



Government of Samoa

DEMOGRAPHIC AND VITAL STATISTICS SURVEY, 2000

Analytical Report



Department of Statistics
Apia, Samoa

Table of Contents

Table of Contents	ii
Preface and acknowledgements	iii
List of Tables	iv
List of Appendix Tables	iv
List of Figures	v
Main Demographic Indicators	vi
Summary of Report	vii
1 CHAPTER 1: SURVEY DESIGN AND POPULATION STRUCTURE	1
2 CHAPTER 2: SOCIAL AND ECONOMIC CHARACTERISTICS	10
3 CHAPTER 3: FERTILITY	15
4 CHAPTER 4: MORTALITY	20
5 CHAPTER 5: MIGRATION	25
APPENDICES	32-57
Survey questionnaire	58

Preface and acknowledgements

It gives me great pleasure to present this report of the 2000 Samoa Demographic and Vital Statistics Survey. The report outlines the demographic, social and economic characteristics of Samoa and provides a measure of Samoa's development at a particular point in time.

This document is an analytical report of the 12th demographic and vital statistics survey conducted in the country to estimate vital rates and the resulting population changes.

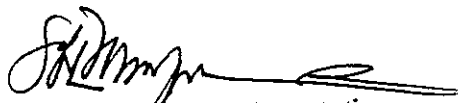
I am very pleased to mention that this is the first time ever the staffs of the Statistics Department have attempted to analyze this type of dataset by themselves. This report helped a lot to improve their computer skills and also enhanced their research and analytical skills. I would like to congratulate them all for their hard work and achievements.

This analysis was particularly made easier in a two weeks workshop arranged with the Secretariat for Pacific Community in Noumea and funded by AUSAID in May 15th to 26th, 2000. I would like to acknowledge the invaluable assistance by Dr Chris McMurray and Dr Habtemariam Tesfaghiorgis (SPC) who spent two full weeks with the staffs in order to come up with good analytical reports in their group work.

A special acknowledgment goes to AUSAID for funding the technical assistance by SPC. Acknowledgement is also due to Malaefono Faafeu-Taaloga who has been the major resource person in the planning and implementation of the workshop in her capacity as the Assistant Government Statistician. I am also grateful for the enormous time she spent on the final compilation, editing and preparation of this document.

My sincere gratitude to the selected villages and all the people who have been interviewed for their invaluable time spent on answering survey questions. My gratitude also goes to all part-time fieldworkers who were hired especially in this survey.

This report provides the Government with population information to support population policies and actions in their continuous effort to promote quality services for the people of Samoa.



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LIST OF TABLES

Table 4.1: Reported number of deaths by age and sex	21
Table 5.1: Moved in and moved-out population within regions and overseas	25

LIST OF APPENDIX TABLES

Appendix Table 1.1 : Population distribution by 5-year age groups and sex	33
Appendix Table 1.2 : Population distribution by major age groups	33
Appendix Table 1.3 : Population by 5 year age groups, region and sex	34
Appendix Table 1.4 : Sex ratios by 5 year age groups	35
Appendix Table 1.5 : Population distribution by relationship to males/females head of households	35
Appendix Table 1.6 : Average household size by regions	35
Appendix Table 1.7 : Population 15 years and over by 5 year age groups, marital status and sex	36
Appendix Table 2.1 : Population 15 years and over by educational attainment and sex	36
Appendix Table 2.2 : Population 15 years and over by further trainings completed	37
Appendix Table 2.3 : Population 15 years and over by socioeconomic activities and sex	38
Appendix Table 2.4: Population by religious denominations and sex	39
Appendix Table 3.1: Distribution of women aged 15-49 ever given birth	40
Appendix Table 3.2: Age distribution of women by age at first birth	41
Appendix Table 3.3: Distribution of mothers by age at first birth and current survey age	41
Appendix Table 3.4: Comparison of reported birth rates per 1000 women by census and survey period	42
Appendix Table 3.5: Comparison of average parities by census and survey period	42
Appendix Table 3.6: Adjusted age-specific fertility rates by survey year	44
Appendix Table 3.7: Comparison of P/F ratios by survey year	44
Appendix Table 3.8: Differences in CEB by socioeconomic characteristics	45
Appendix Table 4.2: Distribution of deaths by major age groups and major causes of deaths	49
Appendix Table 4.3: Major causes of deaths by sex	50
Appendix Table 4.4: Distribution of number of children surviving, dead and ever born by age group of mothers and sex of children	51
Appendix Table 4.5: Proportion of children dead, and estimates of infant and child mortality rates	53
Appendix Table 4.6: Sex ratios of children by age group of mothers	54
Appendix Table 5.2: International migration by regions	56
Appendix Table 5.3: Distribution of international migrants by 5 year age groups	56
Appendix Table 5.4: International migration by reasons for migration	56
Appendix Table 5.5: Internal movements by regions	57
Appendix Table 5.6: Internal movements by reasons	57

LIST OF FIGURES

Figure 1.1: Age and sex distribution of sample population	2
Figure 1.2: Population distribution by age and sex and region	4
Figure 1.3: Sex ratios by region	6
Figure 1.4: Relationship to head of household by sex	7
Figure 1.5: Average household size by region	7
Figure 1.6: Marital status by 15 years and over and sex	8
Figure 1.7: Marriage by age and sex	9
Figure 2.1: Educational attainment 15 years and over	10
Figure 2.2: Type of further training attained	11
Figure 2.3: Economic activity by sex	12
Figure 2.4: Religious denominations	13
Figure 3.1: Women aged 15-49 ever given birth	15
Figure 3.2: Age at first birth, women 15-49 (per cent)	16
Figure 3.3: Adjusted birth rates per 1000 women, 1999 and 2000	17
Figure 3.4: Fertility differentials by socioeconomic characteristics	18
Figure 4.1: Trends in Infant mortality rates, 1985-1999	23
Figure 5.2: International migration by region	26
Figure 5.3: Age distribution of international migrants	27
Figure 5.4: Reasons for international migration	28
Figure 5.5: Net migration between regions	29
Figure 5.7: Reasons for movement between regions	30

MAIN DEMOGRAPHIC INDICATORS, 2000

2000 Total interviewed population	32,660	
Percentage younger than 15 years	40.6	%
Percentage 15-64 years	54.6	%
Percentage 65+ years	4.7	%
Median age of population	20.0	years
Sex ratio	109	males/100 females
Dependency ratio (15-64)	83	dependents/100 working age
Average household size	8.2	persons per household
Estimated vital rates:		
Crude birth rate	29.1	per 1000 population
Crude death rate	5.5	per 1000 population
Net migration rate	-10.7	per 1000 population
Natural increase rate	2.36	%
Population growth rate	1.29	%
Total fertility Rate	4.3	children per woman
Average age at first birth	21.2	years
Infant mortality rate (IMR)	17.8	per 1000 births
Females	16.7	per 1000 births
Males	17.3	per 1000 births
Labour force participation rate		
Males	78.7	%
Females	23.4	%
Total	52.1	%

SUMMARY

The Samoa 2000 Demographic Survey was a follow-up of the 1999 Demographic and Health Survey, using the same sample of 20% of all villages in Samoa.

The age structure of the sample population was very young, with 40.6% under age 15 years. There were more males than females in every region, with an overall sex ratio of 109 males for every 100 females. The average household size was 8.2 persons per household, ranging from 7.6 in Apia Urban Area (AUA) to 9 in ADU. Females tended to marry at younger ages than males, and experienced higher rates of widowhood at older ages than did males.

The survey population was generally educated, with 70% of males and 74% of females having at least secondary education. Fourteen percent of the sample population had attained further education. Twice as many had professional qualifications as trade qualification. Overall, 52% of respondents 15 years and over were economically active, with 56% in regular income employment.

The largest religious denomination was Congregation (38%), followed by Catholic (22%) and Mormons (14%).

Overall, 62% of surveyed women, aged 15-49 had given birth to at least one child, with most having their first birth when they were aged 20-24. The pattern of fertility indicates declining fertility at older ages, although women are still giving birth to an average total of 4.3 children during their lifetimes. Fertility patterns vary between socio economic groups. They are slightly higher on average for Mormons and Other religions than for Congregationists, Catholics and Methodists; substantially higher for women with only primary education than those with secondary education; lower for those with further training and employment than for others, and slightly lower in AUA than in other regions.

Mortality was low in the surveyed population, but there was a pattern of relatively high mortality for females aged 15-19 and males aged 20-34. Infant mortality declined substantially during the 1980s but has been relatively constant in recent years. Non-communicable diseases were reported as the cause of 55% of all deaths in the sample population. In order to make reliable estimates of mortality rates, detailed registration data are needed, but it appears that at present only about half of all deaths occurring in Samoa are registered.

The survey showed that 15% of the sample population changed their place of residence in the year between the two surveys. Seventy-six percent moved within Samoa, and 24% moved to or from overseas destinations. There were 248 more international emigrants than immigrants in the sample population as a whole, with a net loss in every region. Within Samoa, there was a net increase in the North West Upolu sample population from in-migration, and a net decrease in all other regions.

CHAPTER 1: SURVEY DESIGN AND POPULATION STRUCTURE

Prepared by Vaeila Umaga and Fevaea Ah Mu

1.1 Survey Design

The Samoa 2000 Demographic Survey was a follow-up survey of the Samoa 1999 Demographic and Health Survey (DHS). The sample comprised 66 villages, which is 20% of the total of 330 villages, selected systematically with a random start. Thirteen villages were selected from Apia Urban Area (AUA), 10 from North West Upolu (NWU), 23 from Rest of Upolu, including Manono and Apolima Islands (ROU), and, 20 from Savaii. Information was collected from every person in each of the selected villages. The interviews for the Samoa 2000 Demographic Survey were conducted in February and March 2000, which was one year after the 1999 DHS.

The analysis of the 1999 DHS was based on a total of 28,638 persons. The 2000 DHS survey collected information from 33,861 persons. However, respondents who were not usual residents of the surveyed areas were later excluded from the sample and left the remaining 32,660 respondents for this year's analysis. This sample included 7,699 persons from AUA, 7,219 in NWU, 8,936 in ROU and 8,806 in Savaii.

The substantial increase in the 2000 DHS sample size compared to the 1999 DHS was partially due to the inclusion of 2,353 eligible respondents who had been omitted from the sample in 1999 mainly because they were not available at the time of the 1999 survey.

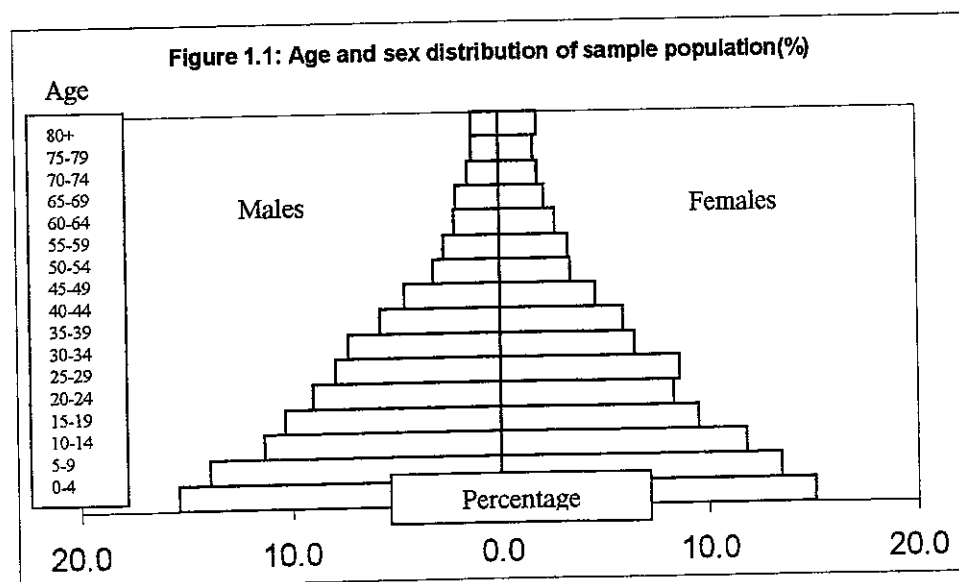
This report is based on information of approximately 20% of the total Samoan population. Like in many sample surveys, the sample survey this year identified

smaller numbers of births and deaths compared to the 1999 survey. This may be due to the fluctuation of births and deaths and may also be due to under-reporting of new births and deaths. Therefore, these results should be considered as indicative of patterns and trends only, rather than precise statistics applied to the population as a whole.

As the Statistics Department always argued, the problems encountered in sample surveys of births and deaths could have largely been avoided if registration of births and deaths were complete. Complete registration of births and deaths administered by the Justice Department would save the Government a lot of money spent on Demographic surveys every year and at the same time allows the Department of Statistics to collect other important information needed for national and community planning.

1.2 Distribution by age and sex

Figure 1.1(Appendix Table 1.1, 1.2) shows the percentage distribution of the sample population by age and sex. The wide base of the pyramid means the sample population is very young with a high proportion of children and young



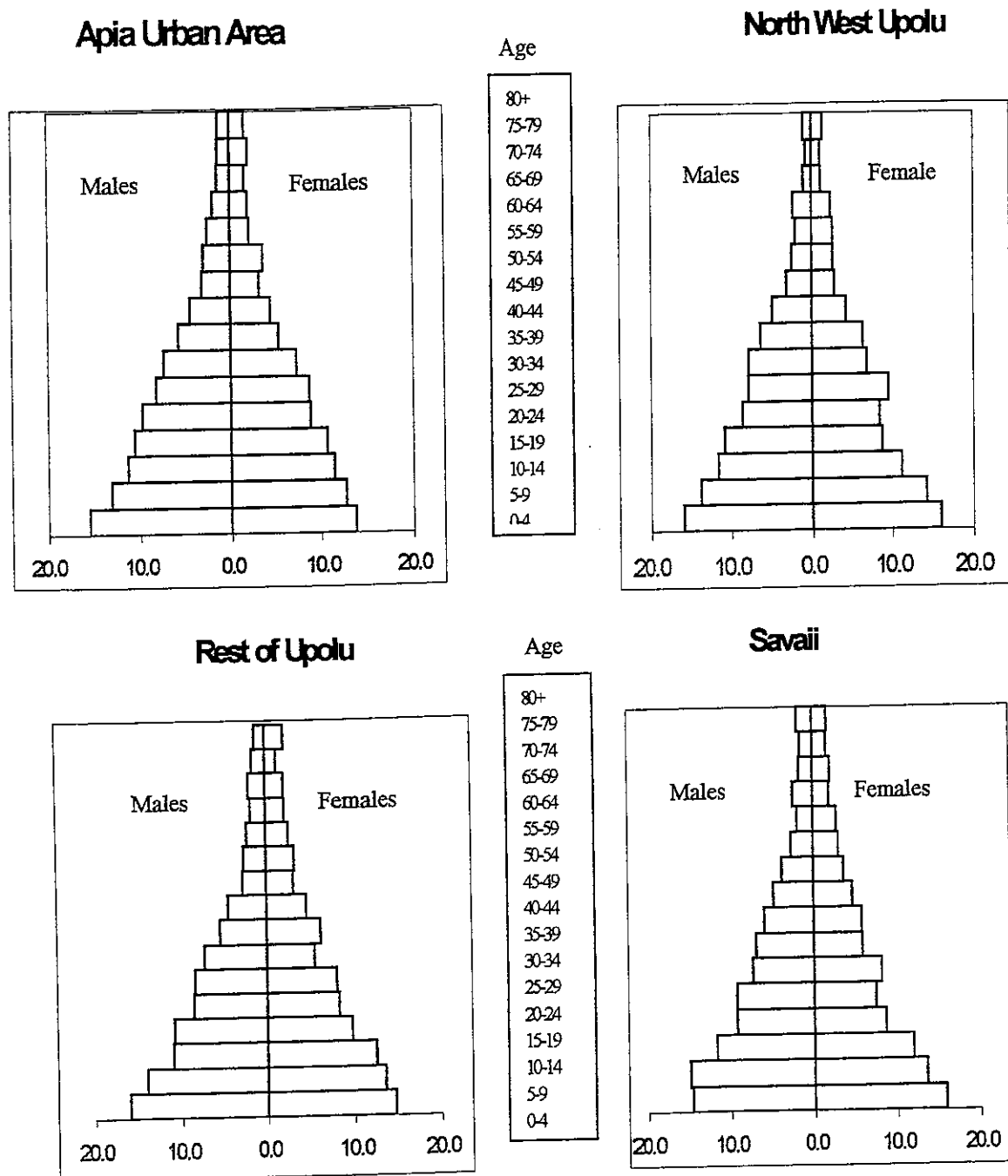
adolescents. Overall, about 41 percent of the sample population were under 15

years, 53 per cent aged between 15-59 and only about 7 per cent were older than 59 years.

The pyramid shows a deficit of females aged 20-24 years compared to age 25-29 as indicated by a shorter bar. This was also evident in the pyramid for the 1999 DHS. This may be due to high emigration of young females in the past.

Figures 1.2 (Appendix: Table 1.3) show the population pyramids for each region. All pyramids have the same wide base as for the total sample, with little more variations in the percentages of males and females. The deficit of females aged 30-34 years is especially evident in Savaii and NWU.

Figures 1.2: Population distribution by age and sex and region (%)



1.3 The Median Age and the Dependency Ratio

The Median age was approximately 20 years. This means that one half of the sample population was under 20 years of age and another half was over 20 years old indicating a young population structure.

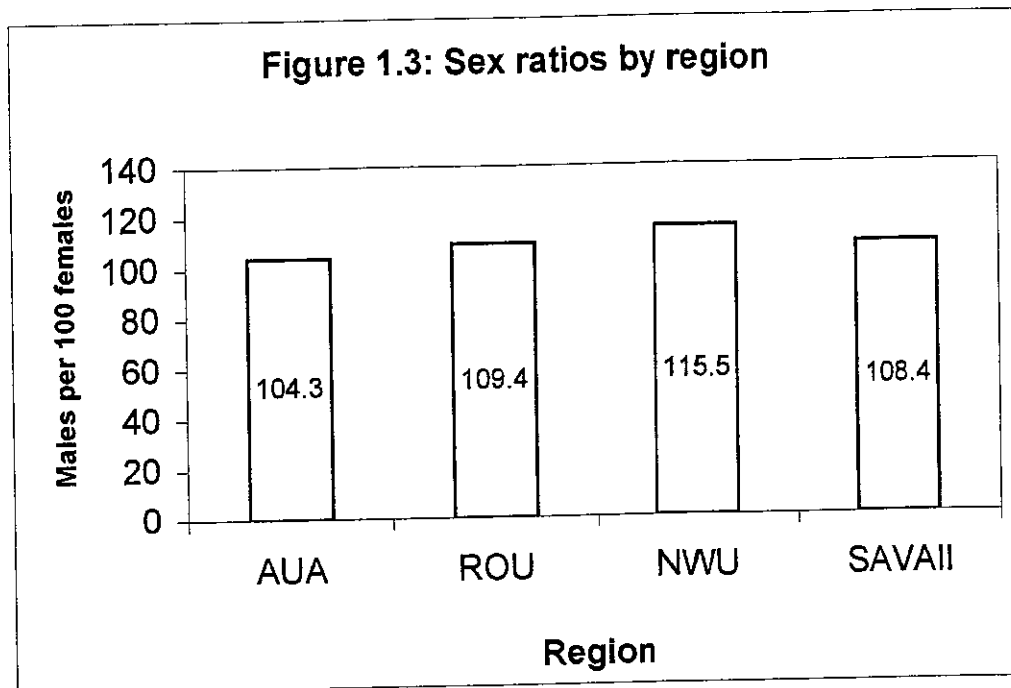
The Age dependency ratio showed that for every 100 persons of working age (15-64), there were 83 dependent persons (persons under 15 years and above 64 years of age). This high age dependency ratio was mainly due to the high proportion of young children and teenagers under 15 years as mentioned earlier. A ratio less than 83 would mean a lesser burden on the working age group to care for the dependents. This can only be achieved with lowering fertility rates which would in turn lower the proportion of young children in the population.

1.4 The Sex Ratio

The overall sex ratio was about 109 (Appendix Table 1.4). This means for every 100 females, there were 109 males in the sample population. The sex ratio in 1999 was 108. These ratios are relatively high if compared to the international standard of 105. By age, the survey reflected high sex ratios where males outnumbered females from birth up to ages 45-49.

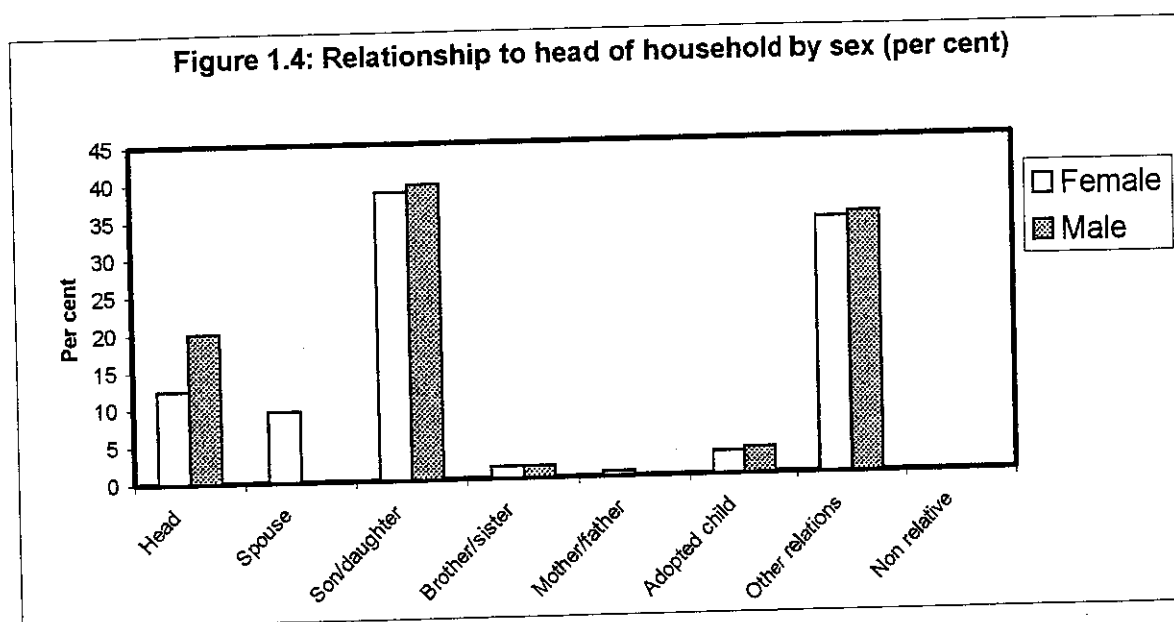
However at older ages, starting from age 50-54 to the oldest age group (except for age 60-64), the sex ratios dropped below 100 revealing females outnumbering males. This is particularly due to longer life expectancies for females or higher survival ratios for females than males at older ages leading to more females at older ages. This is a common aspect in many countries.

Figure 1.3 shows the sex ratios by regions in the sample population. In all regions, there are more males than females with the highest sex ratio in NWU.



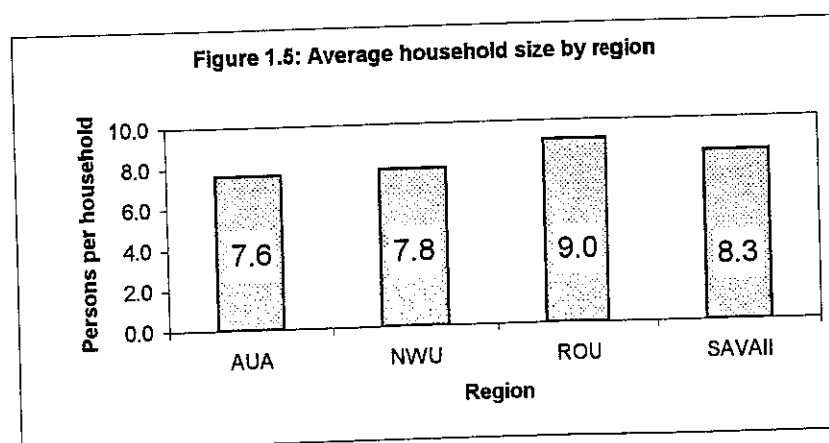
1.5 Relationship to head of households

Figure 1.4 (Appendix: Table 1.5) shows the distribution of the sample by relationship to head of household. The largest groups of persons in the households were the Sons/Daughters (38.6%) followed by Other Relations (34.2%), Heads (12.4%) and Spouses of Heads (9.5%). The high percentage of Other relatives in all households still reflected the tendency of the Samoan people to live as extended families.



1.6 Average household size

Figure 1.5 (Appendix Table 1.6) shows the average household size by regions. The overall average household size in the 2000 survey was 8.2 persons. This is bigger than the average household size in 1999 of 7.5 persons. It must be noted that this increase is largely due to the inclusion of 2,353 eligible respondents who have been omitted from the 1999 DHS because they were not available.



By region, ROU had the largest average household size, with 9.0 persons per household while AUA had the smallest size with 7.6 persons per household.

1.7 Marital Status

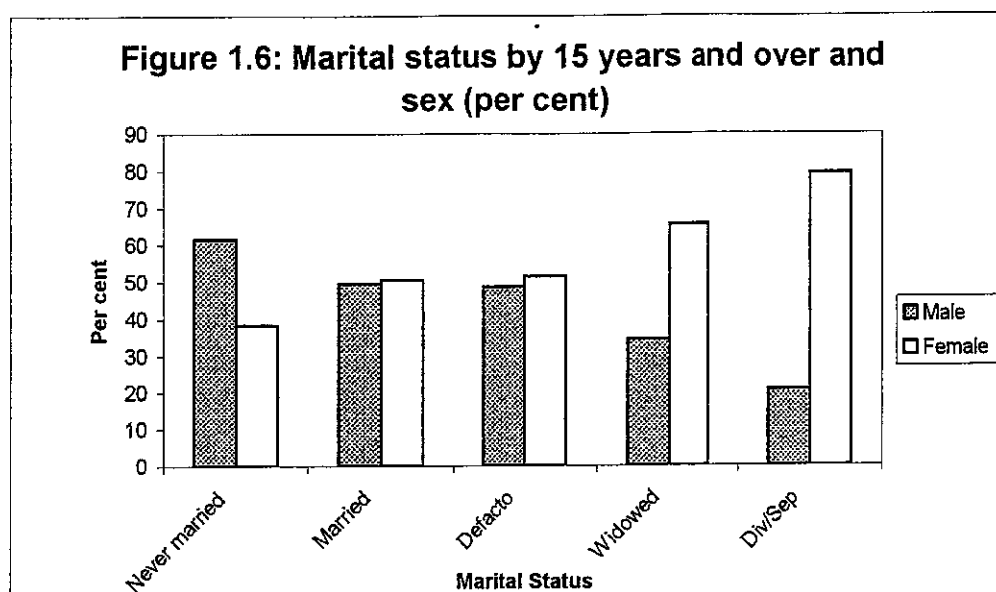
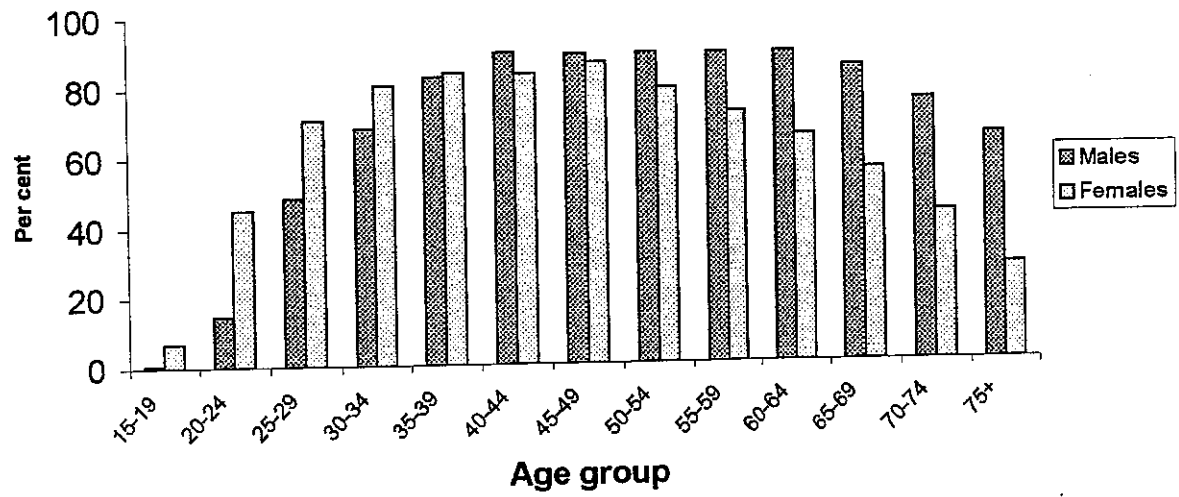


Figure 1.6(Appendix Table 1.7) shows the percentages of males and females in each marriage category. Overall, there were more males than females in the never married category, while the proportion of married and de facto relationships were almost equal for both sexes. As shown, females were more likely than males to be divorced, separated or widowed. The higher percentage of divorcees for women than men maybe due to the fact that men mostly remarried when they lose their partners by divorce or death. The high percentage of widowed women again reflected the longer life expectancies for females than males especially at old ages.

Figure 1.7 shows the proportion married or de facto by age and sex. It shows that females tended to marry earlier than males, as shown by higher percentages of females married at younger ages. However, at age 40 up to the oldest age, marriage declines for women as they go through aging. This again reflected divorces and widowhood.

Figure 1.7: Marriage by age and sex (per cent)



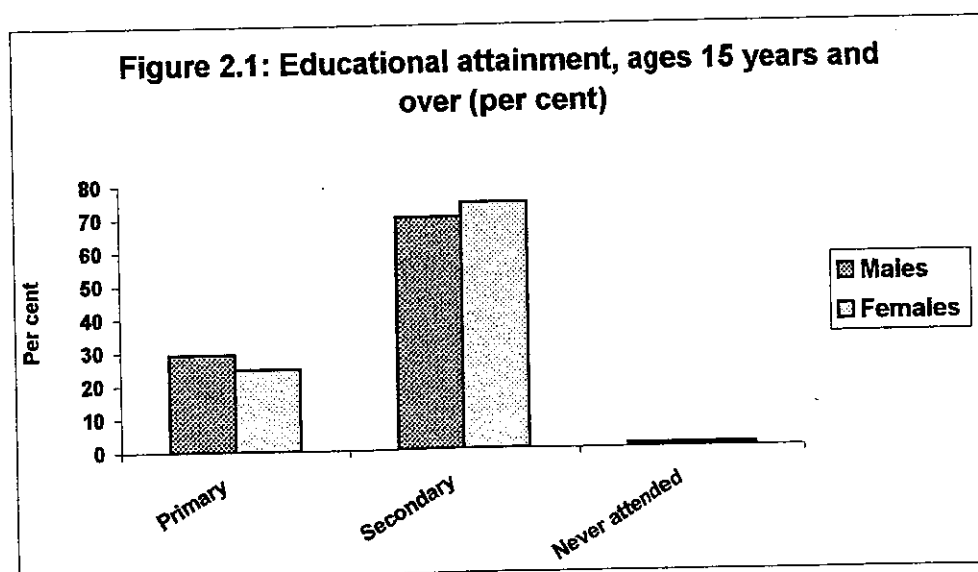
CHAPTER 2: SOCIAL AND ECONOMIC CHARACTERISTICS

Prepared by Atatagi Mulipola and Folavale Sooamalii

Socioeconomic characteristics of the population such as education, economic activity, religion and others can reflect living standards and culture. This information not only helps government to evaluate the effectiveness of social and economic policies already in place but also determines population policies because fertility, mortality and migration levels vary according to socioeconomic characteristics of the population.

2.1 Educational Level of Attainment

Samoa people are very fortunate to have full access to education especially primary and secondary education and further training after leaving school. Figure 2.1(Appendix Table 2.1) shows that in the overall sample, 29 percent of males and 25 percent of females have attained primary education. The majority



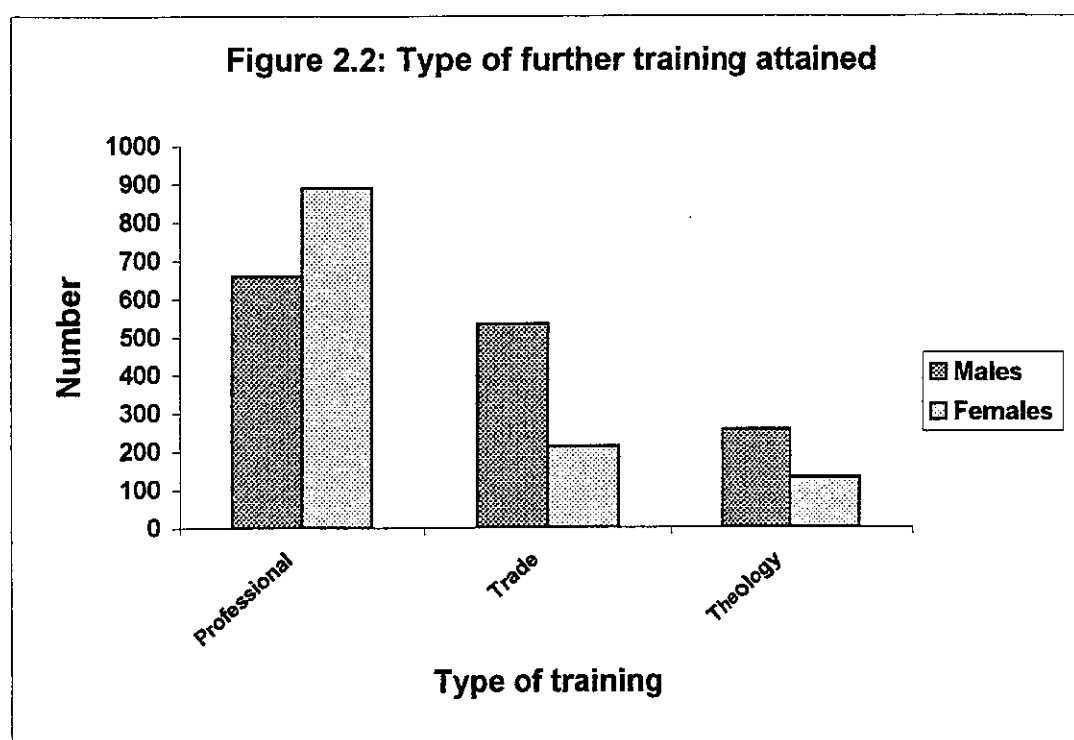
Note: 'Primary' includes 221 respondents who had only pre-school, and 35 whose highest education level was pastor school or Loto Taumafai.

consisting 70 percent of males and 74 percent of females have attained secondary education. This indicates the high level of educated persons in Samoa. The never attended category is very minimal.

2.2 Further Training

A total of 2,681 respondents aged 15 years and over gained other qualifications after leaving school (Appendix table 2.2). This is about 14 percent of the total sample population aged 15 years and over which comprised 15 percent of total males and 14 percent of all females.

Of the 14 percent who had further qualifications, the majority gained university level qualifications and others gained qualifications in teaching, nursing, computing, theology and qualifications in other areas (Figure 2.2).



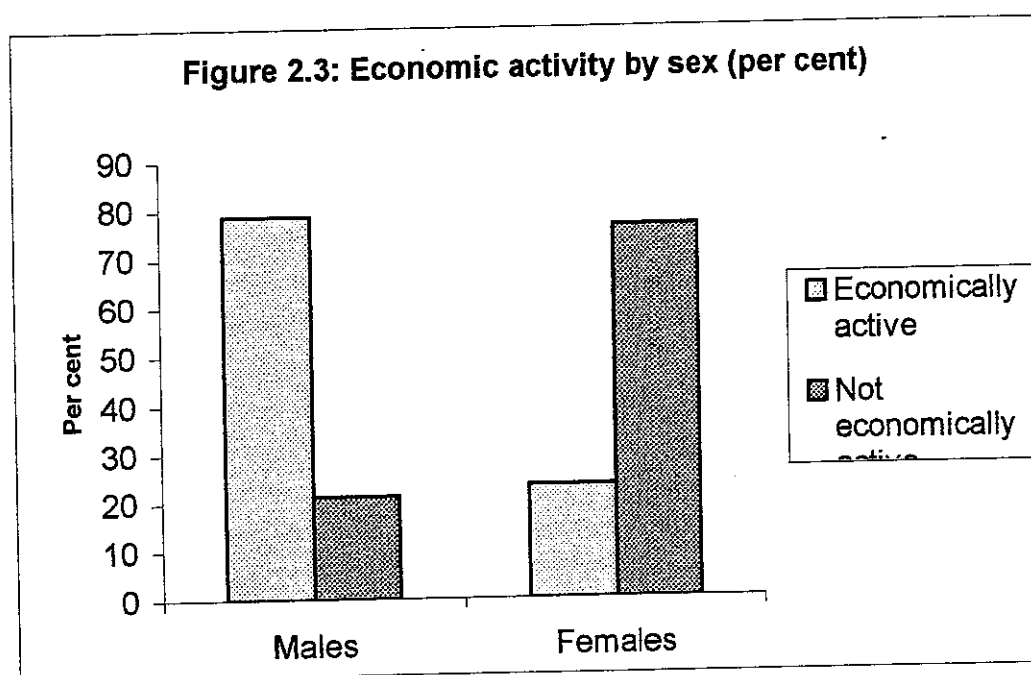
(Note that females with theological training were wives of theology students, who took related training to assist their husbands' religious missions).

This shows the variety of career opportunities available to young people at school. By gender, it is quite apparent from the survey that females are just as equal as males in their levels of education. Only when it comes to choosing their careers that females and males have different areas of preferences. This of course depends on personal choices and opportunities available.

2.3 Economic activities

Economically active people included persons working for wages/salaries, employers and self-employed persons. It also included persons who spent most of their time in producing goods and services for consumption or selling such as farming, fishing and crafting. These types of people make up the labour force of any country.

On the other side, all persons who spent most of their time in domestic duties,



and schooling and all retired and disabled persons are conventionally not considered in the labour force. This group is referred to as Non-economically active because they are not producing any economic goods or services.

From the survey results, 52 percent of all respondents aged 15 years and over were recorded as economically active (Appendix Table 2.3). This comprised 79 percent males and only 23 percent females (Figure 2.3). These results are very similar to those in the 1999 DHS.

Of the economically active population, 56 percent were regularly employed or receiving regular income while 44 percent were engaged in farming, fishing and

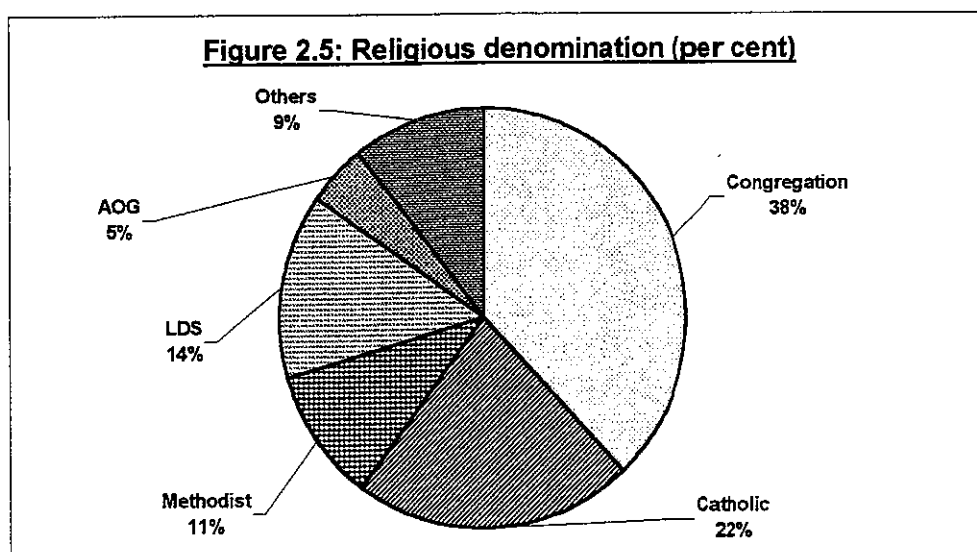
other economic activities. Of those engaged in these activities, 97 percent were males and only 3 percent were females.

The Non-economically active population was largely dominated by women which accounted for 77 percent compared to only 23 percent for men. It is not strange to see that about 85 percent of women were engaged in domestic duties with only 15 percent for men.

It must be noted that the fact that women were mostly non-economically active due to their domestic roles does not necessarily reflect that women were not active. Women in Samoa are well recognized for their childrearing roles in their families and their free commitments in the welfare of their villages. These roles are just as important in supporting the economy of Samoa and particularly the working group.

2.4 Religious Denomination

Figure 2.4 (Appendix Table 2.4) shows that the largest proportion of respondents attended the Congregational Christian Church (38%), followed by Catholics (22%), Mormons (14%), Methodists (11%) and the Assembly of God (5%). All other churches including Seventh Day Adventist, Pentecost, Nazarene, Church of Christ, Worship Center, Baha'i, Jehovah's Witness, Bible Study, Voice of



Christ, Church of England, Peace Chapel, Baptist and Apostolic Church accounted for 9 percent of the total sample. It is interesting to note that all respondents stated their religion. This indicated that Samoan people strongly emphasized the church as part of their lives and it's an identity they do not want to get away from it. This supplements the National logo: "Samoa is founded upon God".

CHAPTER 3: FERTILITY

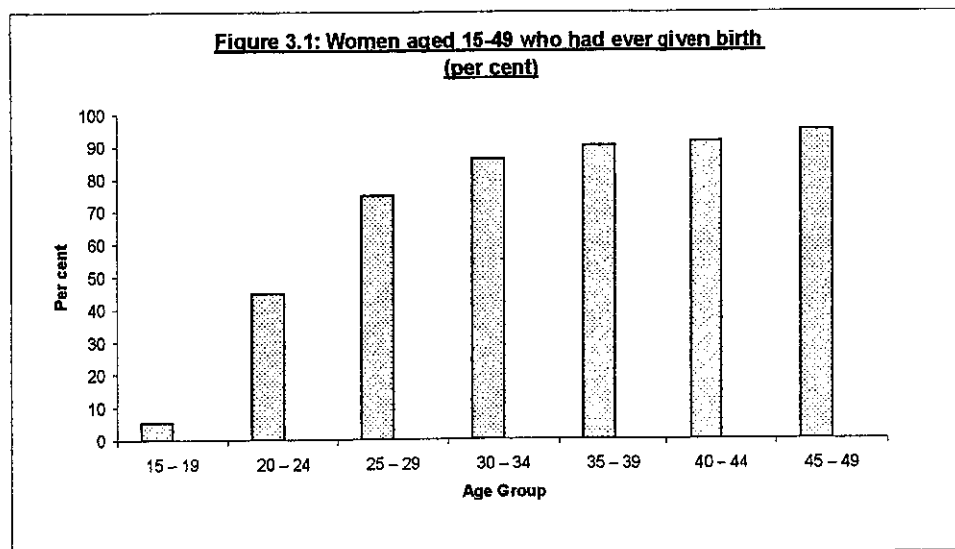
Prepared by Sefo Taulealo, Noma Vaafusuaga and Leemo Tanuvasa.

This chapter summarizes the fertility pattern obtained in the 2000 survey. Fertility is defined as the number of live births occurring in a population and is indicated by the birth rate. Samoa has been experiencing high birth rates in the last decades. The 2000 survey estimated the birth rate at 29.1 per 1000 or around 4,700 new births every year. This number is very high given the limited health resources and services available. Fertility is determined by many factors. Some important factors are discussed in this chapter.

In the 2000 survey, a smaller number of births were found compared to the 1999 DHS. Due mainly to this, the data had been adjusted to allow for inconsistencies in reporting of births. The methods used to adjust the data are explained in Appendix 3: Fertility.

3.1: Ever given birth

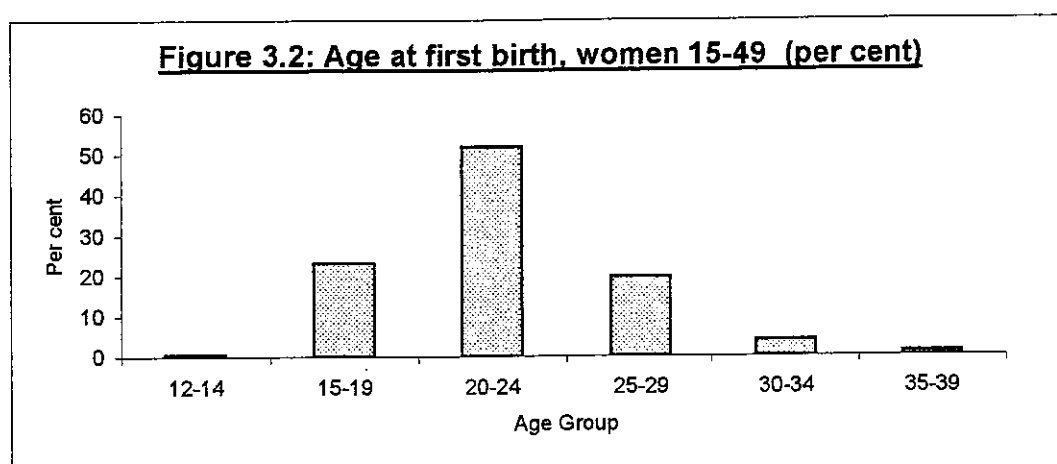
Of all women aged 15-49, 62 percent said they had given birth at least once. Figure 3.1(Appendix: Table 3.1) shows that whereas only 6 percent of women



aged 15–19 had ever given birth, the percentage jumps to 45 percent for ages 20–24, and peaks at 95 percent of those aged 45–49. About 5 percent of all women 15–49 years comprises women who had reached the end of their reproductive lives but never had a child.

3.2 Age at first birth

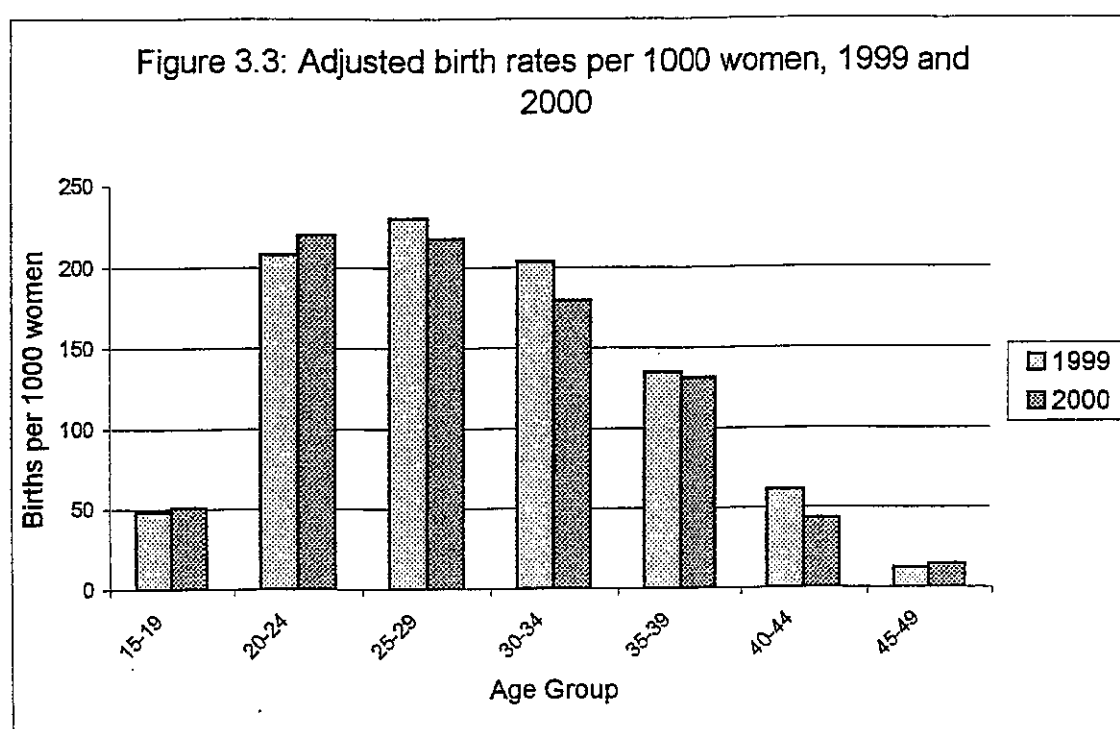
Figure 3.2 (Appendix: Table 3.2) shows that close to a quarter of all surveyed women had their first birth when they were less than 20 years of age, and more than 50 percent had their first birth when they were 20–24 years old. Therefore, almost 75 percent of surveyed women had given birth by age 25. The mean age at first birth was 22.3 years, which was the same as for the 1999 DHS. The median age at first birth, which is the age by which 50 percent of surveyed women had their first birth, was 21.2 years.



The age at first birth is one important factor that contributed to the high fertility in Samoa. The survey showed that one quarter of Samoan women had their first birth when they were less than 20 years or in their teen ages. For fertility, this means women have a longer interval of about 30 years to have more children before they ended their reproductive period at around 50 years of age. If age at first birth could be delayed to an older age, there is a chance of lowering fertility as women have shorter intervals to have more children.

3.3 Age patterns of fertility and total fertility rate

Figure 3.3 shows the adjusted age patterns of fertility calculated from the 1999 and 2000 surveys. The patterns are similar, but the 2000 estimate shows lower fertility for older women, suggesting that they have tended to limit their fertility. The Total Fertility Rate in the 2000 survey is 4.3, which means that if current fertility rates were constant, women would have an average of 4.3 children during their lives (Appendix: Table 3.6).

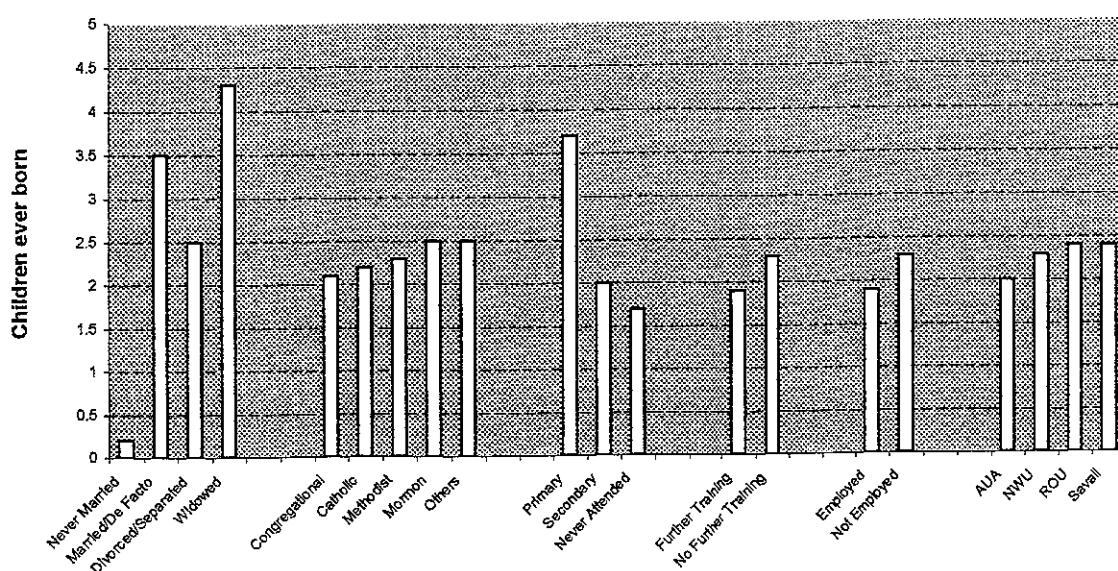


3.4 Fertility differentials by socioeconomic characteristics

Socioeconomic characteristics especially age distribution of women influenced fertility. This is seen in Figure 3.4 (Appendix Table 3.8) showing the average number of children ever born to surveyed women according to their socioeconomic background.

By marital status, the average number of children born to married, remarried or women in a de facto relationship was higher (3.5) than the fertility of those who were never married (0.2) and those who were divorced or separated (2.5). The higher average parity for widows (4.3) as seen is mainly due to the fact that widows are older than women currently in a relationship, and therefore can be expected to have had more children ever born.

Figure 3.4: Fertility differentials by socioeconomic characteristics



By religion, the survey showed that fertility of Mormons and Others were slightly higher than for women in the Methodists, Congregation and the Catholic Church. This was the same result identified in the 1999 DHS.

By educational attainment, there was a vast difference between the fertility of women with only primary education (3.7) and those with secondary education (2.0). In contrast, women who had never attended schools had the lowest fertility compared to those above. As only 81 women were in this category, the low fertility of these women could have been associated with factors such as disability and recall lapse.

By employment, fertility of women who were employed or had further training averaged to only 1.9 children, compared with 2.3 of those not employed or never received further training.

Difference in the fertility according to place of residence is very minimal. That is, women residing in NWU had the fertility rate of 2.3, ROU 2.4, and, Savaii 2.4. AUA had the lowest fertility with only 2.0 children on average.

To summarize, women with the highest fertility were:

- ✓ married women and women in de facto relationships
- ✓ women who attained only primary education and
- ✓ unemployed women

Family planning clinics and health officials can target these women in their programs.

CHAPTER 4: MORTALITY

Prepared by Kaiona Fonoti, Alefa Leofo and Malaefono Faafeu-Taaloga

Samoa is fortunate in having relatively low mortality rates partially due to the young age structure and improved health systems compared to many other developing countries. Consequently, only a small number of deaths can be expected to occur in sample surveys.

On the other hand, some people find it difficult to discuss deaths during surveys, and often failed to report deaths to interviewers. As a result, even large sample sizes like the 2000 survey was not sufficient to collect a larger number of deaths to produce reliable mortality estimates for Samoa.

A much more reliable source of deaths data would be registered deaths compiled by the Justice Department. Unfortunately, death registration has always been very incomplete in Samoa due to late registration by relatives of the deceased or none registration at all. The lack of enforcement of registration by the department also causes this problem. Moreover, registered deaths covered mostly people dying in hospitals and missed out some deaths in villages hence makes deaths analysis using registration data more difficult.

A sample survey is an alternative source of deaths data only if death registration is incomplete. Unfortunately, the 2000 survey, which is 20 percent of the total population reflected it was still not big enough to collect a reliable number of deaths. Statistically, the larger the sample size is, the more reliable the data becomes. Financially, the larger the sample size is, the more costly it becomes to the Department and to the Government.

The number of deaths by age and sex recorded in the 2000 survey are shown in Table 4.1. Due mainly to the small numbers of deaths direct estimates or statistics that could have been estimated directly from the survey results would

not be reliable. As a result, indirect estimates using additional deaths from previous surveys and other sources were used to derive levels and patterns of mortality for the year 2000.

Table 4.1: Reported number of deaths by age and sex, 2000.

AGE GROUP	MALE	FEMALE	TOTAL
0	4	2	6
1-4	1	3	4
5-9	1	1	2
10-14	1	0	1
15-19	1	1	2
20-24	4	0	4
25-29	0	1	1
30-34	1	0	1
35-39	1	0	1
40-44	4	1	5
45-49	3	1	4
50-54	4	4	8
55-59	3	6	9
60-64	8	5	13
65-69	10	6	16
70-74	11	3	14
75+	16	14	30
TOTAL	73	48	121

The mortality estimates using “*Indirect methods*” are described below. “*Direct methods*” using the 2000 survey are discussed in Appendix: Mortality. Readers are strongly advised to focus only on the patterns and trends of mortality in direct estimates.

INDIRECT ESTIMATION OF MORTALITY

Those recorded as ‘died’, ‘new born died’ and ‘moved in and died’ comprised deaths for mortality analysis. To get indirect estimates for infant and child mortality, data were obtained indirectly from reports of mothers on the number of their children ever born who were alive and dead. (Detailed analyses are

explained in the Appendix: Mortality). To estimate the Crude death rate, adjustments were made so as to minimize errors of small numbers.

4.1 Indirect estimation of infant and child mortality

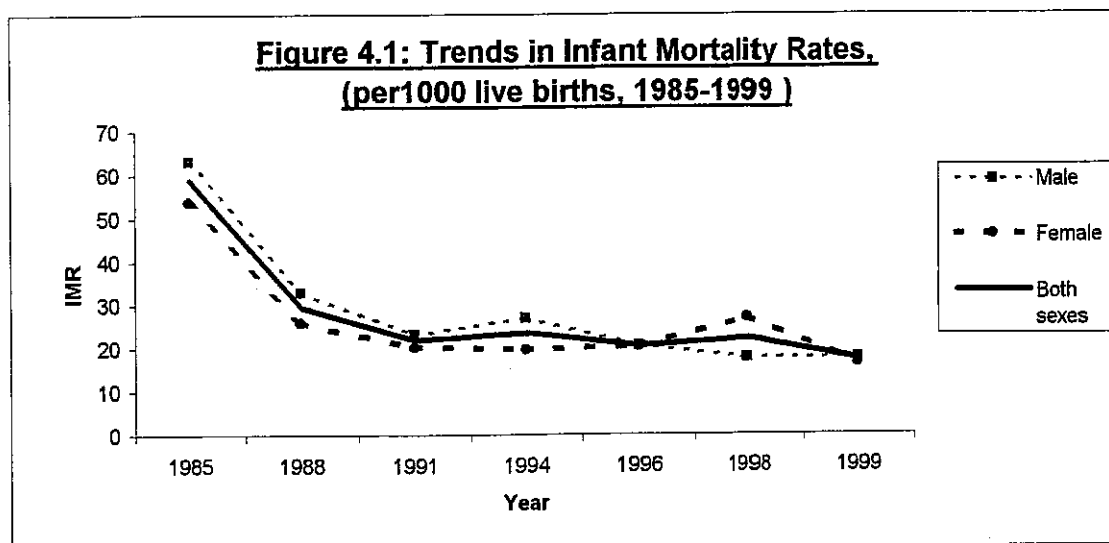
Infant and child mortality estimates were derived from the analysis of mothers' reports of children alive and dead, classified by age group of mothers. The results are shown in Figure 4.1 reflecting the trends in infant and child mortality in Samoa over the last 15 years. The results are consistent, even though such reports are often affected by under reporting of number of dead children, particularly by older women.

The trends as indicated by the lines showed that there have been substantial improvements in infant and child survival as shown by the marked declines in infant mortality in the 1980s and gradual declines in the 1990s. Infant mortality declined from around 60 infant deaths per 1000 live births in 1985 to about 20 per 1000 in 1999.

The analysis reflected that the when weighted by a sex ratio at birth of 108.8 the *Infant Mortality Rates (IMR)* were:

- ✓ 17.8 per 1000 for males,
- ✓ 16.7 per 1000 for females, and,
- ✓ 17.3 per 1000 for both sexes

The IMR in the 1998 survey was 25 per 1000 for both sexes. Although the decline maybe too much in such a short time the data indicated there is a strong tendency for infant mortality to continue declining in the future if children's health programs continue for the better in the future.



4.2 Adjusted Crude Death Rate (CDR)

The CDR is the number of deaths per 1000 population. It is calculated as the number of deaths in a specific survey year divided by the population of that specific period.

A total of 121 deaths were recorded for the 2000 survey period as shown in Table 4.1. This would give a CDR of 3.7 deaths per 1000 population ($121/32,660 \times 1000$). This rate is too low by any standard. This could be caused by:

- ✓ under reporting of deaths during the interviews,
- ✓ the number of people dying were less in the 2000 survey period,
- ✓ the sample of 20 percent was still small and should be increased to get a more reliable number of deaths.

All these factors were considered leading to the adjustment of the Crude death rate. In the 1999 DHS, the CDR was estimated by collecting mortality for two years (1997,1998) rather than one year arriving at 6.4 deaths per 1000 population.

To adjust for the small numbers of deaths this year, the method used was to combine all reported deaths occurring in the sample population in the three years

prior to the 2000 survey (1997, 1998, 1999) and averaged. As a result, a *CDR* of 5.5 deaths per 1000 population was obtained for the period 1997-1999, representing the 2000 survey.

The Natural Increase

The natural increase is the difference between the number of births and the number of deaths in a population in a given year. This difference tells us how much the population has increased or decreased in terms of births and deaths in the absence of migration. This is estimated as follows:

$$\begin{aligned}\text{Natural Increase (NI) rate} &= \text{CBR} - \text{CDR} \\ &= 29.1 - 5.5 \\ &= 23.6 \text{ per 1,000 or } 2.36 \text{ \%.}\end{aligned}$$

The difference apparently shows the excess of births over deaths in the survey year. If this NI is applied to the total population (161,298), then this means births exceeded deaths by about 3,800 births a year. In the absence of migration, this NI rate would mean that the population of Samoa could be increased by 19,000 after the next 5 years (5 X 3,800) if the NI remains the same in this period. This is a critical issue that needs serious attention regarding population policies.

4.3 The Average Life Expectancies

The Average life expectancies can be calculated using data on deaths by age in the population. For the 2000 survey, it is not considered feasible to calculate a life table for Samoa. The registration data are too incomplete while on the other hand deaths from the survey are too small as shown in Table 4.1 to permit a construction of a reliable life table.

The estimated average life expectancies for 1997-1998 from the 1999 DHS was 65.4 years for males, 71.9 for females and 68.4 years for the total population.

CHAPTER 5: MIGRATION

Prepared by Elisapeta Pasa, Iosefa Lualua and Tuiafutea Tuala

5.1: Levels of Migration

Migration is the movement of people across a specified boundary for the purpose of residing. This is another major area of population analysis as the population growth rate can only be estimated from natural increase and the net migration rate.

The 2000 survey recorded a total of 4,813 respondents who have moved into and out of the sample since the 1999 DHS (Table 5.1). This is about 15 percent of the total sample population of 32,660, or, almost one in every seven people in the sample changed their place of residence in the year preceding the survey.

Table 5.1: Moved-in and Moved-out population between regions and overseas, 2000

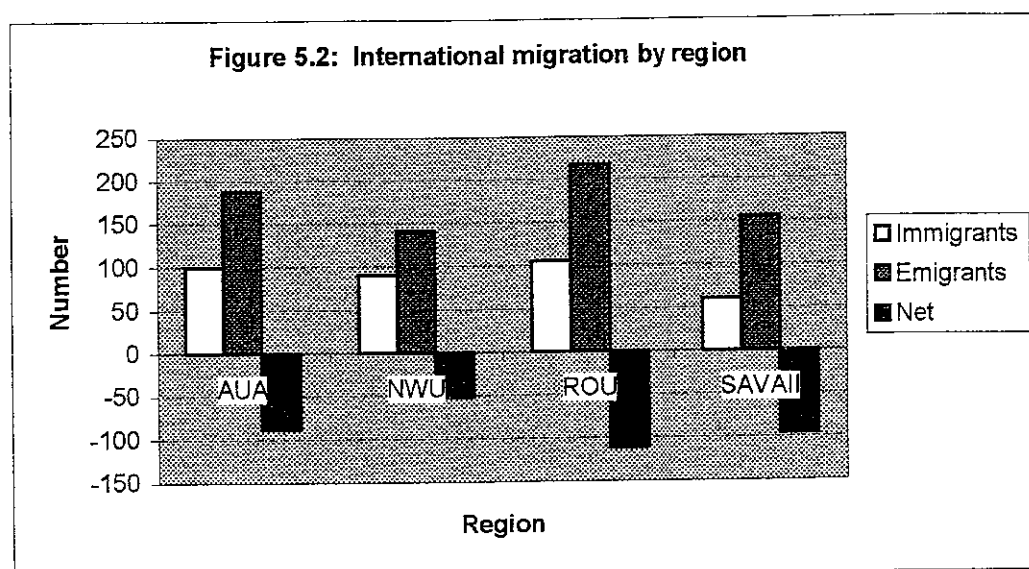
	AUA	NWU	ROU	SAVAII	American Samoa	NZ	Australia	USA	Other count	NS	Total
Moved out											
AUA	196	136	102	81	39	104	19	9	17	60	763
NWU	102	162	97	55	59	70	10	2	1	19	577
ROU	53	105	233	59	88	94	20	6	9	0	667
SAVAII	94	93	58	249	78	66	8		3	10	660
Total	445	496	490	444	264	334	57	18	30	89	2667
Moved in											
AUA	147	74	64	102	17	46	21	7	9	5	492
NWU	140	240	138	90	32	32	13	3	10	0	698
ROU	82	56	150	47	55	35	4	8	3	1	441
SAVAII	117	65	66	207	30	25	0	3	2	0	515
Total	486	435	418	446	134	138	38	21	24	6	2146
Total	931	931	908	890	398	472	95	39	54	95	4813

Those Moving out of the sample exceeded those Moving in by 521 (Moved in = 2146, Moved out = 2667). Of the total of 4,813 movers, 76 percent (3,660)

moved within Samoa, 22 percent (1058) moved overseas, while movement for 95 people were not known.

Movements between regions in Samoa and movements overseas are considered separately in this chapter. This is because International migration affects the total population size of Samoa, while movements within Samoa can only affect the population distribution within regions.

It is important to note that some of those who moved into or out of the sample may have moved to a different village but still stayed in the same region. These movements within the same regions are excluded from figures and tables showing regional migration.



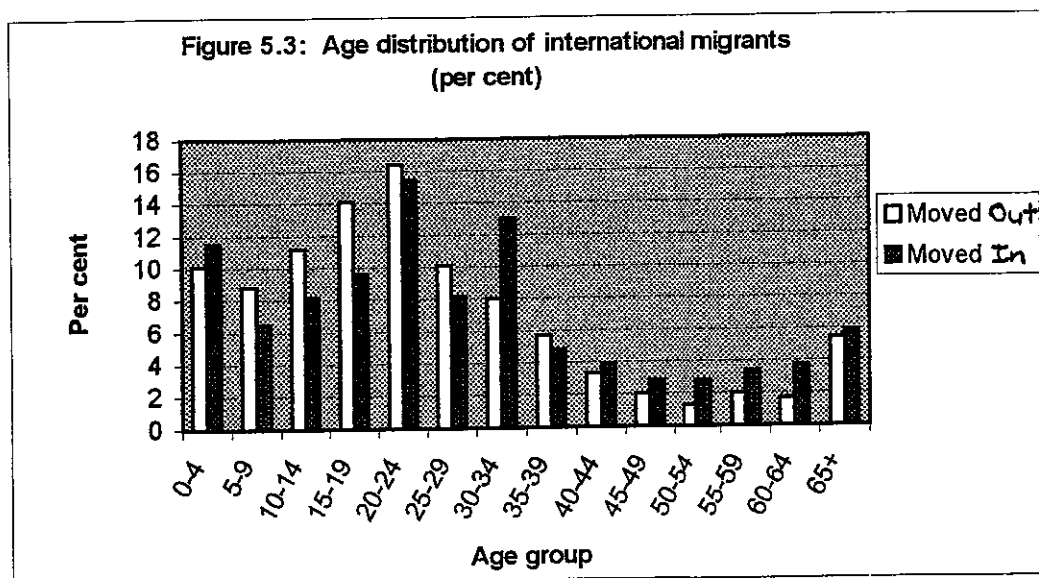
5.2: International Migration

Figure 5.2 (Appendix: Table 5.2) shows international migration by region. The estimated migration rate in the 2000 survey is -10.7 per 1000. This is about 1,725 more people leaving Samoa per annum when applied to the total population (161,298).

It can be seen that all regions experienced a net loss to international migration particularly in ROU. NWU experienced the least loss of people overseas.

The pattern of international migration noted in Samoa is a marked contrast to the usual pattern for most countries. In many countries, migrants tended to move in stages, they usually moved first to the urban area and then later on they moved overseas. The 2000 survey found that, Samoan migrants tended to move straight from their places of usual residence to ports of exit, rather, than moving in the urban area first. This pattern of migration reflected the efficiency and frequency of transportation systems in Samoa where people from Savaii and the rural villages were able to move easily from their own homes to ports of exit.

Figure 5.3 (Appendix Table 5.3) shows the Age distribution of international migrants. As expected, there was the usual predominance of migrants in the working age-group (20-34), accounting for 35%. However, there was also a substantial percentage (44.2%) of children and teenagers under 19 years migrating. This was most probably due to the tendency of Samoan people to move as "families" where parents take their children or young relatives.



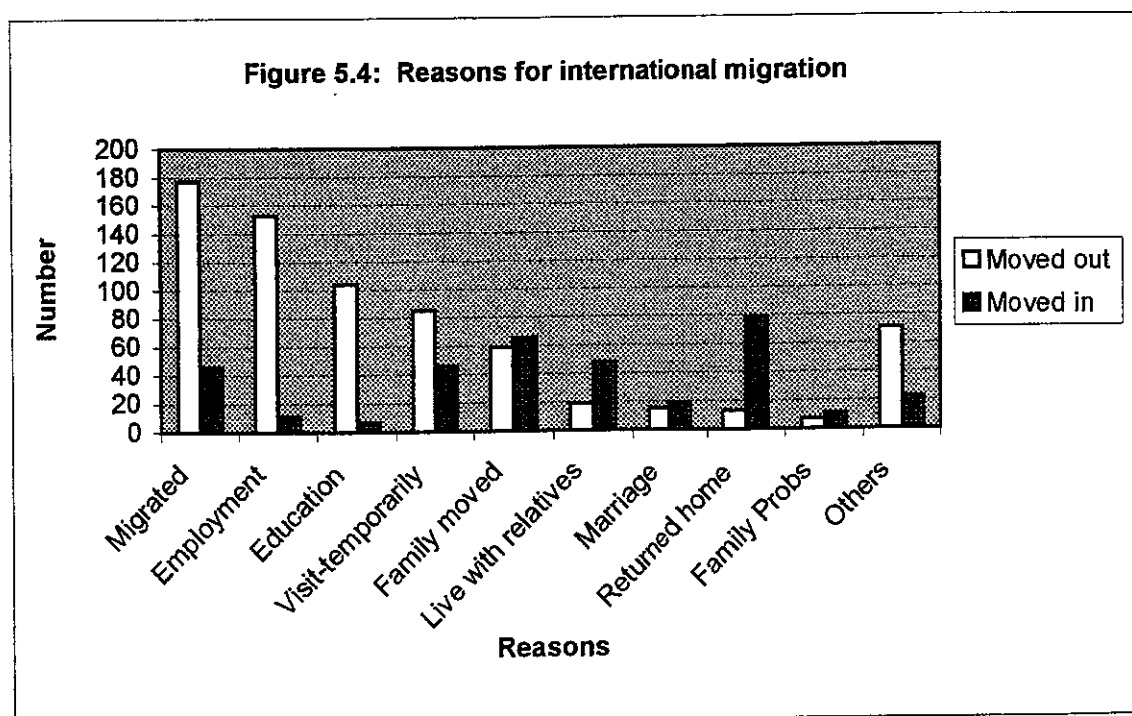
On the other hand, when ages were compared between Moved-in and Moved-out of the country, there was a slight difference in the age distributions of these

migrants. That is, starting from age 30 up to the oldest age (except for age 35-39), persons moving in were slightly older than those moving out.

Figure 5.4 (Appendix Table 5.4) shows the reasons given for International migration. These reasons were reported by family members remaining in the sample rather than the migrants themselves. Therefore, these reasons were not always specific or detailed.

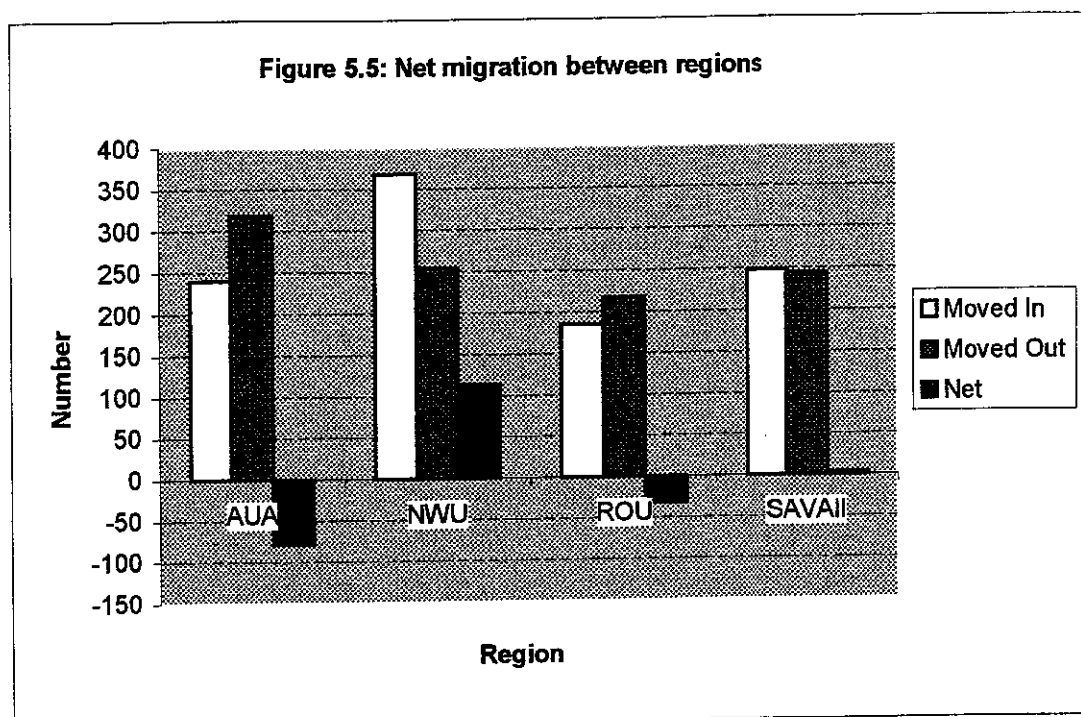
As shown, the main reason reported for Moving out was "Migrated or Settlement overseas" followed by "Employment and Education". These reasons reflected the nature of Samoan people to take up available opportunities overseas to get a better life for their children and to help their families back in Samoa. On the other hand, this means the lost of skilled and qualified people and future Samoan children overseas. This of course is one population issue that should be considered in population policies.

For Moving into Samoa, Family related reasons were the main reasons behind those movements. This again features the importance of "family values" to Samoan people in their lives.



5.3: Internal Migration (Local movement within Samoa)

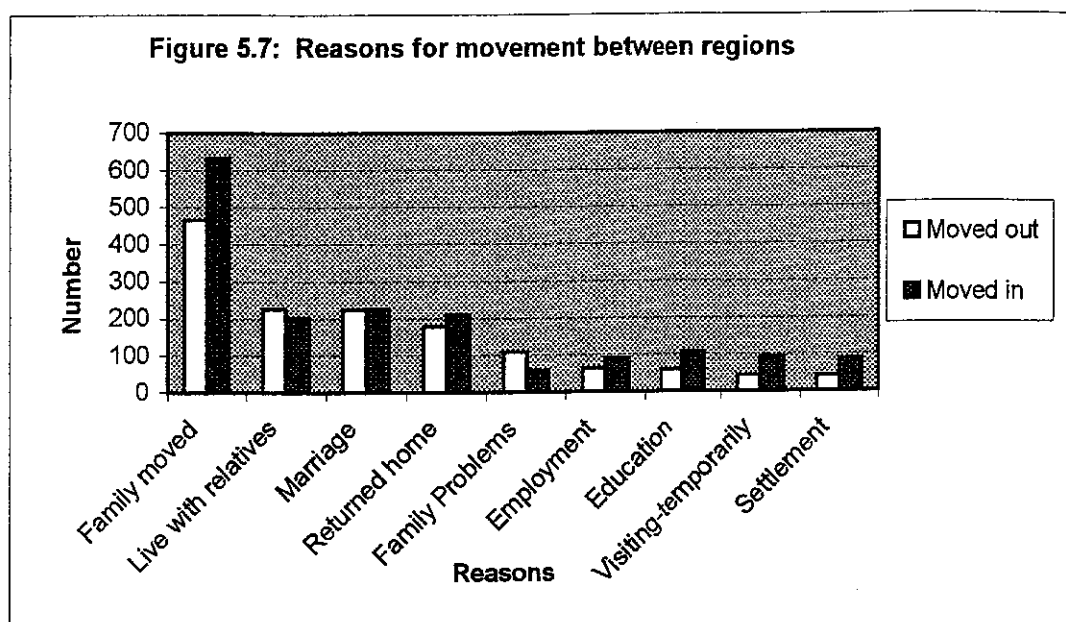
Figure 5.5 (Appendix Table 5.5) shows the Internal migration or movements across the regions of Samoa.



As shown, while AUA and ROU lost their population to other regions, NWU on the other hand gained the most population while movements in and out of Savaii were almost balanced. Although these data were for sampled villages and not for the whole country, it is interesting to note that the gain in NWU is almost equal to the losses in AUA and ROU. It can be said that this gain in NWU was most probably due to increased settlements in residential areas such as Vaitele and Vaialele.

Figure 5.7 (Appendix Table 5.6) presents the reasons given for movements within Samoa. When compared with the pattern of International migrants (Figure 5.4), "Family related reasons" again reflects the predominance of family

migration. However, Education and Employment were not as important reasons for movements across the regions. As mentioned earlier, this maybe due to the



good transportation links that allowed students and employed people to live in villages and travel to school or work each day or only stayed in the urban area for few days.

Information on internal movements is very important. It provides information about the changes that occurred in the geographical distribution of the population. The distribution of social and economic services as well as business ventures can be better achieved if patterns of migration movements are well known.

Population Growth

The population growth rate can only be estimated from natural increase and net migration rates because it takes into account all three components of population changes: births, deaths and migration. This rate indicates the rate at which the population is growing.

The 2000 survey estimated the growth rate as:

Natural increase + Net migration rate

$$23.6 + -10.7 = 12.9/1000 \text{ or } 1.29 \%$$

If this rate is applied to the total population ($0.0129 \times 161,298$), this growth rate would mean an additional of about 2000 people a year instead of 3,800 estimated in the Natural Increase because of the effect of Net Migration. Only when migration is not significant that Natural Increase could be used. But in the case of Samoa, migration plays a significant role in reducing the population growth every year. This may be seen as an option to high birth rates, however policy makers and government planners must always be prepared to face population problems in the phase of decreasing or restricted migration by overseas countries of destinations in the future. This is because migration will not necessarily lower the existing high birth rates.

APPENDICES

Appendix Table 1.1: Population Distribution by 5-year Age Groups and Sex

Age Group	Male	%	Female	%	Total	%
0-4	2622	15.4	2364	15.1	4986	15.3
5-9	2362	13.9	2117	13.5	4479	13.7
10-14	1925	11.3	1852	11.8	3777	11.6
15-19	1745	10.3	1486	9.5	3231	9.9
20-24	1525	9	1294	8.3	2819	8.6
25-29	1343	7.9	1343	8.6	2686	8.2
30-34	1235	7.3	1000	6.4	2235	6.8
35-39	984	5.8	931	5.9	1915	5.9
40-44	789	4.6	714	4.6	1503	4.6
45-49	545	3.2	510	3.3	1055	3.2
50-54	455	2.7	502	3.2	957	2.9
55-59	368	2.2	402	2.6	770	2.4
60-64	354	2.1	332	2.1	686	2.1
65-69	261	1.5	280	1.8	541	1.7
70-74	226	1.3	244	1.6	470	1.4
75+	226	1.3	280	1.8	506	1.5
N/Stated	30	0.2	14	0.1	44	0.1
Total	16995	100	15665	100	32660	100

Appendix Table 1.2: Major Age Groups by Sex

Major Age Groups	Males	%	Females	%	Both Sexes	%
0-14	6909	40.7	6333	40.5	13242	40.6
15-64	9343	55.1	8514	54.4	17857	54.7
65+	713	4.2	804	5.1	1517	4.7
Total	16965	100.0	15651	100.0	32616	100.0

Age-Dependency Ratio	Males	Females	Both Sexes
	82	84	83

Note: Excluding 'Not stated'

$$\text{Ratio} = \frac{<15 + 64+ * 100}{15 - 64}$$

Appendix Table 1.3: Population by 5 year Age Groups, Regions and Sex

Age	AUA				NMU				ROU				SAVAH			
	M	%	F	%	M	%	F	%	M	%	F	%	M	%	F	%
0-4	606	15.4	519	13.8	597	15.8	553	16.0	754	16.0	620	14.7	665	14.5	672	15.9
5-9	514	13.1	481	12.8	514	13.6	492	14.3	657	13.9	569	13.5	677	14.8	575	13.6
10-14	444	11.3	432	11.5	435	11.5	386	11.2	515	10.9	525	12.4	531	11.6	509	12.0
15-19	415	10.6	402	10.7	403	10.7	302	8.8	509	10.8	413	9.8	418	9.1	369	8.7
20-24	381	9.7	334	8.9	324	8.6	292	8.5	400	8.5	349	8.3	420	9.2	319	7.6
25-29	322	8.2	329	8.7	296	7.8	329	9.5	391	8.3	338	8.0	334	7.3	347	8.2
30-34	287	7.3	278	7.4	291	7.7	236	6.8	344	7.3	236	5.6	313	6.8	250	5.9
35-39	222	5.6	203	5.4	237	6.3	219	6.4	255	5.4	263	6.2	270	5.9	246	5.8
40-44	172	4.4	169	4.5	185	4.9	148	4.3	213	4.5	196	4.6	219	4.8	201	4.8
45-49	122	3.1	123	3.3	121	3.2	98	2.8	129	2.7	134	3.2	173	3.8	155	3.7
50-54	114	2.9	139	3.7	95	2.5	92	2.7	123	2.6	140	3.3	123	2.7	131	3.1
55-59	98	2.5	81	2.1	78	2.1	91	2.6	107	2.3	111	2.6	85	1.9	119	2.8
60-64	72	1.8	75	2.0	87	2.3	80	2.3	86	1.8	91	2.2	109	2.4	86	2.0
65-69	54	1.4	61	1.6	38	1.0	40	1.2	95	2.0	89	2.1	74	1.6	90	2.1
70-74	51	1.3	77	2.0	30	0.8	37	1.1	75	1.6	57	1.3	70	1.5	73	1.7
75+	49	1.2	61	1.6	39	1.0	49	1.4	56	1.2	93	2.2	82	1.8	77	1.8
NS	8	0.2	4	0.1	2	0.1	3	0.1	2	0.0	1	0.0	18	0.4	6	0.1
Total	3931	100	3768	100	3772	100	3447	100	4711	100	4225	100	4581	100	4225	100

Appendix Table 1.4: Sex Ratios by 5-year Age Groups

Age Group	Males per 100 Females
0-4	110.9
5-9	111.6
10-14	103.9
15-19	117.4
20-24	117.9
25-29	100.0
30-34	123.5
35-39	105.7
40-44	110.5
45-49	116.9
50-54	90.6
55-59	91.5
60-64	106.6
65-69	93.2
70-74	92.6
75+	80.7
Total	108.5

**Appendix Table 1.5: Population Distribution by Relationship to Males/Females
Head of Households**

Relationship	Males	%	Females	%	Both Sexes	%
Head	3406	20.0	635	4.1	4041	12.4
Spouse	36	0.2	3058	19.5	3094	9.5
Son/daughter	6707	39.5	5891	37.6	12598	38.6
Brother/sister	269	1.6	258	1.6	527	1.6
Mother/father	31	0.2	167	1.1	198	0.6
Adopted child	580	3.4	412	2.6	992	3.0
Other relations	5930	34.9	5228	33.4	11158	34.2
Non relative	36	0.2	16	0.1	52	0.2
Total	16995	100.0	15665	100.0	32660	100.0

Appendix Table 1.6: Average Household Size by Regions

	AUA	NWU	ROU	SAVAII	ALL
Population	7699	7219	8936	8806	32660
Number of Households	1011	929	988	1055	3983
Average Household Size	7.6	7.8	9.0	8.3	8.2

Appendix Table 1.7: Population 15 years and over by 5 year-Age Groups, Marital Status and Sex

Age Group	Never Married				Married				Defacto				Widowed				Divorced/ Separated			
	M	%	F	%	M	%	F	%	M	%	F	%	M	%	F	%	M	%	F	%
15-19	1732	39.8	1377	50.9	5	0.1	55	1.2	7	0.8	48	5.1	1	0.5	6	1.4	0	0.0	0	0.0
20-24	1284	29.5	665	24.6	131	2.9	361	7.9	95	10.7	222	23.6	15	6.8	41	9.7	0	0.0	5	0.7
25-29	659	15.2	311	11.5	440	9.9	722	15.8	211	23.7	228	24.3	33	14.9	80	19.0	0	0.0	2	0.3
30-34	351	8.1	128	4.7	642	14.4	640	14.0	200	22.5	164	17.5	40	18.0	59	14.0	2	1.1	9	1.3
35-39	132	3.0	82	3.0	662	14.9	661	14.5	151	17.0	121	12.9	37	16.7	61	14.5	2	1.1	6	0.9
40-44	53	1.2	51	1.9	615	13.8	518	11.4	91	10.2	78	8.3	27	12.2	51	12.1	3	1.6	16	2.3
45-49	41	0.9	22	0.8	427	9.6	409	9.0	58	6.5	32	3.4	17	7.7	24	5.7	2	1.1	23	3.3
50-54	27	0.6	17	0.6	382	8.6	375	8.2	24	2.7	21	2.2	14	6.3	39	9.2	8	4.4	50	7.1
55-59	16	0.4	10	0.4	306	6.9	275	6.0	21	2.4	14	1.5	9	4.1	21	5.0	16	8.7	82	11.7
60-64	8	0.2	8	0.3	301	6.8	211	4.6	14	1.6	5	0.5	13	5.9	20	4.7	18	9.8	88	12.5
65-69	8	0.2	9	0.3	215	4.8	151	3.3	6	0.7	4	0.4	6	2.7	9	2.1	26	14.2	107	15.2
70-74	11	0.3	12	0.4	165	3.7	104	2.3	5	0.6	1	0.1	7	3.2	8	1.9	38	20.8	119	16.9
75+	9	0.2	4	0.1	145	3.3	76	1.7	2	0.2	1	0.1	3	1.4	3	0.7	67	36.6	196	27.9
N/State	16	0.4	7	0.3	7	0.2	5	0.1	4	0.4	0	0.0	0	0.0	0	0.0	1	0.5	0	0.0
Total	4347	100.0	2703	100.0	4447	100.0	4563	100.0	889	100.0	939	100.0	222	100.0	422	100.0	183	100.0	703	100

Appendix Table 2.1. Population 15 years and over by Educational Attainment and Sex

Education Level Attained	Males	%	Females	%	Both Sexes	%
Primary	2933	29.2	2303	24.8	5236	27.1
Secondary	7052	69.9	6928	74.2	13980	72.0
Never attended	93	0.9	81	1.0	182	0.9
Total	10087	100.0	9332	100.0	19419	100.0

Appendix Table 2.2 Population 15 years and older by further trainings completed.

Further Trainings Completed	Males	%	Females	%	Both Sexes	%
None	8483	85.2	7990	86.5	16473	85.9
Teaching	206	2.1	320	3.5	526	2.7
Nursing	21	0.2	126	1.4	147	0.8
Polytech	498	5.0	163	1.8	661	3.4
Theolo,seminario	255	2.6	131	1.4	386	2.0
University	411	4.1	420	4.5	831	4.3
Computing	6	0.1	9	0.1	15	0.1
Typing	15	0.2	35	0.4	50	0.3
Sewing	5	0.1	7	0.1	12	0.1
YMCA/YWCA	12	0.1	7	0.1	19	0.1
Music School	12	0.1	4	0.0	16	0.1
Fine Art	7	0.1	2	0.0	9	0.0
Flower arrgement	1	0.0	3	0.0	4	0.0
Hair Dressing	0	0.0	0	0.0	0	0.0
Judo	0	0.0	0	0.0	0	0.0
Cooking	0	0.0	0	0.0	0	0.0
Dancing	1	0.0	0	0.0	1	0.0
Agricultural School	2	0.0	0	0.0	2	0.0
Nursing-NUS	0	0.0	5	0.1	5	0.0
Teaching-NUS	0	0.0	1	0.0	1	0.0
More than one of the above	16	0.2	9	0.1	25	0.1
Total	9951	100.0	9232	100.0	19183	100.0

Appendix Table 2.3. Population 15 years and over by Social and Economic Activities and Sex

	Males	%	Females	%	Both Sexes	%
Paid employment	3272	32.5	1873	20.0	5145	26.5
Employer / Owner	56	0.6	20	0.2	76	0.4
Self employed	255	2.5	169	1.8	424	2.2
Farming / fishing	4342	43.1	128	1.4	4470	23.0
Economically Active	7925	78.7	2190	23.4	10115	52.1
Domestic duties	1048	10.4	6100	65.2	7148	36.8
Disabled	33	0.3	30	0.3	63	0.3
Student	861	8.6	795	8.5	1656	8.5
Others	201	2.0	233	2.5	435	2.2
Not Economically Active	2143	21.3	7159	76.6	9302	47.9
Total	10068	100	9349	100	19417	100

Note: Others included elderly, infants, students and voluntary religious work.

Appendix Table 2.4: Population by Religious Denominations and Sex

	Males	%	Females	%	Total	%
Congregation	6710	38.1	6197	38.2	12907	38.1
Catholic	3959	22.5	3528	21.7	7487	22.1
Methodist	1843	10.5	1667	10.3	3510	10.4
LDS	2459	14.0	2300	14.2	4759	14.1
AOG	857	4.9	804	5.0	1661	4.9
Others	1797	10.1	1740	10.7	3537	10.5
Total	17625	100.0	16236	100.0	33861	100.0

APPENDIX 3: ESTIMATION OF FERTILITY

The survey asked every woman aged 15–49 whether they have ever given birth. Those who said they had were asked further questions. These questions were:

- The age when they had their first birth
- The number and sex of the child ever born
- The date of birth of their last child

The survey classified births since the last survey as 'new born living', 'new born died', 'new born moved out' and 'new born moved in'. There were 846 such births. However, the interval between the 1999 DHS and the 2000 Demographic survey was not exactly one year. Therefore, births that took place in the one year before the date of interview were calculated from questions on date of birth of last child and date of survey. This procedure identified 816 births in the year preceding the date of interview. This is less than for the 1999 DHS, which reported 879 births in the year preceding the date of interview. The sex ratio derived from reported births in the year preceding the 2000 survey was 114, which is outside the normal range of 102–108. This suggests that some birth dates of children were incorrectly reported in 2000, especially for females. The sex ratio derived from mothers' reports of children ever born was 108.8.

Current Fertility

Fertility rates by age group of women were calculated by dividing births to mothers in a given age group by the number of women in that age group. The results are shown in Appendix Table 3.3. The Age Specific Fertility Rates (ASFR) were added and multiplied by 5 to get the Total Fertility Rate (TFR). The reported TFR was 3.75, which means that a Samoan woman would give birth to 3.75 children on average during her reproductive life. This is substantially lower than the 1999 DHS estimated TFR of 4.5.

The reliability of the fertility estimate derived from reported fertility was assessed by comparing the average number of children born by age group of women, (parity), and the average parity implied by births in the preceding year (i.e. the P/F ratio).

An examination of the reported fertility rates, as shown in Appendix Table 3.4 shows that fertility rates for young women aged 15-34 increased between the 1991 census and the 1999 survey and appeared to have declined between 1999 and 2000 surveys. By contrast the fertility rates of women aged 35 years and over continued to decline. The reported TFR rose from 4.2 in the 1991 census to 4.5 in the 1999 Survey and appeared to decline to 3.8 in the 2000 survey.

Appendix Table 3.1: Distribution of women aged 15 – 49 ever given birth

Age Group	Total Women	Percent given birth
15 – 19	1462	5.5
20 – 24	1285	44.7
25 – 29	1334	74.7
30 – 34	994	86.0
35 – 39	929	90.2
40 – 44	706	91.4
45 – 49	507	94.9
Total	7217	62.0

Appendix Table 3.2: Age distribution of women by age at first birth

Age at first birth	No of Women	Percent
12-14	23	0.5
15-19	1072	23.1
20-24	2408	51.9
25-29	914	19.7
30-34	178	3.8
35-39	47	1.0
Total	4642	100.0
Mean age at first birth	22.3	
Median age at first birth	21.2	

Appendix Table 3.3: Distribution of mothers by age at first birth and current survey age, Samoa, 2000

Age at first birth	Total mothers	Current age at survey						
		15-19	20-24	25-29	30-34	35-39	40-44	45-49
12-14	23	1	4	7	1	5	3	2
15-19	1045	79	260	177	146	145	131	107
20-24	2306	0	311	617	409	429	304	236
25-29	876	0	0	196	251	183	148	98
30-34	169	0	0	0	46	57	42	24
35-39	48	0	0	0	0	18	16	14
Total	4467	80	575	997	853	837	644	481

Appendix Table 3.4: Comparison of reported birth rates per 1000 women by census and survey period.

Age group	1991 Census	1999 Survey	2000 Survey
15 –19	22.0	38.0	33.7
20-24	139.0	197.1	183.4
25-29	211.0	230.7	192.4
30-34	189.0	209.8	161.4
35-39	153.0	142.0	122.0
40-44	86.0	69.1	42.3
45-49	33.0	15.9	15.7
Total Fertility Rate	4.17	4.5	3.75

Appendix Table 3.5: Comparison of average parities by census and survey period

Age group	1986 Census	1991 Census	1999 Survey	2000 Survey
15-19	0.1	0.1	0.07	0.09
20-24	0.8	0.5	0.74	0.81
25-29	2.2	1.6	1.85	1.87
30-34	3.0	2.8	3.01	2.93
35-39	4.4	4.0	4.07	4.10
40-44	5.0	4.6	4.83	4.64
45-49	5.2	5.3	5.57	5.58

Fertility changes over time

According to the 1986 census data the average number of children born to women born in 1936–1941 was 5.2 children. The 2000 survey indicated that woman born in the period 1950–1955 had an average of 5.6 children. This increase is probably due to improved maternal and child health. The data also showed that there has been no increase in average parity for age groups 15–19 and 30–34.

As births in the year preceding the survey appeared to be under reported, an analysis of the quality of birth reporting was undertaken. By comparing two sets of average number of children born by age group of women (P/F ratios) obtained from the children ever born question and births born in the year previous to the survey, corrected estimates of fertility can be obtained.

The calculated P/F ratios are presented in Appendix Table 3.7. The P/F ratios for the younger age groups 20-34 are near to unity (1.0) indicating that the two data sets, current fertility and life- time fertility are consistent. However, the P/F ratios gradually increased for women aged 35 years and over. In the case of the 2000 survey, the P/F ratios for the 20-29 age groups showed that current fertility, (births in the year preceding the survey), were under reported. P/F ratios thereafter rose with advancing age groups of women. The rising P/F ratios are an indication of declining fertility, particularly among older women. The P/F ratios indicated that older women were increasingly controlling their fertility.

Under conditions of declining fertility, the P/F ratio for the age group 20-24 was used to adjust current fertility. This is because the fertility of the 20-24 age group is less likely to be affected by declining fertility.

The P_2/F_2 adjustment based on the 20-24 age group revealed that the 2000 survey under reported births by 14.2 per cent while the report of births in the 1999 survey was almost complete (99.2 per cent). The corrected total fertility rates based on such comparisons were 4.5 for the 1999 survey and 4.3 for the 2000 survey. The corrected or adjusted fertility rates and TFRs for the 1999 and 2000 surveys are shown in Appendix Table 3.6 and Figure 3.3.

The adjusted Crude Birth rates were 30.9 births per 1000 population for 1999 survey and 29.1 for 2000 survey.

Appendix Table 3.6: Adjusted age-specific fertility rates by survey year

Age group	1999 Survey	2000 Survey
15 –19	0.0486	0.0508
20-24	0.2080	0.2199
25-29	0.2300	0.2173
30-34	0.2033	0.1794
35-39	0.1347	0.1313
40-44	0.0614	0.0434
45-49	0.0120	0.0143
TFR	4.49	4.28
Mean of fertility schedule, (m)	28.2	27.8
Crude birth rate	30.9	29.1

Appendix Table 3.7: Comparison of P/F ratios by survey year.

Age group	P/F ratios, 1999	P/F ratios, 2000
15 –19	1.163	1.474
20-24	0.995	1.142
25-29	0.992	1.111
30-34	1.030	1.211
35-39	1.081	1.278
40-44	1.130	1.329
45-49	1.159	1.348

Fertility differentials according to socioeconomic status are presented in Appendix Table 3.8.

Appendix Table 3.8: Differences in CEB by socio-economic characteristics

Socio-Economic Characteristics	CEB
Marital Status	
Never Married	0.2
Married/De-facto/Remarried	3.5
Divorced/Separated	2.5
Widowed	4.3
Religion	
Congregational	2.1
Catholic	2.2
Methodist	2.3
Mormon	2.5
Others	2.5
Educational Attainment	
Primary	3.7
Secondary	2.0
Other	3.0
Never Attended	1.7
Further Training	
Yes	1.9
No	2.3
Economic Activity	
Employed	1.9
Not Employed	2.3
Region	
Apia Urban Area	2.0
North West Upolu	2.3
Rest of Upolu	2.4
Savaii	2.4
TOTAL	2.3

APPENDIX 4: ESTIMATION OF MORTALITY

The 2000 survey collected information for the direct estimation of mortality. Age at death was asked for every member of the household who died since the 1999 round of the survey. The information on number of deaths was checked with the survey status of respondents as compared with the 1999 DHS. Those recorded as 'died', 'new born died' and 'moved in and died' comprised deaths in the year preceding the 2000 Demographic Survey. Information on infant and child mortality was also obtained indirectly from reports of mothers to questions on their children ever born who were alive and dead. The survey also collected information on causes of death.

Reported Death Rates

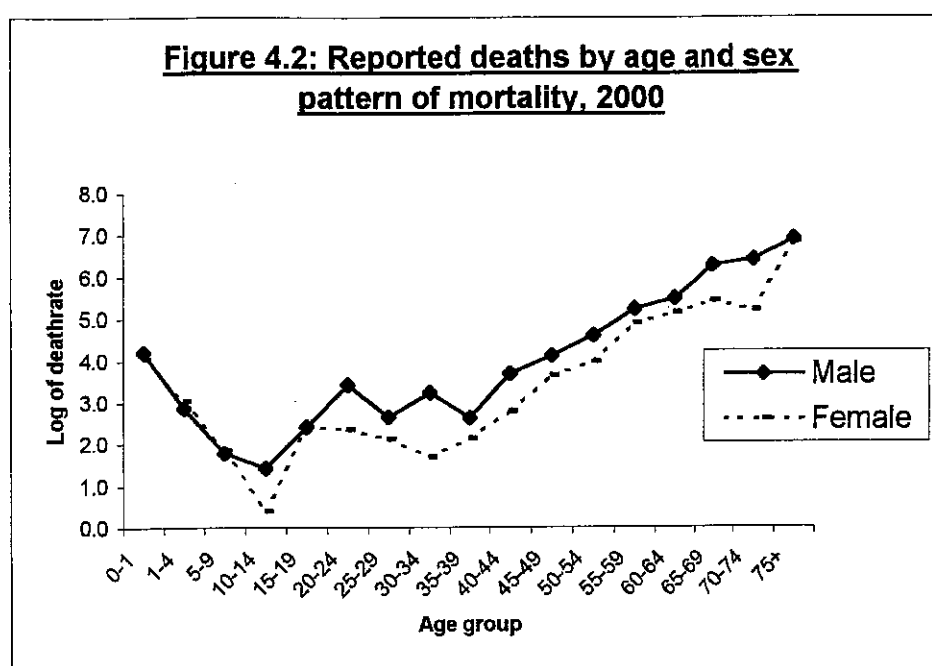
Of the 816 live births reported in the year prior to the 2000 survey, nine were reported as dying before age one year, compared with 22 deaths from 879 births in the 1999 DHS. This gives an IMR of 11 per 1000 live births for 2000, compared with 25 per 1000 for 1999.

4.1 The age pattern of reported deaths

Figure 4.2 shows the age and sex pattern of mortality for the 2000 survey population. The important features of this pattern are:

- *Male mortality rates are higher than female mortality rates for every age group except for children under age five, which are similar.*
- *Mortality rates of infants (under age 1 year) and children aged 1-4 are higher than for older children. Mortality levels are lowest for age group 10-14.*

- *There is high mortality of young males aged 15-34, presumably due to accidents and suicide. Young females aged 15-19 also have relatively high mortality.*
- *For both males and female mortality rates start to rise steeply from age 40 and over. Although mortality rates at older ages are highest, the high death rates at middle age are of concern. Premature adult mortality are mostly related to Life style or Non-communicable diseases as discussed later.*



Causes of reported deaths

Respondents were asked about the causes of reported deaths. As these were the causes of death in the opinion of the respondents and not in the opinion of a medical practitioner, they are not always medically correct. However, they provide information that could be used to indicate important mortality patterns, especially when deaths were grouped into four major causes: Accidents, Infectious/Communicable diseases, Non-Communicable diseases and Other diseases that were not part of the first three groups.

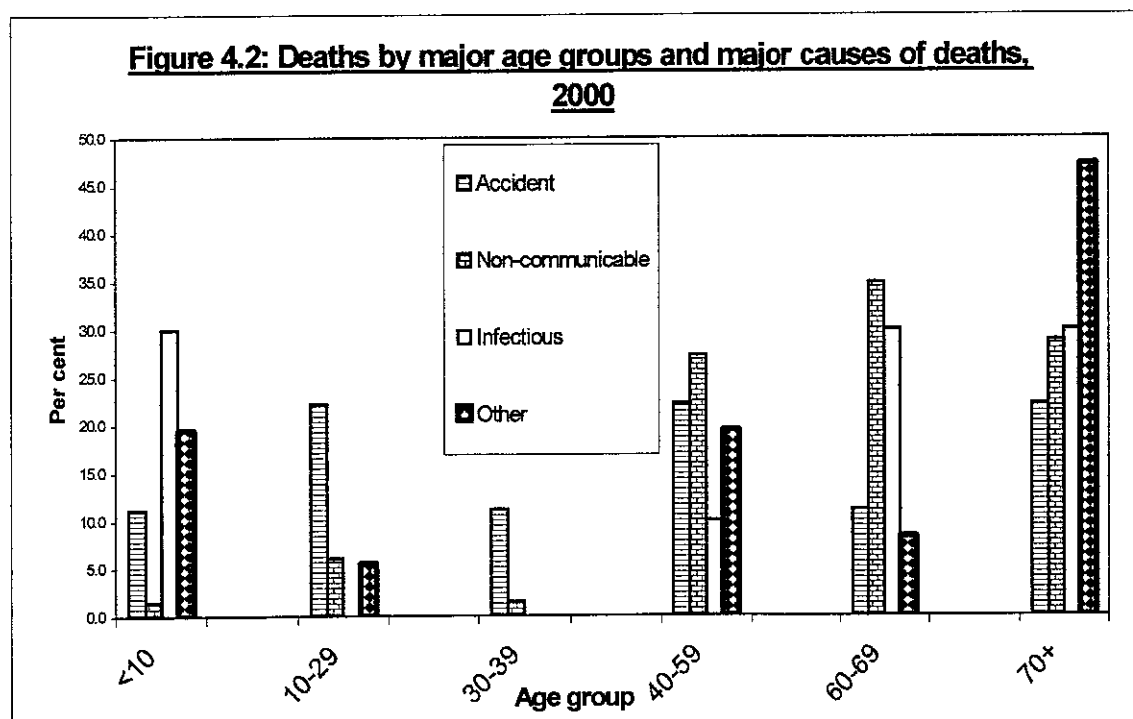
The causes of deaths were grouped as followed:

- **Accidental deaths:** included accidents and suicide
- **Non-communicable diseases:** included cancer, heart disease, mai suka (diabetes), asthma, stroke, mai oso (sudden deaths including heart attack, stomach pains attack, attacking head pains, etc), ulcer, toto maualuga (hypertension) and mai ake (cirrhosis)),
- **Infectious/Communicable diseases:** included influenza, pneumonia, mai mumu (inflammatory diseases), misela, (measles), manava tata, diarrhoeal diseases and mai o tamaiti (childhood infectious disease).
- **Other diseases included:** abnormalities, old age, mai manatu (grieving), mai Samoa (illness believed to be caused by traditional related factors) and unknown causes of deaths.

The results are shown in Figure 4.2 and Table 4.2. The results revealed that the major causes of deaths were mainly related to Non-communicable diseases, which accounted for 55% of all deaths followed by 30% of Other deaths. Apart from Old age, the major causes people died of were Sudden Deaths accounting for 16% of total deaths, Heart Disease/Stroke 12%, Cancer 12%, Mai Samoa 11% and Diabetes 9 % of total deaths.

Appendix Table 4.2: Distribution of deaths by major age groups and major causes of death, 2000.

Age groups	Accidents	Non-communicable	Infectious diseases	Other	Total
<10	1	1	3	7	12
10-29	2	4	0	2	8
30-39	1	1	0	0	2
40-59	2	18	1	7	28
60-69	1	23	3	3	30
70+	2	19	3	17	41
Total	9	66	10	36	121
Percentage(%)	7.4	54.5	8.3	29.8	100



Appendix Table 4.3: Major Causes of deaths by sex, 2000

CAUSES OF DEATH	MALE	FEMALE	TOTAL
ACCIDENT			
Accident/Suicide	8	1	9
<i>Sub-Total</i>	8	1	9
NON-COMMUNICABLE			
Cancer	8	6	14
Heart disease/Stroke	9	5	14
Diabetes	5	6	11
Asthma	5	0	5
Mai Oso (Sudden death)	10	9	19
Ulcer	1	0	1
Hypertension	1	0	1
Cirrhosis(Mai ake)	0	1	1
<i>Sub-Total</i>	39	27	66
INFECTIOUS/COMMUNICABLE			
Influenza	0	1	1
Pneumonia	1	0	1
Mai mumu (Inflammatory)	2	0	2
Misela (measles)	1	0	1
Manava tata (diarrhoea)	1	3	4
Mai o tamaiti	1	0	1
<i>Sub-Total</i>	6	4	10
OTHER CAUSES			
Mai manatu	0	1	1
Mai Samoa	10	3	13
Old age	6	9	15
Abnormalities	2	1	3
Unknown	2	2	4
<i>Sub-Total</i>	20	16	36
TOTAL ALL DEATHS	73	48	121

Indirect Estimation of infant and child mortality

Estimates of infant and child mortality can be indirectly obtained from reports of mothers about children ever born, surviving and dead as shown in Table 4.4. Indirect methods were used to convert the proportion of children dead by age group of mothers into probabilities of dying for children between birth and a given age. The proportion dead is calculated by dividing the number of dead children to mothers of a given age group by the total number of children ever born to mothers of that age group.

Appendix Table 4.4: Distribution of number of children surviving, dead and ever born by age group of mothers and sex of children

Age groups	Surviving		Dead		Children ever born		Total
	Male	Female	Male	Female	Male	Female	
15-19	112	106	0	2	112	108	220
20-24	631	555	11	15	642	570	1212
25-29	1317	1214	29	27	1346	1241	2587
30-34	1531	1395	47	31	1578	1426	3004
35-39	1972	1838	53	43	2025	1881	3906
40-44	1601	1443	68	47	1669	1490	3159
45-49	548	564	54	47	602	611	1213
Total	7712	7115	262	212	7974	7327	15301

Using estimation methods developed for this purpose by Brass, Trussell and others (United Nations, 1983: 77), the proportions of children dead were converted into probabilities of dying in order to get estimates for infants and child mortality.

The proportion of children dead to mothers aged 15-19 (D_1) was converted to an infant mortality rate (${}_1q_0$). The proportion of children dead to mothers' aged 20-24, D_2 , was converted into ${}_2q_0$. This is the probability of dying between birth and age 2 (D_3 is converted into ${}_3q_0$, and D_4 is converted into ${}_5q_0$ (the probability of dying between birth and age 5, called the under five mortality rate). D_5 is converted to ${}_{10}q_0$, D_6 to ${}_{15}q_0$, and D_7 to ${}_{20}q_0$.

The proportion dead, D_i , is converted into probabilities of dying for children between birth and age x , (q_x), using the relation $Q_x = k_i D_i$. The multipliers selected were the Trussell variant. The K_i are multipliers that can be estimated from the Trussell equation on the basis of the appropriate Coale-Demeney Model Life Tables. The Coale-Demeney East Model Life Tables was selected to represent the age pattern of child mortality in Samoa. Estimates of the ratio of average parity of women aged 15-19 to 20-24 (P_1/P_2) and ratio of parity of women aged 20-24 to 25-29 (P_2/P_3) were calculated from the 2000 Demographic Survey (see Appendix: Fertility). The estimates for the coefficients of K_i for these groups and the East Model life table were then read from the Trussell Variant table (Table 47, United Nations, 1983, p77) and the K_i s calculated by substitution in the equation. The formula for K_i is:

$$K_i = a_i + b_i P_1/P_2 + c_i P_2/P_3$$

where a_i , b_i and c_i are coefficients to be read from Trussell's table.

The resulting estimates of q_x values by sex of children are presented in Table 4.5. Mortality levels that were consistent with the estimated q_x values were also calculated.

Appendix Table 4.5: Proportion of children dead, and estimates of infant and child mortality rates (based on the Coale-Demeney East Model Life Tables), Samoa, 2000 Demographic Survey.

Age Groups	Male				Female		
	D _i	x	Q _x	Mortality Level	D _i	Q _x	Mortality Level
15-19		1			0.0185	0.01663	23.6
20-24	0.0171	2	0.01849	24.0	0.0263	0.02840	22.4
25-29	0.0215	3	0.02189	23.7	0.0218	0.02211	23.1
30-34	0.0298	5	0.03015	23.1	0.0217	0.02201	23.2
35-39	0.0262	10	0.02698	23.5	0.0229	0.02357	23.2
40-44	0.0407	15	0.04133	22.5	0.0315	0.03200	22.5
45-49	0.0897	20	0.09020	20.4	0.0769	0.07735	19.9

The results showed that estimated mortality levels show consistent trends of declining infant and child mortality over the past 15 years. Children of both sexes have experienced declines in child mortality equal to about four mortality levels in the life table. That is, improvements in child life expectancy of about 10 years (an increase in mortality level from Level 20 to 21 is equivalent to increases in life expectancy of 2.5 years). The time periods to which these estimates refer were calculated and these time periods along with the estimates of IMR implied by the mortality rates were used to depict trends. The trends in IMR were shown in Figure 4.1.

The infant mortality rate for males was estimated by taking the IMR implied by the East Model mortality level for $2q_0$, that is, Level 24. This is because there were no male child death reported by mothers aged 15-19. For females, the IMR was consistent with Level 23.6. The resulting IMRs were 17.8 per 1000 male

births, 16.7 for females and 17.3 for both sexes (weighted by a sex ratio at birth of 108.8 male births per 100 female births).

Sex ratios of children ever born

From the data on children surviving, dead and ever born by age group of mothers, sex ratios were calculated. Overall, the sex ratio for children ever born was 108.8 male births for 100 female births. This figure was 108.4 for surviving children. More male children had died than female children. The overall sex ratio for dead children under five was 123.6 male deaths for every 100 female deaths. The variations in children sex ratios by age group of their mother could be partially due to under reporting of children by mothers.

The average number of surviving daughters per mother aged 15-49 was 1.8, and the average number of surviving sons was 1.9.

Appendix Table 4.6 Sex ratios of children by age group of mother

AGE GROUP	SURVIVING CHILDREN	CHILDREN DEAD	CHILDREN EVER BORN
15-19	105.7	0.0	103.7
20-24	113.7	73.3	112.6
25-29	108.5	107.4	108.5
30-34	109.7	151.6	110.7
35-39	107.3	123.3	107.7
40-44	110.9	144.7	112.0
45-49	97.2	114.9	98.5
TOTAL	108.4	123.6	108.8

References for Appendix: Mortality

Shryock, H. S and Siegel, J. S. and Associates, 1976. ***The Methods and Materials of Demography***, Condensed Edition, San Diego: Academic Press.

United Nations, 1983. ***Manual X: Indirect Techniques for Demographic Estimation***, New York: United Nations.

Appendix Table 5.2: International Migration by Regions

Regions	Total population	Immigrant	%	Emigrant	%	Net/Loss		Per/1000
						Migration	%	
AUA	7699	100	1.3	188	2.4	-88	-1.1	-11.4
NWU	7219	90	1.2	142	2.0	-52	-0.7	-7.2
ROU	8936	105	1.2	217	2.4	-112	-1.3	-12.5
SAVAII	8806	60	0.7	156	1.8	-96	-1.1	-10.9
Total	32660	355	1.1	703	2.2	-348	-1.1	-10.7

Appendix Table 5.3: Distribution of International Migrants by 5-year Age Groups

Age group	Total	%	Moved out	%	Moved in	%
0-4	112	10.6	71	10.1	41	11.5
5-9	85	8.0	62	8.8	23	6.5
10-14	108	10.2	79	11.2	29	8.2
15-19	133	12.6	99	14.1	34	9.6
20-24	170	16.1	115	16.4	55	15.5
25-29	100	9.5	71	10.1	29	8.2
30-34	102	9.6	56	8.0	46	13.0
35-39	57	5.4	40	5.7	17	4.8
40-44	37	3.5	23	3.3	14	3.9
45-49	24	2.3	14	2.0	10	2.8
50-54	19	1.8	9	1.3	10	2.8
55-59	26	2.5	14	2.0	12	3.4
60-64	25	2.4	12	1.7	13	3.7
65+	59	5.6	38	5.4	21	5.9
NS	1	0.1	0	0.0	1	0.3
Total	1058	100	703	100.0	355	100.0

Appendix Table 5.4 Reasons for International Migration

Reasons	Moved out	%	Moved in	%
Settlement	177	25.2	46	13.0
Employment	153	21.8	11	3.1
Education	104	14.8	7	2.0
Visit-temporarily	85	12.0	46	13.0
Family moved	59	8.4	66	18.7
Live with relatives	19	2.7	48	13.6
Marriage	15	2.1	19	5.3
Returned home	13	1.8	79	22.3
Family Probs	7	1	11	3.1
Others	71	10.1	22	6.2
Total	703	99.9	355	100.3

Appendix Table 5.5: Internal/Local movements by Regions

Regions	Total population	Moved In	%	Moved out	%	Net migration	%	p/1000
AUA	7699	240	3.1	319	4.1	-79	-1.0	-10.3
NWU	7219	368	5.1	254	3.5	114	1.6	15.8
ROU	8936	185	2.1	217	2.4	-32	-0.4	-3.6
SAVAII	8806	248	2.8	245	2.8	3	0.0	0.3
Total	32660	1041	3.2	1035	3.2	6	0.0	0.2

Appendix Table 5.6 Internal/Local Migration by Reasons for Movements

Reasons	Moved out	%	Moved in	%
Moved with parents	318	17.0	432	24.2
To live with relatives	217	11.6	178	10.0
Returned to their own family	178	9.5	211	11.8
To live at spouse's family	120	6.4	122	6.8
Family Problems	110	5.9	59	3.3
Marriage	104	5.5	105	5.9
To live in their own house/land	76	4.1	79	4.4
Employment	65	3.5	91	5.1
Education	59	3.1	107	6.0
Short-term visit	43	2.3	92	5.2
Employment and education of family members	37	2.0	70	3.9
Visiting and never returned	34	1.8	87	4.9
Religious purposes	22	1.2	30	1.7
Adopted Child	17	0.9	29	1.6
Looking for better living	15	0.8	7	0.4
To assist or look after relatives	14	0.7	37	2.1
To set up business	4	0.2	4	0.2
To live at where they got their matai	4	0.2	4	0.2
To develop plantation/farms	3	0.2	4	0.2
Medical treatment	3	0.2	1	0.1
Friendship	2	0.1	7	0.4
Not specified	430	22.9	29	1.6
Total	1875	100	1785	100

"Family moved" includes moved with parents, religious purposes, looking for better living, live in own house/land, went with pastor, live at where they got their matai, employment of mother/father/spouse and education and employment of kids

"Live with relatives" stay with parents family, look after g/parents, assist uncle/aunt, live with brother/sister, ill of family members

"Marriage" includes live with spouse's family

"Returned home" includes return to own family, no one living at home, returned when spouse died, returned when ill

"Family problems" includes chased away, family disputes, divorced, escaped

"Visiting temporarily" includes visiting, family and church affairs

"Settlement" includes permanently residing and visit and never returned

Vital Survey

District	Village	EA	HH No.
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Household members characteristics										B. Death De					
No.	Name	Sex	Date of Birth	Age	Relation to head	Marital Status	Main Activity	Education Attained (level)	Nisi aoga na auai?	Religion	Survey Status	Region (refer to Q9(50-80))	Date of Event	Reason of Migration (refer to Q9(50-80))	Age at Death
			Q2a	Q2b	Q3	Q4	Q5	Q6	Q7	Q8	Q9a	Q9b	Q10	Q11	Q12
1															
2															
3															
4															
5															
6															
7															
8															
9															

Q1 Sex 1 = Male 2 = Female	Q3 Relationship to head: 1 = Head 2 = Spouse 3 = Son/daughter 4 = Sister/Brother 5 = Father/mother of head 6 = Adopted child 7 = Others _____ (specify)	Q4 Marital Status: 1 = Never Married 2 = Married 3 = Defacto 4 = Divorced/Separated 5 = Widowed 6 = Remarried 9 = Not Stated	Q5 Main Activity: 1 = Employee 2 = Owner 3 = Self-employed 4 = Farmer/fisherman 5 = Domestic Duties 6 = Disabled 7 = Student 8 = Infant 9 = Elderly 10 = Others _____ (specify)	Q10 Date of Survey Status (refer to Q9(20-80))
Q6 Education level attained: 0 = Preschool 1 = Year 1 ... 13 = Year 13 14 = Pastor School 15 = Special Education 19 = Never attended school	Q7 Further Education; 0 = No 1 = Teaching 2 = Nursing 3 = Polytech 4 = Theological college 5 = University 6 = Others _____ (specify)	Q8 Religion; 1 = EFKS 2 = Catholic 3 = Methodist 4 = Mormon 5 = SDA 6 = Assembly 7 = Pentecost 8 = Others _____ (specify)	Q9(a) Survey Status 10 = Living in SU 20 = Died 30 = Newborn Living 40 = Newborn Died 50 = Newborn Moved Out 60 = Moved Out 70 = Moved in 80 = Moved in Died 90 = Add to Sample	Q9(b) Region (refer to Q9(50-80)) 1 = AUA 2 = NWU 3 = ROU 4 = SAVAI 5 = Am. Samoa 6 = NZ 7 = Australia 8 = USA 9 = Others _____ (specify)

96= Add to household
97= Exclude from household
98= Exclude from Sample