

T U V A L U

1991 POPULATION AND HOUSING CENSUS

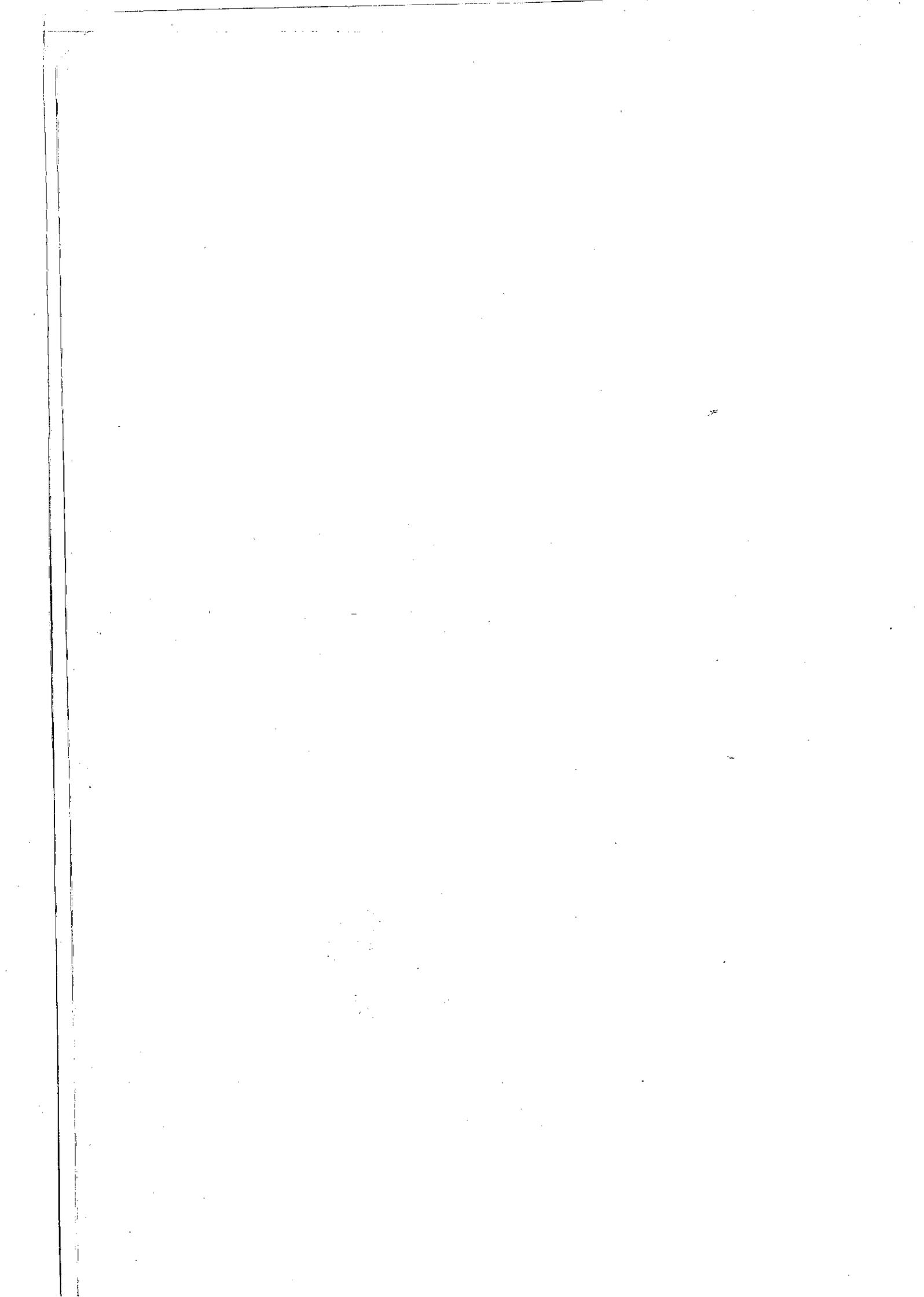
Volume 2: Analytical Report

Prepared by

Habtemariam Tesfagiorghis



Central Statistics Division
Ministry of Finance, Economic Planning, Commerce and Industry
P.O. Box 33, Vaiaku, Funafuti, TUV ALU
Fax: (688) 20210 Phone: (688) 20107



Foreword

This report provides the demographic analysis of the results of the 1991 Population and Housing Census of Tuvalu. The basic tables are given in *Volume 1: Basic Information*. A demographer from the Australian National University, Dr. Habtemariam Tesfaghiorghis, was contracted to do the demographic analysis.

The report gives a comprehensive and explicit account of the social, economic and demographic characteristics of the population of Tuvalu. It analyses the impact of population dynamics in Tuvalu and considers the likely future population scenarios which allow policy-makers and planners make informed decisions and actions on the sustainability of development in Tuvalu. In this context, I believe that this report will be of great value to donor organisations, planners and policy-makers, non-government organisations, entrepreneurs, researchers and citizens of Tuvalu.

A number of people have either directly or indirectly made valuable contributions to the 1991 Population and Housing Census of Tuvalu. Firstly, I would like to thank the Census Commissioner, Ms Hellani Kaitu, and her team whose dedicated work ensured the proper conduct of the Census. Thanks are also due to the South Pacific Commission and the Fiji Bureau of Statistics for providing the technical assistance and expertise. The assistance provided by Dr. Heather Booth is highly appreciated. I would also like to record my appreciation to the United Nations Population Fund (UNFPA) for providing financial support to the Census. The excellent work done by Dr. Habtemariam Tesfaghiorghis in analysing the Census results is greatly appreciated. Last, but not least, I would like to extend my thanks to all the people of Tuvalu for their wholehearted participation in the Census which made it a success.

Fakafetai lasi.



Manuila Tausi
Government Statistician

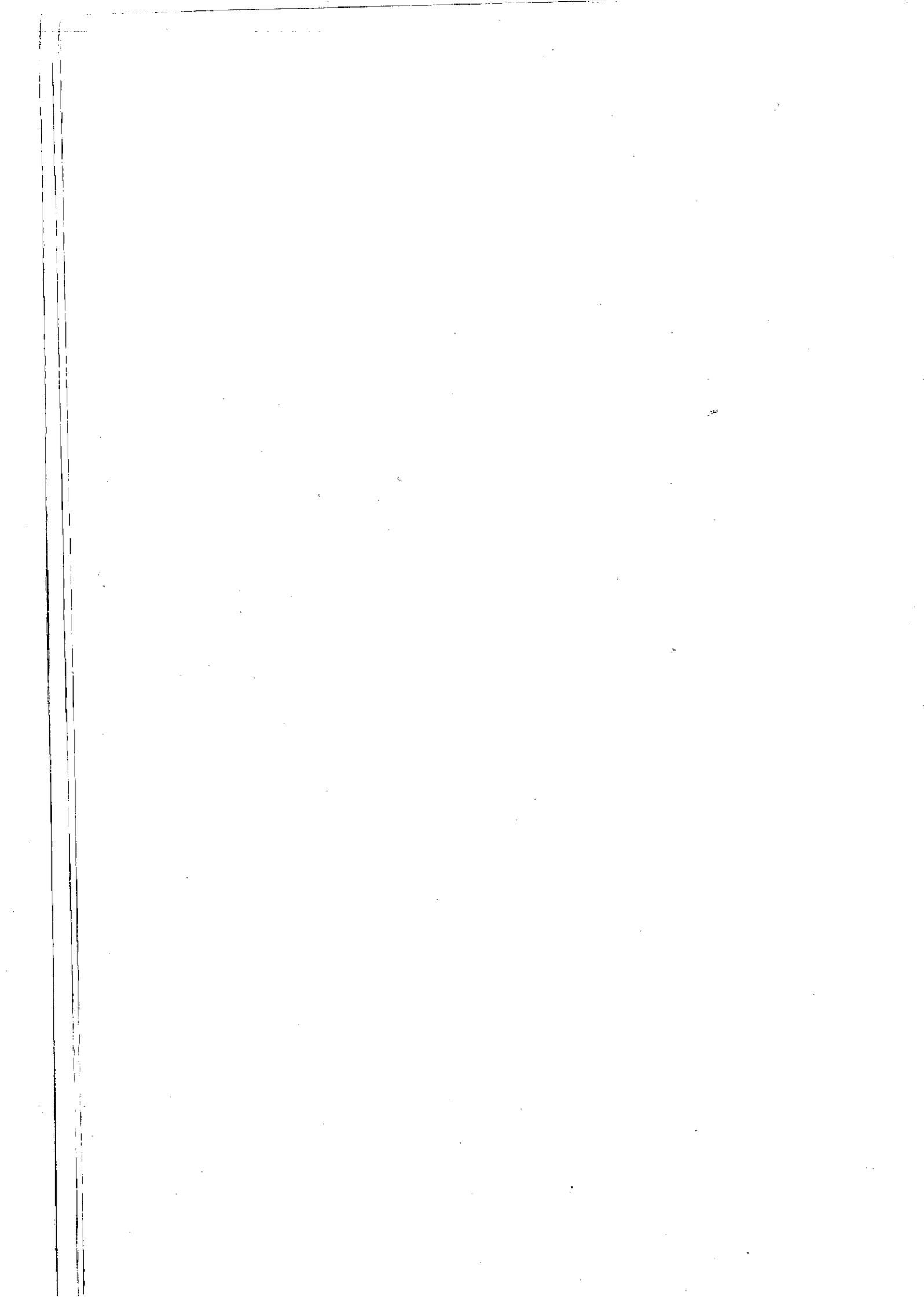


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Executive Summary

The 1991 Population and Housing Census of Tuvalu, the second since independence, was a de facto census that enumerated the population present in the country on census night of 17 November 1991. It enumerated a population of 9,043 persons, 4,376 males and 4,667 females. The de jure population, the usual population, was 10,114. The de jure population was obtained by adding Tuvaluans temporarily overseas to the resident population. It is recommended that the de jure population be taken as the population of Tuvalu, as it is more useful for socio-economic planning purposes. Tuvalu with a population of 10,114 and a land area of 25.6 square kilometres had a very high population density of 395 persons per square kilometre. Funafuti had the highest population density of 1,372 persons per square kilometre.

Good

There has been remarkable shifts in population distribution resulting in massive population concentration in Funafuti accompanied by a decline in the relative share of the population of outer islands, particularly Nanumea, Niutao and Vaitupu. Funafuti's share of the total de facto population increased from 15 per cent in 1973 to 42.5 per cent in 1991.

Resident Tuvaluans had a moderate level of fertility and low mortality resulting in a high rate of natural increase of 2.1 per cent per annum. The estimated crude birth rate was 29 births per 1000 population per year and the crude death rate was about 9 deaths per 1000 population during a year. This study found a fertility decline in the decade before the 1979 Census and a recent fertility rise since 1979 till it stabilised at about the 1991 fertility level. On the other hand, mortality has declined moderately. The estimated demographic rates of resident Tuvaluans for 1990-91 are given as follows:

Estimated vital rates: Resident Tuvaluans, 1990-91

Measure	Rate
Crude birth rate per 1000	29.4
Crude death rate per 1000	8.8
Rate of natural increase (%)	2.1
Total fertility rate	3.4
Gross reproduction rate	1.7
Net reproduction rate	1.5
Mean length of generation in years	28.9
Infant mortality rate per 1000	41.0
Child mortality per 1000, ${}_4q_1$	18.4
Under-five mortality per 1000, ${}_5q_0$	59.0
Expectation of life at birth in years	67.0

There were close to 1,500 households in Tuvalu with an average of six members per household. The majority of Tuvaluan households, 62 per cent, earned income from wage or salary; and at least one-third of all Tuvaluan households earned income from sale of handicrafts. Remittances were frequently received by 57 per cent of all households. The Census found that Tuvaluan households were generally active in four types of traditional activities: fishing, landwork, handicraft and housework. The most common goods possessed by households were bicycles, radios and sewing machines, as they were owned by 72, 68 and 61 per cent of all households, respectively.

The population composition was such that 93 per cent were ethnic Tuvaluan, 97 per cent were Tuvaluan citizens and 92 per cent belong to the Congregational Church. Tuvaluans had a very high literacy status and school attendance is universal: 99 per cent of all persons aged 10 years and over were literate and almost all persons aged six years and over either attended school at the time of the

Census or had attended school before. The majority of the working age population had no educational qualification. Of the persons aged 15 years and over, 68 per cent of males and 77 per cent of females in Funafuti had no educational qualification. In outer islands, the corresponding figures were 81 per cent for males and 88 per cent for females. Of the population aged 15 years and over, 61 per cent were currently married, 28 per cent were single, 7 per cent were widowed and 3 per cent were divorced or separated.

The Census showed that there were 5,663 persons of working age, of which the labour force was 4,865 (4,847 were employed and 18 were unemployed during the reference week). The overall labour force participation rate was very high, 86 per cent. Of the total labour force, 1,500 persons were employed in the formal cash sector (1,468 resident Tuvaluan plus 26 foreigners). The formal cash sector provided for 30 per cent of total employment, and females comprised 37 per cent of total cash sector employment. The predominant employment industry is the public sector, as employment in public administration, education and health accounted for 61 per cent of formal sector employment. In general, the Census found that all persons aged 15 years and over participated in traditional activities including those who had formal sector employment.

The population projections undertaken for the period 1991-2026 show that Tuvalu would have a much larger future population. The projection variants called high, medium and low were carried out by combining three possible assumptions regarding the future course of fertility with only one assumption regarding the likely future course of mortality. According to the high variant, which is based on the assumption of the continuation of current fertility combined with moderate mortality decline, the population of Tuvalu would increase from 10,114 in 1991 to 18,774 in 2026. The medium variant, the projection that is most likely to occur, based on the assumptions of moderate fertility and mortality decline shows that Tuvalu would have a population of 15,938 by 2026. On the other hand, the low variant, which is based on fast fertility decline and moderate mortality decline, produces the minimum population of 15,176 by 2026. The main results of the projections summarised below illustrate the magnitudes of the consequences of the rapid future population growth if no interventionist population policies are put into effect in time.

The crude rate of natural increase under the high variant would remain high throughout the projection period, the population growing annually at between 1.6 and 2.0 per cent. In contrast, in both the medium and low variants, the rate of natural increase would decline to low levels from 1.9 per cent in 1991-1996 to 0.9 per cent per annum in 2021-2026.

The population age structure would undergo substantial changes. While in the high variant, the proportions of children and working age population would remain constant except for a rise in the proportion of old persons, the changes in age structure are considerable under the medium and low variants. Under the medium variant, the share of children under 15 years in the population would decline from 33.6 per cent in 1991 to 24.2 per cent in 2026, the percentage of persons aged 15-64 years would increase from 61.4 to 65.4 percent and the share of persons aged 65 years and over would increase from 5.0 to 11.2 per cent over the same period.

Went
about
Fig 2.

**Projected annual rate of natural increase
by period and variant**

Period	Annual growth rate (%)		
	High	Medium	Low
1991-1996	2.0	1.9	1.9
1996-2001	1.7	1.5	1.4
2001-2006	1.6	1.3	1.1
2006-2011	1.7	1.2	0.9
2011-2016	1.8	1.2	1.0
2016-2021	1.8	1.1	1.0
2021-2026	1.8	0.9	0.9

The projections show that the working age population would increase by 160 per cent in 36 years under the low variant, by 166 per cent under the medium variant and by 179 per cent under the high variant. There is no difference in the size of the working age population from 1991 to 2011, as fertility reduction would only have effect on the working age population in 15 to 20 years.

**Projected total population and working age population
(15-64 years) by year and variant**

Year	Population			Working age population		
	High	Medium	Low	High	Medium	Low
1991	10114	10114	10114	6207	6207	6207
1996	11169	11119	11100	6670	6670	6670
2001	12182	11982	11910	7351	7351	7351
2006	13218	12767	12610	8235	8235	8235
2011	14374	13560	13191	9052	9003	8984
2016	15704	14395	13834	9761	9565	9493
2021	17186	15217	14527	10407	9962	9807
2026	18774	15938	15176	11097	10292	9927

Year	Indices of growth, 1991 base figure = 100					
	High	Medium	Low	High	Medium	Low
1991	100	100	100	100	100	100
1996	110	110	110	107	107	107
2001	120	118	118	118	118	118
2006	131	126	125	133	133	133
2011	142	134	130	146	145	145
2016	155	142	137	157	154	153
2021	170	150	144	168	160	158
2026	186	158	150	179	166	160

The high variant projection shows that there would be large increases in the school age population. For example, the primary school age population would increase from 1,603 in 1991 to 3,000 children in 2026, representing an increase of 87 per cent. On the other hand, this increase would be 30 per cent under the medium and 14 per cent under the low variants over the same period. Under the high variant, it would be difficult if not achievable to meet the educational needs of the school age population. On the other hand, meeting the educational needs of the school age population would be much easier under the medium and low variants.

Projected school age population by variant and year

School Population	Year							
	1991	1996	2001	2006	2011	2016	2021	2026
Primary (6-13)								
High	1603	2003	2182	2154	2203	2376	2672	3000
Medium	1603	2006	2151	1996	1878	1884	1988	2081
Low	1603	2006	2136	1939	1773	1652	1655	1822
Junior Secondary (14-15)								
High	320	396	505	546	535	545	590	668
Medium	320	396	507	540	498	466	468	497
Low	320	396	508	538	484	443	407	409
Senior Secondary (16-19)								
High	623	683	872	1075	1072	1070	1117	1229
Medium	623	683	872	1080	1040	961	921	951
Low	623	683	872	1080	1028	917	866	788

Definitions

Crude birth rate is the number of annual births per 1000 population.

Crude death rate is the number of annual deaths per 1000 population.

Rate of natural increase is the annual natural growth rate of the population, which results from the difference between the birth rate and the death rate.

Total fertility rate is defined as the average number of children that would be borne to a woman during her reproductive life if she survives to the end of her reproductive period and gives birth at each age at the 1991 age specific fertility rates.

Gross reproduction rate measures the average number of daughters that would be born to a woman if she survives to the end of her reproductive life and gives birth at the 1991 age specific fertility rates.

Net reproduction rate is the average number of daughters that would replace a mother in a generation, that is after 29 years, if she gives birth at each of her reproductive age at the current age specific fertility rates and experiences the 1991 age specific mortality rates.

Mean length of generation is defined as the mean age of mothers at the birth of their daughters. It answers the question how many years after birth does a woman replace herself with daughters, 29 years in the case of Tuvalu.

Infant mortality rate is the number of infant deaths under one year per 1000 live births during the year.

Child mortality measures the probability of dying between exact ages 1 and 5.

Under-five mortality is defined as the number of children dying between birth and age five per 1000 live births.

Expectation of life at birth is the average number of years that a newly born person is expected to live under the prevailing age-specific mortality rates.

Overall labour force participation rate is the ratio of the labour force to the working age population times 100. Labour force comprises employed and unemployed persons.

Projection variant is a projection series that results from application of a particular combination of fertility, mortality and migration assumptions to the base population by age and sex.

Chapter One

Population and Social Characteristics

Population Characteristics

Population size

The 1991 Population and Housing Census of Tuvalu, the second national census since 1979, was a de facto census that enumerated all persons who slept in the household on the census night of 17 November 1991. The enumeration was conducted on the census week 18-22 November 1991. The 1991 census counted a total population of 9,043, which were present in the country. Most of the population were resident Tuvaluans, with the non-resident Tuvaluans and non-Tuvaluans numbering only 161 and 132 persons, respectively.

Table 1. De facto population by ethnic group and sex: 1991 Census

Ethnic group	Male	Female	Total
Resident Tuvaluan	4,189	4,561	8,750
Non-resident Tuvaluan	87	74	161
Non-Tuvaluan resident	100	32	132
Total	4,376	4,667	9,043

SR = 94

Using statistics from the Labour and Education offices, and from censuses of neighbouring countries, there were approximately 2,001 (1,157 males and 844 females) Tuvaluans overseas at the time of the Census (see Census Table 1). Of these, 771 Tuvaluans who live in Kioa Island in Fiji and in Kiribati were permanent emigrants, but the remaining 1,230 were temporarily overseas as seamen, contract workers or students. If these temporary migrants were added to the resident population, the de jure population becomes 10,114 persons. The breakdown of the de jure population is given in Table 2.

Table 2. De jure population by type and sex: 1991 Census

Type of de jure Population	Male	Female	Total
Tuvaluan - resident	4,189	4,561	8,750
Nauru contract workers	402	333	735
Seamen overseas	272	0	272
Students overseas	72	61	133
Contract workers in NZ	30	60	90
Resident non - Tuvaluan	101	33	134
Total	5,066	5,048	10,114

1364

10,114 ✓

SR = 100

Population growth

The de facto population of Tuvalu increased from 7,349 in the 1979 Census to 9,043 in the 1991 Census. In 1973, the population of Tuvalu, the then Ellice Islands, was 5,887. The population between 1979 and 1991 grew rapidly at an average rate of 1.7 per cent per annum. In the same period, the resident Tuvaluan population increased from 7,271 in 1979 to 8,750 in 1991, representing a natural growth rate of 1.5 per cent per annum. The foreign residents increased from 78 persons in 1979 (44 males and 34 females) to 134 in 1991 (101 males and 33 females).

The population growth rate of Tuvalu is moderated by substantial emigration than otherwise would have been the case. The de jure population, that is the enumerated resident population plus those temporarily overseas (1,380 in 1979 and 1,230 in 1991) increased from 8,730 persons in 1979 to 10,114 persons in 1991. The average annual growth rate of the de jure population between 1979 and 1991 was 1.2 per cent.

Year	De jure population		Total
	Male	Female	
1979	4,351	4,379	8,730
1991	5,036	5,078	10,114

$r = 1.18$

Ethnicity and citizenship

About 93 per cent of the total population were ethnic Tuvaluan, 4 per cent part-Tuvaluan, 1.6 per cent I-Kiribati, and about 1 per cent Europeans (Table 3). As can be seen from the sex ratios by ethnic groups presented in Table 3, there were more females than males among the Tuvaluan, while the Europeans and other groups were mainly males and the I-Kiribati were mainly females.

Table 3. De facto population by ethnic group

Ethnic group	Population	Per cent	Sex ratio*
Tuvaluan	8,376	92.6	92.8
Part-Tuvaluan	365	4.0	100.5
I-Kiribati	140	1.6	44.3
European	84	0.9	460.0
Other	78	0.9	169.0
Total	9,043	100.0	93.8

* = Number of males per 100 females

The distribution of ethnic groups varied by island of enumeration. The part Tuvaluan were mainly found in Nui, Nanumea, Funafuti and Vaitupu. The I-Kiribati were mainly found in Funafuti, Nanumea, Nui and Vaitupu. The Europeans were mostly enumerated in Funafuti with a few number of them found in Nukufetau and Vaitupu. The enumerated island population were mostly composed of ethnic Tuvaluan. The exceptions were Nui and Nanumea, where the share of ethnic Tuvaluan was relatively lower.

The share of enumerated island populations that were ethnic Tuvaluan was as follows:

Nanumea	86.5 %
Nanumaga	98.3 %
Niutao	98.8 %
Nui	79.9 %
Vaitupu	93.3 %
Nukufetau	96.7 %
Funafuti	92.6 %
Nukulaelae	93.8 %
Niulakita	94.7 %

Citizenship

The population of Tuvalu were mostly of Tuvaluan citizenship. The Tuvaluan comprised 96.6 per cent of the total population. Fijian's lead the list of the small foreign populations. The people from the developed countries constituted for less than one per cent of the total population.

Table 4. De facto population by citizenship and sex

Citizenship	Male	Female	Total	% of total
Tuvalu	4,203	4,533	8,736	96.6
Fiji	65	49	114	1.3
Kiribati	13	50	63	0.7
United States	37	4	41	0.5
Australia	10	5	15	0.2
United Kingdom	10	3	13	0.1
New Zealand	6	3	9	0.1
Other Pacific	12	11	23	0.2
Others	20	9	29	0.3
Total	4,376	4,667	9,043	100.0

Religion

Table 5 shows that the predominant Tuvaluan religion is Congregational, as it comprised 92 per cent of the total population. However, the predominance of the Congregational (known as Tuvalu Church in the previous censuses) has declined from 97 per cent in both the 1973 and 1979 censuses to 92 per cent in 1991. The Seventh Day Adventists make-up for 2.4 per cent, the Bahai for 1.8 per cent, the Jehovah's Witness for 1.3 per cent, and the Roman Catholic for 0.5 per cent (included with Others in Table 5). In contrast to the outer islands, Funafuti shows a more varied religious make-up of the population.

The Congregational religion makes for 93 to 97 per cent of the population of outer islands compared to 87 per cent in Funafuti.

Table 5. Resident Tuvaluans by island and religion

Island	Congregation	SDA	Bahai	Jehovah	Others	Total
Nanumea	95.8	0.9	2.3	0.7	0.3	817
Nanumaga	93.2	0.5	2.6	3.6	0.1	644
Niutao	97.3	1.2	1.2	0.1	0.1	748
Nui	94.7	0.8	0.0	0.2	4.3	605
Vaitupu	96.5	1.6	1.1	0.2	0.6	1196
Nukufetau	95.5	0.8	2.4	0.7	0.5	740
Funafuti	86.5	4.5	2.2	2.1	4.7	3576
Nukulaelae	95.7	0.3	0.9	0.0	3.1	349
Niulakita	94.7	0.0	5.3	0.0	0.0	75
Total	91.9	2.4	1.8	1.3	2.6	8750

Population density and distribution

Table 6 shows the distribution of area in square kilometres, usual resident population and density (number of persons per square kilometre) by island of usual residence. In general, population density is high in Tuvalu, 347 persons per square kilometre, varying in the outer islands from 176 in Niulakita to 351 in Niutao, compared to 1,137 in Funafuti.

Table 6. Distribution of area, population and density by usual island of residence: 1991

Island	Area (sq.km)	Population	Density
Nanumea	3.87	901	233
Nanumaga	2.78	717	258
Niutao	2.53	889	351
Nui	2.83	661	234
Vaitupu	5.60	1280	229
Nukufetau	2.99	831	278
Funafuti	2.79	3172	1137
Nukulaelae	1.82	359	197
Niulakita	0.42	74	176
Total	25.63	8884	347

Table 7 shows that the distribution of population by islands of enumeration was highly uneven. The largest share of the population, 42.5 per cent was enumerated in Funafuti, the only urban area. There was a large gap in the relative population concentration between Funafuti and the second populous island, Vaitupu, which accommodated 13.3 per cent of the total population. Five islands had populations each accounting for between 7 and 9 per cent of the total population. The least populated islands were Niulakita and Nukulaelae.

The average household size in Tuvalu was large, 6.1 persons per household. The average number of persons per household in the outer islands varied from 4 to 6 persons, compared to an overall average of 5.3. The largest household size was found in Funafuti, 7.1 persons per household, reflecting overcrowding due to migration.

**Table 7. De facto population and households
by island of enumeration**

Island	Households	Population	Average Household	Per cent of Population
Nanumea	155	824	5.3	9.1
Nanumaga	157	644	4.1	7.1
Niutao	139	749	5.4	8.3
Nui	116	606	5.2	6.7
Vaitupu	197	1202	6.1	13.3
Nukufetau	145	751	5.2	8.3
Funafuti	499	3,839	7.7	42.5
Nukulaelae	60	353	5.9	3.9
Niulakita	15	75	5.0	0.8
Total	1,483	9,043	6.1	100.0
Outer Islands	984	5,204	5.3	57.5

Table 8 presents a comparison of the distribution pattern of resident Tuvaluan between home islands and islands of usual residence. As home islands, both Nanumea, Niutao and Vaitupu ranked first as they were claimed as home islands by 49 per cent Tuvaluans. The next significant home islands were Nukufetau, Funafuti and Nanumaga as each accounted for 12 to 13 per cent of the population. Although Funafuti was home only to 12 per cent of the population; it was the major island of usual residence as it accommodated 35 per cent of the usual population. The second island of usual residence, Vaitupu, had 15 per cent of the population. While Nanumea and Niutao were each home islands to at least 16 per cent of the population, they were each islands of usual residence to only 10 per cent of the population. The discrepancy in population distribution between home islands and islands of usual residence clearly reflects out migration from home islands to Funafuti and to a small extent to Niulakita.

**Table 8. Resident Tuvaluan by home island
and island of usual residence**

Name of Island	Home Island		Usual residence	
	Population	per cent	Population	per cent
Nanumea	1450	16.6	899	10.3
Nanumaga	1013	11.6	717	8.2
Niutao	1423	16.3	889	10.2
Nui	766	8.7	661	7.5
Vaitupu	1429	16.3	1274	14.6
Nukufetau	1115	12.7	826	9.4
Funafuti	1030	11.8	3051	34.9
Nukulaelae	457	5.2	359	4.1
Niulakita	-	-	74	0.8
Other*	67	0.8	-	-
Total	8750	100.0	8750	100.0

* = Includes 55 persons with home islands in Kiribati and 12 persons with home islands in other Pacific countries.

Age and sex composition

Evaluation of single-age reporting

The age-sex structure of a population can be distorted by omission of persons of particular age groups, age misreporting, migration and non-response. Single-year-age-sex reporting are usually affected by what is known as digital preference, that is the tendency of respondents to report ages at certain preferred terminal digits and avoid reporting at disliked digits. The extent of digital preference is measured by Myers' Blended Index (1940), which calculates the percentage of persons reporting at each terminal digits 0, 1, ..., 9. If age reporting is accurate, the percentage of population reported at each terminal digit would be equal to 10 per cent, otherwise deviations from this value indicate preference or dislike for the digit. The results of the Index calculated for ages 10-69 as presented in Table 9 show that the age data of Tuvalu are little affected by digital preference as the deviation from 10 per cent is small. However, slight avoidance for ages ending in 0 and 4 and slight preference for 1 are observed. Analysis of the 1979 data by Macrae (1980: 19) showed similar result, though digital preference in 1991 was further reduced.

Table 9. Digital preference for ages ending in 0 to 9 based on Myers' Blended Index by sex

Terminal digit/age	Percentage distribution of population reporting at terminal digits	
	Males	Females
0	8.6	8.8
1	10.8	11.1
2	10.7	9.9
3	11.2	10.3
4	9.1	9.1
5	10.0	10.1
6	9.6	10.5
7	10.1	10.1
8	9.4	10.1
9	10.5	10.0
Total	100.0	100.0
Index	3.2	2.2

Age structure

The distribution of population by broad age groups and sex classified separately for total population, Outer Islands and Funafuti is displayed in Table 10. The population is young. The share of children under 15 years, 35 per cent, though high, was relatively low compared to that of developing countries. The population in the ages 15-49 accounted for 48 per cent. The share of old people aged 65 years and over was small, 6 per cent.

There were age and sex structure differences between Funafuti and outer islands. There was a higher proportion of young and adult people aged 15-49 years in Funafuti, 53 per cent, compared to 46 per cent in outer islands. The sex ratios for the age group 15-29 years clearly demonstrate more male than female in-migration to Funafuti. The sex ratios for the age group 15-29 show shortage of males in the outer islands, and excess of males in Funafuti. The age-sex structure of resident Tuvaluan by

five-year age groups is given in Table 11.

Table 10. Age-sex structure

Age	Male		Female		Total		Sex Ratio
	No.	%	No.	%	No.	%	
Total population							
0-14	1667	38	1468	31	3135	35	114
15-29	1096	25	1081	23	2177	24	101
30-49	962	22	1259	27	2221	24	76
50-64	426	10	546	12	972	11	78
65+	225	5	313	7	538	6	72
Total	4376	100	4667	100	9043	100	94
Outer islands							
0-14	987	42	826	30	1813	35	119
15-29	485	20	636	23	1121	22	76
30-49	483	20	736	26	1219	24	66
50-64	277	12	359	13	636	12	77
65+	150	6	235	8	385	7	64
Total	2382	100	2792	100	5174	100	85
Funafuti							
0-14	677	34	638	34	1315	34	106
15-29	604	31	443	24	1047	27	136
30-49	473	24	519	28	992	26	91
50-64	146	7	186	10	332	9	78
65+	75	4	78	4	153	4	96
Total	1975	100	1864	100	3839	100	106

Table 11. Age and sex structure of resident Tuvaluans

Age	Male	Female	Total	Sex ratio
0-4	681	582	1263	117.0
5-9	566	479	1045	118.2
10-14	394	385	779	102.3
15-19	303	285	588	106.3
20-24	347	345	692	100.6
25-29	370	422	792	87.7
30-34	314	414	728	75.8
35-39	241	356	597	67.7
40-44	205	260	465	78.8
45-49	139	197	336	70.6
50-54	150	193	343	77.7
55-59	126	188	314	67.0
60-64	132	149	281	88.6
65+	221	306	527	72.2
Total	4189	4561	8750	91.8

Sex structure

The sex structure of the de facto population was in favour of females, as there were 94 males per 100 females. As a whole, there has been a trend towards a balanced sex structure over time, from 87 to 94 males per 100 females for the de facto population between 1979 and 1991, and from 87 to 92 for resident Tuvaluan over the same period. The main reason for the imbalance is higher male than female migration overseas. However, if the Tuvaluans temporarily overseas are included to the resident population, a balanced sex structure of 99 males per 100 females would be achieved.

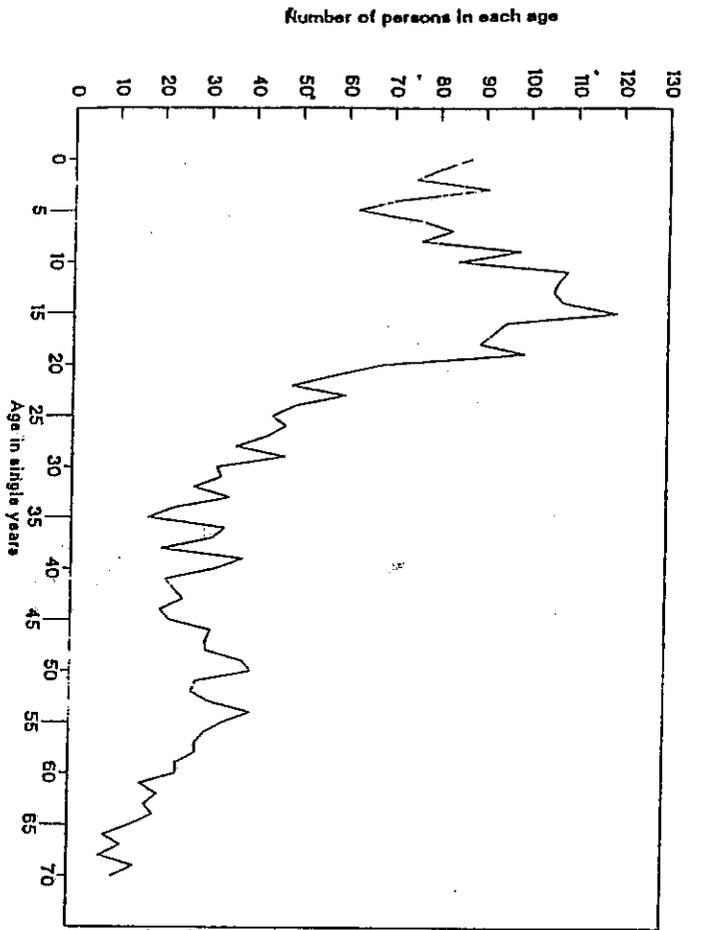
A normal sex structure should show sex ratios that gradually decline with increasing age from 105 males per 100 females among children aged 0-4 to 10-14 to about 100 in the younger adult ages and decline to below 100 from about age 40 to 50 onwards. The sex structure of resident Tuvaluans displayed in Table 11 shows substantial deficits of female children compared to males under age 10, and considerable male deficits compared to females at age group 25-29 and thereafter. The observed sex ratios of 117 and 118 for age groups 0-4 and 5-9, respectively were abnormally high. Sex ratios of this magnitude or higher for children were also observed in the 1973 and 1979 censuses. These ratios suggest either omissions of female children or they are due to the small size of the child population or due to selective emigration of female children, which is an unlikely possibility. Evaluation checks of the 1991 Census count of children done by the author using census returns, comparison of re-interview schedules and vital statistics show of no evidence of omission of female children and hence the result could be genuine.

Age-sex structure changes

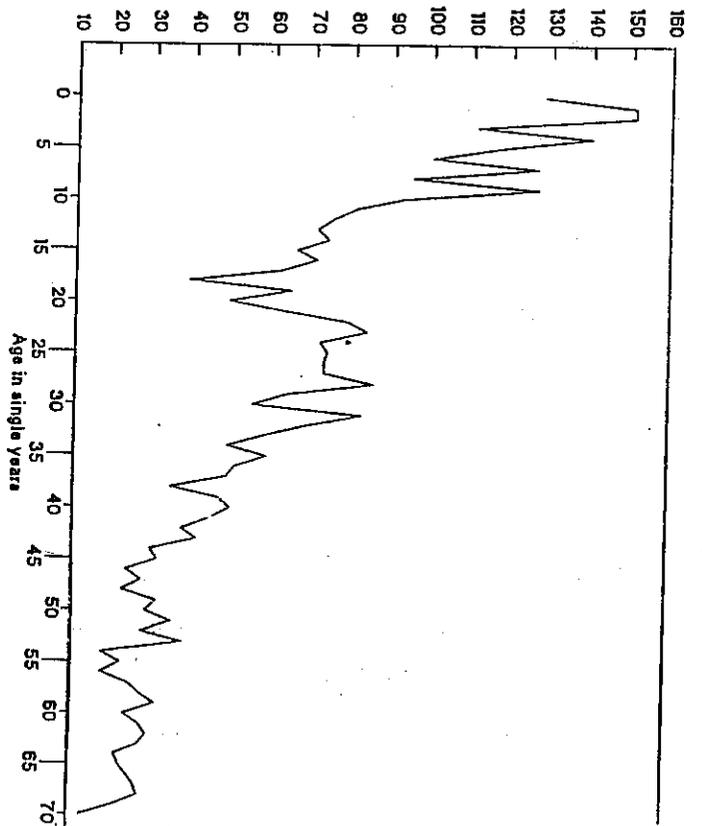
As shown in Table 12, there has been substantial changes in Tuvaluan age structure between 1979 and 1991. There has been large increases in the number of children under age 10. The increases were 70 per cent for children aged 0-4 and 44 per cent for children aged 5-9. On the contrary, there has been significant absolute and relative declines in the age group 10-19 years. Little or small positive changes occurred for age groups 20-24 and 45-59. There were large positive increases for age groups 20-44 and 55 and over, suggesting a lessening of overseas migration over the 1979-91 period.

Figure 1 is a graphic display of the number of persons enumerated at each age for males and females separately both for 1979 and 1991 censuses. The graphs show erratic fluctuations in the number of persons reported at each age instead of the gradual decline in the number of persons at each age with each advancing age as is normally expected. The evaluation of single age reporting showed that these erratic fluctuations are not due to age heaping or digital preference. The 1979 graphs show deficit of children under 10 relative to successive age groups, while the 1991 graphs show more children under 10 years than the following age groups. This could be due to fertility decline in the five to 10 years prior to the 1979 census and a recent fertility rise since the 1979 Census. The deficit of children in the 1979 census are shown by the trough in the 10-19 age group in the 1991 Census. The steep decline in the number of young and adult persons is mainly due to overseas migration.

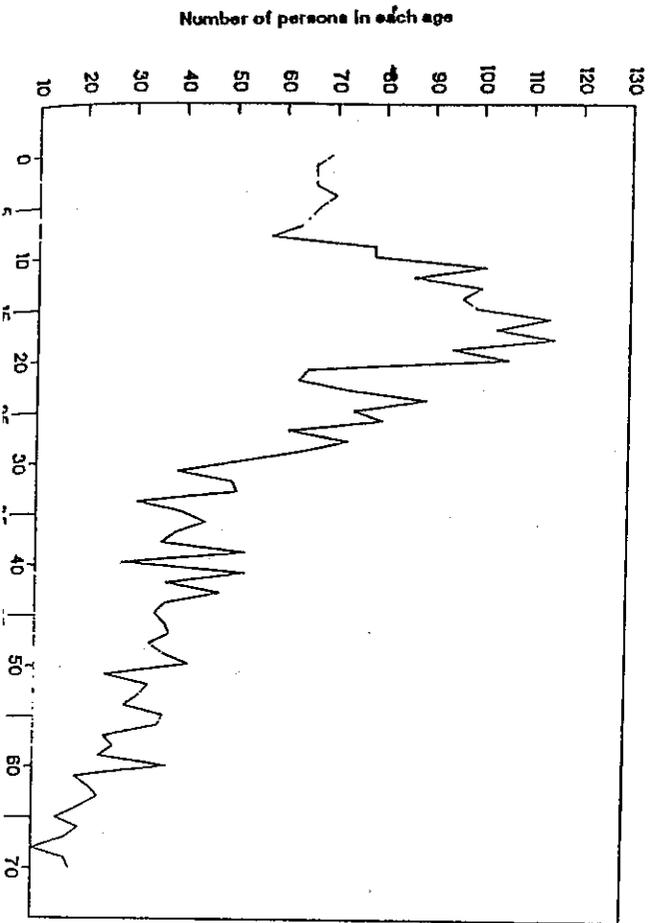
Number of males by age: 1979



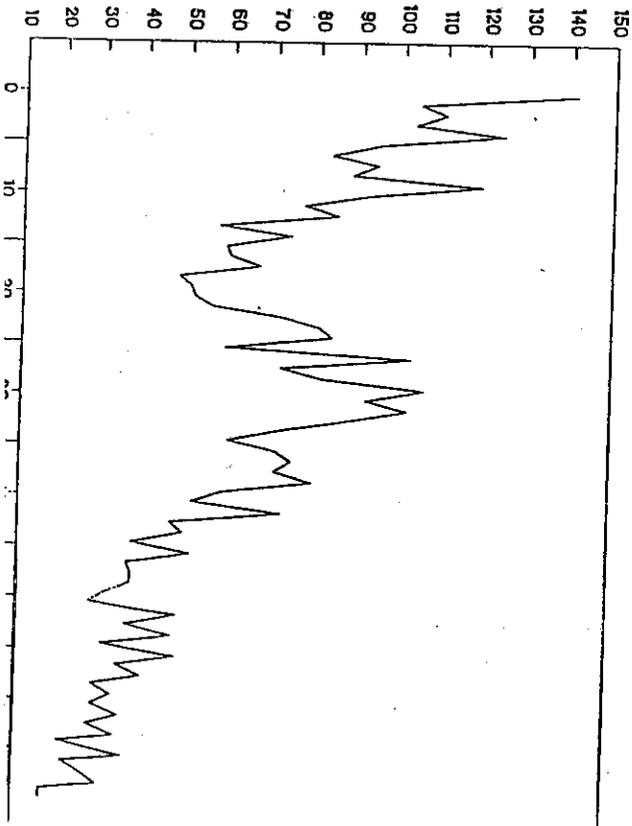
Number of males by age: 1991



Number of females by age: 1979



Number of females by age: 1991



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Changes in sex structure

The observed sex ratios for the two periods are summarised in Table 14. The results show a highly imbalanced sex ratios for all age groups in both periods, though there has been a movement towards a balanced overall sex ratio. The high sex ratios among children appeared to have declined, while those for the age groups 15-44 years increased. There has been considerable decline in the sex ratios for the age group 45-59. Although sex ratio at birth, mortality and migration influence sex structure, the abnormal sex ratios at young, adult and old age are primarily due to migration; while those among children were due to the small size of the population.

Table 14. Comparison of sex ratios of Tuvaluans

Age group	Sex ratios		
	1979	1991	Change*
0-4	120	117	-3
5-9	120	118	-2
10-14	111	102	-9
15-19	94	106	12
20-24	71	101	30
25-29	62	88	26
30-34	68	76	8
35-39	66	68	2
40-44	60	79	19
45-49	83	71	-12
50-54	102	78	-24
55-59	97	67	-30
60-64	78	89	11
65 +	54	72	18
Total	87	92	5

* = 1991 minus 1979 sex ratios

Educational Characteristics

Literacy status

The question on literacy asked in the Census was 'Can you read a Bible or a newspaper in any language?'. The Census showed that literacy is universal in Tuvalu irrespective of age, gender or place of residence. On the whole, out of all persons aged 10 years and over 99 per cent were literate. The literacy rate between age groups varied narrowly from 97 to 100 per cent. However, the very high literacy status of the population may be partly due to the definition of literacy used in the Census, which was based on reading ability only. It is usual to ask literacy status in terms of ability to read and write and in some censuses ability to do basic arithmetic is also asked.

School attendance

The analysis of school attendance refers to persons aged six years and over, as primary schooling start at the age of six. In total, there were 64 resident Tuvaluan aged six years and over who did not attend school (25 males and 39 females). Of these, 19 were children (11 males and 8 females): 11 were aged 6-9 years and 8 were aged 10-14 years. Another 23 of them were youth aged 15-34 years (6 males and 17 females). As revealed by the Census data, school attendance among children in Tuvalu was universal. The percentage of children aged 6-9 years who did not attend school was 1.6 per cent among males and 1.0 per cent among females. The school non-attendance was 1.0 per cent among children aged 10-14 years.

As primary education is compulsory over the ages 6-15 years since 1976, verification done by the author and census staff on why the few children did not attend school was found to be disability. Table 15 clearly shows that almost all children as well as youth aged 6-19 years attended school either now or in the past. Almost all children aged 6-14 years were attending school at the time of the Census. Two-thirds of all 15-19 year olds attended school in the past, while the remaining one-third were still attending school at the time of the Census.

Table 15. Percentage of persons aged 6-19 years by sex and whether attended school

Age Group	Male			Female		
	Now	Past	Never	Now	Past	Never
06-09	98.4	0.0	1.6	99.0	0.0	1.0
10-14	97.2	1.8	1.0	96.1	2.9	1.0
15-19	32.0	67.0	1.0	35.4	63.5	1.1

Highest level of education completed

The Census collected information on highest level of education completed for persons who were not attending school or were attending school at the time of the Census. As formal education of children under 15 years is compulsory, the analysis of highest level of education completed by those who were not attending school is limited to persons aged 15 years and over. Panel A of Table 16 presents the distribution of number of persons who were not attending school by highest level of education completed, age group and sex. For example, there were 924 males aged 15-29 years of whom four never attended school, 23 had attended Classes 1-5, 620 had completed Classes 6-10, and 78 had completed tertiary education, etc. Judging from Table 16, the common level of education completed by both sexes and age groups was Classes 6-10 followed by Forms 1-7. As a whole, 5,451 persons of whom 2,460 males and 2,991 females had completed Classes 1 to 5 or higher level of education.

Panel B of Table 16 presents the relative distribution of persons who were not attending school at the time of the Census by level of education completed for each sex. Examination of the data in panel B shows the following salient features. First, school non-attendance among the population was negligible. Second, the common level of education completed were Classes 6-10, particularly among females. In the case of females, the percentages who completed Classes 6-10 varied from 60.4 per cent in the age group 15-29 to 67.7 per cent in the age group 50 years and over. On the contrary, the percentage of males who completed Classes 6-10 declined from 67.1 per cent for the age group 15-29 to 42.3 per cent at ages 50 years and over. Third, while younger females seemed to be better educated than older cohorts of women in terms of completing Forms 1 to 7 and tertiary education, this was not so in the case of males. Males aged 30-49 years had higher proportions completing Forms 1 to 7 and tertiary education than either those aged 15-29 and 50 years and over. Fourth, the

percentage of persons who completed the lowest level of education, Classes 1-5, rose from being insignificant among the youth to substantial levels with advancing age. Fifth, tertiary education is limited: the proportions who completed tertiary education among the 15-29 age group was 8.4 per cent for males and 7.2 per cent for females, and in the age group 30-49 it was 12.2 per cent for males and 5.5 per cent for females. Among persons aged 50 years and over, this figure was 1.5 per cent for females compared to 7.1 per cent for males. In contrast to females, older males had achieved higher levels of education; but this gap between the sexes is narrowing among the young.

Table 17 shows the percentage distribution of persons who were attending school at the time of the Census by highest level of education completed, age and sex. There were a total of 1,780 persons of whom 925 were males and 855 were females who were attending school at the time of the Census. The majority of children aged 6-9 years, 70 per cent of males and 68 per cent of females, completed Classes 1-3; and the remaining 30 per cent had completed Classes 4-5. The educational level of 10-14 year olds spans all levels except tertiary, with the distribution concentrated in Class four to Form two. A larger proportion of 10-14 year olds had completed Classes 6 to 7. Close to 80 per cent of 10-14 year olds had completed Class 6 or higher levels of education. A large proportion of 15-19 year olds, 42 per cent of males and 47 per cent of females, had completed Forms 5 to 7. About five per cent of the 15-19 year olds had tertiary education. There were some data inconsistencies, as some of the reported completed educational levels were inconsistent with the age of students according to the educational policies and practices of Tuvalu. For example, children aged 10-14 years should attend from Class 5 to Form 3 and not be in Classes 1 to 3.

Table 16. Persons who were not attending school by highest level of education completed, age and sex

Highest level completed	Age Groups			Total
	15-29	30-49	50 +	
Panel A.1: Number of males				
Never attended	4	7	3	14
Classes 1-5	23	144	191	358
Classes 6-10	620	426	269	1315
Forms 1-7	181	212	115	508
Tertiary	78	112	45	235
Other	18	14	12	44
Total	924	915	635	2474
Panel A.2: Number of females				
Never attended	13	7	11	31
Classes 1-5	18	134	201	353
Classes 6-10	574	808	567	1949
Forms 1-7	267	198	32	497
Tertiary	69	68	13	150
Others	10	18	14	42
Total	951	1233	838	3022
Panel A.3: Number of persons				
Never attended	17	14	14	45
Classes 1-5	41	278	392	711
Classes 6-10	1194	1234	836	3264
Forms 1-7	448	410	147	1005
Tertiary	147	180	58	385
Others	28	32	26	86
Total	1875	2148	1473	5496
Panel B.1: Per cent of males				
Never attended	0.4	0.8	0.5	0.6
Classes 1-5	2.5	15.7	30.1	14.5
Classes 6-10	67.1	46.6	42.3	53.1
Forms 1-7	19.6	23.2	18.1	20.5
Tertiary	8.4	12.2	7.1	9.5
Other	2.0	1.5	1.9	1.8
Total	100.0	100.0	100.0	100.0
Panel B.2: Per cent of females				
Never attended	1.4	0.6	1.3	1.0
Classes 1-5	1.9	10.9	24.0	11.7
Classes 6-10	60.4	65.5	67.7	64.5
Forms 1-7	28.1	16.0	3.8	16.4
Tertiary	7.2	5.5	1.5	5.0
Other	1.0	1.5	1.7	1.4
Total	100.0	100.0	100.0	100.0
Panel B.3. Per cent of total				
Never attended	0.9	0.7	0.9	0.8
Classes 1-5	2.2	12.9	26.6	12.9
Classes 6-10	63.7	57.4	56.8	59.4
Forms 1-7	23.9	19.1	10.0	18.3
Tertiary	7.8	8.4	3.9	7.0
Others	1.5	1.5	1.8	1.6
Total	100.0	100.0	100.0	100.0

**Table 17. Percentage of persons attending school
by level completed, sex and age groups**

Completed Level	Age groups			Total	
	6-9	10-14	15-19	%	Number
Males					
Class 1-3	70.1	2.3	-	34.5	330
Class 4-5	29.4	18.8	-	21.8	202
Class 6-7	0.5	39.2	1.0	16.5	153
Class 8-10	-	20.4	30.0	11.7	108
Form 1-2	-	13.3	0.0	5.5	51
Form 3-4	-	5.5	22.0	4.7	43
Form 5-7	-	0.5	42.0	4.8	44
Tertiary	-	-	5.0	0.5	5
Total - %	100.0	100.0	100.0	100.0	
Number	442	383	100	925	
Females					
Class 1-3	68.2	0.8	-	30.7	262
Class 4-5	31.0	21.1	-	22.9	196
Class 6-7	0.8	34.9	0.9	15.6	133
Class 8-10	-	17.8	18.1	9.9	85
Form 1-2	-	17.8	0.0	7.7	66
Form 3-4	-	7.6	24.8	6.3	54
Form 5-7	-	-	51.4	6.3	54
Tertiary	-	-	4.8	0.6	5
Total - %	100.0	100.0	100.0	100.0	
Number	380	370	105	855	
Total persons					
Class 1-3	69.2	1.6	-	32.6	581
Class 4-5	30.2	19.9	-	22.4	398
Class 6-7	0.6	37.1	1.0	16.1	286
Class 8-10	-	19.1	23.9	10.8	193
Form 1-2	-	15.5	0.0	6.6	117
Form 3-4	-	6.5	23.4	5.4	97
Form 5-7	-	0.3	46.8	5.5	98
Tertiary	-	-	4.9	0.6	10
Total - %	100.0	100.0	100.0	100.0	
Number	822	753	205*	1780	

Note:

* = 3 males aged 21-23 years, 2 females aged 21-22 and another 2 aged 25 years and over and studying tertiary education were included in the 15-19 age group.

The column totals for each age group add up to 100 %.

Educational qualifications

The educational qualifications of persons aged 15 years and over by sex for Funafuti and Outer Islands are separately displayed in Table 18. Of the Funafuti population aged 15 years and over, 68 per cent of males and 77 per cent of females had no educational qualification. The corresponding figures for Outer Islands were 81 per cent for males and 88 per cent for females. The percentages of total population aged 15 years and over who had no qualification varied considerably between islands from 72 per cent in Funafuti, 76 per cent in Nukufetau and 78 per cent in Vaitupu to 91 per cent in Nanumea, 92 per cent in Niutao, and to 94 per cent in Nanumaga. Nui (84 per cent), Niulakita (87 per cent) and Nukulaelae (89 per cent) had intermediate levels.

Males in Funafuti had comparatively higher qualification, as about one-third of them had some form of qualification, while outer island females had the least qualification (Table 18). About 10 per cent of both males and females in Funafuti had Junior or Form 5 certificate, compared to 6 per cent of males and 5 per cent of females in Outer Islands. The proportions with diploma or degree qualifications were 7.1 per cent among males in Funafuti in contrast to 2.3 among Funafuti females, 1.6 per cent of males and 0.4 per cent of females in Outer Islands. About 6 to 8 per cent of Funafuti population and 7 per cent of outer island males had other certificate, though it is not clear from the census tabulation what this qualification is.

Table 18. Distribution of total population by educational qualification, residence and sex

Educational Qualification	Funafuti		Outer Islands	
	Male	Female	Male	Female
Number of persons				
None	780	883	1135	1734
Primary SLC	25	20	34	35
Junior cert.	56	60	64	75
Form 5 cert.	65	59	18	28
Cambridge cert.	23	21	6	8
Uni. Ent / HSC.	20	7	4	2
Other cert.	88	67	98	69
Diploma	65	19	16	4
Degree	17	7	6	3
Other	14	6	14	8
Total	1153	1149	1395	1966
Relative distribution				
None	67.7	76.9	81.4	88.2
Primary SLC	2.2	1.8	2.4	1.8
Junior cert.	4.9	5.2	4.6	3.8
Form 5 cert.	5.6	5.1	1.3	1.4
Cambridge cert.	2.0	1.8	0.4	0.4
Uni. Ent. / HSC.	1.7	0.6	0.3	0.1
Other cert.	7.6	5.8	7.0	3.5
Diploma	5.6	1.7	1.2	0.2
Degree	1.5	0.6	0.4	0.2
Other	1.2	0.5	1.0	0.4
Total	100.0	100.0	100.0	100.0

Note:

Primary SLC is Primary School Leaving Certificate.

Junior cert. is Colony / Fiji Junior Certificate.

Form 5 cert. is New Zealand / Tuvalu Form 5 Certificate.

Cambridge cert. is Cambridge School Cert / 'O' Level.

Uni. Ent. / HSC. is University Entrance / University Bursary / Higher School Certificate / 'A' Level / Foundation Certificate.

In general younger age groups were relatively more qualified than older cohorts of people (Table 19). The 25-34 year olds followed by the 35-49 year olds had more higher qualifications, especially diplomas and degrees, than either the youngest or oldest age groups. The 15-24 year olds had the highest proportions with Junior and Form 5 certificates, reflecting the fact that a sizable proportion of this age category was still attending school.

Table 19. Percentage distribution by qualification and age groups: Funafuti and Tuvalu

Educational Qualification	Age groups				Total
	15-24	25-34	35-49	50 +	
Tuvalu					
None	73.5	75.1	80.3	90.6	80.0
Primary SLC	1.1	2.5	3.4	1.0	2.0
Junior cert.	11.3	4.5	2.3	0.6	4.5
Form 5 cert.	7.3	3.5	1.2	0.4	3.0
Camb/Uni.cert.	1.6	2.4	1.6	0.8	1.6
Other cert.	3.8	6.6	7.5	4.7	5.7
Diploma	0.8	3.1	2.1	1.2	1.8
Degree	0.2	1.3	0.8	0.0	0.6
Other	0.4	1.0	0.8	0.7	0.7
Total - %	100.0	100.0	100.0	100.0	100.0
Number	1280	1520	1398	1465	5663
Funafuti					
None	69.7	65.7	71.7	86.7	72.2
Primary SLC	1.2	2.0	3.2	1.3	2.0
Junior cert.	7.6	6.7	3.2	1.4	5.0
Form 5 cert.	11.6	5.3	2.5	0.9	5.4
Camb/Uni. cert.	2.7	4.4	3.1	1.6	3.1
Other cert.	5.1	7.4	9.8	4.1	6.7
Diploma	1.5	5.4	4.1	3.1	3.6
Degree	0.3	2.1	1.2	0.0	1.0
Other	0.3	1.0	1.2	0.9	0.9
Total - %	100.0	100.0	100.0	100.0	100.0
Number	594	702	562	444	2302

Marital Status

The current marital status of the population aged 15 years and over by sex is presented in Table 20. A majority of the population aged 15 years and over were currently married: 63 per cent of males and 60 per cent of females were in a married state. The next significant marital category was the never married. The never married accounted for one-fourth of males and one-third of females. The percentages of both divorced / separated and widowed were small among males, but moderate among females, particularly widowhood.

Among the 15-19 year olds, almost all males and the majority of females were never married. On the other hand, among the 20-24 year olds about half of females were married in contrast to 21 per cent of males. A considerably higher proportion of males than females were in a married state at all age groups except the youngest. The proportion of males married were high, rising from 79 per cent in the age group 30-34 to a peak of 90 per cent in the age group 40-49 years. On the other hand, the percentages of females declined from a peak of 71 per cent in the age group 30-34 to 61 per cent in the age group 50-54 years. At ages 55 and above, less than half of females were married compared to 86 per cent of males. The proportions who ultimately never marry were 10 per cent for females, compared to 4 per cent for males.

Comparison of marital status between Funafuti and outer islands showed considerable differences between males, while females showed a broadly similar marital structure. There was a substantial concentration of never married males in Funafuti compared to outer islands. Of all Funafuti males aged 15 years and over, 41 per cent were never married compared to 27 per cent in outer islands. The corresponding figures for females were 24 and 25 per cent, respectively. The percentages of married males were 55 per cent in Funafuti and 69 per cent in outer islands. In the case of females, the percentages married were 64 per cent in Funafuti and 57 per cent in outer islands. The percentage of females widowed in outer islands (14 %) was two times higher than the level for Funafuti (7 %).

Table 20. Marital status by age-sex groups: 1991

Age Group	Never Married	Married	Divorced / Separated	Widowed	Total
Males					
15-19	98.4	0.7	1.0	0.0	306
20-24	78.0	20.8	1.2	0.0	346
25-34	28.3	68.8	2.2	0.7	688
35-49	7.5	89.3	2.4	0.8	577
50 +	3.7	87.6	1.8	7.0	627
Total %	33.1	63.0	1.8	2.1	2544
Number	842	1602	47	53	2544
Females					
15-19	85.6	14.1	0.4	0.0	284
20-24	48.0	48.8	2.9	0.3	344
25-34	18.5	74.4	5.0	2.0	836
35-49	16.0	73.1	3.6	7.3	810
50 +	9.8	51.4	4.7	34.1	833
Total %	24.5	60.0	4.2	11.4	3107
Number	760	1863	129	355	3107
Total population					
15-19	92.3	7.1	0.7	0.0	590
20-24	63.0	34.8	2.0	0.1	690
25-34	23.0	71.9	3.7	1.4	1524
35-49	12.5	79.7	3.1	4.6	1387
50 +	7.2	66.9	3.4	22.5	1460
Total %	28.3	61.3	3.1	7.2	5651
Number	1602	3465	176	408	5651

Row percentages add up to 100 %

Changes in marital status

The proportions never married by age group, sex and year are presented in Table 21. In the age group 15-19 years, almost all males, 99.8 per cent in 1979, and 99.3 per cent in 1991, were never-married. On the other hand, the percentages of females single in this age group declined from 96.8 per cent in 1979 to 85.3 per cent in 1991. The examination of the proportions single by age and sex over the 1979-91 period shows the following main points. First, there have been substantial declines in the proportions remaining single in the young and adult age groups, particularly in the age group 20-39 years for males and 15-44 years for females. Second, there has been a rise in the

proportions single among males aged 40 years and over. Third, the proportions who ultimately never marry by age 50 (mean of the proportions at age groups 45-49 and 50-54) was small for males but moderate for females; it rose from 2.3 to 5.2 per cent for males over the period 1979-91 and from 13.2 to 14.9 per cent for females. Hence, marriage remained still universal among males but not so among females.

As a consequence of the decline in the proportions remaining single, there has been a corresponding rise in the proportions currently married, in the age groups 15-39 for males and 15-44 years for females. The proportions married among older males appears to decline. The combination of the declining proportions single and the rise in the proportions married resulted in the decline in the mean age at first marriage. The mean age at first marriage among those who ever marry by age 50, known as the Singulate Mean Age at Marriage (SMAM), is calculated from the proportions remaining single at each age group. The mean age at first marriage for males declined from 29.1 years in 1979 to 26.7 years in 1991, and from 25.4 years to 21.4 years for females over the same period. The rise in the proportions married and decline in mean age at first marriage are causes for the fertility rise that occurred between 1979 and 1991.

Table 21. Proportions currently single and married by age and sex: 1979-91

Age Group	Male		Female		Total	
	1979	1991	1979	1991	1979	1991
Proportions single						
15-19	99.8	99.3	96.8	85.3	98.2	92.5
20-24	85.5	77.8	66.6	47.8	75.0	62.9
25-29	50.5	37.8	39.6	19.7	43.6	28.2
30-34	30.1	17.5	22.0	17.4	25.2	17.4
35-39	15.7	9.1	19.8	15.7	18.2	13.1
40-44	6.9	12.2	16.4	10.4	12.8	11.2
45-49	2.8	4.3	12.3	16.2	8.2	11.3
50-54	1.8	6.0	14.0	13.5	7.9	10.2
55 +	1.6	2.9	8.2	8.7	5.3	6.2
Total	44.9	33.0	40.5	24.4	42.4	28.3
SMAM	29.1	26.7	25.4	21.4	27.2	24.0
Proportions married						
15-19	0.2	0.7	3.2	14.0	1.8	7.1
20-24	14.2	20.7	31.9	48.7	24.0	34.7
25-29	48.6	60.5	55.2	73.0	52.7	67.2
30-34	68.1	79.3	70.7	75.8	69.7	77.3
35-39	81.1	86.7	68.5	75.6	73.0	80.1
40-44	89.3	83.4	69.2	78.1	76.8	80.4
45-49	93.6	90.6	69.5	67.5	79.9	77.1
50-54	96.4	90.0	61.0	62.7	78.8	74.6
55 +	83.7	86.4	42.6	47.7	60.2	64.3
Total	51.4	62.9	44.4	59.8	47.4	61.2

There has been substantial changes in marital status. For example, the percentage of females aged 15-49 years that was currently married rose from 44.0 per cent in 1979 to 63.0 per cent in 1991, an increase of 19 percentage points. These changes could be due to changes in age structure and changes in marriage patterns. A decomposition of the total change in the proportion married into changes in age structure and into marriage patterns showed that important changes have taken place in both components. The change in marriage patterns contributed to 54 per cent of the total change, while change in age structure accounted for 46 per cent. There was a substantial decline in the proportion of females aged 15-24 years, while there has been an increase in the proportions of females aged 25-44 years.

Table 22. Comparison of marital status by sex and year

Sex	Single	Married	Divorced	Widowed	Total
Male					
1979	44.9	51.4	1.2	2.6	2140
1991	33.0	62.9	1.8	2.1	2544
Female					
1979	40.5	44.4	4.1	11.0	2812
1991	24.4	59.8	4.1	11.4	3107
Total					
1979	42.4	47.4	2.8	7.4	4952
1991	28.3	61.2	3.1	7.2	5651

Chapter Two

Migration and Urbanisation

who are they?

Changes in geographical distribution

There has been remarkable shifts in the distribution of population by islands. The notable feature is the dramatic increase of the population of Funafuti. The de facto population of Funafuti increased from 15 per cent of the total population in 1973 to 29 per cent in 1979, and to 43 per cent in 1991. Whereas the massive population concentration in Funafuti was mainly due to internal migration, immigration to Funafuti also played an important role. The ex-Tuvaluan in Funafuti, who numbered 742, accounted for 24 per cent of its usual residents in 1991. In contrast to population concentration in Funafuti, Figure 1 clearly shows that the relative share of the population of all outer islands, particularly Nanumea, Niutao and Vaitupu, declined. The decline in the population of Nanumea and Niutao has not been only in a relative terms, but also in absolute numbers. In the remaining outer islands, the population size has remained constant, while some absolute increases were visible for Vaitupu (Figure 2).

The effect of the massive population shift to Funafuti resulted in very high urban population growth rate and high degree of urbanisation. The population of Funafuti grew at 16.3 per cent per annum between 1973 and 1979 and at 4.7 per cent between 1979 and 1991. If the population of Funafuti continues to grow at a constant rate of 4.7 per cent per annum, the current population of Funafuti would double in the next 15 years.

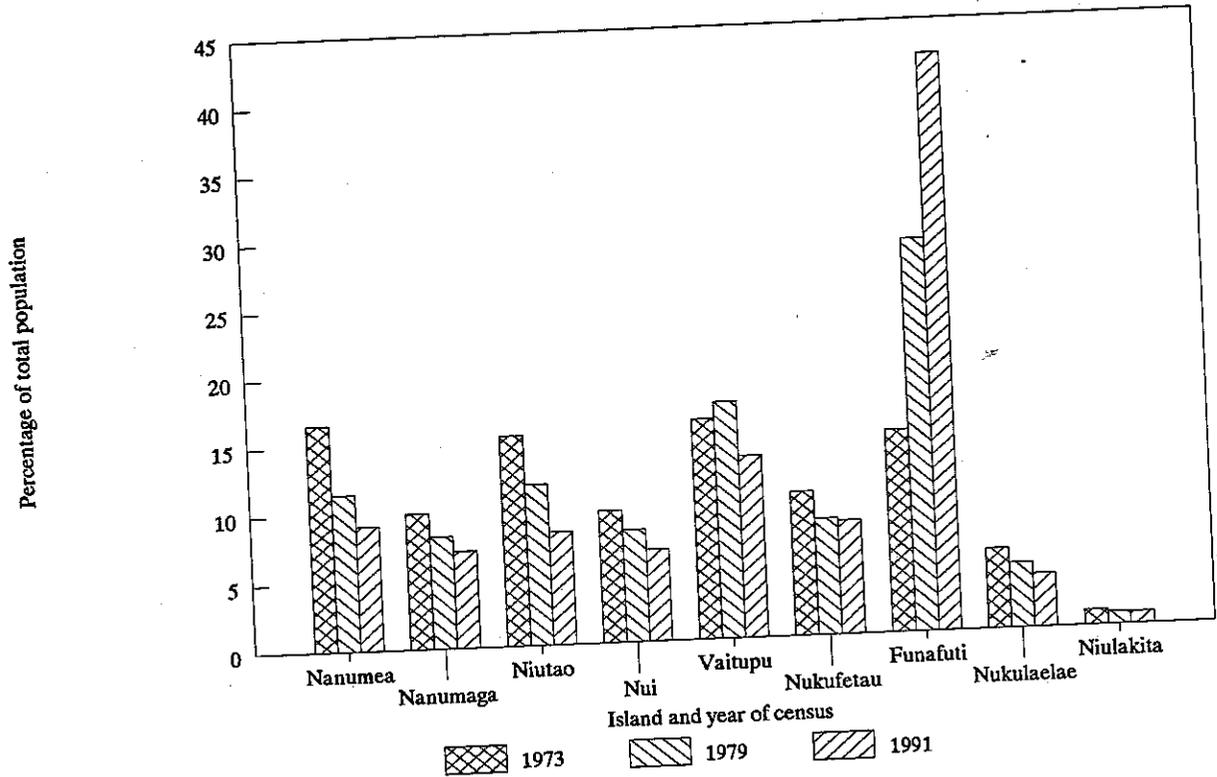
Table 1. Changes in population distribution by islands: 1973-91

Island	Population (de facto)			Relative distribution		
	1973	1979	1991	1973	1979	1991
Nanumea	977	844	824	16.6	11.5	9.1
Nanumaga	587	605	644	10.0	8.2	7.1
Niutao	907	866	749	15.4	11.8	8.3
Nui	569	603	606	9.7	8.2	6.7
Vaitupu	948	1273	1202	16.1	17.3	13.3
Nukufetau	620	626	751	10.5	8.5	8.3
Funafuti	871	2120	3839	14.8	28.8	42.5
Nukulaelae	343	347	353	5.8	4.7	3.9
Niulakita	65	65	75	1.1	0.9	0.8
Total	5887	7349	9043	100.0	100.0	100.0

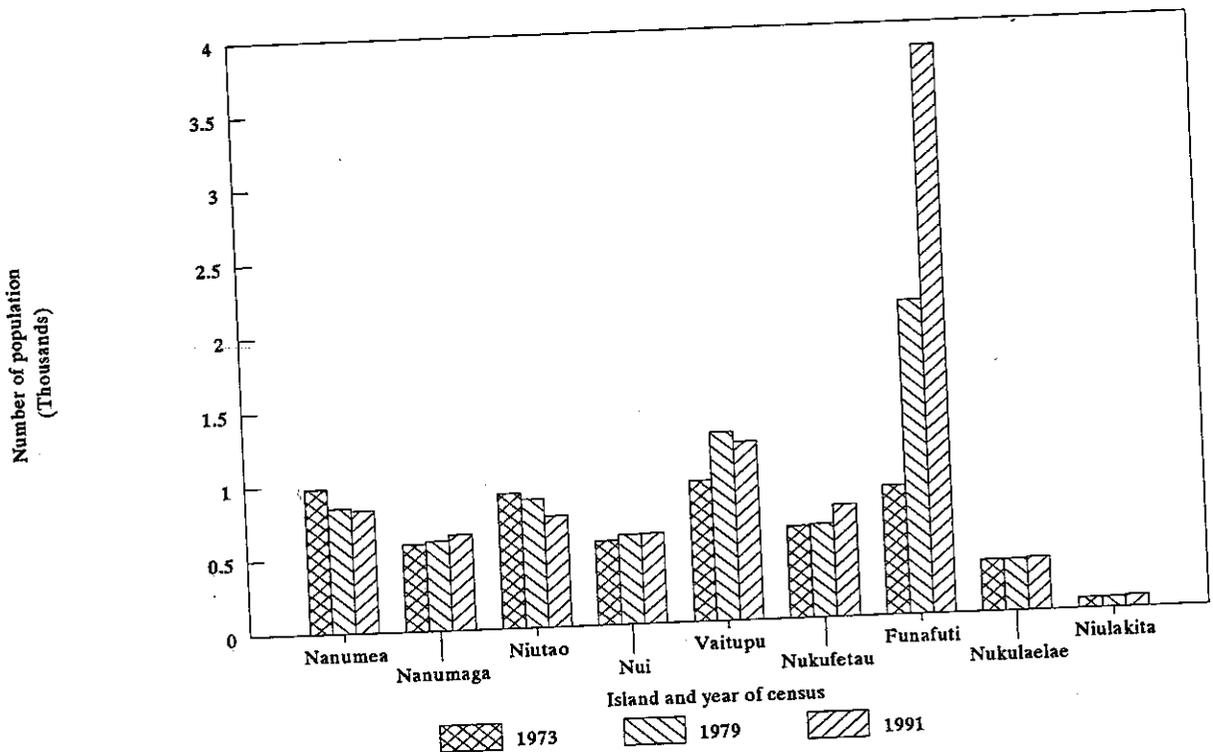
increase in population

Figure 2

Relative population distribution (%)
by islands, Tuvalu 1973-91



Population distribution by islands
Tuvalu 1973-91



Population composition by villages

The size, age structure and sex ratios of the usual population of islands and villages are displayed in Table 2. The distribution of population by village of usual residence was highly uneven (Table 2). Tuvalu has 27 villages constituting the nine islands. The populations of outer villages varied considerably from only 14 persons in Lakena to 561 in Kulia; and in Funafuti town from 83 people in Teone/ Saumalei/ Vao to 997 in Faikafou/ Nanumasa. The average usual village population was 271 in outer islands and 508 in Funafuti, as compared to 324 for the country.

The sex structures of outer islands and villages were considerably unbalanced, reflecting female predominance in the population as a result of male out migration from these islands and villages to Funafuti and overseas. The analysis of sex ratios shows that there has been comparatively higher male out-migration from the villages within Nukulaelae and Nanumaga. In few exceptions such as Asau, Maneapa and Kulia, the number of males and females were balanced. The island sex ratios show excess of females over males, and ranged from 74 in Nukulaelae to 93 in Nukufetau. In contrast to outer islands, the overall sex ratio of Funafuti is balanced, reflecting the flow of male migrants to Funafuti. In two villages of Funafuti, however, there were excess of males over females.

Despite the broadly similar age structure, there are some differences which are indicative of differential migration between islands and villages. The share of total population that were children under the age of 15 years was lowest in Nanumaga, 32.4 per cent, and Nukulaelae, 33.4 per cent. The highest share of children, about 36 per cent, was observed in Nanumea, Vaitupu, Funafuti and Nukufetau. The share of children varies considerably by villages from 31 to 48 per cent, excepting villages with populations under 100. The share of the working age population aged 15-64 years varied from about 56 per cent in Nanumea and Niutao to 60 per cent in Nanumaga and Funafuti. The share of persons aged 65 years and over, though small, showed remarkable variation by villages from 2.5 to 9.2 per cent. A relatively higher proportion of old people were found in villages in Niutao, Nukulaelae, Nanumea and Nanumaga.

Table 2. Total population, age structure, and sex ratios by village of usual residence

Island / Village	Total Population	Age groups			Sex Ratios
		< 15	15-64	65 +	
Nanumea	899	36.5	55.9	7.6	88.9
Hauma	232	35.3	56.9	7.8	85.6
Lolua	321	35.2	57.0	7.8	93.4
Haumaefa	320	39.1	53.4	7.5	88.2
Lakena	14	21.4	71.5	7.1	75.0
Nanumaga	717	32.4	60.2	7.4	79.7
Toga	338	31.4	62.7	5.9	82.7
Tokelau	376	33.5	58.0	8.5	78.2
Niutao	889	35.1	56.5	8.4	91.6
Teava	314	34.1	56.7	9.2	80.5
Kulia	561	35.3	56.5	8.2	98.2
Nui	661	31.6	60.4	8.0	92.2
Tekaiga	484	32.0	59.9	8.1	93.6
Maeao	170	30.6	61.8	7.6	84.8
Vaitupu	1274	36.0	58.0	6.0	91.9
Asau	408	31.9	61.5	6.6	100.0
Tumaseu	488	35.2	57.6	7.2	87.7
Motufoua	199	47.7	49.8	2.5	86.0
Muli	139	39.6	56.8	3.6	90.4
Elisefou	33	21.2	69.7	9.1	106.3
Nukufetau	826	35.7	58.6	5.7	93.4
Maneapa	343	34.7	59.2	6.1	99.4
Aulotu	260	36.5	58.9	4.6	89.8
Motulalo	222	36.5	57.2	6.3	89.7
Funafuti	3051	35.9	60.0	4.1	98.1
Vaiaku	596	34.4	62.2	3.4	96.1
Alapi	505	36.4	59.0	4.6	93.5
Senala	756	38.9	56.1	5.0	94.8
Fakaifou	997	35.3	61.2	3.5	97.8
Teone	83	37.3	59.1	3.6	118.4
Motu	91	20.9	73.6	5.5	184.4
Nukulaelae	359	33.4	58.5	8.1	74.3
Pepesale	177	33.9	58.8	7.3	78.8
Nukualofa	179	32.4	58.7	8.9	68.9
Niulakita	74	48.6	51.4	-	80.5
Total	8750	35.3	58.7	6.0	91.8

Long-term migration

An understanding of aspects of long-term migration of the population aged 15 years and over can be gained through cross tabulation analyses of home island, island of residence at birth and island of residence at independence by island of usual residence at the time of enumeration..

Home island

The concept of home island is difficult as a measure of migration for persons who are second generations in their place of usual residence and its definition in the Census was not clear. The instruction for this question just says the purpose of this question is to know the persons own view or own opinion about which is his / her home island. Comparisons of the distribution of persons by home islands with usual island of residence show that a large proportion of the home-island population were usually resident outside their home islands (Table 3). In the case of Nanumea, out of a total of 942 people who claimed Nanumea as their home island only 54.2 per cent of them were living there in 1991. The proportions of persons aged 15 years and over who were usually resident in their home islands were lowest in Nanumea (54 per cent) and Niutao (61 per cent) and highest in Nui (79 per cent). The major island of residence for those living outside their home island was Funafuti. The proportions of outer island populations residing in Funafuti ranged widely from 18 per cent for Nui to 38 per cent for Nanumea. In contrast, only a small proportion of those whose home island was Funafuti resided in outer islands.

Table 3. Distribution of population by home island and island of usual residence

Home Island	Island of usual residence			Total
	Same	Funafuti	Other	
Nanumea	54.2	38.0	7.8	942
Nanumaga	67.2	22.1	10.7	692
Niutao	60.6	27.6	11.8	917
Nui	78.6	18.2	3.2	516
Vaitupu	72.4	25.1	2.5	912
Nukufetau	66.7	25.1	8.2	726
Funafuti	-	96.7	3.3	601
Nukulaelae	68.6	23.7	7.7	299

Home island and residence at Independence

An examination of the distribution of population by home islands according to island of residence at Independence shows huge out-migration from home islands (Table 4). In all outer islands, between 40 and 56 per cent of the population were residing outside their home islands at Independence. Nanumea features prominently as a home island of considerable out-migration, as only 44 per cent of the population who claimed it as home island were residing there at Independence. Certainly, the movement of the people up to the time of the Independence has been to Funafuti.

Table 4. Distribution of population by home island and residence at independence

Home Island	Residence at independence			Total
	Same	Funafuti	Other	
Nanumea	44.2	34.4	21.4	942
Nanumaga	47.8	26.4	25.8	692
Niutao	55.6	18.1	26.3	917
Nui	59.5	21.7	18.8	516
Vaitupu	56.6	20.6	22.8	912
Nukufetau	58.0	23.7	18.3	726
Funafuti	-	72.2	27.8	601
Nukulaelae	54.5	26.1	19.4	299

Another way to look at the migration between home island and island of residence at Independence is to find out what proportion of those resident in the island at Independence were home island people (Table 5). Most of the population who were resident in outer islands at independence were doing so in their home islands. In four islands, Nanumea, Nanumaga, Niutao and Nukufetau, at least 90 per cent of their residents at independence were home island people. The only exception was Funafuti where only one-fourth of its residents at independence claimed it as their home island. Of the 1,677 people resident in Funafuti at independence, 1,243 people came from outer islands. They came mainly from Nanumea (26.1 per cent), Vaitupu (15.1 per cent), Nanumaga (14.7 per cent), Nukufetau (13.8 per cent) and Niutao (13.3 per cent). Further, all the residents of Niulakita at independence came from outer islands, mainly from Niutao.

Table 5. Distribution of persons by residence at independence and home island

Residence at Independence	Home island		Total
	Same	Other	
Nanumea	90.0	10.0	462
Nanumaga	90.4	9.6	366
Niutao	94.1	5.9	542
Nui	88.2	11.8	348
Vaitupu	78.2	21.8	660
Nukufetau	94.4	5.6	446
Funafuti	25.9	74.1	1677
Nukulaelae	85.8	14.2	190
Niulakita	-	100.0	33

Home island and island of birth

As shown in Table 6, most of the population aged 15 years and over were born in their home islands. The proportion of the total population whose island of birth was the same as their home island were about 90 per cent in the outer islands except Nukulaelae. In Nukulaelae, 24 per cent of those who were born there had home islands elsewhere. Funafuti was the home island for 76 per cent of the population born there.

Table 6. Distribution of population by island of birth and home island

Island of Birth	Home island		Total
	Same	Other	
Nanumea	90.0	10.0	743
Nanumaga	89.8	10.2	530
Niutao	90.4	9.6	760
Nui	86.7	13.3	415
Vaitupu	91.3	8.7	657
Nukufetau	91.8	8.2	611
Funafuti	76.3	23.7	502
Nukulaelae	91.4	8.6	258
Niulakita	-	100.0	42

Island of birth and island of usual residence

The distribution of population aged 15 years and over by island of birth and usual island of residence given in Table 7 clearly shows that a large proportion of the outer-island-born population usually resided outside their island of birth, particularly residing in Funafuti. The highest proportions of population living outside their island of birth were observed in Nanumea and Niutao, 45 and 40 per cent, respectively. In contrast, 86 per cent of those born in Funafuti were usually resident there. Excepting Ex-Tuvalu and those born in Niulakita, the proportions residing outside their island of birth but in other outer islands ranged between 7.0 and 17 per cent, compared to 17 to 32 per cent of them who usually resided in Funafuti.

Table 7. Distribution of population by island of birth and usual island of residence

Island of Birth	Usual island of residence			Total
	Same	Funafuti	Other	
Nanumea	54.6	31.8	13.6	743
Nanumaga	64.7	20.0	15.3	530
Niutao	60.1	23.2	16.7	760
Nui	73.7	16.6	9.7	415
Vaitupu	71.1	21.9	7.0	657
Nukufetau	66.8	21.8	11.4	611
Funafuti	-	85.7	14.3	502
Nukulaelae	70.9	20.9	8.2	258
Niulakita	7.1	23.8	69.1	42
Ex-Tuvalu	-	52.1	47.9	1145

The lifetime migration between island of birth and usual island of residence is set out in Table 8. It is seen from Table 8 that Nanumea and Niutao were birth islands of net-out migration, while the remaining birth islands, to a varying degree, were areas of in migration. The largest net in migration gains occurred in Funafuti followed by Vaitupu. For instance, Funafuti was both the island of birth and usual island of residence for 1218 persons; 1,833 persons in migrated and 526 persons out migrated since birth resulting in a net migration gain of 1,307 persons. The gain in net migration since birth accounted for 43 per cent of its usual residents.

For the country as a whole, there was a considerable net immigration of 1,490 persons, which accounted for 17 per cent of the total resident Tuvaluan. These people had birth place outside Tuvalu, that is to say they are ex-Tuvalu.

Table 8. Resident Tuvaluan by island of birth and usual island of residence

Usual island of residence	Same	Island of birth		Net Mig	%
		In	Out		
Nanumea	620	279	401	-122	-13.5
Nanumaga	489	228	220	8	1.1
Niutao	696	193	372	-179	-20.1
Niu	432	229	140	89	13.5
Vaitupu	703	571	232	339	26.6
Nukufetau	579	247	235	12	1.5
Funafuti	1218	1833	526	1307	42.8
Nukulaelae	246	113	90	23	6.4
Niulakita	13	61	48	13	17.6
Total	4996	3754	2264	1490*	17.0

* = The analysis shows a net immigration of 1,490 ex-Tuvaluan, while the net balance of 2,264 in migrants and out migrants between islands cancels out at the national level.

Migration since Independence

The majority of the island residents at independence were also usually resident in the same islands at the time of the Census (Table 9). In Nanumea, 69.7 per cent of its residents at independence were also usually resident there at the Census, while another 21.4 per cent were resident in Funafuti and the remaining 8.9 per cent in other outer islands. On the other hand, 87.7 per cent of Nukufetau's residents at independence were also living there at the 1991 Census, as only 7.4 per cent lived in Funafuti and another 4.9 per cent in other outer islands. In Funafuti, 66.1 per cent of its residents at independence also lived there at the time of the Census.

On the other hand, if one is interested at what proportion of the usual residents of islands at the 1991 Census were also residents of the same islands at independence, more than one-half of them were residents of the same islands at independence. These figures were 56.4 per cent in Nanumea, 56.7 per cent in Funafuti, 59.4 per cent in Nukulaelae, 59.9 per cent in Vaitupu, 60.8 per cent in Nanumaga, 65.5 per cent in Nui, 70.1 per cent in Niutao and 73.6 per cent in Nukufetau (table not shown). Funafuti has been the focal destination point of migrants since independence.

Table 9. Distribution of population by island at independence and usual island of residence

Island at Independence	Usual island of residence in 1991			Total
	Same	Funafuti	Other	
Nanumea	69.7	21.4	8.9	462
Nanumaga	80.6	11.7	7.7	366
Niutao	75.5	13.3	11.2	542
Nui	85.1	10.1	4.8	348
Vaitupu	73.9	19.2	6.9	660
Nukufetau	87.7	7.4	4.9	446
Funafuti	-	66.1	33.9	1677
Nukulaelae	74.7	14.7	10.6	190
Niulakita	9.1	21.2	69.7	33
Ex-Tuvalu	-	42.9	57.1	939

There has been large internal migrations between islands and external migration since Independence (Table 10). Out of a total of 5,663 Tuvaluan aged 15 years and over 3,454 people resided in the same islands in the Census as they did at Independence; 2,209 persons in migrated and 1,270 persons out migrated. There was also immigration of 939 ex-Tuvaluan. All islands gained by in migration than they lost by out migration, primarily due to return-migration from Funafuti and the settlement of the large ex-Tuvaluan people in the various islands. The larger part of ex-Tuvaluan, 403 persons, resided in Funafuti. The highest percentage of population gains, between 19 and 25 per cent of their usual residents, since Independence due to in-migration and immigration was observed in Nanumaga, Nui, Nukulaelae, Nanumaga and Vaitupu. The smallest absolute and relative net migration gains were observed in Niutao and Niulakita.

Table 10. Resident Tuvaluan by island of residence at independence and usual island of residence

Usual island at Independence	Same	Usual island of residence			Rate*
		In	Out	Net Mig	
Nanumea	322	249	140	109	19.1
Nanumaga	295	190	71	119	24.5
Niutao	409	168	133	35	6.1
Nui	296	156	52	104	23.0
Vaitupu	488	327	172	155	19.0
Nukufetau	391	140	55	85	16.0
Funafuti	1108	847	569	278	14.2
Nukulaelae	142	97	48	49	20.5
Niulakita	3	35	30	5	13.2
Total	3454	2209	1270	939**	16.9

Note: * = Migration rate is calculated as a ratio of net migrants to usual residents in 1991 times 100.

** = These were 939 Ex-Tuvaluan aged 15 years and over who immigrated since independence.

Current migration

20% in year before Census

The Census collected information about where people resided one year prior to the Census, that is residence in November 1990. In most islands, close to 20 per cent of their usual residents lived elsewhere a year ago (Table 11). There seems to be moderate to high return migration to outer islands from Funafuti during the year preceding the Census. The highest return migration from Funafuti was to Nukufetau, where 18.5 per cent of the usual residents of Nukufetau were living in Funafuti a year ago, and another 7.7 per cent of its residents were living in other outer islands. In three other outer islands about 10 to 11 per cent of their usual residents lived in Funafuti one year ago. Excepting Niulakita and Funafuti, between 6 and 12 per cent of the usual island residents lived in other outer islands one year ago.

Table 11. Distribution of population by usual island of residence and residence one year ago

Usual Island of residence	Residence one year ago			Total
	Same	Funafuti	Other	
Nanumea	81.8	11.4	6.8	870
Nanumaga	82.6	8.3	9.1	695
Niutao	86.1	7.7	6.2	859
Nui	81.2	10.2	8.6	649
Vaitupu	82.4	8.9	8.7	1236
Nukufetau	73.8	18.5	7.7	793
Funafuti	-	83.0	17.0	2962
Nukulaelae	77.7	10.4	11.9	345
Niulakita	97.2	1.4	1.4	72

Table 12 shows all islands but two gained from net migration in the year preceding the census. In absolute terms, 1,529 in-migrants were residing outside their island of usual residence one year ago, while 1,157 residents out-migrated from their islands a year ago. The large absolute and relative gains from migration were observed in Nukufetau and Niu. The gain in Nukufetau was mainly due to return-migration of 147 persons from Funafuti and the residence of 25 ex-Tuvalu in the island. The net gains ranged from a low of 1.5 per cent in Vaitupu, to about 6.0 per cent each in Nanumea and Niutao, 7.5 per cent in Nukulaelae, 9.9 per cent in Nanumaga, to a high of 13.9 per cent in Niu and 20.4 per cent in Nukufetau. Funafuti and Niulakita were areas of excess out-migration in the year preceding the census. The current migration experience shows that Funafuti sends out more people than it receives from outer islands. It may be that Funafuti has reached a saturation point in terms of provision of accommodation, livelihood and employment to outer island migrants. However, the data clearly show that current internal migration is large in Tuvalu with 1,157 people (excluding 372 ex-Tuvalu) changing their island of residence in one year.

Table 12. Resident Tuvaluan by residence one year ago and usual island of residence

Usual island of residence	Island of residence one year ago				Rate*
	Same	In	Out	Net Mig	
Nanumea	712	158	110	48	5.5
Nanumaga	574	121	52	69	9.9
Niutao	740	119	68	51	5.9
Niu	527	122	32	90	13.9
Vaitupu	1018	218	199	19	1.5
Nukufetau	585	208	46	162	20.4
Funafuti	2458	504	583	-79	-2.7
Nukulaelae	268	77	51	26	7.5
Niulakita	70	2	16	-14	-19.4
Total	6952	1529	1157	372**	4.4

Note: * = Migration rate is calculated as a ratio of net migrants to usual residents of island in 1991.

** = There were 372 ex-Tuvalu immigrants aged one year and over who resided overseas one year ago and accounted 4.4 per cent of the total 8481 resident Tuvaluan aged one year and over.

Chapter Three

Household Characteristics

The 1991 Census collected detailed information on households through the Household Questionnaire. The information ranges from size and composition of households to source of income, economic activity, ownership of livestock and capital goods, and housing conditions of households. These data are contained in basic census tabulations from Tables 45 through Table 54c. These household data need to be systematically analysed to understand and to make informed planning as well as policy decisions about Tuvaluan households.

Household size and composition

In general, households in Tuvalu are large, as is seen from Table 1. In the outer islands, the average number of members per household varied from 4.1 persons in Nanumaga to 5.9 in Nukulaelae, compared to 7.7 in Funafuti and 6.0 for the country. Part of the reason for large households in Funafuti was that the de facto population of Funafuti was much larger than the usually resident population. If only the usual residents of Funafuti were considered, the average Household size would be 6.4 instead of 7.7. Households with 1 to 3 members, which are the norm in developed countries, are a minority in Tuvalu. Households with 1 to 3 members generally constituted from one-fifth to one-fourth of all households. The exceptions were that such households constituted 14 per cent in Funafuti, 17-18 per cent in Nukulaelae and Nui, and 38 per cent in Nanumaga. In Tuvalu, single-person households are rare, as they comprised 4 per cent of all households. The common household size in Tuvalu was 4 to 6 members. Households were larger in Funafuti owing to migration and the considerable existence of extended families.

Table 1. Percentage distribution of households by island of enumeration and household size

Island	Number of members per household			Mean household size	Total households
	1-3	4-6	7+		
Nanumea	23.2	51.6	25.8	5.3	155
Nanumaga	38.2	52.2	9.6	4.1	157
Niutao	26.6	45.3	28.1	5.4	139
Nui	18.1	55.2	26.7	5.2	116
Vaitupu	20.6	49.5	29.9	5.6	194
Nukufetau	25.4	45.1	29.5	5.2	142
Funafuti	13.7	32.3	64.0	7.7	474
Nukulaelae	16.7	51.7	31.6	5.9	60
Niulakita	0.0	93.3	6.7	5.0	15
Total	21.0	44.5	34.5	6.0	1452

Source of household income

Table 2 shows the number of households earning income by island and source of income. The second panel of Table 2 shows the percentage of all households in a given island deriving income from each source. For instance, out of a total of 157 households in Nanumaga, 87 households derived income from sale of handicraft, which accounted for 55 per cent of all households. The last panel of Table 2 sets out the average number of persons per household participating in each income generating activity.

As is seen from Table 2, a large number of Tuvaluan households generated income from various sources. The major source of income was wages and salary followed by sale of handicrafts. A significant number of Tuvaluan households also derive income from sale of produce / fish and from own business. The least source of income was pensions and other sources in which only 65 households in the whole country participated. As households participate in more than one source of income, the total households in each island participating in cash incomes may be greater than the total households in the island. As a whole, 62 per cent of all households earn wage or salary income. The highest wage-earning households were in Funafuti, where 88 per cent of the households earn such income. Of course, 93 per cent of households in Niulakita derive wage incomes, but note should be taken of the small number of households in the island. Wage income was also important in Nanumea, Nui, Vaitupu and Nukulaelae, where between 50 and 68 per cent of their households earned wages. Nanumaga households ranked least with respect to wage income, as only 26 per cent of the households earned such income.

At least one-third of Tuvaluan households earned income from sale of handicrafts. Sale of handicrafts tops as source of income in Nui and Nanumaga, where 72 per cent of households in Nui and 55 per cent in Nanumaga earned such income. A large proportion of households in Nukulaelae and Funafuti earned cash from sale of handicrafts. In contrast, it was a least source of household income in Nanumea and Niulakita. The sale of produce was an important source of income in Nukufetau, Nukulaelae and Vaitupu, where between 22 and 37 per cent of households earned such income. Own business income supports a small proportion of households in all islands but three. However, it was a significant source in Nui, Funafuti and Vaitupu, where between 17 and 22 per cent of the households earned business income.

As shown in Panel C, more than one member per household contributed to cash income. With respect to number of persons contributing to wage income, about two household members participated in Funafuti, Nukulaelae and Nui, while about one person per household participated in the rest of the islands. Of those household members who earned wages, 34 per cent of them were females. Of all the sources of income, handicrafts involved more household members. In all islands except Niulakita, Vaitupu and Nanumaga, about two household members participated in the sale of handicrafts. Females were the main contributors to cash incomes derived from sale of handicrafts and own business, while males predominated in wages, pension and sale of produce / fish (see last row of Table 2).

Table 2. Tuvaluan households by source of income and mean number of contributing members

Name of Island	Wages	Business	Produce	Sale of Handicraft	Pension
A: Number of households					
Nanumea	77	4	9	18	2
Nanumaga	41	7	25	87	3
Niutao	60	2	3	36	6
Nui	68	25	21	83	9
Vaitupu	114	33	42	36	8
Nukufetau	64	8	52	42	6
Funafuti	416	86	52	181	29
Nukulaelae	41	5	15	24	1
Niulakita	14	0	1	2	1
Total	895	170	220	509	65
B: Per cent of households					
Nanumea	49.7	2.6	5.8	11.6	1.3
Nanumaga	26.1	4.5	15.9	55.4	1.9
Niutao	43.2	1.4	2.2	25.9	4.3
Nui	58.6	21.6	18.1	71.6	7.8
Vaitupu	58.8	17.0	21.6	18.6	4.1
Nukufetau	45.1	5.6	36.6	29.6	4.2
Funafuti	87.8	18.1	11.0	38.2	6.1
Nukulaelae	68.3	8.3	25.0	40.0	1.7
Niulakita	93.3	0.0	6.7	13.3	6.7
Total	61.6	11.7	15.2	35.1	4.5
C: Members per household					
Nanumea	1.1	1.2	1.2	1.3	1.0
Nanumaga	1.1	1.1	1.1	1.7	1.0
Niutao	1.1	1.0	1.0	1.7	1.3
Nui	1.5	1.8	1.2	1.7	1.3
Vaitupu	1.3	1.3	1.4	1.4	1.4
Nukufetau	1.2	1.0	1.5	1.6	1.3
Funafuti	2.2	1.5	1.8	1.6	1.2
Nukulaelae	1.7	1.4	1.5	1.8	1.0
Niulakita	1.2	0.0	1.0	1.0	1.0
Total	1.7	1.5	1.4	1.6	1.2
% Females	33.7	64.5	37.4	90.3	31.6

Note: 9 households with 14 members in Funafuti, 5 households with 8 members in Vaitupu, 6 households with 8 members in Niutao, and one household each in Nui and Nukufetau who earned income from other sources were included with pension.

Remittance income

Households were asked if they received remittances, and if so, where the remittances came from, and how regularly they are received, that is if it is every month, every 2 to 3 month, or once a year etc. In general, more than 50 per cent of Tuvaluan households received remittances quite frequently. Out of the 826 households who received remittances, more than one-half of them, 469, received monthly, and still a large number also received every 2 to 3 months. Those who received once a year or infrequently were comparatively small, 93 households in all. The majority of households, 77 per cent, received remittances from outside Tuvalu, as only 202 out of the 826 such households received such incomes from within Tuvalu.

The distribution of households by frequency of remittances show considerable differences by islands. The prevalence of remittances was highest among Nukulaelae, Nui and Nanumea households, where about two-thirds of the households in these islands received remittances. The highest proportion of households who received no remittances were found in Nanumaga, Funafuti and Vaitupu, and in the case of Niulakita all households did not receive any remittances.

Table 3. Distribution of households by frequency of remittances received and by island

Name of Island	Remittances received every -- months					Total
	None	1	2-3	4-11	12	
Number of households						
Nanumea	56	59	10	12	18	155
Nanumaga	85	37	15	9	11	157
Niutao	54	38	26	18	3	139
Nui	42	48	12	7	7	116
Vaitupu	86	47	36	6	19	194
Nukufetau	54	57	18	8	5	142
Funafuti	215	158	52	20	29	474
Nukulaelae	19	25	7	8	1	60
Niulakita	15	0	0	0	0	15
Total	626	469	176	88	93	1452
Percentage distribution						
Nanumea	36	38	6	8	12	100
Nanumaga	54	24	9	6	7	100
Niutao	39	27	19	13	2	100
Nui	36	41	11	6	6	100
Vaitupu	44	24	19	3	10	100
Nukufetau	38	40	13	6	3	100
Funafuti	45	33	11	4	6	100
Nukulaelae	32	42	12	13	2	100
Niulakita	100	0	0	0	0	100
Total	43	32	12	6	7	100

The amount of remittances received by households was not collected in the Census. However, the information was collected from secondary sources, the Tuvalu Post Office, and is given in basic information Table 53b. The amount of remittances received for 1991 was A\$453,697, of which 19 per cent originated overseas. The overseas remittances came mainly from Nauru, which was A\$76,482 and accounted for 88 per cent of all overseas remittances. There were also remittances sent

totalling A\$346,933, of which only about 2 per cent were sent overseas. As is seen from Table 4, all outer islands had net remittances, while Funafuti sent more remittances than it received. The 15 households in Niulakita did not receive any remittances but sent A\$279.

The average amount of remittances received by households, given in the last column of Table 4, was calculated by assuming that all remittances were received by the households who reported as receiving such income in the census. It appears that Tuvaluan households received substantial remittance income. In the outer islands excluding Niulakita, the average remittance received per household varied considerably from A\$523 in Nanumea to A\$883 in Vaitupu, compared to A\$549 for the country. The least remittance of A\$323 was received by Funafuti households and had large negative remittances, as they have to send remittances to outer islands. It is not known how many households were involved in sending remittances, as this information was not collected in the census.

Table 4. Amount of remittances received and sent from Tuvalu by island

Name of Island	Amount of remittance Paid	Amount of remittance sent	Net	Remittance received by Household*
Nanumea	51814	7038	44776	523
Nanumaga	41610	7385	34225	578
Niutao	53982	10373	43609	635
Nui	49593	5794	43799	670
Vaitupu	95411	12316	83095	883
Nukufetau	47576	13881	33695	541
Funafuti	83573	283745	-200172	323
Nukulaelae	30128	6122	24006	735
Niulakita	-	279	-279	-
Total	453687	346933	106754	549

* = Average amount of remittance received by a household based on the assumption that all the amount of remittances paid to Tuvalu was received by the households who reported as receiving such income in the Census.

Participation in traditional activities

Generally, Tuvaluan households were active in four types of traditional activities: fishing, land work, handicraft and housework (Table 5). The census identified 20 activities in which Tuvaluan households were engaged. In 11 of these activities about two-thirds or more of the households participated: these were raising pigs and chickens / ducks, collecting firewood, making mats / baskets / fans, reef fishing, thatch, taro, toddy, toddy processing and lagoon and ocean fishing. Carving, house building and sweet potato farming were the least activities, which engaged between 23 and 31 per cent of all households.

In all traditional activities, more than one member per household were active. Reef and collection fishing, land activities such as copra, sweet potato, pigs and chickens / ducks, thatch making and firewood collection involved two household members. There was sex segregation in the activities. There was little participation of females in fishing except collection, toddy work, string, carving and house building, while females were predominant in house work, in handicrafts such as mats, thatch and bead shells.

Table 5. Percentage of households and average members per household active in traditional activity

Type of Traditional Activity	Per cent of Total Households	Average number of active household members		
		Male	Female	Total
Fishing				
Ocean	64	1.35	0.02	1.37
Lagoon	66	1.40	0.18	1.57
Reef	76	1.32	0.48	1.80
Collection	54	0.81	1.15	1.96
Land work				
Copra	45	1.21	1.03	2.24
Sweet potato	30	0.87	1.16	2.03
Taro	70	1.15	0.49	1.64
Toddy	72	1.26	0.02	1.28
Garden vegetables	37	0.86	0.97	1.83
Pigs	89	1.27	0.81	2.08
Chickens / ducks	81	0.85	1.29	2.14
Handicrafts				
Mats/baskets/fans	77	0.05	1.48	1.53
String	44	0.94	0.18	1.12
Thatch	70	0.51	1.42	1.93
Carving	23	1.04	0.23	1.27
Bead shells	47	0.10	1.52	1.63
House building	31	1.30	0.10	1.39
House work				
Toddy processing	70	0.29	1.33	1.62
Dry / salting fish	59	0.28	1.44	1.73
Collect firewood	81	0.97	1.45	2.42

The analysis of the distribution of traditional activities by islands, as displayed in Table 6, shows considerable variation. For instance, fishing activities were very high in Nukufetau, Nui, Nanumaga and Nukulaelae, and comparatively low in Niutao. In the case of copra, the figures range from a low of 10 per cent in Funafuti to a high of 80 per cent or more in Vaitupu, Niutao and Nanumaga. However, very high and comparable household participation in all outer islands were observed in poultry, firewood collection, and to a lesser extent in pig raising, taro production, and mats / basket/fans making. Compared to outer islands, Funafuti showed the lowest participation in many activities. However, Funafuti households showed high participation in raising pigs, bead shells and lagoon fishing.

Table 6. Percentage of households active in traditional activity by island

Activity	Nanumea	Nanumaga	Niutao	Nui	Vaitupu	Nukufetau	Funafuti	Nukulaelae	Niulakita
Fishing									
Ocean	74	64	54	81	58	79	56	75	95
Lagoon	85	40	0	87	71	89	73	87	0
Reef	86	80	48	88	84	91	68	83	93
Collection	63	54	32	33	54	92	48	83	87
Landwork									
Copra	42	85	84	30	78	58	10	27	60
Sweet potato	25	27	27	34	26	44	26	75	0
Taro	88	88	81	91	89	94	34	92	0
Toddy	77	68	64	84	83	82	61	82	93
Garden vegetables	27	31	30	35	29	52	43	60	0
Pigs	93	91	82	91	94	96	85	93	100
Chickens/ducks	95	94	88	90	93	92	56	95	100
Handicraft									
Mats/baskets	82	88	72	92	87	87	61	95	100
String	65	50	30	61	65	61	18	62	93
Thatch	88	82	63	91	91	87	38	90	100
Carving	23	12	9	40	30	42	16	40	7
Bead shells	21	34	23	42	41	84	57	63	53
House building	55	24	9	63	47	34	17	17	60
Housework									
Toddy processing	78	68	67	86	87	94	47	90	93
Dry/salting fish	75	50	30	81	74	94	36	90	100
Collect firewood	97	97	85	96	96	94	54	98	93

Goods sold last week

A significant number of Tuvaluan households sold food, pigs, chickens and handicrafts last week. As a whole, 23 of all households sold handicraft, 16 per cent each sold fish and food, 14 per cent sold copra and 7 per cent sold pigs and chicken. There were substantial differences between islands as shown in Table 7. For instance, the proportion of households who sold copra varied from none or little in Nanumea, Nukufetau, Funafuti and Niulakita to 25 per cent in Vaitupu, 42 per cent in Niutao, and to a high of 57 per cent in Nanumaga. Close to 50 per cent of households in Nukufetau and Nukulaelae sold fish, compared to none in Niutao, Niulakita and Nanumea. The sale of handicrafts was highest in Nui, Funafuti, Nukulaelae, Nukufetau and Nanumaga, where it comprised between 23 and 37 per cent of the households. In contrast, the sale of handicrafts was non-existent or little during last week in Niulakita, Nanumea and Vaitupu.

Table 7. Percentage of households who sold goods last week by island and type

Name of Island	Type of food, livestock and goods sold					
	Fish	Copra	Food	Pigs	Handicraft	Other
Nanumea	2	0	5	5	2	1
Nanumaga	10	57	11	6	23	0
Niutao	0	42	4	4	17	9
Nui	16	2	16	10	37	8
Vaitupu	24	25	25	7	7	1
Nukufetau	49	0	19	5	24	4
Funafuti	11	0	18	7	33	3
Nukulaelae	47	8	40	32	33	2
Niulakita	0	0	7	0	0	0
Total	16	14	16	7	23	3

Note: Fish comprised 136 households who sold fresh fish and 98 who sold dry / salt fish; Food consisted of 92 households who sold toddy, 85 cooked food, 24 taro, 23 vegetables and 12 sweet potato; and pigs consisted of 65 who sold pigs and 40 who sold chicken.

Possession of durable goods

The census asked every household which of the 15 pre-listed durables it owned. It has to be noted that the question did not ask the number of each durable owned by the household. Out of these items, most of the reported electric fans, washing machines, motor vehicles, fridges / freezers and videos were owned by Funafuti households. In Funafuti, 14 households owned motor vehicles, 205 owned fridges / freezers, 163 owned washing machines, 206 owned electric fans and 113 households owned videos. Excluding these exclusively Funafuti goods, the results by islands are summarised in Table 8.

As a whole, the results show that the most common goods were bicycles, radios and sewing machines, as they were possessed by 72, 68 and 61 per cent of all households, respectively. The next largest possessions were canoe / boat, fish net, and cassette player, as they were owned by between 44 and 47 per cent of households. Further, it can be seen that 32 per cent of households owned bath / shower, 23 per cent handcart, 20 per cent power boat and 14 per cent motor cycle.

However, Table 8 shows that the island differences in the ownership of these goods were remarkable. For instance, the possession of bicycles ranged from 20 per cent in Niulakita to 86 per cent in Vaitupu. There was a comparatively high ownership of bath / shower in Niulakita, Nanumea, Funafuti and Vaitupu, while only 3 to 7 per cent of all households in Nui, Nukufetau and Nanumaga possess it. Funafuti had a comparatively high possession of radios, motor cycles, sewing machines and cassette players. Households in Nanumea, Nukufetau and Nukulaelae had a particularly high possession of fishing goods, canoe / boat, fish net and power boat. The only common capital good in Tuvalu was sewing machine; it was owned by between 50 and 70 per cent of all households.

Table 8. Percentage of households who owned durable goods by type and island

Name of Island	Per cent of households owning				
	Radio	Bicycle	Hand cart	Motor Cycle	Canoe/boat
Nanumea	57	78	23	13	70
Nanumaga	55	78	33	2	38
Niutao	55	84	14	1	51
Nui	69	74	25	2	51
Vaitupu	71	86	23	15	25
Nukufetau	58	33	13	5	66
Funafuti	82	75	24	30	42
Nukulaelae	72	48	40	2	63
Niulakita	47	20	0	0	73
Total	68	72	23	14	47

Island	Per cent of households owning				
	Power boat	Fish Net	Bath/ Shower	Sewing Machine	Cassette Player
Nanumea	17	63	57	58	34
Nanumaga	11	29	7	55	13
Niutao	2	19	43	55	17
Nui	8	41	3	59	42
Vaitupu	19	43	37	60	41
Nukufetau	28	49	6	53	32
Funafuti	25	46	42	70	76
Nukulaelae	53	72	15	63	38
Niulakita	0	20	67	47	0
Total	20	44	32	61	44

Ownership of Pigs, Ducks and Chicken

The census collected from every household the number of pigs, ducks and chickens owned broken down by type. Tables 9 to 14 present the results. The census found that Tuvaluan households owned 12,905 pigs of which 46 per cent were grower pigs, 25 per cent were boars and 29 per cent were sows. There were on average nine pigs per household. The distribution of households, pigs and mean number of pigs per household by island is given in Table 9. The largest number of pigs were found in Nanumea, Funafuti, Nukufetau and Vaitupu. The average number of pigs per household varied markedly from 4.4 pigs in Niutao, and 6-7 pigs in Funafuti, Nanumaga and Nukulaelae, and to a high of 19 pigs in Nanumea. Compared to their share of total households, Nanumea and Nukufetau had a disproportionate share of pigs. Nanumea owned 23 per cent of all pigs, but only accommodated 11 per cent of all households. On the contrary, Vaitupu's share of pigs was consistent with its relative share of households, that is it accommodated 13 per cent of all households and owned 13 per cent of pigs.

Table 9. Distribution of households and pigs by island

Name of island	Total households	Number of pigs by type			Total	Mean
		Growers	Boars	Sows		
Nanumea	155	1243	928	752	2923	18.9
Nanumaga	157	478	254	333	1065	6.8
Niutao	139	227	152	229	608	4.4
Nui	116	666	210	296	1172	10.1
Vaitupu	194	824	341	471	1636	8.4
Nukufetau	142	928	465	650	2043	14.4
Funafuti	474	1366	690	856	2912	6.1
Nukulaelae	60	104	146	164	414	6.9
Niulakita	15	83	21	28	132	8.8
Total	1452	5919	3207	3779	12905	8.9

Percentage distribution

Nanumea	11	21	29	20	23	-
Nanumaga	11	8	8	9	8	-
Niutao	10	4	5	6	5	-
Nui	8	11	7	8	9	-
Vaitupu	13	14	11	12	13	-
Nukufetau	10	16	14	17	16	-
Funafuti	33	23	22	23	23	-
Nukulaelae	4	2	4	4	3	-
Niulakita	1	1	1	1	1	-
Total	100	100	100	100	100	-

Table 10 displays the percentage distribution of households according to the number of pigs owned broken down by type of pig. On the whole, 30 per cent of households had no growers, 33 per cent had no boars and 17 per cent had no sows. The variation between islands was considerable. For instance, 50 per cent of households had no growers in Niutao and Nukulaelae, in contrast to 13 per cent in Nukufetau and 16 per cent in Nanumea. While a large proportion of households had seven or more growers, particularly in Nanumea, Nukufetau, Nui and Niulakita, only a small proportion of households owned such number of sows and boars. The common number of sows and boars owned was 1 to 3 pigs.

Table 10. Percentage of households by number and type of pigs owned and by island

Name of Island	Percentage of households by number of pigs				Mean
	0	1-3	4-6	7 +	
Growers					
Nanumea	16.1	13.5	21.9	47.1	8.0
Nanumaga	30.6	29.3	26.8	13.3	3.0
Niutao	50.4	31.7	13.7	4.2	1.6
Nui	23.3	19.8	21.6	34.5	5.7
Vaitupu	27.3	25.3	23.2	24.2	4.2
Nukufetau	12.7	31.0	19.7	36.6	6.5
Funafuti	33.3	31.0	23.4	12.2	2.9
Nukulaelae	50.0	30.0	13.3	6.7	1.7
Niulakita	6.7	26.7	33.3	33.3	5.5
Total	29.6	27.3	21.8	21.1	4.1
Boars					
Nanumea	34.2	44.5	12.9	7.1	6.0
Nanumaga	27.4	63.1	7.0	2.5	1.6
Niutao	38.8	55.4	5.8	-	1.1
Nui	34.5	44.8	16.4	3.4	1.8
Vaitupu	30.4	52.1	14.4	3.1	1.8
Nukufetau	28.9	55.6	9.9	5.6	3.3
Funafuti	37.8	53.0	7.4	1.9	1.5
Nukulaelae	16.7	55.0	28.3	-	2.4
Niulakita	33.3	60.0	6.7	-	1.4
Total	33.3	53.0	10.5	2.9	2.2
Sows					
Nanumea	13.5	51.0	27.7	6.5	4.9
Nanumaga	15.3	65.6	18.5	0.6	2.1
Niutao	25.2	65.5	8.6	0.7	1.6
Nui	13.8	56.9	25.9	2.6	2.6
Vaitupu	12.9	64.9	18.0	4.1	2.4
Nukufetau	12.7	66.2	16.9	4.2	4.6
Funafuti	23.0	65.2	10.1	1.7	1.8
Nukulaelae	6.7	65.0	25.0	3.3	2.7
Niulakita	13.3	73.4	13.3	-	1.9
Total	17.4	63.2	16.4	2.7	2.6

The row percentages for Nanumea and Nui do not add up to 100 % because there are 2 households in Nanumea and 1 household in Nui that did not state the number of pigs.

Mean gives the average of each type of pig per household.

Number of ducks owned

Tuvaluan households owned 7,912 ducks, owning on average 5.4 ducks per household. The ducks consisted of 52 per cent growers, 18 per cent males and 30 per cent females. Table 11 shows that the highest number of ducks, 1,567, were found in Nanumaga, which comprised 20 per cent of all ducks. Vaitupu with its 1,319 ducks, Nukufetau with its 1,261 ducks and Funafuti with its 1,168 ducks ranked second, third and fourth, respectively. Nui and Niulakita had the smallest number of ducks, giving on average 1.4 and 2.6 ducks per household, respectively. Although Nukulaelae ranked seventh in Number of ducks, it ranked first in terms of average household ownership, 11 ducks per household (see last column of Table 11).

Table 11. Distribution of households and ducks owned by island

Name of Island	Total households	Number of ducks by type			Total	Mean
		Grower	Male	Female		
Nanumea	155	561	80	134	775	5.0
Nanumaga	157	790	298	479	1567	10.0
Niutao	139	438	174	342	954	6.9
Nui	116	68	37	58	163	1.4
Vaitupu	194	639	210	470	1319	6.8
Nukufetau	142	823	251	187	1261	8.9
Funafuti	474	550	206	412	1168	2.5
Nukulaelae	60	229	134	303	666	11.1
Niulakita	15	29	2	8	39	2.6
Total	1452	4127	1392	2393	7912	5.4
Percentage distribution						
Nanumea	11	14	6	6	10	-
Nanumaga	11	19	21	20	20	-
Niutao	10	11	13	14	12	-
Nui	8	2	3	2	2	-
Vaitupu	13	15	15	20	17	-
Nukufetau	10	20	18	8	16	-
Funafuti	33	13	15	17	15	-
Nukulaelae	4	6	10	13	8	-
Niulakita	1	1	0	0	0	-
Total	100	100	100	100	100	-

Table 12 shows that 66 per cent of households had no growers and male ducks and 54 per cent had no females. There was a high proportion of households with no ducks in Nanumea, Nukufetau, Funafuti and Nui. A large proportion of households in Nanumaga, Niutao, Vaitupu and Nukufetau owned three or more grower and female ducks. Whereas 62 per cent of households in Nanumaga owned three or more grower ducks, the corresponding figure was only 4 per cent in Nui, where duck ownership was the lowest.

Table 12. Percentage of households by number and type of ducks owned and by island

Name of Island	Percentage of households by number of ducks				Mean
	0	1-2	3-4	5 +	
Growers					
Nanumea	78.7	6.5	5.2	9.0	3.6
Nanumaga	22.3	15.9	11.5	50.3	5.0
Niutao	54.0	13.7	8.6	23.7	3.2
Nui	89.7	5.2	1.7	2.6	0.6
Vaitupu	52.1	11.9	8.2	27.8	3.3
Nukufetau	80.3	10.6	2.8	6.3	5.8
Funafuti	81.0	7.6	4.0	7.4	1.2
Nukulaelae	55.0	6.7	5.0	33.3	3.8
Niulakita	20.0	66.7	6.7	6.7	1.9
Total	66.9	10.2	5.7	17.1	2.8
Males					
Nanumea	60.6	35.5	3.2	-	0.5
Nanumaga	33.8	38.2	17.2	10.8	1.9
Niutao	51.8	30.2	13.7	4.3	1.3
Nui	83.6	12.9	1.7	0.9	0.3
Vaitupu	52.6	34.5	8.8	4.1	1.1
Nukufetau	86.6	8.5	2.8	2.1	1.8
Funafuti	81.4	14.8	1.5	2.3	0.4
Nukulaelae	38.3	35.0	16.7	10.0	2.2
Niulakita	93.3	6.7	-	-	0.1
Total	66.4	23.6	6.3	3.6	1.0
Females					
Nanumea	52.3	35.9	9.7	1.3	0.9
Nanumaga	13.4	36.9	29.9	19.7	3.1
Niutao	25.9	35.3	23.0	15.8	2.5
Nui	77.6	17.2	3.4	0.9	0.5
Vaitupu	34.0	36.6	15.5	13.9	2.4
Nukufetau	76.1	17.6	2.8	3.5	1.3
Funafuti	77.0	14.1	3.8	5.1	0.9
Nukulaelae	18.3	28.3	20.0	33.3	5.1
Niulakita	66.7	26.7	6.7	-	0.5
Total	54.3	25.3	11.2	9.1	1.6

Number of chickens owned

Table 13 shows that there were 28,190 chickens, giving an average ownership of 19.4 chickens per household. Unlike that of pigs and ducks, the household ownership of chickens was similarly high in all islands. The average number of chickens per household in outer islands varied between 18 chickens in Niulakita and Nui to 25 in Vaitupu, compared to 15 in Funafuti. In most islands, the relative share of households and chickens were consistent. The exceptions were Vaitupu which had a disproportionate share of chickens, and Funafuti which had a lower share of chickens compared to its relative share of households. In absolute terms the highest number of chickens were found in Funafuti (6,893) followed by Vaitupu (4,849) and Nanumea (3,238).

Table 13. Distribution of households and chickens owned by island

Name of Island	Total Households	Number of chickens by type			Total	Mean
		Grower	Rooster	Hen		
Nanumea	155	1257	767	1214	3238	20.9
Nanumaga	157	1925	659	957	3541	22.6
Niutao	139	1739	441	958	3138	22.6
Nui	116	1141	381	568	2090	18.0
Vaitupu	194	2910	710	1229	4849	25.0
Nukufetau	142	959	971	894	2824	19.9
Funafuti	474	3794	978	2121	6893	14.5
Nukulaelae	60	576	285	503	1364	22.7
Niulakita	15	171	17	75	263	17.5
Total	1452	14462	5209	8519	28190	19.4
Percentage distribution						
Nanumea	11	9	15	14	11	-
Nanumaga	11	13	13	11	13	-
Niutao	10	12	8	11	11	-
Nui	8	8	7	7	7	-
Vaitupu	13	20	14	14	17	-
Nukufetau	10	7	19	10	10	-
Funafuti	33	26	19	25	24	-
Nukulaelae	4	4	5	6	5	-
Niulakita	1	1	0	1	1	-
Total	100	100	100	100	100	-

The percentage distribution of Tuvaluan households by number of growers, roosters and hens owned is displayed in Table 14. As is seen in Table 14, the majority of households owned hens and roosters, but the converse was true for growers. The percentage of households who had no growers was 61 per cent, compared to 40 per cent for roosters and 23 per cent for hens. The percentage of all households who owned three or more hens was 58 percent, compared to 36 per cent for roosters. The number of grower chickens owned was usually between 1 to 29. The percentage of households that owned 1 to 19 roosters was 33 percent, and those that owned 30 or more roosters were 6.0 per cent. Although the majority of households had no growers, the number of chickens was greatest for households who owned growers. If the analysis is limited chicken owning households only, the resulting overall average number of chickens per owning household would be 26 growers, 8 hens and 6 roosters instead of 10 growers, 3.6 roosters and 5.9 hens.

Table 14. Percentage of households by number and type of chickens owned and by island

Name of Island	Percentage of households by number of chickens				Mean
	0	1-29	30-59	60 +	
Growers					
Nanumea	63.9	31.0	4.5		8.1
Nanumaga	41.4	54.8	3.2	0.6	12.3
Niutao	46.8	45.3	7.2	0.7	12.5
Nui	58.6	34.5	5.2	0.9	9.8
Vaitupu	35.6	50.0	12.9	1.5	15.0
Nukufetau	79.6	17.6	2.8	-	6.8
Funafuti	77.6	18.8	1.7	1.7	8.0
Nukulaelae	61.7	31.7	6.7	-	9.6
Niulakita	33.3	66.7	-	-	11.4
Total	61.2	32.9	4.8	1.0	10.0
Roosters					
	0	1-2	3-5	6 +	Mean
Nanumea	43.2	30.3	19.4	6.5	4.9
Nanumaga	17.8	22.3	35.7	23.6	4.2
Niutao	30.9	29.5	23.7	15.8	3.2
Nui	30.2	41.4	17.2	10.3	3.3
Vaitupu	22.2	21.1	35.6	21.1	3.7
Nukufetau	38.0	29.6	24.6	7.7	6.8
Funafuti	61.0	16.7	13.7	8.4	2.1
Nukulaelae	23.3	18.3	26.7	31.7	4.8
Niulakita	53.3	20.0	26.7	-	1.1
Total	40.0	23.9	22.6	13.2	3.6
Hens					
	0	1-2	3-5	6 +	Mean
Nanumea	9.0	27.7	36.8	25.8	7.8
Nanumaga	6.4	18.5	34.4	40.8	6.1
Niutao	3.6	21.6	38.8	36.0	6.9
Nui	12.9	17.2	37.9	31.0	4.9
Vaitupu	11.9	13.9	31.4	42.8	6.3
Nukufetau	14.1	35.9	35.2	14.8	6.3
Funafuti	50.2	15.0	19.4	15.4	4.5
Nukulaelae	11.7	10.0	30.0	48.3	8.4
Niulakita	6.7	26.7	33.3	33.3	5.0
Total	22.9	19.4	30.0	27.6	5.9

Chapter Four

Housing Characteristics

Information on housing covering tenure of house, material of construction of roof, outer walls and floor, type of toilet, main source of household's drinking water, type of cooking fuel used by the household, and main source of lighting was collected in the census through the Household Questionnaire.

Type of tenure and house type

The 1991 Census showed that housing ownership is very common among Tuvaluan households, with the majority of households owning the land as well as the house. Out of the total 1,452 households, 61 per cent owned the house and the land, 24 per cent owned the house only, 8 per cent were renters and 6 per cent borrowed the house. However, there were considerable tenure differences between islands. The percentage of households who owned both the land and the house varied from 50 per cent in both Funafuti and Vaitupu to a high of 77 per cent in Nukulaelae, and to 83 per cent in Nui. In Niulakita, there were no households that owned the land, but 73 per cent owned the house only. The extent of renting is very limited comprising 5 per cent or less of households in most outer islands. In contrast, 15 per cent of households in Funafuti were renters and another 10 per cent lived in borrowed house.

An interesting aspect of the measure of housing modernity by islands is given by the percentage breakdown of houses into traditional and non-traditional houses (last column of Table 1). As is seen from Table 1, Tuvaluan households commonly live in non-traditional houses. In general, 40 per cent of Tuvaluan households live in traditional houses, while 59 per cent live in non-traditional houses. However, the variation between islands was remarkable. The percentage of households living in non-traditional houses was highest in Funafuti, 92 per cent, followed by Nukulaelae, 83 per cent, Vaitupu, 81 per cent, and Nui, 64 per cent. In contrast, most households in Nanumea, Niulakita, Nanumaga, and Niutao live in traditional houses.

Table 1. Percentage of households by island, type of house and tenure

Island/ Type of House	Percentage of households by type of tenure				Total household	
	Own house/ Land	Own house Only	Borrowed House	Rented House	Number	%
Nanumea						
Traditional	62	28	7	4	141	91
Non-traditional	73	9	9	9	11	7
Not stated		33		67	3	2
Total	61	27	7	5	155	100
Nanumaga						
Traditional	67	31		2	135	86
Non-traditional	77	14		9	22	14
Total	68	29		3	157	100
Niutao						
Traditional	75	15	5	5	109	78
Non-traditional	69	13	6	6	16	12
Not stated	64	29			14	10
Total	73	16	4	4	139	100
Nui						
Traditional	84	8	3	5	38	33
Non-traditional	82	9	4	4	74	64
Not stated	75				4	3
Total	83	9	3	4	116	100
Vaitupu						
Traditional	46	41	3	11	37	19
Non-traditional	51	42	4	3	157	81
Total	50	42	4	5	194	100
Nukufetau						
Traditional	74	19	2	5	58	41
Non-traditional	65	23	2	7	84	59
Total	69	21	2	6	142	100
Funafuti						
Traditional	63	23	13	3	40	8
Non-traditional	49	22	9	17	434	92
Total	50	22	10	15	474	100
Nukulaelae						
Traditional	50	40	10		10	17
Non-traditional	82	10	6	2	50	83
Total	77	15	7	2	60	100
Niulakita						
Traditional		85		15	13	87
Non-traditional				100	2	13
Total		73		27	15	100
Tuvalu						
Traditional	66	26	4	4	581	40
Non-traditional	57	23	7	11	850	59
Not stated	57	24		10	21	1
Total	61	24	6	8	1452	100

The row totals for types of tenure add up to 100 %

Construction materials

Table 2 displays by island the percentage distribution of houses classified according to types of roof, floor and wall. With respect to roofing, 50 per cent of all houses in Tuvalu had thatched roof, 47 per cent had metal roof and 3 per cent had other roofing. Most of the houses in Niutao, Nanumaga, Nanumea, Niulakita and Nui had thatch roofs. On the other hand, the majority of houses in Nukulaelae (85 %), Funafuti (81 %), and Vaitupu (59 %) had metal roofs. With regard to types of floor, 55 per cent of houses had concrete, 31 per cent had stone and 8 per cent had wood floors. Stone floors were prevalent in Niulakita, Niutao and Nui, while concrete floors were more common in Nukulaelae, Funafuti, Vaitupu and Nukufetau. With respect to types of wall, 31 per cent had screen, 27 per cent had cement blocks, 9 per cent had midribs and 17 per cent had other types. The majority of houses in Nukulaelae, Funafuti and Vaitupu had cement blocks or masonite walls. The majority of houses in Nanumea, Nanumaga, Niulakita and Niutao had screen walls.

Table 2. Percentage of houses by type of construction material and by island

Name of Island	Type of roof		Type of floor		
	Thatch	Metal	Stone	Concrete	Wood
Nanumea	89.0	11.0	48.4	41.9	4.5
Nanumaga	90.4	9.6	49.7	45.2	1.9
Niutao	91.3	8.7	83.3	10.1	2.9
Nui	80.9	19.1	68.7	22.6	2.6
Vaitupu	39.7	59.3	18.0	62.9	3.1*
Nukufetau	57.7	40.8	38.0	59.2	2.1
Funafuti	10.8	81.4	1.1	75.9	19.6
Nukulaelae	15.0	85.0	1.7	90.0	5.0
Niulakita	86.7	13.3	86.7	13.3	-
Total %	50.4	46.8	31.4	55.2	8.4
Number	731	678	455	800	122

Island	Type of wall				
	Screen	Midribs	Masonite	Cement block	Other
Nanumea	84.5	6.5	2.6	3.9	0.6
Nanumaga	82.8	3.2	1.3	12.7	-
Niutao	73.2	5.8	3.6	7.2	0.7
Nui	21.7	11.3	19.1	9.6	35.7
Vaitupu	9.3	9.8	25.8	27.8	27.3
Nukufetau	4.9	35.9	10.6	39.4	9.2
Funafuti	5.7	2.7	21.9	41.4	28.3
Nukulaelae	5.0	11.7	23.3	60.0	-
Niulakita	73.3	13.3	13.3	-	-
Total	31.2	8.8	14.9	27.0	16.8
Number	453	128	216	370	243

* = Another 13.4 % of houses had midribs floor

The difference from 100 % of row category totals of a construction material is due to other category

The type of wall influences roofing type. Walls made of screen or midribs mainly had thatched roofs, while masonite and cement block houses had metal roofs. Out of 453 screen walled houses, 96.3 per cent had thatched roofs, and 85 per cent of the 128 midribs walled houses had thatched roofs. In contrast, 96 per cent of the 370 cement block houses and 65 per cent of the 216 masonite walled houses had metal roofs.

The types of floor according to types of roof and wall is presented in Table 3. It is evident from Table 3 that the types of floor depends on type of roof and type of wall. For instance, the floor of houses which have thatched roofs and screen walls was made up of 64 per cent stone, 23 per cent concrete and 13 per cent wood, while 65 per cent of screen walled and metal roofed houses had concrete floors. However, irrespective of the type of roof, cement block walled houses had concrete floors; the percentage of cement walled houses with concrete floors was 93 per cent for thatched roofs and 94 per cent for metal roofs.

In Funafuti, 81 per cent of houses had metal roofs, 11 per cent had thatched roofs, and 8 per cent had other roofing. The majority of Funafuti houses, 76 per cent, had concrete floors and another 20 per cent had wood or midribs floor. The relationships between type of roofs and walls by type of floors for Funafuti is also set out in Table 3.

Table 3. Percentage of houses by type of floor according to types of wall and roof

Type of Walls	Thatched roof			Metal roof		
	Stone	Concrete	Wood	Stone	Concrete	Wood
Tuvalu						
Screen	64.2	22.7	12.8	5.9	64.7	29.4
Midribs	62.4	30.3	6.4	10.5	57.9	31.6
Masonite	25.4	58.7	14.3	2.9	80.0	15.7
Cement block	6.7	93.3	-	3.7	94.1	0.6
Other	52.2	13.3	33.3	4.8	74.8	18.4
Total	58.5	26.8	12.7	4.0	85.3	9.3
Funafuti						
Screen	8.3	-	81.7	-	-	100.0
Midribs	-	-	100.0	-	-	100.0
Masonite	-	57.1	42.9	-	74.1	23.5
Cement block	-	100.0	-	-	96.5	-
Other	13.3	13.3	73.3	0.9	77.9	18.6

Note: Floors with midribs are included with wood. In Funafuti, 51 houses had thatched roofs, 386 had metal roofs and 37 had other roofing material.

Type of toilet facility

Table 4 shows that the major type of toilet facility in Tuvalu was water seal, as it was used by 60 per cent of households. The substantial proportion of households (19 %) which use modern flush toilet is heavily weighted by Funafuti, as close to 50 per cent of Funafuti households had the facility. This figure was also relatively high in Nukulaelae and Vaitupu, each accounting for 13 per cent of households. In the rest of the islands only between 1 and 3 per cent of households had flush toilets. Reef latrine was relatively high in Nanumea, Nukufetau and Nanumaga, as it was used by between 10 and 19 per cent of households, whereas in the rest of the islands it was either non-existent or only used by a small proportion of households. The lack of toilet facility is a health hazard. As a whole 15 per cent of all households had no toilet facility. The proportion of households with no toilet was particularly high in Niulakita and Vaitupu, as it affects 67 and 31 per cent of households, respectively. It was also high in Nukufetau (23 %), Nui (16 %) and Nanumea (15 %). Although Funafuti had better toilet facilities, it is still a matter of health concern that 10 per cent of its households had no toilet and another 7 per cent had to resort to reef latrine(77 households).

Table 4. Percentage of households by types of toilet facility and island

Name of Island	Flush	Type of toilet facilities			Total
		Water Seal	Reef Latrine	None	
Nanumea	0.6	65.8	18.7	14.8	155
Nanumaga	1.9	82.2	10.2	5.7	157
Niutao	2.9	85.6	2.2	7.9	139
Nui	2.6	65.5	14.7	16.4	116
Vaitupu	12.9	55.7	0.5	30.9	194
Nukufetau	2.1	71.8	3.5	22.5	142
Funafuti	46.6	37.1	6.5	9.7	474
Nukulaelae	13.3	78.3	5.0	3.3	60
Niulakita	-	33.3	-	66.7	15
Total	18.5	59.5	7.2	14.6	1452

Main source of drinking water

The major source of drinking water in Tuvalu as shown in Table 5 was tank water, as it was the source for 71 per cent of all households. The percentage of outer island households which use tank water varied from 72 to 74 per cent in Vaitupu, Nukufetau and Nui, to 81 to 85 per cent in Niutao, Nanumea and Nanumaga, and to 92 per cent in Nukulaelae. This figure was as low as 20 per cent in Niulakita, as 80 per cent of its households used rainwater cistern. In the case of Funafuti, 56 per cent used tank, 37 per cent rainwater cistern, and 6 per cent communal tap. Overall, 8 per cent of households used communal tap, but it was comparatively high in Nui (17 %), Nukufetau (12 %), Nanumea (10 %) and Vaitupu (9 %).

Table 5. Percentage of households by main source of drinking water and island

Name of Island	Main source of drinking water				Total
	Rainwater Cistern	Tank	Communal Tap	Other	
Nanumea	5.2	82.6	9.7	1.9	155
Nanumaga	10.2	84.7	4.5	0.6	157
Niutao	13.7	81.3	4.3	-	139
Nui	6.9	74.1	17.2	0.9	116
Vaitupu	14.9	72.2	9.3	3.6	194
Nukufetau	10.6	73.2	12.0	4.2	142
Funafuti	37.1	55.5	5.7	1.7	474
Nukulaelae	5.0	91.7	3.3	-	60
Niulakita	80.0	20.0	-	-	15
Total	19.7	70.6	7.7	1.8	1452

Main type of cooking fuel

The main type of cooking fuel in Tuvalu was firewood. Firewood was used as cooking fuel by 70 per cent of households (Table 6). In outer islands, firewood is used by at least 92 per cent of households in six islands and by 83 per cent in Nukufetau. The least use was in Funafuti, as it was used by only 24 per cent of households. The second important cooking fuel was kerosene, which was used by 26 per cent of all households. The use of modern sources, gas and electric stoves was very limited, as they accounted for only 4 per cent. This figure was highest in Funafuti, 9 per cent. In Funafuti, the major cooking fuel was kerosene, as it was used by 67 per cent of households. The high dependence on firewood should be a cause for concern and for seeking alternative sources, as it can lead to reduction and depletion of forests in the future.

Table 6. Percentage of households by main type of cooking fuel and island

Name of Island	Main type of cooking fuel			Total
	Firewood	Kerosene	Gas stove	
Nanumea	95.5	4.5	-	155
Nanumaga	95.5	3.8	-	157
Niutao	92.1	6.5	-	136
Nui	92.2	5.2	1.7	116
Vaitupu	92.3	5.7	2.1	194
Nukufetau	83.1	14.8	2.1	142
Funafuti	23.6	66.9	9.3*	474
Nukulaelae	98.3	1.7	-	60
Niulakita	100.0	-	-	15
Total	69.9	26.0	3.7	1452

* = Five households who use electric stove were included with gas stove users, which gave a total of 44 stove users in Funafuti

Main source of lighting

The two main sources of lighting in Tuvalu were hurricane lamp and electricity. A larger proportion of households, 42 per cent used hurricane lamp. Hurricane lamp was the major source of lighting in Niulakita, Niutao, Nanumaga and Nanumea, which was used by 61 to 87 per cent of households in these islands. It was also the source of lighting to about one-half of households in Nui, Nukufetau and Vaitupu. Despite the fact that a substantial proportion of households in Tuvalu (28 per cent) had electricity for lighting, this source is exclusive to Funafuti; as electricity was none-existent in all outer islands. In Funafuti, 85 per cent of households had electricity for lighting. Next to hurricane lamp, pressure lamp was an important source of lighting in Nui (40 %), Vaitupu (28 %), Nukufetau (28 %) and Niulakita (28 %). In the rest of the islands, between 4 and 6 per cent of households used pressure lamp for lighting. The highest proportion of households who use solar power were found in Nukulaelae and Nanumea, 43 and 27 per cent, respectively.

Table 7. Percentage of households by main source of lighting and island

Name of Island	Main source of lighting					Total
	Bottle Lamp	Hurricane Lamp	Pressure Lamp	Electricity	Solar Power	
Nanumea	9.0	60.6	3.9	-	26.5	155
Nanumaga	3.2	74.5	6.4	-	15.9	157
Niutao	5.0	77.0	5.8	-	11.5	139
Nui	4.3	45.7	39.7	-	9.5	116
Vaitupu	9.3	52.1	28.4	1.0	9.3	194
Nukufetau	8.5	50.7	27.5	1.4	12.0	142
Funafuti	1.5	7.6	5.5	84.6	0.6	474
Nukulaelae	-	26.7	28.3	1.7	43.3	60
Niulakita	-	86.7	-	-	13.3	15
Total	4.7	41.9	14.3	28.0	11.0	1452

Chapter Five

Economic Characteristics

Usual Economic Activity Status

Although, the 1991 Census collected information on both the usual and current economic activity status of all persons aged 10 years and over; the analysis of the economic characteristics of the population is limited to resident Tuvaluans aged 15 years and over, as school attendance of children under 15 year is compulsory. The Census asked on the usual activity / work of persons, that is the kind of work the person was engaged for most of last year and the definitions of some of the usual work categories given in the Census are as follows:

Work for wages / salary or in family business: This category includes those who worked for Government, for a private business, an individual or mission, runs his / her own business, family business whether paid or unpaid.

Fishing / farming / handicraft for sale or money: This category includes anyone who works by catching fish, growing crops, keeping livestock, or making any kind of handicraft for sale or money. Those who work in these activities mainly for their own family use are classified as working for subsistence only.

Housework: This category refers to people who spend most of their time occupied with purely domestic duties round the house, such as cleaning, washing, cooking, caring for children and looking after sick or old relatives.

Those persons who did not have a usual activity were categorised as students, too old, unemployed, sick, disabled, or doing voluntary work. According to the Census, persons aged 15 years and over were considered as economically active if they usually worked for wages / salary, sale of goods, subsistence or did housework. From these activities, the inclusion of housework as economic activity is internationally very debatable. The 1991 Census reported that a total of 5,064 persons of whom 2,241 males and 2,823 females participated in economic activities. The overall labour force participation rate in Tuvalu was 89 per cent.

There were no gender differences in the level of labour force participation, though the very high participation rate of females was primarily due to the consideration of housework as economic activity. In many censuses, housework is not regarded as economic activity due to the reluctance of economists and national accountants to consider it as an economic activity or due to lack of suitable methodology for measuring the contribution of housework to national income. Because of the inclusion of housework, the overall labour force participation rate of Tuvalu is very high by any standard. The Census reported that unemployment was almost non-existent, as few persons were reported as being unemployed throughout most of the year. Those who were not engaged in economic activities were mostly students and old people.

**Table 1. Resident Tuvaluan aged 15 years and over
by usual activity status and sex**

Activity Status	Male		Female		Total	
	Number	%	Number	%	Number	%
Economically Active						
Wages & salary	883	35	505	16	1388	25
Sale of goods	60	2	67	2	127	2
Subsistence	662	26	206	7	868	15
(Housework	629	25	2043	66	2672	47)
Unemployed	7	0	2	0	9	0
Sub-total	2241	88	2823	91	5064	89
	1612		780			
Economically Inactive						
Disabled / sick	33	1	30	1	63	1
Student	134	5	96	3	230	4
Old	86	3	165	5	256	5
Others*	54	2	1	0	55	1
Sub-total	307	12	293	9	600	11
	936		2,336			
Total	2548	100	3115	100	5663	100

Note:

This analysis excludes Tuvaluans working overseas: 272 seamen, 90 female contract workers in New Zealand and Nauru contract workers.

Sale of goods means those who worked in fishing, farming or handicraft for sale and money; while those who worked in these activities mainly for subsistence were categorised as subsistence.

* = The Others include 33 seamen training or awaiting work, 13 pastors and 5 male prisoners.

Age-sex specific labour force rates based on usual activity during most of the year as well as current activity based on activity during the reference week are given in Table 2 (results and discussions based on current economic activity will be dealt in subsequent sections). The age-sex specific labour force participation rates given in Table 2 shows what percentage of the population in a given age group participated in economic activity. For instance, in the age group 15-19 years, 60.1 per cent of males and 65.3 per cent of females participated in economic activity. Except at the youngest and oldest age groups, almost all males and females were active, with a broad peak in the age groups 25 to 54 years.

The level of age-sex specific participation rates for Funafuti and outer islands were similarly high. The only exception was at younger ages, particularly at age group 20-24, where the participation rates in Outer Islands were higher than that of Funafuti.

Table 2. Age-sex specific labour force participation rates by usual and current activity status

Age Group	Usual activity (%)			Current activity (%)		
	Male	Female	Total	Male	Female	Total
15-19	60.1	65.3	62.6	62.0	64.6	63.3
20-24	87.6	97.4	92.5	86.7	94.2	90.5
25-29	95.9	99.1	97.6	95.1	93.8	94.4
30-34	96.9	99.3	97.6	94.3	94.2	94.2
35-39	95.9	100.0	98.3	95.4	93.8	94.5
40-44	98.5	99.2	98.9	96.6	93.5	94.8
45-49	97.1	99.0	98.2	92.1	91.9	92.0
50-54	94.7	97.4	96.2	90.0	95.3	93.0
55-59	92.9	89.4	90.8	87.3	84.6	85.7
60-64	85.6	86.6	86.1	81.0	79.9	80.4
15-64	89.5	94.2	92.0	87.9	89.5	88.8
65 +	68.8	57.8	62.8	63.3	53.9	57.9
15 +	87.7	90.6	89.3	85.7	86.0	86.0

While the overall labour force participation rates in Funafuti, 88 per cent, and outer islands, 90 per cent, were similarly high, their usual economic activities were different. Table 3 shows that the two main activities in Funafuti were work for wages or salary and housework. An equally high proportion of the economically active, 46-47 per cent, were employed in each of these two categories. However, the gender distribution of these two activities were markedly different. In the case of males, 61 per cent of them worked for wages or salary, 31 per cent for housework and another 8 per cent for subsistence. In contrast, 63 per cent of females did housework and 32 per cent worked for wages or salary.

The activities of the outer islands were substantially different from that of Funafuti. Unlike Funafuti, the largest share of males, 47 per cent, worked for subsistence, and a comparatively small proportion worked for wages or salary, 23 per cent. The percentages of males who did housework in both Funafuti and outer islands were similar, close to 30 per cent. Compared to both males and females in Funafuti and males in outer islands, a comparatively high proportion of outer island females did housework and participated less in work for wages or salary. Sale of goods is the least activity in both Funafuti and outer islands.

Table 3. Economically active persons by type of usual activity and sex: 1991

Type of Activity	Males		Females		Total	
	Number	%	Number	%	Number	%
Funafuti						
Wages/salary	600	61	344	32	944	46
Sale of goods	14	1	21	2	35	2
Subsistence	75	8	31	3	106	5
(Housework	290	30	661	63	951	47)
Total	979	100	1057	100	2036	100
Outer islands						
Wages/salary	283	23	161	9	444	15
Sale of goods	46	3	46	3	92	3
Subsistence	587	47	175	10	762	25
(Housework	339	27	1382	78	1721	57)
Total	1255	100	1764	100	3019	100
Tuvalu						
Wages/salary	883	39	505	18	1388	27
Sale of goods	60	3	67	2	127	3
Subsistence	662	30	206	7	868	17
Housework	629	28	2043	73	2672	53
Total	2234	100	2821	100	5055	100

Table 4 presents the distribution of economically active persons by usual economic activity and by usual island of residence. The most notable feature of Table 4 is the marked variation in the distribution of usual activity by islands. The percentage of persons who were engaged in cash sector economy, that is those who worked for wages / salary and sale of goods, ranged from a low of 10 to 12 per cent in Nanumea and Nanumaga to a high of 51 per cent in Funafuti. In Niulakita, 42 per cent worked for salary / wages. The cash sector accounted for about 25 per cent of total employment in both Vaitupu and Nukulaelae, and for about 20 per cent in both Nui and Nukufetau. Subsistence activity was small in Funafuti and Vaipatu, but was important in Niutao, Nukufetau, Nanumaga, Nukulaelae and Nui. In these islands, between 21 and 45 per cent of their active populations were engaged in subsistence activity. Nanumaga stands out as the island with the least cash sector and subsistence employment.

The last row of Table 4 shows the share of females in each usual work category. Females accounted for 36 per cent of total wage and salary employment, this varied between 32 and 37 per cent in six outer islands. However, this figure was 20 per cent in Niulakita and 28 per cent in Nukulaelae and 38 per cent in Funafuti. Females comprised 53 per cent of those engaged in sale of goods, 24 per cent of subsistence and 77 per cent of housework.

Table 4. Economically active persons by island of usual residence and usual economic activity

Island of residence	Wages / Salary	Sale of goods	Subsistence	Housework	Total
Nanumea	10.5	0.2	16.8	72.5	531
Nanumaga	11.4	1.2	27.0	60.4	429
Niutao	12.0	3.3	44.5	40.2	517
Nui	16.0	5.8	20.5	57.7	400
Vaitupu	23.2	2.0	8.8	66.0	711
Nukufetau	14.6	5.8	28.0	51.6	479
Funafuti	49.3	1.9	5.7	43.1	1737
Nukulaelae	23.2	2.8	24.2	49.8	215
Niulakita	41.7	0.0	11.1	47.2	36
Total - %	27.4	2.5	17.2	52.9	5055
Number	1388	127	868	2672	5055
% Females	36.4	52.8	23.7	76.5	55.8

Current Economic Activity

The Census collected information on current activity status by asking persons whether they did any work during last week. The subsequent sections dealing with industry, occupation and hours worked by persons engaged in the formal cash sector are based on current activity status data. The current data showed that out of a total of 5,663 persons aged 15 years and over 4,865 persons were economically active (including 18 unemployed persons) and 798 persons were economically inactive. This results in a high overall participation rate of 86 per cent.

Industry of employed persons

According to work done during last week, there were 1,468 resident Tuvaluan plus 26 non-Tuvaluan, giving a total of about 1,500 persons employed in the formal cash sector. However, this figure excludes 1,204 persons who earned cash incomes from sale of handicrafts, fishing and crops. Employment in the formal cash sector is defined as those persons who worked for wages or salary. The formal cash sector provided for 30 per cent of the total employment. The two approaches of measuring the economic activity status of the population produced small differences in the number of Tuvaluans employed in the cash sector: 1,388 according to the usual activity status approach and 1,468 according to the current activity status approach.

Tables 5 and 6 sets out separately for Funafuti and Tuvalu the number of persons employed in each of the eight major industry groups classified by sex, and the share of total employment contributed by each major industry group. Although the number of minor industry divisions within each group are large, only those minor industry groups which provide significant employment are shown under their major industry group. For instance, the important minor divisions within the community services industry group in Tuvalu were administration, personal services, church missions, education and health.

As is seen from Tables 5 and 6, the predominant employment industry for those engaged in the cash sector in Funafuti and Tuvalu as a whole was community services, or in other words the public sector. Community services accounted for 69 per cent of total employment. The important category within this industry is administration, which accounted for 56 to 58 per cent of total employment. The second significant industry was commerce, which accounted for 14 per cent. The contribution of agriculture to total employment was small. Funafuti accounted for 57 per cent of the total formal cash sector employment.

With respect to cash sector employment, females accounted for 37 per cent of total employment in Tuvalu and for 38 per cent in Funafuti. In Funafuti, there were more females than males engaged in clothes, retail trade, finance, personal services, education and health. In Tuvalu as a whole, there were more females than males in fishing, education, health and personal services.

**Table 5. Tuvaluans employed in the formal cash sector
by industry and sex: Funafuti**

Major / minor Industry groups	Number of persons			Per cent of Total
	Males	Females	Total	
Agriculture	21	8	29	3.6
Farming	8	2	10	1.2
Fishing	13	6	19	2.3
Manufacture	10	14	24	2.9
Food	2	2	4	0.5
Clothes	3	12	15	1.8
Furniture	5	0	5	0.6
Electricity & water	9	0	9	1.1
Construction	20	0	20	2.4
Commerce	62	54	116	14.0
Wholesale	25	9	34	4.1
Retail	30	39	69	8.3
Hotels / bars	7	6	13	1.6
Transport	30	6	36	4.3
Land	6	0	6	0.7
Services	23	5	28	3.6
Finance	9	11	20	2.4
Banks	3	4	7	0.8
Other	6	7	13	1.6
Community services	357	218	575	69.3
Administration	315	162	477	57.5
Education	5	7	12	1.4
Health	5	8	13	1.6
Church missions	22	10	32	3.9
Personal services	10	31	41	4.9
Total	519	311	830	100.0

Table 6. Tuvaluans employed in the formal cash sector by industry and sex: Tuvalu

Major / minor Industry groups	Number of persons			Per cent of Total
	Male	Female	Total	
Agriculture	53	56	109	7.4
Farming	21	10	31	2.1
Fishing	32	46	78	5.3
Manufacture	17	15	32	2.2
Food	7	3	10	0.7
Clothes	4	12	16	1.1
Furniture	6	0	6	0.4
Electricity & water	13	0	13	0.9
Construction	31	1	32	2.2
Commerce	119	88	207	14.1
Wholesale	39	15	54	3.7
Retail	73	67	140	9.5
Hotels & bars	7	6	13	0.9
Transport	38	7	45	3.1
Services	26	5	31	2.1
Water	7	0	7	0.5
Communications	3	2	5	0.3
Finance	9	11	20	1.4
Banks	3	4	7	0.5
Other	6	7	13	0.9
Community services	649	361	1010	68.8
Administration	570	256	826	56.3
Education	21	34	55	3.7
Health	8	16	24	1.6
Church missions	31	12	43	2.9
Personal services	19	42	61	4.2
Total	929	539	1468	100.0

Note:

In addition to the 1,468 resident Tuvaluan employed in the formal cash sector, there were also 26 resident non-Tuvaluan (23 males and 3 females) employed in this sector. 17 males and 2 females were in administration, two each in finance and construction, one each in fishing, sanitation and education.

Occupational profile

The occupational profile of those engaged in the cash sector by sex are separately given for Funafuti and Tuvalu (Tables 7 and 8). The two main occupation groups in Funafuti were production workers, which accounted for 29 per cent of all workers, and clerical and related workers, which accounted for 22 per cent. The next important occupational groups were professional and technical workers, and service workers, which accounted for 17 and 12 per cent, respectively. The largest minor occupational groups in Funafuti were shop assistants, cooks and waiters, house workers and cleaners, managers, teachers, bus drivers, mechanics and electricians, policemen, accountants and economists, and fishermen.

In outer islands, production workers like in Funafuti were the important occupational category, but their share was relatively high in outer islands, 35 per cent compared to 29 per cent in Funafuti (table not shown). Unlike in Funafuti, professional and technical workers were the second important occupational category in outer islands, accounting for 28 per cent of total employment. Compared to Funafuti, the share of service workers was small in outer islands, 6 per cent compared to 12 per cent. The share of agriculture and fisheries workers was higher in outer islands than in Funafuti.

In Tuvalu, as a whole, the three important major occupation groups in descending order of importance were production workers, professional, technical and related workers, and clerical and related workers (Table 8). Their share of total employment were 32, 22 and 16 per cent, respectively. Service workers accounted for 10 per cent, sales workers for 8 per cent, administrative and managerial for 7 per cent, and agriculture and fisheries workers for 6 per cent. Nationally, the following occupations were relatively prevalent: carpenters, shop assistants, managers and teachers.

Not only is the participation of females in cash sector employment comparatively low, but also their occupational profile. The high profile occupations such as administrative and managerial, judges and lawyers, executive officers and sales managers were the domain of men. In some occupations, there were no women or they were lightly represented: policemen, engineers and surveyors, judges and lawyers, agricultural officers, and legislative officials. On the other hand, there was concentration of females in clerical and related works, nurses, teachers, shop assistants, cooks, waiters, houseworkers, weavers, bakers, and dressmakers. The leading occupation of females in Funafuti was clerical and related work followed by professional, technical and related workers, service workers and sales workers. In outer islands, the leading female occupation was professional, technical and related workers followed by production workers. Unlike Funafuti, females in outer islands outnumber males in professional and technical works. However, it is worth noting that the share of females out of the total cash sector employment remains equally low in both Funafuti and outer islands, 38 and 36 per cent, respectively.

Table 7. Employed persons by major occupation group and sex: Funafuti

Major Occupation	Number of		Total	Per cent of Total
	Males	Females		
Professional & technical	85	55	140	16.9
Engineers & surveyors	13	0	13	1.6
Electrical technicians	10	2	12	1.4
Nurses	0	11	11	1.3
Health personnel	10	1	11	1.3
Accountants / economists	18	5	23	2.8
Teachers	5	23	28	3.4
Administration & managerial	46	10	56	6.7
Legislative officials	9	1	10	1.2
Administrators	10	3	13	1.6
Managers	27	6	33	4.0
Clerical & related	63	123	186	22.4
Executive officers	12	1	13	1.6
Typists	3	19	22	2.7
Cashiers	5	7	12	1.4
Bank clerks book keepers	5	11	16	1.9
Radio operators	3	7	10	1.2
Sales workers	29	42	71	8.6
Shop assistants	17	35	52	6.3
Service workers	57	46	103	12.4
Cooks / waiters	8	14	22	2.7
House workers / cleaners	8	31	39	4.7
Policemen	25	0	25	3.0
Agriculture & fisheries	27	2	29	3.5
Fishermen	21	1	22	2.7
Production workers	208	33	241	29.0
Quarrymen	11	1	12	1.4
Bakers	0	11	11	1.3
Dressmakers	0	15	15	1.8
Mechanics / electricians	29	1	30	3.6
Carpenters	68	1	69	1.1
Bus drivers	31	0	31	3.7
Not stated	4	0	4	0.5
Total	519	311	830	100.0

Table 8. Employed persons by major occupation group and sex: Tuvalu

Major Occupation	Number of		Total	Per cent of Total
	Male	Female		
Professional & technical	170	146	316	21.5
Engineers & surveyors	18	0	18	1.2
Electrical technicians	13	2	15	1.0
Agricultural officers	17	1	18	1.2
Nurses	0	30	30	2.0
Health personnel	19	6	25	1.7
Accountants / economists	21	6	27	1.8
Judges / lawyers	20	0	20	1.4
Teachers	26	81	107	7.3
Social workers	9	9	18	1.2
Administration & managerial	81	16	97	6.6
Legislative officials	31	1	32	2.2
Administrators	10	4	14	1.0
Managers	40	11	51	3.5
Clerical & related	83	151	234	15.9
Executive officers	17	1	18	1.2
Typists	3	25	28	1.9
Cashiers	6	9	15	1.0
Bank clerks / bookkeepers	8	12	20	1.4
Radio operators	6	9	15	1.0
Sales workers	57	64	121	8.2
Sales managers	14	1	15	1.0
Shop assistants	39	55	94	6.4
Service workers	85	56	141	9.6
Cooks / waiters	13	15	28	1.9
Houseworkers / cleaners	10	39	49	3.3
Policemen	41	0	41	2.8
Agriculture & fisheries	72	11	83	5.7
Fishermen	43	3	46	3.1
Production workers	369	93	462	31.5
Quarrymen	16	3	19	1.3
Weavers	3	42	45	3.1
Bakers	1	16	17	1.2
Dressmakers	0	15	15	1.0
Mechanics / electricians	42	1	43	2.9
Cement workers	36	8	44	3.0
Carpenters	108	1	109	7.4
Bus drivers	42	0	42	2.9
Not stated	13	1	14	1.0
Total	929	539	1468	100.0

Traditional economic activities

In general, all persons aged 15 years and over in Tuvalu participate in traditional economic activities. The Census collected information from all persons who did work last week whether the person did any traditional kind of work last week for sale or for own use. Traditional activity comprises fishing, collection, toddy making, drying / salting fish, growing crops, raising poultry, making thatch or handicraft and house work. The traditional activities are classified in the census into two categories: sale and subsistence. In the country as a whole, 20 per cent of traditional activities were done for sale and 80 per cent for subsistence (Table 9). Some persons did traditional work for sale as well as for subsistence. In Funafuti, sale activities accounted for 18 per cent, as against 22 per cent in outer islands. The major traditional work done for sale in Tuvalu was handicrafts, predominantly a female activity, followed by fishing, which was mainly a male activity. The pattern is similar in Funafuti and outer islands. The exceptions were that land work is done more for sale in outer islands than in Funafuti, while the converse was true for housework in Funafuti. Of the subsistence activities, housework was the predominant activity, followed by fishing and land work. There was clear gender segregation of traditional activities, whether done for sale or subsistence. Females predominate in housework and handicrafts, while fishing and land work were the domain of men.

Table 9. Tuvaluans aged 15 years and over by type of traditional activity, sex and residence

Residence / activity	Male		Female		Total	
	Number	%	Number	%	Number	%
Funafuti: Sale						
Fishing	90	8.5	12	0.9	102	4.4
Land work	18	1.7	12	0.9	30	1.3
House work	19	1.8	58	4.5	77	3.3
Handicrafts	15	1.4	202	15.8	217	9.3
Sub-total	142	13.4	284	22.1	426	18.2
Funafuti: Subsistence						
Fishing	388	36.6	17	1.3	405	17.3
Land work	168	15.8	31	2.4	199	8.5
House work	357	33.7	865	67.5	1222	52.2
Handicrafts	5	0.5	84	6.6	89	3.8
Sub-total	918	86.6	997	77.8	1915	81.8
Total	1060	100.0	1281	100.0	2341	100.0
Outer islands: Sale						
Fishing	147	9.8	11	0.5	158	4.4
Land work	109	7.3	36	1.7	145	4.0
House work	34	2.3	51	2.4	85	2.4
Handicrafts	25	1.7	365	17.3	390	10.8
Sub-total	315	21.0	463	21.9	778	21.5
Outer islands: Subsistence						
Fishing	507	33.7	20	0.9	527	14.6
Land work	343	22.8	81	3.8	424	11.7
House work	300	20.0	1332	63.0	1632	45.1
Handicrafts	38	2.5	217	10.3	255	7.1
Sub-total	1188	79.0	1650	78.1	2838	78.5
Total	1503	100.0	2113	100.0	3616	100.0
Tuvalu: Sale						
Fishing	237	9.2	23	0.7	260	4.4
Land work	127	5.0	48	1.4	175	2.9
House work	53	2.1	109	3.2	162	2.7
Handicrafts	40	1.6	567	16.7	607	10.2
Sub-total	457	17.8	747	22.0	1204	20.2
Tuvalu: Subsistence						
Fishing	895	34.9	37	1.1	932	15.6
Land work	511	19.9	112	3.3	623	10.5
House work	657	25.6	2197	64.7	2854	47.9
Handicrafts	43	1.7	301	8.9	344	5.8
Sub-total	2106	82.2	2647	78.0	4753	79.8
Total	2563	100.0	3394	100.0	5957	100.0

Number of Hours Worked

Table 10 sets out the percentage distribution of economically active persons by number of hours worked last week classified by type of economic activity and sex. Persons who were engaged in traditional activity were divided into those who worked for sale of goods and those who worked for subsistence, while those who worked in the cash sector were those who worked for pay or profit. It is seen from Table 10 that the number of hours worked differed according to type of economic activity and gender. In general, traditional work took less hours of work than cash sector work, and in the cash sector males worked for more hours than females. While persons employed in the cash sector commonly worked for 17 to 40 hours during last week, only 5 to 6 per cent of those engaged in traditional activity worked for that amount of time. About one-half of those who worked in traditional activity did so for less than five hours and at least 70 per cent of them worked for a day or less in a week. In contrast, 20 per cent of males and 32 per cent of females engaged in the cash sector worked for a day or less in a week. The percentage of those employed in the cash sector who worked for two days or less was 29 per cent for males and 40 per cent for females. These figures represent considerable underemployment, especially for females, as they worked for less than half the normal working week.

Table 10. Economically active persons by number of hours worked last week, type of sector and sex

Number of hours	Cash sector		Traditional activity for			
	Male	Female	sale		subsistence	
			Male	Female	Male	Female
1-4	9	16	46	60	53	53
5-8	11	16	26	16	25	23
9-16	9	8	21	18	15	17
17-40	51	43	6	5	6	6
41 +	20	17	1	1	1	1
Total	100	100	100	100	100	100
Number	929	539	457	747	2106	2647

Note: the column percentages by number of hours worked during the week add up to 100 %

Characteristics of employed persons

Persons employed in the cash sector possessed different demographic and social characteristics than the working age population, and some aspects of these are described here. These include the age, marital status and educational characteristics of employed persons.

The age distribution of employed persons presented in Table 11 shows that the age of employed persons varied according to type of occupation and sex. In the case of males, persons working in administrative and managerial occupation, and service were relatively old; while those working in clerical and production occupations were the youngest. While only 6 per cent of administrative and managerial workers were aged 15-29 years, this figure was as high as 44 per cent for both clerical and production workers. The young age of production workers is reasonable, as such type of work demands hard labour and a lot of energy which can be mainly provided by young people. A summary measure of the age differences is given by the median age (last column of Table 11) which gives the age where 50 per cent of the workers in a given occupational group are below that age and the

remaining 50 per cent are above that age. For males, the median age varied from 31 years for clerical workers to 44.4 years for administrative and managerial workers. In the case of females, the youngest workers were sales and clerical workers followed by professional and agricultural workers. The oldest female workers were in agriculture, administrative and managerial occupations.

With respect to gender differences, female workers were more younger than males. There was a concentration of female workers in the age group 15-29 years instead of the 30-44 years for males. Only females in production, service and administrative works tend to be older. In contrast to males, females in professional, managerial and clerical jobs were younger. This may be that young and educated women are recently entering into this professions which previously have been the domain of males (see Tables 11 and 13).

Table 11. Distribution of employed persons by occupation, sex and age groups

Occupation Groups	Distribution by age groups(%)				Median Age
	15-29	30-44	45 +	Total	
Males					
Professional	31.8	41.2	27.1	170	34.4
Administrative	6.2	45.7	48.1	81	44.4
Clerical	44.6	43.4	12.0	83	31.2
Sales	38.6	43.9	17.5	57	32.7
Service	29.4	40.0	30.6	85	38.4
Agriculture	19.4	55.6	25.0	72	36.7
Production	44.4	37.3	18.3	381	31.9
Total	35.1	41.3	23.6	929	34.5
Females					
Professional	45.9	47.9	6.2	146	31.1
Administrative	37.5	50.0	12.5	16	34.0
Clerical	61.8	36.2	2.0	152	28.0
Sales	62.5	32.8	4.7	64	27.3
Service	30.4	58.9	10.7	56	33.2
Agriculture	45.5	36.4	18.1	11	31.2
Production	27.7	41.5	30.8	94	37.1
Total	47.3	41.7	11.0	539	30.7

Row totals by age groups adds up to 100 %

Table 12 shows that the majority of males and more than one-half of females in cash employment were married, reflecting the fact that the demand for cash employment is greater among married people in order to sustain the family. It is seen also that the majority of employed persons in age groups 15-24 were never married. The reduction in the proportions of single employed persons at age group 25-29 and thereafter is probably due to the movement toward family formation after young people have secured jobs for sometime. It is worth noting that a substantial proportion of single females were employed at adult and old ages compared to males.

Table 12. Persons employed in the cash sector by age, sex and marital status

Age group	Single	Married	Other*	Total
Males				
15-19	100.0	0.0	0.0	100
20-24	73.2	25.2	1.6	127
25-29	37.1	61.6	1.3	159
30-34	15.6	80.5	3.9	154
35-39	6.5	91.9	1.6	123
40-44	8.4	86.0	5.6	107
45 +	2.7	93.2	4.1	219
Total	25.7	71.4	2.9	929
Females				
15-19	94.7	5.3	0.0	38
20-24	65.0	32.0	3.0	103
25-29	24.6	69.3	6.1	114
30-34	16.5	70.6	12.9	109
35-39	19.2	74.0	6.8	73
40-44	14.0	72.1	13.9	43
45 +	15.3	57.6	27.1	59
Total	33.0	57.5	9.5	539

* = Other means divorced, separated and widowed

As shown in Table 13, there were considerable differences in educational level between various occupation groups and gender. Workers in the majority of occupational groups had Class 6 or higher education. The occupations with the highest educational level, particularly tertiary education, were professional, technical and related workers, and administrative and managerial workers followed by clerical and related workers. The common educational level of clerical workers, especially females, was Forms 1 to 7. Production workers and labourers, agriculture and fishing, service and sales workers had the lowest education, usually classes 6 to 9.

In general, working females had higher educational level than their male counterparts. This is particularly so with professional and clerical workers. For instance, the proportion of professional workers who completed Forms 1-7 or higher education was 68.2 for males, compared to 78.1 per cent for females. But male administrative and managerial workers had higher education than females.

Table 13. Employed persons by major occupation, educational level and sex

Major Occupation Groups	Distribution by educational level (%)			
	Classes		Forms	
	1-5	6-9	1-7	Tertiary
Males				
Professional	6.5	21.8	28.2	40.0
Administrative	11.1	18.5	34.6	34.6
Clerical	7.2	18.1	44.6	25.3
Sales workers	1.8	40.4	35.1	22.8
Service workers	16.5	42.4	28.2	10.6
Agriculture	23.6	54.2	15.3	5.6
Production & Labourers	10.0	68.0	14.2	5.2
Total	10.3	45.6	23.9	17.5
Females				
Professional	2.1	17.8	39.7	38.4
Administrative	0.0	37.5	31.2	31.2
Clerical	1.3	13.8	66.4	17.1
Sales workers	0.0	56.3	37.5	3.1
Service workers	8.9	57.1	19.6	7.1
Agriculture	0.0	81.8	9.1	9.1
Production & Labourers	16.0	58.5	18.1	5.3
Total	4.6	34.3	40.3	18.4

Note: Refer Table 11 for number of persons in each major occupational group

The row totals for each occupational group is slightly short of 100 %, due to the omission of the 'Other' educational category

Trends in labour force

There has been substantial growth in the cash sector employment and labour force in the period leading to and after independence. On the contrary, the role of village work as a major source of employment has declined. Because home duties were not considered as an economic activity in the 1973 Census but considered so in the 1979 and 1991 censuses, and because the definition of village work activity used in the earlier censuses is not comparable to traditional activity used in the 1991 Census, comparisons by type of activity over time are not attempted here. However, comparisons based on cash sector employment (work for wage or salary) and working age populations (persons aged 15 years and over) will capture changes that occurred in the Tuvaluan labour force.

The cash sector employment of resident Tuvaluan has more than trebled from 441 persons in 1973 to 1,468 in 1991. The growth has been spectacular for females, where it has increased by more than six fold, though from a low base. In contrast, cash sector employment of males increased by one-and-a-half times. The growth of the working age population has also been substantial, where it increased by 67 per cent for males and by 54 per cent for females. Of the total 2,112 increase in the working age population, about one-half of the increase, 1,027 persons, has been absorbed into the cash economy. This reflects the dramatic expansion of the public sector employment. Parallel to the growth of the cash sector economy, has been the growth in the share of females in cash employment from 17 per cent in 1973 to 26 per cent in 1979, and to 38 per cent in 1991.

Table 14. Trends in cash sector employment and working age population by sex: 1973-1991

Sex	Census years			Change (1973-91)	
	1973	1979	1991	Number	Per cent
Male					
Cash sector	368	671	929	561	152.4
Population 15 +	1524	2133	2548	1024	67.2
Female					
Cash sector	73	231	539	466	638.4
Population 15 +	2027	2810	3115	1088	53.7
Total					
Cash sector	441	902	1468	1027	232.9
Population 15 +	3551	4943	5663	2112	59.5

Chapter Six

Fertility and Mortality

The purposes of this chapter is to undertake analysis and estimation of the levels of fertility and mortality, and analysis of fertility and mortality trends and differentials in Tuvalu on the basis of the 1991 census. In addition to the 1991 census, results from the 1973 and 1978 censuses are also utilised to establish fertility and mortality trends. In the estimation of fertility and mortality levels and analysis of trends, the series of vital statistics are also used. The first part of this section begins with estimating the levels and trends of fertility and mortality using vital statistics.

Vital rates based on Vital Statistics

Before undertaking an analysis of census data, the series of vital statistics are analysed first. Tuvalu has a complete vital registration system, and the vital statistics derived from the system are published in annual Medical Reports. The series of registered annual number of births, deaths and natural population increases are summarised in Table 1. The annual number of births increased sharply from about 120 in 1978 to 210 in 1981, and fluctuated between 200 and 250 between 1981 and 1986, and then rose dramatically and fell between 1987 and 1991. The highest number of births, 281, were recorded in 1987, followed by 266 births in 1989 and 269 births again in 1991. Although there has been fluctuations in fertility, it is clear that the annual number of births between 1978 and 1991 has at least doubled. On the other hand, the annual number of deaths has increased slowly from about 50 deaths in 1978-79 to about less than 90 deaths. The only exceptions were 1987 and 1990, which recorded the highest deaths, 109 and 102, respectively. The differential movement of births and deaths resulted in rapid annual increases of the population of between 100 and 180 persons (column 4).

The last three columns of Table 1 display crude birth rates, crude death rates and crude rates of natural increase, measured per 1000 population. The denominator for the rates, the mid-year populations, were calculated by applying the natural growth rate of the resident population of 1.5 per cent observed between 1979 and 1991 to the 1979 enumerated resident population. What the rates say is that in 1978, the resident population had on average 16 births per 1000 population during the year, 7 deaths per 100 population, and about 10 persons per 1000 population were added to it at the end of the year through natural increase. It is seen from Table 1 that the birth rate rose from 16 to 18 births per 1000 population in 1978-79 to between 25 and 30 births per 1000 population between 1980 and 1991. The death rate too rose from about 7 per 1000 in 1978-79 to about 10 to 13 per 1000 population in the 1980s, gravitating around 10 per 1000. The substantial increase in the birth rate accompanied by a rather stable and low death rate has resulted in the rapid natural growth rate of the population from about 1 per cent per annum in 1978-79 to about 2 per cent throughout most of the 1980s. If the time frame is restricted to the 1980-91 period, then the resident population of Tuvalu had on average experienced a birth rate of 28 births per 1000 population, a death rate of 10 per 1000 population and a rate of natural increase of 1.8 per cent per annum.

Table 1. Trends in number of registered births, deaths, natural increase, and crude vital rates

Year	Total		Natural Increase	Crude rates per 1000		
	Births	Deaths		Births	Deaths	NI*
1978	119	50	69	16.4	6.9	9.5
1979	135	49	86	18.3	6.7	11.6
1980	182	73	109	24.4	9.8	14.6
1981	210	78	132	27.7	10.3	17.4
1982	244	74	170	31.7	9.6	22.1
1983	197	79	118	25.2	10.1	15.1
1984	222	63	159	28.0	7.9	20.1
1985	202	92	110	25.0	11.4	13.6
1986	231	78	153	28.2	9.5	18.7
1987	281	109	172	33.8	13.1	20.7
1988	227	83	144	26.9	9.8	17.1
1989	266	87	179	31.1	10.2	20.9
1990	230	102	128	26.4	11.7	14.7
1991	269	85	184	30.4	9.6	20.8
1980-91	2840	1032	1808	28.2	10.3	17.9

* = NI means annual Crude Rate of Natural Increase per 1000 population

Fertility

Sex ratio at birth

Sex ratio at birth, the ratio of number of male births per 100 female births, for most populations is observed to vary between a narrow margin of 102 to 107 males per 100 females. The series of Tuvaluan sex ratios at birth given in Table 2 are substantially higher than what is normally expected. The values that were close to the upper limit of the sex ratio at birth were those for 1989 and 1983, which were 109 and 110, respectively. The average sex ratio at birth for 1983-91 was 117 males per 100 females. There could be a number of reasons for this. One reason could be the small population of Tuvalu and hence the small number of births resulting in this unusually high sex ratio at birth. Another reason could be the good health enjoyed by expectant mothers during pregnancy and delivery, which help to reduce the comparatively high male than female foetal mortality. A third reason could be due to data errors, but this is unlikely due to the consistency of the vital statistics data and the agreement with census data also.

$$\text{Cen } 1978 : 27/5$$

$$57 \div 17/11$$

$$\text{1978 Total Net}$$

$$\text{when increase:}$$

$$\frac{86 + 7 (\text{Jan - Dec})}{12} = 50$$

Table 2. Births by sex, sex ratios and year

Year	Male	Female	Sex ratio
1983	103	94	109.6
1984	118	102	115.7
1985	114	91	125.3
1986	119	105	113.3
1987	155	127	122.0
1988	119	108	109.1
1989	152	114	133.3
1990	134	96	139.6
1991	128	141	90.8
Total	1142	978	116.8

Estimation of fertility level

There is an exact match in the total annual number of births for 1991 between the Census and vital statistics, 267 and 268 births, respectively. As all births take place in hospitals and clinics, the registration of births is considered complete. The complete agreement between the Census and registration allows confidence to be placed on the fertility findings from the Census data. Although there is agreement in the level of birth reporting, there are however, variations in the distribution of births by age group of mothers. Both the census and registration show that the maximum number of births occurred to mothers aged 25-29. However, the Census showed more births reported to mothers aged 20-24 and 35-39 than the registration.

The 1991 Census reported a crude birth rate of 30 births per 1000 resident population, which corresponds exactly to the result obtained from the vital statistics. The general fertility rate, measured as the number of annual births per 1000 women aged 15-44 years, was 128. Age specific birth rates referring to the 12 months preceding the Census were calculated from information on the date of the last birth, and are presented in Table 3. The data show that childbearing is concentrated among women aged 20-39 years with a peak fertility reached at age group 25-29 years. The Census showed that women aged 35-39 years had higher fertility than women aged 30-34 years, while the vital statistics shows the converse. The higher fertility of women aged 35-39 years is due to data errors, as it is likely caused by age misreporting. The fertility distribution obtained by the registration seems acceptable. Women aged 15-19 and 40-44 years had an equally low fertility rate of 39 births per 1000 women in a year. Both the Census and vital statistics recorded no births for women aged 45-49 years. The distribution of age specific fertility rates demonstrate considerable fertility control by young and old women.

The summation of the age specific birth rates gives a total fertility rate of 3.5 to 3.6 children per woman. Total fertility rate is defined as the average number of children a woman would bear if she survives to the end of her reproductive period and gives birth at each age group at the current age specific birth rates.

Table 3. Number of annul births and age specific birth rates by age of women and data source

Age Group	Total Women	Total births		Age specific birth rates	
		Census	Vital	Census	Vital
15-19	285	11	13	38.6	45.8
20-24	345	60	54	173.9	156.5
25-29	422	88	98	208.5	227.9
30-34	414	50	52	120.8	124.4
35-39	356	48	40	134.8	111.7
40-44	260	10	11	38.5	42.1
Total	2082	267	268	715.1	708.4
GFR	-	128	128	-	-
TFR	-	-	-	3.6	3.5

From the information on number of children ever born to each woman, average parities by age group of women can be calculated as shown in Table 4. The parity data show that there was a substantial fertility decline for all age groups between 1973 and 1979, and for women aged 30 years and over between 1979 and 1991. However, fertility decline seems to have slowed down or even increased slightly for young women aged 15-29 years between 1979 and 1991. The average parity to women aged 45-49 can be considered as a measure of completed fertility. The average completed fertility of all Tuvaluan women declined from 6.1 children per woman in 1973 to 5.6 in 1979 and 3.7 children per woman in 1991.

However, this general picture of fertility decline depicted by the parity data is not supported by current fertility, that is by the level and distribution of age specific fertility rates. The age specific fertility rates clearly show a rise of fertility between 1973 and 1991, especially between 1979 and 1991. There appeared a decline for young women aged 15-24 years and for women aged 40-44 years between 1973 and 1979, but this was reversed in 1991. The analyses trends in age structure and proportions married also supported a recent fertility rise.

Table 4. Trends in reported mean parities and age specific fertility rates by age of women

Age Group	1973	Mean parity per woman	
		1979	1991
15-19	0.04	0.05	0.08
20-24	0.70	0.48	0.66
25-29	1.77	1.44	1.49
30-34	2.79	2.50	1.98
35-39	4.15	3.52	2.76
40-44	5.49	4.53	3.48
45-49	6.09	5.61	3.66
Total	-	1.89	1.89

Age specific fertility rates per 1000 women			
15-19	26.8	17.1	38.6
20-24	153.0	146.5	173.9
25-29	136.8	180.0	208.5
30-34	73.2	108.1	120.8
35-39	77.8	51.6	134.8
40-44	20.1	5.0	38.5
45-49	0.0	5.5	0.0
TFR	2.4	2.6	3.6
m	27.9	27.7	28.2

The fertility pattern in Tuvalu given in column 4 of Table 5 is represented by the average of the age specific fertility rates obtained from the Census and vital statistics. However, for the age group 35-39 the fertility rate obtained from vital statistics is preferred because of the obvious error in the fertility rate for age group 35-39 obtained from the Census.

The current level of fertility can be estimated by a procedure developed by Brass (UN 1983), which involves comparison of average parities for a given age group with equivalent parities obtained by cumulating and interpolating the age specific fertility rates. The P/F ratios column gives this comparison. If fertility has been constant in the recent past, the average parity obtained from the parity data and the equivalent parity derived from current fertility will be equal, and the P/F ratios will be equal to one. However, the P/F ratios except for women aged 15-19 and 20-24 fell short of one. What the ratios say is that P's are less than F's, that is past fertility is less than current fertility, in other words recent fertility is rising. If this interpretation is accepted we can't adjust the level of fertility on the basis of average parities, otherwise fertility will be underestimated than it is in reality. So an adjustment factor based on women aged 20-24 years, 0.981, is accepted as reasonable, and it is the same as accepting the reported fertility level as correct. The adjustment gives a total fertility rate of 3.4 children per woman. Thus, the true level of fertility in Tuvalu would be reflected by a total fertility rate of 3.4 to 3.5 children per woman.

Table 5. Average parities, estimated parity equivalents, reported and adjusted period fertility rates, P/F ratios

Age Group	Average Parity	Estimated Parity Equivalent	Reported Fertility Rate	P/F Ratio	Adjusted Fertility Rate		
15-19	0.081	0.074	0.0422	1.097	0.0413	#57	12
20-24	0.658	0.671	0.1652	0.981	0.1621	0	60
25-29	1.493	1.720	0.2182	0.868	0.2140	285	30
30-34	1.978	2.455	0.1226	0.806	0.1202	345	50
35-39	2.764	3.156	0.1117	0.876	0.1096	422	39
40-44	3.477	3.531	0.0403	0.985	0.0395	444	10
TFR	-	-	3.5	-	3.4	358	260
						197	261

Fertility differentials

There are no studies on fertility differentials in Tuvalu. This study attempts to describe fertility differences in Tuvalu on the basis of the 1991 Census. The comparative analyses considered here are fertility differences between Funafuti and outer islands, by islands, educational level, type of work and between marital and non-marital fertility.

Parity distributions

Table 6 shows the percentage distribution of women according to number of children ever born alive and age group of women classified separately for Funafuti and outer islands. The parity distribution shows important aspects of fertility in Tuvalu. First, the percentage of women with no children, that is of zero parity, gives the extent of childlessness among older women. It is seen that 92 per cent of the 15-19 year olds and about 50 per cent of the 20-24 year olds were childless. However, in the age group 25-29, the percentage childless drops to 27 per cent in Funafuti and 22 per cent in outer islands and thereafter steadily declines. By the time women reach the end of their reproductive period at age group 45-49 years, a significant proportion of women had no children, 13 per cent in Funafuti and 17 per cent in outer islands. The percentage childless among women aged 50 years and over was 9 per cent in Funafuti and 11 per cent in outer islands. The lower figures for women aged 50 years and over is primarily due to reporting errors. The level of childlessness was similar between Funafuti and outer islands, with the exception that the prevalence of childlessness was higher among women aged 45 years and over in outer islands and among Funafuti women aged 20-29 years. Compared to 1979, the 1991 data show that the proportions childless declined among women aged 15-29 years while it increased among women aged 40-49. The percentage childless among women aged 15 years and over declined from 38 per cent in 1979 to 26 per cent in 1991.

Second, the distribution of mean parities shows that 42 per cent of women aged 15 years and over in both Funafuti and outer islands had 1 to 3 children, another 9-10 per cent had four children, and 19 per cent of women in Funafuti and 24 per cent in outer islands had five or more children. Third, an examination of the distribution of mean parities by age group of women (last column of Table 6) shows that the level of fertility between Funafuti and outer islands were broadly similar. The only exception was that women aged 20-29 years in outer islands had higher fertility than their counter parts in Funafuti. This is also reflected in the higher proportion of women with two or more children in outer islands than in Funafuti. For instance, the percentage of women aged 25-29 years with two or more children was 54 per cent in outer islands, compared to 39 per cent in Funafuti. As a whole, it appears that outer island women had a higher fertility than Funafuti women: the overall mean parity of women aged 15 years and over was 2.9 children in outer islands and 2.5 in Funafuti.

However, this fertility difference was not real, as it is caused by differences in age composition between Funafuti and outer islands. When Funafuti and outer islands women were made to have the same age structure as Kiribati women in 1990, the overall mean parity of women aged 15 years and over becomes 2.3 instead of 2.9 for outer islands and 2.3 instead of 2.5 for Funafuti. This standardisation procedure, which controls the differences in age structure, shows that there is no fertility difference between Funafuti and outer islands. Furthermore, the standardisation shows that the age structure of women in Tuvalu favours high fertility, as the fertility of Tuvalu was depressed when the age structure of Kiribati was applied.

Table 6. Distribution of women by number of children ever born and age group: Funafuti and Outer Islands

Age Group	% Distribution of women by parity						Mean
	0	1	2	3	4	5+	
Funafuti							
15-19	92	8	-	-	-	-	0.08
20-24	52	37	8	2	-	-	0.59
25-29	27	34	24	12	3	-	1.30
30-34	19	20	22	23	12	4	1.99
35-39	18	11	10	25	21	16	2.74
40-44	10	3	13	15	27	31	3.58
45-49	13	4	7	21	15	40	3.87
50 +	9	7	7	10	12	55	4.98
Total	28	17	12	13	10	19	2.51
Outer Islands							
15-19	92	6	1	-	-	-	0.08
20-24	48	36	14	1	1	-	0.70
25-29	22	24	32	15	7	-	1.63
30-34	21	17	24	26	10	3	1.97
35-39	11	15	17	24	20	14	2.78
40-44	10	11	15	17	14	33	3.42
45-49	17	9	10	14	12	38	3.56
50 +	11	8	10	7	10	55	5.05
Total	25	15	15	12	9	24	2.86

Row totals by parity add up to 100 %. Differences from 100 are due to parity not stated.

Island differences

As is seen in Table 7, there were some apparent fertility differences between islands; fertility was highest in Nanumea and lowest in Nanumaga. However, when differences in the age structure of women were controlled, there were no fertility differences between islands. The adjusted overall mean parity of women aged 15-49 years was about 1.6 children. The exception was Nanumea, which stands out as the island of highest fertility. An examination of the average parities by islands shows that young women aged 15-29 years in Nanumea and Nukufetau had the highest fertility.

Table 7. Average parities by age and island of usual residence of women

Age Group	Average parity per woman			
	Nanumea	Nanumaga	Niutao	Nui
15-19	0.18	0.06	0.17	0.00
20-24	0.85	0.62	0.61	0.56
25-29	1.93	1.74	1.38	1.11
30-34	1.76	1.55	2.00	1.50
35-39	3.15	2.30	2.48	3.31
40-44	3.68	3.32	3.54	3.88
45-49	4.44	4.05	3.26	4.28
Mean - Reported	2.20	1.75	1.93	2.00
Adjusted	2.61	1.48	1.58	1.64
	Vaitupu	Nukufetau	Funafuti	Nukulaelae
15-19	0.00	0.24	0.08	0.33
20-24	0.56	0.97	0.59	0.69
25-29	1.33	1.91	1.30	1.63
30-34	2.13	2.00	1.99	1.83
35-39	2.89	2.22	2.74	3.00
40-44	3.25	2.96	3.58	2.63
45-49	3.76	2.63	3.87	1.83
Mean - Reported	1.81	1.83	1.85	1.67
Adjusted	1.61	1.60	1.63	1.49

Educational differentials

An analysis of fertility by level of education shows that there was small fertility differences between women with primary education and women with secondary or higher education, after controlling for differences in age structure. The reported overall mean parity to women aged 15-49 years was 2.1 for women with primary education and 1.4 for women with secondary education. After controlling for age differences, this figure was 1.7 for women who had primary education and 1.6 for women with secondary or higher education.

Fertility and work

The analysis found fertility differences between women who work in the cash sector and those who did not work. Women who work for wages and salary had the lowest fertility, while housewives and subsistence workers had the highest fertility. Women who worked for wages and salaries had the lowest parties than housewives and subsistence workers at every age group. The overall mean parity of women aged 15-49 years was 1.6 children for women who work for wages and salary, 2.1 children for housewives and 2.3 children for those who work for subsistence. After controlling for differences in age structure, this figure was reduced to 1.4 children for those who worked for wages and salary, and to 1.7 children for both housewives and subsistence workers.

Non-marital fertility

The series of vital statics give insights into non-marital fertility in Tuvalu. Table 8 presents the total number of all births and illegitimate births by year. The fourth column gives the share of total births that are illegitimate, and the remaining columns give the percentage distribution of illegitimate births

by age groups of single mothers. The data show a substantial prevalence of non-marital fertility in Tuvalu. Table 8 shows that every year between 27 and 41 births were born to single mothers. The share of total births that were due to single mothers contributed to between 10 and 19 per cent of all births. There is no apparent trend in non-marital fertility, although the figures for 1988 to 1991 indicate of a decline.

The majority of non-marital fertility occurs to single mothers aged 20-29 years. Single mothers aged 20-24 years contributed for between 33 and 46 per cent of total illegitimate births. The share of total illegitimate births due to Single mothers aged 30 years and over was about 20 per cent, though it reached as high as 30 per cent in 1983 and 33 per cent in 1984. The contribution to non-marital fertility by single women aged 15-19 years varied from small to moderate, accounting for between 3 and 19 per cent of total non-marital fertility.

Non-marital fertility in Tuvalu is substantial, and its reduction has to be considered both because of its effects in reducing total fertility and also to reduce adverse social, economic and health effects on illegitimate children and their single mothers.

Table 8. Total and illegitimate births by year and illegitimate births by age of mother

Year	Number of births			Births to single mothers (%)			
	All	Illegal	% Share	15-19	20-24	25-29	30+
1983	197	37	18.8	8.1	35.1	27.0	29.7
1984	222	30	13.5	3.3	33.3	30.0	33.3
1985	205	39	19.0	2.6	46.2	33.3	17.9
1986	231	35	15.2	12.1	39.4	27.3	21.2
1987	282	27	9.6	18.5	33.3	29.6	18.5
1988	227	41	18.1	12.2	36.6	29.3	21.9
1989	266	35	13.2	5.7	40.0	34.3	20.0
1990	230	24	10.4	-	-	-	-
1991	269	27	10.0	11.1	37.0	33.3	18.5

Note: the row totals of cols 5-8 add up to 100 %.

The estimates of fertility measures that are considered acceptable for resident Tuvaluan population in 1991 are summarised as follows:

Crude birth rate = 29.4 births per 1000 population

Total fertility rate = 3.4 children per woman

Gross reproduction rate = 1.7 daughters per woman

Net reproduction rate = 1.5 daughters per woman

Mean length of generation = 28.9 years

The results say that there were 29 births per 1000 population in 1991 and that a woman would have 3.4 children of which 1.7 were daughters by the time she completes her reproductive life if she survives to the end of her reproductive period and gives birth at each age at the 1991 age-specific fertility rates. The Net reproduction rate says that if new born girls experienced the age-specific fertility rates and age specific mortality rates of 1991, they would be replaced by 1.5 daughters a generation later, that is in about 29 years. In other words, the next generation of daughters would be 1.5 times larger than their mothers.

Mortality

Estimation of infant and childhood mortality

Indirect estimates of the level of infant and child mortality can be derived from census information on children ever born and dead to women classified by age group of women. Estimation procedures originally developed by Brass and later modified by others (UN 1983) allow the estimation of infant and childhood mortality from reported proportions dead among children ever born alive classified by five-year-age groups of women. The indirect estimation procedures have a set of multipliers, depending on the type of mortality model selected, which are used to convert the proportions of children dead into probabilities of dying from birth to a given exact age of the child. A mortality model describes the pattern of mortality by age, that is a description of the distribution of age specific death rates by age group. There are a number of mortality models to choose from, and the choice of the model has to be appropriate as mortality estimates vary by model. The analysis that was carried out here to assess the appropriate mortality model found out that the Coale-Demeny North family model life tables were appropriate to describe the pattern of infant and child mortality in Tuvalu (This was arrived through graphical analyses of the trends of infant mortality derived from the 1979 and 1991 census data on proportions of children dead, and through fitting mortality models that compare closely with the 1991 age specific death rates derived from vital statistics using the UN Mortpak COMPAR procedure).

Table 9 presents the reported proportions dead among children ever born classified by age group of women, the estimated probabilities of dying between birth and exact age x (q_x) on the basis of the North mortality model. The last column gives the time reference (t_x) in years of the infant and child mortality estimates; that is the number of years before 1991 to which these mortality estimates refer.

Table 9. Proportions of children dead and estimated infant and child mortality rates: Both sexes, Tuvalu 1991

Age of Woman	Proportion dead	Exact Age (X)	$q(x)$	$t(x)$
15-19	0.043	1	0.049	0.9
20-24	0.044	2	0.046	2.1
25-29	0.051	3	0.049	3.8
30-34	0.050	5	0.050	6.0
35-39	0.086	10	0.091	8.5
40-44	0.072	15	0.074	11.1
45-49	0.093	20	0.094	14.1

Source: Primary analysis of 1991 Tuvalu Population Census

What meanings do the figures in Table 9 convey? If we consider women in the age group 20-24, the proportion of children dead to them is 0.044, or 4.4 per cent of children born to them were dead. If this proportion is converted into probabilities of dying, it turns out that out of 1000 live births, 46 would die before reaching their second birth day. The time period to which this probability of dying between birth and exact age 2 refers is about two years before the Census, that is to 1989.

Except for q_1 , the q_x values consistently increase with advancing age of women. This is to be expected as risks of childhood mortality increases with longer durations of exposure of children to the risks of dying and because mortality in the past may be higher. The infant mortality rate, given by q_1 , is usually biased upward and unreliable because the number of children ever born alive and dead to women aged 15-19 are small and because the children of this young women experience unusually high mortality risks (UN 1983: 73; Hill, 1991: 371).

It is unfortunate that the indirect methods produce unreliable estimates of infant mortality, as it is the most useful and commonly used indicator of health status and socio-economic development of a population. However, the q_2 , q_3 and q_5 values produced by this methods give reliable estimates of childhood mortality, and an estimate of infant mortality is obtained from the level implied by these childhood mortality estimates.

The definitions of three useful infant and childhood mortality measures and their time references, based on the North mortality model and presented in Table 10, are given: q_1 known as infant mortality rate measures the number of infant deaths per 1000 live births during a year or the probability of dying between birth and exact age 1; and ${}_4q_1$ known as childhood mortality measures the probability of dying between ages 1 and 5; and q_5 christened as 'under-five mortality' by the UNICEF is the probability of dying between birth and age 5.

As is seen in Table 10, the implied infant mortality rate based on reported proportions of children dead to women aged 20-24 and 25-29 years was 39-40 infant deaths per 1000 live births referring to the period 1988-90, and the corresponding under-five mortality was 55-56 child deaths per 1000 live births. Excepting the rate for 1983, infant mortality declined, though slowly, from 47 per 1000 in 1978 to about 40 per 1000 in 1990. The high mortality rate for 1983 is clearly due to data errors. Like infant mortality, childhood and under-five mortality also declined. The under-five mortality declined from 69 deaths per 1000 in 1978 to 55-56 per 1000 in 1990. The lack of consistent trend in the estimates points to data errors arising from omission of dead children, particularly by older women.

Table 10. Estimates of infant and child mortality and their reference dates based on 1991 Census

Age of Women	Reference date	Infant Mortality Rate q_1	Probability of dying between ages	
			1 and 5 ${}_4q_1$	0 and 5 q_5
20-24	1989.8	0.040	0.017	0.056
25-29	1988.0	0.039	0.017	0.055
30-34	1985.9	0.036	0.014	0.050
35-39	1983.4	0.053	0.028	0.079
40-44	1980.7	0.042	0.019	0.060
45-49	1977.8	0.047	0.023	0.069

On the basis of the analysis of the indirect estimates of infant and childhood mortality, the following mortality estimates for 1990 are considered acceptable. It is worth noting that both the Census data and vital statistics showed comparatively high infant male deaths. The vital statistics recorded 12 male infant deaths compared to 4 female infant deaths in 1991. Hence, the wide range in male expectation of life at birth reflects the unusually high as well as the normal infant mortality rate.

Infant mortality rate (q_1) :	40 per 1000
Male :	39 - 49 per 1000
Female :	31 - 39 per 1000
Child mortality (${}_4q_1$) :	17 per 1000
Under-five mortality (q_5) :	56 per 1000
Life expectancy at birth	
Male =	64.1 - 66.4 years
Female =	68.0 - 70.0 years
Both sexes =	67.0 - 68.0 years

Adult mortality

Information on adult mortality in Tuvalu is obtained from the census question on survival of parents. Every respondent was asked whether the real father is alive or dead, and whether the real mother is dead or alive. Estimation of adult mortality is done using the survival of mother data, as it is more reliable than that of fathers' survival data. Employing estimation procedures developed by Brass and later modified by Hill and Trussell, the Mortpak procedure ORPHAN estimates female adult survivorship from age 25 to age x (for $x = 45, 50, \dots, 75$) and their corresponding life expectancies at age 20 and at birth. The results based on the North mortality model are summarised in Table 11. The estimates refer to adult mortality in the recent past, that is to 1982 or earlier.

The results show that the probability of a woman surviving from age 25 to age 45, that is having already survived to age 25, was 0.9409; and the survival probability from age 25 to age 50 was 0.9225. The life expectancies corresponding to the survival probabilities in the last column are given in the second panel. A woman who has survived to age 20 is on average expected to live another 53.4 years. The estimated life expectancy at age 20 was about 51-53 years, suggesting a rather constant female adult mortality between 1976 and 1982. The estimated expectation of life at birth based on the survival of mother for the period 1976 and 1982 was 63.5 to 68.7 years.

Analysis of the father's survival data produced an expectation of life for males at age 20 of 48 years and a corresponding expectation of life at birth of 59 years for 1983. The estimates of adult mortality clearly show of a substantially higher male than female adult mortality; adult females on average living about five years longer than their male counterparts.

Table 11. Estimates of female adult mortality

Age Group of Respondent	Proportion with Mother alive	Age x	Probability of surviving from age 25 to age x
15-19	0.9354	45	0.9409
20-24	0.9090	50	0.9225
25-29	0.8586	55	0.8833
30-34	0.7788	60	0.8169
35-39	0.6884	65	0.7400
40-44	0.5247	70	0.5758
45-49	0.4107	75	0.4521

	Reference date	Life expectancy at age 20	Life expectancy at birth
15-19	Oct 1982	53.4	67.8
20-24	Dec 1980	53.8	68.7
25-29	Jan 1979	53.2	67.5
30-34	Dec 1977	51.7	64.5
35-39	May 1976	51.2	63.5
40-44	Apr 1976	48.5	57.5

Fitting of an appropriate mortality model to the age-sex specific death rates obtained from vital statistics was carried out using the Mortpak COMPAR procedure. The results of the fitting suggest that different mortality patterns may apply at childhood and at young and adult ages; the pattern of childhood mortality in Tuvalu seems to fit the Coale-Demeny, North family of model life tables, while the United Nations General, South Asian or Far East family of model life tables seem to describe better the pattern of adult mortality. However, owing to the small number of deaths or none at all at some young and adult ages, one can't put much faith on the fitted mortality models. As the death registration data for children under age 10 seem more reliable, the North mortality model which fits the childhood mortality pattern well, is assumed to describe the childhood as well as the overall mortality pattern of Tuvalu. Estimates of expectation of life at birth by sex derived from the North mortality model that fitted the registered age-specific-death rates are given as follows:

Expectation of life at birth - Males : 54.4 - 64.5 years
 Females : 71.8 - 72.0 years

The male figures show wide variation, because of high male infant deaths in 1991, the expectation of life based on infant death rate was lowest, 54.4 years. But the expectation of life at birth based on death rates for ages 1-5 and 5-10 was similar, 64.5 and 65.9 years respectively. Due to fluctuations in infant death rates, the male expectation of life of 54.4 years is substantially low while the female expectation of 72 years may also be on the high side.

The different estimates point that life expectancy at birth tend to be approximated by 64 years for males and by 70 years for females. The mortality gap between males and females, that is females living six years longer than males, is one-and a-half times more than the difference of 3.6 years allowed by the mortality models. However, these mortality levels by sex are considered acceptable as both the results from the vital statistics and from the proportions of children dead show a comparatively high male mortality, especially at infancy. It is also worth noting that the male infant mortality rate of 49 per 1000 live births is consistent with the level of mortality implied by the death rate for ages 65 years and over calculated from the death registration data.

Life Table construction

On the basis of male infant mortality of 49 deaths per 1000 live births and a female expectation of life at birth of 70 years, a Life Table reflecting the mortality condition of Tuvalu in 1990-91 is constructed using the UN Mortpak MATCH procedure. Table 12 displays the main functions of the constructed Life Table by sex. An explanation of what the functions mean is in order. The last column, e_x , gives the average number of years expected to be lived for a person who survived to age x . The expectation of life at birth, e_0 , says that a newly born girl expects to live for 70 years while a newly born boy expects to live for 64 years, if they experience at all ages the age-specific mortality rates prevailing in Tuvalu in 1990-91. A young woman who already survived to age 20 expects to live for another 54.4 years, while her male counterpart expects to live for another 50.6 years. The third column, ${}_nq_x$, gives the probability of dying between exact ages x and $x+n$ expressed per 1000. The probability of dying between birth and age 1, that is infant mortality rate, was 33 per 1000 live births for females and 49 per 1000 for males. The probability of dying between exact ages 1 and 5, ${}_4q_1$, was 14.2 per 1000 for females and 22.5 per 1000 for males. The ${}_nM_x$ values of a Life Table mean age-specific death rates, which are similar in meaning to age-specific death rates obtained from vital statistics or from survey or census data. The l_x values gives the number of survivors at exact ages out of an initial 100000 birth cohort. In the case of females, out of 100000 birth cohort, 95326 will survive to age 5 and only 39023 will live to reach age 80.

From the Life Table by sex, mortality measures for the total population were derived by weighting the results for each sex by sex ratio at birth of 107 males per 100 females: an infant mortality rate of 41 per 1000 and an expectation of life at birth of 67 years. The multiplication of the ${}_nM_x$ values by the distribution of the 1991 resident Tuvaluan population by age and sex groups resulted in a crude death rate of 9.5 for males, 8.1 for females and an overall rate of 8.8 per 1000 population.

This section on levels and patterns of mortality concludes by summarising the final estimates of mortality measures for Tuvalu. The rates are expressed per 1000 except for expectation of life at birth which is measured in years.

Summary estimates of final mortality measures: 1990-91

Measure	Male	Female	Total
Infant mortality rate, ${}_1q_0$	49.0	33.1	41.0
Child mortality, ${}_4q_1$	22.5	14.2	18.4
Under-five mortality, ${}_5q_0$	70.4	46.7	59.0
Expectation of life at birth	64.1	70.0	67.0
Crude death rate	9.5	8.1	8.8

Table 12. Life Table by sex: Tuvalu, 1990-91.

Age x	1000 ${}_nM_x$	1000 ${}_nq_x$	l_x	${}_nS_x$	e_x
Females					
0	34.02	33.06	100000	0.9610 ^a	70.0
1	3.57	14.15	96694	0.9888 ^b	71.4
5	1.25	6.25	95326	0.9946	68.4
10	0.90	4.51	94730	0.9947	63.8
15	1.27	6.34	94303	0.9925	59.1
20	1.73	8.61	93705	0.9907	54.4
25	2.00	9.97	92897	0.9895	49.9
30	2.23	11.07	91972	0.9882	45.4
35	2.59	12.87	90954	0.9850	40.9
40	3.52	17.46	89783	0.9807	36.4
45	4.36	21.58	88216	0.9737	31.9
50	6.46	31.79	86312	0.9632	27.6
55	8.73	42.75	83568	0.9463	23.4
60	13.94	67.49	79996	0.9132	19.3
65	23.24	110.21	74597	0.8585	15.6
70	39.18	179.28	66376	0.7736	12.1
75	65.76	283.66	54476	0.5323 ^c	9.2
80	145.91	-	39023	-	6.9
Males					
0	51.04	49.00	100000	0.9421 ^a	64.1
1	5.7	22.46	95100	0.9813 ^b	66.4
5	2.23	11.08	92964	0.9910	63.9
10	1.39	6.94	91934	0.9913	59.6
15	2.26	11.27	91295	0.9861	55.0
20	3.29	16.33	90267	0.9832	50.6
25	3.39	16.82	88792	0.9826	46.4
30	3.66	18.12	87299	0.9809	42.1
35	4.10	20.29	85717	0.9777	37.8
40	5.04	24.91	83978	0.9721	33.6
45	6.44	31.74	81887	0.9613	29.4
50	9.53	46.62	79288	0.9463	25.2
55	12.77	61.95	75592	0.9235	21.3
60	19.73	94.28	70909	0.8832	17.6
65	30.80	143.51	64223	0.8227	14.1
70	48.72	218.06	55007	0.7315	11.1
75	78.73	329.61	43012	0.5028 ^c	8.4
80	158.33	-	28835	-	6.3

a = Probability of surviving from birth to age group 0-4.

b = Probability of surviving from age group 0-4 to 5-9.

c = Survival probability from age group 75 years and over to 80 years and over.

Definitions

${}_nM_x$ = Death rate per 1000 in the age interval x to x+n.

${}_nq_x$ = Probability of dying between exact ages x and x+n.

l_x = Number of people surviving at exact age x out of an initial birth cohort of 100000.

${}_nS_x$ = Survivorship probability from one five-year age group to the next higher age group.

e_x = the average number of years remaining to be lived at age x. e_0 is expectation of life at birth.

Differential mortality

The foregoing analysis has shown substantial excess male mortality over females and mortality differences by age and sex. With respect to mortality differences by residence, Funafuti has lower infant mortality than outer islands. The infant mortality rate was 33 per 1000 in Funafuti compared to 44 in outer islands. The under-five mortality was 44 per 1000 in Funafuti compared to 64 in outer islands.

Analysis of mortality by various socio-economic characteristics is not attempted here due to the small number of observations when the data are tabulated by such characteristics. Bearing this limitation in mind, the census data indicate that there are differences in infant and childhood mortality by socio-economic characteristics and residence of mothers. The estimates in Table 13 show that women who work for wages or salary had lower infant and childhood mortality than homemakers, and that women with primary education experience higher infant and childhood mortality than those with secondary or tertiary education.

**Table 13. Estimates of infant and childhood mortality
by education and work status**

Category	Infant mortality	Childhood mortality ${}_4q_1$	Under-five mortality ${}_5q_0$
Work status			
Wage & salary	27	7	34
Homemaker	46	23	68
Education			
Primary	47	23	69
Secondary & tertiary	24	6	30
Total	41	18	59

Chapter Seven

Population Projections 1991-2026

A 35-year population projections time framework is undertaken to help, inform and chart short, medium and long-term development planning. National population projections provide the likely future population size and structure, demographic rates and trends, projections of sub-populations such as school age population, school enrolments, working age population and labour force. In addition, population projections are useful to point out the need for taking interventionist population policies and programs to bring down future population growth in line with planned social and economic development and also to effect population redistribution.

The base of the projections is the 1991 de jure population of Tuvalu. The population projections for Tuvalu were based on the cohort - component method of projection, whereby separate projections of fertility and mortality are made and applied to the base population by five-year age sex groups to obtain the projected population at the end of each five-year projection period. Three assumptions of fertility and one assumption of mortality were made, to describe the likely future courses of fertility and mortality. The combinations of the three fertility assumptions with the one moderate mortality decline assumption results in three projection variants. These are the high variant, a combination of constant fertility and moderate mortality decline; the medium variant, which is a combination of the moderate fertility and mortality decline, and the low variant, which is a combination of fast fertility decline with moderate mortality decline. The projections do not include assumptions about international migration for lack of data, though international migration is recognised to have a significant effect on the population of Tuvalu. However, the problem of international migration is circumvented by including in the base population those residents who were temporarily overseas as contract workers, seamen and students.

Base population age-sex structure

Population projections require a reliable base population classified by five-year age-sex groups. The 1991 age-sex structure of the base de jure population was obtained by adding the age-sex distribution of the residents temporarily overseas to the distribution of enumerated resident population by age and sex. The number and age-sex structure of the residents temporarily overseas was compiled for the purpose of this report by the Census Office. The age-sex structure of the base de jure population presented in Table 1 was adjusted for errors of age misreporting using a three point formula similar to that of the UN five point formula (UN Manual III).

**Table 1. Adjusted base de jure population
by five-year age-sex groups: 1991**

Age groups	Male	Female	Total
0-4	745	638	1383
5-9	605	527	1132
10-14	460	422	882
15-19	407	372	779
20-24	453	410	863
25-29	473	461	934
30-34	421	449	870
35-39	344	385	729
40-44	271	303	574
45-49	211	235	446
50-54	175	206	381
55-55	152	185	337
60-64	138	156	294
65-69	115	127	242
70-74	63	90	153
75 +	33	82	115
Total	5066	5048	10114

Fertility assumptions

Projections on fertility depends on assumptions regarding the likely courses of fertility as well as the pattern of childbearing. The data on the pattern of childbearing in 1991 resembles the late child-bearing pattern of low-fertility countries, as shown by comparisons with model fertility patterns given in Table 2. In Tuvalu, maximum fertility occurred among women aged 25-29 years where these women contributed 31 per cent of all births. As is shown in Table 2, the fertility contribution of women aged 20-24 was higher than that of women aged 30-34, and that women aged 30-34 and 35-39 had similar levels of fertility. Fertility among women aged 15-19 was low while that of women aged 45-49 was zero. The pattern of age-specific fertility pattern of Tuvalu is projected to reach the model late child-bearing pattern of the projection package 'People'.

**Table 2. Comparison of age-specific fertility pattern:
Tuvalu and model patterns**

Age Group	Percentage of total fertility rate			People Late
	Tuvalu	UN		
		Early	Late	
15-19	6	20	4	4
20-24	24	40	22	22
25-29	31	25	40	38
30-34	18	10	22	24
35-39	16	4	10	10
40-44	6	1	2	3
45-49	0		0	0
Total	100	100	100	100

Source: UN 1991: 90-91 and People : 80

The projection of fertility is made both on the basis of the likely future courses of total fertility rate and age-specific fertility rates. The analysis in this report shows that fertility rose since 1978, but in recent years it appears to have stabilised. It is possible for fertility to stabilise at its current level or decline in the future. Fertility decline depends on increasing use of contraception, expanded family planning coverage and government commitment to reduce population growth.

Currently, the contraceptive prevalence rate in Tuvalu is substantial. The family planning coverage of women of reproductive age in 1990 was 45 per cent. There has been fluctuations in contraception use between 1984 and 1989, but in general between 38 and 41 of women aged 15-49 years were covered by family planning (Central Statistics Division 1992: 5).

Three fertility assumptions are made. The first assumption is a continuation of the current fertility rates, that is fertility remaining constant throughout the projection period. The second and third assumptions are based on the premise that current fertility would decline and stabilise at replacement-level fertility in 20 years on the basis of a fast fertility decline and in 35 years on the basis of moderate decline. A replacement-level fertility is defined as the fertility level that produces a net reproduction rate of one when it is combined with the lowest mortality pattern assumed possible in the projection period. A net reproduction rate of one means that a cohort of newly born girls will be exactly replacing themselves a generation later. According to the lowest projected level of mortality and a sex ratio of 107 males per 100 females, a total fertility rate of 2.1 in Tuvalu would produce a net reproduction rate of one. The second fertility assumption, which is the medium variant, assumes a substantial reduction of total fertility rate from 3.4 children per woman in 1991 to 2.1 children in 2026, that is a 38 per cent decline in fertility in 35 years. The third assumption incorporates a fast decline, where total fertility rate declines from 3.4 children per woman in 1991 to 2.1 children per woman in 2011. However, if the second and third fertility assumptions are to be realised, the current contraceptive use among married and non-married women aged 15-44 years should be greatly increased to achieve a two-child family norm among couples.

Table 3. Projection of total fertility rate by variant

Projection Period	Total fertility rate		
	High	Medium	Low
1991-1996	3.43	3.30	3.25
1996-2001	3.43	3.06	2.93
2001-2006	3.43	2.85	2.65
2006-2011	3.43	2.65	2.20
2011-2016	3.43	2.47	2.10
2016-2021	3.43	2.31	2.10
2021-2026	3.43	2.17	2.10

Mortality assumption

Dr Tiliga Pulusi (pers. comm.) sums up the health status of the population as follows: the people of Tuvalu are enjoying good health, the population is small, health service is good, all births take place in clinics and the medical personnel is more than needed. Indeed, as of 1990, there were one senior and three medical officers, 36 nurses, nine each MCH and sanitation aides in Tuvalu. However, if further improvements in the health status of the population are to be achieved the comparatively high infant mortality and still births need to be reduced. The analysis in this report has shown that infant mortality was relatively high. The number of still births, perinatal deaths and neonatal deaths per 1000 live births were 75.3 in 1987 and 45.1 in 1989. The corresponding infant mortality was 14.3 per 1000 live births in 1987 and 11.3 in 1989. Thus, there is high pregnancy wastage. There is a

need for more expanded and improved prenatal and postnatal care to reduce foetal and infant deaths.

Thus, on the assumption that more health efforts will be made to improve the survival chances of infants and of the whole population, an assumption of moderate mortality decline in Tuvalu is made. The assumed improvements in expectation of life at birth follows the UN model of moderate mortality decline (UN 1989: 16). Table 4 presents projected expectation of life at birth by sex.

Table 4. Projection of mortality by sex based on expectation of life at birth

Projection period	Male	Female	Total
1991-1996	65.1	70.7	67.8
1996-2001	66.6	72.2	69.3
2001-2006	68.1	73.7	70.8
2006-2011	69.3	74.9	72.0
2011-2016	70.5	75.9	73.1
2016-2021	71.5	76.9	74.1
2021-2026	72.5	77.9	75.1

Population projection results

Three projection variants were carried out based on the combinations of three fertility assumptions with one mortality assumption. These are the high, medium and low projection variants. The high variant gives the maximum future population, the low variant gives the minimum population. The most likely projection is the medium variant and thus the projection results from the medium variant should be used for planning purposes. However, for purposes of illustrating of what would happen if fertility continues at its current level or declines fast, comparisons of projection results by variants are displayed in Tables 5 to 11 and are discussed in the following subsections.

Population size

The population of Tuvalu would grow from 10,114 people in 1991 to 18,774 in 2026 according to the high variant, to 15,938 according to the medium variant, and to 15,176 according to the low variant (Table 5). In 35 years from now, the population of Tuvalu would grow by 180 per cent on the basis of the high variant and by 150 per cent on the basis of the low variant. The variants show that the population of Tuvalu in 2026 would be at least one-and half times larger than its current size.

Table 5. Projection of total de jure population and indices of population growth by variant

Year	Population			Growth indices 1991 = 100		
	High	Medium	Low	High	Medium	Low
1991	10,114	10,114	10,114	100	100	100
1996	11,169	11,119	11,100	110	110	110
2001	12,182	11,982	11,910	120	118	118
2006	13,218	12,767	12,610	131	126	125
2011	14,374	13,560	13,191	142	134	130
2016	15,704	14,395	13,834	155	142	137
2021	17,186	15,217	14,527	170	150	144
2026	18,774	15,938	15,176	186	158	150

Future vital rates

The projected vital rates by variant and projection period are summarised in Table 6. The crude birth rate under the high variant would slightly fluctuate around 24 births per 1000 population. On the other hand, the crude birth rate would decline from 26 per 1000 in 1991-96 to about 16.0 per 1000 in 2021-2026 under both the medium and low variants. The crude death rate appears to slightly decline from 7 deaths per 1000 and then increase slightly from 2016 onward under the medium and low variants. The slight increase in the crude death rate is due to the effects of the increasing ageing population on mortality. The crude rate of natural increase under the high variant would remain high through out the projection period, varying between 1.6 and 2.0 per cent per annum. In contrast, in both the medium and low variants, the crude rate of natural increase would decline to low levels from 1.9 per cent per annum in 1991-96 to 0.9 per cent per annum in 2021-2026.

Table 6. Summary of projected vital rates by variant and projection period

Vital rate / Variant	Projection period						
	1991-1996	1996-2001	2001-2006	2006-2011	2011-2016	2016-2021	2021-2026
CBR							
High	26.8	24.2	23.1	23.5	24.3	24.6	24.2
Medium	25.9	21.8	19.5	18.9	18.9	18.1	16.5
Low	25.6	20.9	18.3	15.9	16.6	17.1	16.3
CDR							
High	7.0	6.9	6.8	6.7	6.7	6.6	6.5
Medium	7.0	6.9	6.8	6.9	6.9	7.0	7.2
Low	7.0	6.9	6.8	6.9	7.1	7.3	7.6
CRNI							
High	2.0	1.7	1.6	1.7	1.8	1.8	1.8
Medium	1.9	1.5	1.3	1.2	1.2	1.1	0.9
Low	1.9	1.4	1.1	0.9	1.0	1.0	0.9

Note: CBR means crude birth rate per 1000 population; CDR means crude death rate per 1000 population, and CRNI means annual crude rate of natural increase in per cent.

Population change by functional age groups

The projected population by functional age groups: children under 15 years, working age populations classified into 15-49 and 50-64 years, and old age persons aged 65 years and over, are displayed in Table 7a. The indices of growth for each of these functional age groups computed by taking their base 1991 population equal to 100 are presented in Table 7b.

It is seen from Table 7a that the number of children under 15 years grew rapidly from 3,397 in 1991 to 5,883 in 2026 under the high variant, while it increased moderately to 3,853 under the medium variant. In contrast, under the low variant after a period of initial gradual increase, the number of children would not grow. While the number of children under the medium and low variants showed small growth or even declined, the increases in the number of the rest of the age groups, especially those aged 50-64 and 65 years and over, were very rapid. In the 35 year projection period, the number of persons aged 15-49 years increased by 170 per cent under the high variant, by 154 per cent under the medium variant and by 147 per cent under the low variant. The population aged 50-64 years increased by 226 per cent and those aged 65 years and over by 352 per cent under all variants. Note that the assumptions of fertility decline have effects only on the young age groups, under 15 years and 15-49 years; as all those who attained or would attain the age of 50 years and over during the projection period were at least aged 15 years in 1991 and thus their number could not be affected by fertility reduction.

Table 7a. Projected population by broad age-groups

Variant /Year	Number of persons by age group				Total
	< 15	15-49	50-64	65+	
High					
1991	3397	5195	1012	510	10114
1996	3854	5557	1113	646	11169
2001	4069	6048	1303	761	12182
2006	4119	6634	1601	865	13218
2011	4336	7086	1966	986	14374
2016	4764	7490	2271	1178	15704
2021	5324	8033	2374	1455	17186
2026	5883	8814	2283	1793	18774
Medium					
1991	3397	5195	1012	510	10114
1996	3804	5557	1113	646	11119
2001	3870	6048	1303	761	11982
2006	3667	6634	1601	865	12767
2011	3571	7037	1966	986	13560
2016	3652	7294	2271	1178	14395
2021	3800	7588	2374	1455	15217
2026	3853	8009	2283	1793	15938
Low					
1991	3397	5195	1012	510	10114
1996	3785	5557	1113	646	11100
2001	3798	6048	1303	761	11910
2006	3511	6634	1601	865	12610
2011	3221	7018	1966	986	13191
2016	3162	7222	2271	1178	13834
2021	3265	7433	2374	1455	14527
2026	3456	7644	2283	1793	15176

Table 7b. Indices of population growth by variant, year and age group: 1991 = 100

Variant / Year	Indices of population growth, 1991 = 100				Total
	< 15	15-49	50-64	65 +	
High					
1991	100	100	100	100	100
1996	113	107	110	127	110
2001	120	116	129	149	120
2006	121	128	158	170	131
2011	128	136	194	193	142
2016	140	144	224	231	155
2021	157	155	235	285	170
2026	173	170	226	352	186
Medium					
1991	100	100	100	100	100
1996	112	107	110	127	110
2001	114	116	129	149	118
2006	108	128	158	170	126
2011	105	135	194	193	134
2016	108	140	224	231	142
2021	112	146	235	285	150
2026	113	154	226	352	158
Low					
1991	100	100	100	100	100
1996	111	107	110	127	110
2001	112	116	129	149	118
2006	103	128	158	170	125
2011	95	135	194	193	130
2016	93	139	224	231	137
2021	96	143	235	285	144
2026	102	147	226	352	150

Age Structure

The population of Tuvalu would undergo substantial changes in its age structure if either the medium or the low variant projections materialise. The percentage distribution of the projected age structure by variant is presented in Table 8. The distribution of the projected population by single and five year age-sex groups for the medium variant are given in the Appendix. The results in Table 8 give a clear picture of the effects of fertility and mortality reduction on age structure. The main results of Table 8 are the rapid decline of the share of children under both the medium and low variants, counteracted by rising proportions of persons over 15 years, particularly those aged 65 years and over. In the medium variant scenario, the proportion of total population that are children would sharply decline from 34 per cent in 1991 to 24 per cent in 2026, while the share of the working age population would increase from 61.4 per cent in 1991 to 68.6 per cent in 2016 and then decline to 65.4 per cent in 2026. The proportion of the old population more than doubled from 5.0 per cent in 1991 to 11.8 per cent in 2026. In line with the ageing of the population, the median age of the population increased from 25 years in 1991 to 32 years in 2026 under the medium variant and to 34 years under the low variant. The median age is the age whereby 50 per cent of the population are aged below it and the

remaining 50 per cent are aged above it.

Table 8. Projected age structure and median age by variant and year

Variant /Year	Percentage distribution			Median age
	< 15	15-64	65 +	
High				
1991	33.6	61.4	5.0	25.1
1996	34.5	59.7	5.8	25.5
2001	33.4	60.4	6.2	25.2
2006	31.2	62.3	6.5	25.2
2011	30.2	62.9	6.9	25.8
2016	30.3	62.2	7.5	26.6
2021	31.0	60.5	8.5	27.0
2026	31.3	59.1	9.5	27.1
Medium				
1991	33.6	61.4	5.0	25.1
1996	34.2	60.0	5.8	25.6
2001	32.3	61.3	6.4	25.9
2006	28.7	64.5	6.8	26.5
2011	26.3	66.4	7.3	27.6
2016	25.4	66.4	8.2	29.0
2021	25.0	65.4	9.6	30.7
2026	24.2	64.6	11.2	32.3
Low				
1991	33.6	61.4	5.0	25.1
1996	34.1	60.1	5.8	25.7
2001	31.9	61.7	6.4	26.1
2006	27.8	65.3	6.9	26.9
2011	24.4	68.1	7.5	28.5
2016	22.9	68.6	8.5	30.1
2021	22.5	67.5	10.0	32.0
2026	22.8	65.4	11.8	33.8

Projected dependency ratios

The projected number of total and old age dependants to be supported by 100 persons of working age are set out in Table 9. Total dependency ratio is defined as the ratio of number of children under 15 years plus old persons aged 65 years and over per 100 persons aged 15-64 years. As is seen in Table 9 the high variant shows an increasing dependency ratio while both the medium and low variants reflect a declining dependency burden. The results clearly reflect a reduction of dependency burden, especially childhood, under declining fertility. While there is a general declining trend of dependency ratios under both the medium and low variants, there would be a rapid increase in old age dependency burden due to the ageing of the population. For instance, under the medium variant the number of old age dependants would grow from 8 persons per 100 working age persons in 1991 to 17 in 2026.

Table 9. Projected dependency ratios: 1991-2026

Year	Dependants per 100 persons aged 15-64 years					
	Total			65 years & over		
	High	Medium	Low	High	Medium	Low
1991	62.9	62.9	62.9	8.2	8.2	8.2
1996	67.5	66.7	66.4	9.7	9.7	9.7
2001	65.7	63.0	62.0	10.3	10.3	10.3
2006	60.5	55.0	53.1	10.5	10.5	10.5
2011	58.8	50.6	46.8	10.9	11.0	11.0
2016	60.9	50.5	45.7	12.1	12.3	12.4
2021	65.1	52.8	48.1	14.0	14.6	14.8
2026	69.2	54.9	52.9	16.2	17.4	18.1

*= Total dependency ratio is the ratio of number of children under 15 years plus the number of persons 65 years and over per 100 persons aged 15-64 years.

Projection of school age population

There is a restructured educational system in Tuvalu which is put into effect since 1992. The restructuring encompasses primary education to take eight years by including Forms 1 and 2 to Classes 1 to 6; Junior secondary schools to comprise Forms 3 and 4; and senior secondary schools to consist of senior secondary academic (Forms 5 and 6) and vocational/maritime technical schools.

For purposes of educational planning, projections of school aged population are made and presented here on the following age categories: children aged 6-13 years as primary school age population, children aged 14-15 years as junior school age population and persons age 16-19 years as senior secondary school age population.

If current fertility rates continue, the ever-growing school age population would place heavy demands on educational resources even to maintain the current status quo. According to the high variant, the primary school age population would increase markedly from 1,603 in 1991 to 3,000 by 2026, the junior secondary school age population would increase from 320 to 668, and the senior secondary population would grow from 623 to 1,229 over the same period. The educational needs of these massive increases of the school age population are hard to meet. On the other hand, the increase in the school age population would be much slower under the medium and low variants, especially the latter. Under the medium variant, the primary school age population would grow from 1,603 in 1991 to 2,081 in 2026, representing an increase of 30 per cent over the 35 year period. The corresponding increases for the junior and senior secondary school age population were 55 and 53 per cent, respectively. Of course, it is clear from the projections that meeting the educational needs and school resources of the school age population would be much easier under the low variant.

Table 10. Projection of school age population

Variant /Year	Primary school (6-13)	Junior secondary school (14-15)	Senior secondary school (16-19)
High			
1991	1603	320	623
1996	2003	396	683
2001	2182	505	872
2006	2154	546	1075
2011	2203	535	1072
2016	2376	545	1070
2021	2672	590	1117
2026	3000	668	1229
Medium			
1991	1603	320	623
1996	2006	396	683
2001	2151	507	872
2006	1996	540	1080
2011	1878	498	1040
2016	1884	466	961
2021	1988	468	921
2026	2081	497	951
Low			
1991	1603	320	623
1996	2006	396	683
2001	2136	508	872
2006	1939	538	1080
2011	1773	484	1028
2016	1652	443	917
2021	1655	407	866
2026	1822	409	788

Projection of labour force

Projection of labour force are undertaken by multiplying age-sex specific labour force participation rates by the projected working age population in corresponding age-sex groups at the end of each projection period. In the case of Tuvalu, the age-sex specific labour force participation rates based on the current activity status of the 1991 Census are assumed to remain constant through out the projection period. There are a number of caveats to go with this assumption. First, the 1991 labour force activity rates are very high, and for such high rates to continue into the future there should be full employment, especially in the cash sector of the economy. Second, almost all the labour force in 1991 consisted of employed persons, as there were a few reported unemployed persons. However, with the ever-growing labour force, the number of unemployed people are expected to substantially increase. Third, changes in labour force participation rates would certainly occur either due to changing economic conditions and employment opportunities or due to the effect of changing demographic processes, particularly external migration.

Bearing these caveats in mind, the projection of Tuvaluan labour force by variant is carried out by multiplying the constant age-sex specific labour force participation rates by the projected working age population. Table 11 displays, the total working age population and labour force aged 15-64 years

by the end of each five-year projection period and variant.

Table 11. Projected total working age population and labour force by year and variant

Variant /Year	Working age population			Labour force		
	High	Medium	Low	High	Medium	Low
1991	6207	6207	6207	5498	5498	5498
1996	6670	6670	6670	5900	5900	5900
2001	7354	7354	7354	6455	6455	6455
2006	8236	8236	8236	7184	7184	7184
2011	9055	9006	8986	7921	7890	7876
2016	9761	9565	9493	8562	8424	8372
2021	10409	9963	9809	9135	8798	8680
2026	11101	10296	9931	9738	9101	8824

There are no differences in the number of working age population as well as the size of the labour force by variant in the 15-year projection period from 1991 to 2006. The reason is that the effect of fertility decline on the size of the labour force is a long term one, as smaller birth cohorts resulting from fertility decline take 15 to 20 years to enter the labour force. If the medium variant projection holds, there would be 10,296 persons of working age in 2026 instead of 11,101 under the high variant projection. The size of the labour force in 2026 under the medium variant would be 6.5 per cent smaller than that obtained under the high variant. Still this difference is small, but if the medium or low variant assumptions continue to hold for a long time, there would be substantial reductions in the size of the labour force than would otherwise be obtained under the high variant.

The size of the labour force under the medium variant would grow from 5,498 persons in 1991 to 9,101 in 2026 or an increase of 66 percent. As the medium variant is the most likely projection, the five-year age-sex structure of the labour force for the medium variant is displayed in Table 12. Under the medium variant, the male labour force would grow from 2,678 in 1991 to 4,647 in 2026, a growth of 74 per cent in 35 years. In the same period, the female labour force would grow from 2,820 to 4,453, representing an increase of 58 per cent.

Cash sector employment

About one-third of the labour force in Tuvalu is employed in the cash sector, mainly in the public sector, and the majority in the traditional subsistence sector and in housework. To assess the magnitude of future cash sector employment, projection of the labour by cash versus non-cash sector is carried out for each sex separately. The 1991 census results of the division of the labour force into cash sector and subsistence and housework sectors is assumed to remain constant throughout the projection.

Sector	% Share of labour force by sex: 1991		
	Male	Female	Total
Cash	46.0	22.0	33.0
Subsistence & housework	54.0	78.0	67.0

The projection of the labour force into cash and non-cash sector employment according to the medium variant is presented in Table 13. Cash sector employment are projected to grow from 1,232 in 1991 to 2,138 in 2026 for males, and from 620 to 980 for females. The projected cash sector employment represents a 74 per cent increase for males and 58 per cent for females. To raise the income levels and living standards of the population, an even greater proportion of the labour force needs to be engaged in the cash sector more than is assumed in this projection. Nevertheless, meeting even the projected cash sector employment is going to be difficult unless substantial employment creating programs are developed and put into effect in the formal and informal sectors of the economy.

Table 12. Projected labour force by five-year age-sex groups: Medium variant

Age	1991	1996	2001	2006	2011	2016	2021	2026
Projected total labour force								
15-19	493	554	707	854	818	755	731	759
20-24	779	696	785	1001	1210	1161	1074	1039
25-29	882	806	721	812	1040	1257	1204	1117
30-34	820	869	794	712	804	1029	1246	1195
35-39	689	810	861	788	708	800	1026	1242
40-44	545	681	803	853	782	703	795	1022
45-49	410	516	646	763	812	745	671	760
50-54	354	401	507	635	751	799	733	662
55-59	289	313	356	451	566	672	718	662
60-64	236	254	276	315	400	504	600	643
Total	5498	5901	6455	7184	7890	8424	8798	9101
Projected male labour force								
15-19	252	283	370	448	408	378	366	380
20-24	393	349	391	512	621	565	524	508
25-29	450	424	377	423	554	673	614	571
30-34	397	438	414	369	415	544	662	604
35-39	328	394	437	413	368	415	545	663
40-44	262	326	392	435	412	367	414	545
45-49	194	243	303	366	406	385	344	389
50-54	158	183	230	286	347	385	366	329
55-59	133	145	168	212	265	322	360	343
60-64	112	114	125	147	185	232	282	316
Total	2678	2898	3206	3610	3981	4266	4477	4647
Projected female labour force								
15-19	240	271	338	406	410	378	365	379
20-24	386	348	394	490	589	595	550	531
25-29	432	382	344	389	486	583	590	546
30-34	423	430	380	343	389	485	584	591
35-39	361	416	424	375	340	385	481	579
40-44	283	355	410	418	370	336	381	477
45-49	216	273	343	397	406	360	326	371
50-54	196	218	277	349	404	414	367	334
55-59	157	168	188	239	300	349	359	319
60-64	125	140	151	169	216	272	318	328
Total	2820	3002	3249	3574	3909	4158	4321	4453

Table 13. Projected labour force by cash and non-cash sector employment and sex

Year	Cash employment			Non-cash employment		
	Male	Female	Total	Male	Female	Total
1991	1232	620	1852	1446	2200	3646
1996	1333	660	1993	1565	2342	3907
2001	1475	715	2190	1731	2534	4265
2006	1661	786	2447	1949	2788	4737
2011	1831	860	2691	2150	3049	5199
2016	1962	915	2877	2304	3243	5547
2021	2059	951	3010	2418	3370	5788
2026	2138	980	3118	2509	3473	5982

Note: The 1852 persons employed in the cash sector for the base projection are higher than the Census figure of 1495. The figure of 1852 is arrived by assuming that the proportion of the total de jure labour force that is employed in the cash sector is the same as the resident labour force. This figure of 1,852 could be on the lower side as it includes the seamen, contract workers in Nauru and New Zealand.

Implications of demographic trends

The analysis in this report has shown that Tuvalu has moderate levels of fertility and relatively low mortality resulting in a high rate of natural increase. The estimates of the level of fertility from the 1991 census were a crude birth rate of 30 births per 1000 population per year and a total fertility rate of 3.4 children per woman. The final estimates of the level of mortality were a crude death rate of 9.0 per 1000, an infant mortality rate of 41 infant deaths per 1000 live births and an expectation of life of 67 years. The population has been growing fast by natural process, that is the difference between births and deaths, at a rate of 2.0 per cent per annum. The analysis undertaken has shown not only that population growth has been rapid, but also the population distribution is highly uneven. There has been massive shifts in population concentration towards Funafuti so much so that Funafuti was home to 36 per cent of the population in 1991, and that 43 per cent of the de facto population were enumerated in Funafuti. Although the analysis found a very high labour force participation, employment in the cash sector was limited as it comprised only one-third of the total employment.

What are the implications of the population projection results against these background. The three projection variants showed that Tuvalu would have a large population in 2026 irrespective of variant. However, the consequences of the continuation of the current fertility level would be huge. The population would continue to grow at a high rate of natural increase of between 1.6 and 2.0 per cent per annum. The high variant projection shows a large population of 18,774 by 2026 that is about two times higher than the current population, a school age population about two times larger than the base figure, and a labour force that is 77 per cent larger. The consequences of such large population growth in 35 years from now for meeting the food, employment, education, housing and health needs of the population are enormous. Even with radical structural economic changes to meet the challenge, such huge population increase would adversely affect living and housing conditions, especially in Funafuti, would threaten the principle of universal primary education and seriously aggravate employment problems. However, if the low variant projection materialises, many of the demographic, social and economic consequences of rapid population growth would be reduced. However, the reduction in the size of the labour force would be moderate, as the effect of fertility is long term. In the next 35 years, the labour force of Tuvalu would increase by 77 per cent under the high variant, by 66 per cent under the medium variant and by 60 per cent under the low variant.

The Government need to develop an urbanisation policy, particularly for Funafuti, with respect to limiting the maximum population of Funafuti and development and implementation of population redistribution program. The population of Funafuti would continue to grow rapidly due to high rate of natural increase, in-migration from outer islands and immigration. If we make a very conservative assumption that Funafuti would accommodate 36 per cent of the population of the country in 2026 as it did in 1991; the population of Funafuti would be 5,463 according to the low variant, 5,738 according to the medium variant and 6,759 according to the high variant. This would result in a very high population density of between 2,000 and 2,500 persons per square kilometre. Unless planning is done in time, the population and density of Funafuti would be considerably much higher than this resulting in severe overcrowding of housing and urban space, poor infrastructure and high unemployment.

One option to moderate the projected high population growth is through emigration. But this does not look a likely option, as developed economies tighten their immigration laws. The possible option is reduction of population growth through family limitation. Tuvalu cannot afford to support a fast growing population in terms of meeting food, education, health, employment, land and housing requirements of the population. Tuvalu needs to strengthen and greatly expand its family planning program so as to cover most couples and single women in order to achieve a substantial fertility reduction. Tuvalu needs to develop and implement a comprehensive population policy that encompasses fertility reduction, population redistribution as well as urban development policy for Funafuti.

In order to measure and monitor changes in fertility levels, efforts should be made to hold the regular censuses at exactly five years apart so that estimation methods developed for measuring intercensal fertility change could be applied. Tuvalu has a complete and reliable vital registration system. In order to evaluate and monitor demographic trends, it is recommended that the Health Department keeps up its good record of complete vital registration and to make a timely compilation of vital statistics.

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