

CHAPTER 8

MORTALITY

8.0 Introduction

Basic demographic information on the number of deaths by age and sex in a population is a critical input for the determination and evaluation of health policies and programmes, according to the World Health Organisation (WHO, 2002:1). Specifically, child mortality data are important for evaluating and monitoring progress on governments' child survival targets and intervention measures. Equally important for planning and programme implementation purposes is information on adult mortality. This is of particular importance in the era of HIV/AIDS as the pandemic affects the most productive and reproductive ages (15-49 years).

Indirect demographic methods are used to derive both child and adult mortality indicators. Information on child mortality estimation was based on the reports of the mothers, aged 15-49 years, of the survival of their children by sex. This gives information on children surviving and not surviving out of the total children ever born per woman (mother) in the reproductive age group (15-49 years). The United Nations Mortality measurement package, Mortpak-Lite, was used to compute child mortality indicators, namely, infant mortality rate (IMR), child mortality rate (CMR), under-five mortality rate (UMR) and life expectancy at birth (e_0) based on the Coale-Demeny North Model. It is worth noting that these child mortality indicators are based on life tables that were developed on mortality data in the pre-AIDS era. WHO (2002:13) notes that if deaths from HIV/AIDS were to be excluded, life expectancy at birth in some countries in Southern Africa including Zambia would be 15 to 20 years higher.

Information on the number of adult deaths by age and sex in the household was not collected in the 2000 round of Census of Population and Housing. Therefore, measurement of adult mortality was based on estimates of life expectancies by age for ages 10 - 70 years. The measurements were computed using the Population Analysis Spreadsheet (PAS) and two consecutive census populations by 5-year age groups as an input into the measurement (Preston-Bennett Mortality Technique) (US Bureau of the Census, 1994:161). This method indirectly takes into account the effects of the HIV/AIDS pandemic on the population that would not be captured from the model life tables and is also based on large numbers of the populations.

8.1 Concepts and Definitions

- *Mortality* refers to the occurrence of deaths in a population.
- *Infant mortality rate (IMR) (${}_1q_0$)* refers to the number of deaths among infants aged below one year per thousand (1,000) live births per year
- *Child mortality rate (CMR) (${}_5q_1$)* refers to the number of deaths among children aged between exact age one and five years per thousand (1,000) live births per year
- *Under-five mortality rate (UMR) (${}_5q_0$)* refers to the number of deaths among children aged below five years per thousand (1,000) live births per year. UMR, therefore, constitutes both the infant and child mortality.
- *Life expectancy at birth (e_0)* refers to the average number of years a newly born child is expected to live, if the current existing mortality conditions were to prevail for a long time.
- *Life expectancy at exact age (e_x)* refers to the average number of years a person aged X years is expected to live, if the current existing mortality conditions were to prevail for a long time and;
- *Adult mortality (${}_{60}q_{15}$)* refers to the number of deaths that occur to persons in the age range 15 to 60 years.

8.2 Infant Mortality Levels, Trends and Differentials

Table 8.1 shows various mortality indicators in Zambia from 1980 to 2000. Overall, infant mortality rate has declined in Zambia by about 12 percent, but still higher than the 1980 Figure. In 1980, IMR stood at 99 deaths per 1000 live births. It increased by about 24 percent between 1980 and 1990, from 99 to 123 deaths per 1000 live births, respectively. In 2000, it dropped to 110 deaths per 1000 live births. In other words about 11 children died more in 2000 than in 1980 for every 1000 live births. However, when compared to the 1990 Figure, about 13 children

survived more in 2000 for every 1000 infants born, suggesting that survival chances for infants were better in 1980 than they were in both 1990 and 2000.

Table 8.1: Childhood Mortality indicators by Sex of Child, Residence and Province, Zambia, 1980-2000

Characteristics	Infant Mortality Rate (per '000)			Child Mortality Rate (per '000)			Under-five mortality Rate (per '000)			Life Expectancy at Birth (Years)		
	1980	1990	2000	1980	1990	2000	1980	1990	2000	1980	1990	2000
Zambia	99	123	110	71	95	82	121	151	162	52	47	50
Sex of Child												
Male	101	127	120	73	98	91	124	157	169	52	46	48
Female	94	120	100	66	91	72	115	146	155	53	48	52
Residence												
Rural	106	133	117	78	104	89	132	164	180	50	45	48
Urban	89	106	91	61	77	64	108	128	126	54	51	54
Province												
Central	81	105	100	54	77	72	100	129	144	56	51	52
Copperbelt	87	109	91	59	81	63	97	132	126	55	50	54
Eastern	128	149	129	99	120	100	177	206	196	46	42	46
Luapula	127	161	132	99	132	103	161	199	224	46	40	45
Lusaka	87	106	88	60	78	60	106	129	126	55	50	54
Northern	104	137	130	75	108	101	127	169	180	51	44	46
North-Western	77	103	83	50	75	56	95	126	137	57	51	56
Southern	94	97	93	66	69	65	115	118	138	53	53	53
Western	106	141	140	77	113	111	132	175	201	51	43	44

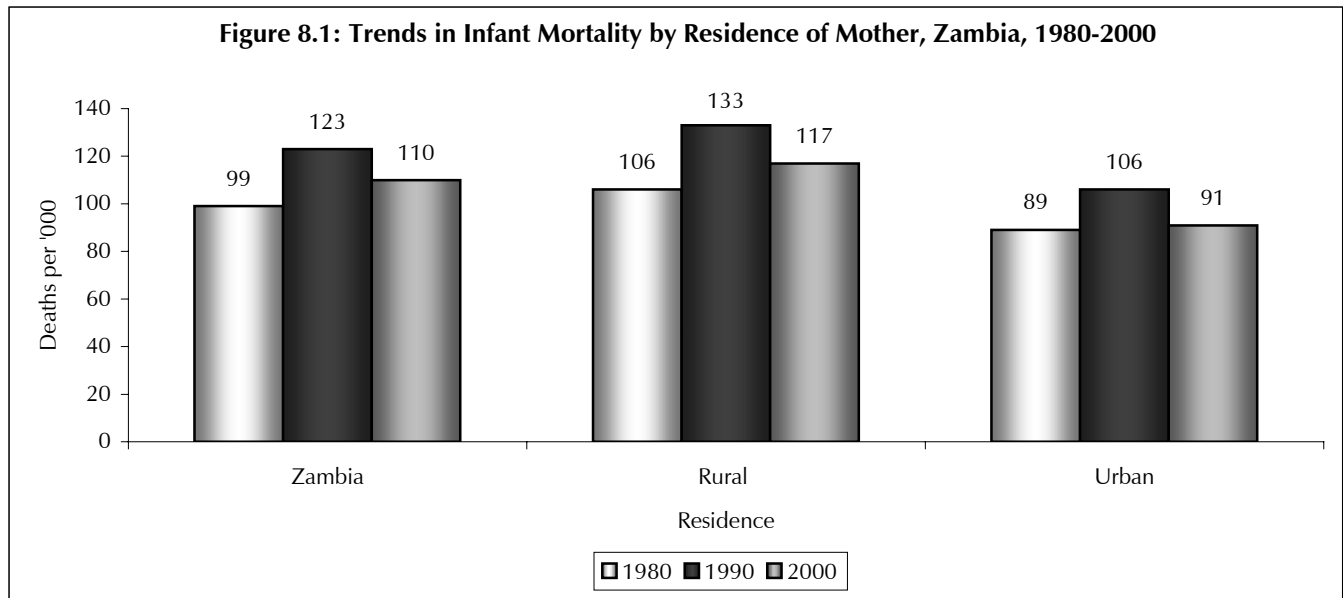
Source: CSO, 1980, 1990 and 2000 Censuses of Population and Housing

8.2.1 Infant Mortality Rate by Residence of the Mother

There are rural and urban differentials in IMR (Table 8.1 and Figure 8.1), with the former experiencing higher levels than the latter. In 1980, for instance, IMR in rural areas was 16 percent higher than in urban areas. The trend persisted in both 1990 and 2000. In 2000, about one in nine infants in rural areas and one in 11 infants in urban areas die before celebrating their first birthday.

In rural areas, IMR increased from 106 in 1980 to 133 in 1990, but declined to 117 in 2000. The trends in urban areas were similar: increased from 89 in 1980 to 106 in 1990 and declined to 91 in 2000. This result shows that children in the rural areas of Zambia experience a higher risk of dying before age one than urban infants (Table 8.1 and Figure 8.1).

Figure 8.1: Trends in Infant Mortality by Residence of Mother, Zambia, 1980-2000

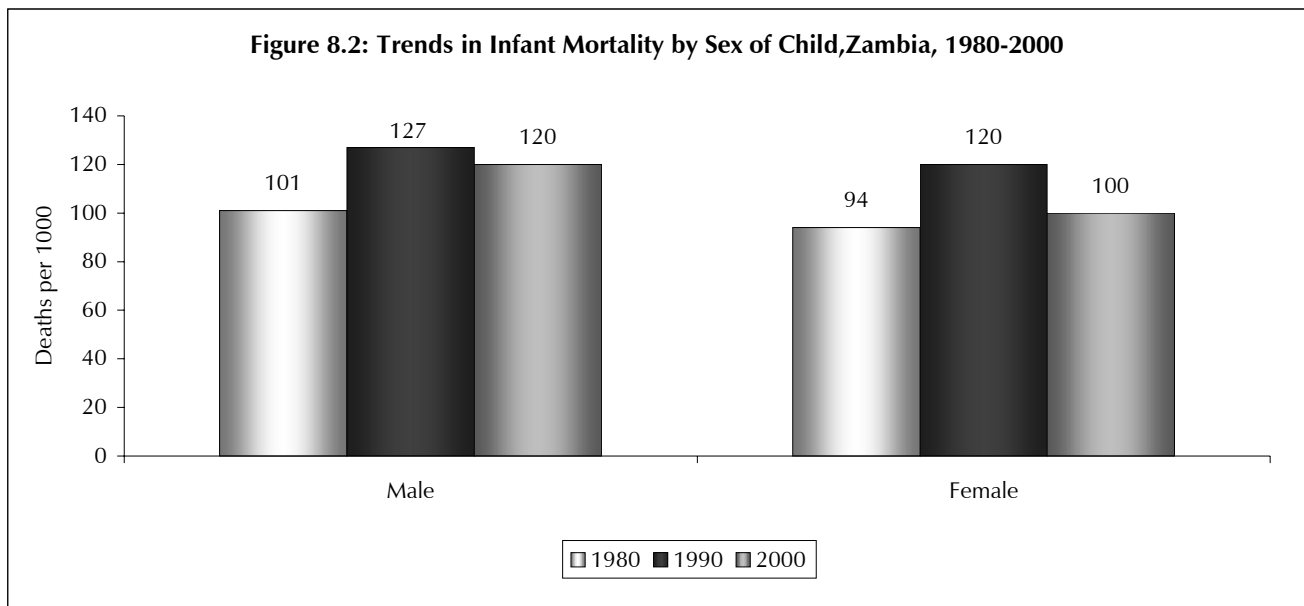


Source: CSO, 1980, 1990 and 2000 Censuses of Population and Housing

8.2.2 Infant Mortality Rate and Sex of Child

Results presented in Table 8.1 and Figure 8.2 show that males died more than females. In 2000, 120 deaths per 1000 live births occurred among males compared to 100 deaths for females. A similar pattern is also observed for the 1980 and 1990 census data. In 1980, 101 male and 94 female infants died before reaching age one. In 1990, 127 male infants and 120 for female infants died before reaching age one. However, the 2000 IMR for both sexes is still higher than the 1980 levels.

Figure 8.2: Trends in Infant Mortality by Sex of Child, Zambia, 1980-2000

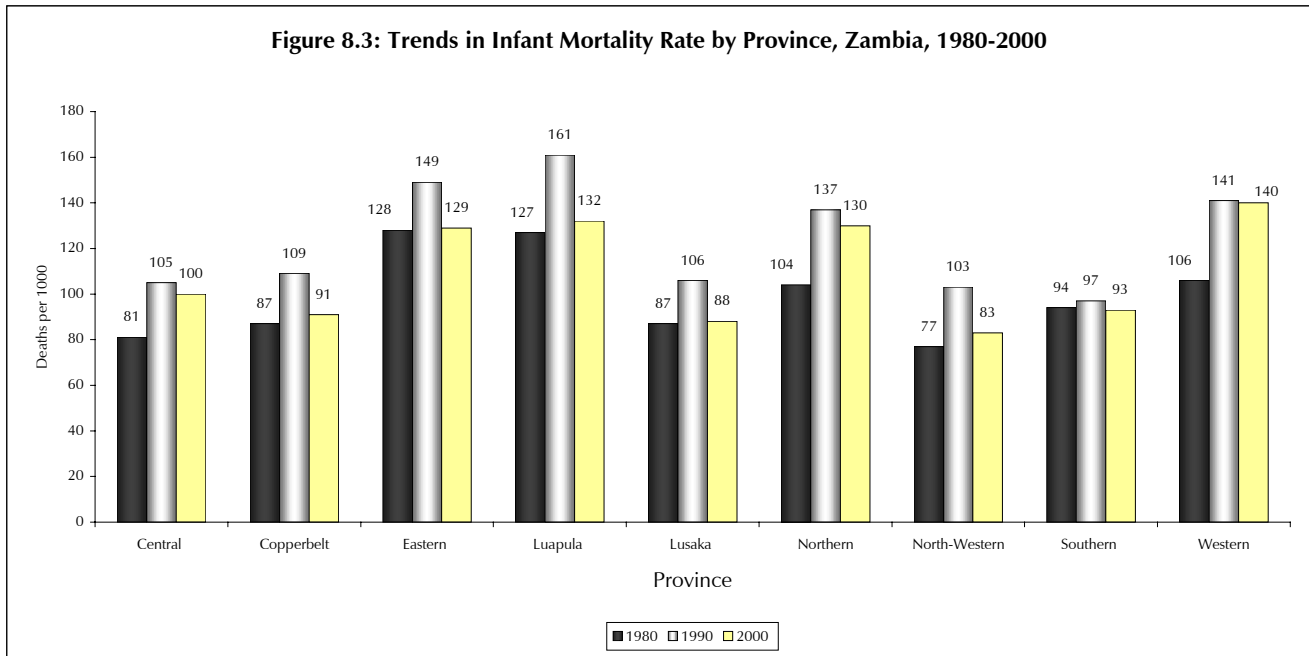


Source: CSO, 1980, 1990 and 2000 Censuses of Population and Housing

8.2.3 Infant Mortality Rate by Province of Residence of the Child

Table 8.1 and Figure 8.3 reveal that overall IMR has declined between 1990 and 2000, but still higher than the 1980 levels. In 1980, Eastern Province experienced the highest level of infant deaths (128), followed by Luapula Province (127). The lowest rate was observed in North-Western province. In 2000, the highest IMR was experienced in Western Province (140) and the lowest still remained North-Western Province (83).

Figure 8.3: Trends in Infant Mortality Rate by Province, Zambia, 1980-2000

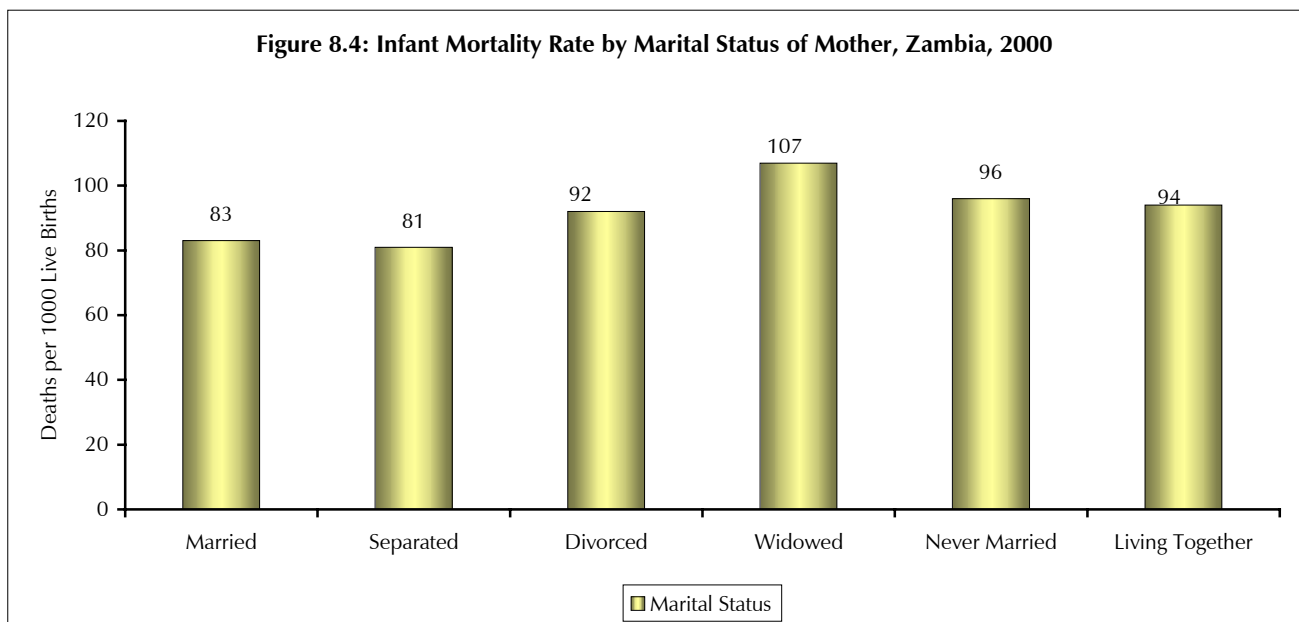


Source: CSO, 1980, 1990 and 2000 Censuses of Population and Housing

8.2.4 Infant Mortality Rate by Marital Status of the Mother

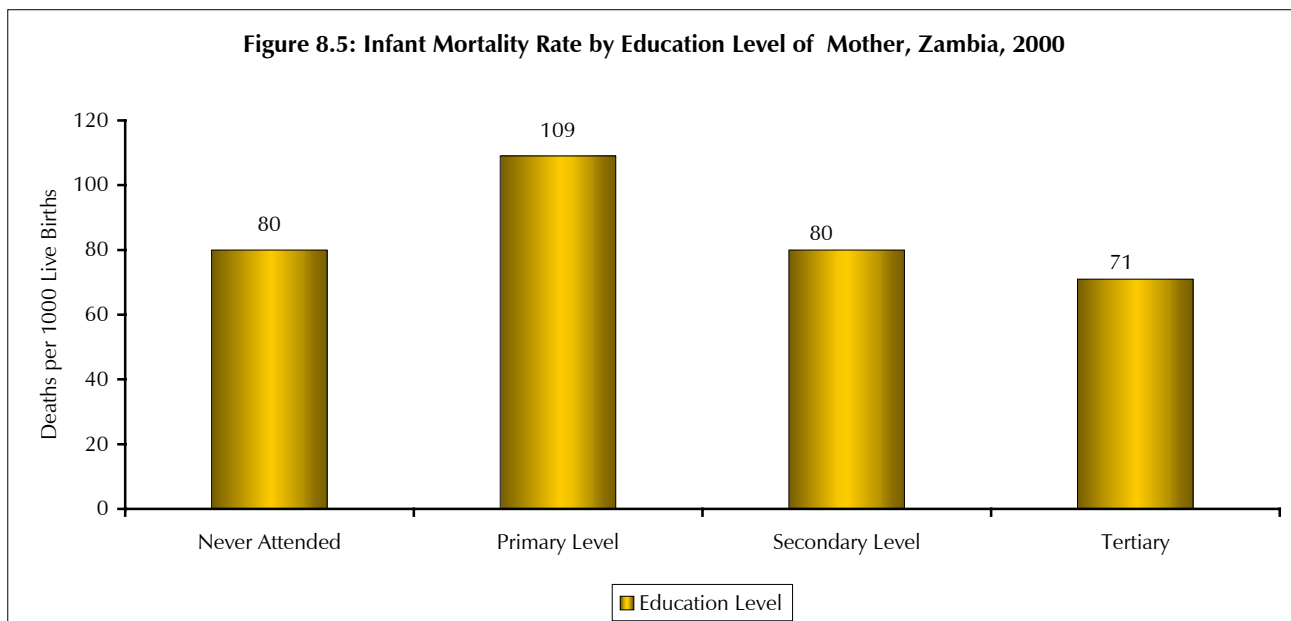
Figure 8.4 shows that children born to mothers who are not in marital union (widowed, never married, living together and divorced) tend to die more (almost one in every 10 children) than children born to married and separated mothers (one in every 12 children).

Figure 8.4: Infant Mortality Rate by Marital Status of Mother, Zambia, 2000



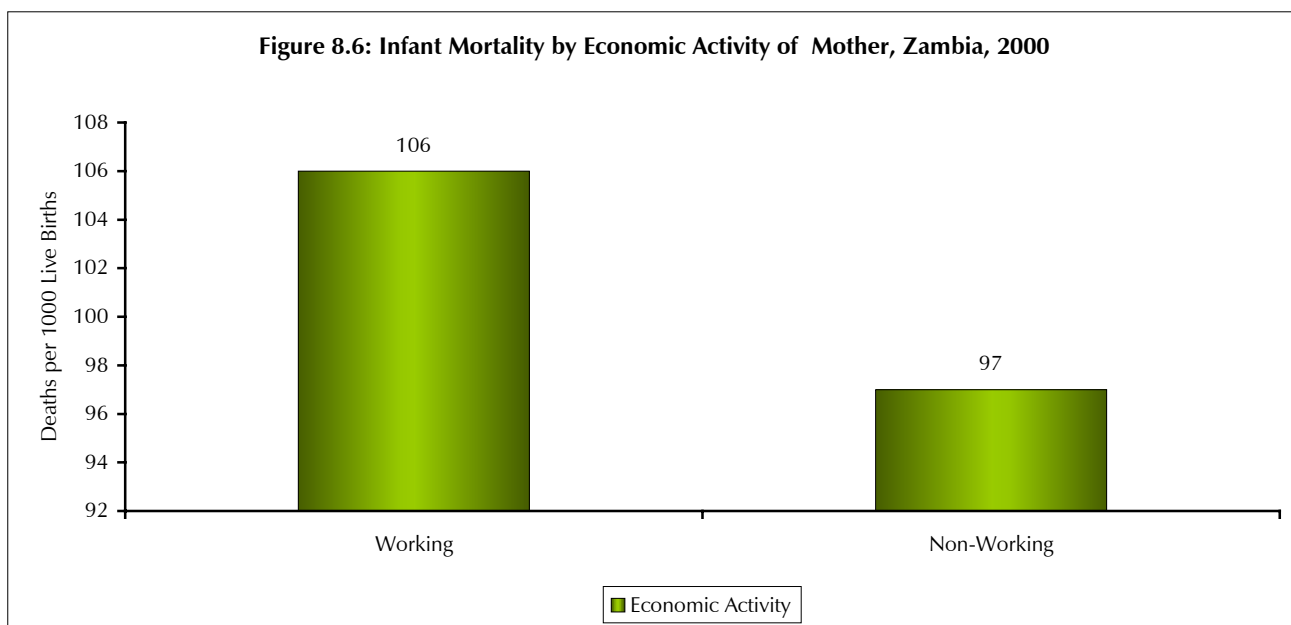
8.2.5 Infant Mortality Rate by Education Level of the Mother

Results in Figure 8.4 indicate that IMR among children born to mothers who have never attended school is significantly lower than those with primary level of education (80 compared to 109 deaths per 1000 live births, respectively). However, IMR varies markedly according to the level of education of mother (Primary to tertiary), with survival chances of infants increasing substantially as the level of education of mothers increases from 109 to 80 and then 71 deaths per 1000 live births, accordingly.



8.2.6 Infant Mortality Rate by Economic Activity of the Mother

Children born to working mothers have lower chances of reaching age one than those born to non-working mothers (Figure 8.6). The differences are relatively significant (106 versus 97 deaths per 1000 children), representing about 8 percent higher deaths among the working mothers.

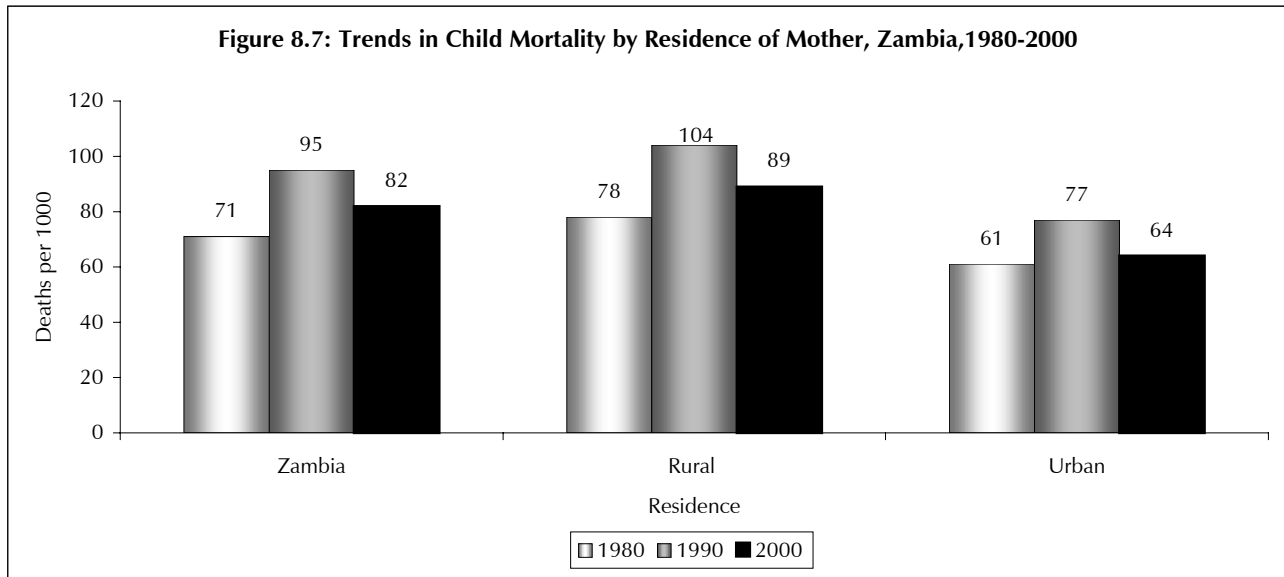


8.3 Child Mortality Levels, Trends and Differentials

Overall, results in Figure 8.7 show that Child Mortality Rate (CMR) has declined slightly between 1990 and 2000 by about 13 percent, from 95 to 82 deaths per 1000 children, respectively. Despite this decline, the 2000 levels are still higher (16 percent) than the 1980 level (82 compared with 71 deaths per 1000 children).

8.3.1 Child Mortality Rate by Residence of Mother

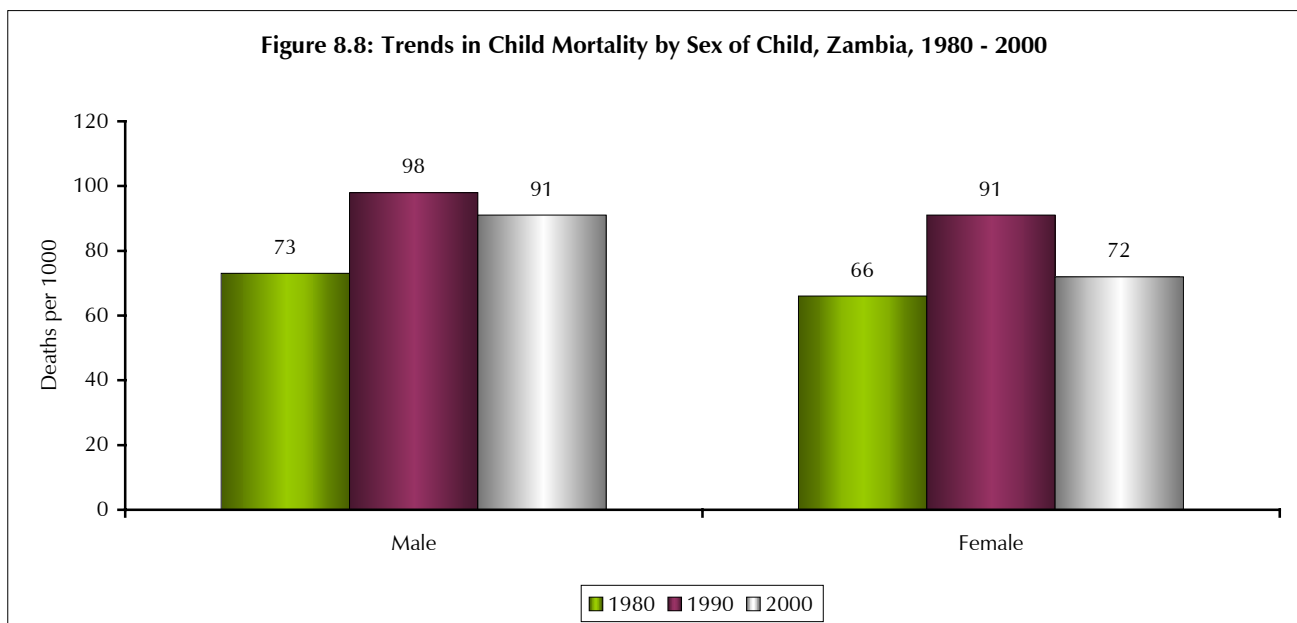
The pattern of CMR is similar to IMR (section 8.2.1). Children born to mothers residing in rural areas have higher risks of dying between age one and five than those in urban areas (89 compared to 64 deaths per 1000 children) (Figure 8.7).



Source: CSO, 1980, 1990 and 2000 Censuses of Population and Housing

8.3.2 Child Mortality Rate by Sex of the Child

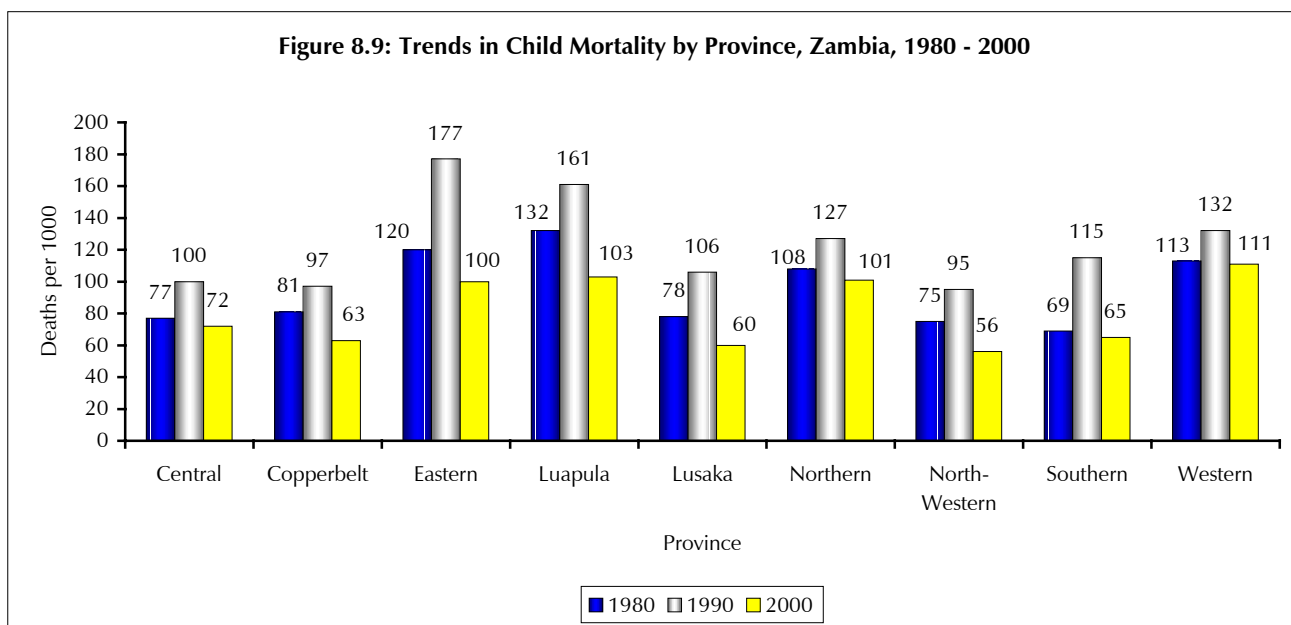
CMR is higher (91 deaths per 1000 children) among males than females (72 deaths per 1000 children). A similar pattern is observed for the 1980 and 1990 census data. In 1980, 73 male and 66 female children, and in 1990, 98 male and 91 female died between age one and five. The 1980 levels are lower than those observed in 1990 and 2000, respectively.



Source: CSO, 1980, 1990 and 2000 Censuses of Population and Housing

8.3.3 Child Mortality Rate by Province of Residence of the Child

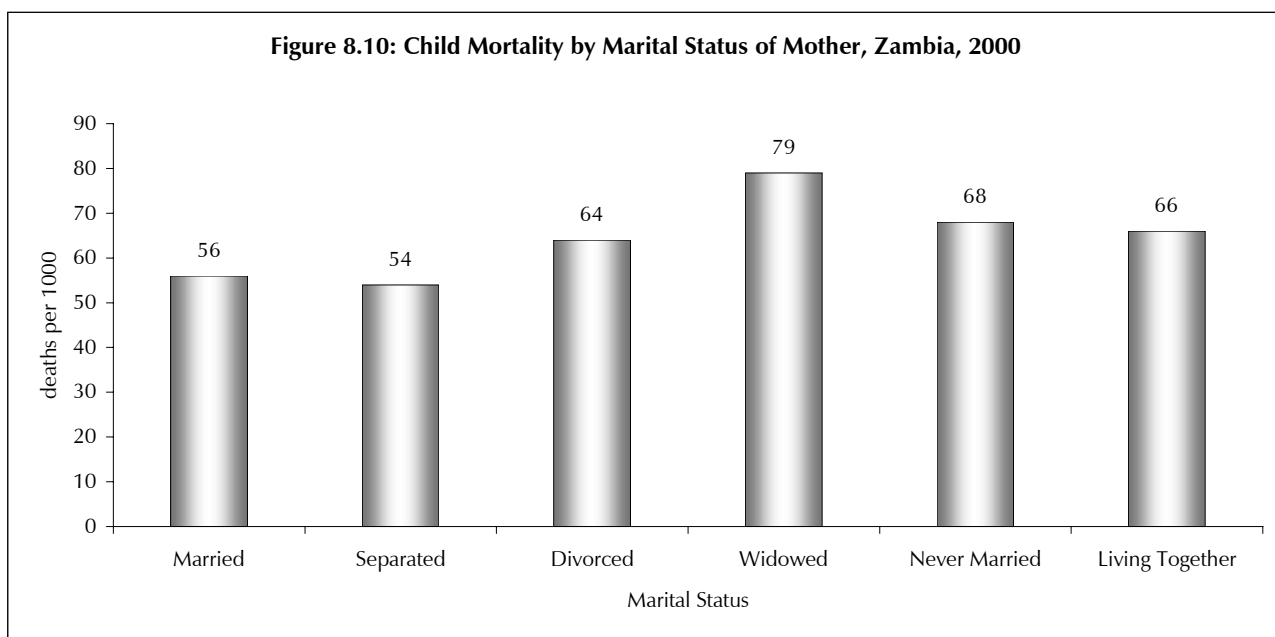
At the provincial level, the CMR trends follow those of the national picture. All the nine provinces have registered declines in CMR 2000 from the 1990 but still higher than the 1980 levels (Figure 8.9). In 1990, CMR was relatively very high in Eastern (177), Luapula (161), Western (132) and Northern (127) and relatively low in north-western (95), (copperbelt (97) and Central (100), respectively. In 2000, the highest CMR was observed in Western Province (111) and the lowest in North-Western Province (56).



Source: CSO, 1980, 1990 and 2000 Censuses of Population and Housing

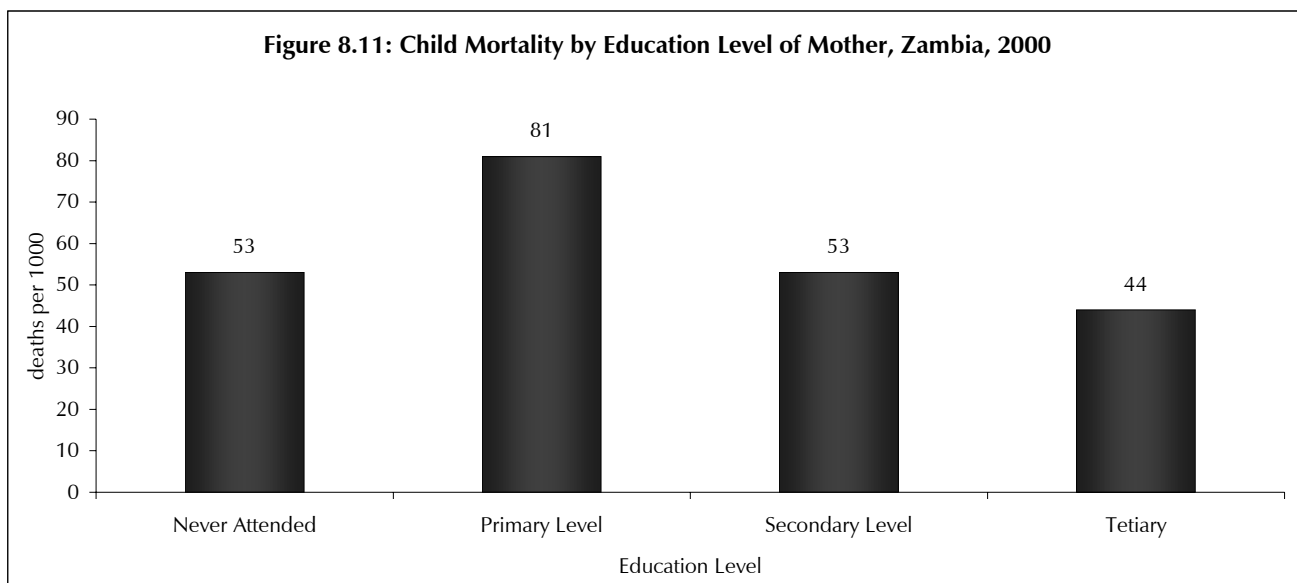
8.3.4 Child Mortality Rate by Marital Status of the Mother

Figure 8.10 shows that children born to mothers who are not in marital union (widowed, never married, living together and divorced) have lower chances of surviving between exact age one and five (almost one in every 15 children), while children born to separated and married mothers have higher survival chances (1 in every 18 children).



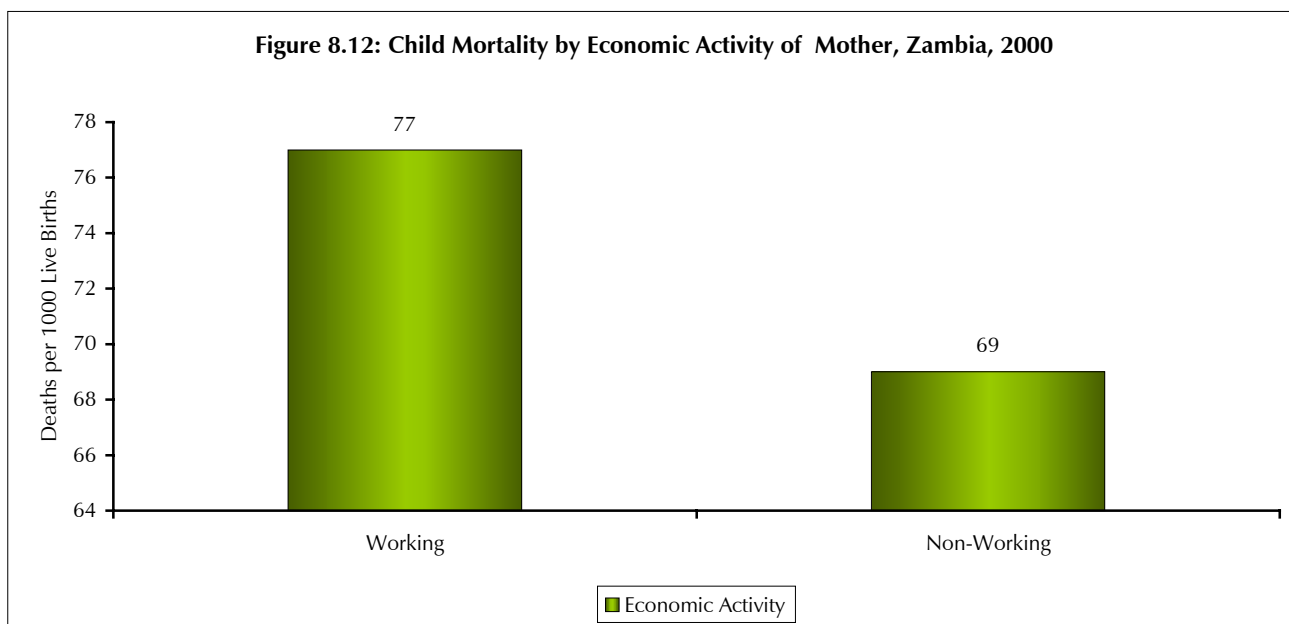
8.3.5 Child Mortality Rate by Education Level of the Mother

The lowest CMR was observed among women who had attained tertiary level of schooling (44) (Figure 8.11). CMR among children born to mothers with no education school was 53 deaths per 1000 children. CMR varies markedly according to the level of education of mother (Primary to tertiary). Survival chances of children increase substantially as the level of education of mothers increases. CMR for mothers with primary level of education is 81 deaths per 1000 children, 53 deaths per 1000 for mothers with secondary school education and 44 deaths per 1000 for those with tertiary education. It can be noted that CMR for children born to mothers with no education are markedly higher than those born to mothers with primary school level of education.



8.3.6 Child Mortality Rate by Economic Activity of the Mother

Children born to working mothers have higher chances of dying between exact age one and five than those born to non-working mothers. The differences are notable (77 versus 69 deaths per 1000 children, respectively), representing 10 percent higher deaths among the working mothers (Figure 8.12).

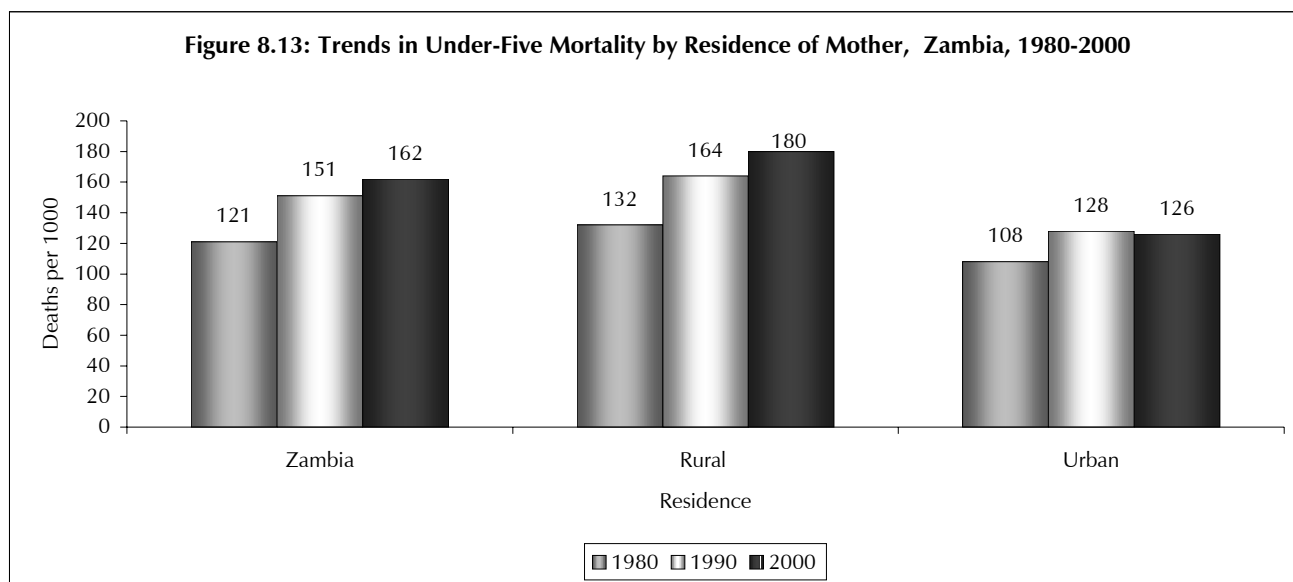


8.4 Under-Five Mortality Levels, Trends and Differentials

Under-five Mortality Rates (UMRs) in Zambia continued to increase between 1980 and 2000 (Figure 8.13). It increased by about seven percent, from 151 to 162 deaths per 1000 children between 1990 and 2000, respectively. In 1980, UMR stood at 121 deaths per 1000 children, representing about 34 percent increment over the 2000 level.

8.4.1 Under-Five Mortality Rate by Rural-Urban Residence of Mother

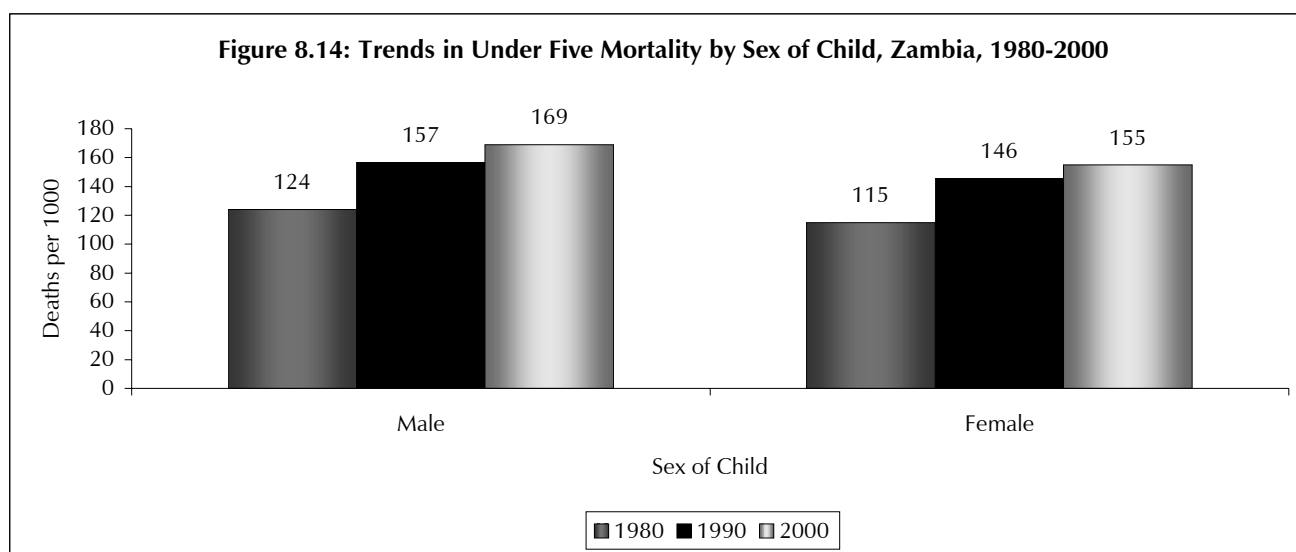
The increasing UMR in rural areas is similar to the national trend (as observed in Figure 8.13). UMR in 1980 stood at 132 deaths per 1000 children. This increased substantially by about 24 percent in 1990 (164) to 180 deaths per 1000 children. However, UMR remained relatively stable between 1990 and 2000 in urban areas, from 128 to 126 deaths per 1000 children. Overall, children born to mothers residing in rural areas have higher risks of dying between birth and age five than those in urban areas (164 compared to 128 deaths per 1000 children).



Source: CSO, 1980, 1990 and 2000 Censuses of Population and Housing

8.4.2 Under-Five Mortality Rate by Sex of the Child

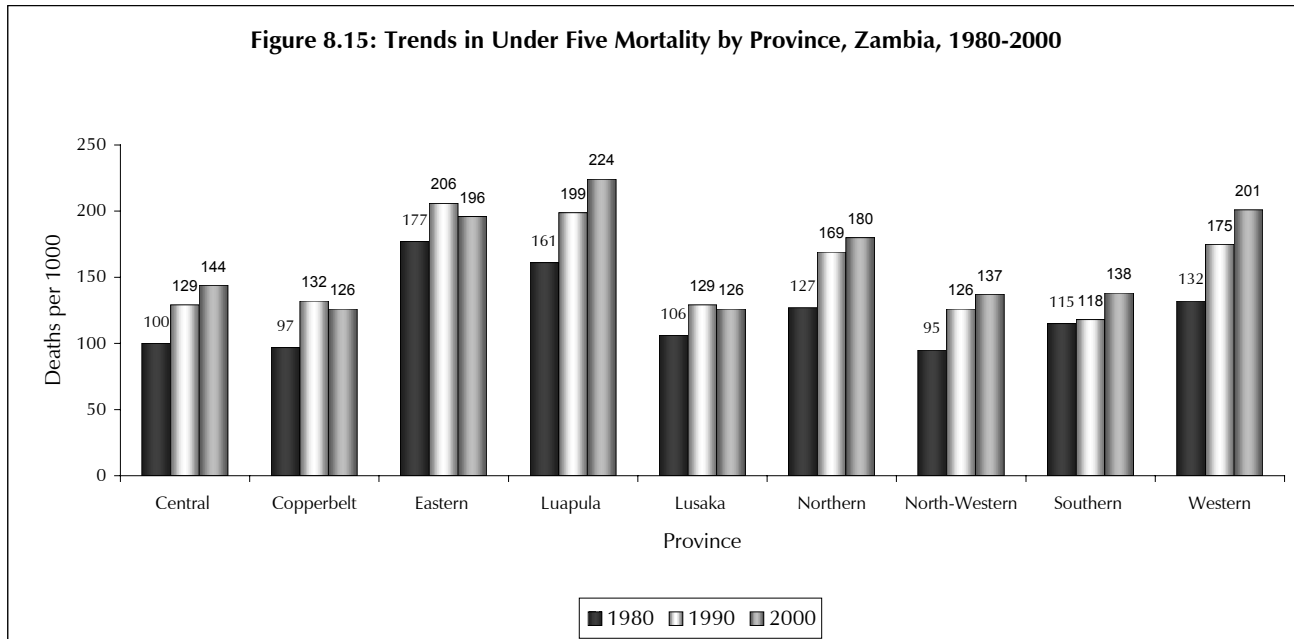
More male than female children in 2000 did not celebrate their fifth birthday, 169 versus 155 deaths per 1000 children (Figure 8.14). A similar pattern was also observed in 1980 and 1990 census years. In 1980, 124 male and 115 female, and in 1990, 157 male and 146 female children died before reaching their fifth birthday.



Source: CSO, 1980, 1990 and 2000 Censuses of Population and Housing

8.4.3 Under-Five Mortality Rate by Province of Residence of the Mother

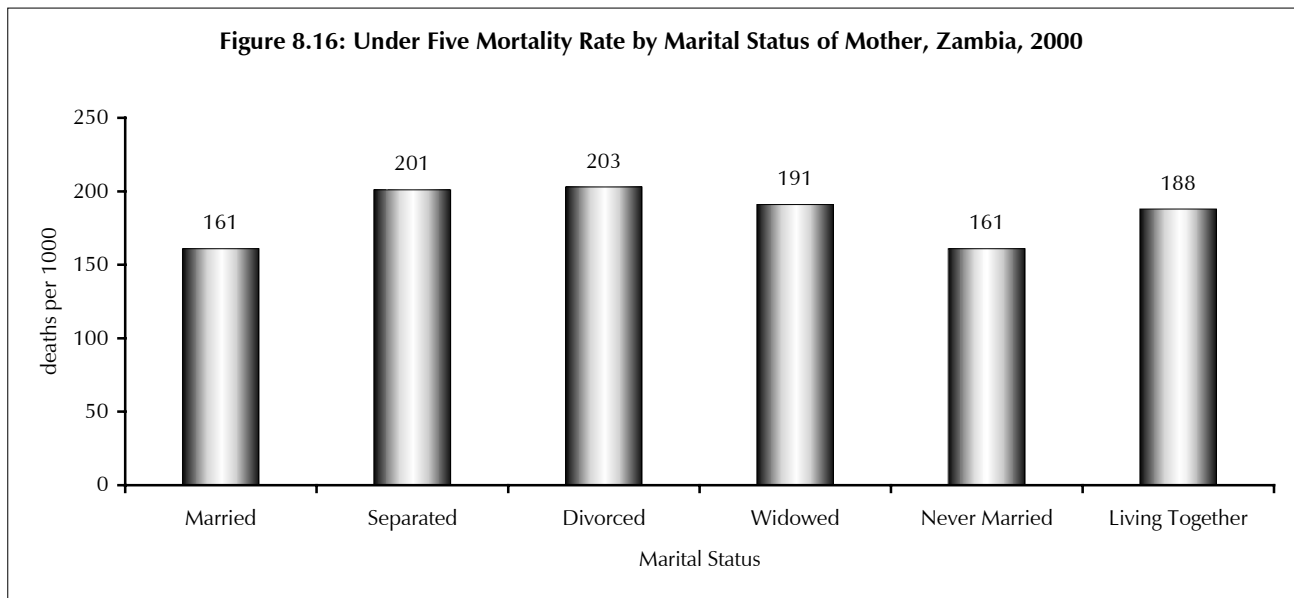
Figure 8.15 shows that at the provincial level, overall UMR has been increasing between 1980 and 2000, except in Lusaka and the Copperbelt where it remained relatively stable in the last decade. In 2000, the highest UMR level was observed in Luapula (224) and the lowest recorded in Lusaka and Copperbelt Provinces (126).



Source: CSO, 1980, 1990 and 2000 Censuses of Population and Housing

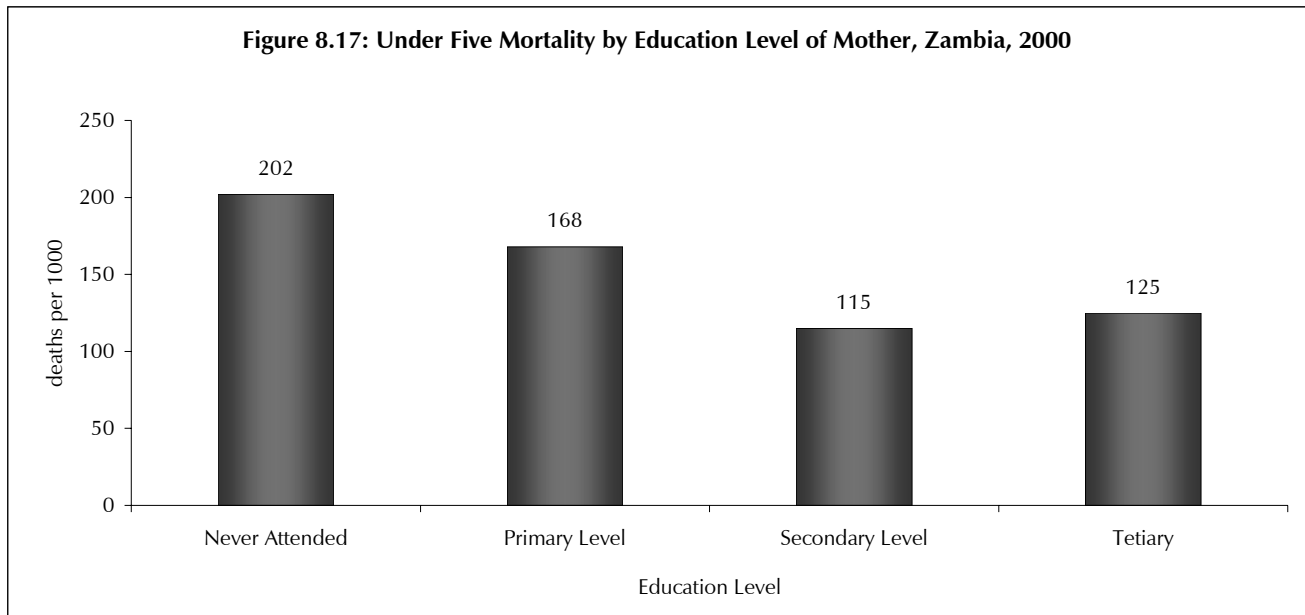
8.4.4 Under-Five Mortality Rate by Marital Status of Mother

There are no notable differences in the risks of children dying by various marital status (Figure 8.16). On average, in all marital categories, almost one in every five children die before celebrating their fifth birthday. However, it is worth noting that children born to mothers who were previously married (separated, divorced or widowed) slightly have higher chances of dying before reaching age five than those born to mothers who are currently or never married.



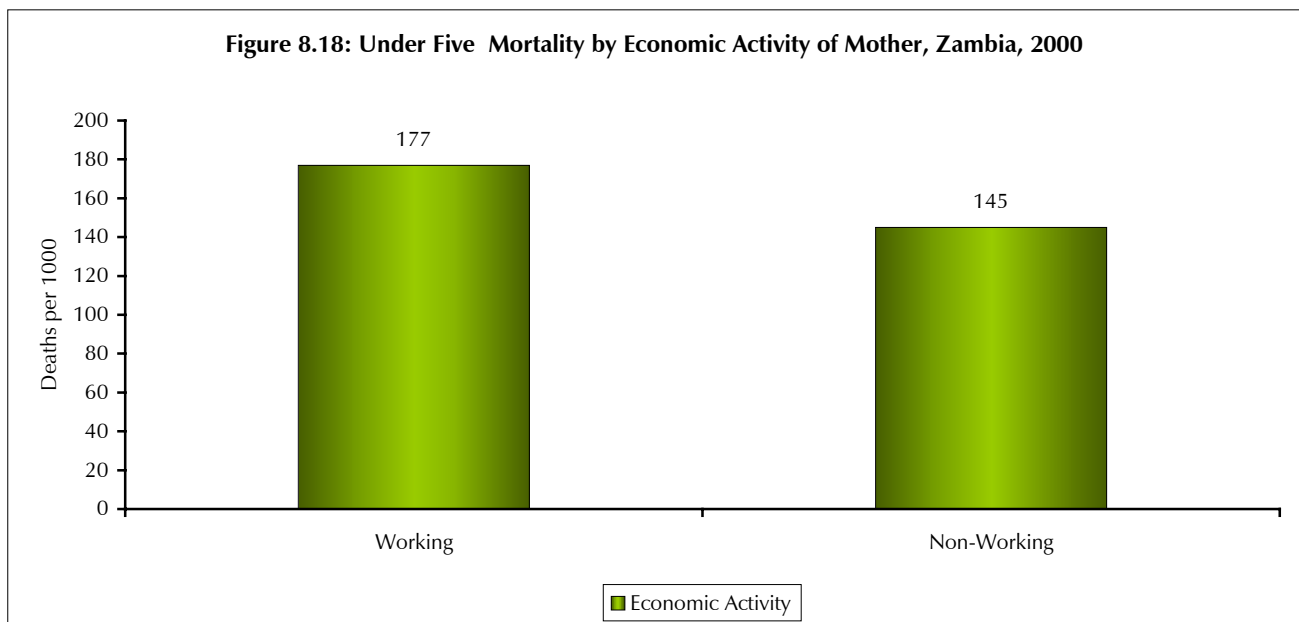
8.4.5 Under-Five Mortality Rate by Education Level of Mother

UMR varies markedly according to the level of education of mother (Primary or less to tertiary) (Figure 8.16). Children born to mothers with primary or less formal education are at the greatest risk of not celebrating their fifth birthday than those born to mothers with above primary school level of education.



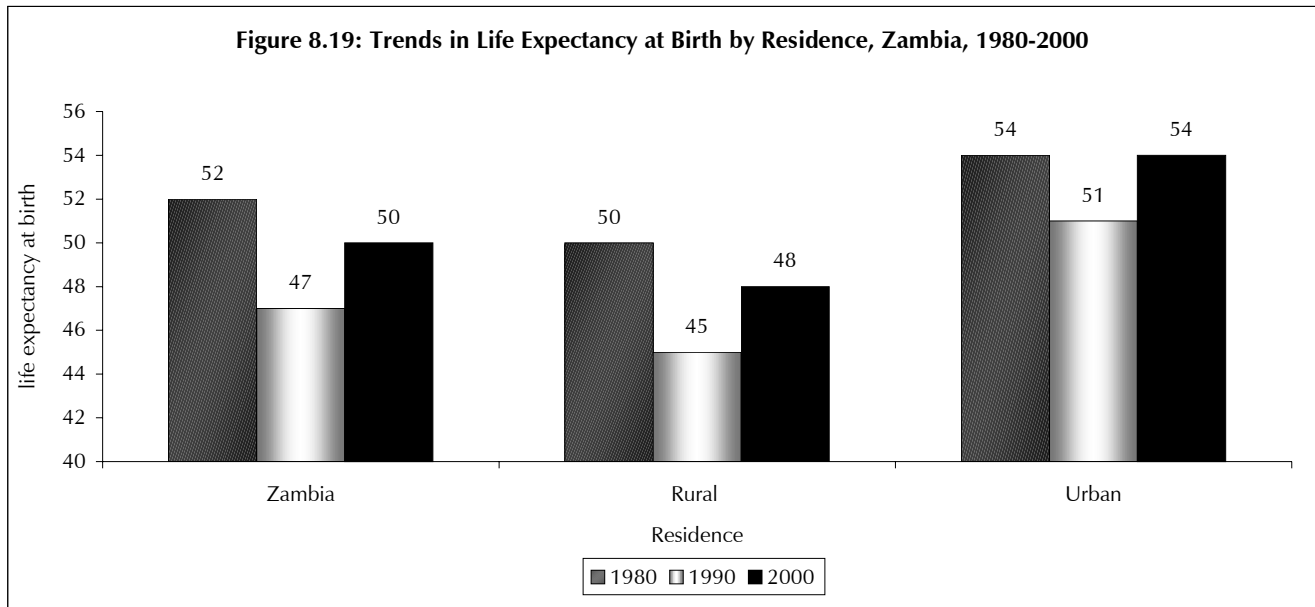
8.4.6 Under-Five Mortality Rate by Economic Activity of the Mother

Results in Figure 8.19 show that children born to working mothers are at greater risks of not surviving to age five than those born to non-working mothers. The differences are marked (177 versus 145 deaths per 1000 children, respectively), representing about 18 percent higher deaths among the working mothers.



8.5 Life Expectancy at Birth: Levels, Trends and Differentials

There has been an increase in Life Expectancy at Birth between 1990 and 2000 (Figure 8.19). It rose from 47 in 1990 to 50 in 2000, an improvement of about three years. Despite the increase, the 2000 Figure is still lower than the 1980 one estimated at 52. When disaggregated by sex, the same trend is observed. It is also observed that female babies experience higher expectation of life at birth at 53, 48 and 52 years in 1980, 1990 and 2000, respectively compared to males at 52, 46 and 48 years in 1980, 1990 and 2000, respectively.



Source: CSO, 1980, 1990 and 2000 Censuses of Population and Housing

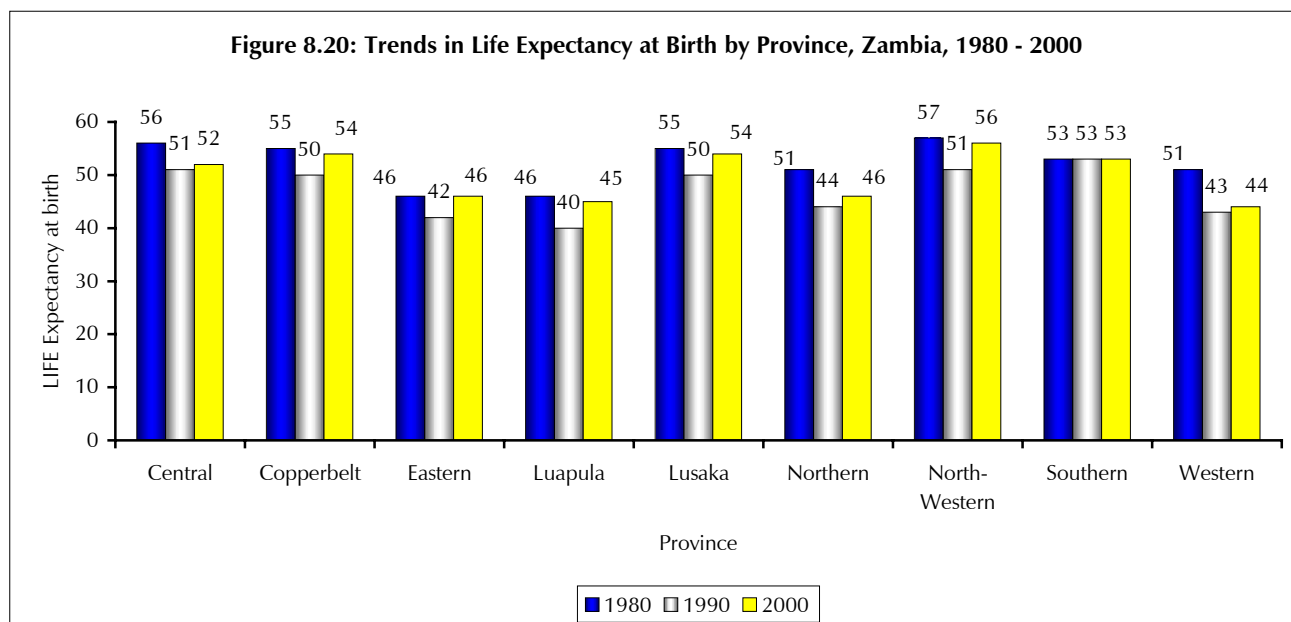
8.5.1 Life Expectancy at Birth by Rural-Urban Residence of the Mother

In terms of residence, the rural results (Figure 8.19) follow the national trend where the 2000 life expectancy at birth has not increased above the 1980 Figure. In the urban areas, however, the 2000 Figure is equal to that of 1980. It is also observed that newly born babies in urban areas have a higher expectation of life at birth than their rural counterparts. In the urban areas, life expectancy was 54, 51 and 54 while in the rural areas it was 50, 45 and 48 in 1980, 1990 and 2000, respectively.

8.5.2 Life Expectancy at Birth by Province of Residence of the Mother

At the provincial level, Life Expectancy at Birth is relatively low in Western province (44) and Luapula (45) and relatively high in North-Western (56) and Lusaka (54). All the provinces had an increase in the years newly born babies were expected to live from 1990 to 2000, apart from Southern province, which experienced no change between 1980-2000 (Figure 8.20).

Figure 8.20: Trends in Life Expectancy at Birth by Province, Zambia, 1980 - 2000

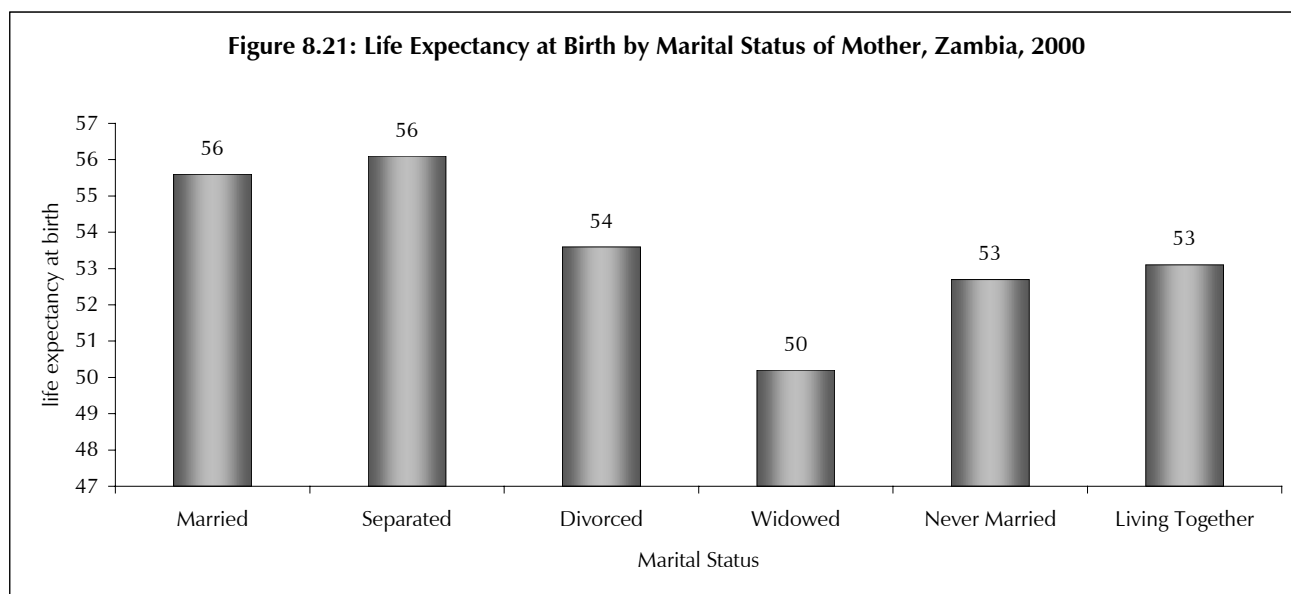


Source: CSO, 1980, 1990 and 2000 Censuses of Population and Housing

8.5.3 Life Expectancy at Birth by Marital Status of the Mother

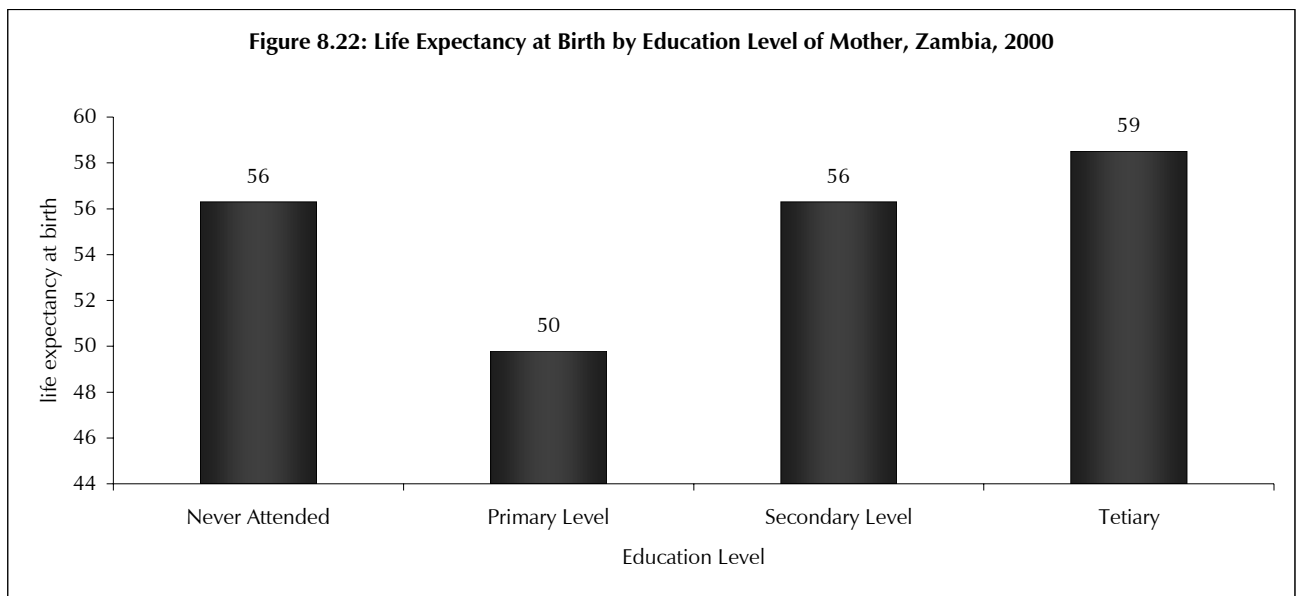
There are no notable differences in life expectancy at birth by marital status (Figure 8.21). The years range from 50 years for children born to widowed mothers to about 56 years for those born to married and separated mothers.

Figure 8.21: Life Expectancy at Birth by Marital Status of Mother, Zambia, 2000



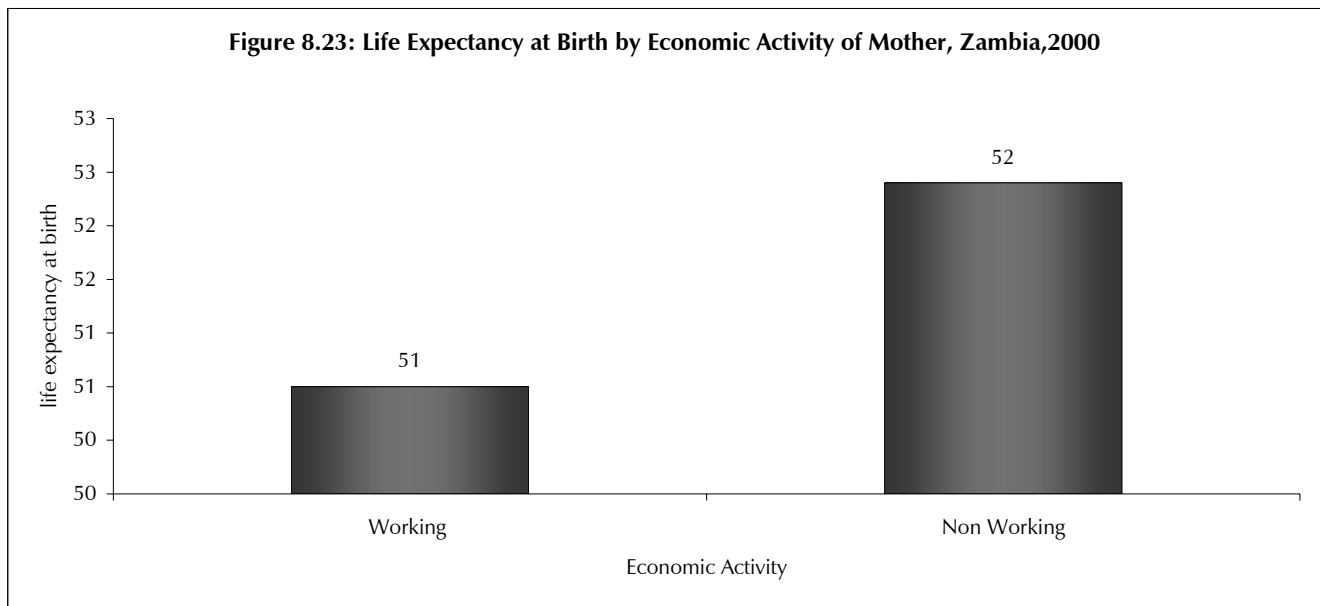
8.5.4 Life Expectancy at Birth by Education Level of the Mother

Life Expectancy at Birth varies markedly according to the level of education of mother (Primary or less to tertiary). Children born to mothers with tertiary education have the highest number of years they are expected to live (59 years) where as those born to mothers with primary education have the lowest number of years they are expected to live at 50 years. However, those born to mothers who have never attended formal schooling survive six years more than those with primary education, and three years less than those with tertiary education.



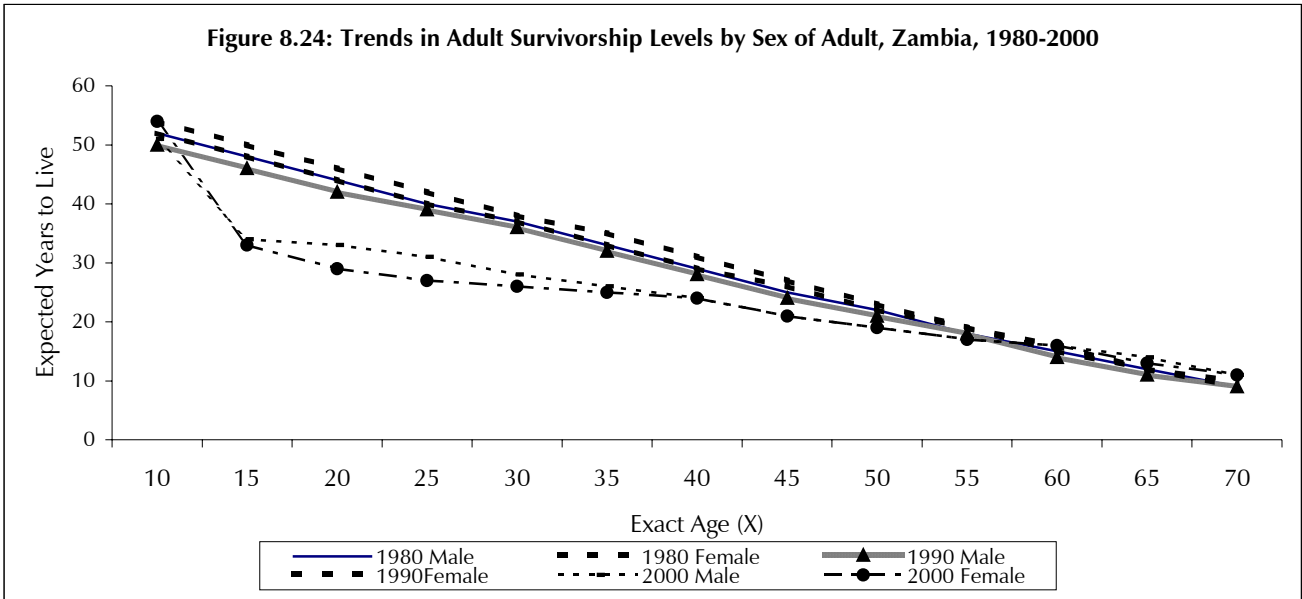
8.5.5 Life Expectancy at Birth by Economic Activity of the Mother

As may be expected, children born to working mothers have a higher expectation of life at birth than those born to non-working mothers (Figure 8.23). The difference, however, is not large (52 compared with 51 years, respectively).



8.6 Adult Mortality: Survivorship Levels, Trends and Differentials

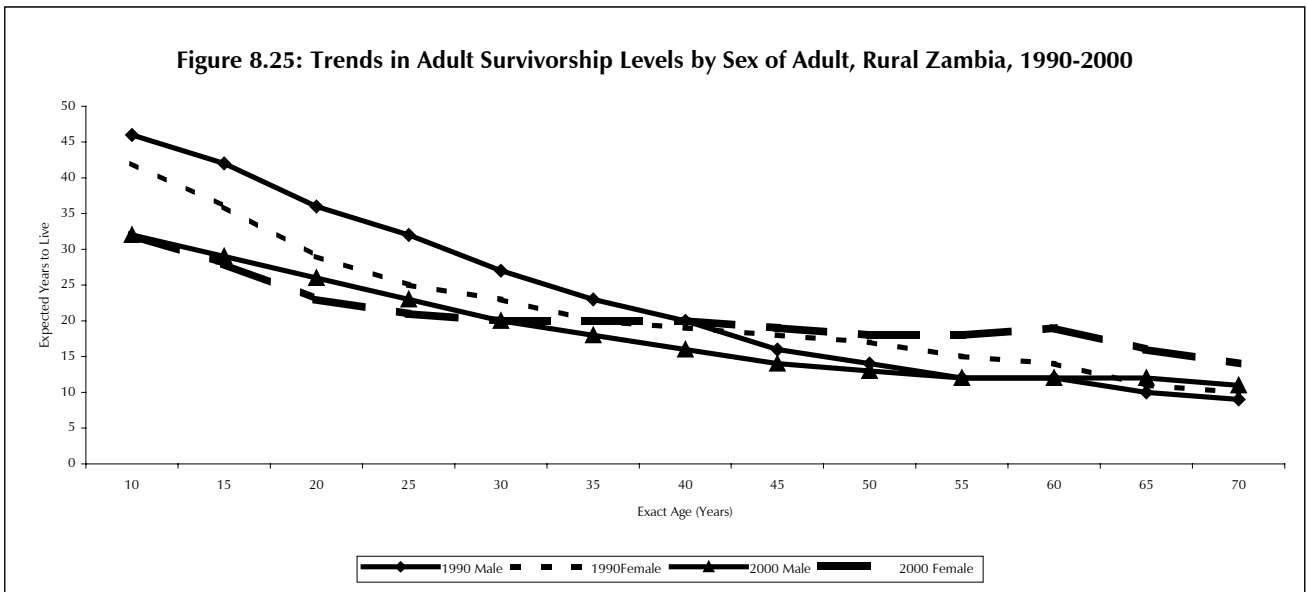
Results in Figure 8.24 reveal that adult survivorship levels in Zambia have been deteriorating in the last 20 years (1980-2000). In the 1990 -2000 intercensal period the adult survival levels deteriorated significantly, especially in the 15-55 years age-group. The deteriorating situation may be attributable to the HIV/AIDS pandemic. Between 1980 and 1990, more female than male adults survived from age 10.



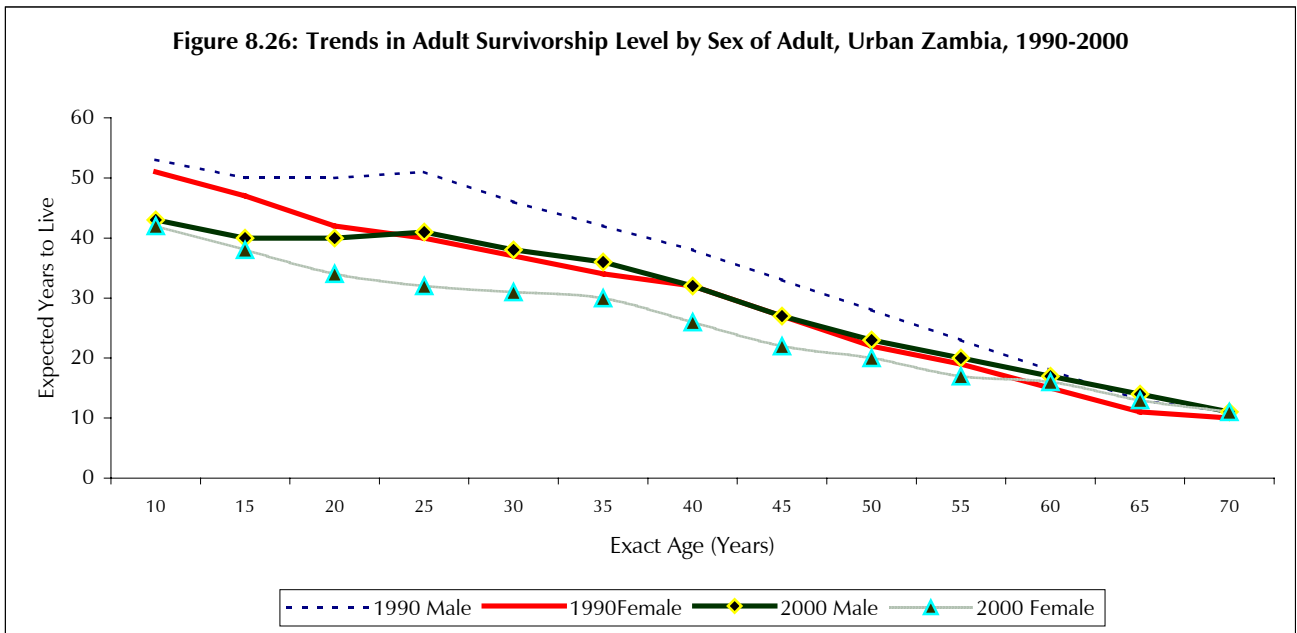
Source: CSO, 1980, 1990 and 2000 Censuses of Population and Housing

However, after 1990, the situation changed. Overall, more male than female adults survived, especially in the younger age group (15-40 years). It is interesting to note that after age 60, both sexes live longer than in the 1980s and 1990s. At age 15 both sexes lost at least 12 years between 1980 and 2000 and about 10 years between 1990 and 2000.

Differentials by residence in Figures 8.25 and 8.26 show that adults in urban areas have higher chances of surviving to older ages than in rural areas. In rural areas, although female adults have high chances of dying between age 10 and 30, they however have more years to live after age 40 until older ages (even above the 1990 mortality levels). In urban areas, on the contrary, the pattern is very different. In both 1990 and 2000, more male than female adults live longer in adulthood. The gap is even wider between age 15 and 55 years.

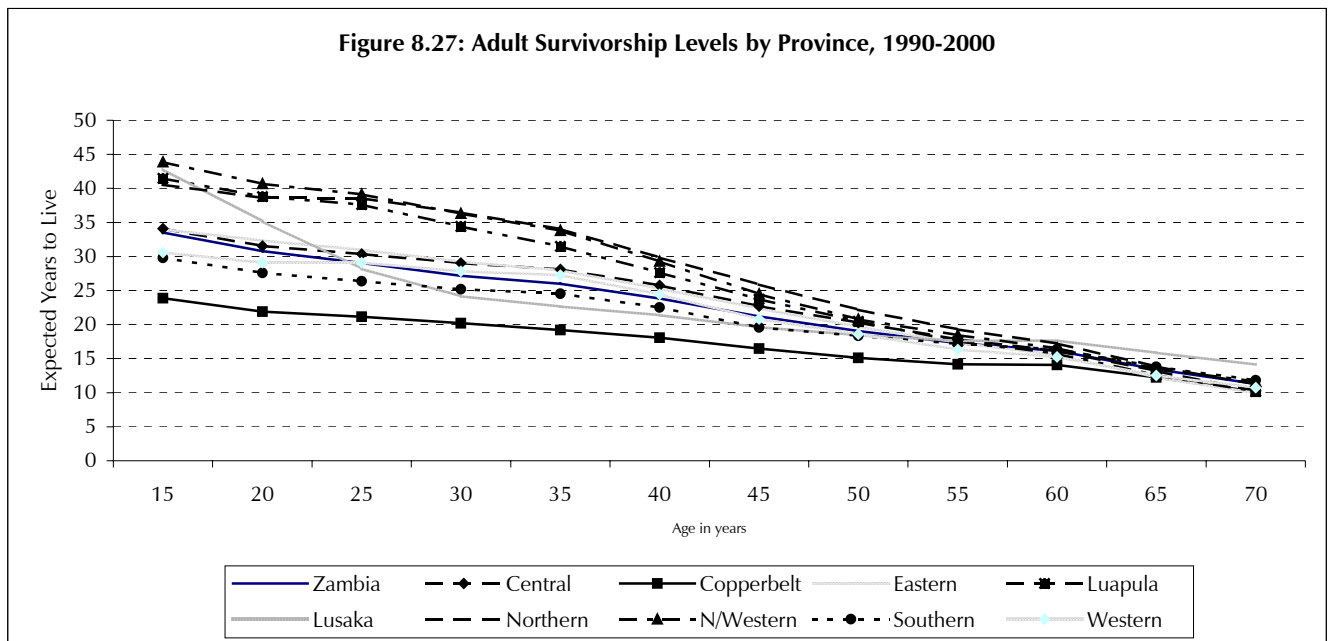


Source: CSO, 1990 and 2000 Censuses of Population and Housing



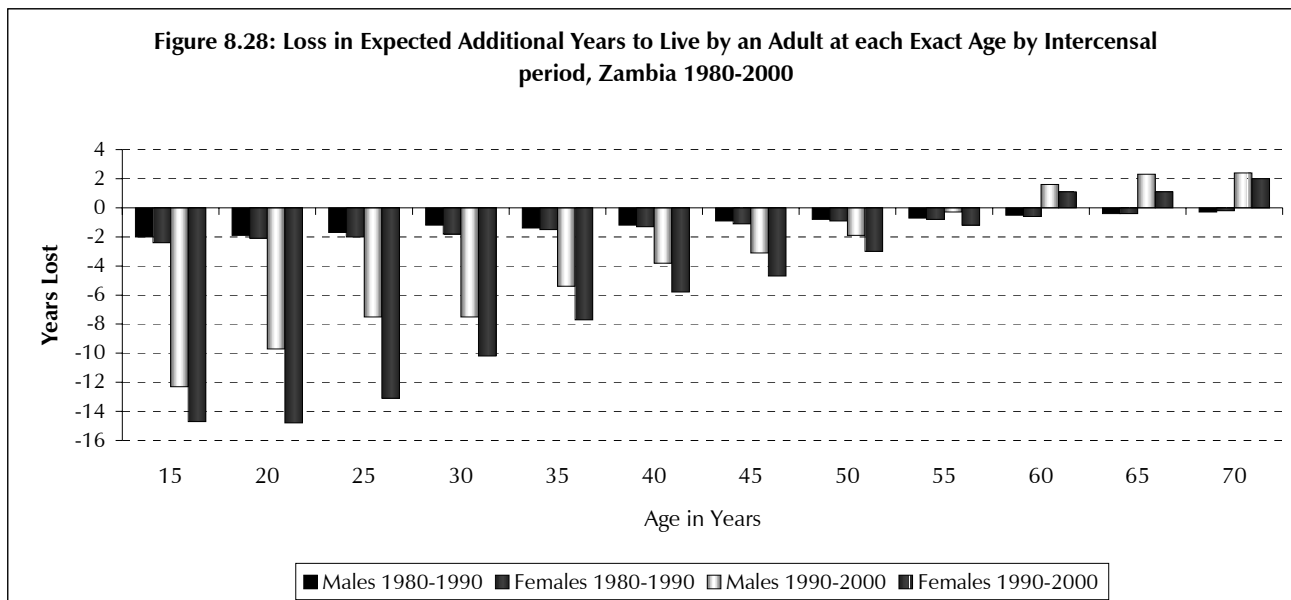
Source: CSO, 1990 and 2000 Censuses of Population and Housing

At provincial level, adult survivorship levels vary markedly. North-Western Province has the least adult mortality risks whereas the Copperbelt Province has the greatest risks of adults not surviving to older ages. Southern province showed a drastic decline in adult survivorship levels between age 25 and 40, while the rest of the Provinces showed a steady decline (Figure 8.27).



Source: CSO, 1990 and 2000 Censuses of Population and Housing

Figure 8.28: Loss in Expected Additional Years to Live by an Adult at each Exact Age by Intercensal period, Zambia 1980-2000



Source: CSO, 1980, 1990 and 2000 Censuses of Population and Housing

Figure 8.28 shows that overall, adults lost more years to live between 1990-2000 than 1980-1990 intercensal period. Further, adult survival chances remained barely the same for both males and females between 1980 and 1990. However, in the later intercensal period of 1990-2000, adult females lost more years to live than male adults between exact age 15 and 55 years. It is worth noting that more years of survival for adults are lost in the most productive and reproductive age-group, 15-55 years.

8.7. Summary

Overall, infant mortality rate in the 1990 to 2000 intercensal period declined in Zambia by about 12 percent. Despite the decline, the levels are still high and with about one in nine infants dying before their first birthday compared to one in eight in 1990. The decline in infant mortality rate has had no major impact on reduction of under-five mortality. At province level, Western registered the highest infant deaths and North-western the least. In Western province about one in seven infants do not survive to their first birthday compared to one in 12 in North-western province. Higher Infant mortality risks are associated with mothers who live in a rural area, has less education, currently not married and working.

There was a 13 percent decline in child mortality rate between 1990 and 2000, from 95 to 82. However, the 2000 level is still above the 1980 one (71 deaths per 1000). At the provincial level CMR was highest in Eastern (111) and lowest in North-western (56). Higher incidents of dying among children aged between exact age 1 and 5 were observed in those born to rural mothers, widowed and divorced mothers, mothers with a low level of education (primary or less), and working.

The number of children that die before their fifth-birthday has increased in Zambia between 1990 and 2000 by about seven percent. Between 1990 and 2000, about one in six under-five children died before their fifth birthday compared to one in seven in the 1980 to 1990 period. At provincial level, both Copperbelt and Lusaka provinces recorded the least under-five deaths and Luapula province recorded the highest. Under-five children in both Lusaka and Copperbelt provinces are twice less likely to die than those in Luapula province. About one in four under-five children in Luapula die before reaching age five. Greater numbers of children dying before their fifth birthday were associated with mothers from rural areas, low level of education, previously married and among working women.

The expected number of years of life after birth in Zambia improved by about three years in 1990 to 2000 period (rose from about 47 to 50 years). At province level, Western registered the lowest life expectancy at birth of 44 years, compared with the highest, North-western at 56 years. Low Life Expectancy at Birth is also associated with babies born to rural mothers, widowed mothers, mothers with a low level educational, and working mothers.

Adult survivorship levels have significantly deteriorated between 1990-2000 compared to the periods 1980-1990 and 1969-1980. Between 1990 and 2000, an adult has lost about 11 years of survival (33 versus 44 years). Males have higher chances of surviving than females. At province level, adults in North-western province have higher chances of surviving to older ages while adults in the Copperbelt province have higher risks of not surviving to older ages.