INFANT AND CHILD MORTALITY DIFFERENTIALS IN TAITA-TAVETA DISTRICT, BY DIVISION

BY

MWANGI CHARITY WANGARI

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Declaration

This project is my original work and to the best of my knowledge has not been presented for a degree in any other university.

Signature ....

This project has been submitted for examination with our approval as supervisors

Signature ....
J.A.M. Otieno

Signature ....
B.O. Koyugi

Population Studies and Research Institute
University of Nairobi
P.O. Box 30197
NAIROBI.

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Abstract

This study has looked into the effects of socio-economic factors education, marital status and place of residence on infant and child mortality by divisions of Taita-Taveta District as of 1979 census.

Trussell's method of mortality estimation was used to make infant and child mortality estimates using the q(2) values.

The findings have shown that socio-economic development has a great influence on infant and child mortality. Mothers belonging to groups of varying socio-economic status have been found to have different infant and child mortality experiences. Thus promotion of socio-economic development will be a means of reducing infant and child mortality.

CHAPTER ONE

1.1 Introduction

Infant and child mortality is said to be a good indicator of the physical well-being of a society. It reflects the society's social and economic conditions. Studies done on infant and child mortality indicate that the social and economic conditions into which children are born strongly influence their survival.

Thus changes in social and economic conditions in the developing countries and Kenya in particular are responsible for the substantial decline in infant and child mortality. These changes include improvement in medical technology, disease control, improved nutrition, parental education and improvement in the general living conditions.

However, inspite of this decline, infant and child mortality is still high in the developing world. The rapid pace of mortality decline achieved in most of these countries after World War II has not been sustained because of the slow pace of economic development. However, the levels of mortality in these countries vary from one country to another. Within countries themselves there are regional variations. In Kenya, for example, we have regions of high mortality such as Nyanza and Coast Province with IMR of 165 and 101 deaths per 1,000 births respectively and regions of low mortality such as Central Province with IMR of 61 deaths per 1,000 births in 1979 (Kichamu, 1979). These variations are mainly due to differences in socio-economic, socio-cultural and environmental conditions. Thus improvement in socio-economic and environmental conditions will bring about further decline in the level of mortality.

1.2 BACKGROUND OF THE STUDY AREA:

Taita-Taveta district is situated in the south-west part of coast province. It covers an area of approximately 16,975 sq.km. The district can be divided into two major regions the highlands or mountainous zone that rise about 2,150m above sea-level and the lowlands that are about 300m above sea level.

Administratively, the district is divided currrently into four divisions, namely, Wundanyi, Mwatate, Taveta and Voi. (In 1979 it was divided into three divisions, Wundanyi, Voi and Taveta). These are then sub-divided into 13 locations and 54 sub-locations.

The total populations in the district is estimated to have increased from 147,597 in 1979 to 196,925 in 1987, reflecting an annual growth of 3.67% over a period of 8 years.

The major economic activity of the people in the district is agriculture. Other activities are livestock keeping, small businesses and public sector employment. Agricultural production forms the economic base. However, income from agriculture is low and hence the level of development in the district is low.

Infant and child mortality in Taita-Taveta is moderately high. In 1979 (census) the infant mortality rate was about 99 deaths per 1,000 births. Due to improved education, improved health programs and other social services, this IMR declined to 85 deaths per 1,000 births in 1988. (District Development Plan 1989-93). However, the provision of social services is not adequate and the facilities are unevenly distributed in the four divisions. In some areas, for example, people have to travel far for medical services.
There is high population density on land leading to uneconomical subdivision of land. This is one of the factors that have contributed to low income from agriculture. The district has low literacy level and high degree of malnutrition.

All these indicate that the social economic conditions in the district requires a lot of improvement.

1.3 PROBLEM STATEMENT.

Infant and child mortality in Kenya is generally high. In 1984 the IMR was about 82 deaths per 1,000 births (KCPS, 1984). Compared to such countries as Japan with 7 deaths per 1,000 births, Kenya's IMR then is very high. The level of infant and child mortality in Kenya, however, varies from one region to another. Coast province is one of the regions with high mortality. In 1979 the IMR was 101 deaths per 1,000 births (Kichamu, 1986).

In Taita-Taveta district, Coast Province, the IMR has shown signs of declining but is still high. In 1979 it was about 99 deaths per 1,000 births which dropped to 85 deaths per 1,000 births in 1988 (Kichamu 1986). The high mortality in the district may be attributed to the low socio-economic development. Thus the study of socio-economic factors and their influence on infant and child mortality may help to point out those aspects that need close attention in development planning so as to reduce the mortality further. This study is designed to look at some of the socio-economic and demographic factors that affect infant and child mortality in the district.

1.4 SIGNIFICANCE OF THE STUDY

By investigating the effect of socio-economic and demographic factors on infant and child mortality, the study will be important for social and economic planning. It will indicate, what social and economic aspects in Taita-Taveta district should be given priority in planning in order to reduce the high infant and child mortality in the district. There is need for policy measures aimed at promoting social and economic development in order to reduce the level of mortality. These measures would be most effective if based on information gathered from the study of those factors that affect mortality.

In addition to this, the death of a child is an economic and psychological loss to the parents and society as a whole. So any effort aimed at identifying causes of the deaths in order to reduce them is of great importance.

High infant and child mortality contributes to high fertility. Thus high fertility creates rapid population growth which makes social and economic development, difficult. Thus reduction of infant and child mortality will influence the reduction of birth rates and hence promote social and economic development.

1.5 OBJECTIVES OF THE STUDY

The general objective of this study is to show the relationship between socio-economic factors and the infant and child mortality in Taita-Taveta district.

SPECIFIC OBJECTIVES

1. To investigate the association between maternal education and infant and child mortality.
2. To find out the association between mothers´ places of residence and the survival status of their children.
3. To determine the influence of mothers´ marital status on the survival status of their children.
4. To provide planners with information that will be useful in the reduction of infant and child mortality in Taita-Taveta district.

1.6 LITERATURE REVIEW

Studies done by various researchers show that there are many factors that influence the level of infant and child mortality in the society. These include socio-economic, socio-cultural, environmental factors e.t.c. Some of the researchers argue that for mortality to decline there must be improvement in socio-economic and environmental conditions. One of such researchers is Kathleen Newland (1981) who in her study of `Infant Mortality and the Health of Societies´ argues that rapidly declining rates of infant mortality signifies improvement in socio-economic and environmental conditions. That is, the decline occurs where there is improvement in direct causes of death such as sanitation, water supply, nutrition, access to medical care, education and access to fertility control. Thus high infant mortality is associated with certain social problems.

However, another researcher Bixby (1986) who did his study in Costa Rica, found that improvement in public health and education can reduce infant mortality without much economic development. He found that improvement in public health programmes especially primary health care contributed 3/4 of mortality decline in Costa Rica. This was inspite of Costa Rica´s state of uneconomic development. So from this he concluded that though socio-economic factors are important determinants of mortality health intervention aimed at controlling diseases can overcome socio-economic obstacles-

Provision of health services to all decreases socio-economic differentials related to children´s risk of death. In studying culture, nutrition - and infant and childhood mortality, in India, Mohadevan (1981) found that socio-cultural factors played a great role in determining the level of infant and childhood mortality in the three cultural groups he studies, namely, Hindus, Muslims and Haryiens. The social cultural factors included age at marriage, practices of midwifery and child weaning. Other factors that affected infant mortality were birth order and mother´s nutritional status.

In Kenya various studies on infant and child mortality have been done one of these was done by Mott F.L. (1979) using the Kenya Fertility Survey. In his analysis of infant and child mortality, in Kenya Mott states that, one of every two deaths in Kenya is a young child of less than 5 years. Thus Kenya´s mortality is high mainly because of the high infant and child mortality rate. He found that most of the infants and children´s deaths occurred among women with no education and those having either first birth or high birth order. However, he says the greatest infant mortality decline has occurred amongst these same women. The decline has been due to changing demographic factors, improved food distribution and improved health measures.

In Kenya there are regional variations in levels of infant and child mortality. These variations are due to differences in socio-economic status, environmental conditions and socio-cultural factors. The study by Kibet (1981) on mortality differentials in Kenya confirms the above observations. He found that regional differences in mortality are due to differences in education of women, availability of health services, knowledge of sanitation and willingness to utilize the health services.

Nyamwange (1982) too studied mortality differentials. He found that the mortality differentials in the various wards of Nairobi were due to the effect of demographic, biological and socio-economic factors. He however, states that socio-economic variable had an independent underlying influence on mortality differentials.

Other studies have been done to determine effect of level of education and marital status on infant and child mortality. One of these was done by Kichamu (1986). In his analysis of levels of and differentials of infant and child mortality in Kenya, he states that there is a general decline of child mortality with the rise of mother´s education. On the effect of Marital Status, he found that single mothers had the lowest infant mortality followed by the married next the divorced and separated and lastly, the widowed who had the highest infant and child mortality.

Koyugi's study of mortality and morbidity situation in Siaya district (1982) has the same findings as Kichamu's. In addition to these he found that mother's economic status had an effect on the survival status of their children. So that mothers in the better off group had lower child mortality. The residence of the mothers also influence the infant and child mortality. Mothers residing in urban areas, he found, had lower mortality than those in rural areas. In his study of infant and child mortality in Bondo-division Otieno (1988) found that the geographical factors, diseases found in the area and availability of medical and health facilities affect the child mortality in that area.

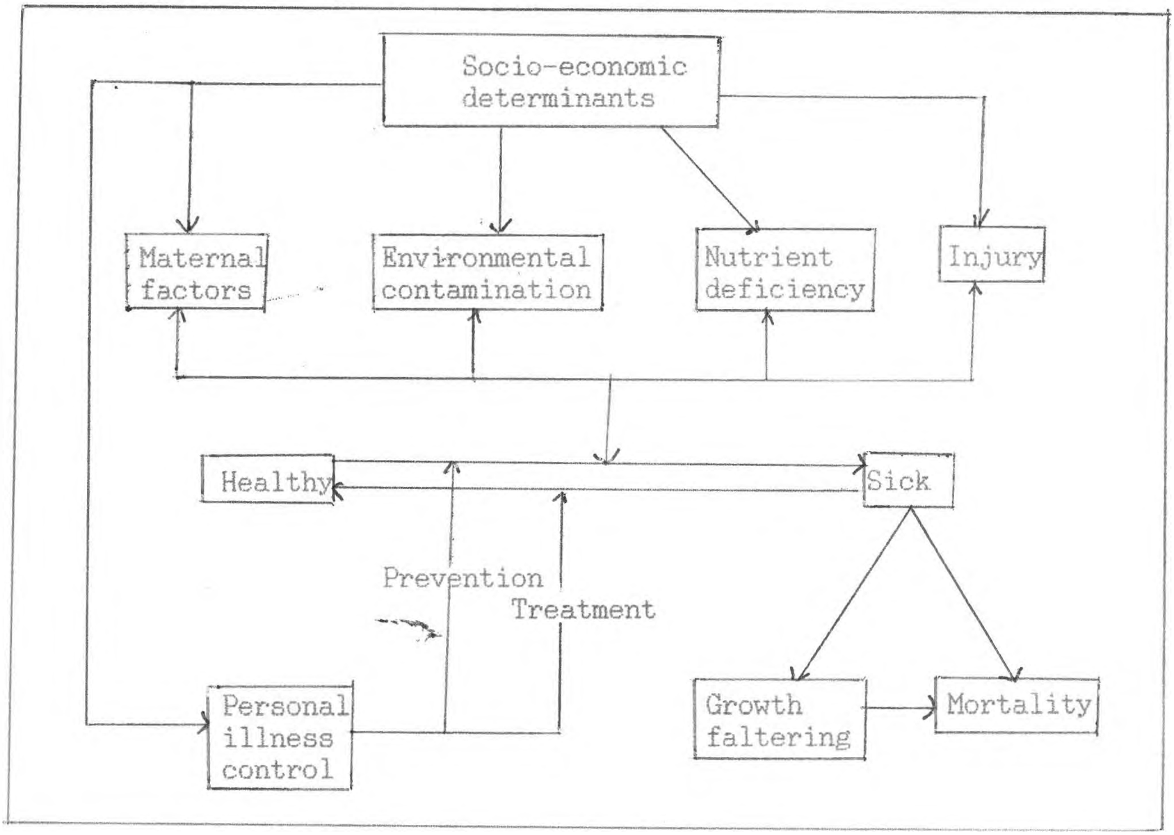
So from all these studies it is quite clear that socio-economic development and demographic factors among others play an important role in child mortality reduction. Muganzi (1988) argues that reduction in infant and child mortality in Kenya has been due to the socio-economic development the country has experienced. The development has led to increased availability of health services, improved parental care through education and general improvement in living conditions.

1.7 THEORETICAL FRAMEWORK

From the literature review we see that several factors influence infant and child mortality in any given place. These factors include socio-economic, socio-cultural, environmental, biological and demographic factors.

Mosley and Chen developed an analytical framework for the study of child survival. The framework shows that socio-economic determinants of mortality operate through biological mechanisms or proximate determinants to influence mortality.

Mosley´s and Chen´s Model



Source: Population and Development Review, Supplement to Vol.10, pp. 25-48.

Using the above frame work the socio-economic determinants of infant and child mortality will be studied. The variables that will be measured are:

1. Maternal education
2. Marital status
3. Residence.

1.8 Conceptual Hypotheses

1. Mother´s education is likely to affect infant and child mortality in Taita-Taveta district.
2. Marital status of the mothers is likely to affect infant and child mortality in Taita Taveta district.
3. Place of residence is likely to affect infant and child mortality in Taita-Taveta district.

1.9 Operational Hypotheses

1. The level of maternal education is inversely related to infant and child mortality.
2. The married and single will have lower child mortality the widowed and divorced/separated.
3. The mother´s place of residence; urban or rural, influence the survival status of her children.

CHAPTER 2

Data Sources, Quality and Methodology

2.1 Data Source:

In this study the data used is from the 1979 census. The information derived from the data is:-

1. Total female population of reproductive age by five year age-groups.
2. Children ever born and children dead reported by women in reproductive ages by five year age groups.
3. Children ever born and children dead by mothers education
   - (i) No education
   - (ii) Primary school education
   - (iii) Secondary education plus.
4. Children ever born and children dead by mother´s marital status
   - (i) Single
   - (ii) Married
   - (iii) Divorced/separated
   - (iv) Widowed.
5. Children everborn and children dead by mother´s residence
   - (i) Urban
   - (ii) Rural.

2.2 Quality of data:

The three main sources of data in Kenya are censuses, surveys and vital registration. Like in other developing countries the data in Kenya are usually incomplete and inaccurate. They suffer from many different kinds of errors. The most common of these errors are omission of births and deaths and age misreporting.

The omission of births and deaths occur due to the following factors:

(a) Lapse of memory for the older women

(b) Mis-inpretation of questions

(c) Omission of children living outside the home at the time of interview

(d) Socio-cultural factors that discourage the reporting of deaths

(e) Omission of deaths of very young infants.

The omission of births leads, to underestimation of CEB for older women and thus mean parity by age would show a decline in fertility in the older ages. Omission of births and deaths by the younger women during the interview time will show underestimation of level of fertility and mortality in the most recent period.

Age misreporting occurs due to mothers preference for ages ending with certain digits at the expense of others. It may also be due to the tendency of the respondents declaring themselves younger or older than their true ages. Age misreporting produces distorted age distribution. Thus the errors found in surveys or census produce distorted estimates of demographic vaqnables; for example, omission of deaths may give lower values of child mortality when the values are actually higher. Analysis of mean parity or average number of children born per woman by age will show discrepancies if there has been omission of births. Older women may seem to have lower parity than the younger ones while the truth is the reverse.

2.3 Method of data analysis.

Method of Child Mortality Estimation

Brass was the first to develop a procedure of converting proportions dead of children ever born reported by women in the reproductive age groups into estimates of the probability of dying before attaining certain exact childhood ages. The estimation equation he proposed is

$$q(x) = K(i)\ D(i)$$

q(x) - denotes the probality of dying between birth and exact age x.

D(i) - denotes the proportion dead of children ever born by women in successive five year age groups

(i) - Signifies age group eg i = 1 signifies age group 15 - 19

k(i) - Is the multiplier that adjusts for non-mortality factors determining the value of D(i).

The multipliers were selected according to the value of P (1)/ P (2) where

P(i) - denotes average parity by women in age group (i)

The Brass technique has been modified by others to increase its flexibility. Sullivan computed another set of multipliers using least squares regression to fit the equation q(x) = K(i) D(i). Trussell estimated a third set of multipliers using data generated from model fertility schedules developed by Coale and Trussell. His multipliers are calculated from the ratios P(1)/P(2) and P92)/P(3) using the equation

$$K(i) = a(i)+b(i)\ P(1)/P(2)+c(i)\ P(2)/P(3)$$

Trusell´s method is more advantageous than Sullivan´s as it is based on a wider range of cases. The Brass technique is based on the assumption - that fertility and childhood mortality have remained constant in the recent past. Palloni proposed an alternative approach to estimate time allocation of births which avoid all problems associated with changing fertility. This approach, however, is only useful where there is good age repoting and good enumeration:-

Feeney was the first to examine effects of changing mortality on the performance of child mortality estimation procedure. Using infant mortality as an index of mortality level in one parameter logit time table, he calculated the proportions of children dead that would be observed if infant mortality was changing linearly through time. However, this method produces biased q(1) estimates when mortality pattern in early childhood of the population under study does not resemble that embodied by general standard.

In this study the method that will be used in the data analysis is the recent version of the original Brass estimation procedure - Trusell´s method.

The information required for application of this method is

(1) Children ever born and children dead classified by age mother.

(2) Total female population - classified by five year age-groups

Proportion dead among children ever born to women in reproductive ages will be obtained and converted to q(x)- the probability of dying between birth and exact age x. Values of q(x) will also be obtained for children by various categories of women i.e women classified by educational level, marital status and place of residence.

Computational Procedure

Step 1 - Calculation of average parity per woman

$$P(i) = CEB(i)/FP(i)$$

CEB(i) - denotes number of children ever born by women in age group (i)

FP(i) - Is the total number of women in age group (i)

Step 2 - Calculation of proportion of children dead for each age group of mother

Step 3 - Calculation of multipliers K(i) required to adjust the reported proportion dead from ratios P(1)/P(2) and P(2)/P(3).

$$K(i) = a(i) + b(i)\ P(1)/P(2) + c(i)\ (P(2)/P(3)$$

Where a(i), b(i), and c(i) are Trusell´s coefficients for estimating child mortality. The North model, which is most appropriate to Kenya shall be used.

Table I
COEFFICIENTS FOR ESTIMATION OF CHILD MORTALITY MULTIPLIERS, TRUSSEL´S VARIANT WHEN DATA ARE CLASSIFIED BY AGE OF MOTHER. (North Mortality Model)

Age Group	Index (1)	Coefficients a(i)	b(i)	c(i)
15-19	1	1.1119	-2.9287	-0.08507
20-24	2	1.2390	-0.6865	-0.2745
25-29	3	1.1884	0.0421	-0.5156
30-34	4	1.2046	0.3037	-0.5656
35-39	5	1.2586	0.4236	-0.5898
40-44	6	1.2240	0.4222	-0.5456
45-49	7	1.1772	0.3486	-0.4624

SOURCE: MANUAL X, 1983. pp.77

Step 4: - Calculation of probabilities of dying and surviving. This is a product of the report proportional dead, D(i) and the corresponding Multipliers, K(i)

$$q(x) = K(i)\ D(i)$$ where

x = 1,2,3,4,5,10 and 20

i = 1,2,3,4,5,6 and 7

representing age groups 15-19. 20-24, 25-29, 30-34, 35-39, 40-44, 45-49.

Example:

Table 2

Infant and child mortality estimates by age of mother: Taveta urban

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)	q(x)
15-19	1	117	49	7	0.418803	0.142857	0.879448	0.125635
20-24	2	99	185	21	1.868686	0.113513	0.948356	0.107651
25-29	3	84	315	45	3.76	0.142857	0.940903	0.134414
30-34	4	38	193	31	5.078947	0.160621	0.990816	0.159146
35-39	5	24	137	29	5.708333	0.211678	1.059628	0.224300
40-44	6	26	206	32	7.923076	0.155339	1.046740	0.162600
45-49	7	7	41	5	5.857142	0.121951	1.024905	0.124988

CHAPTER 3

3.0 DISCUSSION OF FINDINGS

3.1 Introduction

In the following discussion of infant and child mortality in Taita Taveta district, we shall use the q(2) values in analysing the mortality differentials in the three divisions of Voi, Taveta and Wundanyi, by socio-economic factors i.e. maternal education, marital status and place of residence. q(1) values are not reliable because mothers of age 15-19 are exposed to high risk of child mortality. q(10), q(15) and q(20) are also unreliable because they are affected by the problem of ommission of deaths and births due to loss of memory for the older women. Thus those considered more reliable are q(2), q(3) and q(5). From these, we have chosen to use q(2).

Since the data used is from the 1979 census, this study is based on the administrative divisions that existed then. In 1979 the district was divided into three divisions i.e. Taveta, Voi and Wundanyi. Mwatate division is a recent creation.

3.2 INTER-DIVISIONAL VARIABILITY

Of the three divisions, Taveta has the highest infant and child mortality by all differentials i.e. maternal education, marital status and place of residence, except in the case of mothers with secondary plus education. (see table 3). The infant and child mortality estimates for each of the divisions, (using q(2) values) are 128 deaths per 1,000 births in Taveta, 105 deaths per 1,000 births in Voi and 108 deaths per 1,000 births in Wundanyi.

The district as a whole has a high level of infant and child mortality, (113 deaths per 1,000 births). This high mortality could be attributed to the low level of economic development in the district. Though the district has high potential areas of agriculture development these are not exploited to the full capacity. Hence the district suffers from food insufficiency and has to import food from other areas. There is also low nutritional level of consumption of protein and starch, making the district have a high level of malnutrition. The district as a whole also has a low level of literacy which could be one factor that has contributed to high child mortality.

Table 3.
Infant and child mortality estimates for all divisions by education, marital status and place of residence.

Variable	Taveta	Voi	Wundanyi
Education	1000.q(2)	1000.q(2)	1000.q(2)
None	131	124	125
Primary	124	101	100
Secondary +	53	45	60
Marital status			
Single	135	91	107
Married	103	86	84
Divorced/ separated	123	56	99
Widowed	68	59	97
Place of residence			
Urban	108	97	101
Rural	130	108	108
Total	128	105	108

Taveta division lies in the dry lowlands and thus most of it is semi-arid. The lowlands receive very low rainfall, about 250mm. As a result they are poor for agricultural production and suffer from lack of water. The lowland region is therefore underdeveloped unlike the highlands where there's high potentiality for agricultural production. This may explain the high infant and child mortality in Taveta division.

Though Voi and Wundanyi have also areas that are semi-arid they also have high and medium potential areas for agricultural development. Agricultural production forms the major economic base for the district. Thus Voi and Wundanyi have experienced some degree of economic growth. This could explain their lower level of infant and child mortality, 105 and 108 respectively compared to Taveta´s 128 deaths per 1,000 births.

Taveta division also has high population density, of the three divisions. It has a density of 38 persons per sq.km. While Voi has 3 persons per sq.km and Wundanyi 32 persons per sq.km. (see table.4).

Table 4.
Population Distribution by Division

DIVISION	Area sq.km	1979 Pop.	Pop. density (persons/sq.km)	% Total Pop.
Wundanyi	2,590	83,855	32	57
Taveta	13,689	37,880	3	26
Voi	680	25,862	38	17
Taita-Taveta District Total	16,954	147,597	8	100

Source: Central Bureau of Statistics Population, Census, 1979 Vol.1.

The high population density may be one of the factors contributing to high infant and child mortality in Taveta division. High population density creates problems of food supply, inadequacy of basic services such as health services e.t.c. factors that affect mortality. In the district as a whole there´s unequal distribution of basic services, for example, in the case of primary schools Wundanyi has 63, Taveta 20 and Voi, 39. This creates differences in the literacy level in the three divisions.

3.3 Differential by Education

Education here is categorised into; no education, primary education and secondary and above education.

Table 5
q(2) values by mother´s education

DIVISION	NO EDUCATION	PRIMARY	SECONDARY+
TAVETA	0.131472	0.124443	0.052642
VOI	0.123809	0.100835	0.044534
WUNDANYI	0.124641	0.099800	0.059938

From the above table we see that mortality differential by education confirms the already observed pattern. Child mortality is highest among mothers with no education and lowest among those with secondary and above education. Thus it confirms that education is inversely related to child mortality. As education increases mortality decreases (Mott, 1979, Kichamu 1986, e.t.c). This is mainly because mothers with education are more aware of proper hygiene and sanitation for the prevention of diseases. Educated mothers are also able to make autonomous decision about where and when to seek medical care for their children. Hence they tend to make more use of the available health and medical services than the uneducated mothers.

Mothers with education in most cases are also earning income. This raises the income status of the family such that the family can afford better living conditions i.e. good diet, good housing e.t.c.

From table 4, we see that the infant and child mortality variation in the three divisions is not very great. Voi has the lowest q(2) values for women with no education (0.123809) and those with secondary and above education (0.044534). Wundanyi has the lowest q(2) value for women with primary education (0.099800). Taveta division has the highest q(2) values for those with primary education, 0.131472 and 0.124443 respectively.

For secondary plus education Wundanyi has the highest q(2) value (0.059938). This variation of child mortality by education in the divisions would be due to the unequal distribution of schools in the district as mentioned earlier. Voi has 39 primary schools, Wundanyi 63 while Taveta has only 20.

N.B. Data used for analysis of mortality differential by education is for rural women only. Data for urban women was not available.

Table 6.
Differential by mother´s marital status

q(2) values by mother´s marital status

DIVISION	Single	Married	Divorced/ separated	Widowed
TAVETA	0.135005	0.120665	0.123462	0.067844
VOI	0.091197	0.086288	0.055592	0.057866
WUNDANYI	0.106533	0.083906	0.099156	0.097378

In the above table the marital status is categorised into single, married, divorced/separated and widowed. We see that a lot of variations in child and infant mortality exists in the three divisions. While among the divorced/separated in Taveta the mortality is 123 deaths per 1,000 births, in Voi it is as low as 55 deaths per 1,000 births.

The highest infant and child mortality among the single is in Taveta (0.135005) while the lowest is in Voi with q(2) of 0.91197. Wundanyi is mid-way with 0.106533.

For the married, again Taveta leads with a q(2) value of 0.120665 while Wundanyi has the lowest with 0.083906.

Voi has the lowest infant and child mortality among the divorced/separated and widowed with 0.055592 and 0.057866 respectively. Taveta has the highest for the divorced/separated, 0.123462 while Wundanyi has the highest for the widowed 0.097378.

Looking at all the q(2) values for all the categories, it is clear that Taveta has the highest infant and child mortality while Voi has the lowest.

Infant and child mortality differential by marital status in Taita-Taveta does not conform to the observed pattern in various other studies, especially in the case of the widowed and the single. Kichamu (1986), Munala (1988), Ndede (1988), Koyugi (1982) Kibet (1981) e.t.c. found that single mothers experience the lowest infant and child mortality while the widowed experienced the highest. However, in this study, in all the three divisions, the single mothers experience the highest child mortality while the widowed experience the lowest except in Voi where they have the second lowest mortality.

The high infant and child mortality among the single women could be due to the influence of socio-cultural and socio-economic factors. In most African cultures women are discriminated against, have no autonomy and have low level of literacy. Thus single mothers are disadvantaged. Explanation for the low child mortality among the widowed could be the small number of women involved (see appendix). The number of widowed women appears to be very low in the district. This could explain the low q(2) values. It would also be due to errors in the data which have given wrong estimates. However, another factor could be that widows in this communities are taken care of by relatives. The widowed could also be in a better economic status, due to deceased husbands property, while the single mother may be in poor economic status since in most cultures women do not inherit property from their parents. Divorced/separated usually experience higher mortality than the married due to the psychological and economic problems that arise after the separation or divorce. However, Voi appears to have very low infant and child mortality among the divorced/separated 55 deaths per 1,000 births. This could be due to the divorced/separated women enjoying good economic status in this division or it could be due to errors in the data.

3.5 Differential by Residence

Table 7.
q(2) values by mother´s residence

DIVISION	URBAN	RURAL
TAVETA	0.107651	0.130208
VOI	0.09721	0.10758
WUNDANYI	0.100871	0.10818

In all the divisions in Taita-Taveta district, the urban mothers have lower child mortality than the rural mothers. This can be explained by the differences in socio-economic situations in the urban and rural areas. Mothers in urban areas tend to be more educated and earning income which means better living conditions for their families. In the urban areas there are more and better health facilities and provision of basic services such as clean water supply. In the urban areas there is also better infrastructure. This means easy access to health and medical services unlike in the rural areas where lack of proper infrastructure makes the services inaccessible to many people. People walking long distances to health centres attend the centres infrequently.

All the factors mentioned above make living conditions better in the urban areas compared to the rural areas and thus child survival status is better in urban areas.

Once again, from the table, we see that Voi has the lowest infant and child mortality in both urban and rural areas, 97 and 107 deaths per 1,000 births respectively. Taveta, on the other hand has the highest with 107 and 130 deaths per 1,000 births.

This variation as mentioned earlier could be explained by the differences in the level of socio-economic development in the three divisions.

CHAPTER 4

4.0 SUMMARY AND POLICY IMPLICATIONS

4.1 Summary

In this study we have used Trussell´s method of mortality estimation to make estimates of infant and child mortality by socio-economic differentials - education, martial status, place of residence and by divisions in Taita-Taveta district. From these estimates it is clear that there exists a marked difference in mortality levels for all the differentials considered in all the three divisions.

The estimates also show that there is variation in infant and child mortality levels in the three divisions. In Taveta it is about 128 deaths per 1,000 births, Voi 105 deaths per 1,000 births and Wundanyi 108 deaths per 1,000 births.

Inspite of some shortcomings, such as use of data (census) that is subject to many errors, use of just three differentials i.e. education, marital status, and place of residence, out of many, the study was able to come up with some major findings. However, these findings do not differ much from what has already been found in earlier studies.
The findings are:-

1. Education is inversely related to infant and child mortality. Mothers with high level of education have lower infant and child mortality. This was the case in all the three divisions of Taita Taveta district.
2. Infant and child mortality is influenced by mother's place of residence. Mortality is lower for mothers in urban areas than for those in rural areas.
3. The influence of marital status on infant and child mortality does not follow a similar pattern for all regions. In this study single mothers are shown as having higher infant and child mortality than mothers in other marital status, while the widowed have the lowest. In other studies (Kichamu, 1986; Kibet, 1981, e.t.c) the single had low infant and child mortality while the widowed had the highest. This variation, however, is usually influenced by differences in socio-cultural, socio-economic e.t.c. factors.

4.2 POLICY IMPLICATIONS

One of the objectives of this study was to provide information to planners and policy makers that will be useful for policy formulation especially in the policy aimed at reducing infant and child mortality. This objective has been achieved and as such the study is useful as a tool for policy formulation.

From the study, we have seen the importance of education in determining the level of infant and child mortality. Mothers with low level of education have higher mortality than mothers with high level of education. Thus in planning for mortality reduction close attention should be given to education, especially the education of women. In most communities women are discriminated against in educational and job opportunities. As women´s education has great influence on infant and child mortality the government should encourage the enrolment of girls in schools in large numbers. Mothers too should be given an opportunity to acquire some education through the expansion of adult education. Thus in Taita Taveta there is need for expansion of educational facilities in order to raise the level of literacy in the district.

Improving educational and job opportunities for women means that single mothers, divorced/separated and widowed will be economically independent and so able to take care of their children in a better way.

From the study we have also seen that infant and child mortality is higher in rural areas than urban areas. This is mainly because of the differences in socio-economic situations in the two areas. There is therefore need to promote socio-economic development in all rural areas to match that in urban areas. Improvement of infrastructure, establishment of industries, health centres, electrification e.t.c. will raise the level of socio-economic development in the rural areas. Majority of the population lives in the rural areas and so planning for development should aim at reaching this majority.

Many factors besides the ones considered in this study interact to determine the level of infant and child mortality. So in planning for mortality reduction all these factors should be taken into consideration. Some of these factors are:-

4.3 Environmental Factors

1. There is need to improve housing conditions, water supply and sewage system e.t.c. in order to reduce incidences of diseases. In Taita-Taveta district the lowland regions suffer from inadequate supply of water. So ways can be found of getting water from the highlands to the lowlands.

   The district also suffers from food insufficiency because of failure to exploit the potential land to full capacity. So to increase agricultural production farmers can be educated on modern methods of farming. This will raise the income of the farmers and thus improve their living conditions.

2. Medical and health services.

The improvement of health and medical services should include educating mothers on simple hygiene and sanitation.

The district has 3 district hospitals. These hospitals have discouraged the expansion of health centres and dispensaries. People therefore have to travel far for medical care. The district hospitals have also become over crowded.

So there is need to expand and equip the small health centres so that medical facilities will be close to the people.

3. Improvement of infrastructure will increase the attendency rate at the health centres especially in the rural areas. Most of the available centres are underutilized because the areas where they are located are inaccessible.

The infrastructure will also make it easy for people to market their agricultural products and therefore increase income in the rural areas.

4. Demographic Factors:-

Age at marriage and age at first birth have been found to affect infant and child mortality. Improvement of education will raise age at marriage and birth and thus help in the reduction of the mortality.

Educated women will also use contraceptive as a form of limiting their fertility. Low fertility have a positive effect on infant and child mortality.

Recommendations for further research

1. There is need for a study of the interaction of all the factors that influence infant and child mortality. This will include factors not considered in this study i.e socio-cultural, environmental, biological e.t.c.
2. A study of the infant and child mortality situation in the district at the locational level can also be undertaken.

   This will give a clearer picture of the mortality situation in the district.

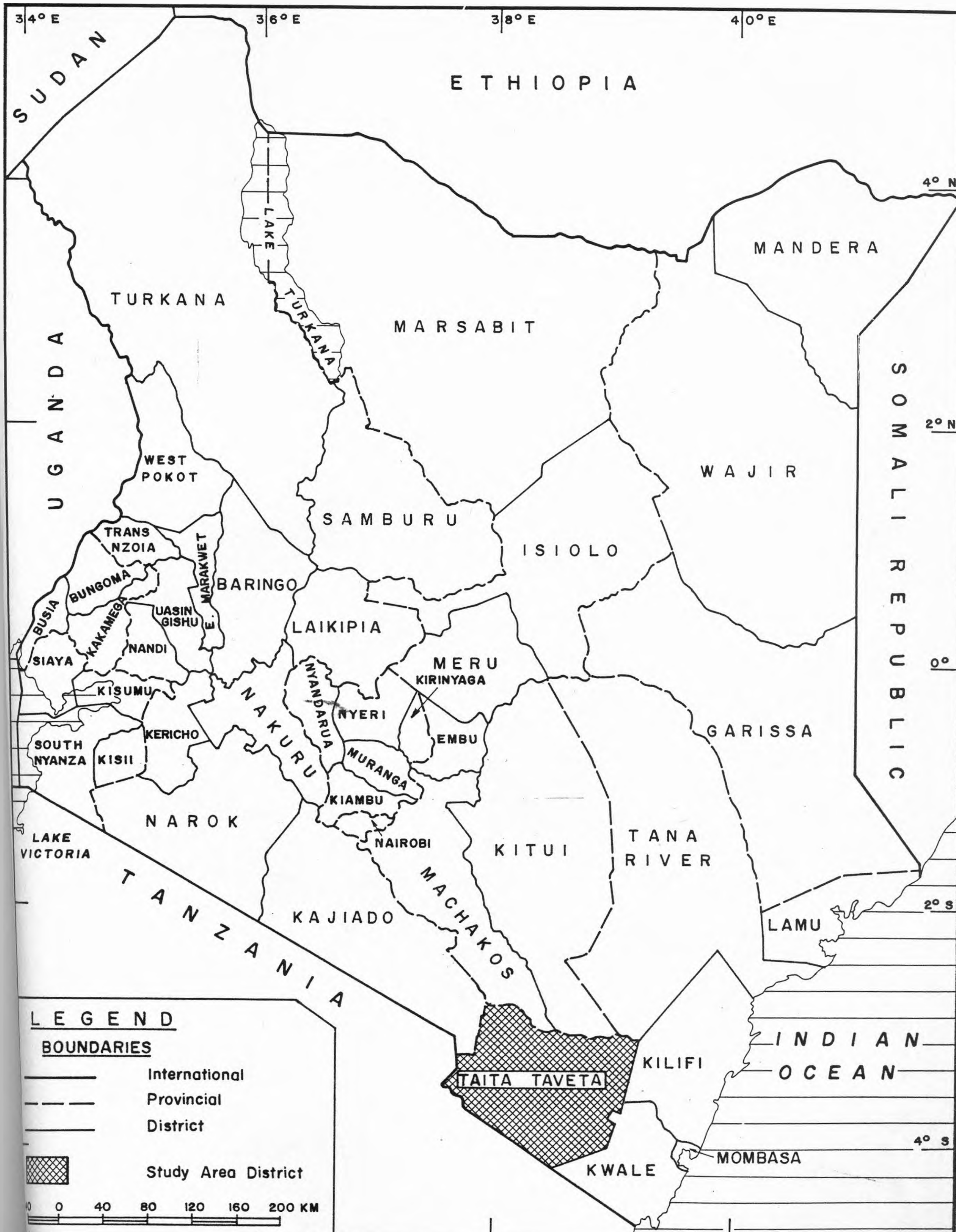


Fig. LOCATION OF TAITA TAVETA DISTRICT IN KENYA

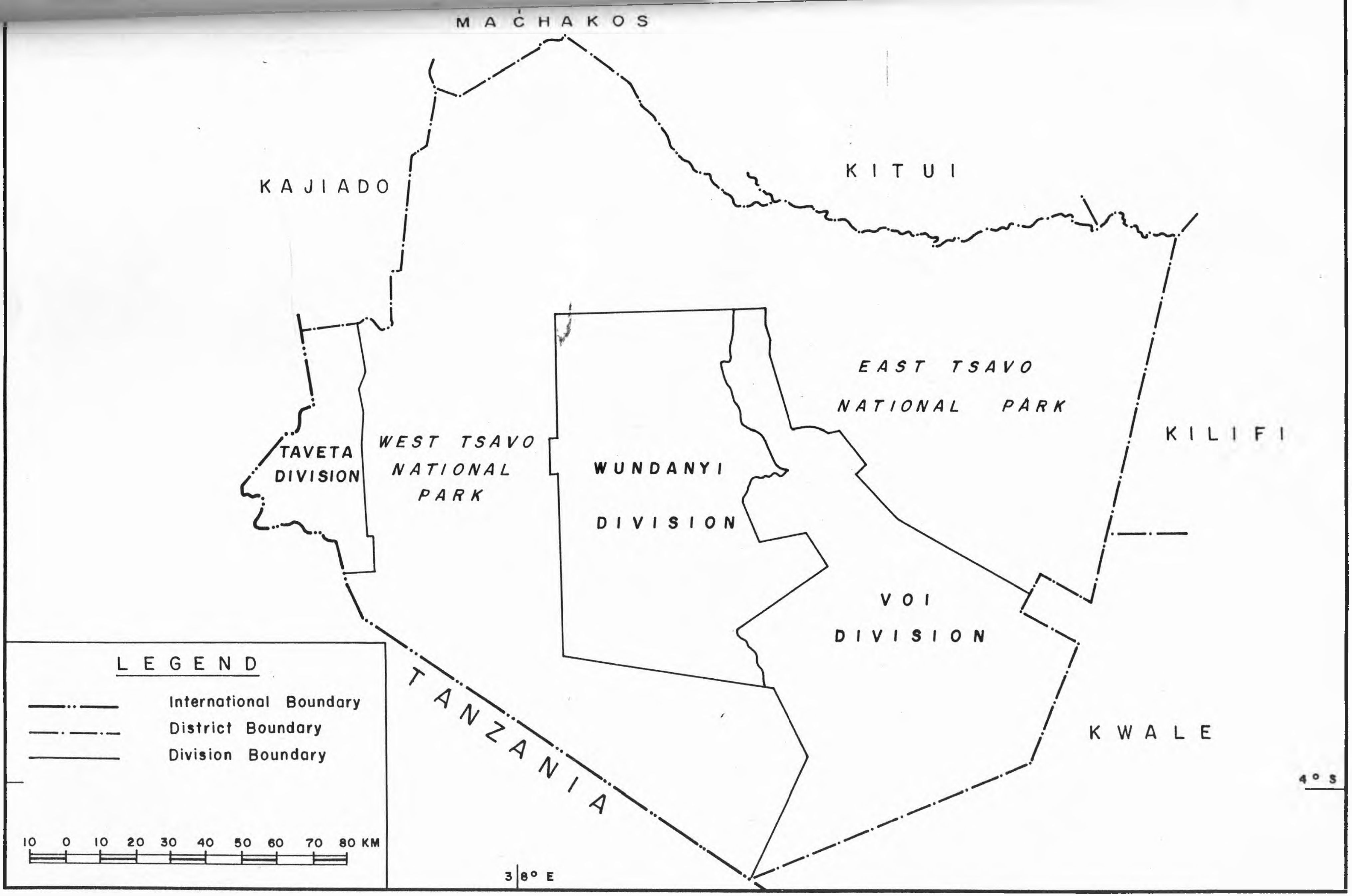


Fig. TAITA TAVETA DISTRICT BY DIVISIONS : 1979

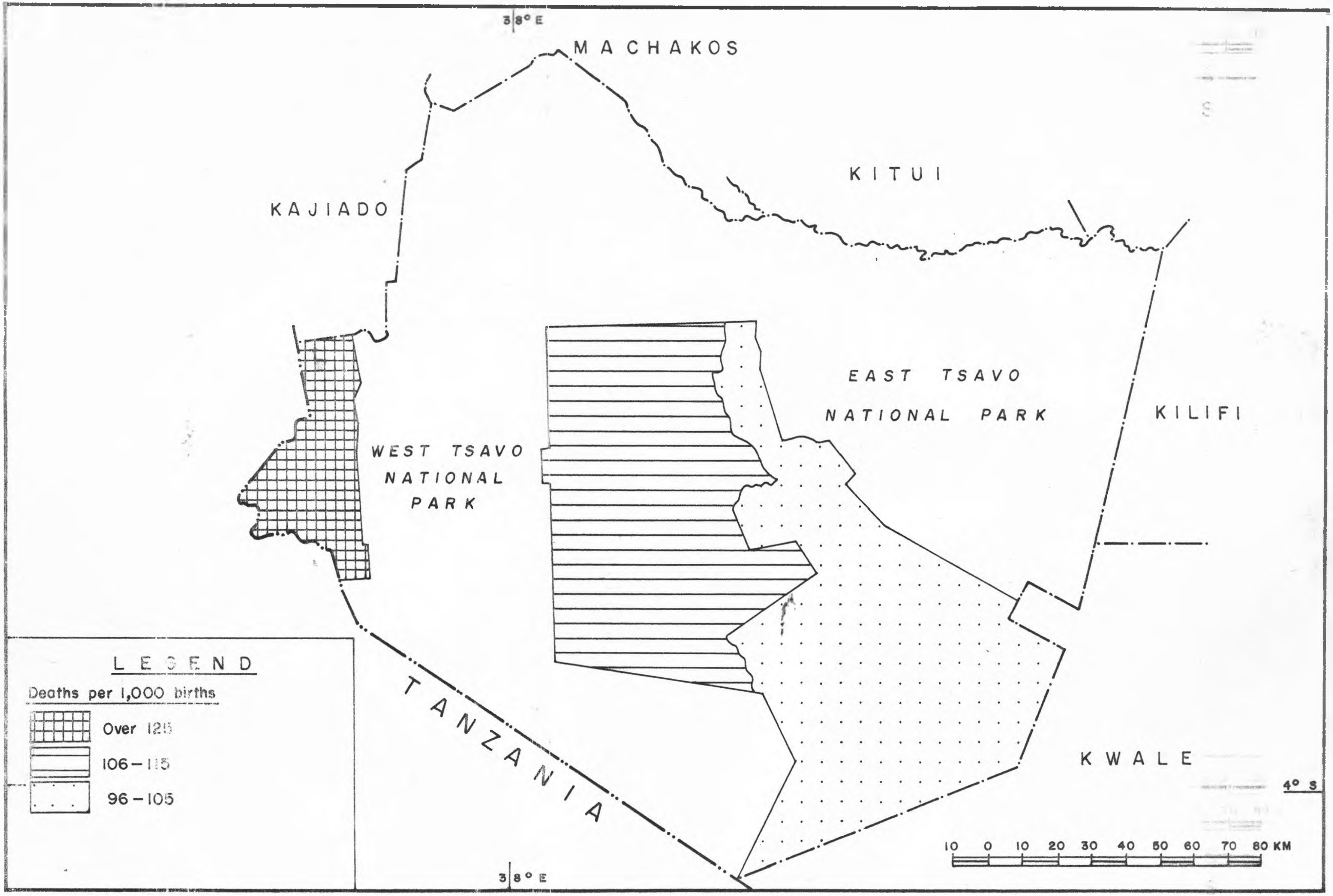


Fig. INFANT AND CHILD MORTALITY ESTIMATES BY DIVISIONS – TAITA TAVETA DISTRICTS

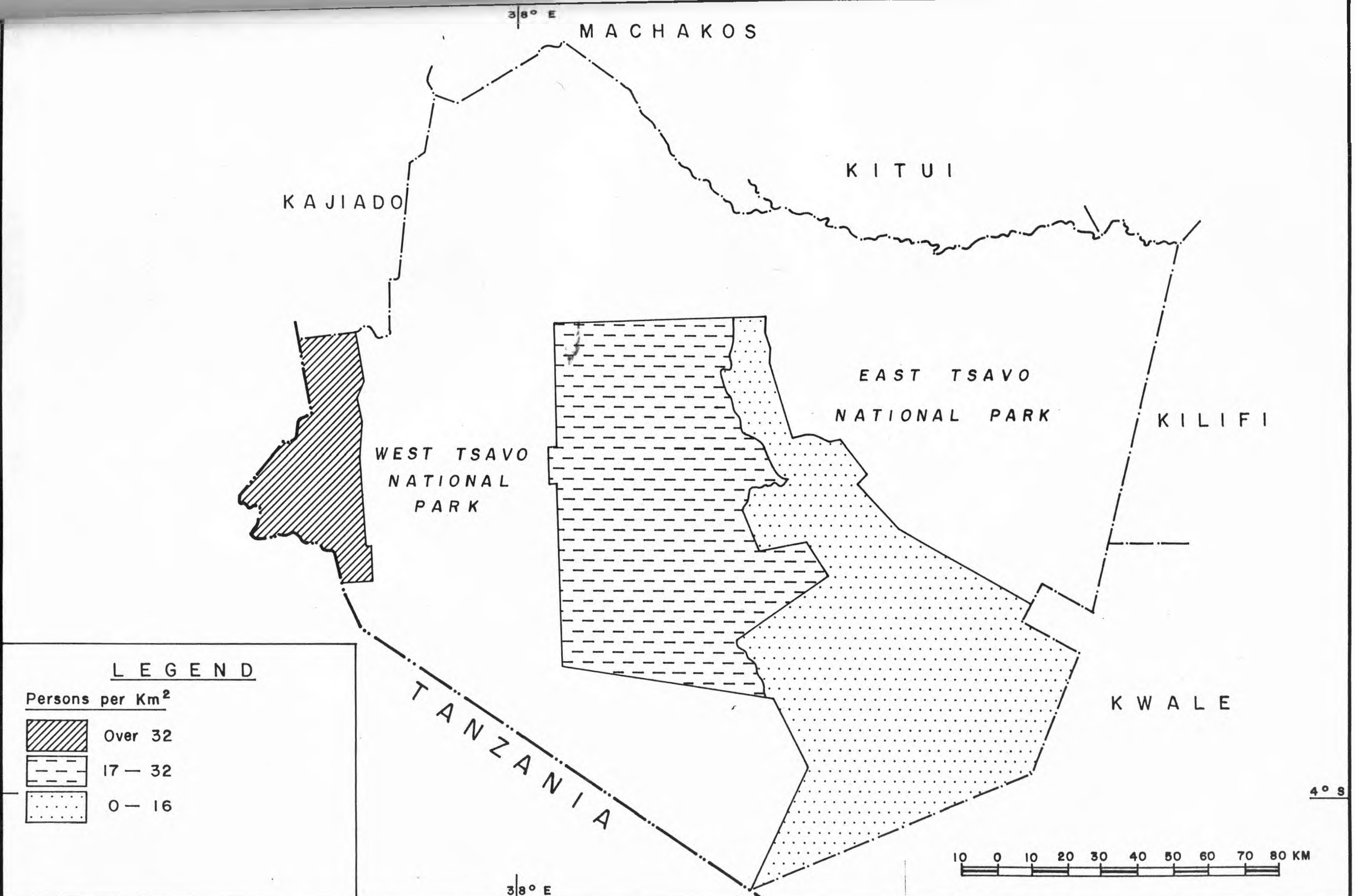


Fig. POPULATION DENSITY — TAITA TAVETA DISTRICT

APPENDIX

Taveta - Urban

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	117	49	7	0.418803	0.142857	0.879778
20-24	2	99	185	21	1.868686	0.113513	0.948356
25-29	3	84	315	45	3.75	0.142857	0.940903
30-34	4	38	193	31	5.078947	0.160621	0.990816
35-39	5	24	137	29	5.708333	0.211678	1.059628
40-44	6	26	206	32	7.923076	0.155339	1.046740
45-49	7	7	41	5	5.857142	0.121951	1.024905

P(1)/P(2) = .2241163 P(2)/P(3) = .4983162

Age Group	x	q(x)
15-19	1	0.125635
20-24	2	0.107651
25-29	3	0.134414
30-34	5	0.159146
35-39	10	0.224300
40-44	15	0.162600
45-49	20	0.124988

Taveta - Rural

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	1155	491	53	0.425108	0.107942	0.977611
20-24	2	932	1972	269	2.115879	0.136409	0.954538
25-29	3	852	3377	545	3.963615	0.161385	0.921618
30-34	4	594	3406	627	5.734006	0.184086	0.963685
35-39	5	532	3467	711	6.516917	0.205076	1.028856
40-44	6	421	3075	775	7.304038	0.252032	1.017570
45-49	7	394	2727	785	6.921319	0.287862	1.000397

P(i)/P(2) = .2009131 P(2)/P(3) = .5338255

Age Group	x	q(x)
15-19	1	0.105526
20-24	2	0.130208
25-29	3	0.148736
30-34	5	0.177401
35-39	10	0.210994
40-44	15	0.256460
45-49	20	0.287976

TAVETA DIVISION

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	1272	540	60	0.424528	0.111111	0.968835
20-24	2	1031	2157	290	2.092143	0.134445	0.954103
25-29	3	936	3692	590	3.944444	0.159804	0.923467
30-34	4	632	3599	658	5.694620	0.182828	0.966229
35-39	5	556	3406	740	6.482014	0.205327	1.031723
40-44	6	447	3281	807	7.340044	0.245961	1.020283
45-49	7	401	2768	790	6.902743	0.285404	1.002678

P(i)/P(2) = 0.202915 P(2)/P(3) = 0.530402

Age Group	x	q(x)
15-19	1	0.107648
20-24	2	0.128275
25-29	3	0.147574
30-34	5	0.176654
35-39	10	0.211841
40-44	15	0.250950
45-49	20	0.286169

WUNDANYI - URBAN

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	20	4	2	0.2	0.5	1.198608
20-24	2	31	50	5	1.612903	0.1	1.008712
25-29	3	20	61	5	3.05	0.081967	0.920960
30-34	4	12	60	12	5	0.2	0.943157
35-39	5	5	27	6	5.4	0.222222	0.999228
40-44	6	1	6	0	6	0	0.987828
45-49	7	3	30	5	10	0.166666	0.975899

P(i)/P(2) = .12400002 P(2)/P(3) = .5288206

Age Group	x	q(x)
15-19	1	0.599304
20-24	2	0.100871
25-29	3	0.075488
30-34	5	0.188631
35-39	10	0.222050
40-44	15	0
45-49	20	0.162649

WUNDANYI RURAL

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	4880	1000	115	0.204918	0.115	1.144918
20-24	2	3022	5082	534	1.681667	0.105076	1.029538
25-29	3	2594	9520	1179	3.670007	0.123844	0.957220
30-34	4	2227	12583	1812	5.650202	0.144003	0.982381
35-39	5	1958	12830	2223	6.552604	0.173265	1.039900
40-44	6	1809	13063	2855	7.221116	0.218556	1.025387
45-49	7	1540	11315	2984	7.347402	0.263720	1.007751

P(i)/P(2) = .121854 P(2)/P(3) = .458319

Age Group	x	q(x)
15-19	1	0.131665
20-24	2	0.108180
25-29	3	0.118546
30-34	5	0.141466
35-39	10	0.180179
40-44	15	0.224104
45-49	20	0.265764

WUNDANYI- DIVISION

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	4900	1004	117	0.204897	0.116533	1.145063
20-24	2	3053	5132	539	1.680969	0.105027	1.029429
25-29	3	2614	9581	1184	3.665263	0.123577	0.957066
30-34	4	2239	12643	1824	5.646717	0.144269	0.982222
35-39	5	1963	12857	2229	6.549668	0.173368	1.039738
40-44	6	1810	13069	2855	7.220441	0.218455	1.025239
45-49	7	1543	11345	2989	7.352559	0.263464	1.007625

P(i)/P(2) = 0.121892 P(2)/P(3) = 0.1458621

Age Group	x	q(x)
15-19	1	0.133438
20-24	2	0.108118
25-29	3	0.118272
30-34	5	0.141704
35-39	10	0.180258
40-44	15	0.223969
45-49	20	0.265473

Voi - Urban

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	402	150	13	0.373134	0.086666	0.963001
20-24	2	408	700	73	1.715686	0.104285	0.932216
25-29	3	318	951	104	2.990566	0.109358	0.901756
30-34	4	206	920	157	4.466019	0.170652	0.946165
35-39	5	148	778	142	5.256756	0.182519	1.012358
40-44	6	114	646	135	5.666666	0.208978	1.002811
45-49	7	70	400	111	5.714285	0.2775	0.987736

P(i)/P(2) = .2174838 P(2)/P(3) = .5736994

Age Group	x	q(x)
15-19	1	0.083460
20-24	2	0.097216
25-29	3	0.098614
30-34	5	0.161465
35-39	10	0.184774
40-44	15	0.209565
45-49	20	0.274096

Voi - Rural

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	1715	352	52	0.205247	0.147727	1.168685
20-24	2	1127	1900	200	1.685891	0.010526	1.022049
25-29	3	943	3272	402	3.469777	0.122860	0.943006
30-34	4	814	4149	609	5.097051	0.146782	0.966760
35-39	5	721	4392	685	6.091539	0.155965	1.023599
40-44	6	619	4123	821	6.660743	0.199126	1.010304
45-49	7	479	3250	743	6.784968	0.228615	0.994969

P(i)/P(2) = .1217439 P(2)/P(3) = .4858787

Age Group	x	q(x)
15-19	1	0.172646
20-24	2	0.010758
25-29	3	0.115858
30-34	5	0.141903
35-39	10	0.156946
40-44	15	0.201178
45-49	20	0.227465

VOI DIVISION

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	2117	502	65	0.237128	0.129482	1.132157
20-24	2	1535	2600	273	1.693811	0.105002	1.004057
25-29	3	1261	4223	506	3.348929	0.119820	0.933515
30-34	4	1020	5069	766	4.969367	0.151114	0.961049
35-39	5	869	5170	827	5.949367	0.159961	1.019595
40-44	6	733	4769	956	6.506139	0.200461	1.007154
45-49	7	549	3650	554	6.648451	0.151780	0.992131

P(i)/P(2) = 0.139996 P(2)/P(3) = 0.505776

Age Group	x	q(x)
15-19	1	0.146594
20-24	2	0.105425
25-29	3	0.111853
30-34	5	0.145228
35-39	10	0.163095
40-44	15	0.201895
45-49	20	0.150586

Mother's Education - Taveta

NONE

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	242	220	26	0.909090	0.118181	0.437153
20-24	2	381	879	142	2.307086	0.161547	0.813836
25-29	3	453	1855	343	4.094922	0.184905	0.914499
30-34	4	389	2335	470	6.002570	0.201284	1.005610
35-39	5	397	2553	554	6.430730	0.216999	1.093222
40-44	6	347	2553	682	7.357348	0.267136	1.082972
45-49	7	339	2269	685	6.693215	0.301895	1.054046

P(i)/P(2) = .3940425 P(2)/P(3) = .5634017

Age Group	x	q(x)
15-19	1	0.051663
20-24	2	0.131472
25-29	3	0.169096
30-34	5	0.202414
35-39	10	0.237228
40-44	15	0.289301
45-49	20	0.318211

TAVETA

PRIMARY

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	779	243	24	0.311938	0.098765	1.144954
20-24	2	459	978	123	2.130718	0.125766	0.989479
25-29	3	373	1464	198	3.924932	0.135245	0.914661
30-34	4	188	1002	156	5.329787	0.155688	0.942016
35-39	5	127	892	157	7.023622	0.176008	1.000432
40-44	6	71	517	93	7.281690	0.179883	0.989621
45-49	7	53	442	99	8.339622	0.223981	0.977213

P(i)/P(2) = .1464004 P(2)/P(3) = .5428674

Age Group	x	q(x)
15-19	1	0.113081
20-24	2	0.124443
25-29	3	0.123704
30-34	5	0.146661
35-39	10	0.176085
40-44	15	0.178017
45-49	20	0.218878

TAVETA

SECONDARY PLUS

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	119	25	3	0.210084	0.12	0.899978
20-24	2	72	74	4	1.027777	0.054054	0.973889
25-29	3	23	52	2	2.260869	0.038461	0.962616
30-34	4	14	55	1	3.928571	0.018181	1.009559
35-39	5	4	10	0	2.5	0	1.079067
40-44	6	2	5	0	2.5	0	1.062273
45-49	7	2	16	1	8	0.0625	1.038251

P(i)/P(2) = .2044062 P(2)/P(3) = .4545937

Age Group	x	q(x)
15-19	1	0.107997
20-24	2	0.052642
25-29	3	0.037023
30-34	5	0.018355
35-39	10	0
40-44	15	0
45-49	20	0.064890

MOTHER'S EDUCATION - VOI

NONE

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	209	124	22	0.593301	0.177419	0.824910
20-24	2	339	752	104	2.218289	0.138297	0.895240
25-29	3	374	1422	215	3.802139	0.151195	0.898847
30-34	4	423	2189	388	5.174940	0.177249	0.955843
35-39	5	450	2782	477	6.182222	0.171459	1.027793
40-44	6	444	2981	671	6.713963	0.225092	1.018606
45-49	7	384	2671	619	6.955729	0.231748	1.000661

P(i)/P(2) = .2674588 P(2)/P(3) = .5834318

Age Group	x	q(x)
15-19	1	0.146355
20-24	2	0.123809
25-29	3	0.135901
30-34	5	0.169423
35-39	10	0.176224
40-44	15	0.229280
45-49	20	0.231901

VOI

PRIMARY

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	1086	203	26	0.186924	0.128078	1.210454
20-24	2	536	931	91	1.736940	0.097744	1.031619
25-29	3	483	1725	180	3.571428	0.104347	0.942172
30-34	4	360	1876	204	5.211111	0.108742	0.962207
35-39	5	245	1559	206	6.363265	0.132135	1.017341
40-44	6	157	1084	146	6.904458	0.134686	1.004086
45-49	7	82	120	646	1.463414	5.383333	0.989830

P(i)/P(2) = .1076168 P(2)/P(3) = .4863432

Age Group	x	q(x)
15-19	1	0.155033
20-24	2	0.100835
25-29	3	0.098313
30-34	5	0.104632
35-39	10	0.134427
40-44	15	0.135236
45-49	20	5.328585

VOI

SECONDARY PLUS

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	403	23	3	0.057071	0.130434	1.154511
20-24	2	222	146	6	0.657657	0.041095	1.083668
25-29	3	61	115	7	1.885245	0.060869	1.012189
30-34	4	20	61	11	3.05	0.180327	1.033648
35-39	5	11	46	2	4.181818	0.043478	1.089611
40-44	6	7	40	0	5.714285	0	1.070308
45-49	7	4	25	3	6.25	0.12	1.046145

P(i)/P(2) = .0867792 P(2)/P(3) = .3488443

Age Group	x	q(x)
15-19	1	0.150588
20-24	2	0.044534
25-29	3	0.061611
30-34	5	0.186395
35-39	10	0.047374
40-44	15	0
45-49	20	0.125537

WUNDANYI EDUCATION

NONE

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	452	295	46	0.652654	0.155932	0.733840
20-24	2	738	1643	232	2.226287	0.141205	0.882697
25-29	3	956	3768	593	3.941422	0.157377	0.909508
30-34	4	1167	6846	1167	5.866323	0.170464	0.974156
35-39	5	1242	8262	1639	6.652173	0.198378	1.049636
40-44	6	1307	9309	2295	7.122417	0.246535	1.039592
45-49	7	1201	8765	2534	7.298084	0.289104	1.018211

P(i)/P(2) = 0.293158 P(2)/P(3) = .5648436

Age Group	x	q(x)
15-19	1	0.114429
20-24	2	0.124641
25-29	3	0.143136
30-34	5	0.166059
35-39	10	0.208225
40-44	15	0.256296
45-49	20	0.294369

WUNDANYI

PRIMARY

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	3201	632	66	0.197438	0.104430	1.168175
20-24	2	1707	2917	282	1.708845	0.096674	1.032337
25-29	3	1444	5319	559	3.683518	0.105094	0.954068
30-34	4	991	5466	619	5.515640	0.113245	0.977297
35-39	5	661	4313	561	6.524962	0.130071	1.033724
40-44	6	471	3628	552	7.702760	0.152149	1.019667
45-49	7	328	2492	439	7.597560	0.176163	1.002961

P(i)/P(2) = .115538 P(2)/P(3) = .4639165

Age Group	x	q(x)
15-19	1	0.121992
20-24	2	0.099800
25-29	3	0.100267
30-34	5	0.110674
35-39	10	0.134484
40-44	15	0.155142
45-49	20	0.176685

WUNDANYI

SECONDARY PLUS

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	1203	70	3	0.058187	0.042857	1.118994
20-24	2	529	367	20	0.695761	0.054495	1.099872
25-29	3	176	411	25	2.335227	0.060827	1.038753
30-34	4	57	217	10	3.807017	0.046082	1.062040
35-39	5	46	221	12	4.804347	0.054298	1.118907
40-44	6	19	106	8	5.579947	0.075471	1.097321
45-49	7	7	48	7	6.857142	0.145833	1.069065

P(i)/P(2) = .0838718 P(2)/P(3) = .297085

Age Group	x	q(x)
15-19	1	0.047956
20-24	2	0.059938
25-29	3	0.063184
30-34	5	0.048941
35-39	10	0.060755
40-44	15	0.082816
45-49	20	0.155905

MARITAL STATUS - TAVETA

SINGLE

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	871	123	12	0.141216	0.097560	1.181361
20-24	2	244	278	37	1.139344	0.133093	1.014367
25-29	3	75	168	27	2.24	0.160714	0.931509
30-34	4	24	94	12	3.916666	0.127659	0.954715
35-39	5	24	103	32	4.291666	0.310679	1.011274
40-44	6	15	40	11	2.666666	0.275	0.998969
45-49	7	6	16	5	2.666666	0.3125	0.985342

P(i)/P(2) = .123945 P(2)/P(3) = .5086357

Age Group	x	q(x)
15-19	1	0.115254
20-24	2	0.135005
25-29	3	0.149706
30-34	5	0.121878
35-39	10	0.314182
40-44	15	0.274716
45-49	20	0.307919

MARRIED

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	382	392	45	1.026178	0.114795	0.353103
20-24	2	734	1760	230	2.397820	0.130681	0.785615
25-29	3	796	3283	513	4.124371	0.156259	0.906658
30-34	4	524	3056	546	5.832061	0.178664	1.005744
35-39	5	460	3056	606	6.643478	0.198298	1.096988
40-44	6	343	2616	662	7.626822	0.253058	1.087485
45-49	7	306	2182	615	7.130718	0.281851	1.057558

P(i)/P(2) = .4279629 P(2)/P(3) = .5813783

Age Group	x	q(x)
15-19	1	0.040534
20-24	2	0.102665
25-29	3	0.141674
30-34	5	0.179691
35-39	10	0.217531
40-44	15	0.275197
45-49	20	0.298074

WIDOWED

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	1	0	0	0	ERR	1.587560
20-24	2	6	16	1	2.666666	0.0625	1.085516
25-29	3	13	62	16	4.769230	0.258064	0.900107
30-34	4	33	204	47	6.181818	0.230932	0.888350
35-39	5	35	220	55	6.285714	0.25	0.928819
40-44	6	60	406	95	6.766666	0.233990	0.918933
45-49	7	68	460	144	6.764705	0.313045	0.918655

P(i)/P(2) = 0 P(2)/P(3) = .5463906

Age Group	x	g(x)
15-19	1	-0.07238
20-24	2	0.123462
25-29	3	0.152596
30-34	5	0.245504
35-39	10	0.239571
40-44	15	0.269597
45-49	20	0.282427

DIVORCED/SEPARATED

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	15	25	3	1.666666	0.12	-0.60322
20-24	2	46	103	22	2.239130	0.213592	0.578028
25-29	3	51	209	34	4.098039	0.162679	0.578028
30-34	4	49	233	51	4.755102	0.218884	1.121616
35-39	5	46	256	49	5.565217	0.191406	1.251639
40-44	6	30	161	35	5.366666	0.217391	1.240148
45-49	7	21	109	26	5.190476	0.238532	1.184024

P(i)/P(2) = .744336 P(2)/P(3) = .5463906

Age Group	x	g(x)
15-19	1	-0.07238
20-24	2	0.123462
25-29	3	0.152596
30-34	5	0.245504
35-39	10	0.239571
40-44	15	0.269597
45-49	20	0.282427

VOI - MARITAL STATUS

SINGLE

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	1682	180	17	0.107015	0.094444	1.135301
20-24	2	520	410	37	0.788461	0.090243	1.010008
25-29	3	187	298	21	1.593582	0.070469	0.939009
30-34	4	88	171	29	1.943181	0.169590	0.965976
35-39	5	46	86	13	1.869565	0.151162	1.024276
40-44	6	24	90	15	3.75	0.166666	1.011355
45-49	7	14	62	27	4.428571	0.435483	0.995731

P(i)/P(2) = .1357264 P(2)/P(3) = .4947727

Age Group	x	q(x)
15-19	1	0.107222
20-24	2	0.091147
25-29	3	0.066171
30-34	5	0.163820
35-39	10	0.154832
40-44	15	0.168559
45-49	20	0.433624

MARRIED

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	392	332	45	0.846938	0.135542	0.485101
20-24	2	907	2006	212	2.211686	0.105682	0.816482
25-29	3	940	3575	434	3.803191	0.121398	0.904682
30-34	4	808	4345	628	5.377475	0.144533	0.991982
35-39	5	705	4489	664	6.367675	0.147917	1.077823
40-44	6	592	4049	792	6.839527	0.195603	1.068391
45-49	7	412	2988	665	7.252427	0.222556	1.041790

P(i)/P(2) = .3829377 P(2)/P(3) = .5815343

Age Group	x	q(x)
15-19	1	0.065751
20-24	2	0.086288
25-29	3	0.109827
30-34	5	0.143375
35-39	10	0.159428
40-44	15	0.208981
45-49	20	0.231857

WIDOWED

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	1	0	0	0	ERR	2.428209
20-24	2	9	47	9	5.222222	0.191489	0.814259
25-29	3	16	54	8	3.375	0.148148	0.390599
30-34	4	41	214	39	5.219512	0.182242	0.329432
35-39	5	53	314	75	5.924528	0.238853	0.345987
40-44	6	69	433	93	6.275362	0.214780	0.379779
45-49	7	89	490	122	5.505617	0.248979	0.461716

P(i)/P(2) = 0 P(2)/P(3) = 1.547325

Age Group	x	q(x)
15-19	1	ERR
20-24	2	0.155921
25-29	3	0.057866
30-34	5	0.060036
35-39	10	0.082640
40-44	15	0.081569
45-49	20	0.114958

DIVORCED/SEPARATED

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	29	42	3	1.448275	0.071428	-1.12032
20-24	2	86	137	16	1.593023	0.116788	0.476010
25-29	3	94	296	43	3.148936	0.145270	0.965836
30-34	4	73	329	70	4.506849	0.212765	1.194572
35-39	5	56	281	75	5.017857	0.266903	1.345334
40-44	6	41	197	56	4.804878	0.284263	1.331822
45-49	7	26	110	40	4.230769	0.363636	1.260200

P(i)/P(2) = 0.909136 P(2)/P(3) = 0.505892

Age Group	x	q(x)
15-19	1	-0.08002
20-24	2	0.055592
25-29	3	0.140307
30-34	5	0.254164
35-39	10	0.359075
40-44	15	0.378589
45-49	20	0.458254

WUNDANYI - MARITAL STATUS

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	4167	292	32	0.070074	0.109589	1.191447
20-24	2	1221	858	87	0.702702	0.101390	1.050636
25-29	3	437	703	75	1.608695	0.106685	0.967376
30-34	4	170	381	43	2.241176	0.112860	0.987822
35-39	5	100	155	24	1.55	0.154838	1.043208
40-44	6	78	174	32	2.230769	0.183908	1.027776
45-49	7	43	72	17	1.674418	0.236111	1.009979

P(i)/P(2) = 0.099720 P(2)/P(3) = 0.436814

Age Group	x	q(x)
15-19	1	0.130569
20-24	2	0.106533
25-29	3	0.103205
30-34	5	0.111486
35-39	10	0.161529
40-44	15	0.189016
45-49	20	0.238467

MARRIED

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	627	624	74	0.995215	0.118589	0.363857
20-24	2	1624	3843	406	2.366379	0.105646	0.794216
25-29	3	1955	8137	984	4.162148	0.120929	0.912962
30-34	4	1823	11088	1566	6.082281	0.141233	1.010755
35-39	5	1590	11104	1873	6.983647	0.168677	1.101421
40-44	6	1428	10993	2257	7.698179	0.205312	1.091362
45-49	7	1185	9292	2339	7.841350	0.251721	1.060912

P(i)/P(2) = 0.420564 P(2)/P(3) = 0.568547

Age Group	x	q(x)
15-19	1	0.043149
20-24	2	0.083906
25-29	3	0.110403
30-34	5	0.142752
35-39	10	0.185785
40-44	15	0.224070
45-49	20	0.267054

WIDOWED

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	6	2	1	0.333333	0.5	1.259659
20-24	2	16	40	4	2.5	0.1	0.973786
25-29	3	41	162	26	3.951219	0.160493	0.867784
30-34	4	87	480	85	5.517241	0.177083	0.887229
35-39	5	153	1002	217	6.549019	0.216566	0.941903
40-44	6	203	1421	430	7	0.302603	0.935083
45-49	7	233	1528	507	6.557939	0.331806	0.931112

P(i)/P(2) = 0.133333 P(2)/P(3) = 0.632716

Age Group	x	q(x)
15-19	1	0.629829
20-24	2	0.097378
25-29	3	0.139274
30-34	5	0.157113
35-39	10	0.203985
40-44	15	0.282959
45-49	20	0.308948

DIVORCED/SEPARATED

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	91	86	10	0.945054	0.116279	1.704716
20-24	2	83	380	53	4.578313	0.139473	0.710935
25-29	3	178	579	99	3.252808	0.170984	0.471385
30-34	4	158	694	130	4.392405	0.187319	0.471210
35-39	5	117	589	108	5.034188	0.183361	0.515898
40-44	6	98	481	136	4.908163	0.282744	0.543220
45-49	7	82	453	126	5.524390	0.278145	0.598331

P(i)/P(2) = .206419 P(2)/P(3) = 1.407495

Age Group	x	q(x)
15-19	1	0.198222
20-24	2	0.099156
25-29	3	0.080599
30-34	5	0.088267
35-39	10	0.094595
40-44	15	0.153592
45-49	20	0.166423

COEFFICIENTS FOR ESTIMATION OF CHILD MORTALITY MULTIPLES, TRUSSELL VARIANT, WHEN DATA ARE CLASSIFIED BY AGE GROUP OF MOTHER

North Model — Coefficients

Age Group	i	a(i)	b(i)	c(i)
15-19	1	1.1119	-2.9287	0.8507
20-24	2	1.239	-0.6865	-0.2745
25-29	3	1.1884	0.0421	-0.5156
30-34	4	1.2046	0.3037	-0.5656
35-39	5	1.2586	0.4236	-0.5898
40-44	6	1.224	0.4222	-0.5898
45-49	7	1.1772	0.3486	-0.4624

Source: UN Manual X, pp.77, 1983.

TAITA-TAVETA DISTRICT

Age Group	i	FP(i)	CEB(i)	CD(i)	P(i)	D(i)	K(i)
15-19	1	8289	2046	242	0.246833	0.118279	1.112830
20-24	2	5619	9889	1102	1.759921	0.114369	1.009876
25-29	3	4811	17496	2280	3.636665	0.944786	0.944786
30-34	4	3891	21311	3248	5.476998	0.152409	0.973479
35-39	5	3388	21631	3796	6.384592	0.175488	1.032584
40-44	6	2990	21119	4618	7.063210	0.218665	1.019177
45-49	7	2493	17763	4633	7.125150	0.260823	1.002318

P(i)/P(2) = 0.140252 P(2)/P(3) = 0.483938

Age Group	x	q(x)
15-19	1	0.131625
20-24	2	~~0.094165~~ 0.125575
25-29	3	0.123120
30-34	5	0.148367
35-39	10	0.181207
40-44	15	0.222859
45-49	20	0.261427

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