
Fuelwood collection	56.9	52.1	54.6
Farm work	40.7	38.5	39.6
House cleaning	56.1	19.7	38.3
Cooking	42.3	23.1	32.9
Livestock rearing	-	48.7	23.8
Flour milling	17.9	3.4	10.8
Young children care	7.3	3.4	5.4
Petty business	7.3	2.6	5.0
Washing clothes	7.3	-	3.8
Pottery	-	2.6	1.3

Source: Survey, June, 1988.

These information indicates that, the dominant activities which children are involved in are fetching water and fuelwood collection, in that order. However, some differences were observed with regards to the proportion of mothers stating various activities. The general view is that, there is more assignment of duties to children in the HADO area than in Periphery HADO. This may be one of the factors causing high demand for children among cultivators.

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A general observation of the age at which children begin farmwork suggests that children in the HADO area were starting agricultural activities at lower ages than their Periphery HADO counterparts. The median age for starting farmwork in the former cluster was 7.4 years (with mean age of 8.1 years), and it was 8.0 years (with median age of 8.6 years) in the latter cluster. The reason for the differences between the two clusters is the nature and type of activities which children are engaged in.

On the one hand, subsistence agriculture which dominates the HADO area cluster, is labour intensive (Kamuzora, 1984) and requires a large labour force, children are regarded as the cheapest labour source at the disposal of the parents. Livestock keeping on the other hand, requires less manpower per unit of time. Moreover, because of the distance which has to be covered between home and the grazing areas, the task is not conducive for younger children. In many cases, children under seven years of age are assigned to look after calves, goats and sheep in areas nearer to the homesteads and the older children take the cattle for longer distances seeking for suitable pastures. For the cultivators, children are socialized into working in the farms by following the parents. Table 3.10 summarizes the age of children at which they enter into the labour force for different occupations.

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Table 3.10: Percent Distribution of Children by Age of Starting Farm and Livestock Activities.

Age of Children	HADO AREA	PERIPHERY HADO	
	Farmwork	Farmwork	Livestockwork
5-7	53.4	40.8	50.8
8-10	34.8	48.1	41.2
11-13	8.1	6.6	4.8
14+	3.7	4.5	3.2
TOTAL	100.0	100.0	100.0

Source: Survey, June 1988.

The data shows clearly that a larger proportion of children entered the labour force at younger age. About 53.4 percent, 40.8 percent and 50.8 percent of the children in both clusters started farmwork and livestock activities between age 5 and 7 years. It has been noted that, the proportion of children starting farmwork between age 5 and 7 was higher in the HADO area than in Periphery HADO. A comparatively larger proportion of children in the latter cluster was starting farmwork later between age 8 and 10 where the proportion was 48.1 percent as opposed to 34.8 percent in the former cluster. These data provide a convincing demonstration that children were an essential labour source from very tender age.

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FIGURE 3.6: PERCENT DISTRIBUTION OF CHILDREN BY AGE OF ENTERING THE LABOUR FORCE.

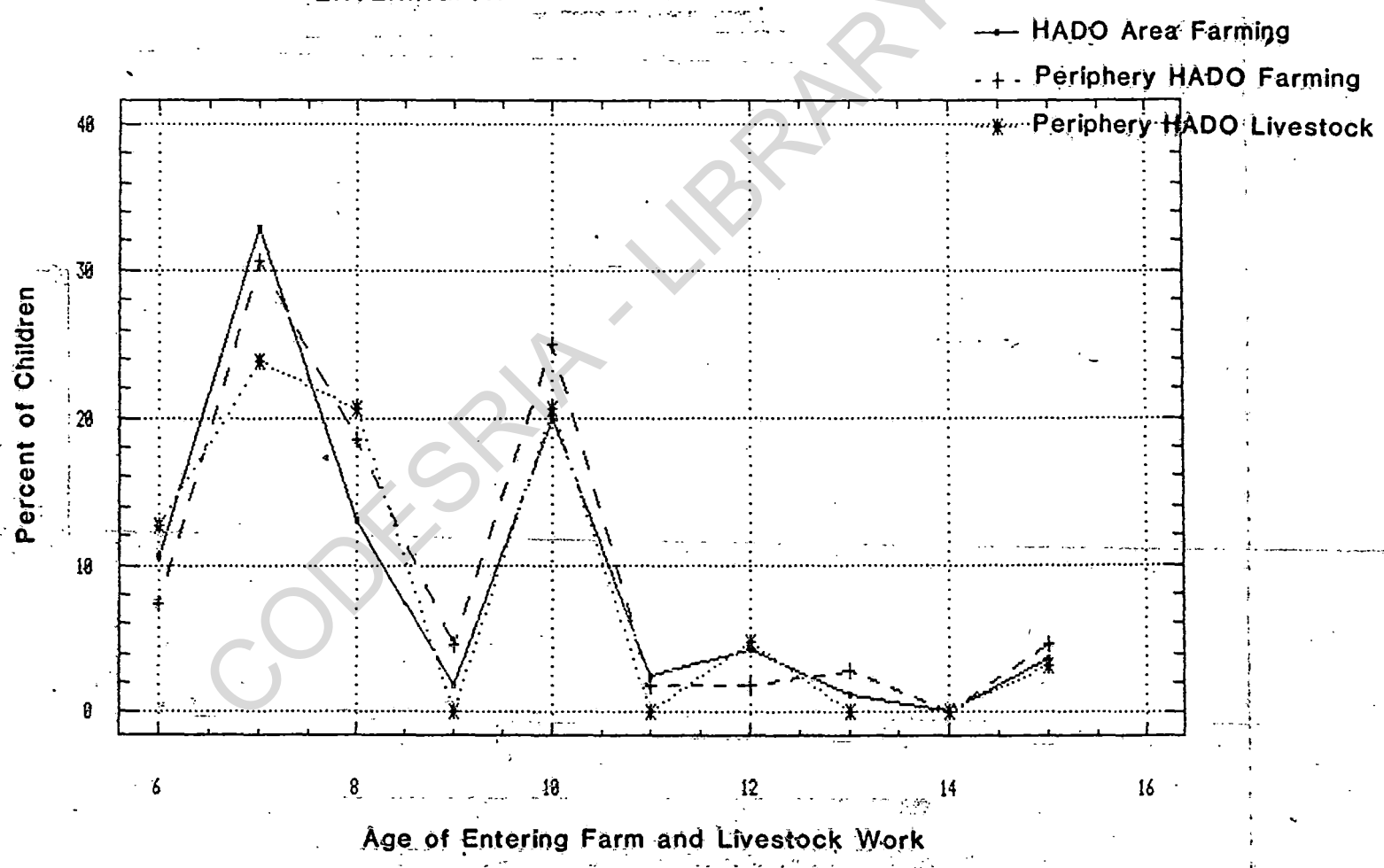

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Figure 3.6 shows the distribution of children by age at which children start farm and livestock rearing activities. The graphs show that a larger proportion of children enter the labour force between age six and age ten with age seven containing the highest concentration followed by age ten. The proportion of children starting farmwork at age seven was 32.9 percent in the HADO area and 30.6 percent in Periphery HADO. For the agro-pastoral households, the proportion at age seven was 23.8 percent. The trends demonstrated in Figure 3.6 shows evidence of digit preference among the respondents. While much concentration was placed on age seven, eight and ten, age nine was avoided. The graphs show that very few children enter the labour force at age nine. However, the pattern in the graphs suggests that children play an important role in the labour force at very younger ages. They contribute to the family's welfare.

Involvement of children in the labour force at the younger age provide an incentive for demanding more children, which leads to higher fertility. However, the available data for the study area shows that the desire for children was incrsasing with increasing age of mothers. The information provided in Table 3.8 indicated that the desired number of children increased from 5.0 children in age group 15-19 in both clusters to 8.5 children in HADO area and

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7.5 children in Periphery HADO in age group 40-44. But the observed rise in desired number of children may be unrealistic because only women were interviewed. In most societies (including those in the HADO area), it is the husband who determines the family size, the type of activities to be carried out in the household, and the source of family labour. On this basis, the need for obtaining the males' opinions is important in examining the demand for children in the households. The point of emphasis here is that, both couples have to be interviewed if fair treatment is to be attained.

In summary, the findings of this study provide evidence of some variations in demographic variables between the HADO area and the Periphery HADO clusters. First of all, the household size was observed to be higher in the former cluster and in the households of cultivators than in the latter cluster and the households of agro-pastoralists. Secondly, a rapid increase in age at first marriage with increasing age of women was found in the HADO area, where a net increase of 3.1 years existed as compared to 1.4 years in Periphery HADO. The observed difference in age at first marriage was particularly high in the younger age groups who married after destocking in 1979. Thirdly, an upward trend in age at first birth was observed in both clusters.

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However, the HADO area exhibited lower age at first birth in all age groups as compared to the Periphery HADO cluster. The difference between the two clusters was particularly broad in the age group 15-19 where it was 2.1 years.

Further observation established that women in the HADO area has higher fertility levels than their Periphery HADO counterparts. The computed ASFRs, TFRs and CEB supports this argument. The TFR of 8.0 in the HADO area and 7.0 in Periphery HADO suggest existence of very high fertility in the study area. Lastly, it was observed that, children are engaged in the labour force starting at age six. Time consuming activities are in most cases assigned to children. Also, the data indicated that there was more assignment of duties to children in the HADO area than in Periphery HADO. This observation demonstrates that children are vital to the household social and economic welfare from very early age.

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CHAPTER FOUR

SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS.

4.1. Summary of Findings:

In an attempt to study the influence of changing bases for household economy on family fertility in the HADO areas, three hypotheses were formulated.

Hypothesis One: Complete destocking of the HADO area influenced changes in marriage patterns and decline in age at first marriage among women.

Marriage was used to examine the influence of the HADO project on fertility because it is one of the most important intermediate determinants of fertility. Age at first marriage determines the onset of regular sexual relationships and thus expose the woman to high chances of conception. Assuming that women remain in marital unions for the whole reproductive period, age at first marriage determines the length of the reproductive lifespan for which a married woman remains in the sexual union.

It was established that, only a small proportion of women in the study area never marry. Among the respondents aged 45-49, none in HADO area and only

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7.7 percent in Periphery HADO remained single. Furthermore, about 64.7 percent and 80.8 percent of women in age group 15-19 were single in the HADO area and Periphery HADO respectively. These proportions suggest that, a relatively larger proportion of women in the former cluster (34.3 percent) married while still teen-agers and the proportion was only 19.2 percent in the latter cluster.

The observed pattern of age at first marriage was higher in the HADO area as compared to the Periphery HADO. Whereas the net increase in age at first marriage between age group 15-19 and 45-49 was 3.1 years in the HADO area, it was 1.4 years only in Periphery HADO. The abrupt change in the trend observed in age group 20-24 was attributed to complete removal of the livestock in 1979. With no livestock at their disposal (which were formerly used in the marriage institution), people had to look for other ways of integrating the new socioeconomic conditions into marriage. The situation caused some sort of delay in marriages. Thereafter, an exceptionally rapid decline in the age at first marriage was experienced in the HADO area. The median age at first marriage between age group 20-24 and 15-19 exhibited a net decline of 1.7 years in the former cluster and 0.6 years in the latter. The higher decline in the former cluster caused the median age at first marriage to go further below that of the

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latter cluster in age group 15-19. This decline was stimulated by complete removal of livestock in this cluster.

The median age at marriage for older age groups illustrated a small difference between the HADO area and Periphery HADO. The reason for the smaller difference is that women in the higher age groups experienced almost similar socio-economic conditions before total destocking of the HADO area. The people in these clusters were agro-pastoralists, with much emphasis on livestock keeping than crop cultivation.

Hypothesis Two: Age at first birth of women who entered the childbearing lifespan after destocking is lower than that of women who entered the reproductive period earlier.

A total number of 286 respondents answered the questions on births. Among these women, 52.8 percent belonged to the HADO area and 47.2 percent to the Periphery HADO. All of the respondents had had a live birth before.

The median age at first birth varied between 16.2 years and 21.5 years in the HADO area and between 18.3 years and 20.4 years in Periphery HADO for age groups 15-19 and 45-49 respectively. In both clusters, the age at first birth was lower in the younger age groups as compared to the older age groups.

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Generally, the two clusters in the study area exhibited an upward trend in age at first maternity. But, the HADO area curve was lower than that of the Periphery HADO. Such a pattern implies that age at first birth was lower in the former cluster than in the latter. Moreover, the net increase in age at first birth in the HADO area was 5.3 years as compared to 3.2 years in the Periphery HADO. The higher increase in the former cluster was probably a result of changing socio-economic conditions after destocking.

The difference in age at first birth which was observed in all age groups, was lower in the older age groups. It has been argued that small difference in the older age groups was a result of persistence of similar socio-economic condition in both clusters before destocking. The highest difference between the HADO area and the Periphery HADO clusters, was found in age group 15-19 where it was 2.1 years.

Hypothesis Three: A change from livestock keeping to pure crop cultivation encourages high fertility performance in the households.

The data on fertility has indicated that fertility levels among the cultivators was higher than that of the agro-pastoralists. The cornerstone for high fertility in the households of cultivators

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is the labour intensive nature of the subsistence and peasant production systems. Children are viewed as an essential source of family labour and they are highly valued on this regard.

Observation has indicated that women in younger age groups (i.e. age group 15-19, 20-24, and 25-29) had high age specific fertility rates. Women in these age groups entered their reproductive lifespan after complete destocking the HADO area. The divergence of the fertility levels of women in the two clusters was expected to occur after destocking the HADO area. Before then, the two clusters had almost similar socio-economic characteristics and fertility performance.

The total contribution of the young age groups to the total fertility rates was 57.8 percent in HADO area and 51.7 percent in Periphery HADO. The observed total fertility rates for the two clusters was 8.0 births in the former and 7.0 births in the latter. Inspite of the difference in TFR of 1.0 birth between the former and the latter cluster, the data suggests existence of very high fertility levels especially in the destocked areas (i.e. the HADO area). The study demonstrated that fertility levels in the HADO area and Periphery HADO clusters were higher than the averages for the district.

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The fertility levels were also examined by utilizing the retrospective data. The information on children everborn alive (CEB) was used in computing the parities for each age cohort of mothers. The median number of children everborn was 6.2 in the HADO area and 5.1 in Periphery HADO. Further, the parities in age group 40-44 were used to indicate the rough estimation of the completed family size in the two clusters. Age group 45-49 was not used because of the effect of misreporting at older ages due to memory lapse. Thus, using age group 40-44, the average completed family size was 7.3 births in HADO area and 6.5 births in the Periphery HADO. These figures shows a difference of 0.8 births between the two clusters. This difference is considered to be a result of actual fertility differences between the two clusters because even the current fertility data has shown almost a similar difference.

The proportion of mothers having fewer children was higher in Periphery HADO than in the HADO area. However, the vice versa was true for mothers having many children for which the proportion was higher in the HADO area than ir Periphery HADO. This observation was supported by the data on desired number of children which indicated that 51.4 percent of mothers in the former cluster desired 1-6 children as compared to 66.3 percent in the latter. Further,

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about 48.6 percent of the mothers in the HADO area and 33.7 percent in Periphery HADO, desired 7 or more children. However, the median desired number of children in the younger age groups were almost similar in both clusters. A slight increase in desired number of children with increasing age of mothers was observed. Whereas women in age group 15-19 indicated preference of 5.0 only children, women in age group 40-44 preferred approximately 8.0 children.

The above summary have indicated that the momentum for fertility increase is high in young women, especially in the HADO area. Observations have established that the age specific fertility rates, total fertility rates and the parities were higher in the former than in the latter cluster. Although the fertility measures have indicated a small difference between the two clusters, at least a gap has been observed with the latter cluster showing lower fertility levels. Even after standardizing the ASFRs, the HADO area indicated higher fertility.

With declining age at first marriage and age at first birth, women tend to remain in the reproductive lifespan for longer periods, and (other factors being constant), there is a possibility of higher parities.

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4.2. Conclusions:

The findings have demonstrated that there are possibilities of increasing fertility rates in the study areas. It has been indicated that, the age specific fertility rates, total fertility rates, children everborn, and desired number of children were relatively higher in the HADO area than the corresponding rates for the Periphery HADO cluster. Moreover, age at first marriage was rapidly declining in the former cluster particularly in age group 15-19 than in the latter. A similar pattern was observed for age at first birth.

These observations lead us to infer that unless other corrective measures are initiated, with time fertility will tend to increase in the study area. With lower age at marriage, a larger portion of the reproductive lifespan is spent in sexual unions. Early marriages also encourage early births and hence high fertility.

These discussions show that the conditions in the HADO area are conducive for increasing fertility. The most important factors leading towards this end are early marriages (i.e. at younger age), young age at first maternity, lack of alternative birth control services, and changes in values and customs due to changes in the economic base of the households from livestock keeping to pure crop cultivation.

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Furthermore, the demand for family labour has been observed to increase as the society change from livestock keeping to subsistence peasant agriculture. The nature of the activities in the households of cultivators and pastoralists determine the size of labour force needed in the family. The study has indicated that there is more assignment of duties to children in the households of cultivators than in those of the agro-pastoralists. In other words, children were used as the major source of family labour. This argument implies that a shift from agro-pastoralism to pure subsistence crop cultivation means higher demand for family labour, which in turn, implies more women and children. That is, the labour value of children increased with complete destocking of the HADO area.

4.3. Policy Implications and Recommendations.

(i) The HADO area in Kondoa district is characterized by severe land degradation which have led to scarcity of arable land. The existing high rates of population growth, particularly due to increasing fertility levels has caused an increase in population density and in the demand for more arable land. Unless other virgin lands are found or agricultural mechanization and intensification are introduced, the conserved areas in the Kondoa

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Irangi highlands will in no time be put into cultivation even before recovery of the degraded areas. Therefore, there is a clear need to strike the balance between land conservation on the one hand, and the population variables on the other. It is important for the Ministry of Lands, Natural Resources and Tourism to take note of the existing population resource imbalances in the HADO area.

(ii) A change from agro-pastoralism to pure crop cultivation has influenced early marriages and younger age at first birth. Hence, evidence of increasing fertility levels have been observed. The consequence of these factors is that fertility tends to continue with the increasing trend. The best alternative strategy for checking the ever increasing fertility in the HADO area, is to encourage modern family planning practices by educating the couples and improving the supply and accessibility to the services. UMATI (the Family Planning Association of Tanzania) is responsible of implementing this aspect.

(iii) High population growth in an area which has a limited arable land, increases the pressure on the land and the proportion of the landless population. Consequently, the rate of

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unemployment in the rural sector is increased. As a result, migration flows of the younger generation from the rural to urban areas are further encouraged. Evidence from Kondoa town where idle young men are in large numbers, supports this argument. In order to stop this trend and reduce the intensity of exploitation of the environment, there is a need to encourage development of off-farm activities (such as small scale industries) in the villages. In other words, diversification of the economy in the rural areas should be encouraged instead of depending on crop cultivation alone.

(iv) The continued rapid population growth outrun the level at which non-renewable soil, water and vegetation can be sustained. Thus, the resource base deteriorates. Further, increasing population density leads to greater ecological risk. Such situations may handicap the achievements of land and environmental conservation which have so far been realized.

(v) Every programme or strategy selected to resolve the problem of land degradation must have an integrated approach which reconciles ecological, social, cultural, economic and demographic factors in the combating measures.

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The present study was limited in scope and coverage. Some of the most important proximate fertility variables (such as breastfeeding, postpartum abstinence, abortions and fetal mortality) were not investigated. Therefore, a need still exists for more detailed and systematic demographic studies on how complete dependence on the land for subsistence and land shortages affect population growth in general and fertility performance in particular. Further research is needed on prospects of fertility limitation practices as a means of reducing the population pressure on land in the HADO areas. These studies can be used to determine the extent to which socio-economic development aims can be made to coincide with the objectives of the HADO project. However, this study has formed a point of departure for further demographic investigations.

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APPENDIX 1.

DISTRIBUTION OF RESPONDENTS BY AGE AND AREA:

Age Group	HADO Area		Periphery HADO		Total HADO	
	No.	%	No.	%	No.	%
15-19	26	13.1	17	10.6	43	12.0
20-24	26	13.1	25	15.6	51	14.2
25-29	29	14.6	28	17.5	57	15.9
30-34	20	10.1	19	11.9	39	10.9
35-39	19	9.5	29	18.1	48	13.4
40-44	22	11.1	12	7.5	34	9.5
45-49	13	6.5	11	6.9	24	6.7
50-54	12	6.0	5	3.1	17	4.7
55-59	10	5.0	2	1.3	12	3.3
60-64	5	2.5	4	2.5	9	2.5
65+	17	8.5	8	5.0	25	7.0
TOTAL	199	100.0	160	100.0	359	100.0

Source: Survey, June 1988.

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APPENDIX 2.

CHILDREN EVERBORN AND BIRTHS DURING 12 MONTHS BY 5-YEAR AGE GROUPS OF MOTHERS.

AGE GROUPS	HADO AREA Women	CEB	Birth 12M	PERIPHERY HADO Women	CEB	Birth 12M
15-19	26	12	5	17	6	2
20-24	26	45	10	25	39	8
25-29	29	104	10	28	116	8
30-34	20	96	5	19	103	4
35-39	19	124	4	29	163	6
40-44	22	161	3	12	78	2
45-49	13	89	1	11	65	1
TOTAL	155	631	38	141	570	31

Source: Survey, June, 1988.

Note: Computations were based only on women who ever had a live birth.

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APPENDIX 3.

THE HADO PROJECT OPERATION AREA IN KONDOA DISTRICT (DIVISION, WARD AND VILLAGES).

DIVISION	WARD	VILLAGES
KONDOA MJINI	Kondoa Mjini	Chemchem
		Mnarani
		Iboni
		Bicha
		Ubembeni
	Suruke	Tura
		Tungufu
		Mluwa
	Kingale	Kwantisi/Unkuku
		Kingale Juu *
KOLO	Kolo	Kolo
		Bolisa
		Hachwi
	Soera	Kwadinu
		Humai
	Changaa	Tumbelo
		Changaa
	Thawi	Thawi Juu
		Thawi Madukani
		Sakami

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MONDO	Mondo	Mondo
		Waida
PAHI	Haubi	Haubi
		Mafai
		Ntomoko
	Kalamba	Kalamba
		Baura
		Hebi
BEREKO	Kikilo	Ororimo *
		Kwahengwa *

* Villages to be put under HADO treatment in Phase II.

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APPENDIX 4

CHANGING BASES FOR HOUSEHOLD ECONOMY AND FAMILY FERTILITY RESPONSE IN THE HADO AREAS IN KONDOA DISTRICT.

HOUSEHOLD QUESTIONNAIRE

A. GENERAL HOUSEHOLD INFORMATION:

1. Village .....

2. Ward .....

3. Name of the Head of Household .....

4. Sex

   (a) Male .....

   (b) Female .....

5. Age (years) .....

6. Educational level:

   (a) None

   (b) Class 1-4

   (c) Class 5-8

   (d) Class 9-14

   (e) Adult education

7. Size of the household (number) .....

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Name	Relation to H/Hh	Sex	Age	marital status	Age at marriage
(i)	.....	.....	.....	.....	.....
(ii)	.....	.....	.....	.....	.....
(iii)	.....	.....	.....	.....	.....
(iv)	.....	.....	.....	.....	.....
(v)	.....	.....	.....	.....	.....
(vi)	.....	.....	.....	.....	.....
(vii)	.....	.....	.....	.....	.....
Total					

B. ECONOMIC ACTIVITIES IN THE HOUSEHOLD.

8. What do you usually do to earn your living in your household (main occupation)?

(a) Crop cultivation .....

(b) Livestock keeping .....

(c) Crop cultivation and livestock keeping .....

(d) Fishing and hunting .....

(e) Agricultural labourer .....

(f) Paid employment .....

(g) Sales and business .....

(h) Not stated .....

9. If you are a CULTIVATOR; what type of crops do you grow?

(a) Maize ..... (f) Beans .....

(b) Millet/sorghum ..... (g) Pigeon peas .....

(c) Cassava ..... (h) Ground nuts .....

(d) Sunflower ..... (i) Sweet potatoes .....

(e) Finger millet .....

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10. Do you own land in this village? YES/NO

11. If YES how many hectares of land do you have?

(a) None .....

(b) 1-4 .....

(c) 5-8 .....

(d) 9-12 .....

(e) 13 and above .....

12. Is the available land enough for your family requirements? YES/NO

13. If NO, how do you intend to fill the deficit?

(a) rent land from other people.....

(b) apply for additional land from the village government .....

(c) seek for arable land elsewhere (outside this village).....

(d) buy food.....

(e) seek for non-agricultural employment.....

(f) depend on livestock.....

(g) other methods (specify).....

14. How many people do you require to satisfy your agricultural labour needs (number)? .....

15. How do you get them?

(a) use family members .....

(b) hired labour .....

(c) working party .....

(d) exchange labour (between households) .....

(e) others (specify) .....

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16. Do you involve children in agricultural activities? YES/NO.

17. If YES, at what particular age do children start working in the farm? .....

18. What other activities do children perform in your household?

(a) .....

(b) .....

(c) .....

(d) .....

(e) .....

19. If you are keeping livestock, what type of livestock do you own and how many of them do you have?

(a) cattle number .....

(b) goats number .....

(c) sheep number .....

(d) donkeys number .....

(e) pigs number .....

20. How many people do you require to satisfy the labour demand for your agro-pastoral activities in your household? .....

21. How do you get them?

(a) use family members .....

(b) hired labour .....

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(c) working party .....

(d) exchange labour (between households) .....

(e) others (specify) .....

22. Do you involve children in livestock keeping activities? YES/NO.

23. If YES, at what particular age do children start working in the livestock keeping activities? ....

24. What other activities do children perform in your household?

(a) .....

(b) .....

(c) .....

(d) .....

(e) .....

C. <u>QUESTIONS ADRESSED TO WOMEN AGED 15 YEARS AND ABOVE</u>.

25. Name .....

26. Age.....

27. Educational level

(a) none .....

(b) Class 1-4 .....

(c) Class 5-8 .....

(d) Class 9-14 .....

(e) Adult Education .....

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28. Relationship to the head of the household?

(a) Head of household .....

(b) Wife/Husband .....

(c) Son .....

(d) Daughter .....

(e) Others (specify) .....

29. Marital status

(a) Never married .....

(b) Currently married .....

(c) Divorced .....

(d) Widow .....

(e) Separated .....

30. How old were you when you married for the first time? .....

31. Did you had a live birth before your first marriage? YES/NO

32. If the answer is YES, how many children did you had?..... .....

33. Have you ever had a live birth in your lifetime?

YES/NO

34. If YES, how old were you when you had your first maternity? (completed years) .....

35. How many children have you everborn? .....

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36. Among the children you have born alive:

(a) How many are living with you? .....

(b) How many are living elsewhere? .....

(c) How many have died? .....

37. When did you had your most recent/last live birth?

Month ..... Year .....

38. Is the child still alive? YES/NO.

39. How many children do/did you prefer(ed)(d) to have in your lifetime?

(a) Males .....

(b) Females .....

(c) Total .....

40. Why do you preferred that number of children?

(a).....

(b).....

(c).....

(d).....

(e).....

41. Do you involve children in the:

(a) agricultural activities? YES/NO

(b) livestock rearing activities? YES/NO.

42. If YES, at what particular age do children start working in:

(a) agriculture .....

(b) livestock keeping .....

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43. What other activities do you assign to your children?

(a) .....

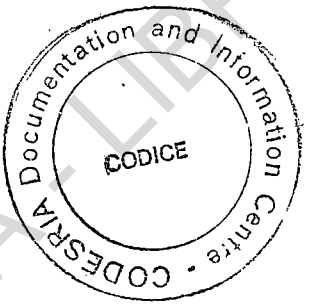
(b) .....

(c) .....

(d) .....

(e) .....

END OF INTERVIEW.



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