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KIRIBATI 2010 CENSUS
Volume 2: Analytical Report

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and the SPC Statistics for Development Programme,
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Preface

This ‘Kiribati 2010 census analytical report’ contains analyses of data collected during the 2010 Population and Housing Census. The purpose of the report is to summarise the census results in order to provide planners, policy-makers, researchers and other census users with updated and accurate demographic and socioeconomic statistical information regarding Kiribati’s population at the time of the 2010 census. This report is the second output from the Kiribati 2010 Population and Housing Census, and is known as Volume 2 (Volume 1 contains the basic census tables only).

The main analyses presented in Chapters 2 through 6 examine Kiribati’s population size and growth, population distribution and composition, urbanisation, age and gender composition, and the three known population processes — fertility, mortality and migration. The social characteristics of the population are discussed in Chapter 7, Chapter 8 summarises some of Kiribati’s housing characteristics and conditions while Chapter 9 covers Kiribati population projections for the 20 year periods of 2010 to 2030.

The analysis in each chapter focuses on responses to questions from the 2010 Population and Housing Census questionnaire; and where possible, the data are compared with previous census results — especially the most recent 2005 census — to explore the way in which Kiribati’s population characteristics have changed over the intercensal period. Summary results include all of Kiribati, the urban area (South Tarawa only), and rural areas (comprising 21 outer islands). However, the urbanisation analysis includes Kiritimati Island as another urban area in order to examine and determine the more accurate level and tempo of urbanisation in Kiribati.

The Kiribati National Statistics Office will later produce an Island Profile Report for each island. The Island Profile Reports will contain descriptive analyses of the demographic, socioeconomic, household characteristics and housing conditions of each island’s population.

The 2010 census data provide a rich information base that can be used to produce other demographic, social and economic analyses that are not contained in this report but which are critical for the development of Kiribati. Hence, all census users and researchers are encouraged to make further contributions to theses analyses. Those who are willing to undertake further analysis can address their request to the Kiribati National Statistics Office. All census data users are requested to contact the Kiribati National Statistics Office in Bairiki, Tarawa for other census data requirements that have not been addressed in this report.

Tekena Tiroa
Republic Statistician
Republic of Kiribati
July 2012

Acknowledgements

A traditional census — such as this Kiribati 2010 Population and Housing Census — is among the most complex and massive peacetime exercises a nation can undertake. It requires mapping the entire country, mobilising and training many enumerators, conducting a massive public awareness campaign, canvassing all households, collecting individual information, compiling vast amounts of completed questionnaires, and analysing and disseminating the data.

The successful completion of the Kiribati 2010 Population and Housing Census exercise is the result of a collective effort and support from various agencies, institutions and individuals, including the Kiribati government, donor partners, regional bodies and individual Kiribati citizens who have all contributed in one way or another to make this census a success.

The Kiribati National Statistics Office is grateful to and acknowledges the continued funding support from its two donor partners — the United Nations Population Fund (UNFPA) and the Australian Agency for International Development (AusAID).

The continued technical assistance from the Secretariat of the Pacific Community (SPC) throughout the different census phases is also fully acknowledged. Many thanks go to Dr Gerald Haberkorn, Programme Manager for SPC's Statistics for Development Programme, and his census team for their tireless technical assistance and support, from the planning stage to the production of this report. The Kiribati National Statistics Office has greatly benefitted from the technical expertise and assistance received from SPC during the entire 2010 Population and Housing Census exercise. Support included assistance from:

- Mr Peter Gardener, Census Technical Advisor, who was contracted by SPC on a short-term basis (four weeks) to assist the Kiribati Census Commissioner during the initial stages of the census;
- Mr Scott Pontifex and Mr Phil Bright (both GIS specialist) in the form of technical expertise in the areas of census cartography, GPS training, and the production of the Kiribati 2010 census mapping for enumeration;
- Mr Pierre Wong (Data Processing Specialist) and Ms Leilua Taulealo (Data Processing officer) in setting up the data processing system, training Kiribati National Statistics Office staff in data processing procedures and undertaking census data editing and tabulation of census tables;
- Mr Arthur Jorari (Demographer) and Ms Kaobari Matikarai (DHS Technical Officer) in census planning (census work plan and budget), training of census fieldworkers, and drafting this analytical report;
- Ms Jenny Tonganibeia, the Census Commissioner attached and worked with SPC staff in drafting some of the chapters in this report;
- Dr Gerald Haberkorn (Programme Manager) and Mr Arthur Jorari for their valuable time in reviewing different chapters of this report;
- Mr Nicholas Turk and Ms Renee Sorchik (both Demographers) in reviewing the chapters;
- Ms Gladys Beccalossi and Ms Sandra Gianini (Programme Administrators) in administrative support and expertise in managing and expediting the census report compilation process; and
- SPC's Publication Section staff in editing, formatting, laying out and printing of this report.

In this regard, the Kiribati National Statistics Office wishes to extend its sincere gratitude and acknowledgement to SPC for all of its valuable technical expert and contributions throughout the entire census process.

I would also like to take this opportunity to thank all of the staff of the Kiribati National Statistics Office and the Kiribati census team led by Ms Jenny Tonganibeia (Kiribati Census Commissioner), Ms Aritita Tekaieti (Deputy Census Commissioner), Mr Tebukabane Toki and Ms Teimaro Boutu (both senior census officers) for their hard work and willingness to work extra hours behind the scene to ensure that the census operations proceeded accordingly. I also acknowledge the enormous work done by the census supervisors, enumerators, data operators and census clerical staff — without their dedication and commitment to their work, this census would not have been a success.

Last but not least, a very big *kam raba* to every individual in Kiribati who happily participated in the interview during the 2010 census undertaking for their support, understanding and patience in providing very valuable information that is been compiled, analysed and presented in this report.

Te mauri, te raoi ao te tabomoa

Tekena Tiroa
Republic Statistician
Kiribati National Statistics Office
July 2010

Summary of indicators

Indicators	2010		
	Total	Males	Females
Total enumerated population (November 2010)	**103,058**	**50,796**	**52,262**
Urban population (South Tarawa)	50,182	24,233	25,949
Percent urban (%)	49		
Urban growth rate (%)	4		
Urban population (South Tarawa and Kiritimati))	55,768		
Percent urban (%)	54		
Urban growth rate (%)	4		
Rate of growth (%) of total population, 2005-2010	2		
Rate of natural increase (CBR – CDR)	2		
Population density (number of persons per square km)			
Kiribati	142		
South Tarawa	3,184		
Median age (in years)	22	21	23
Per cent of population younger than 15 years of age	36	38	35
Per cent of population 15-24 years of age (youth)	21	21	20
Per cent of population 15-59 years of age	58	58	59
Per cent of population 60 years and older	5	5	6
Age dependency ratio	71		
Sex ratio	97		
Labor market activity	**39,034**	**21,186**	**17,848**
Employed population (number)	*27,096*	*15,333*	*11,763*
Paid cash workers	*19,593*	*10,762*	*8,831*
Formal employment	13,440	7,759	5,681
Producing goods for sale	6,153	3,003	3,150
Unpaid workers	*7,503*	*4,571*	*2,932*
Voluntary workers & family unapid business workers	3,493	2,242	1,251
Subsistence workers - producing good for own consumption	4,010	2,329	1,681
Unemployed (number)	11,938	5,853	6,085
Non-labor force	**26,840**	**10,547**	**16,293**
Students	5,377	2,561	2,816
Persons engaged in Home duties	9,738	2,771	6,967
Inactive persons	5,845	2,838	3,007
Retired persons	5,110	1,993	3,117
Disabled or sick persons	770	384	386
Labour force participation rate	59	67	52
Employment-population ratio	30	34	26
Unemployment rate (%)	31	28	34

Education			
School enrolment rates of 6-15 year olds (%)	90	86	92
Proportion of population 15 years and older with secondary	60	60	60
or higher education			
Proportion of total population with secondary or	31	31	32
tertiary qualification			
Proportion of population 15 years and older with no education	10	10	11
Proportion of population 15 years and older with primary education	30	31	30
Literacy rate (15+)	98	98	98
Internet use (15+)	15	15	15
Substance use, % (15+)			
Smoking tobacco	44	58	31
Acolhol consumption	22	40	6
Kava consumption	23	42	5
Fertility			
Number of births, 2010	3,125		
Crude Birth Rate (CBR), 2010	30		
Total Fertility Rate (TFR), 2009-2010			4
Teenage Fertility Rate, 2009-2010			49
Mean Age at Childbearing, 2010			29
Average age at first marriage (SMAM), 2010	23	24	22
Mortality			
Estimated Number of deaths, 2010	889		
Crude Death Rate (CDR), 2010	9		
Life expectancy at birth, (e0)	62	58	66
Infant Mortality Rate (IMR)	45	50	39
Child mortality Rate (1q5)	14	16	11
Under 5 mortality (q5)	59	66	50
Orphanhood			
Father's dead	36		
Mother's dead	25		
International Migration (2000-2010)	0		
Households			
Number of private households	16,043		
Number of persons in private households	99,960	49,182	50,778
Average household size	6		
Number of institutions (non-private households)	97		
Number of persons in institutions	3,908		
Households with Improved water and toilet access(%)			
Main source of drinking water			
Improved	64		
Not improved	36		
Main type of toilet facility			
Improved	49		
Not improved	51		

Executive Summary

The total population of Kiribati, as counted in the 2010 census, was **103,058**. This compares with 92,533 in 2005, and is an increase of 11.4% or 10,525 people. This increase in population represents **an average annual growth rate of 2.2%**. At this rate, Kiribati's population would reach just over 200,000 people in 32 years (in 2042). The total population consists of 52,262 females and 50,796 males, which converts to a sex ratio of 96 males per 100 females.

Kiribati's urban population (South Tarawa) accounted for 49% (50,182 people) of the total population, while the rural population accounted for 51% of the total population (52,876 people). South Tarawa has doubled its population since 1990, when the total population was about 25,000 people. Of the total rural population, 43,609 lived in the Gilbert Islands while another 9,267 resided in the Line and Phoenix Islands.

Teeraina and Butaritari islands gained more population, while several islands such as Makin, Kiritimati and Kanton islands experienced negative growth that resulted in a population decline on these islands.

Kiribati still has a young population with a **median age of 21.6 years compared with 20.7 years in 2005**. More than one-third (36% cent) of the population was younger than 15, and only 5% was 60 years and older.

The **age dependency ratio of 71** was calculated by using the 15–59 year old population as the 'working age population'. This means that for every 100 working age people, there were 71 people in the dependent ages.

The reported **number of births was estimated to be 2,964 births in 2010**, and the **total fertility rate**, the average number of births per woman, increased from 3.5 in 2005 to 3.8 in 2010. In comparison, Kiribati's Civil Registration office reported 2,305 births while 1,596 births were reported by Kiribati's Health Statistics office during the same periods.

The reported **number of deaths** among household members in 2010 based on the 2010 census was estimated to be **633 — 385 males and 248 females**. At the same time, Kiribati's Civil Registration office reported the total number of deaths to be 592 — 393 males and 199 females. Kiribati's Health Statistics office recorded much lower figures. The adjusted number of births was **889 deaths** in the 12 months prior the 2010 census.

Based on census data for the number of children ever born and still alive, the infant **mortality rate (IMR) was estimated to be 45**; 50 for males and 39 for females. This estimate is significantly less than it was in 1995 when IMR was estimated to be 67 for males and 56 for females. In 2005, IMR was estimated to be 53 for males and 51 for females.

Based on the combination of the estimated infant, childhood and adulthood mortality rates, **life expectancies at birth were estimated to be 58 for males and 66 for females.**

The estimated mortality indicators show more positive mortality indicators for females than for males, with females expected to live, on average, around eight years longer than males.

The calculated **maternal mortality rate** in 2010, based on the census, was estimated to be around **169 deaths per 100,000 total live births** as opposed to 125 deaths per 100,000 total live births reported from Kiribati's Health Statistics office. **Net international migration** was estimated to be very small during 2005 and 2010 and was considered insignificant. This could be attributed to the fact that the number of people leaving the country (out-migration) during 2005 and 2010 were almost equal the number of people moving in (in-migration).

The New Zealand migration scheme introduced in 2002, known as Pacific Access Category, provides an opportunity for about 75 I-Kiribati residents to migrate to New Zealand every year for the purpose of establishing permanent residence there. The scheme still exists and is commonly utilized and, therefore, might have captured some of the net outflows of people. In addition, education and work opportunities outside Kiribati also attracted I-Kiribati nationals to leave the country.

On the other hand, during the same periods, migrants from nearby island countries (e.g. Fiji) sought work opportunities in Kiribati in fields such as education and health. However, the figures for these migrants were unavailable.

Women marry at younger ages than men. The average **age at marriage in 2010 was estimated to be 24.0 for males and 21.5 for females** as compared with 24.6 for males and 22.2 for females in 2005.

Catholicism is the dominant religion in Kiribati, and about 56% of the total population is affiliated with the Roman Catholic Church. The Kiribati Protestant Church is the second largest (34%) followed by the Mormon Church (about 5%). The only other religions with more than 2,000 members were the Bahai and Seventh Day Adventist churches. All other religions had less than 1% of the population as members.

Males are more likely to smoke and drink alcohol and kava than females. This is based on census questions related to smoking, drinking alcohol and kava, which were asked of everyone aged 15 and over. **More than 40% of the population aged 20–44 were regular smokers**. At ages 45–59, more than half of this cohort was regular smokers. With regard to drinking alcohol, the result showed that **more than 40% of males in the 20–34 age group drank alcohol sometimes**, compared with less than 10% of females in almost all age groups. As with drinking kava, the data show that more **than 10% of males in the 20–54 age group regularly drank kava**.

The **literacy rate** in Kiribati is high, with **98% of the total population aged 10 and over able to read and write a short, simple sentence in Kiribati, English and other languages**. The literacy rate is higher in Kiribati's urban areas than rural areas (outer islands).

Based on the 2010 census, about 25,393 people aged 6 and over were attending school at the time of the census; 12,781 were males and 13,158 were females. About 7% never attended school. Additionally, the data also show that in 2010, about 28,066 people aged 5 and over were enrolled in school as compared with 28,467 in 2005.

About **4% of the school age population** (aged 5–15) **never attended school in 2010**, which was a decline from about **6%** in 2005.

Data on **educational attainment** confirm that educational levels have increased considerably since 1995. While only 27.1% of males and 20.6% of females had a secondary or higher education in 1995, this percentage increased to 51.6% for males and 49.5 for females in 2005, which has further increased in 2010 to 56.2% for males and 56.8% for females.

According to the 2010 census, 59.3% (**39,034**) of Kiribati's population aged 15 and over were **economically active** (employed or unemployed). The **employed population accounted for 69.4%** and the **unemployed population accounted for 30.6%**.

Of the employed population, **72.3% per cent were classified as paid workers,** whether in formal employment or producing goods for sale only. Another **27.7% were classified as unpaid workers,** those who were involved in voluntary and unpaid family work or producing goods for their own family consumption (subsistence or village work).

Paid workers by gender showed a reasonable balance in the number of males and females involved, particularly in the case of government employment which was made up of **55% males and 45% females.** However, there was a noticeable gender gap in the **private sector, which was made up of 60% males and 40% females.**

Among the unemployed, 97% were without work, looking for job, and available to work anytime a work opportunity should arise. The other 3% were without work, not looking for work, but would be available to start work should an opportunity arise. Data show that more females than males are in this type of arrangement – were without work and would be available to start work should an opportunity arise.

Kiribati's **labour force participation rate was 59.3%**, consisting of more males (66.8%) than females (52.3%). The urban and rural labour force participation rate consisted of 58.7 males and 59.8% females. In 2005, Kiribati's labour force participation rate was 63.4%.

The majority of employed paid workers were employed in the Wholesale, Retail Trade and Repair of Motor Vehicles category with 3,811 people (19.5% of the total number of employed paid workers). The second largest group was the Agriculture and Fisheries sector accounting for 3,047 people or 15.6%.

The **unemployment rate was 30.6%** of the total labour force. The level of unemployment for males was 27.6% and was 34.1% for females. In urban areas, the unemployment level was 35.5% compared with 25.7% in rural areas.

Nearly half of all women (48%) are not in the labour force category compared with 33% of men.

The average **population density in Kiribati was 142 people per square kilometer,** which was an increase from 116 in 2000 and 127 in 2005. This varies widely from island to island. While Kiritimati island only has 14 people per square kilometer, South Tarawa has 3,184 people per square kilometer.

The census counted **16,043 private households** with 99,960 household members, which translate to **6.2 people per household** on average. In South Tarawa, there are 7.3 people per household on average. A total of 97 institutions such as boarding schools, hotels and hospitals were also enumerated in the 2010 census.

About 70% of households lived in a one-family house detached from any other family house, while more than 2% of all households were living in a dwelling that shared a kitchen and toilet facilities with other families.

In Kiribati, 28.3% of houses were constructed from permanent materials, 48.9% were constructed from local materials, and 21.9% were constructed from both permanent and local materials.

Most dwellings or **houses were privately owned (80.5%)** meaning that the head or spouse or other household member owned the dwelling. Kiribati government-owned houses accounted for 18%, mostly located in the capital and urban South Tarawa. Private rented houses were reported to account for 1.7% of all houses.

The 2010 census data showed that six out of ten houses were built on land that belonged to the head of the household or spouse or other household member. In contrast, about 4% were built on lands that did not belong to the head of the household or other members, and there was no personal arrangement in effect and no private or government lease arrangement.

Based on the 2010 census, 5.6% of occupied dwellings or houses were newly built or constructed within the year. A little more than 10% of occupied dwellings were built in the last 30 years and another 7% in the last 40 years.

Safe drinking water was available to 63.8% of all occupied dwellings, which included drinking water sourced from rainwater, pipe, protected well water and bottle water. About 61% of all houses obtained their drinking water from an open and protected well.

An **improved toilet facility accessible to 48.7% of all dwelling units or houses**, including access to a flush toilet connected to a public sanitation system, or a flush toilet connected to a private own septic tank. Another **41.3% had access to non-improved toilet facilities** such as pit latrines, atolletes or *kamkamka*, and other types of toilet facilities.

The **most common method of waste disposal was a ground pit used by 35%** of all dwellings, followed by burning used by 21.9% of dwelling units. Rural dwellings mostly used a ground pit as a method of waste disposal while urban dwellings used roadside point and ground pit methods.

Wood and coconut shells were the most common cooking fuels used by 68.2% of all dwellings, followed by kerosene used by 28.6% of dwellings. Electricity and kerosene were the most common sources for lighting, with 88.7% of dwellings in urban areas using electricity compared with 53.0% of dwellings in rural areas using kerosene.

Bicycles were owned by 34.9% of all dwellings and motorbikes were owned by 21.2% of dwellings. Boats were owned by about 8.0% of households while 6.4% of all households owned cars. A small proportion of all dwellings owned buses (0.8%).

Radios and mobile phones were the two most common communication devices owned, with **43.0%** of all households **owning a radio,** and **29.9% owning a mobile phone**. Landline phones were owned by 8.4% of all households, and 4.3% of households had access to the Internet.

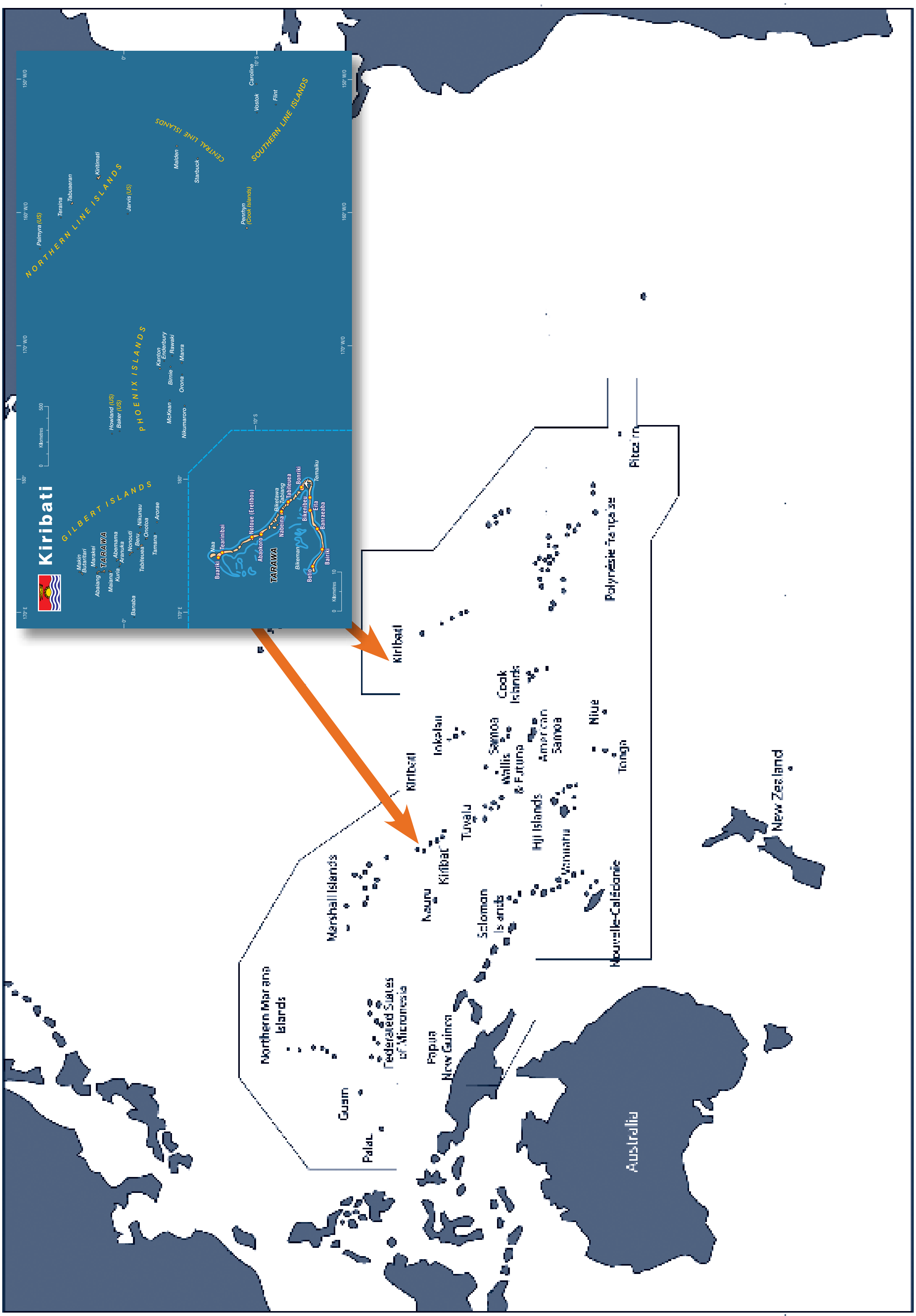
In terms of ownership of capital goods and items, the most common appliances owned were: a DVD deck (owned by 41.5% of households), a fridge or freezer (22.4%), gas stove (13.6%), manual water pump (11.9%) and a generator (11.6%). A cassette player was owned by 9.8% of households and an electric water pump was owned by 5.8%.

More than three-quarters **(78.5%) of all dwellings grew coconut,** followed by **breadfruit (65.4%)**, **pawpaw (60.3%)**, ***te kaina* (54.3%), coconut dwarf (50.7%) banana (43.3%)**, *te bero* (14.0%), *babai* (13.3%), cabbage (11.0%) and sweet potatoes (6.0%). About 26% of all dwelling grew other crops and more than half of all dwellings engaged in cutting toddy.

More than **half of all dwelling units** had household members **engaged in fishing** by collecting in the lagoon or on the reef, lagoon fishing or reef fishing and 35.5% of all dwellings were engaged in fishing on the reef flat or in the ocean.

Households receiving an income from wages accounted for 50.2% of all dwellings, with the majority of these dwellings located in urban areas. **Income from the sale of fish and crops** was the second highest, **accounting for 39.5%** of all dwellings and more common in rural areas. Income from seamen's remittances, land rent, other remittances and own business accounted for less than 20% of all dwellings, while only 2% received income from renting properties.

Map: Pacific region, Kiribati



Chapter 1: Introduction

1.1 Geography

Kiribati consists of three groups of 33 coral atolls: the Gilbert Islands, Phoenix Islands, Line Islands, and one isolated volcanic island, Banaba (or Ocean Island). The islands are spread over an area of 5 million km2 of the central Pacific Ocean and have a total land area of 810.5 km^2. Kiribati, which was previously administered by Britain, became independent on 12 July 1979. Tarawa, the capital and most populous island, is about 1,800 km north of Suva, Fiji.

1.2 Kiribati housing and population censuses

Population censuses in Kiribati have been conducted in 1963, 1968, 1973, 1978, 1985, 1990, 1995, 2000, 2005 and 2010. In 1990, the Kiribati National Statistics Office (KNSO) took full responsibility for conducting and administering censuses. Censuses in Kiribati closely follow the *de facto* census methodology, which enumerates people as to where they spent the census night.

1.3 Background of the 2010 census report

As with past censuses, the 2010 Kiribati census was the responsibility of KNSO. The compilation of this report was a joint effort between KNSO and the Statistics for Development Programme of the Secretariat of the Pacific Community (SPC). The Kiribati Census Commissioner, Jenny Tonganibeia, drafted some of the chapters of this report.

The main purpose of this report is to summarise and present the results of the 2010 census, covering all of the topics (questions) included in the census, and where possible, to also illustrate comparisons with earlier census results.

Census data users are requested to contact either KNSO or SPC's Statistics for Development Division for further information.

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Ministry of Finance and Economic Development PO Box 67 Bairiki, Tarawa Kiribati Telephone: +686 21816 Fax: +686 21307 Email: statistics@mfep.gov.ki	Secretariat of the Pacific Community BP D5, 98848 Noumea Cedex New Caledonia Telephone: +687 26 20 00 Fax: +687 26 38 18 Email: Stats&Demog@spc.int http://www.spc.int

Chapter 2: Population size, growth, distribution and composition

2.1 Introduction

Data regarding the size, composition and location of a country's population are critical statistics that enable governments to make informed decisions, plan and budget effectively, and monitor development progress. An understanding of population trends is essential in assessing probable future developments, and developing policies and plans to provide or improve access to services (health and education) and infrastructure (housing, water, sanitation, roads and transport). Such information is provided through periodic population and housing censuses, which have particular value if undertaken every five years (as is the case of Kiribati), as they then provide important insights into the country's population dynamics.

2.2 Total population size

The 2010 Kiribati census recorded a total population of 103,058, reflecting nearly a fourfold increase since the first Kiribati census in 1931, which reported 29,671 people (Fig. 2.1). Over the past five years, Kiribati's population has increased by 11,000 people. The current population is made up of 50,796 males and 52,262 females.

Figure 2.1: Population of Kiribati and South Tarawa, 1931–2010

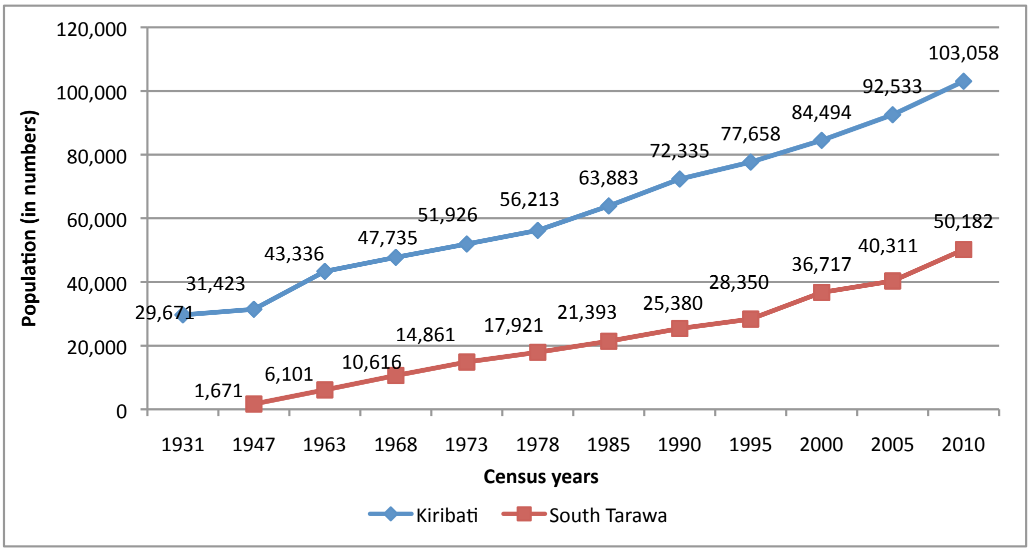


Figure 2.1 also provides information about corresponding developments of South Tarawa's population, Kiribati's capital and main urban area, highlighting an even more expansive population growth, from a mere 1,671 in 1947 to 50,182 in 2010. The magnitude of this rapid population growth is further substantiated by the fact that its population increased by 9,871 between 2005 and 2010, representing 94% of Kiribati's total population growth.

2.3 Population size by island group

In 2010, South Tarawa had the largest portion of Kiribati's total population at 49%, followed by the rest of the Gilbert group at 42%, and the Line and Phoenix group at 9%. For the purposes of this report, however, 'urban' refers to South Tarawa and data for Kiritimati falls under the rural category. Kiritimati Island is also considered to be an urban area; therefore, adding its population of 5,586 to the South Tarawa's population of 50,182, means that Kiribati's overall population has become more urban than rural in recent years. These developments — featuring South Tarawa's impressive population growth since the 1990s, relative to a more modest increase in the rural population — (illustrated in Table 2.1), reflect a doubling of South Tarawa's population in just 20 years relative to a more modest 11% growth of Kiribati's rural population during the same period.

Figure 2.2: Kiribati population size by island group, 1985–2010

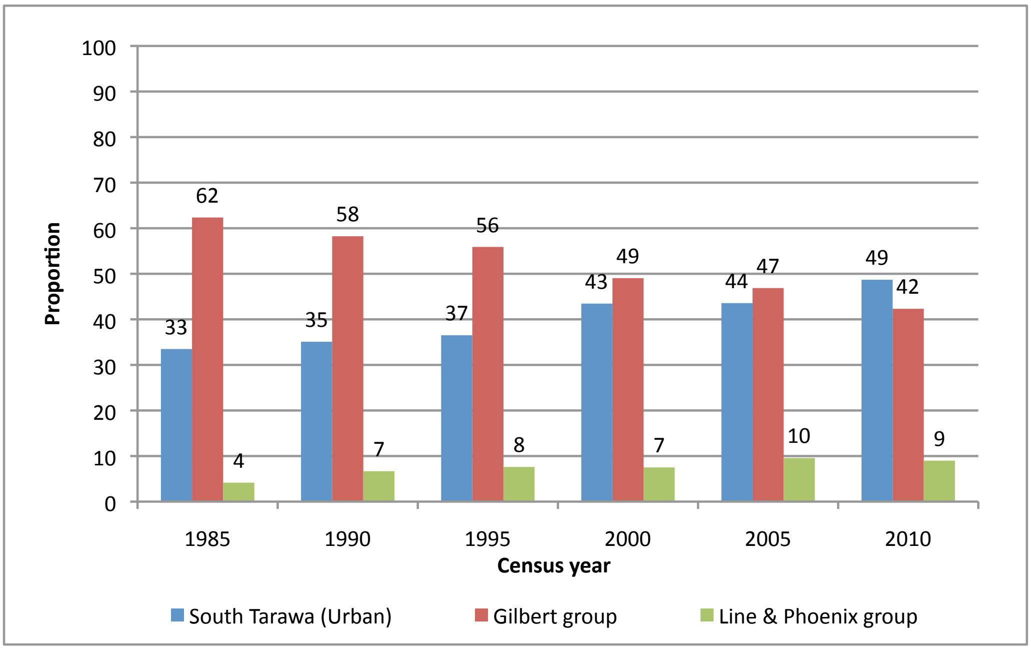


Table 2.1: Rural and urban (South Tarawa) population growth, 1990–2010

	South Tarawa	Rural	Total
1990			
Males	12,529	23,241	**35,770**
Females	12,851	23,714	**36,565**
1995			
Males	13,925	24,553	**38,478**
Females	14,425	24,755	**39,180**
2000			
Males	17,822	23,834	**41,656**
Females	18,895	23,953	**42,848**
2005			
Males	19,435	26,177	**45,612**
Females	20,876	26,045	**46,921**
2010			
Males	24,233	26,563	**50,796**
Females	25,949	26,313	**52,262**

2.4 Population growth

Disaggregating these population developments across all of Kiribati (as shown in Table 2.2) highlights the key role played by South Tarawa in Kiribati's population dynamics. South Tarawa's population increased by a very high annual growth rate of 4.4% between 2005 and 2010, relative to a near stagnating rural population growth of 0.2%. The latter, however, is by no means representative of rural population growth, as shown by variations ranging from annual population declines of -5.7% on Makin and -5.2% on Tabuaeran, to high annual increases of +7.6% on Teeraina and +5.6% on Butaritari. Tabuaeran's decline could be the result of the closure of the secondary school, including boarding facilities, sometime after 2005 — a development that may have also impacted growth on neighbouring Teeraina.

Table 2.2: Population size and growth by islands, 1985–2010

Island/region	Census total population				Population change								
					(in numbers)			(in %)			Annual growth rate		
	1995	2000	2005	2010	1995-2000	2000-2005	2005-2010	1995-2000	2000-2005	2005-2010	1995-2000	2000-2005	2005-2010
Banaba	339	276	301	295	-63	25	-6	-18.6	9.1	-2.0	-4.1	1.7	-0.4
Makin	1,830	1,691	2,385	1798	-139	694	-587	-7.6	41.0	-24.6	-1.6	6.9	-5.7
Butaritari	3,909	3,464	3,280	4346	-445	-184	1,066	-11.4	-5.3	32.5	-2.4	-1.1	5.6
Marakei	2,724	2,544	2,741	2872	-180	197	131	-6.6	7.7	4.8	-1.4	1.5	0.9
Abaiang	6,020	5,794	5,502	5502	-226	-292	0	-3.8	-5.0	0.0	-0.8	-1.0	0.0
North Tarawa	4,004	4,477	5,678	6102	473	1,201	424	11.8	26.8	7.5	2.2	4.8	1.4
South Tarawa	28,350	36,717	40,311	50182	8,367	3,594	9,871	29.5	9.8	24.5	5.2	1.9	4.4
Maiana	2,184	2,048	1,908	2027	-136	-140	119	-6.2	-6.8	6.2	-1.3	-1.4	1.2
Abemama	3,442	3,142	3,404	3213	-300	262	-191	-8.7	8.3	-5.6	-1.8	1.6	-1.2
Kuria	971	961	1,082	980	-10	121	-102	-1.0	12.6	-9.4	-0.2	2.4	-2.0
Aranuka	1,015	966	1,158	1057	-49	192	-101	-4.8	19.9	-8.7	-1.0	3.6	-1.8
Nonouti	3,042	3,176	3,179	2683	134	3	-496	4.4	0.1	-15.6	0.9	0.0	-3.4
North Tabiteuea	3,383	3,365	3,600	3689	-18	235	89	-0.5	7.0	2.5	-0.1	1.4	0.5
South Tabiteuea	1,404	1,217	1,298	1290	-187	81	-8	-13.3	6.7	-0.6	-2.9	1.3	-0.1
Beru	2,784	2,732	2,169	2099	-52	-563	-70	-1.9	-20.6	-3.2	-0.4	-4.6	-0.7
Nikunau	2,009	1,733	1,912	1907	-276	179	-5	-13.7	10.3	-0.3	-3.0	2.0	-0.1
Onotoa	1,918	1,668	1,644	1519	-250	-24	-125	-13.0	-1.4	-7.6	-2.8	-0.3	-1.6
Tamana	1,181	962	875	951	-219	-87	76	-18.5	-9.0	8.7	-4.1	-1.9	1.7
Arorae	1,248	1,225	1,256	1279	-23	31	23	-1.8	2.5	1.8	-0.4	0.5	0.4
Gilbert Group	**71,757**	**78,158**	**83,683**	**93,791**	**6,401**	**5,525**	**10,108**	**8.9**	**7.1**	**12.1**	**1.7**	**1.4**	**2.3**
Teeraina	978	1,087	1,155	1690	109	68	535	11.1	6.3	46.3	2.1	1.2	7.6
Tabuaeran	1,615	1,757	2,539	1960	142	782	-579	8.8	44.5	-22.8	1.7	7.4	-5.2
Kiritimati	3,225	3,431	5,115	5586	206	1,684	471	6.4	49.1	9.2	1.2	8.0	1.8
Kanton	83	61	41	31	-22	-20	-10	-26.5	-32.8	-24.4	-6.2	-7.9	-5.6
Line & Phoenix Group	**5,901**	**6,336**	**8,850**	**9,267**	**435**	**2,514**	**417**	**7.4**	**39.7**	**4.7**	**1.4**	**6.7**	**0.9**
Rural	49,308	47,777	52,222	52,876	-1,531	4,445	654	-3.1	9.3	1.3	-0.6	1.8	0.2
Urban	28,350	36,717	40,311	50,182	8,367	3,594	9,871	29.5	9.8	24.5	5.2	1.9	4.4
TOTAL	**77,658**	**84,494**	**92,533**	**103,058**	**6,836**	**8,039**	**10,525**	**8.8**	**9.5**	**11.4**	**1.7**	**1.8**	**2.2**

Kiribati's population grew at an average annual rate of 2.2% between 2005 and 2010, picking up pace from more modest annual growth rates of 1.7% between 1995 and 2000, and 1.8% between 2000 and 2005. This gradual change, however, does not occur across all islands. To the contrary, there are quite substantive intercensal contrasts as illustrated by Kiritimati and Tabuaeran, whose populations increased at modest annual rates of 1.2% and 1.7%, respectively, between 1995 and 2000, jumping to 8.0% and 7.4%, respectively, between 2000 and 2005, before reverting to a more modest 1.8% annual growth in the case of Kiritimati, and a -5.2% annual decline in the case of Tabuaeran.

2.5 Population doubling time

An effective way of illustrating the true meaning of population growth is to represent an annual growth rate in terms of the doubling time of a population. In other words, rather than saying that South Tarawa's population increased at a rate of 4.4% each year between 2005 and 2010, a more effective way of communicating the magnitude of this growth is to say, 'Should South Tarawa continue to grow at this rate, its population would double, reaching 100,000 people by the year 2026, or 13 years from now.' And at a rate of 2.2%, Kiribati's population would reach just over 200,000 people in 32 years (i.e. by 2042).

2.6 Population density

High population growth goes hand in hand with growing population density, a demographic concept that describes the number of people living within a specific land area. In this instance, population density is expressed as the number of people per one square kilometer (km^2).

Table 2.3: Population density by island and island group, Kiribati 2010

Island/region	land area (sq.km.)	Population density (per km^2)			
		1995	2000	2005	2010
Banaba	6.29	54	44	48	47
Makin	7.89	232	214	302	228
Butaritari	13.49	290	257	243	322
Marakei	14.13	193	180	194	203
Abaiang	17.48	344	331	315	315
N.Tarawa	15.26	262	293	372	400
South Tarawa	**15.76**	**1,799**	**2,330**	**2,558**	**3,184**
Maiana	16.72	131	122	114	121
Abemama	27.37	126	115	124	117
Kuria	15.48	63	62	70	63
Aranuka	11.61	87	83	100	91
Nonouti	19.85	153	160	160	135
North Tabiteuea	25.78	131	131	140	143
South Tabiteuea	11.85	118	103	110	109
Beru	17.65	158	155	123	119
Nikunau	19.08	105	91	100	100
Onotoa	15.62	123	107	105	97
Tamana	4.73	250	203	185	201
Arorae	9.48	132	129	132	135
Gilbert Group total	**285.52**	**251**	**274**	**293**	**328**
Teeraina	9.55	102	114	121	177
Tabuaeran	33.73	48	52	75	58
Kiritimati	388.39	8	9	13	14
Kanton	9.15	9	7	4	3
Line & Phoenix Group total	**440.82**	**13**	**14**	**20**	**21**
Kiribati	**726.34**	**107**	**116**	**127**	**142**

The average population density for Kiribati in 2010 was 142 people/km^2, reflecting a gradual increase from 107 people/km^2 in 1995 to 127 people/km^2 in 2005 (Table 2.3). The population density in the Gilbert group varied from a low of 41 people/km^2 in Banaba to 400 people/km^2 in North Tarawa. In the Line and Phoenix group, the density varied from 3–177 people/km2. Kiritimati, which has the biggest land area in all of Kiribati, had a density of only 14 people/km^2. South Tarawa had the highest population density of just over 3,000 people/km^2, illustrating the magnitude of recent urbanisation, with a population density increasing from 1,799 people/km^2 in 1995, to 2,330 people/km^2 in 2000, to 2,558 people/km^2 in 2005, and to 3,184 people/km^2 in 2010. This rate is clearly in excess of other islands with high population densities, such as North Tarawa, Abaiang and Butaritari with more than 300 people/km^2.

2.7 Urbanisation (South Tarawa and Kiritimati Island)

Urbanisation refers to the increase in the proportion of a country's population living in urban areas, which reflects the process by which people move to towns, cities or other densely populated areas. Usually driven by sustained periods of rural-to-urban migration, the process of urbanisation accelerates when combined with high levels of fertility, as discussed in Chapter 4. Urbanisation and urban growth are events of increasing importance to planners and policy-makers because trends and patterns of urbanisation have wide-ranging implications on socioeconomic development as well as on the provision of services in urban and rural areas.

During the past several decades, both the scale and pattern of urban growth in Kiribati have continued to increase rapidly. Like many other countries, the growth of Kiribati's urban population was more rapid than the growth of its rural population. This situation can be attributed to two factors: 1) the availability of more employment and education and/or training opportunities in the capital, which drew migrants from the outer islands to South Tarawa; and 2) the population resettlement scheme introduced by the Kiribati government in 1978, which encouraged individuals and families to move north to Kiritimati Island.

The definition of 'urban area' used in Kiribati population censuses refers to the main island of South Tarawa, where the government capital is located and where many people are involved in activities that are non-traditional or purely for subsistence but also for sales for cash income. However, for the purpose of analysing the level of urbanisation in Kiribati, both Kiritimati Island and South Tarawa are included as urban areas in order to present a better picture of the urbanisation pattern.

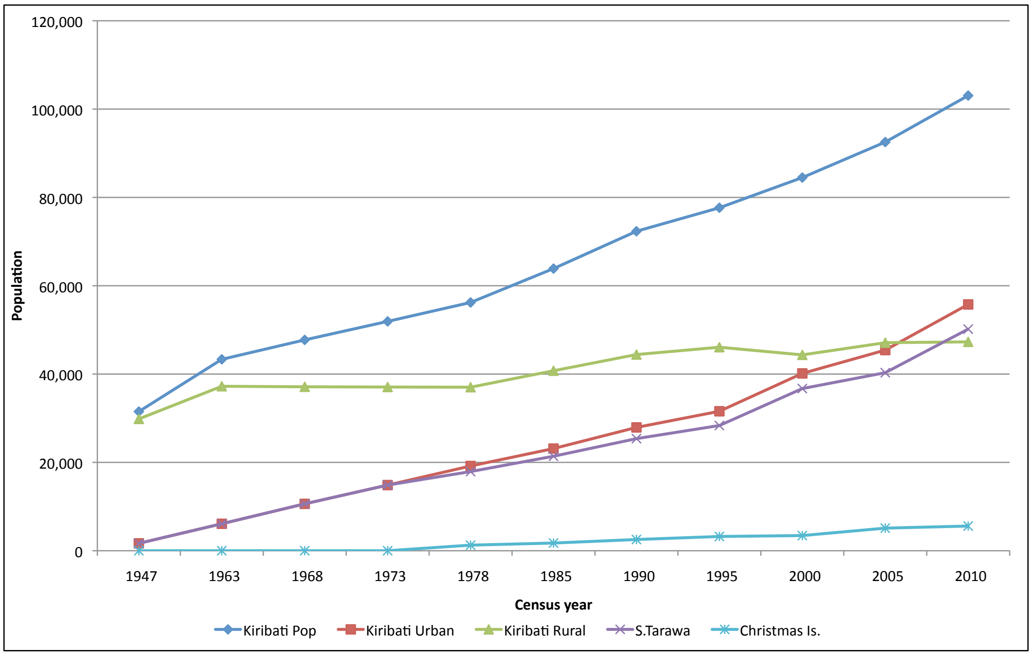
2.7.1 Overall trends and levels of urbanisation

Urban and rural population growth in Kiribati since 1947 (illustrated in Table 2.4 and Fig. 2.3), reflect a gradual trend of increased urbanisation. Kiribati is at an accelerated stage of the urbanisation process, with over 50% of its population now living in urban areas. Out of a total population of 103,058, 55,768 people live in the two defined urban areas of South Tarawa and Kiritimati Island, compared with 47,290 people who live in rural areas.

Table 2.4: Trends in urban and rural population growth in Kiribati since 1947

Year	Kiribati total	Kiribati Urban	Kiribati Rural	SouthTarawa	Kiritimati
1947	**31,513**	1,671	29,842	1,671	-
1963	**43,336**	6,101	37,235	6,101	-
1968	**47,735**	10,616	37,119	10,616	-
1973	**51,926**	14,861	37,065	14,861	-
1978	**56,213**	19,186	37,027	17,921	1,265
1985	**63,883**	23,130	40,753	21,393	1,737
1990	**72,335**	27,917	44,418	25,380	2,537
1995	**77,658**	31,575	46,083	28,350	3,225
2000	**84,494**	40,148	44,346	36,717	3,431
2005	**92,533**	45,426	47,107	40,311	5,115
2010	**103,058**	55,768	47,290	50,182	5,586

Figure 2.3: Trends in urban and rural population growth in Kiribati since 1947



2.7.2 Level of urbanisation

There are two commonly used measures of urbanisation: 1) the degree of urbanisation, which is defined as the proportion of the total population of a country or region that resides in some type of defined urban area; and 2) the tempo of urbanisation, which accounts for the change in the degree (or level) of urbanisation by analysing changes in the indices (or measures) used for measuring the degree of urbanisation. These measures are discussed briefly in the following sections.

Percent urban
The simplest index to measure the urbanisation process refers to the proportion of the total population living in defined urban areas. It is calculated by dividing the total urban population by the total population of a country and multiplying by 100.

While the index is straightforward and easy to understand, it is questionable if it reflects the true relative levels of urbanisation when comparing such figures between countries or over time. For example, in 2000, 47.5% of Kiribati's population lived in urban areas, compared with only 21% of Fiji's population although an analysis of the urban characteristics of the two countries shows that, in most aspects of the urbanisation process, Fiji is 'more urban' than Kiribati. A second disadvantage of this index as a measure of urbanisation is that once a high proportion of the population of a country or an island lives in defined urban areas, further increases in the percent urban are negligible, although the 'urbanisation process' may continue as the size of cities or towns increases.

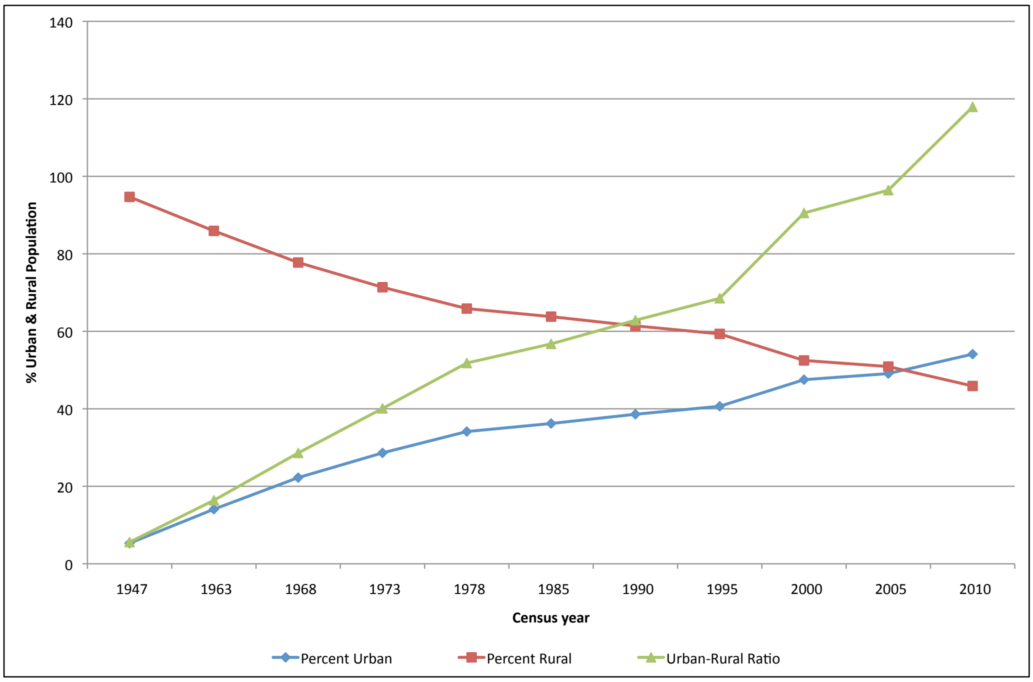
Urban–rural ratio
This problem is overcome when looking at the urban–rural population ratio, which refers to the number of urban residents relative to the number of rural residents. The urban–rural population ratio is calculated by dividing the proportion of the population that is urban by the proportion that is rural, and multiplying it by 100; this is expressed as the number of urban residents for every 100 rural residents (Table 2.5). In 1947, 5.3% of the population lived in urban areas, while the urban–rural ratio was 5.6, meaning that there were between 5 and 6 people living in South Tarawa for every 100 people living in rural areas. In contrast, by 2010, 54.1% of the population lived in urban areas, and the urban–rural ratio had increased to 117.9, meaning for every 100 people in rural areas, 118 lived in urban areas.

Table 2.5: Urban–rural population distribution (%), Kiribati 1947–2010

Census year	Percent urban	Percent rural	Urban-rural ratio
1947	5.3	94.7	5.6
1963	14.1	85.9	16.4
1968	22.2	77.8	28.6
1973	28.6	71.4	40.1
1978	34.1	65.9	51.8
1985	36.2	63.8	56.8
1990	38.6	61.4	62.9
1995	40.7	59.3	68.5
2000	47.5	52.5	90.5
2005	49.1	50.9	96.4
2010	54.1	45.9	117.9

Figure 2.4 illustrates these developments, showing the proportions of urban and rural populations moving in opposite directions over time, with the urban–rural ratio gradually expanding.

Figure 2.4: Level of urbanisation in Kiribati since 1947



2.7.3 Tempo of urbanisation

With the magnitude of urbanisation readily described by changes in the relative proportions of urban versus rural populations (as illustrated in Table 2.5), policy-makers and planners need to understand more about the underlying process, particularly the speed of this development, in order to make accurate policy and planning decisions for the future.

There are two ways of viewing the speed of recent developments. The first, and perhaps most obvious, is to compare different urban versus rural annual population growth rates over time (see Table 2.6, which illustrates different phases in the Kiribati urbanisation process).

- Following World War II there was a very small population base in South Tarawa. Urban growth between 1947 and 1979 ranged between 5.1% and 11.1% annually; the first 20 years in particular reflected massive social change in terms of rapid urbanisation.
- Annual urban growth slowed from 1978 to 1995, averaging between 2.5% and 3.8%. Many Ellise Islanders lived in South Tarawa during the British colonial administration, and the population decline between 1978 and 1985 most likely reflects a return by Ellise Islanders to Tuvalu. (The Ellise Islands gained their independence in 1978, becoming Tuvalu, while the Gilbert Islands became part of the independent country of Kiribati in 1979).
- Two other factors resulted in slower population growth in South Tarawa after 1978: 1) the relocation scheme to resettle people in Kiritimati, to counteract South Tarawa's rapid population growth; and 2) the labor migration of I-Kiribati to Nauru, to work in the phosphate mines.
- The last 15 years show renewed growth, with South Tarawa and Kiritimati alternately achieving high annual growth rates amidst negative (1995–2000), modest (2000–2005) and only marginal (2005–2010) rural population growth.

- Over the past five years, urban growth averaged 4.1% annually. If Kiribati's urban population continues to grow at this rate, it would double to 111,500 by 2017 — a figure greater than Kiribati's total population today!

Table 2.6: Population growth rates in Kiribati since 1947

Census years	Annual Population Growth Rate (r) of:				
	Kiribati	Urban*	Rural	South Tarawa	Kiritimati
1947-1963	**2.0**	8.1	1.4	8.1	-
1963-1968	**1.9**	11.1	-0.1	11.1	-
1968-1973	**1.7**	6.7	0.0	6.7	-
1973-1978	**1.6**	5.1	0.0	3.7	-
1978-1985	**1.8**	2.7	1.4	2.5	4.5
1985-1990	**2.5**	3.8	1.7	3.4	7.6
1990-1995	**1.4**	2.5	0.7	2.2	4.8
1995-2000	**1.7**	4.8	-0.8	5.2	1.2
2000-2005	**1.8**	2.5	1.2	1.9	8.0
2005-2010	**2.2**	4.1	0.1	4.4	1.8

Note: * South Tarawa and Kiritimati combined since 1978. Urban population before 1978 is for South Tarawa only.

A second way of gauging the pace of urbanisation is to examine how quickly the urban–rural ratio (Table 2.7) changes, by calculating the annual growth rate in the urban–rural ratio. This supports the earlier description of three different urbanisation phases.

Table 2.7: Change in urban–rural ratios since 1947

Census year	Urban-rural ratio	Annual growth urban-rural ratio
1947	5.6	
1963	16.4	6.7
1968	28.6	11.1
1973	40.1	6.8
1978	51.8	5.1
1985	56.8	1.3
1990	62.9	2
1995	68.5	1.7
2000	90.5	5.6
2005	96.4	1.3
2010	117.9	4

Chapter 3: Population structure and composition

3.1 Introduction

Age and sex are the most important characteristics of a population. Data for males and females and for ages are important for evaluating the completeness and accuracy of census enumeration. In addition, accurate data on age and sex are important because they are used to calculate birth and death rates, internal and international migration, marital status composition, planning regarding education, medical services, housing and others.

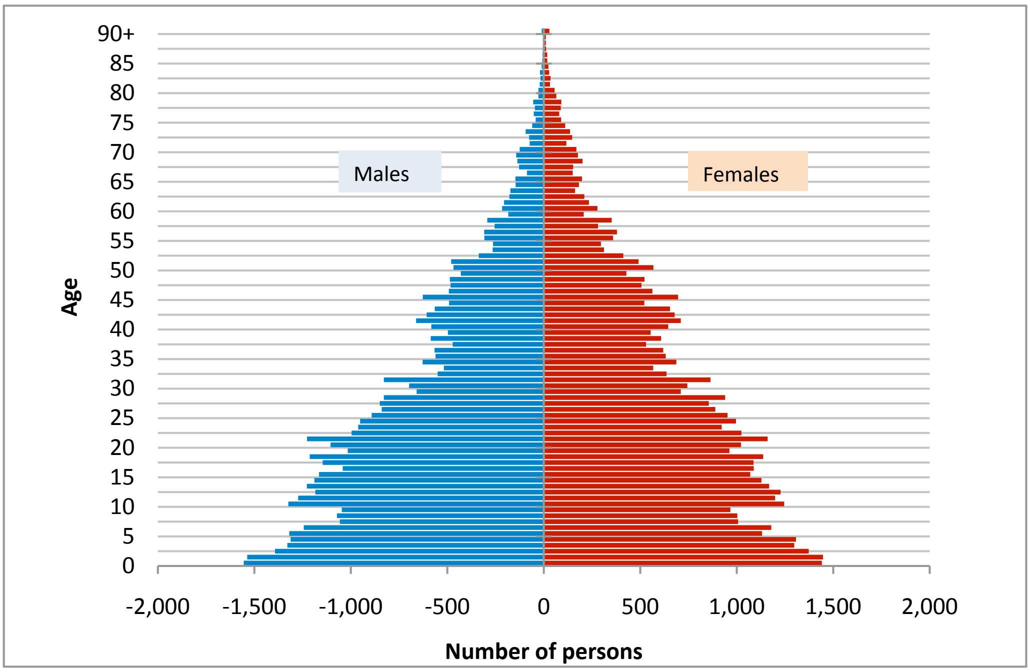
This chapter analyses and presents Kiribati's population structure by age and sex based on the results of the 2010 population census. Analysis and evaluation of the accuracy of age data are first presented, and are followed by descriptions of the changes in the age–sex structure, and a comparison of age–sex pyramids. Other population indices based on age and sex distribution are also presented.

3.2 Examining the quality of age data

Age data collected in any data collection exercise — such as a census or survey — are often subject to errors in age misreporting in the form of either age heaping (digit preference) or age shifting. Age heaping occurs when people round their age up or down, typically to a number ending with a 0 or a 5. Age shifting occurs when people either understate or overstate their ages for various reasons. Several measures have been developed to determine the extent of errors in age data reporting, such as the Myer's index and others. Also, a population pyramid based on a single year of age data can detect any irregularities in age distribution.

Figure 3.1 shows heaping at ages ending with 0, 1 and 5, and avoidance of ages ending with 7, 8 and 9 in the Kiribati 2010 census.

Figure 3.1: Population pyramid by single year of age and sex, Kiribati 2010



Other indices of age misreporting are presented in Table 3.1. One of the most useful indices included in Table 3.1 is the Myer's index, which evaluates age data with respect to digit preference. The index returns a negative value if a digit is avoided and a positive value if it is preferred. This index's range is from 0 to 180. The Whipple's index is also applied here to evaluate age preference of digits 0 and 5, and varies from 100, representing no concentration or preference at all, to 500, if no returns were recorded with any digits other than those mentioned.

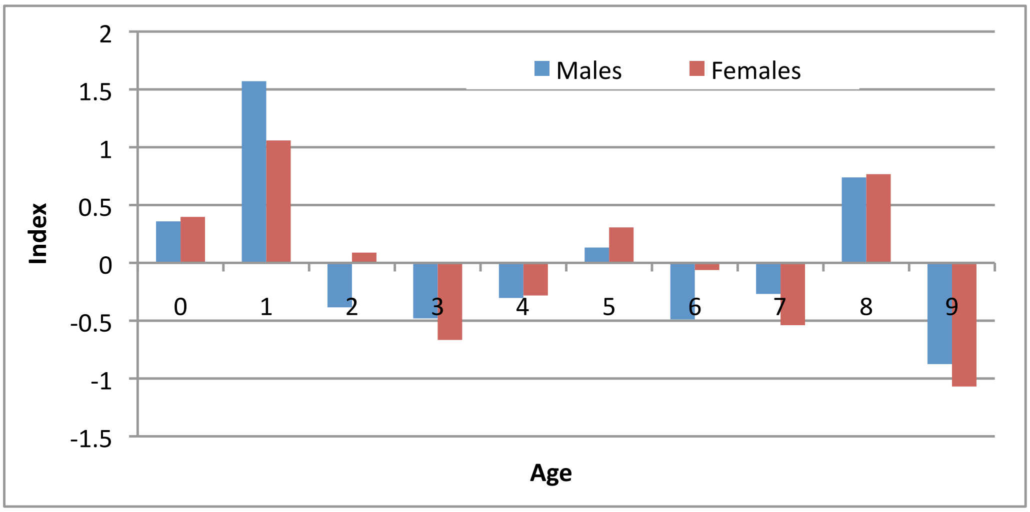
Table 3.1: Indices of accuracy of age reporting for Kiribati censuses in 2000, 2005 and 2010

Censuses	Myer's Index		Whipple's Index	
	Males	Females	Males	Females
2000	9.9	8.9	109.6	119.3
2005	6.5	6.1	104.0	107.7
2010	5.6	5.3	102.4	105.2

The results of age misreporting shown in Table 3.1 indicate considerable improvements in age reporting over the three census periods, as shown with the Myer's index. The Whipple index also indicates that there is no concentration or age heaping with respect to numbers ending with 0 or 5, as the measures shown in 2010 are closer to 100 (102.4 for males and 105.2 for females).

Figure 3.2 shows some age heaping for ages ending in 1 and 8, and less with ages ending in 0, 2 and 5. Females show more preference for ages ending in 1. The remaining digits were avoided, with 9 being the most avoided followed by 3.

Figure 3.2: Myer's index of digit preference, Kiribati 2010



3.3 Changes in the age and sex structure

The growth and changing population structure of Kiribati can also be illustrated by using population pyramids with horizontal bars presenting the number or proportion of males and females for each age group. The overall shape of the pyramid and the size of the bars depict the changes in the age and sex structure of the population as a result of past levels of fertility, mortality and migration. Population pyramids for Kiribati as a whole, and for its urban and rural residents for 2005 and 2010, are presented in Figures 3.3, 3.4 and 3.5.

Figure 3.3: Kiribati population pyramid for 2005 (shaded) and 2010 (outlined)

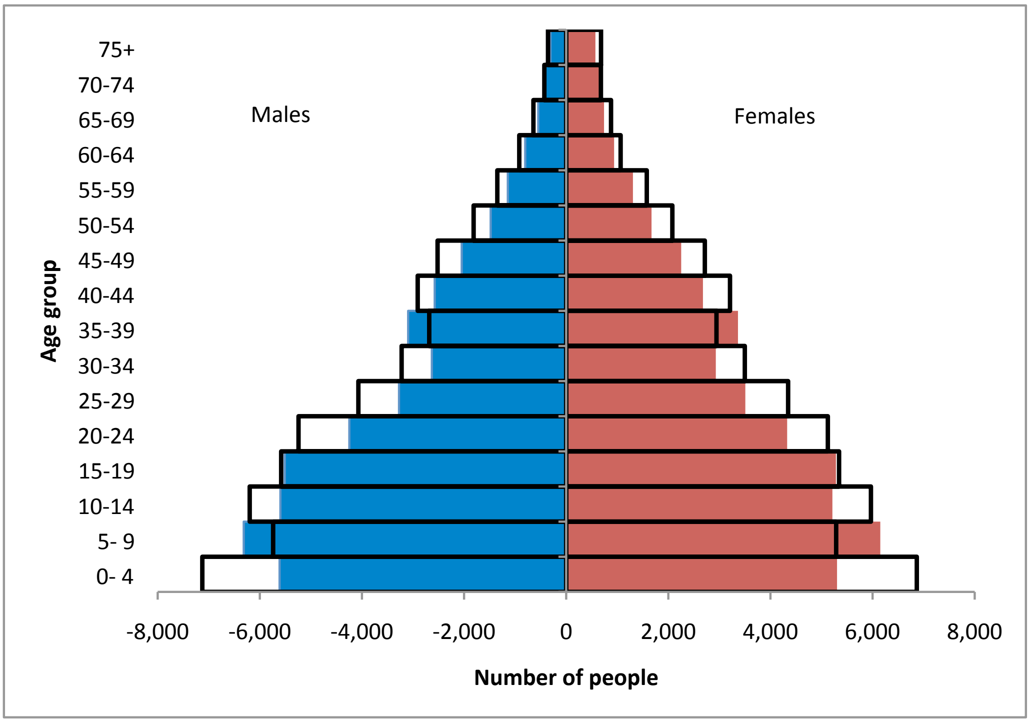


Figure 3.3 presents Kiribati's population pyramid for 2005 (shaded area) and 2010 (outlined). Both pyramids have a similar shape — one that is typical of a population with rapid growth associated with high birth rates. The pyramid also indicates evidence of early death in Kiribati's 2010 population. Adult mortality, particularly in ages 60 and over, results in a narrowing of the pyramid as age increases. This is also supported by the estimated life expectancy discussed in a later chapter.

When comparing the pyramids for 2005 and 2010, the base of the pyramid in 2005 was much smaller than it was in 2010, indicating that there were fewer births between 2000 and 2005 as compared with births between 2005 and 2010. In 2005, the fertility level was recorded to be declining from 4.5 births in 2000 to 3.5 births in 2005, and this could have contributed to the narrow base of the 2005 census pyramid. The data also showed fewer people in the 35–39 age group, illustrating a decline in fertility around 1970.

Figure 3.4: Population pyramid, South Tarawa 2005 (shaded) and 2010 (outlined)

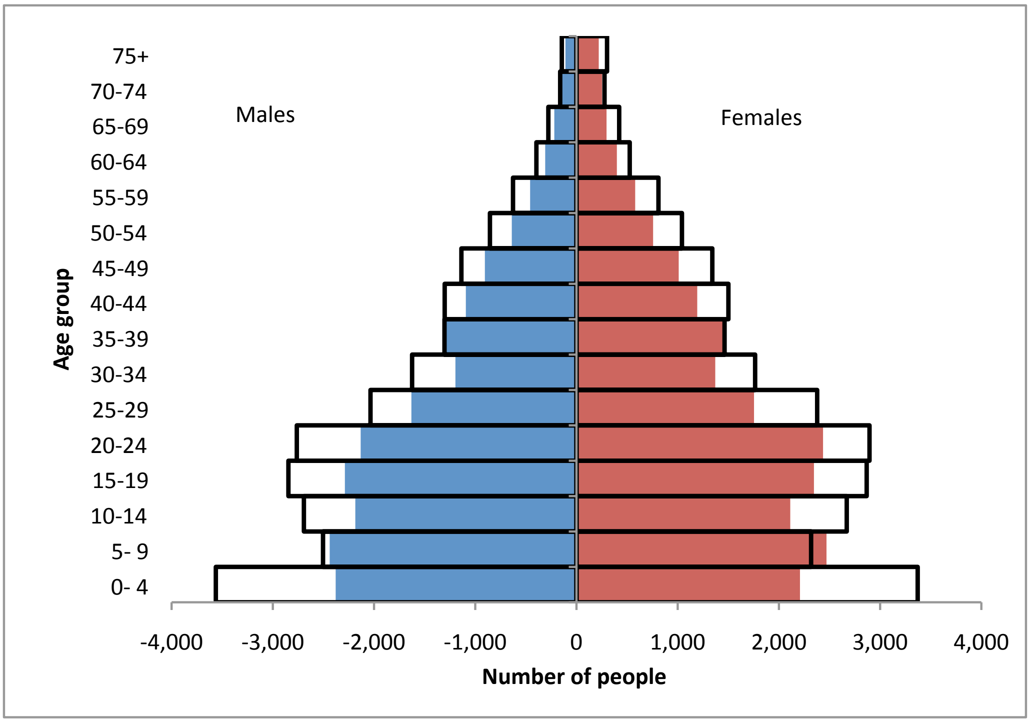
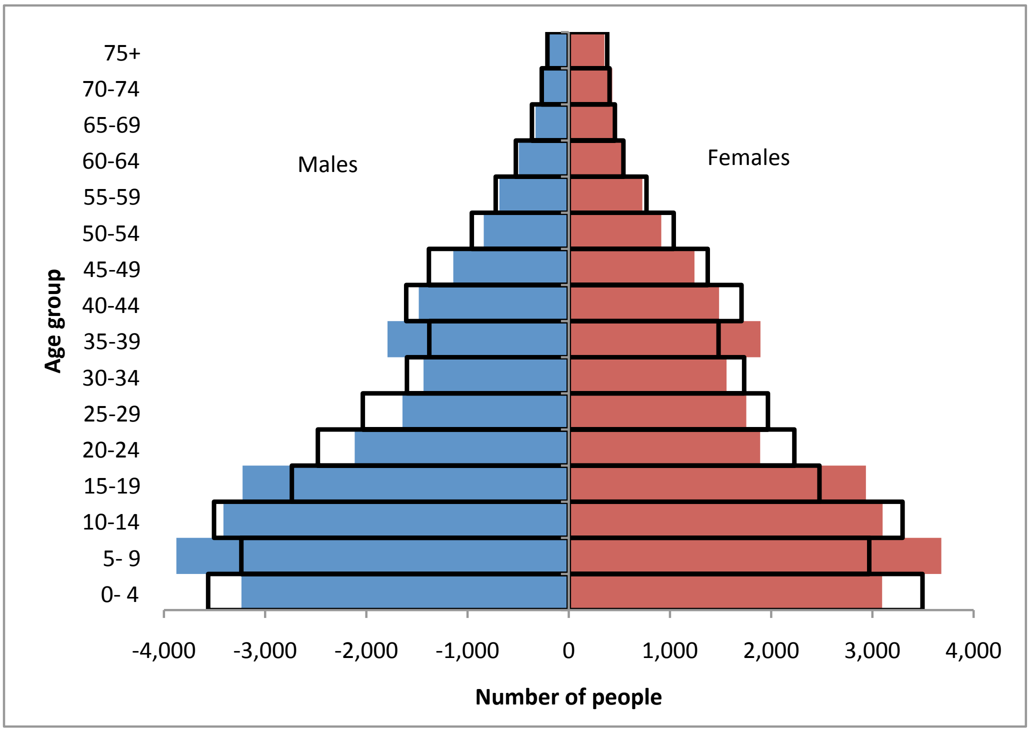


Figure 3.4 shows the population pyramid for South Tarawa in 2005 and 2010 censuses by age group and sex. More births occurred in South Tarawa between 2005 and 2010 than between 2000 and 2005. The bars for males and females are longer in 2010 than they are in 2005, in particular for the 10–24 age groups. This could be attributed to the expansion of education services and institutions on South Tarawa between 2005 and 2010 (encouraging migration). For instance, in 2006, Saint Patrick Catholic secondary school opened with intakes of about 400 students, while in 2009, Santa Maria secondary school expanded to accommodate dropouts and students who want to continue with their education from forms 1 to 6. At the same time, other private church secondary schools (Moroni and Saint Louis) expanded, again picking up junior secondary students (forms 1–3). Moreover, Kiribati Institute of Technology introduced and upgraded new programmes that encourage and attract older students to engage in vocational study, and the University of the South Pacific, Kiribati campus has had growing numbers of private students and in-country students pursuing higher education qualifications.

Figure 3.5: Population pyramid for Kiribati's rural areas (outer islands) in 2005 (shaded) and 2010 (outlined)



The rural areas (outer islands) pyramid for 2005 and 2010 (Fig. 3.5) confirms the likelihood of migration between the outer islands and South Tarawa. While South Tarawa gained more people in the 10–24 age group, rural areas lost people. During these periods, one of the government secondary schools (Meleangi Tabai secondary school) located on Tabuaeran was closed, which could have resulted in the movement of people from this outer island to South Tarawa. Consequently, births recorded in rural areas for both censuses did not show significant differences as compared with those recorded for South Tarawa.

Although the pyramids for South Tarawa (urban) and the outer islands (rural) present different features than the pyramid for Kiribati as a whole, they have a common pattern of a wide base that narrows with increasing age, indicating future population growth and early death in the population.

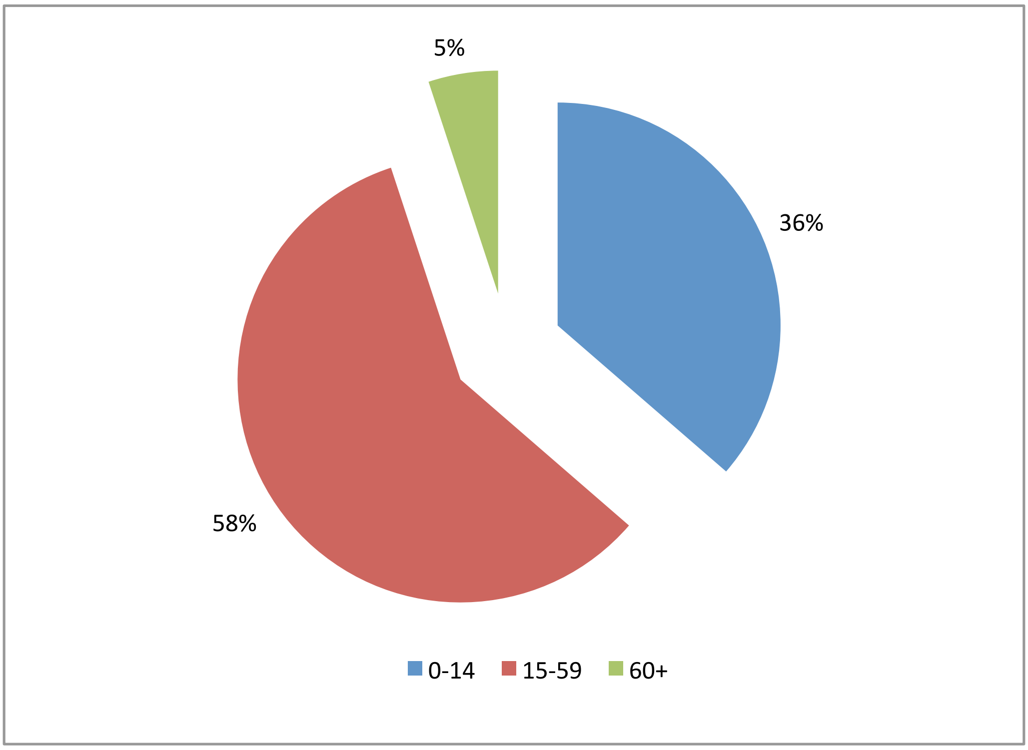
3.4 Kiribati population indicators for 2005 to 2010

Kiribati's population is young, with 36% below the age of 15, and only 6% in the 60 and over age group. The working age population (i.e. 15–59) is estimated to comprise 58% of Kiribati's entire population. These population counts are stable as seen in Table 3.2 below. Figure 3.6 presents the results in graphical form.

Table 3.2: Population indicators of the 2005 and 2010 Kiribati censuses

Indicators	Kiribati		South Tarawa		Rural areas	
	2005	2010	2005	2010	2005	2010
Age group						
0-14	37	36	34	34	39	38
15-59	58	58	61	61	55	56
60+	5	5	5	5	6	6
Total						
Summary measures						
Dependency ratio	74	71	64	64	82	78
Median age	20.7	21.6	21.9	21.8	19.6	20.9
Sex ratio	97	97	93	93	101	101

Figure 3.6: Proportion of population by age group, Kiribati 2010



3.4.1 Dependency ratio

The age-dependency ratio is defined here as the population aged less than 15, and the population aged 60 and over (known as the 'dependent population'), divided by the population in the 15–59 age group (economically productive or working population). The age-dependency ratio is often used as an indicator of the economic burden that the productive portion of the population must carry in order to support the 'dependent population'. The age-dependency ratio for Kiribati in 2010 was estimated to be 71, which is a decline from 74 in 2005. This means that there were 71 people in the dependent group for every 100 working age people. This ratio is considered to be high due to the large proportion of children in Kiribati. The higher the dependency ratio, the higher the number of people in the dependent group that need to be supported and cared for by the working age population. South Tarawa's age-dependency ratio is lower than in rural areas.

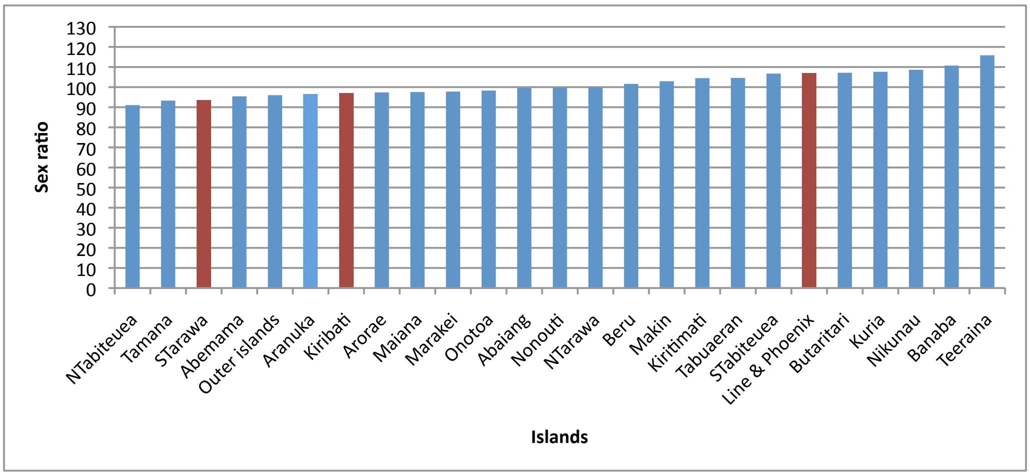
3.4.2 Median age

The median age is the age at which exactly half of the population is older and the other half is younger. The median age for Kiribati in 2010 was 21.6, meaning that half of the total population for Kiribati is older and the other half is younger than 21.6. The median age of 21.6 indicates that the majority of Kiribati's population is composed of young people. In 2005, the median age was 20.7 (Table 3.2).

3.4.3 Sex ratio

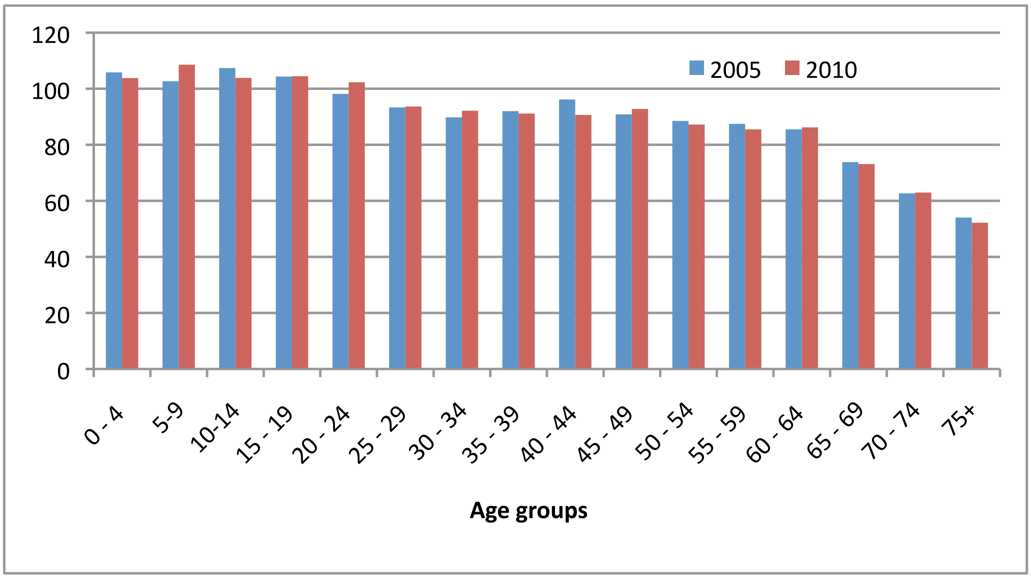
The 2010 census recorded 50,796 males and 52,262 females for a total population of 103,058 people. The sex composition of the population can be measured by the sex ratio, which is defined as the number of males per 100 females. A sex ratio of 100 denotes equal numbers of males and females; a sex ratio of more than 100 means more males than females; and a sex ratio of less than 100 indicates fewer males than females. Data from the 2010 census makes it possible to calculate the sex ratio for Kiribati as a whole, and for each individual island.

Figure 3.7: Sex ratio by island, Kiribati 2010



The sex ratio for each island, including Kiribati as a whole, South Tarawa (urban), and rural areas (outer islands), are presented in Figure 3.7. Overall, Kiribati's sex ratio was 97 males per 100 females, reflecting more females than males in the total population. South Tarawa's sex ratio was 93, also indicating fewer males than females. In the Line and Phoenix group, the sex ratio was 107 (i.e. more males than females). Of the 23 inhabited islands in Kiribati, 10 had a population that consisted of more females than males.

Figure 3.8: Sex ratio by age group, Kiribati 2005 and 2010



Sex differences in mortality and migration cause the sex ratio to vary between ages as shown in Figure 3.8. Normally, the sex ratio at birth favours males, but on average, women live longer than men and, thus, the sex ratio tends to decline with age. Kiribati is no exception. The sex ratio was highest in the 0–19 age groups in both 2005 and 2010, meaning that there were more males in the population within these age groups. By age 25 and over, the sex ratio started to decline as age increased, meaning that men were outnumbered by women in the older age groups.

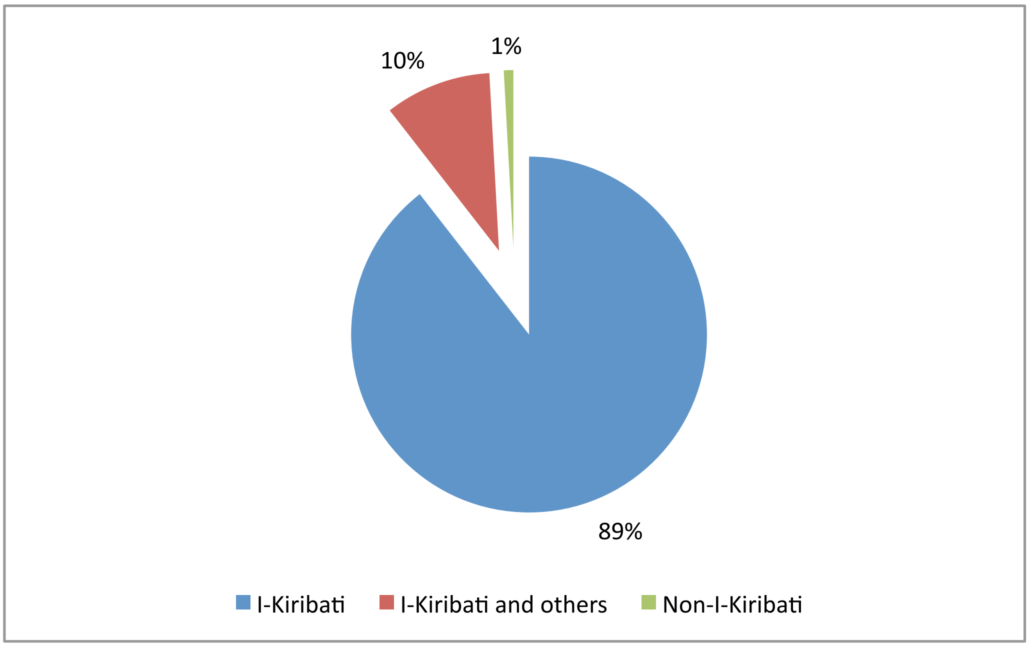
3.5 Population composition

All people residing in Kiribati during the 2010 census were asked about their ethnicity. Of the total population of 103,058 people, about 90% were I-Kiribati, 10% were I-Kiribati and other ethnicities, and about 1% identified themselves as non-I-Kiribati (e.g. from Australia, New Zealand, Fiji). Table 3.3 and Figure 3.9 present the results in figures and graphic form, respectively.

Table 3.3: Population by ethnic origin and by sex, Kiribati 2010

Ethnicity	Male	Female	Total	Percent
I-Kiribati	45,300	46,906	**92,206**	89.5
I-Kiribati and others	4,977	4,983	**9,960**	9.7
Non-I-Kiribati	519	373	**892**	0.9
Total	**50,796**	**52,262**	**103,058**	**100.0**

Figure 3.9: Population by ethnic origin, Kiribati 2010



Chapter 4: Fertility

4.1 Introduction

Fertility refers to the reproductive behaviour of a population, and is related to the number of live births a woman has had. Fertility significantly impacts a country's age and sex composition, because birth rates largely determine the composition and size of younger age groups, unless there are high levels of migration involving children and young people.

The main source of fertility data is derived from the Kiribati 2010 census. Fertility estimates and measures presented here are calculated from information collected on children ever born and births in the 12 months prior to the census by women in the child bearing age groups of 15–49. All women in this age range residing in Kiribati during the 2010 census were asked two fertility-related questions.

Although fertility-related questions tried to capture all births, the data obtained are often subject to different types of errors such as omissions or recall errors related to some births within the specified period, or overstating the number of births. Several methods such as the parity/fertility (P/F) ratio and Arriaga method, have been developed and widely used to adjust for reporting errors and, thus, present more accurate levels of fertility.

4.2 Fertility estimates

This chapter presents the following fertility indicators:

- *age-specific fertility rate* (ASFR) is the number of births to women of a particular age group during a specific time period;
- *total fertility rate* (TFR) is the average number of children that would be born to a woman during her childbearing years if she were to pass through all her childbearing years conforming to the age-specific fertility rate of a given year (the census year);
- *crude birth rate* (CBR) is the number of live births per 1,000 population in a given year;
- *teenage fertility rate* relates to child-bearing among young women aged 15–19, and is synonymous with the ASFR (15–19); and
- *mean age at childbearing* (MAC) refers to the mean age of mothers at the birth of their children if women were subject throughout their lives to the ASFR observed in a given year (the census year).

4.2.1 Children ever born alive

The Kiribati 2010 census asked all women aged 15 and over two fertility-related questions:

- How many live-born children of each sex have been born to this woman?
- What is the date of birth of this woman's last child born alive (including a child that may have died since)?

There were 88,322 children ever born alive from 34,141 women aged 15 and over in 2010, which equals an average of 2.6 children ever born alive per woman. The average number of children ever born alive (or, average parity) varies throughout each age cohort, illustrating differential fertility levels at each age group (Table 4.1). Younger women had fewer children born alive (0.09) than older women because they just entered the child bearing age. On the other hand, women aged 30–34 had 2.63 children on average, and by the end of their childbearing years (49 years), women had given birth to an average of 4.3 children.

Table 4.1: Females aged 15 and over by number of children ever born alive, Kiribati 2010

Age of women	Number of women	Number of children ever born			Average of children ever born		
		Males	Females	Total	Males	Females	Total
15–19	5,344	233	238	471	0.04	0.04	0.09
20–24	5,124	1,773	1,714	3,487	0.35	0.33	0.68
25–29	4,346	3,539	3,387	6,926	0.81	0.78	1.59
30–34	3,498	4,742	4,452	9,194	1.36	1.27	2.63
35–39	2,943	5,076	4,887	9,963	1.72	1.66	3.39
40–44	3,208	6,737	6,206	12,943	2.10	1.93	4.03
45–49	2,715	5,947	5,632	11,579	2.19	2.07	4.26
50–54	2,079	4,963	4,675	9,638	2.39	2.25	4.64
55–59	1,578	3,881	3,550	7,431	2.46	2.25	4.71
60–64	1,066	2,516	2,502	5,018	2.36	2.35	4.71
65–69	878	2,284	2,153	4,437	2.60	2.45	5.05
70–74	680	1,772	1,787	3,559	2.61	2.63	5.23
75+	682	1,861	1,815	3,676	2.73	2.66	5.39
Total	**34,141**	**45,324**	**42,998**	**88,322**	**1.33**	**1.26**	**2.59**

A comparison of children ever born in 2000, 2005 and 2010 is shown in Figure 4.1. As expected, children ever born increased with mother's age. Overall, there has been a slight decline in fertility (the area under the graph) between 2000 and 2010, primarily among mothers in the 30–49 age groups. However, when looking at the period between 2005 and 2010, the fertility pattern was almost the same and constant for every age group of mothers except in the 35–39 and 45–49 age groups, which were lower in 2010. This could indicate underreporting of children ever born by older mothers, especially with their children that died very early.

Figure 4.1: Average number of children ever born, Kiribati 2000, 2005 and 2010

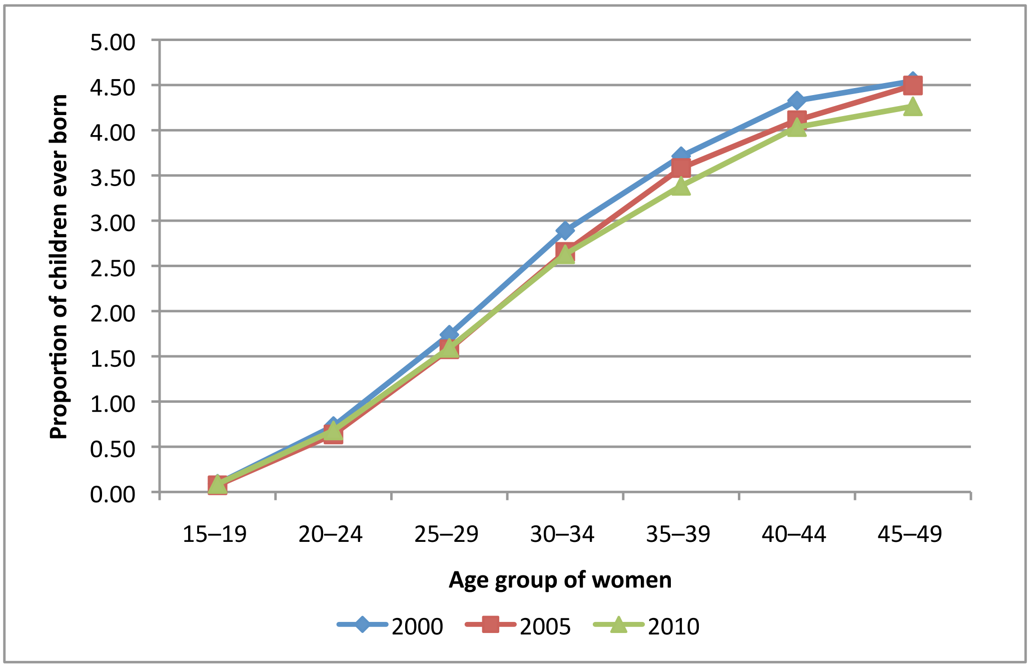
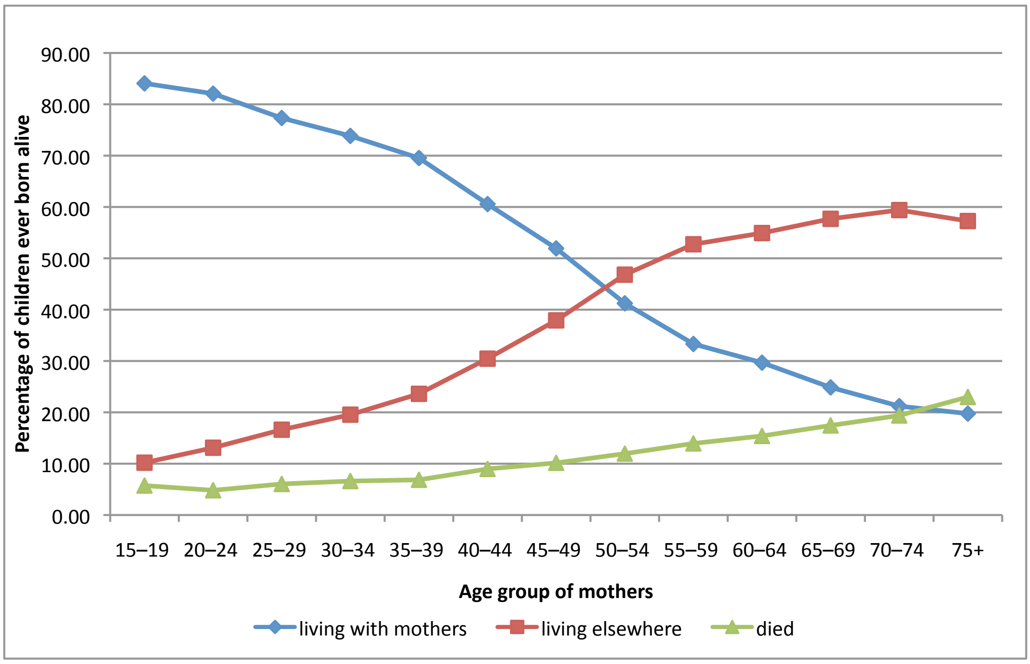


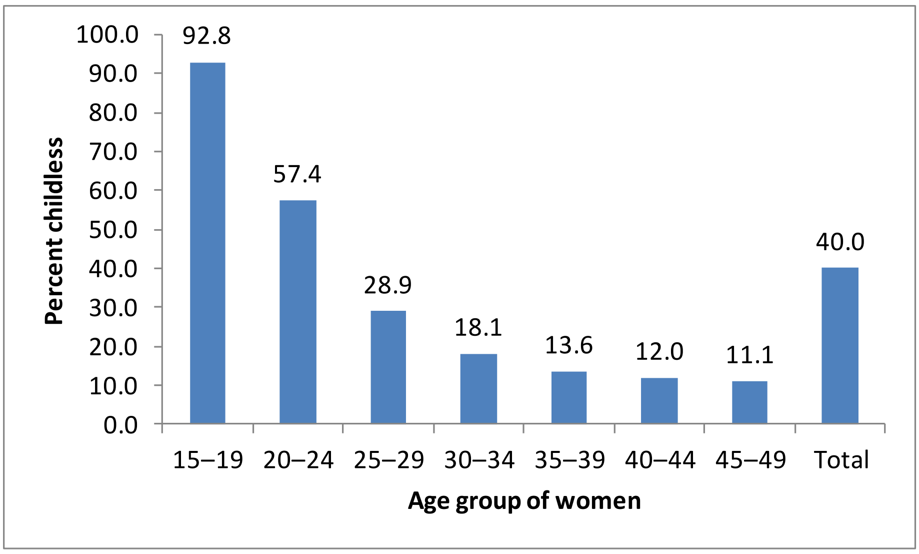
Figure 4.2 presents the proportion of children ever born alive, living with their mothers, living elsewhere, and those who have died. The results indicate that the proportion of children living away from their own mothers increased with age of mothers because as children grew up, they moved away for education, jobs and having their own families elsewhere. The proportion of children who have died also increased with age of mothers (6–23%). This is because of a reduction in rates of child death, and because the grown-up children of older mothers have died.

Figure 4.2: Proportion of children ever born living with their mothers in the same household, living elsewhere, and those who have died, Kiribati 2010



In response to the question asked of women aged 15 and over about whether they have ever given birth or not, the results indicate that 40% of women aged 15–49 have never given birth or are childless (Fig. 4.3). The results also show that two in every five women in the 45–49 age group were childless.

Figure 4.3: Percent childless among women, Kiribati 2010



4.2.2 Births in the 12 months prior to the census

Direct estimation of fertility rates

The total number of live births reported in the 12 months prior to the census (7 November 2009 to 6 November 2010) was 2,964 (Table 4.3). By contrast, the total number of registered births of women aged 15–49 in the 12 months prior to the census reported from the Kiribati Civil Registration Office was 2,305 (Table 4.2), while the Statistics Division in the Ministry of Health reported 1,596 registered births in the same period (data not shown). Both records were very low compared with the number of births reported in the 2010 Kiribati census. Based on the Civil Registration Office data, TFR was estimated to be around 2.8 children per woman (Table 4.2); an estimate based on Ministry of Health data would be lower still.

When exploring the administration data, the following issues were encountered that could contribute to low reporting of births.

1. Data coverage:
    a. Of the 23 inhabited islands in Kiribati, only 18 islands were able to collect and report information on births. This was the case with the Civil Registration births data.
    b. On the 18 islands where Civil Registration births data are available, underreporting may be an issue.
2. Poor reporting:
    a. There is a lack of accuracy in the information that is collected (e.g. a mother's age is not recorded, or the wrong date of birth is reported), which restricts further and proper analysis of the data.

Table 4.2: Current births, age-specific fertility rate, and total fertility rate estimated from administrative data (Civil Registration Office)*

Age group of mother	Number of women (census 2010)	Births in the last 12 months			Age-specific fertility rates (ASFR)
		Males	Females	Total	
15-19	5,344	94	93	187	0.0350
20-24	5,124	343	325	668	0.1304
25-29	4,346	361	331	692	0.1592
30-34	3,498	238	201	439	0.1255
35-39	2,943	127	109	236	0.0802
40-44	3,208	45	27	72	0.0224
45-49	2,715	6	5	11	0.0041
Total	**27,178**	1,214	1,091	2,305	0.5568
Total fertility rate					2.78

*Nine birth cases without age of mothers are proportionally distributed.

A direct calculation of fertility rates can be derived using the data reported on the number of births during the 12 months prior to the census as shown in Tables 4.2 and 4.3. ASFRs were derived by dividing the total number of live births by women in each age group in the 12 months prior to the census by the total number of corresponding women in the same age group. While this would be the best source of fertility information, it is not the best practice to use, particularly in countries where administration data are incomplete, because of the likelihood of underestimation of fertility rates. Similarly, direct estimation of fertility from reported births in the 12 months prior to the census would produce a misleading result due to the tendency to undercount or underreport births as well as misreporting the correct date of birth. Therefore, indirect methods were commonly applied on these data to derive more reliable fertility rates.

Table 4.3: Number of births in the 12 months prior to the 2010 census by age of mother and the age-specific fertility rate (ASFR), Kiribati, 2010

Age of women	Number of women	Number of births	ASFR
15-19	5,344	202	0.0378
20-24	5,124	827	0.1614
25-29	4,346	837	0.1926
30-34	3,498	595	0.1701
35-39	2,943	346	0.1176
40-44	3,208	139	0.0433
45-49	2,715	18	0.0066
Total	**27,178**	**2,964**	**0.7294**
Total Fertility Rate			**3.65**

Indirect estimation of fertility rates

An estimation of fertility rates from the 2010 census was derived using several indirect estimation methods and techniques. The following methods provided indirect estimates of fertility rates in Kiribati.

The P/F ratio method developed by Brass (1968, 1975) seeks to adjust the level of observed ASFRs — which are assumed to represent the true age pattern of fertility — in order to agree with the level of fertility indicated by the average parities of women in age groups lower than ages 30 or 35, which are assumed to be accurate. The method assumes constant fertility in the past. Appendix 1 shows detailed analysis of the method. For further explanation of the P/F ratio method, see United Nations (1983:27–38).

The two variants of the Arriaga indirect techniques of fertility estimation were also applied. These measure fertility based on data at one or two points in time. The first Arriaga method used is based on data at one point in time, which assumes constant fertility.

The second Arriaga procedure is based on data at two points in time and was also applied to take account of fertility changes in Kiribati. The method is similar to the P/F ratio method but links data for more than one date. While the Brass P/F ratio method assumes constancy in fertility, the Arriaga method, which is based on data at two points in time, does not assume constancy.

Similar to the Brass P/F ratio method, the Arriaga method transformed the parity data into comparable estimates of ASFRs and used the ratios of the cumulative estimated and reported ASFRs to derive adjustment factors (Arriaga 1983; United Nations 1988:59–72) The United Nations software MORTPAK 4.1, procedure FERTPF was used, which considers both parity and ASFRs at one or two points in time, in this case data from the 2005 and 2010 censuses (Appendices 2 and 3).

The Trussel P/F ratio technique was also adopted to further examine the accuracy of fertility rates. The analysis and results are presented in Appendix 4.

Applying these five methods (the direct methods, the Brass P/F ratio, the two Arriaga methods, and the Trussell P/F ratio) provides the results displayed in Table 4.4. Fertility results from other sources are also included for comparative purposes. Although the four indirect methods applied used different assumptions as discussed above, the results are similar, with a fertility rate of around 3.8 births per woman for each method. The direct method of fertility estimation based on reported births in the 12 months prior to the census provides an estimate of 3.6 births per woman, which is regarded as an underestimate. A comparison of the results from the above methods provides a reliable TFR of 3.8 per woman and a crude birth rate (CBR) of 30 births per 1,000 population (Table 4.4).

After examining the results from these different methods, the results derived using the Trussell P/F ratio and the Arriaga methods based on data at one point in time were retained because they produced similar TFRs with a smaller variation when compared with the other methods.

Table 4.4: Estimate of fertility level based on Kiribati 2010 population census

Methods	Estimated total fertility rate per woman	Estimated crude birth rate per 1,000 population	Reference period
Brass P/F ratio[1]	3.80	30.4	Nov, 2009 - Nov 2010
Arriaga's method - 1 point in time[1]	3.76	30.1	Nov, 2009 - Nov 2010
Arriaga's method - 2 points in time[1]	3.88	31.1	Nov, 2009 - Nov 2010
Trussell's P/F ratio[1]	3.79	30.3	Nov, 2009 - Nov 2010
Direct estimate (based on reported births in the 12 months prior to the census)	3.64	28.8	Nov, 2009 - Nov 2011
Other sources:			
KDHS 2009[2]	3.8	NA	2007-2009
2005 Kiribati Census[3]	3.5	26.6	Nov 2004 - Nov 2005

1 = adjustment factor of women aged 25-29

2=Kiribati Demographic Health Survey, 2009

3 = Kiribati Census 2005 Analytical Report

4.2.3 Total fertility rate

The TFR for Kiribati is estimated to be 3.8 births per woman, which is an increase of 0.3 births from the 2005 census (Tables 4.4 and 4.5). This figure corresponds to that of the 2009 Kiribati Demographic Health Survey, which recorded a TFR of 3.8. In 2010, the TFR for urban Kiribati was 3.7 births per woman while the rural TFR was 3.9 children per woman (Table 4.5).

4.2.4 Age-specific fertility rates

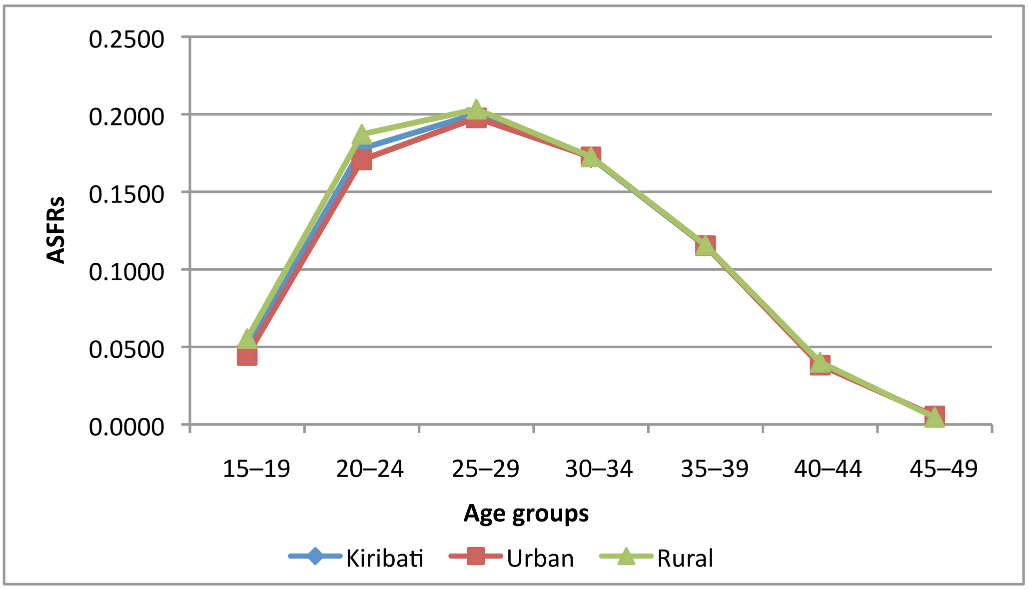
Table 4.5 and Figure 4.4 present fertility rates based on the Trussell P/F ratio method. The data illustrate the estimated ASFRs for women in the childbearing ages of 15–49 based on the 2010 census, and demonstrate Kiribati's high fertility rate. Childbearing commences early, at 15–19 years, with an average of 49.3 children per 1,000 women in this age group (Table 4.5), then increasing and peaking in the 25–29 age group, before declining in the 30–34 age group, and dropping sharply in the 40–49 age groups. A similar pattern can be observed in urban and rural ASFRs. Looking at ASFRs for each age group, the peak reproductive age group is the 25–29 age category, with rural areas having higher fertility rates than urban areas.

Table 4.5: Estimated age-specific fertility rate (ASFR), total fertility rate (TFR),crude birth rate (CBR), teenage fertility rate, and median age at childbearing (MAC) for urban and rural areas, Kiribati, 2010

Age group	No.of women	ASFR			Estimated births
		Kiribati	Urban	Rural	
15–19	5,344	0.0493	0.0446	0.0554	264
20–24	5,124	0.1779	0.1706	0.1871	911
25–29	4,346	0.2003	0.1977	0.2033	870
30–34	3,498	0.1721	0.1725	0.1726	602
35–39	2,943	0.1151	0.1153	0.1156	339
40–44	3,208	0.0390	0.0383	0.0402	125
45–49	2,715	0.0050	0.0055	0.0046	14
Total	**27,178**				**3,125**
TFR		**3.79**	**3.72**	**3.89**	
CBR		**30.4**	**33.3**	**26.6**	
MAC		**29.2**	**29.4**	**29.1**	

*Trussell's P/F ratio methods

Figure 4.4: Estimated age-specific fertility rate (ASFR) of women aged 15–49 in urban and rural areas, Kiribati, 2010



4.2.5 Crude birth rate

In 2010, the CBR for Kiribati as a whole was 30.4 births per 1,000 population, for South Tarawa (urban Kiribati) CBR was 33.3 births per 1,000 population, and for rural areas in Kiribati CBR was 26.6 births per 1,000 population (Table 4.5).

4.2.6 Mean age at childbearing

MAC is the mean age of mothers at the time of birth of their children if women were subject throughout their lives to the ASFR observed in a given year. It is calculated by adding ASFRs weighted by the mid-point of each age group, and dividing by the sum of ASFRs. In 2010, MAC was estimated to be 29.2 years (Table 4.5), down from 29.6 in 2005 (data not shown).

4.2.7 Teenage fertility rates

Teenage pregnancy is a major challenge in Kiribati due to concerns over the young age of the mother (implying a lack of parenting skills), the impact on her health and the health of her child. The adverse impact that an early pregnancy may have on a young woman's education and employment must also be considered. Similarly, unprotected sex exposes the mother and child to the risk of HIV/AIDs and other sexually transmitted infections. Teenage fertility rates correspond to the ASFR of women in the 15–19 age group.

Table 4.5 demonstrates that in 2010, the fertility rate for teenage mothers was 49 births per 1,000 women in the 15–19 age group, with significant differences between urban areas (44 births per 1,000 women) and rural areas (55 births per 1,000 women). This is a 25% increase from 2005 when the teenage fertility rate was 39 births per 1,000 teenage mothers (Fig. 4.5).

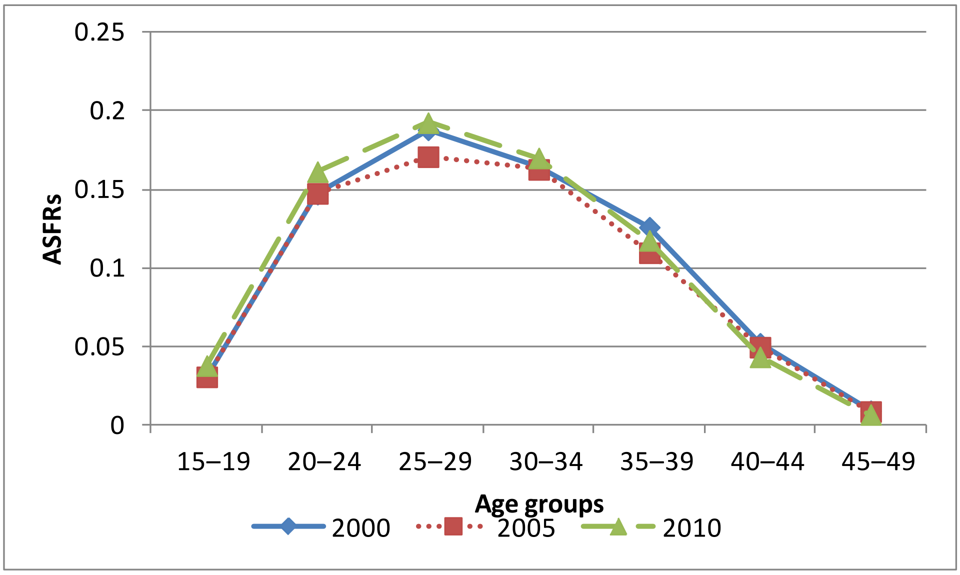
4.3 Fertility trends and patterns

The 2010 census-derived ASFRs were compared with ASFRs from the censuses of 2000 and 2005 (Fig. 4.5). The pattern of fertility rates in all three censuses demonstrate a similar trend, with peak rates occurring in women aged 25–29. In addition, in 2010, women in the 20–34 age groups had higher fertility rates than women in the same age cohort for years 2000 and 2005. This corresponds to the broader base of the population pyramid discussed in chapter 2, indicating more births in 2010 than in 2005. Fertility rates began declining at ages 30–34, dropping dramatically with increasing age. This either indicates that these older women have more control over the number of children they have, or that they have completed their childbearing.

Despite these broad similarities, two noteworthy developments emerge:

- overall lower ASFRs of women across all age groups in 2005; and
- a noticeable decline in fertility among women aged 40–49 since 2000, pointing to women ending their childbearing at earlier ages.

Figure 4.5: Age-specific fertility rates for women in Kiribati aged 15–49 in 2000, 2005 and 2010

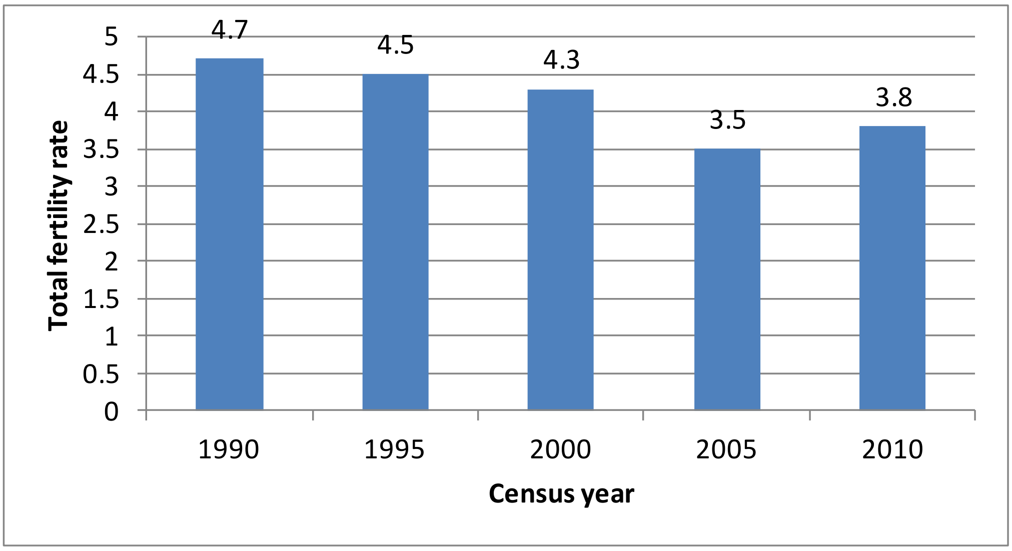


TFRs for Kiribati are shown in Figure 4.6, illustrating a declining trend over the past 20 years, and highlighting an uncharacteristic dip between 2000 and 2005. This dip may be due to several reasons, including:

1) the possibility that more effective family planning took place between 2000 and 2005, which resulted in less births during this period;
2) the possibility of undercounting in 2005, particularly of women in the reproductive age groups, which then resulted in missing out on some of their births;
3) the likelihood of women underreporting their total live births;
4) census fieldworkers not recording the births correctly; and
5) the possibility that more births occurred and were reported in 2010 (as indicated in the population pyramid in chapter 3), which had a broader base at age 0–4 years compared with the 2005 census.

Kiribati's TFR declined by just around 0.9 live birth per woman between 1990 and 2010, with women currently averaging almost 4 children. This rate (3.8) is almost double the replacement fertility levels (2.2), and ranks among the highest in the Pacific Islands region. At this rate, Kiribati will continue to experience high population growth into the near future.

Figure 4.6: Trends in Kiribati's total fertility rate for 1990, 1995, 2000, 2005 and 2010



4.4 Fertility and family planning

Fertility is affected by cultural, social, economic and health factors, and therefore, family planning is a key factor that can significantly impact on fertility. Many researchers have shown that a decline in fertility rates correlates with an increasing rate of contraceptive use. Such knowledge provides clues to potential changes in fertility and aids further understanding of past and current changes.

In most developing countries, such as Kiribati, information on family planning use is quite challenging to compile due to several problems and limitations that are frequently encountered during data collection and data processing. At the time of writing this report, information on family planning use was not available from the Ministry of Health due to new development changes within the data system. However, the results from the 2009 Kiribati Demographic Health Survey indicate that more than 90% of the sample population (men and women aged 15 and over) had knowledge of at least one contraceptive method. However, less than one-quarter of Kiribati's married women stated that they actually used a method of contraception.

4.5 Main findings

Fertility is one of the population processes that affect the structure (size, growth and distribution) of the population. This section summarises the key findings of fertility levels and the differences that are important to consider in future development planning and policy decisions regarding population growth, distribution, and service delivery, including education and health in Kiribati. Kiribati, like most Pacific Island countries, experiences significant challenges due to high fertility rates, which are the main source of high population growth rates. High population growth rates are always associated with socioeconomic problems, including high unemployment, urban growth with unplanned settlement practices, and poor sanitation.

The 2010 Kiribati census reported fertility levels of 3.8 births per women, implying that on average, a woman in Kiribati would have nearly 4 children if she were to pass through her childbearing years, and conformed to the 2010 census estimates of ASFRs. There has been an 8.5% increase in the fertility rate of 3.5 children per woman, as estimated from the 2005 census.

The following findings are highlighted to provide more insights on fertility rates, trends and patterns in Kiribati.

1. The fertility rate is higher among women in rural areas (TFR = 3.9) than in urban areas (TFR = 3.7), which implies that women in rural areas are more likely to have more children than women in urban areas.
2. According to the 2010 census, 27,178 women were in the childbearing ages of 15–49. In total, these cohorts had 54,563 children ever born alive, an average of 2.0 children ever born alive per woman in this age group. The average number of children ever born alive (or average parity) increases with age as expected. The average parity varies throughout each age cohort with younger women having the fewest children while women who had reached aged 40 had about 4 children on average.
3. Teenage fertility increased by 25%, from 39 live births in 2005 to 49 live births per 1,000 teenage girls in 2010. These results indicate the likelihood of more teenage girls entering childbearing at younger ages, which is always associated with higher chances of having larger sized family if not controlled, which in turn contributes to population growth. In addition, the risk of getting a sexually transmitted infection will be higher while the opportunity of gaining a better education and employment will be very low.
4. A comparison of ASFRs for the three census years of 2000, 2005 and 2010 clearly illustrate that fertility peaks among women in the 25–29 age group, before declining. By ages 44–49, women had completed their childbearing.
5. The data show that in the last two decades, Kiribati's fertility rate had declined by only 0.9 live births, with an average TFR of 3.8 children per women. This rate is almost double the replacement levels, placing Kiribati among the highest fertility populations in the Pacific Islands region. With the current fertility rate of about 4 children per women, Kiribati will continue to have high population growth in the future.

Chapter 5: Mortality

5.1 Introduction

The mortality of a population depends on various factors, including:

- its age–sex structure;
- access to health and medical services;
- environmental conditions and availability of infrastructure such as housing, water supply, sanitation, waste disposal;
- exposure to risk factors and substance abuse;
- work-related dangers;
- exposure to events outside individual control (e.g. natural disasters, war); and
- socioeconomic status and level of overall well-being.

Incidence of death reveals much about a population's standard of living and its general state of health, with indicators such as infant mortality and life expectancy at birth widely used to describe the overall development status of a country.

As with fertility and migration, mortality statistics are important ingredients of reliable population projections and estimates, which are essential to sound policy development and planning. The Kiribati government endorsed the 2000 Millennium Development Goals, and requires accurate and up-to-date mortality information in order to report on progress against key development goals regarding child and maternal health.

5.2 Data quality and availability

The Kiribati 2010 Census of Population and Housing was conducted on 7 November 2010. The census gathered the following information, which enabled the estimation of mortality rates through indirect methods:

- Number of household members that died in the last three years.
- Children ever born alive classified by age of mother.
- Children surviving (or dead) classified by age of mother.
- Whether a respondent's father and/or mother was surviving (orphanhood).
- Whether a respondent's marital status was 'widowed' (widowhood).

The accuracy and reliability of mortality rates depend heavily on female respondents giving complete answers to questions on the number of live births and total number of children who have died. Accurate recall of deaths of former household members is critical. Misreporting distorts the accuracy of mortality estimates and is particularly problematic for small populations. Use of indirect estimation methods based on census and survey data, allows for some adjustment to reporting errors.

5.3 Mortality measures and data sources

Mortality is measured using the crude death rate (CDR), the infant mortality rate (IMR), and by estimating life expectancy. As stated earlier, the inclusion of questions and information collected about deaths of household members, the number of children ever born alive by age of mother, children surviving (or dead) by age of mother, parental survivorship and widowhood are the main data sources used in calculating mortality measures. This section will examine, discuss and present the limitations and quality of these data sources.

5.3.1 Household deaths in the 12 months prior to the census

Information on deaths in the 12 months prior to the census provides a means of directly measuring recent mortality levels in the country. Based on the question about deaths in the household, Table 5.1 shows that 633 deaths occurred in the 12 months prior to the census. Of these reported deaths, 385 were of males and 248 were of females. Therefore, reported male deaths exceed reported female deaths by 21.6% of all deaths reported. Consequently, these data should be interpreted with caution because there appears to be a high level of underreporting of female deaths, particularly among older ages (when female deaths should exceed male deaths). There is also a problem with underreporting of male deaths at age zero, because male deaths should outnumber female deaths at this age.

The reported number of deaths in the same period provided by Kiribati's vital registration is 592, with 34% (199) being female deaths and 66% (393) being male deaths (Table 5.7). Vital registration data suggest that even fewer deaths, especially among females, were registered as compared with deaths reported in the census. This suggests that a number of deaths, especially those of women, are never registered.

Table 5.1: Deaths reported in the 2010 Kiribati census to have occurred between 7 November 2009 and 6 November 2010

Age	Sex		
	Total	Males	Females
0	**90**	43	47
1–4	**42**	30	12
5–9	**12**	6	6
10–14	**5**	4	1
15–19	**29**	20	9
20–24	**25**	15	10
25–29	**22**	15	7
30–34	**22**	18	4
35–39	**29**	18	11
40–44	**31**	21	10
45–49	**45**	31	14
50–54	**40**	25	15
55–59	**69**	42	27
60–64	**29**	21	8
65–69	**42**	26	16
70+	**101**	50	51
Total	**633**	**385**	**248**

To further evaluate the completeness of the reported number of household deaths, the Preston-Coale method was applied. This application is also part of the United Nations Population Analysis Spreadsheets (PAS), which are commonly used for population analysis exercises. The results show that the mean implied completeness of the Kiribati 2010 census data on adult mortality was about 52% of which was 42% were females and 62% were of males. This underreporting has resulted in an overestimation of life expectancy in Kiribati (data not shown).

5.3.2 Children ever born alive, survived and died

The 2010 Kiribati census questionnaire also asked women aged 15 and over about the total number of live children they had ever given birth to and how many of them had died.

The proportion of children ever born but who have died is an indicator of child mortality. In the 2010 census, 34,141 women aged 15 and over were reported to have given birth to 88,322 live children from the beginning of their childbearing years until 7 November 2010 (Table 5.2).

Of these 88,322 children, 89.2% (78,809) were still alive at the time of the census, and 10.8% (9,513) had died (Table 5.2).

The proportion of children who died increased with the mother's age, with 5.7% of children born to mothers in the 15–19 age group having died, compared with 8.9% of children born to mothers in the 40–44 age group. The direct calculation of the sex ratio in the last column of Table 5.3 indicates the probability of male and female children dying. On average, the sex ratio was 1.3, meaning that more male children than female children died.

Table 5.2: Females aged 15 and over by the total number of children ever born, survived and died, Kiribati 2010

Age of mother	Total females	Children ever born			Children survived			Children died		
		Males	Females	Total	Males	Females	Total	Males	Females	Total
15–19	5,344	233	238	471	224	220	444	9	18	27
20–24	5,124	1,773	1,714	3,487	1,677	1,642	3,319	96	72	168
24–29	4,346	3,539	3,387	6,926	3,320	3,187	6,507	219	200	419
30–34	3,498	4,742	4,452	9,194	4,389	4,197	8,586	353	255	608
35–39	2,943	5,076	4,887	9,963	4,696	4,584	9,280	380	303	683
40–44	3,208	6,737	6,206	12,943	6,084	5,697	11,781	653	509	1,162
45–49	2,715	5,947	5,632	11,579	5,261	5,142	10,403	686	490	1,176
50–54	2,079	4,963	4,675	9,638	4,294	4,192	8,486	669	483	1,152
55–59	1,578	3,881	3,550	7,431	3,258	3,137	6,395	623	413	1,036
60–64	1,066	2,516	2,502	5,018	2,048	2,197	4,245	468	305	773
65–69	878	2,284	2,153	4,437	1,834	1,829	3,663	450	324	774
70–74	680	1,772	1,787	3,559	1,360	1,509	2,869	412	278	690
75+	682	1,861	1,815	3,676	1,392	1,439	2,831	469	376	845
Total	**34,141**	**45,324**	**42,998**	**88,322**	**39,837**	**38,972**	**78,809**	**5,487**	**4,026**	**9,513**

Table 5.3: Females aged 15 and over by the proportion of children ever born alive, survived and died, Kiribati 2010

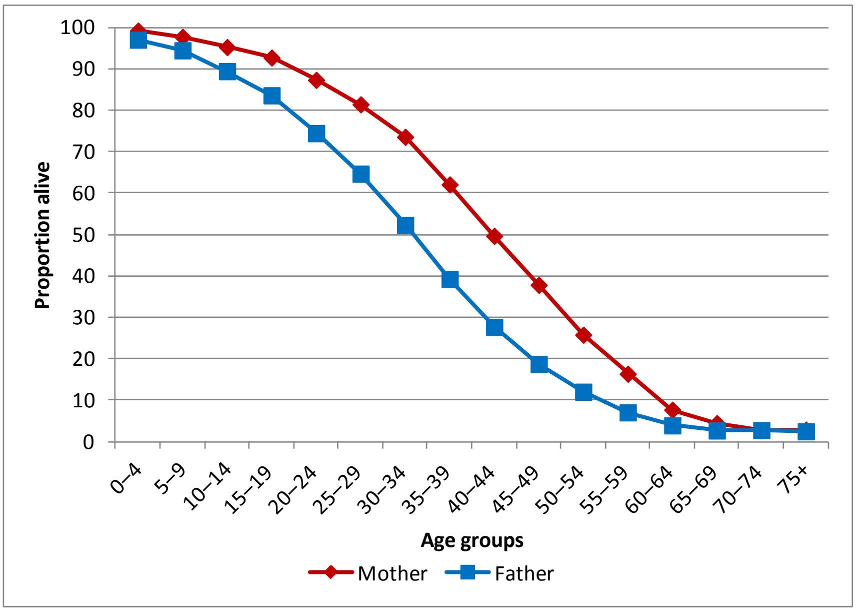
Age of mother	Total females	Proportion of children survived			Proportion of children died			Death
		Males	Females	Total	Males	Females	Total	Sex ratio
15–19	5,344	96.14	92.44	94.27	3.86	7.56	5.73	0.51
20–24	5,124	94.59	95.80	95.18	5.41	4.20	4.82	1.29
24–29	4,346	93.81	94.10	93.95	6.19	5.90	6.05	1.05
30–34	3,498	92.56	94.27	93.39	7.44	5.73	6.61	1.30
35–39	2,943	92.51	93.80	93.14	7.49	6.20	6.86	1.21
40–44	3,208	90.31	91.80	91.02	9.69	8.20	8.98	1.18
45–49	2,715	88.46	91.30	89.84	11.54	8.70	10.16	1.33
50–54	2,079	86.52	89.67	88.05	13.48	10.33	11.95	1.30
55–59	1,578	83.95	88.37	86.06	16.05	11.63	13.94	1.38
60–64	1,066	81.40	87.81	84.60	18.60	12.19	15.40	1.53
65–69	878	80.30	84.95	82.56	19.70	15.05	17.44	1.31
70–74	680	76.75	84.44	80.61	23.25	15.56	19.39	1.49
75+	682	74.80	79.28	77.01	25.20	20.72	22.99	1.22
Total	**34,141**	**87.89**	**90.64**	**89.23**	**12.11**	**9.36**	**10.77**	**1.29**

5.3.3 Orphanhood

Information collected on the survival of parents (orphan hood) and the survival of spouses (widowhood) can be used to make indirect estimates of adult mortality. Regarding the survival of parents, all respondents were asked whether their biological mother and father were still alive. The question regarding the respondent's marital status is used as a proxy to determine whether the person is widowed or not. Appendix 5 shows the population by age, sex and parental survivorship.

Figure 5.1 presents the proportion of the population whose mother and father are still alive. Based on the 2010 census data, the proportion of fathers still alive was lower than the proportion of mothers still alive. In total, 77,530 mothers were still alive (75.2%) compared with 66,447 fathers still alive (64.5%). The results indicate that males, or fathers, have lower survival rates than females (or mothers) for all ages up to age 70.

Figure 5.1: Proportion of the population with mother and father still alive, Kiribati 2010



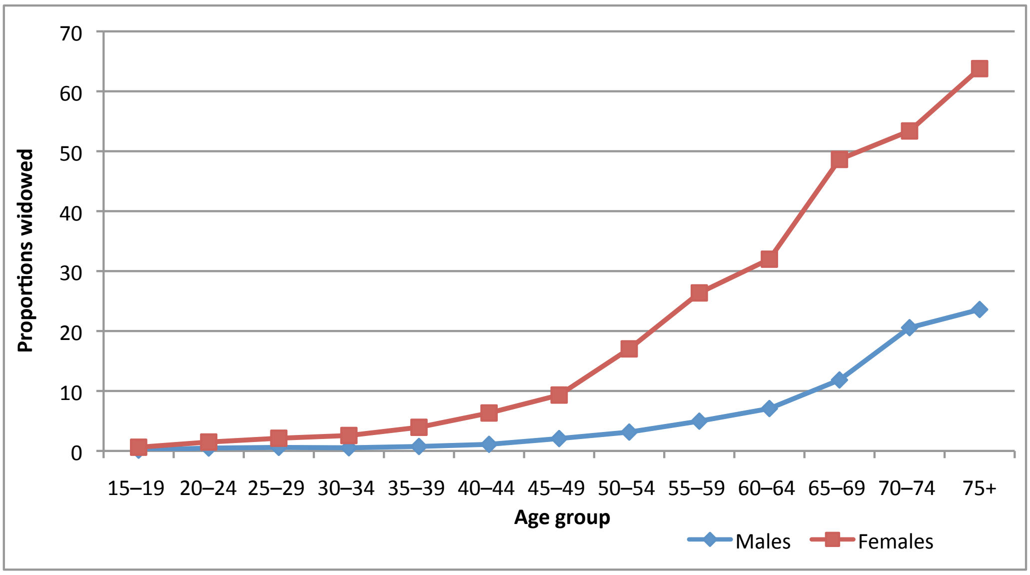
5.3.4 Widowhood

Information on widowhood is shown in Table 5.4 and Figure 5.2. The proportion of the married population who were widowed at the time of the 2010 census was much higher for women than for men in all age groups, but particularly in older age groups. The gap in widowhood between women and men becomes wider and wider into older age groups. This is because mortality rates are higher for men than for women in Kiribati in all age groups.

Table 5.4: Population aged 15 and over by five-year age group and proportion widowed, Kiribati 2010

Age group	Population			Widowed		
	Males	Females	Total	Males	Females	Total
15–19	5,582	5,344	10,926	7	33	40
20–24	5,242	5,124	10,366	25	76	101
25–29	4,070	4,346	8,416	24	92	116
30–34	3,223	3,498	6,721	17	90	107
35–39	2,682	2,943	5,625	20	116	136
40–44	2,908	3,208	6,116	32	203	235
45–49	2,519	2,715	5,234	52	253	305
50–54	1,813	2,079	3,892	57	354	411
55–59	1,349	1,578	2,927	67	416	483
60–64	919	1,066	1,985	65	341	406
65–69	642	878	1,520	76	427	503
70–74	428	680	1,108	88	363	451
75+	356	682	1,038	84	435	519
Total	**31,733**	**34,141**	**65,874**	**614**	**3,199**	**3,813**

Figure 5.2: Population aged 15 and older by sex, age group and proportion widowed, Kiribati 2010



5.4 Mortality indicators

5.4.1 Infant and childhood mortality

In countries where administrative data are incomplete and the tendency to underreport deaths is high, the direct method of estimating mortality is not considered. It is more appropriate in the case of Kiribati to calculate mortality rates using indirect methods. The results and discussion are presented below.

The United Nations software package MORTPAK 4.1 (procedure CEBCS) was used to derive early age mortality estimates for Kiribati (Appendices 6 and 7) from data on the average number of children ever born and the average number of children surviving, tabulated by age group of mother on 7 November 2010.

The infant mortality rate (IMR) is the number of deaths of those less than 1 year of age per 1,000 live births during the same period. In 2010, IMR was 50 for males and 39 for females, which is a decrease from 2005 when IMR was 53 for males and 51 for females (Table 5.5).

The child mortality rate is the probability of a child dying between the ages of 1 and 5 years. The child mortality rate for Kiribati is estimated to be 16 for male children and 11 for female children per 1,000 population aged between 1 and 5 years (Table 5.5).

The under 5 mortality rate refers to the probability of a child dying between birth and age 5, and is estimated to be 66 for male children and 50 for female children per 1,000 population aged between 0 and 5 years (Table 5.5).

Table 5.5: Early age mortality indices, Kiribati 2005 and 2010

Mortality indices/sex	2005	2010
Infant mortality rate (IMR)-q1		
Males	53	50
Females	51	39
Total	**52**	**45**
Child mortality rate (4q1)		
Males	**18**	**16**
Females	17	11
Total	18	14
Under 5 mortality rate (q5)		
Males	71	66
Females	**68**	**50**
Total	69	59

Table 5.6 presents early age mortality rates by sex for Kiribati's urban and rural populations from three census years (2000, 2005 and 2010). Over this 10-year period, early age mortality rates have fluctuated for both males and females in urban and rural areas, which could be attributed to the small number of deaths involved. However, most urban early age mortality rates in 2010 were lower than in 2000, whereas in rural areas early age mortality rates were higher in 2010 than in 2005.

Table 5.6: Early age mortality indices by sex and region from census data for 2000, 2005 and 2010

Mortality indices/sex	2000		2005		2010	
	Urban	**Rural**	**Urban**	**Rural**	**Urban**	**Rural**
Infant mortality rate (IMR)-q1						
Males	50.3	41.0	42.0	62.0	51.0	49.0
Females	40.0	39.7	38.0	61.0	35.0	44.0
Total	45.2	40.4	40.0	61.5	43.0	46.5
Child mortality rate (4q1)						
Males	17.5	11.5	12.0	24.0	17.0	16.0
Females	11.5	12.0	11.0	23.0	9.0	13.0
Total	14.5	11.8	11.5	23.5	13.0	14.5
Under 5 mortality rate (q5)						
Males	67.8	52.5	54.0	86.0	68.0	65.0
Females	51.5	51.7	49.0	84.0	44.0	57.0
Total	59.7	52.1	51.5	85.0	56.0	61.0

5.4.2 Life expectancy

5.4.2.1 Direct methods

Information on the total number of reported deaths from the census or from administrative data sources (vital registration or administrative health datasets) can be used directly to calculate age-specific death rates, which are the main inputs for deriving life expectancy. Table 5.7 illustrates the age-specific death rate and CDR by age group and sex based on the reported deaths from the 2010 census and civil registration dataset. As shown, CDR derived from the census is 6.2 deaths per 1,000 population, but is 5.8 when using vital registration data, an indication of underreported deaths from vital registration.

To derive life expectancy directly from census-reported death data, the US Census Bureau's PAS software LTPOPDTH application was used. The application used data on the total number of reported deaths (which occurred between 7 November 2009 and 6 November 2010) by five-year age group of mothers, with the population by age group and sex for 8 May 2010 (the midpoint of the 12 months of deaths data used). Thereafter, United Nation's MORTPAK procedure LIFTB, with age-specific death rate (m(x,n)) values as the main input requirement, was also used. Both methods yield high life expectancies of about 62 years for males. LIFTB yielded 69 years for females and LTPOPDTH yielded 78 years for females (Table 5.9). These life expectancies are high for a developing world population such as Kiribati, particularly for females, which is probably attributable to underreporting of female deaths.

These results produced from direct methods of calculation are only provided for the purpose of highlighting the data limitation on reported deaths and its effect of increasing life expectancies. These estimates should not be used.

Table 5.7: Mid-year population, deaths in the 12 months prior to the census, and age-specific death rate, Kiribati 2010

Census deaths	Mid-year population (May 8)			Deaths in 12 months prior the census			Age-specifc death rate (ASDR)		
Age group	Total	Males	Females	Total	Males	Females	Total	Males	Females
0	2,930	1,519	1,411	90	43	47	0.0307	0.0283	0.0333
1–4	10,714	5,436	5,277	42	30	12	0.0039	0.0055	0.0023
5–9	11,161	5,794	5,367	12	6	6	0.0011	0.0010	0.0011
10–14	12,022	6,135	5,887	5	4	1	0.0004	0.0007	0.0002
15–19	10,913	5,575	5,338	29	20	9	0.0027	0.0036	0.0017
20–24	10,168	5,131	5,037	25	15	10	0.0025	0.0029	0.0020
25–29	8,234	3,981	4,253	22	15	7	0.0027	0.0038	0.0016
30–34	6,593	3,157	3,436	22	18	4	0.0033	0.0057	0.0012
35–39	5,703	2,721	2,982	29	18	11	0.0051	0.0066	0.0037
40–44	6,022	2,873	3,150	31	21	10	0.0051	0.0073	0.0032
45–49	5,131	2,466	2,664	45	31	14	0.0088	0.0126	0.0053
50–54	3,809	1,776	2,033	40	25	15	0.0105	0.0141	0.0074
55–59	2,875	1,327	1,548	69	42	27	0.0240	0.0317	0.0174
60–64	1,959	906	1,052	29	21	8	0.0148	0.0232	0.0076
65–69	1,495	632	863	42	26	16	0.0281	0.0412	0.0185
70–74	1,108	428	680	36	16	20	0.0325	0.0374	0.0294
75+	1,021	351	670	65	34	31	0.0637	0.0969	0.0463
Total	**101,858**	**50,208**	**51,650**	**633**	**385**	**248**	**0.0062**	**0.0077**	**0.0048**
Civil data									
0	2,930	1,519	1,411	28	15	13	0.0096	0.0099	0.0092
1–4	10,714	5,436	5,277	13	6	7	0.0012	0.0011	0.0013
5–9	11,161	5,794	5,367	8	6	2	0.0007	0.0010	0.0004
10–14	12,022	6,135	5,887	10	4	6	0.0008	0.0007	0.0010
15–19	10,913	5,575	5,338	12	6	6	0.0011	0.0011	0.0011
20–24	10,168	5,131	5,037	24	18	6	0.0024	0.0035	0.0012
25–29	8,234	3,981	4,253	21	17	4	0.0026	0.0043	0.0009
30–34	6,593	3,157	3,436	31	28	3	0.0047	0.0089	0.0009
35–39	5,703	2,721	2,982	28	17	11	0.0049	0.0062	0.0037
40–44	6,022	2,873	3,150	35	30	5	0.0058	0.0104	0.0016
45–49	5,131	2,466	2,664	61	43	18	0.0119	0.0174	0.0068
50–54	3,809	1,776	2,033	58	42	16	0.0152	0.0236	0.0079
55–59	2,875	1,327	1,548	52	38	14	0.0181	0.0286	0.0090
60–64	1,959	906	1,052	42	30	12	0.0214	0.0331	0.0114
65–69	1,495	632	863	40	26	14	0.0268	0.0412	0.0162
70–74	1,108	428	680	34	18	16	0.0307	0.0421	0.0235
75+	1,021	351	670	95	49	46	0.0931	0.1396	0.0687
Total	**101,858**	**50,208**	**51,650**	**592**	**393**	**199**	**0.0058**	**0.0078**	**0.0039**

5.4.2.2 Indirect methods

The indirect method of estimating life expectancy for Kiribati is presented in two ways: from infant and childhood mortality only, and a combination of infant, childhood mortality and adult mortality.

The first approach is determined for the main purpose of comparison with the 2005 census when life expectancies at birth for males and females were derived from child mortality data.

To calculate male and female life expectancy at birth using child mortality data, MORTPAK procedure MATCH was used. The mortality pattern was based on the Far East Asian United Nations model life tables, which were assumed to most closely match the empirical mortality pattern of Kiribati. The empirical mortality pattern was calculated by using the number of census-recorded deaths and population data by age and sex (as denominators) to determine age-specific death rates. Table 5.9 presents the results. Life tables are in Appendices 8 and 9 while Appendix 10 shows the estimated number of deaths and crude death rates..

The second approach to determine life expectancy is undertaken by linking data on childhood mortality and adult mortality. Child mortality data are obtained from Table 5.5, while adult mortality data are extracted from orphanhood data, discussed in section 5.3.3. MORTPAK software ORPHAN procedure enables the calculation of adult life expectancy (from age 20 onwards) from tabulations on the proportion of the population with mothers and fathers still alive by age group (Brass and Hill 1973). Table 5.8 presents the results for both males and females, which are the required input for constructing the completed life table.

Table 5.8: Life expectancy at age 20 (E20)

Life expectancy E(20)	Males	Females	Total
E(20)	42.8	51.1	46.95

MORTPAK software COMBIN procedure was applied to construct the Kiribati 2010 completed life table. COMBIN links child and adult mortality data together to produce completed life expectancy at birth. Appendices 11 and 12 provide detailed completed life tables. Appendix 13 provides the adjusted number of deaths and estimated crude death rates.

Table 5.9 presents the summary result of life expectancy and CDRs for Kiribati males and females based on 2010 census data derived from direct and indirect methods. Life expectancies and CDRs calculated using indirect methods produced by the combination of childhood mortality and adult mortality provide the most reliable data for users. These are the values in bold in the last row of Table 5.9. These figures are considered to be more refined because data reporting errors have been minimised through indirect methods, and they compare more realistically with previous census life expectancies. Therefore, 2010 life expectancies for Kiribati in 2010 were 58 years for males and 66 years for females.

Table 5.9: Life expectancies at birth-e(0) and crude death rates by sex derived by different methods and procedures, Kiribati 2010

Methods	Life expectancy e(0)			Crude death rate		
	Males	Females	Total	Males	Females	Total
Direct methods						
Reported deaths (LTPOPDTH)	62.9	77.8	70.35	7.7	4.6	6.6
Age-specific death rates (LIFTB)	61.5	69.2	65.35	7.7	4.8	6.2
Indirect methods						
Childhood mortality only (MATCH)	59.7	67.5	63.6	9.1	6.6	7.8
Childhood and adult mortality (COMBIN)	**58.0**	**66.3**	**62.2**	**10.1**	**7.2**	**8.6**

5.5 Mortality trend

Data on the mortality trend is critical to enabling data users to understand how mortality rates in Kiribati have changed over time. The direction of the changes provides an indication of the success of national or international inputs and interventions designed to reduce mortality, and of the need for amendments to interventions, setting future goals and plans.

Three indices of infant and child mortality are presented by sex for five censuses in Figure 5.3. There are clear declines in all indices from the 1990 census to the 2010 census. These declines in infant and childhood mortality rates are the result of the combined efforts of the Kiribati government health department, other national public and private sectors, individuals and international public and private bodies to ensure that health services are securely in place and easily accessible.

Despite these improvements, there is scope to further reduce mortality rates and meet international commitments such as the Millennium Development Goals (MDGs). According to the MDGs (Goal 4: Reduce child mortality), infant and under 5 mortality rates should be reduced by two-thirds between 1990 and 2015. IMRs for males were 73% of the 1990 rate in 2010, whereas for females, rates were 59% of the 1990 level. Mortality rates for children aged 1 to 4 were at 57% of the 1990 level for males and 41% for females. Mortality rates for children aged 0–4 were at 68% of the 1990 level for males and 54% for females. Therefore, Kiribati is closer to achieving its MDG Goal #4 for females in all indices, although much more work is required to reach this target for males, especially for those in infancy.

Figure 5.3: Infant and childhood mortality rate by sex, Kiribati 1990, 1995, 2000, 2005 and 2010

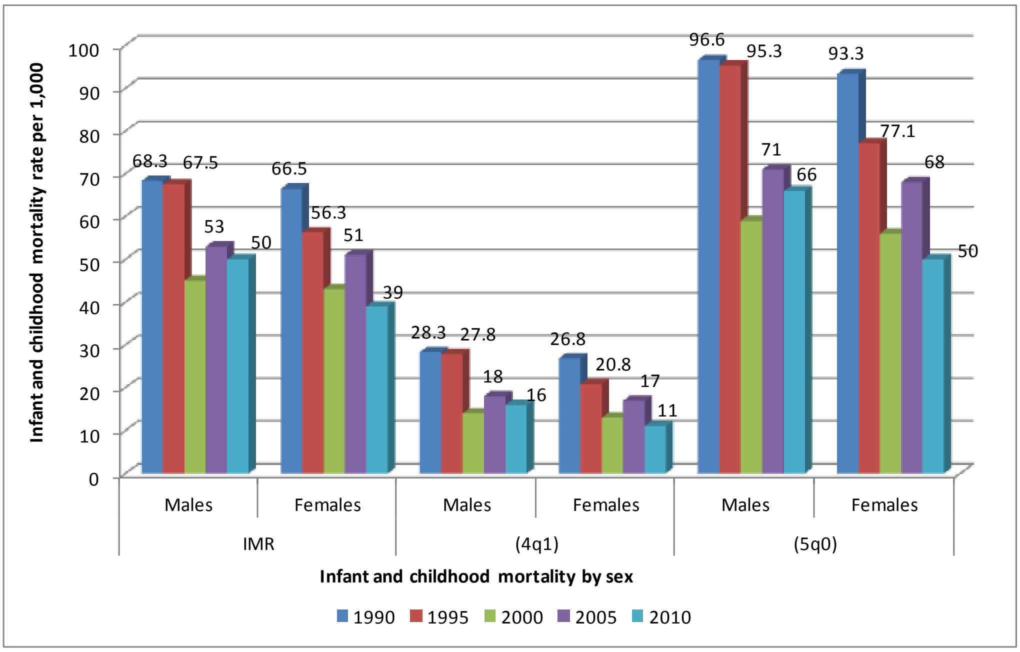
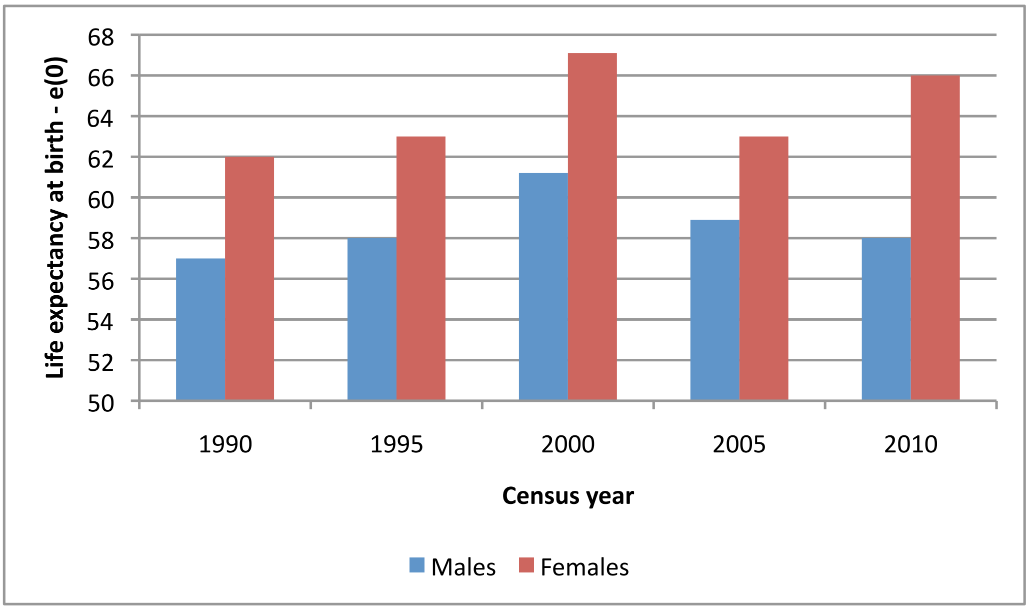


Figure 5.4 presents the estimated life expectancy for males and females using data from the previous five censuses. Two observations can be made from this graph. First, the trend in the last two decades shows some improvement for females (four years of increased life expectancy at birth) but limited improvement for males (one year of increased life expectancy at birth between 1990 and 2010). The second distinct point about Kiribati's life expectancy is that the gap between male and female life expectancy has widened from five years in 1990 to eight years in 2010.

Figure 5.4: Kiribati estimated life expectancy by sex, 1990–2010



5.6 Maternal mortality

The maternal mortality rate (MMR) is the number of women who die as a result of complications during pregnancy or childbearing in a given year per 100,000 live births in that year. The Kiribati 2010 census questionnaire gathered information on female deaths and whether they were pregnancy or childbearing-related deaths, permitting the calculation of MMR. Total births in the 12 months prior to the 2010 census were estimated to be 2,964, while 5 maternal deaths were reported from the total of 248 female deaths (data not shown). The calculated MMR based on these data was about 169 deaths per 100,000 live births. In comparison, administrative data from the Kiribati Ministry of Health estimated MMR in 2010 at 125 deaths per 100,000 live births (Table 5.10).

Table 5.10: Reported number of deliveries, number of maternal deaths, and maternal mortality rate, Kiribati 2001–2010

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Number of deliveries	1,980	1,957	1,800	1,864	2,281	1,404	1,281	1,492	804	1,596
Number of deaths due to pregnancy or delivery	3	2	3	4	0	1	0	1	0	2
Maternal mortality rates	152	102	167	215	0	71	0	67	0	125

Source: Ministry of Health, Statistics Section, Kiribati Government

5.7 Main findings

1. Based on 2010 census information collected on children ever born and children surviving, the total IMR in 2010 was estimated to be 45 per 1,000 live births, a decline of about 13% from 2005 when IMR was 52. Male IMR was higher than female IMR, meaning that more male children died than female children.
2. The child mortality rate (4q1), or the probability of dying between the ages of 1 and 5, was estimated to be 14 per 1,000 population aged 1 to 4, with 16 for male children aged between 1 and 4, and 11 for female children of the same ages. The under 5 mortality rate was 66 for male children and 50 for female children. All early age mortality rates showed a declining trend when compared with 2005 census results.
3. Adult mortality information with regard to life expectancy at age 20 derived from orphanhood data indicates the likelihood of females living longer than their male adult counterparts. Life expectancy at age 20 is estimated to be only 43 for males and 51 for females. This is supported by the higher proportion of fathers who died than mothers, along with data on marital status, which resulted in more female widowers than male widowers.
4. Life expectancy at birth for males is 58 while female life expectancy is estimated to be 66. This is derived from early child mortality and adult mortality (based on orphanhood) information. In comparison with the 2005 life expectancy estimates, males showed no improvement, whereas female life expectancy increased by three years. However, this is derived from early child mortality information only.
5. MMRs, based on 2010 census information about female deaths caused by pregnancy and childbearing complications, are estimated to be about 169 deaths per 100,000 live births. The calculated MMR from the Kiribati Ministry of Health was reported to be 125 deaths per 100,000 live births, 44 fewer deaths per 100,000 live births than reported in the 2010 census.
6. These mortality rates and life expectancy indicators reveal much about Kiribati's standard of living. By examining mortality trends in Kiribati over the last two decades, the results showed some progress, particularly in infant and child mortality and life expectancy for females, with only limited change for males. This emphasises the need for further work in reducing risky behaviour by males, and in improving healthcare access and uptake for everyone in Kiribati.

Chapter 6: Migration

6.1 Introduction

Migration is a form of geographic or spatial mobility that involves the changing of a person's usual residence between clearly defined geographic areas in a specified given time. In particular, migration is another factor — besides fertility and mortality — that affects not only the growth and decline of a population, but also the demographic characteristics of the areas of origin and destination. Hence, knowledge of migration is required in order to analyse the changes in a population's size and characteristics. These types of information are useful for policy-makers as a basis from which to develop strategic plans that deal with population changes caused by migration.

This chapter presents the estimated level of two broad types of migration: internal and international. A discussion on data sources for the two types of migration is presented and is followed by a description of the procedures used to estimate the level of migration in Kiribati.

6.2 Internal migration

Internal migration refers to the movement of people within Kiribati. During the 2010 census, people were asked about their place of birth, usual residence, and home island. The level of internal migration in Kiribati is estimated by comparing place of enumeration with place of usual residence, place of residence one year prior to the census and place of birth. The data collected on place of enumeration by place of residence one year prior to the census were not analysed due to some inconsistencies in the data — this question should be asked of all people aged one year and above but instead was asked of all people aged three years and above.

6.2.1 Usual place of residence

Of Kiribati's total 2010 population (103,058), 95% stated that their usual place of residence was the same as their place of enumeration; only 4% were enumerated in the place that was not their usual residence; 183 people stated that their usual place of residence was overseas — the majority of these people were enumerated in South Tarawa (Table 6.1).

Table 6.1: Population by place of enumeration and by place of usual residence, Kiribati 2010

Island of enumeration	Usual residence			
	Same residence	Elsewhere	Overseas	Total
Banaba	242	53	0	**295**
Makin	1,792	6	0	**1,798**
Butaritari	3,774	572	0	**4,346**
Marakei	2,801	70	1	**2,872**
Abaiang	5,341	161	0	**5,502**
North Tarawa	5,622	476	4	**6,102**
South Tarawa	48,504	1,569	109	**50,182**
Maiana	1,989	37	1	**2,027**
Abemama	2,902	303	8	**3,213**
Kuria	965	15	0	**980**
Aranuka	1,018	39	0	**1,057**
Nonouti	2,420	253	10	**2,683**
North Tabiteuea	3,624	65	0	**3,689**
South Tabiteuea	1,240	50	0	**1,290**
Beru	2,068	31	0	**2,099**
Nikunau	1,872	35	0	**1,907**
Onotoa	1,504	15	0	**1,519**
Tamana	934	17	0	**951**
Arorae	1,272	6	1	**1,279**
Teeraina	1,576	112	2	**1,690**
Tabuaeran	1,873	84	3	**1,960**
Kiritimati	5,005	537	44	**5,586**
Kanton	31	0	0	**31**
Total	**98,369**	**4,506**	**183**	**103,058**

6.2.2 Lifetime migration (place of birth)

Table 6.2 presents the population by place of enumeration and by place of birth in 2010, illustrating the lifetime migration of current residents. The data show that 57% of the total population were counted in their place of birth. About 40% were enumerated on another island in Kiribati — different from their place of birth — and 3% stated that their place of birth was outside of Kiribati, with most of those people currently residing in South Tarawa (Table 6.2).

Table 6.2: Population by place of enumeration and place of birth, Kiribati 2010

Place of enumeration	Place of birth			Total
		Elsewhere		
	Same place	In Kiribati	Overseas	
Banaba	113	146	36	**295**
Makin	1,418	366	14	**1,798**
Butaritari	3,136	1,159	51	**4,346**
Marakei	2,301	556	15	**2,872**
Abaiang	3,785	1,653	64	**5,502**
North Tarawa	3,322	2,662	118	**6,102**
South Tarawa	27,113	21,166	1,903	**50,182**
Maiana	1,353	653	21	**2,027**
Abemama	1,601	1,535	77	**3,213**
Kuria	368	575	37	**980**
Aranuka	558	464	35	**1,057**
Nonouti	1,636	991	56	**2,683**
North Tabiteuea	2,731	910	48	**3,689**
South Tabiteuea	848	429	13	**1,290**
Beru	1,434	636	29	**2,099**
Nikunau	1,201	665	41	**1,907**
Onotoa	981	503	35	**1,519**
Tamana	637	292	22	**951**
Arorae	815	430	34	**1,279**
Teeraina	761	904	25	**1,690**
Tabuaeran	725	1,208	27	**1,960**
Kiritimati	2,134	3,286	166	**5,586**
Kanton	1	29	1	**31**
Total	**58,972**	**41,218**	**2,868**	**103,058**

Table 6.3: Population by place of enumeration and place of birth, Kiribati 2010

Place of enumeration	Place of birth				
	South Tarawa	Gilberts group (excl. South Tarawa)	Line & Phoenix group	Overseas	Total
South Tarawa	27,113	20,006	1,160	1,903	**50,182**
Gilberts group (excluding South Tarawa)	6,611	35,760	492	746	**43,609**
Line & Phoenix group	1,719	3,152	4,177	219	**9,267**
Total	**35,443**	**58,918**	**5,829**	**2,868**	**103,058**

As seen in Table 6.3, 34% (35,443) of people reported that their place of birth was South Tarawa, 57% (58,918) claimed that they were born elsewhere in the Gilbert group and only 6% (5,829) said that their place of birth was in the Line and Phoenix group. Of the 35,443 people born in South Tarawa, 76% were recorded in South Tarawa at the time of the census, 19% were enumerated in the Gilbert group, and 5% in the Line and Phoenix group.

Of the total number of people whose place of birth was the Gilbert group, excluding South Tarawa (58,918), 34% resided in South Tarawa and 5% resided in the Line and Phoenix group. The vast majority of people born in the Line and Phoenix group were residing there (72%), with 20% enumerated in South Tarawa and 8% in the Gilbert group.

Table 6.4 illustrates the lifetime net migration of current Kiribati residents, between South Tarawa (urban), the remaining islands in the Gilbert group, and the Line and Phoenix group. Overall, South Tarawa recorded a net gain of 14,739 people, mainly from other islands in the Gilbert group. The Line and Phoenix group had a net gain of 3,438 people, whereas the Gilbert group had a net loss of 15,309 people.

Table 6.4: Interregional lifetime migration, Kiribati 2010

Place of enumeration	In-migrants (from within Kiribati)	Immigrants (from overseas)	Out-migrants (from within Kiribati)	Net migrants
South Tarawa	21,166	1,903	8,330	14,739
Gilberts group	7,103	746	23,158	-15,309
Line & Phoenix group	4,871	219	1,652	3,438
Net migrants (within Kiribati)	33,140		33,140	0
Overseas/place unknown		2,868		2,868

6.3 International migration

International migration is defined as the movement of people across national boundaries for the purpose of establishing a new residence. International migration has two components: emigration and immigration. Emigration is the movement of people *out of* the country, whereas immigration is the movement of people *into* the country.

Data on international migration for many developing countries, including Kiribati, are often non-existent or of poor quality. Because administrative data can be unavailable or unreliable, measuring the level of international migration can also be accomplished by using data collected from censuses or surveys that have similar migration-related questions. Another common approach in estimating the level of international migration is by applying indirect estimation of net migration using the population balancing equation.

The 2010 census included migration-related questions that were used to estimate the level of immigration. All people staying in Kiribati during the census night were asked about their:

- place of birth,
- home island, and
- place of residence in the year prior to the 2010 census.

In response to the question on place of birth, only 6% (2,868) stated that they were born outside of Kiribati. Of those, 1,446 stated that their place of birth was Nauru, and 489 stated they were born in Fiji.

Those who said their home island was overseas accounted for 1% (972).

6.3.1 Indirect estimation of net migration

Given the lack of complete and accurate measures in many Pacific Island countries, demographers resort to the balancing equation, which allows for an indirect measure of net migration. With population growth over time, representing the sum total of births, deaths and net-migration, and knowing the value of three of the four components of the equation (population growth, births and deaths), the residual value describes the magnitude of migration.

Population growth = Births *minus* Death *plus* Net-migration

Given the fluctuation of migration over time, it is advisable to adopt a longer period than just one census interval to apply this method; hence, a 10-year time span has been adopted, in this instance, from 2000–2010.

$$\textit{Population growth}_{\{2000-2010\}} = \text{Births}_{\{2000-2010\}}\ \textit{minus Deaths}_{\{2000-2010\}}\ \textit{plus Net-migration}_{\{2000-2010\}}$$

The annual population growth between 2000 and 2010 was 1.986%; the average crude birth rates (CBR) was 28.5 per 1,000 people, and the crude death rate (CDR) for the same period was 8.65 per 1,000 people. Inserting these figures into the balancing equation, with the annual growth rate converted into a per thousand measure to make it compatible with CBR and CDR, points to a net-migration of almost zero (0.01).

$$19.86 = 28.5 - 8.65 + \text{Net-migration}$$
$$19.86 - 28.5 + 8.65 = \text{Net-migration}$$

$$\text{Net-migration} = 0.01/1000$$

This is not to say that people do not move to or leave Kiribati; a net-migration of virtually zero during the past decade merely illustrates that:

- immigration (such as the return migration of I-Kiribati from Nauru or the arrival of citizens from other countries), and emigration (such as I-Kiribati migrating elsewhere and other nationals leaving the country) balanced each other out; and
- Kiribati's population growth has been largely driven by births and deaths.

Following the introduction of the New Zealand–Kiribati migration scheme in 2002, known as the Pacific Access Category scheme, an opportunity exists for 75 I-Kiribati residents to move to New Zealand each year. Marrying foreign nationals, and long-term studies abroad provide other opportunities for I-Kiribati to emigrate or temporarily relocate overseas. Such opportunities, combined with a decrease in the number of I-Kiribati returning from Nauru in recent times, point to a likely negative net-migration rate in the future.

Chapter 7: Social characteristics

7.1 Religious affiliation

In Kiribati, 56% (57,503) of the population is Catholic, 34% (34,528) belong to the Kiribati Protestant Church, and 5% (4,802) are Mormons. Other religions with more than 2,000 members are the Bahai (2,322) and Seventh-Day Adventist (2,085).

In addition, 51 people said that they did not belong to any religious group, while 212 people did not state their religious affiliation.

Table 7.1: Population by religious affiliation and sex – Kiribati 2010

Religious affiliation	Sex			Percent of total population		
	Male	Female	Total	Male	Female	Total
Catholic	28,322	29,181	**57,503**	55.8	55.8	**55.8**
Kiribati Protestant Church	17,045	17,483	**34,528**	33.6	33.5	**33.6**
Seven Day Adventist	1,007	1,078	**2,085**	2.0	2.1	**2.0**
Church of God	164	196	**360**	0.3	0.4	**0.3**
Mormon	2,342	2,460	**4,802**	4.6	4.7	**4.6**
Assembly of God	197	193	**390**	0.4	0.4	**0.4**
Bahai	1,175	1,147	**2,322**	2.3	2.2	**2.3**
Te koaua	202	219	**421**	0.4	0.4	**0.4**
Muslim	65	54	**119**	0.1	0.1	**0.1**
None	33	18	**51**	0.1	0.0	**0.1**
Not stated	119	93	**212**	0.2	0.2	**0.2**
Other	125	140	**265**	0.2	0.3	**0.2**
Total	**50,796**	**52,262**	**103,058**	**100.0**	**100.0**	**100.0**

Table 7.2 shows the population by religious affiliation in the last three census years. As the population size increased, so did membership to almost all religious organisations.

Table 7.2: Population by religious affiliation and census years

Religious affiliation	Census years		
	2000	2005	2010
Catholic	46,108	51,144	57,503
Kiribati Protestant Church	31,221	33,042	34,528
Seventh-day Adventist	1,402	1,756	2,085
Church Of God	522	364	360
Mormon	2,307	2,910	4,802
Assembly of God	*	*	390
Bahai	2,052	2,034	2,322
Te koaua	*	*	421
Muslim	*	*	119
None	*	23	51
Not Stated	*	22	212
Other	883	1,238	265

* These religious affiliations were grouped under "Other" categories

7.2 Marital status

All censuses in Kiribati ask questions about marital status. For the resident population in 2010, this information is presented in Figure 7.1. In the 2010 census, the category 'Married' was defined to include those people living in a consensual (*de facto*) relationship, including those living under a traditional union arrangement.

The results show that 19,678 males and 21,169 females aged 15 and older shown are married. The proportion of never married (single) males was 33% (10,346) and was 23% (7,803) for females. Widowed males accounted for 2% (614) of the population aged 15 and over, and widowed females 9% (3,199).

Figure 7.1: Population aged 15 and over by marital status and sex, Kiribati 2010

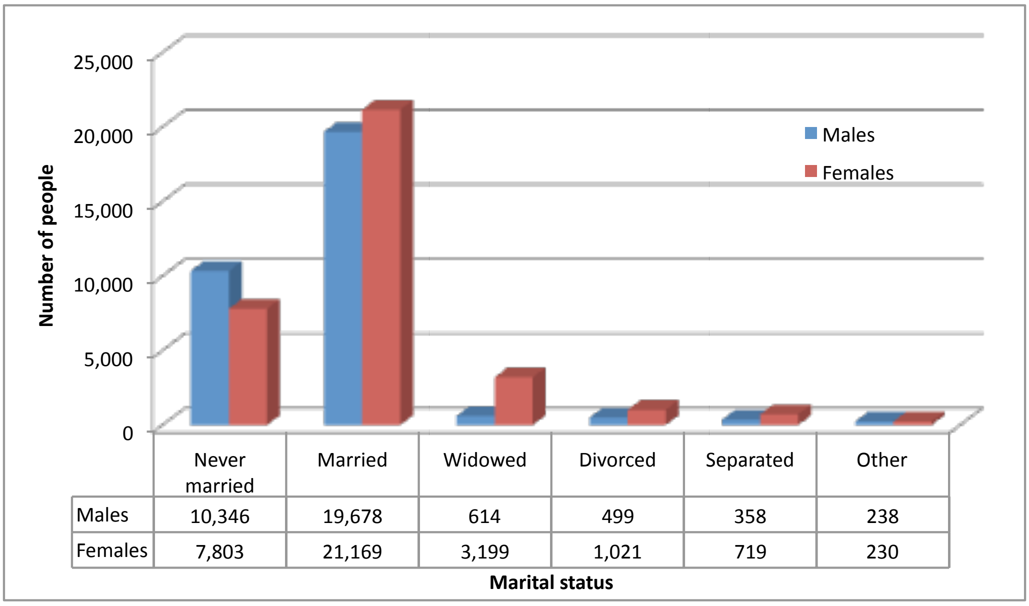


Table 7.3 shows the percent of never married people aged 15 and over by age group and gender. Overall, the proportion of never married was high at 85% in the 15–19 age group, declining to less than one-half of the total population in the 20–24 age group. By age 35, marriage is almost universal in Kiribati with just over 7% of the population estimated to be 'never married'. Table 7.3 shows that females are more likely to be married than males in almost all age groups.

The data also showed that of the total youth population aged 15-24 (21,292 persons), about 29% were reported to be in some kind of marriage arrangements during the 2010 Census. From the total married youth population, 35% percent were females as opposed to 24% males. In comparison, the 2005 Census data showed the total of 19,367 persons aged 15-24 with around 15% were married. There were more young females married than males. The findings indicated that between 2005 and 2010 marriage among youth population 15-24 increased with females are more likely to enter marriage life earlier than males.

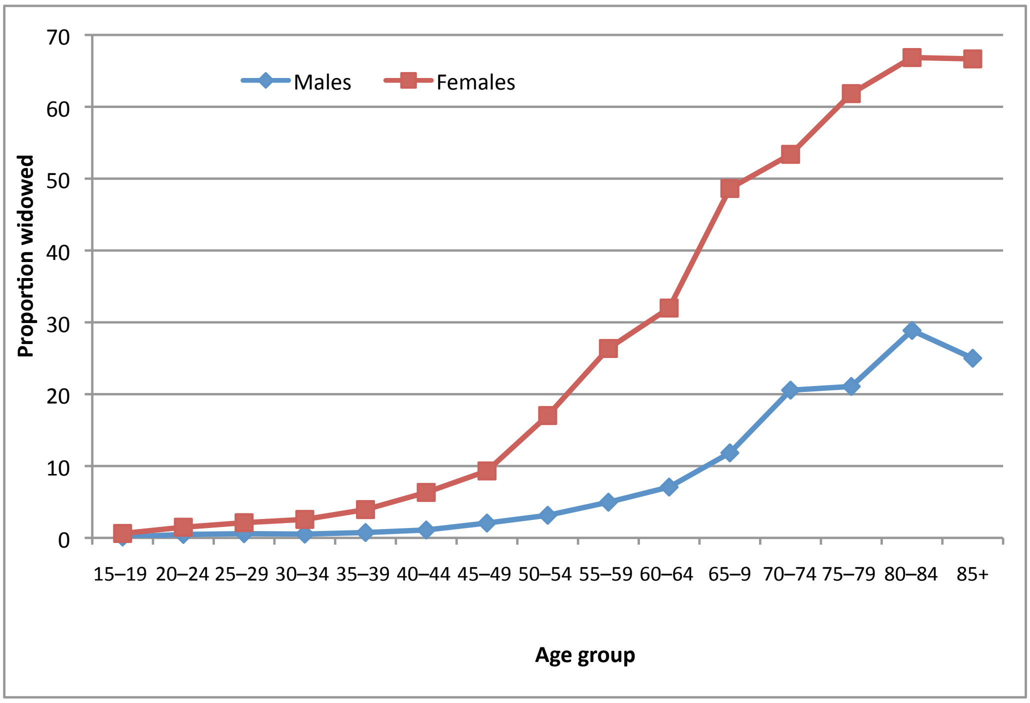
Table 7.3 also presents the singulate mean age at marriage (SMAM) for the total population (22.7 years) and differentials by gender (24.0 years for males, 21.5 years for females). The results indicate that females marry earlier than males, with females more likely to have married by age 22 (on average), which is 3 years earlier than for males. SMAM for females in 2005 was 22.2 and was slightly lower in 2010 at 21.5.

Figure 7.2 presents the proportion of the population aged 15 and over by gender who are widowed. As can be seen, a much higher proportion of females are widowed than males. Widowed females become prevalent in the 35–39 age group, and rapidly increase thereafter, reflecting higher rates of adult male mortality in Kiribati. That is, the higher proportion of females widowed could be explained by the fact that the mortality level for women is much lower than for. The mean age at marriage indicates that men are more likely to be married later than females and tend to die earlier than their younger wives.

Table 7.3: Percent never married by age group and sex, and singulate mean age at marriage (SMAM) by sex – Kiribati 2010

Age group	Sex		
	Males	Females	Total
15–19	89.6	81.0	85.4
20–24	56.3	37.7	47.1
25–29	26.4	13.8	19.9
30–34	13.7	6.6	10.0
35–39	9.0	5.4	7.1
40–44	7.3	4.5	5.8
45–49	5.3	4.3	4.8
50–54	5.3	4.1	4.7
55–59	4.4	3.9	4.1
60–64	5.4	5.1	5.2
65–9	5.6	3.4	4.3
70–74	5.8	4.3	4.9
75–79	8.5	5.6	6.6
80–84	2.1	3.4	2.9
85+	8.3	8.6	8.5
SMAM	**24.0**	**21.5**	**22.7**

Figure 7.2: Population aged 15 and over by sex and proportion widowed, Kiribati 2010



7.3 Health

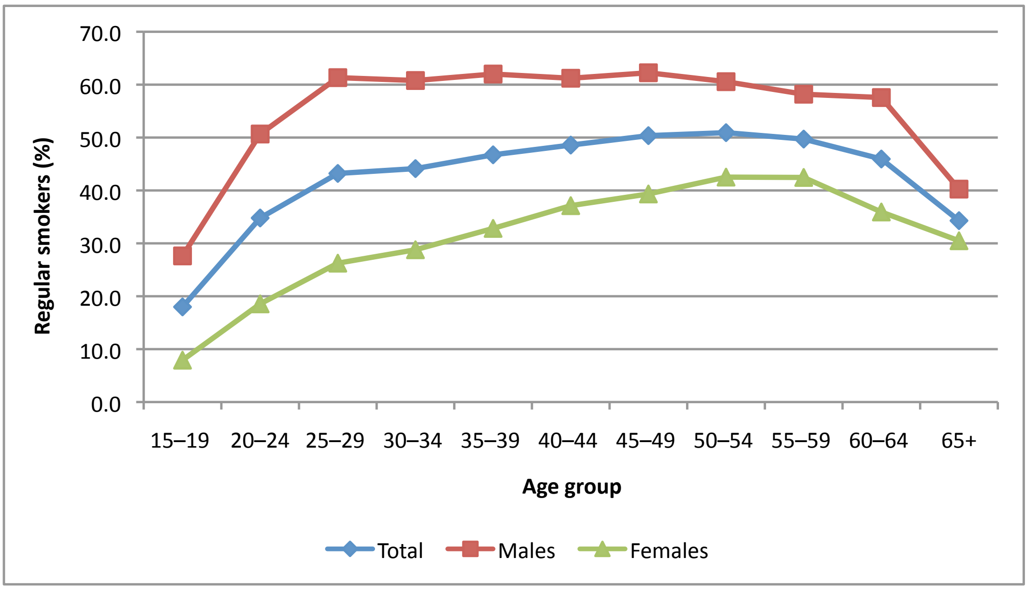
The Kiribati 2010 census questionnaire included health questions related to the respondent's smoking habits, and alcohol and kava (*yagona*) consumption. All individuals aged 15 and over in the household were asked these substance use questions.

7.3.1 Smoking tobacco

About one in five people (20%) in the 15–19 age group claim to be regular smokers (having one packet or more cigarettes a day). By ages 25–44, more than 40% are regular smokers, and by age 45–59 over one-half consider themselves to be regular smokers. Interestingly, the proportion of people who are regular smokers declines in the older ages (60 and over; see Figure 7.3), which could be due to health complications or early death.

More men than women in all age groups are smokers.

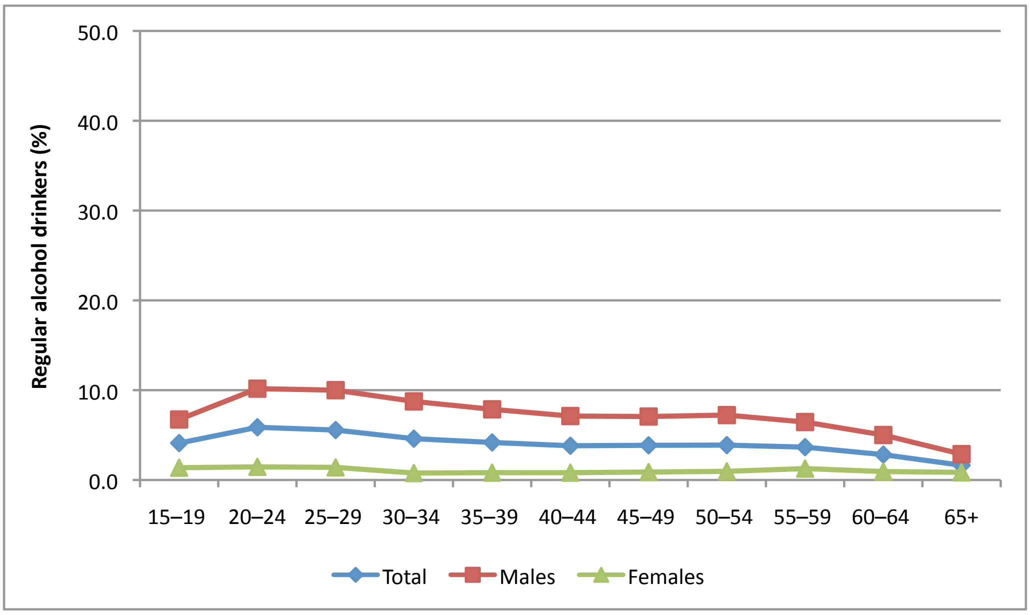
Figure 7.3: Proportion of the population aged 15 and over who regularly smoke tobacco, – Kiribati 2010



7.3.2 Alcohol consumption

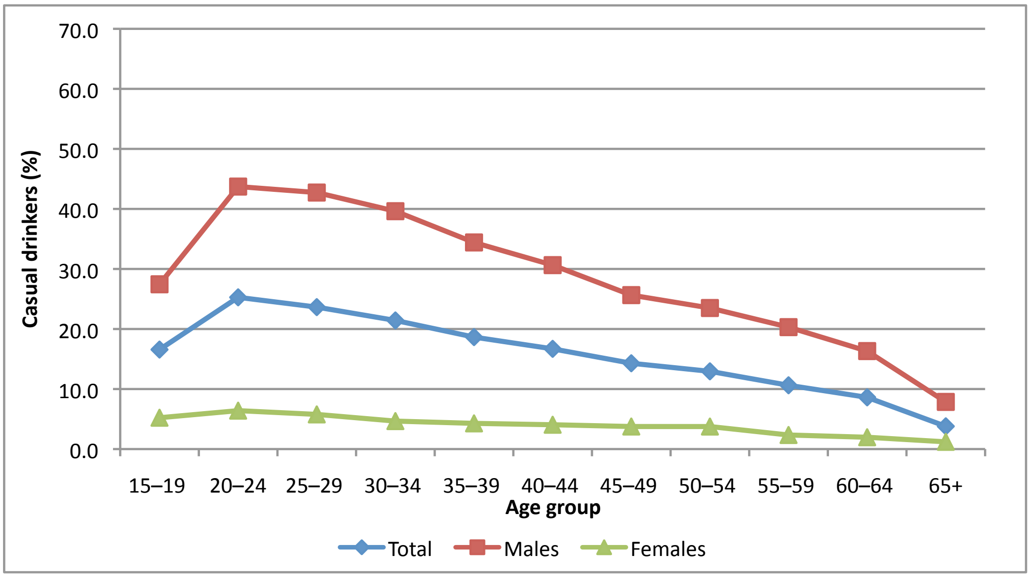
About 8% of males and 1% of females are regular (drinking everyday) alcohol (includes beer, spirits as well as toddy and kava) drinkers. A high proportion of both male and female drinkers are more likely to be younger, aged 15–29 (Fig. 7.4).

Figure 7.4: Proportion of population aged 15 and over who regularly drink alcohol, Kiribati 2010



In contrast, more people reportedly consume alcohol occasionally or sometimes (from time to time when there is excess cash or when invited by friends). More than 40% of males in the 20–34 age group drink alcohol sometimes, compared with less than 10% of females in almost all age groups.

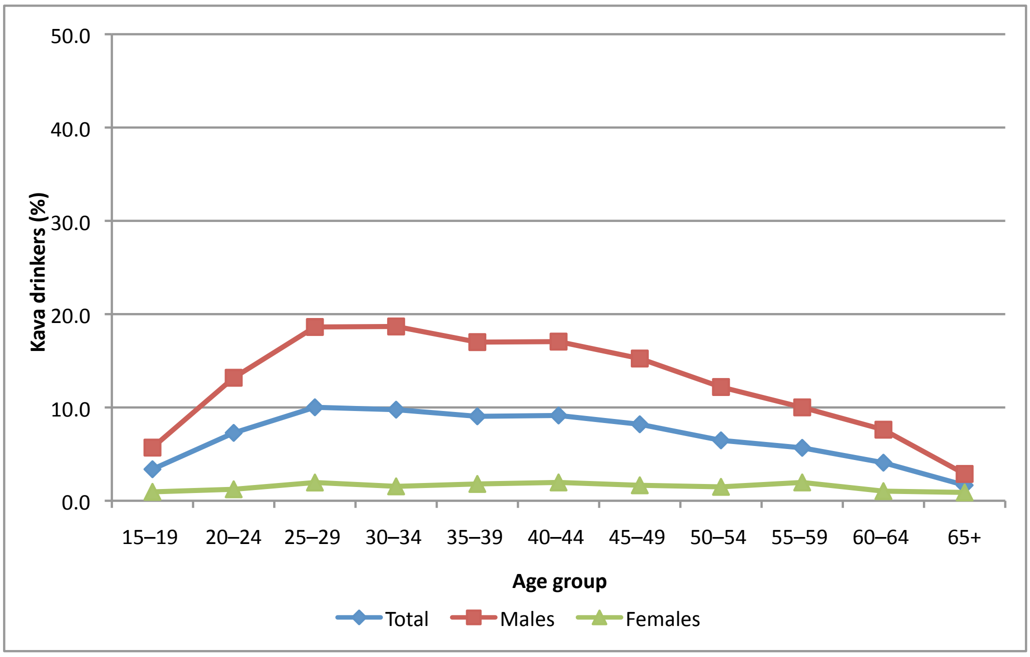
Figure 7.5: Proportion of population aged 15 and over who occasionally drinks alcohol, Kiribati 2010



*7.3.3 Kava/*Yagona *consumption*

In recent years, kava (or *yagona*) drinking has increased. According to 2010 census data, more than 10% of males in the 20–59 age group are regular kava drinkers. In contrast, less than 3% of females in all age groups are kava drinkers.

Figure 7.6: Proportion of the population aged 15 and over who regularly drinks kava, Kiribati 2010



7.4 Education and literacy

The main objective of Kiribati's national education policy is to provide **an education system that achieves high quality standards and broad coverage, and is relevant and cost-effectives in delivering education services. In line with international goals** to achieve universal primary education (e.g. Millennium Development Goals), primary level education in Kiribati is provided free, and the government also provides subsidies for secondary schools in other private education institutions to ensure that education is universal. Providing free access to education in Kiribati provides greater opportunities for children in the school-age population to have access to basic primary and secondary education.

7.4.1 School attendance status

Based on question about current school attendance, respondents were categorised into three main groups as shown in Table 7.4: 1) those who are currently attending school or enrolled, 2) those who left school, and 3) those who have never been to school. Information on school attendance was collected from all individuals aged 3 years and over who were residing in Kiribati during the 2010 census. Table 7.4 presents the population — aged 6 years and older — by school attendance and by gender (*not* aged 3 years and older).

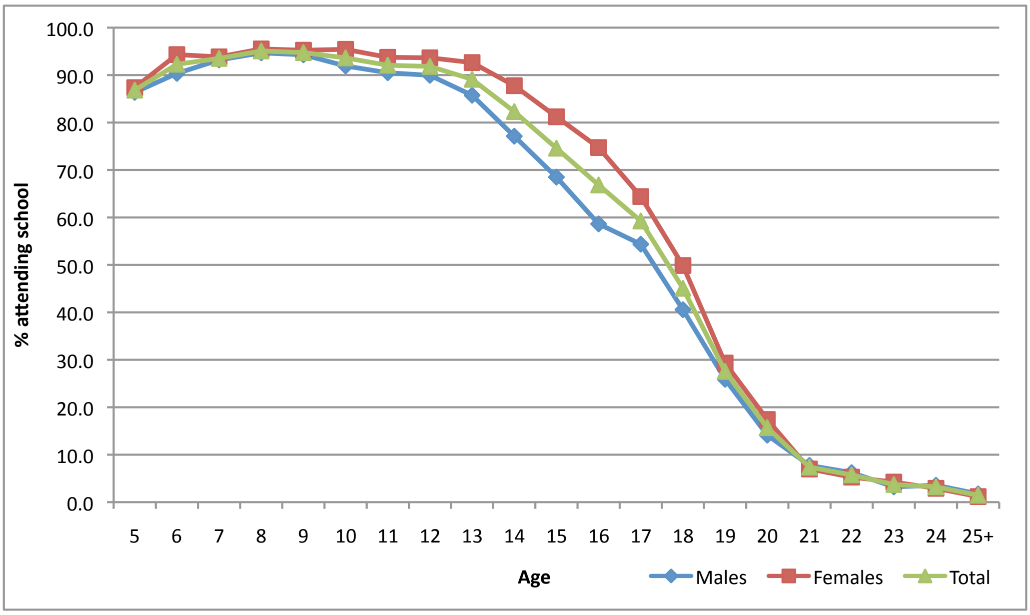
Table 7.4: Population aged 6 and over, and 15 and over by sex and by school attendance status, Kiribati 2010

School attendance status	Aged 6 years and over				Aged 15 years and over		
	Total	Males	Females		Total	Males	Females
At school	29.9	30.2	29.7		10.6	10.3	10.8
Left school	63.5	63.4	63.6		81.8	82.5	81.1
Never been to school	6.6	6.5	6.7		7.7	7.2	8.1
Total	**100**	**100**	**100**		**100**	**100**	**100**

About 7% of the total population aged 6 and over and 8% of the aged 15 and over stated that they had never attended any school. While 3 out of 10 people aged 6 and over attended school, more than one-half of all people (63.5%) had left school early.

According to the 2010 census, 25,939 people aged 6 and over attend school; of these, 12,781 are males and 13,158 are females. More than 90% of those aged 6–12 attend school (Fig. 7.7) which was similar in 2005 Census. The proportion of those attending school declines by age 13. In contrast, less than one-quarter of all 15-year-olds and less than one-half of all 18-year-olds reported that they do not attend any school. School attendance level is higher for females than for males.

Figure 7.7: Population aged 5 and over attending school, by sex – Kiribati 2010



Interestingly, the 2010 Census data presented the total of 28,066 aged 5 years and over enrolled or attending school as opposed to 28,467 in 2005 Census, a decline of about 2% in the number of people in this age group during these periods. More over the data also showed that 959 persons (or 3.8%) in the age group 5-15 stated that they never attended any school with more males than females. In 2005 there were about 1,354 (or 5.3%) stated that they never attended any school.

7.4.2 Educational attainment

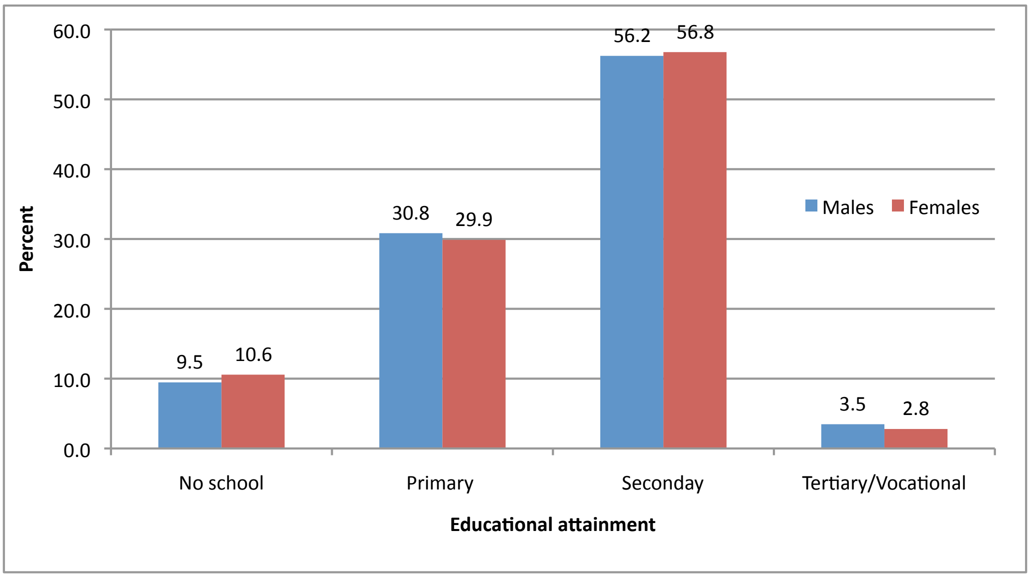
The Kiribati 2010 census collected information on educational attainment, which is the level of education each individual aged 15 and over reached or achieved at the time of the census. The results are presented in Figure 7.8.

Although primary education is provided free in Kiribati, less than one-half of the population aged 15 and over (31% males, 30% females) had attained a primary level education. Only 3.5% of males and 2.8% of females had achieved a tertiary level education.

About 56% of males and 57% of females had attained a secondary level education. More females than males had no education.

In 2005, about 47.9% and 47.3% of males and females had secondary education increased to about 10% for both males and females in 2010. In contrast, tertiary education attainment did not show any changes for both males and females of about 4% and 3% respectively in 2005 and 2010. This could be attributed to the limited opportunity of higher education services in Kiribati including the associated high cost involved in pursuing higher education.

Figure 7.8: Population aged 15 and over by educational attainment and sex - 2010



7.4.3 Literacy

Literacy refers to a person's ability to read and write a short, simple sentence in any language. For the Kiribati 2010 census, literacy was measured by a person's ability to read and write in any of the following languages: Kiribati, English and other languages.

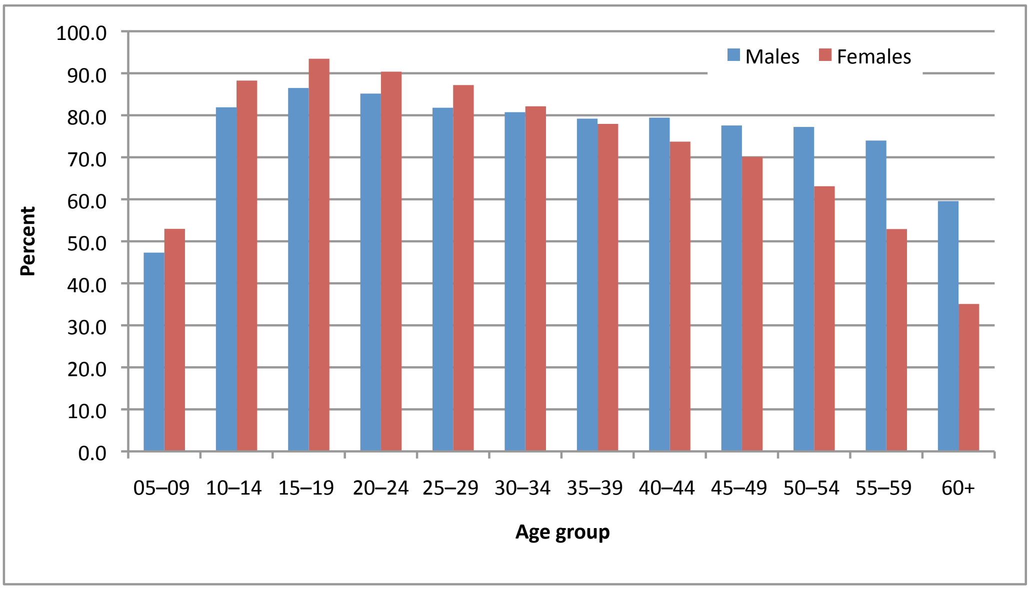
The results in Table 7.5 provide the literacy rates for people aged 10 and over living in urban and rural Kiribati. Kiribati's total literacy rate is 98%, and is higher in the urban area (99%) than in rural areas or outer islands (97%). There are no literacy differences between males and females.

Table 7.5: Literacy rate by region and sex, Kiribati 2010

Region	Males	Females	Total
Urban	98.6	98.5	98.6
Rural	96.9	97.0	96.9
Kiribati	**97.7**	**97.8**	**97.7**

The literacy rate by gender and age groups — shown in Figure 7.9 — indicates that more than 80% of all people aged 10–34 are literate. Higher literacy rates are observed for females in aged 10–34 than for males. Literacy rates among females aged 35 and over are low compared to males.

Figure 7.9: Literacy rate by age group and sex - 2010



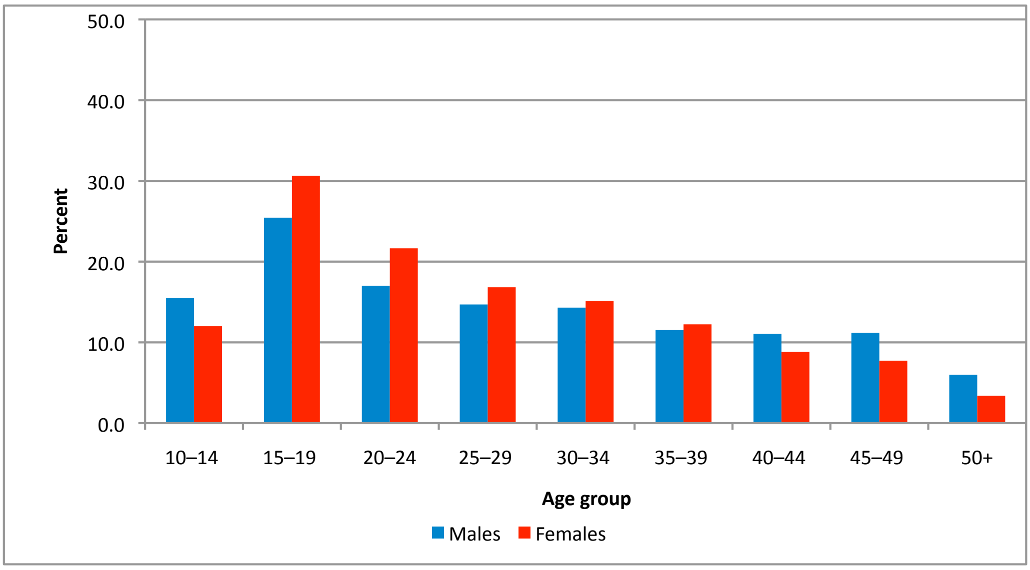
7.5 Internet use

Information on Internet use was also collected during the 2010 census. Everyone aged 15 and over was asked about their use of the Internet in the week prior to the census. Figures 7.10, 7.11 and 7.12 summarise and present the results.

Out of the total population of people aged 10 and older (78,040), about 15% (11,387) stated that they used the Internet during the week prior to the census date. The proportion of males and females using the Internet were equal at 15%.

Internet use started earlier with the proportion of 14% in the 10–14 age group having used the Internet in the week prior to the census. Internet use was highest among those aged 15–19, with more females (30.6%) than males (25.4%) using the Internet. Overall, Internet use was comparatively high for younger females aged 15–34 and for older males aged 40–50 years and over (Fig. 7.10).

Figure 7.10: Proportion of the population aged 10 and older by age group, sex and Internet use, Kiribati 2010



Respondents who used the Internet in the week prior to the census, were asked about the place where they used or accessed the Internet. Most users had access through Internet cafés (48.6% males, 43.7% females). One-quarter of them access the Internet at work. One out of every five people (i.e. 20%) access the Internet from home (Fig. 7.11).

Figure 7.12 shows that Internet use is higher in the urban area (South Tarawa) than in rural areas (outer islands). Also, there is little difference in the proportion of males and females who used the Internet in the week prior to the census by region.

Figure 7.11: Proportion of the population aged 10 and over who use the Internet, by place of Internet use, Kiribati 2010

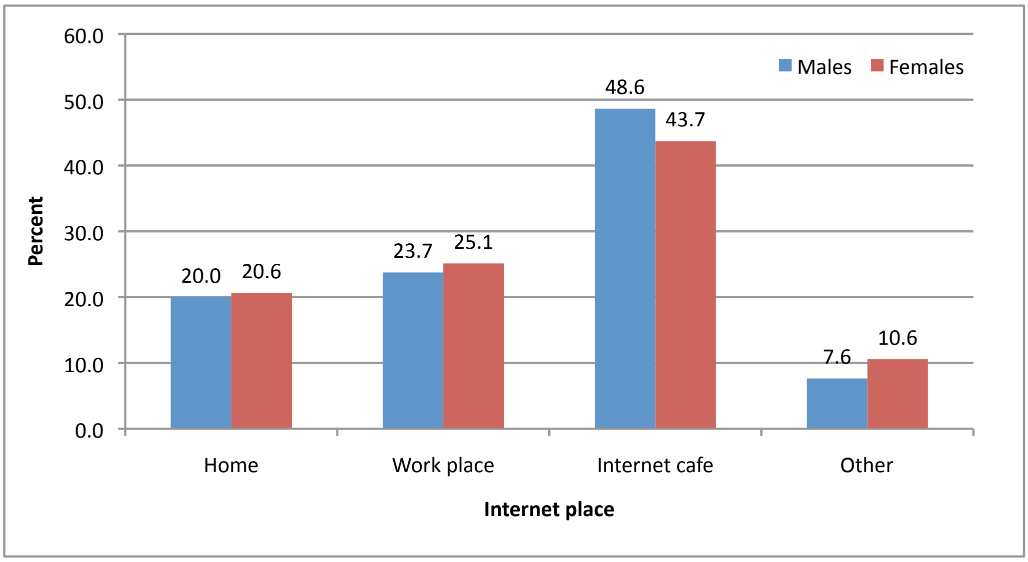
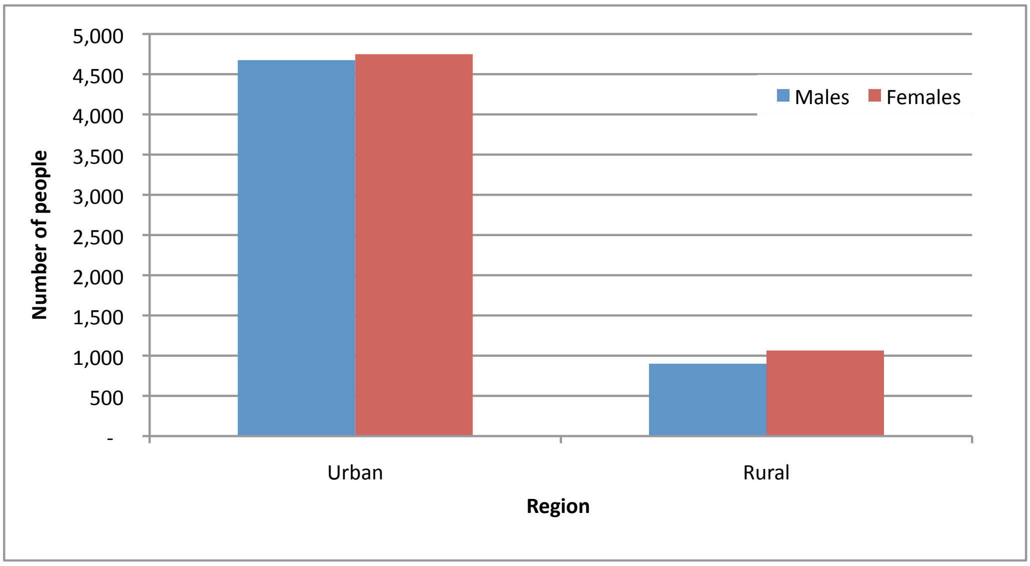


Figure 7.12: Population aged 10 and over who use the Internet, by sex and region, Kiribati 2010



7.6 Economic activity

7.6.1 Background

Economic activity and employment are shaped by many factors, including the size of the working-age population, specific community, educational and skill level of the labour force, and the availability of economic resources (e.g. access to employment). Integrating population factors into economic and social development strategies is vital to achieve sustainable development outcomes and improve the quality of life. In order to pursue such objectives, Kiribati's policy-makers and planners and their development partners require quality data on economic and labour market activities, such as employment and unemployment, the size and characteristics of the labour force, as well as information about those not in the labour force. This information is of fundamental importance because it provides an indication of the size of the labour supply for the production of goods and services in a country, and provides much needed benchmarks and baseline information against which to measure people's general well-being and standard of living, and monitor development progress.

To provide this information, population and housing censuses, and household surveys include a series of questions on labour market activities undertaken by people over 15. The Kiribati 2010 census included a series of eight questions (Questions #24–32) relating to an individual's economic activity. All individuals 15 and over were asked about their work during the week prior to the census, with work being any kind of work or activity that provides the necessities of life.

The census included questions about paid and unpaid work, and took into account community activities and unpaid family work, and people who produce goods for sale or for their own consumption. People not actively engaged in any activity were asked if they were actively looking for or were available to work. Responses resulted in the following broad categories.

- *Work for pay* — A person who works for wages, salary, commission, or has a contract, or are operating a business. The person is either a government or private employee, an employer, or self-employed.
- *Voluntary work and unpaid family work* — A person who works but does not receive a wage, salary, commission, and does not have a contract. This also includes village workers.
- *Work to support the household by producing goods for sale* — A person who performs a variety of task,s such as fishing, farming, gardening, producing handicrafts and other products for sale to support the household.
- *Work to support the household by producing goods for own consumption* — A person who performs tasks such as fishing, farming, gardening, cutting copra, or produces other goods for household consumption only (also referred to as subsistence activities).
- *People who did not work* — Such person was asked whether they were looking for work and if so, whether they were available; and if neither applied, what they were doing. This question allows the census to capture unemployment, as well as people not in the labour force, such as full-time homemakers, students, retired people and those unable to work because of an illness or disability.

7.6.2 Economic activity framework

The current official working age group in Kiribati is 15–50. In contrast, the international standard working age is 15–64. For the purpose of this analysis, the working age group referred to is 15 and over, and is divided into two main groups: those who are in the labour force (economically active population) and those who are not in the labour force (economically inactive population). The labour force comprises people who are employed and not employed but who are actively looking for work and are available to work. Figure 7.13 illustrates the relationship between the total population aged 15 and over, the labour force (employed and unemployed), and the population not in the labour force.

7.6.3 People of working age — background characteristics

Out of Kiribati's total 2010 population (103,058), the working age group (15 and over) accounted for 64% (65,874), consisting of 31% males (31,733) and 33% females (34,141). The working age group is composed mostly of people in the 20–29 and 40–64 age groups.

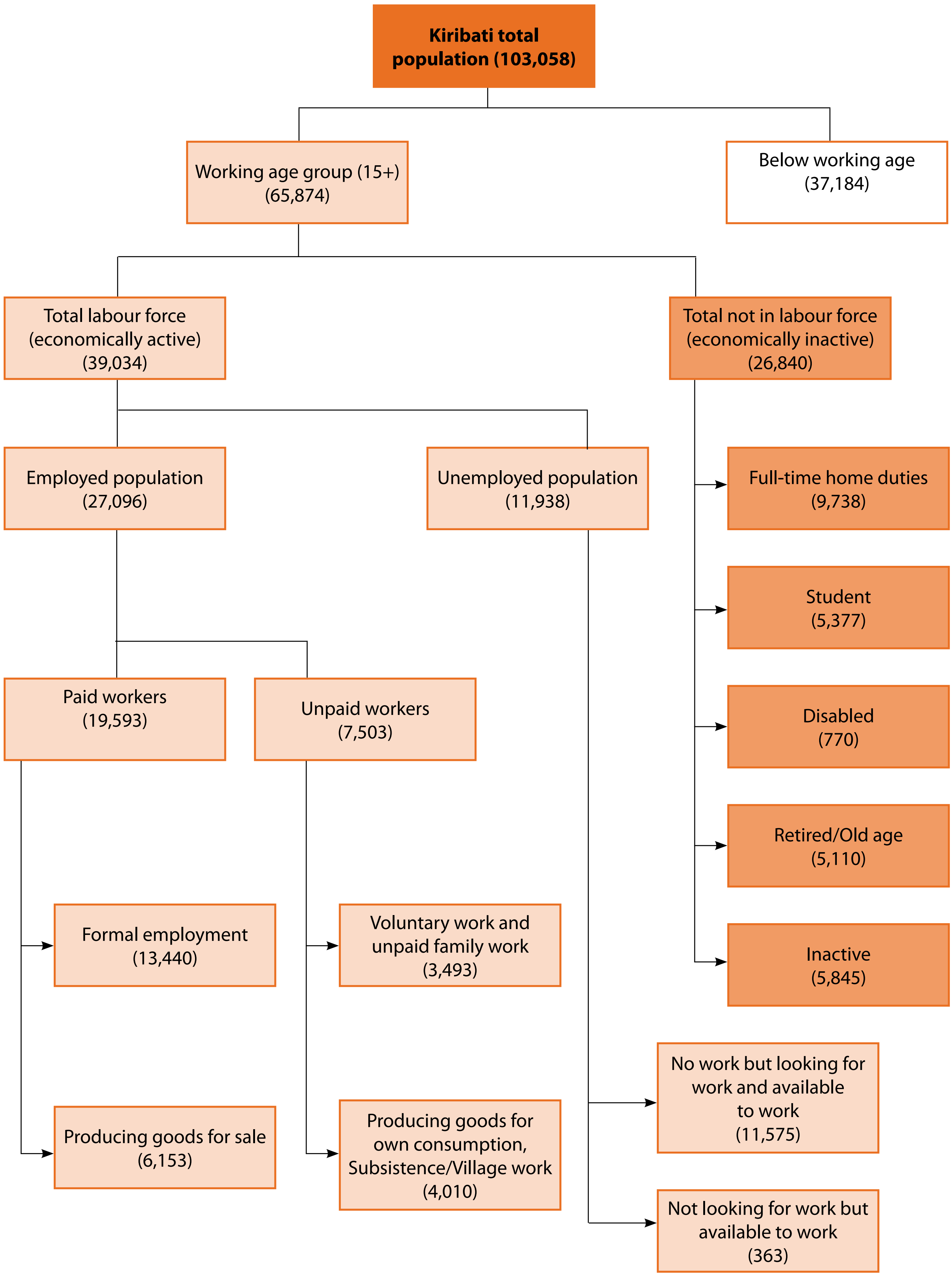
Table 7.6 shows that the working force population is nearly distributed by region.

Table 7.6: Working population aged 15 and over by background characteristics, Kiribati 2010

Age group	Males	Females	Total
15–19	17.6	15.7	16.6
20–29	29.3	27.7	28.5
30–39	18.6	18.9	18.7
40–64	30.0	31.2	30.6
65+	4.5	7.1	0.0
Region			
Urban	48.8	51.5	50.2
Rural	51.2	48.5	49.8
School attainment			
No school	9.5	10.6	10.0
Primary	30.8	29.9	30.3
Seconday	56.2	56.8	56.5
Higher education	3.5	2.8	3.1
Total	**100.0**	**100.0**	**100.0**

The data show that only 3% of the labour force has a higher education. More than one-half the working population (57%) has attained a secondary level education, with just over 30% has a primary education. About 10% of the working population has no education.

Figure 7.13: Labour force framework



7.6.4 Labour force participation

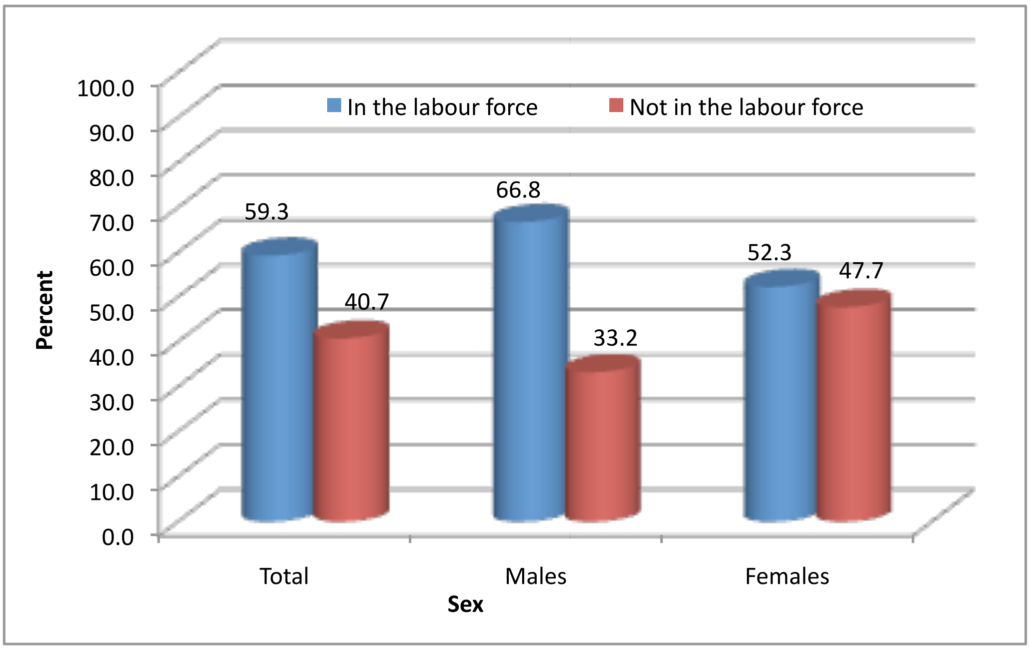
The labour force comprises all people aged 15 and over who, during the week prior to the census, were either employed or unemployed. Out of the total working age population aged 15 and over (65,874), the labour force accounted for about 59.3% (39,034), showing a higher male (66.8%) than female (52.3%) labour force participation rate (Fig. 7.14) in both urban and rural areas (Table 7.7 and Fig. 7.14).

In comparison in 2005 Census, the labour force accounted for about 63.4% with higher participation rate for males (71.3%) than their female counterparts of 56%.

Table 7.7: Labour force participation rate (LFPR)

LFPRs	Kiribati	Urban	Rural
Males	66.8	65.8	67.7
Females	52.3	52.4	52.2
Total	**59.3**	**58.7**	**59.8**

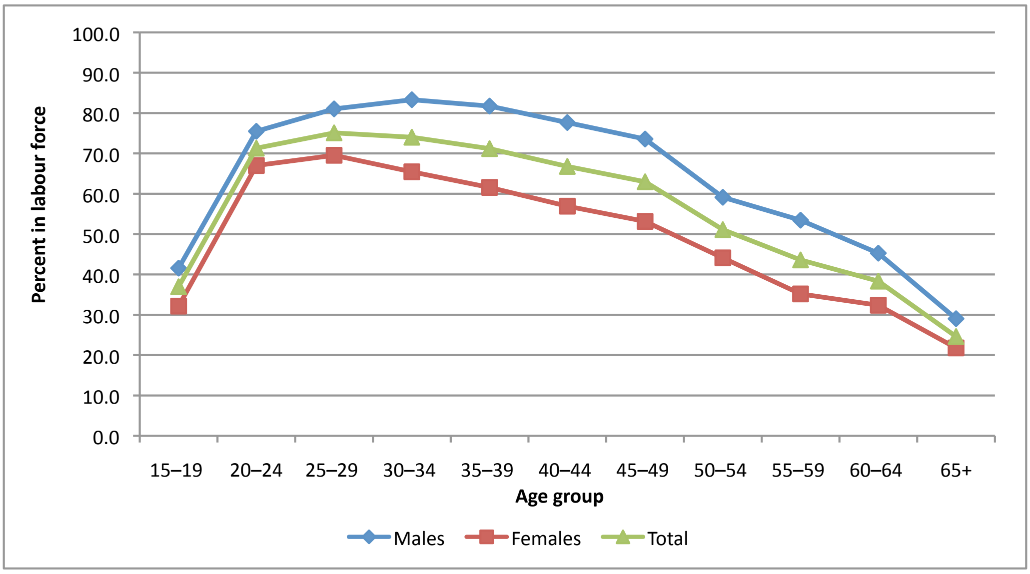
Figure 7.14: Labour force participation



In addition to the contrast between men and women, and between urban and rural areas, labour force participation also varies markedly by age, being lowest amongst those aged 15-19 years (when many are often still in school or are undertaking other forms of training), and increases with age (Fig. 7.15). A dip around age 50 illustrates Kiribati's retirement age for civil servants. Male–female differentials noted above appear consistent throughout all age groups. Labour force participation is at its peak for men in the 30–34 age group, and reaches a peak for women in the 25–29 age group, declining gradually in subsequent years. With women in the 25–29 age group also accounting for the highest level of fertility (as noted in Chapter 3), this suggests that as families become larger, more women opt out of the labour force.

Among people not in the labour force (Fig. 7.13), people engaged in full-time home duties (e.g. home-makers, housewives) represent the largest single group, accounting for one-third (36.3%), with people not 'interested' in work (21.8%), students (20.0%), retirees (19.0%), and people not economically active due to disability (29%) making up the remainder.

Figure 7.15: Population aged 15 and over by age group, sex and labour force participation rate, Kiribati 2010



7.6.5 Employment and unemployment

Employment here is defined as either paid or self-employed work during a specified brief period of either one week or one day. According to the International Labour Organization (ILO), someone who is employed has:

- performed some work for wage or salary in cash or in kind;
- had a formal attachment to their job but were temporarily not at work during the reference period;
- performed some work for profit or family gain in cash or in kind; or
- were with an enterprise such as a business, farm or service but who were temporarily not at work during the reference period for any specific reason.

This definition includes everyone involved in subsistence or unpaid family or village work. ILO states that 'persons engaged in economic activities in the form of own account production of goods for own final use within the same household should be considered to be self-employed'. Unpaid village work, such as when young people receive food from the community for their endeavours, is also considered to be employment, in as far as these people performed some work for 'payment in kind'.

In Kiribati, employment refers to paid and unpaid work, with

- work for pay including employees, employers, self-employed people, and everyone producing goods for sale;
- unpaid work consisting of people who were involved in voluntary work, unpaid family or community work, or who produced goods for their own consumptions (engaged in subsistence activities).

Unemployment in Kiribati refers to people who:

- did not undertake any paid or unpaid work in the week prior to the census; but spent some time looking for work, and were available to work if a job was offered to them; and
- were not actively seeking a job but indicated their availability for work.

If a person did not work and did not spend some time looking for work, or if they looked for work but were not available for work, they were classified as 'economically inactive' (not in the labour force).

The 2010 census recorded 27,096 people as employed, which represents 69.4% of the Kiribati labour force. Of these, 56.6% were males and 43.4% were females (Table 7.8). This contrasts with 11,938 people classified as unemployed, which represents 30.6% of the labour force. Of these, 11,575 people were not working but stated that they were looking for work and expressed their availability to take work if it was offered, and 363 people who did not actively look for work but said they were available to work if work was offered. Adding to this high unemployment rate is the fact that one in four labour force participants is involved in unpaid work, and 5,845 people are considered to be 'inactive' (see next section), illustrating the difficulty of engaging in paid employment or economic activity in the Kiribati economy.

The latter becomes even more pronounced when considering the employment-population *ratio,* which refers to the number of employed people (in paid or unpaid work) relative to the total population. Looking at Kiribati's 65,784 people of working age (Fig. 7.15), only 4 out of 10 people aged 15 and over are employed, working in either paid or unpaid employment. The situation is worst in South Tarawa. This contrast can be explained by the fact that more people in rural areas are involved in subsistence and village work, which is recognised as unpaid work, than people in South Tarawa.

Table 7.8: Economic activity by sex, population aged 15 and older, Kiribati 2010

Economic activity	Males	Females	Total
1. Labour force			
1.1 Employed - paid work			
Employer	775	343	1,118
Employee	9,158	7,974	17,132
- Employee gov't (paid work)	*3,586*	*3,135*	*6,721*
- Employee private (paid work)	*2,569*	*1,689*	*4,258*
- Producing goods for sale	*3,003*	*3,150*	*6,153*
Self-employed	829	514	1,343
Total employed - paid work	***10,762***	***8,831***	***19,593***
1.2 Employed - unpaid work			
Voluntary work	355	223	578
Unpaid family work	1,887	1,028	2,915
Subsistence - Village work	2,329	1,681	4,010
Total employed - unpaid work	***4,571***	***2,932***	***7,503***
Total employed	**15,333**	**11,763**	**27,096**
1.3 Unemployed	5,853	6,085	11,938
Total in the labour force	**21,186**	**17,848**	**39,034**
2. Not in the labour force			
Student	2,561	2,816	5,377
Home duties	2,771	6,967	9,738
Inactive	2,838	3,007	5,845
Retired	1,993	3,117	5,110
Disabled	384	386	770
Total not in the labour force	***10,547***	***16,293***	***26,840***
Total	**31,733**	**34,141**	**65,874**

Table 7.9: Employment–population ratio (EPR)

EPR	Kiribati	Urban	Rural
Males	48.3	44.4	52.0
Females	34.5	32.1	37.0
Total	**41.1**	**37.8**	**44.4**

Mirroring the earlier pattern of labour force participation, Kiribati's employment–population ratio shows similar fluctuations throughout people's lives (Fig. 7.16).

Figure 7.16: Employment–population ratios by age group and sex, Kiribati 2010

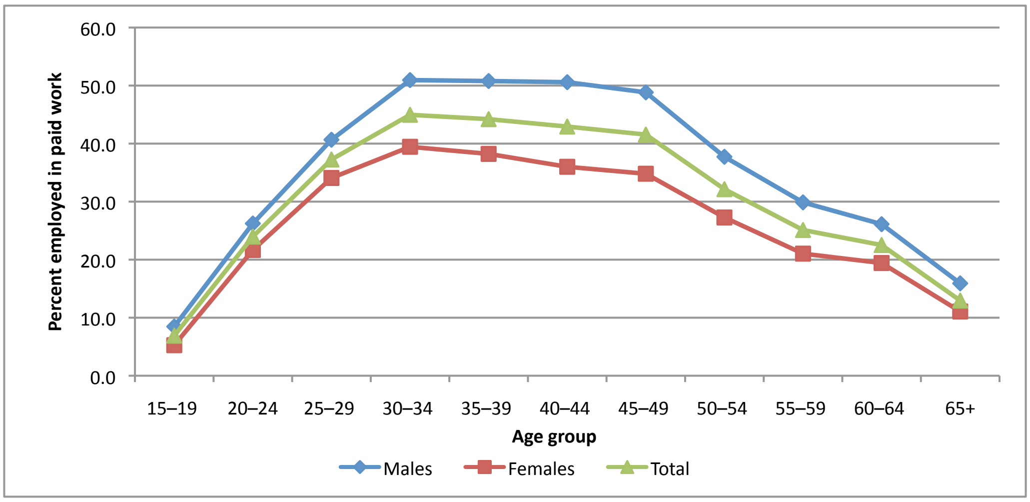


Table 7.10: Economic activity of urban and rural populations aged 15 and older, Kiribati 2010

Economic activity	Region		
	Urban	Rural	Total
1. Labour force			
1.1 Employed - paid workers			
Employer	510	608	1,118
Employee	10,143	6,989	17,132
Employee gov't	*4,443*	*2,278*	*6,721*
Employee private	*3,213*	*1,045*	*4,258*
Producing goods for sale	*2,487*	*3,666*	*6,153*
Self-employed	428	915	1,343
Total employed paid workers	11,081	8,512	19,593
1.2 Employed - unpaid workers			
Voluntary work	220	358	578
Unpaid family work	424	2,491	2,915
Subsistence - Village work	789	3,221	4,010
Total employed - unpaid workers	1,433	6,070	7,503
Total employed	**12,514**	**14,582**	**27,096**
1.3 Unemployed	**6,883**	**5,055**	**11,938**
Total in the labour force	***19,397***	***19,637***	***39,034***
2. Not in the labour force			
Student	3,883	1,494	5,377
Home duties	4,098	5,640	9,738
Inactive	2,379	3,466	5,845
Retired	2,997	2,113	5,110
Disabled	309	461	770
Total not in the labour force	***13,666***	***13,174***	***26,840***
Total	**33,063**	**32,811**	**65,874**

Summary of key employment and unemployment differentials

Tables 7.8 and Table 7.10 highlight some interesting employment patterns and differentials regarding men and women, and urban and rural Kiribati.

Paid work — There is a reasonable balance in the number of males (55%) and females (45%) in paid employment. This is particularly the case in government employment, which consists of 53% males and 47% females, and the production of goods for sale, which consists of 49% males and 51% females. The gender gap widens, however, in the private sector, which is made up of 60% males and 40% females, and in those who are employers, with more men (69%) than women (31%) employing others, or running their own business (62% males, 38% females). This gap becomes even more pronounced when considering the employment–population ratio; nearly half of all I-Kiribati men of working age reported to be employed (48.3%), compared with just one in three I-Kiribati women (34.5%) — a pattern that occurs across urban and rural Kiribati.

Unpaid work — A different gender gap emerges in unpaid work, with more men (61%) than women (39%) undertaking unpaid work. This contrast occurs across all three categories of unpaid work, and is most pronounced in 'unpaid family work' (consisting of 65% males, 35% females), followed by 'voluntary work' (61% males, 39% females) and 'subsistence/village work' (58% males, 42% females).

Unemployed — Unemployment affects a larger proportion of women than men, with reported unemployment rates of 34.1% for women and 27.6% for men. Unemployment (for both men and women) is much higher in South Tarawa and Kiritimati (35.5% combined) than in rural Kiribati (25.7%). This is not surprising given Kiribati's larger formal urban economy, which prompts more people to actively look for work in town. It is worth noting, however, that one in four people in rural areas were reportedly looking for work and would have been available to take it, if it had been offered.

Unemployment impacts various age groups differently, with a country's youth (aged 15–24) usually the most affected. Kiribati is no different, featuring a youth unemployment rate of 54%; of these, 61.8% are young women and 47.6% are young men. Unemployment is a major policy challenge for Kiribati, and is illustrated in the uneven distribution of unemployment (Fig. 7.17), with young people accounting for more than one-half (51.7%) of all unemployed people.

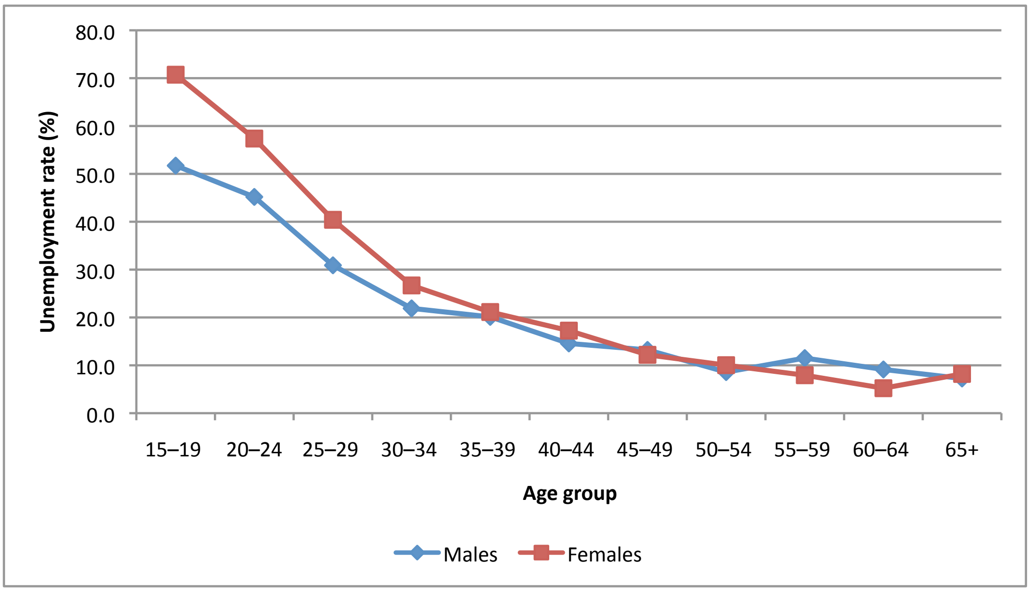
Not in the labour force —Nearly half of all women (48%) are not in the labour force compared with one-third of all men (33%). This is largely the result of women dominating the 'home duties' category, which 36% not in the labour force. Of this group, 72% are women. Women are also more prominent across all other 'not in the labour force' categories.

The largest contrast in urban–rural differentials emerges in 'continued schooling', with over twice as many urban males and females (3,883) than rural males and females (1,494) not in the labour force because of involvement in ongoing education. This reflects the urban location of higher education and training centres. It is worth noting — given its obvious relevance to social policy — the large number (5,845) of 'inactive' men and women, who account for 22% of the population not in the labour force or for one in ten people (8.9%) of working age. The vast majority of these (3,882) explain their non-participation in the labour force in terms of 'no interest', and 'not wanting to work'. This in itself does not necessarily reflect a sense of 'disengagement', because it could also reflect people being content with what they are doing; while there appears to be no gender difference, there is a distinct contrast between rural (60%) and urban (40%) areas (Table 7.10).

Table 7.11: Economically inactive population aged 15 and over who do not wish to engage in work

	Kiribati	Urban	Rural
Males	1,884	779	1,105
Females	1,998	755	1,243
Total	**3,882**	**1,534**	**2,348**

Figure 7.17: Unemployment rate by age group and sex, Kiribati 2010



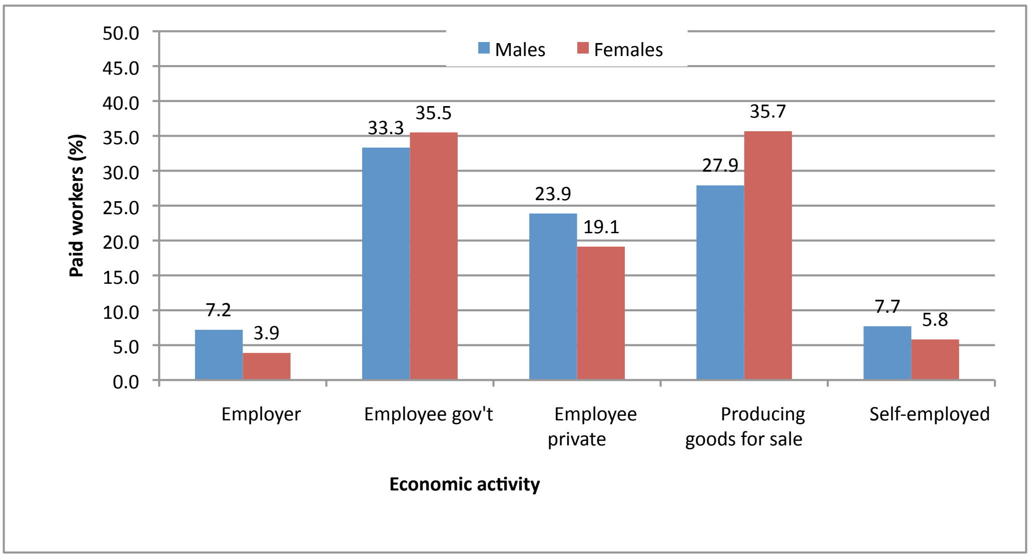
Final observation

The objective of this census report, which is to provide a summary of Kiribati's population in 2010, prevents a more detailed analysis of labour force and employment. But, given its importance in terms of social and economic development, we recommend a separate and more detailed analysis of Kiribati's labour force be undertaken, in order to provide both the government and general public with a more comprehensive picture and to facilitate development of robust social and economic policy and planning measures. The latter are of critical importance for the well-being of future generations, especially given the ongoing pressures of high population growth on urbanisation, and the combined pressure of the country's labour force being divided in near equal halves of those in paid employment (50.2%), and unpaid work (19.2%) and unemployment (30.6%).

7.6.6 Employment by work status

Employment status refers to whether someone is self employed, an employer, an employee for government or private sector, or producing goods for sale.

Figure 7.18: Employment by work status, Kiribati 2010



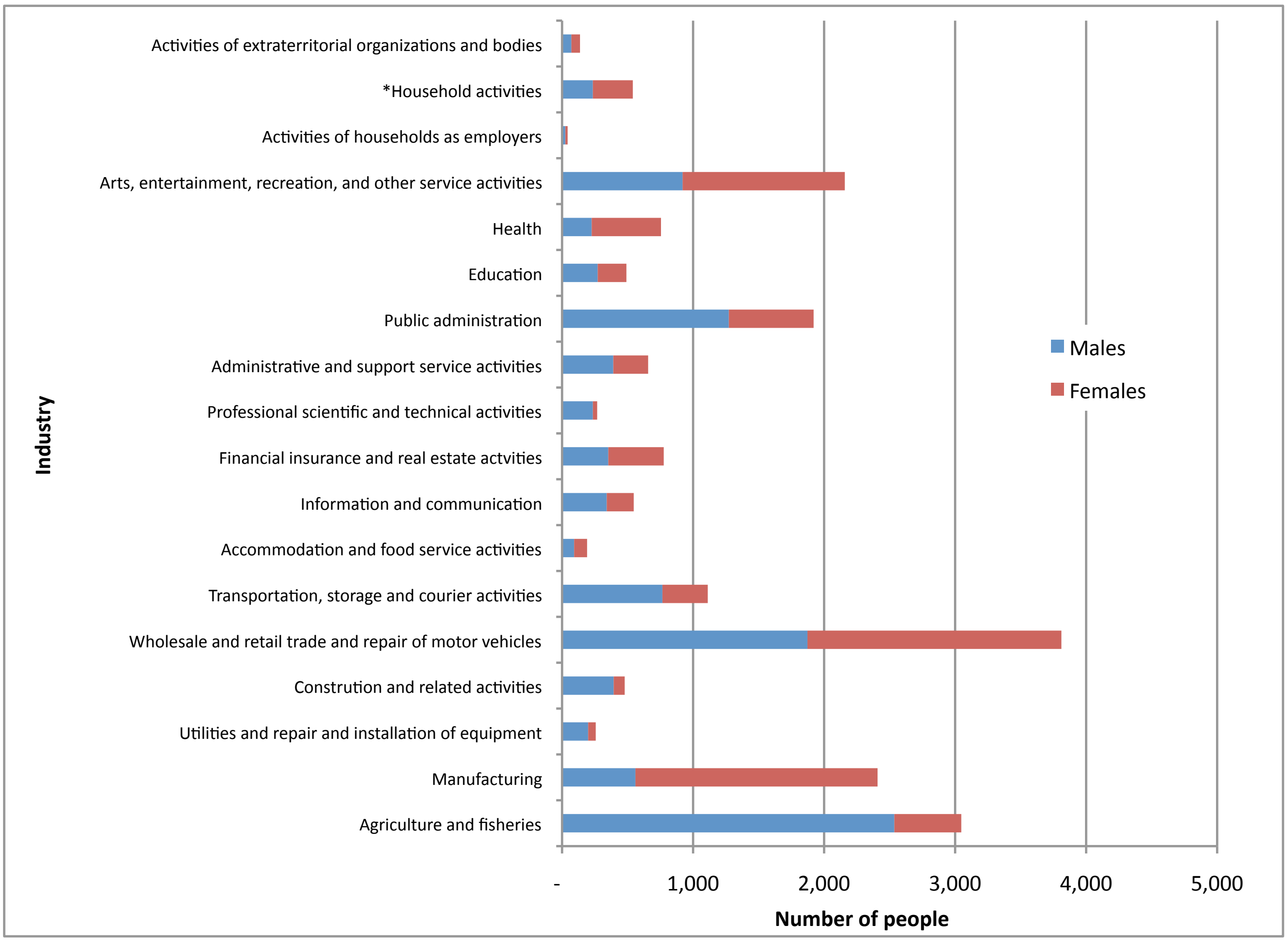
Out of the total number of paid workers, 56% were employees in both the government and private sector, followed by 31.4% who produced goods for sale, 6.9% who were self-employed, and 5.7% who were employers (Fig. 7.18 and Table 7.10). In a comparison by gender, more women than men were employed by the government, and produced goods for sale.

7.6.7 Employment by industry

Employment in an industry is defined as activity carried out by enterprises where people work. Figure 7.19 presents the results of all employed workers by their main industry and by gender.

The majority of employed paid workers were employed in the 'Wholesale, Retail Trade and Repair of Motor Vehicles' category, with 3,811 people (19.5% of the total number of employed paid workers). The 'Agriculture and Fisheries' sector was the second largest group (3,047 people, 15.6%) followed by 'Manufacturing' (2,408, 12.3%), and 'Arts Entertainment Recreational and Other Service Activities' and 'Public Administration' accounted for 11.0% The remaining industries employed less than 10% of the total paid workers.

Figure 7.19: Employment by industry, Kiribati 2010



*Note: * Undifferentiated goods- and services-producing activities of households for own use*

Manufacturing activities were dominated by women while men dominated most other industries.

7.6.8 Employment by occupation

Occupation refers to the type of work a person does at her/his place of work, and includes paid employment in government or the private sector, self-employment, being an employer, and producing goods for sale.

Figure 7.20 presents the distribution of paid workers by occupation and gender. Overall, the largest number of paid employed people was in the 'Service Workers and Shop and Market Sales' with 3,780 people (19.3%). The next significant occupational groups were 'Skilled Agriculture and Fisheries' with 3,260 people (16.6%), 'Craft and Related Workers' with 2,942 people (15.0%), 'Professionals' with 2,867 people (14.6%) and 'Elementary Occupations' with 1,970 workers or 10.1%. The remaining occupational groups had less than 10% of all paid workers.

Females outnumbered males in the occupational categories of 'Craft and Related Workers', 'Professionals', 'Elementary Occupations' and 'Clerks' (Fig. 7.20).

As for occupation by urban and rural as shown in Figure 7.21, it is evident that the majority of all employed paid workers in the rural areas were *skilled agricultural and fisheries workers*. In contrast, the majority of urban employed workers were *in service workers and shop and market sales workers.*

Figure 7.20: Employment by occupation, Kiribati 2010

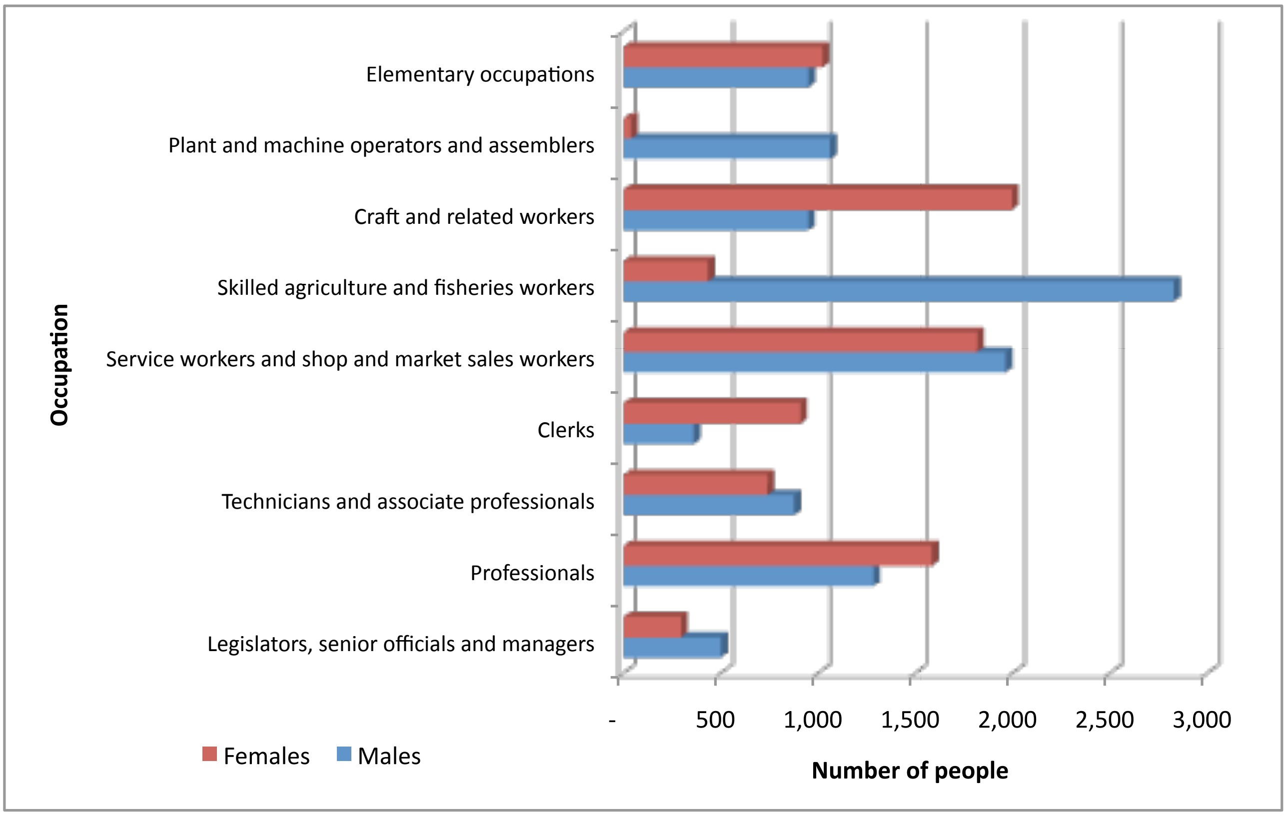
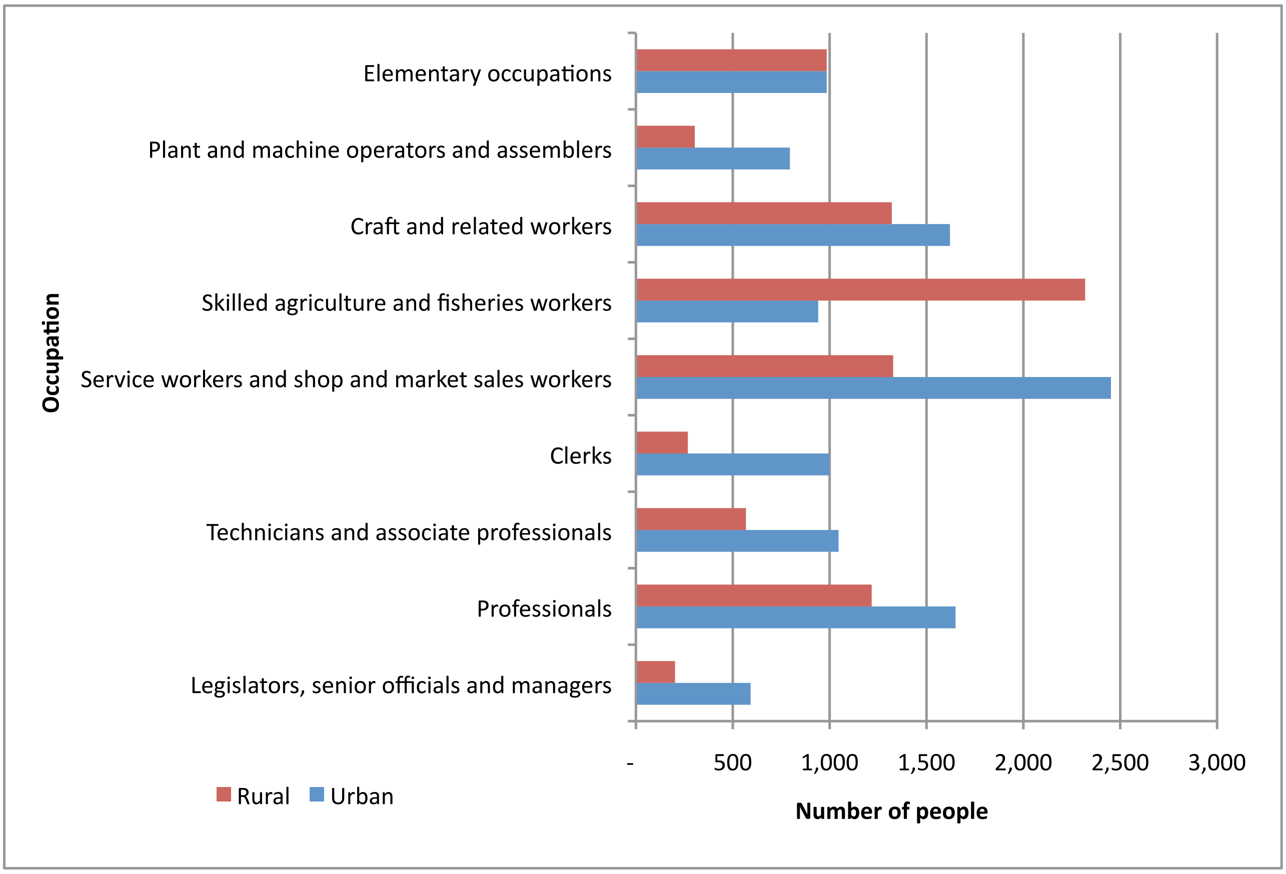


Figure 7.21: Employment occupation in urban and rural Kiribati, 2010



Chapter 8: Housing and household characteristics

8.1a Total number of households and household size

In a population and housing census, a household refers to a group of people who normally eat and live together. This chapter summarises the characteristics of physical dwelling units, and is followed by a description of the households within the dwelling units. In summary, the 2010 census enumerated 16,140 dwellings of which 16,043 (99.4%) were private dwellings while 97 (0.6%) were non-private dwellings or institutions.

The primary focus of this chapter's analysis is on occupied private dwelling units. There has been an increase of 2,044 dwelling units between 2005 and 2010. Most of this increase has been in South Tarawa, which has 1,460 more dwelling units. In contrast, many of the outer islands experienced a decrease in the number of dwelling units (see Table 8.1).

The 2010 census also enumerated 97 institutions such as boarding schools, hotels, hospitals, *maneaba*s and others.

Table 8.1a: Number of private dwellings, occupants and average household size in Kiribati in 2000, 2005 and 2010

Island/Region	Number of private households			Number of people in private households			Average household size (number of people per household)		
	2000	2005	2010	2000	2005	2010	2000	2005	2010
Banaba	54	61	57	262	301	295	4.9	4.9	5.2
Makin	292	328	347	1,679	1,858	1,798	5.8	5.7	5.2
Butaritari	592	561	630	3,464	3,279	3,546	5.9	5.8	5.6
Marakei	429	437	492	2,523	2,664	2,856	5.9	6.1	5.8
Abaiang	843	853	926	5,093	5,008	5,330	6.0	5.9	5.8
North Tarawa	693	867	1,002	4,294	5,404	5,927	6.2	6.2	5.9
South Tarawa	**4,530**	**5,245**	**6,705**	**35,499**	**39,186**	**49,250**	**7.8**	**7.5**	**7.3**
Maiana	376	354	383	2,048	1,894	2,016	5.4	5.4	5.3
Abemama	533	592	583	2,753	3,059	2,826	5.2	5.2	4.8
Kuria	182	202	190	958	1,082	980	5.3	5.4	5.2
Aranuka	194	211	214	963	1,158	1,057	5.0	5.5	4.9
Nonouti	508	540	508	2,850	3,068	2,549	5.6	5.7	5.0
North Tabiteuea	600	573	682	3,214	3,332	3,573	5.4	5.8	5.2
South Tabiteuea	230	262	249	1,207	1,298	1,290	5.2	5.0	5.2
Beru	492	462	449	2,419	2,022	1,991	4.9	4.4	4.4
Nikunau	333	335	365	1,733	1,912	1,858	5.2	5.7	5.1
Onotoa	354	332	332	1,668	1,644	1,519	4.7	5.0	4.6
Tamana	214	196	202	962	875	951	4.5	4.5	4.7
Arorae	244	241	238	1,225	1,250	1,261	5.0	5.2	5.3
Teeraina	169	198	278	1,003	1,155	1,690	5.9	5.8	6.1
Tabuaeran	282	438	348	1,591	2,470	1,943	5.6	5.6	5.6
Kiritimati	458	702	857	3,386	4,684	5,423	7.4	6.7	6.3
Kanton	9	9	6	61	41	31	6.8	4.6	5.2
Total	**12,611**	**13,999**	**16,043**	**80,855**	**88,644**	**99,960**	**6.4**	**6.3**	6.2
Rural	8,081	8,754	9,338	45,356	49,458	50,710	5.6	5.6	5.4
Line&Phoenix Islands	918	1,347	1,489	6,041	8,350	9,087	6.6	6.2	6.1
Gilbert Islands	11,693	12,652	14,554	74,814	80,294	90,873	6.4	6.3	6.2

Table 8.1 also provides information on the average household size per dwelling unit in Kiribati (by islands) for the last three censuses of 2000, 2005 and 2010. In 2010, the average household size for Kiribati was 6 people, although in South Tarawa it was higher (7 people) and in rural areas it was lower (5 people). Kiribati's long history of large households has contributed to prevailing social problems, particularly in South Tarawa.

8.1b Household composition

Household composition is determined by the people living and eating together and their relationship to one another. Data on the household composition is very critical as it provides better understanding of the household family size and structure and mostly help in identifying the proportion of vulnerable members of the households particularly children and women. In establishing the household composition, the head of the household was first identified and served as a reference person and then identify the relationship of all other household members to the head of the household. Table 8.1b shows the household composition of all households in Kiribati as of 2010 Census.

Table 8.1b: Population by household composition – Kiribati 2010

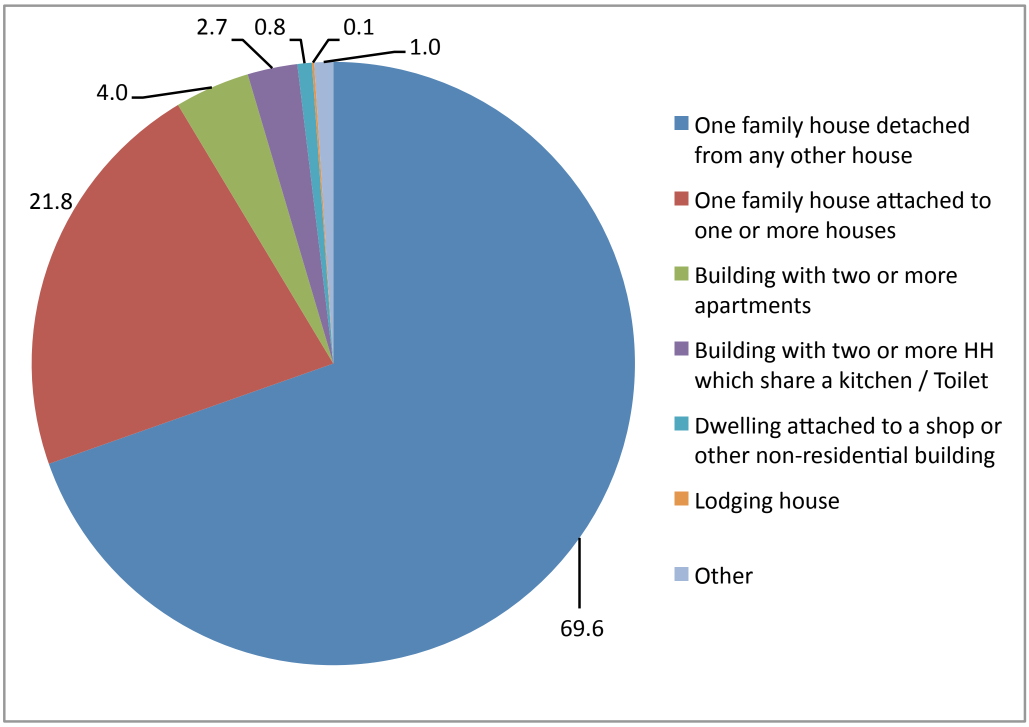
Relationship	Sex					
	Total	Males	Females	Total	Males	Females
	Total number			Percentage		
Head	16,043	12,388	3,655	16.0	25.2	7.2
Spouse	12,203	1,188	11,015	12.2	2.4	21.7
Child	33,663	17,481	16,182	33.7	35.5	31.9
Adopted Child	813	430	383	0.8	0.9	0.8
Son/Dtr in Law	3,361	1,481	1,880	3.4	3.0	3.7
Grand Child	8,863	4,690	4,173	8.9	9.5	8.2
Parent	1,710	428	1,282	1.7	0.9	2.5
Relative	14,603	7,151	7,452	14.6	14.5	14.7
Non-Relative	8,701	3,945	4,756	8.7	8.0	9.4
Total	**99,960**	**49,182**	**50,778**	**100.0**	**100.0**	**100.0**

Generally, the result indicated that most families in Kiribati lived in an extended family type which includes other extended relatives. This is shown in the result with about 15% of household members were other relative. The data also showed that more than 8% of household members were non-relative living together in one household. In 2005, the proportion of non-relative members living together was almost the same.

8.2 Type of private dwellings

Figure 8.1 shows the distribution of dwelling units in 2010 by type of construction. About 70% (11,167 units) of all occupied units are one-family houses that are detached from any other family house; while 22% are one-family houses attached to one or more houses. Over 2% of dwelling units were in one building that has a common kitchen and toilet facilities.

Figure 8.1: Types of dwellings, Kiribati 2010



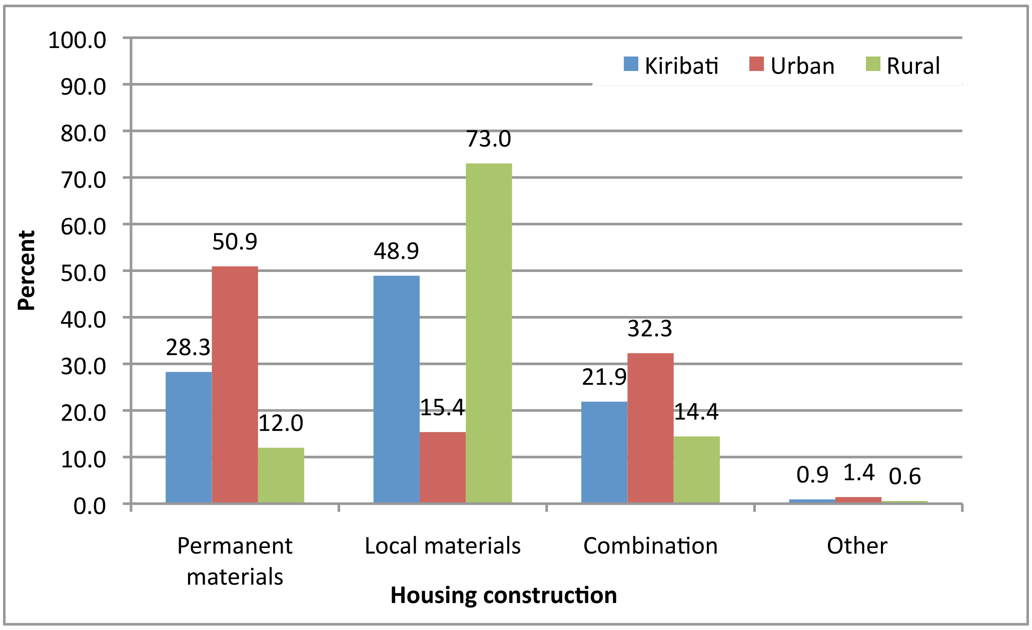
8.3 Housing conditions

8.3.1 Housing construction

The 2010 census collected information on the type of construction materials used in each dwelling; that is, whether the house was constructed with permanent materials (e.g. cement, bricks, aluminium roofing), local materials (e.g. coconut leaves, mangrove wood, etc) or a combination. As seen in Figure 8.2, 28.3% of occupied dwellings were constructed with permanent materials while almost half of the dwellings used local materials (e.g. coconut leaves, mangrove wood, etc) for construction. A further 21.9% used a combination of permanent and local materials.

Housing units constructed with permanent materials were more common in South Tarawa than in rural areas, where three-quarters of all private dwelling units in rural areas used local materials, while 14.4% of rural dwelling units used a combination of materials.

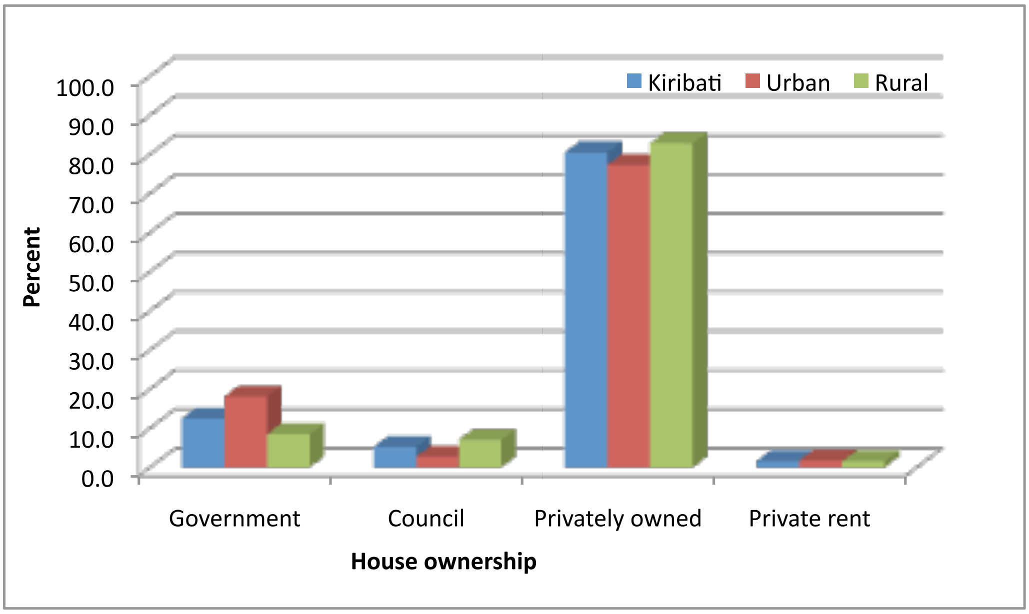
Figure 8.2: Dwellings by construction type, Kiribati 2010



8.3.2 House ownership

Heads of households were asked about house ownership, and whether the house was government owned, privately owned, owned by the island council, or rented from other private owners.

Figure 8.3: Dwellings by ownership, Kiribati 2010



Most dwelling units (80.5%) were privately owned, meaning that the head of the household or the spouse or one of the family members owned the house. Private ownership was common in both urban areas (77.3%) and rural areas (82.9%). Government-owned houses accounted for 18% in South Tarawa where most government workers live. Private rented houses were estimated to account for only 1.7% of the total dwelling units in Kiribati in 2010.

8.3.3 Land ownership

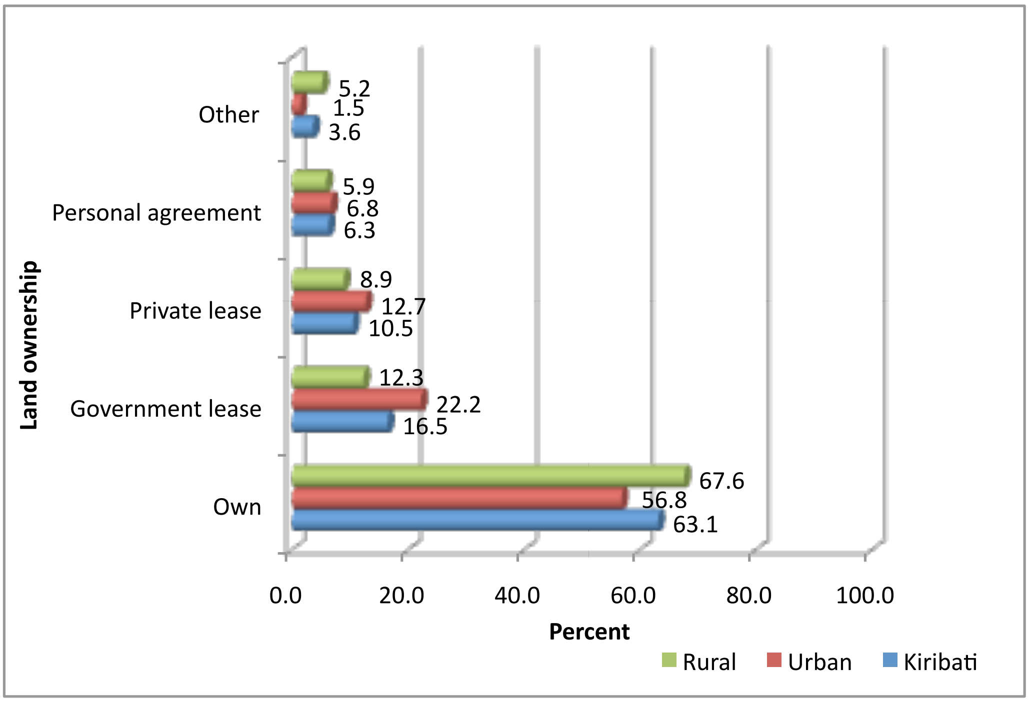
Heads of households were asked whether the land that the house was built on was:

- owned by the head of the household, spouse or other family member;
- government leased, in which the land was owned by the government and the household occupants paid a lease to the government for a specified period;
- privately leased, where the land belonged to someone else and that the household occupants paid for the land;
- personal agreement, where the land belongs to someone else but where the occupants and land owner have some agreed on method of payment (other than cash); or
- Other referred to households built on lands that did not belong to the households and had no other agreement or arrangement with the land owner.

As seen in Figure 8.4, more than three-fifths of all dwelling units were built on the land that belonged to the head of the household, or the spouse, or one of the household members while about one-fifth were built on government leased land. One out of ten dwelling units was built on land under private lease arrangement. The remaining 10% of dwelling units were on land where there was a personal arrangement with regard to payment or other arrangement.

Dwelling units built on a household's own land is higher in rural areas (67.6%) than in the urban area (56.8%). In contrast, housing units built on government-owned land are more common in the urban area where most land belongs to the government. A little over 5% of households in rural areas were built on land belonging to other people.

Figure 8.4: Dwelling units by ownership of land on which the main house was built, Kiribati 2010

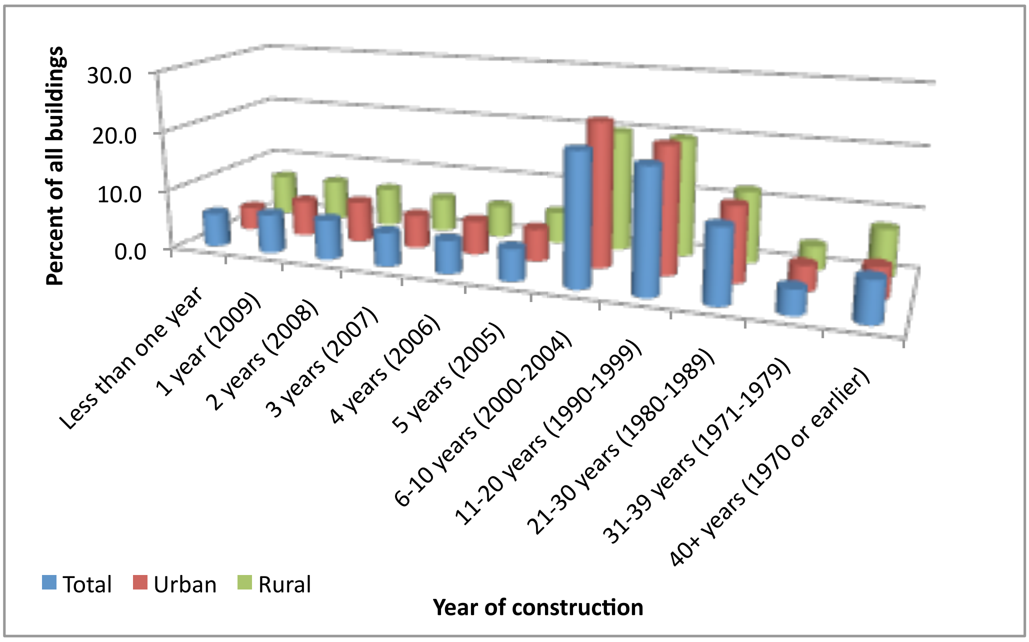


8.3.4 Age of dwelling unit

The 2010 census included questions about the age of the building. Figure 8.5 presents the year in which the dwelling units were constructed.

About 5.6% of occupied dwelling units were newly built or constructed in one year prior to the 2010 census, and these are more likely to be found in rural areas than in the urban area. One out of five dwelling units was constructed in the last ten years while a little more than 10% were constructed in the last 30 years. About 7% of all dwelling units constructed in the last 40 years are still occupied by household members.

Figure 8.5: Dwellings by age of construction, Kiribati 2010



8.4 Household health and sanitation

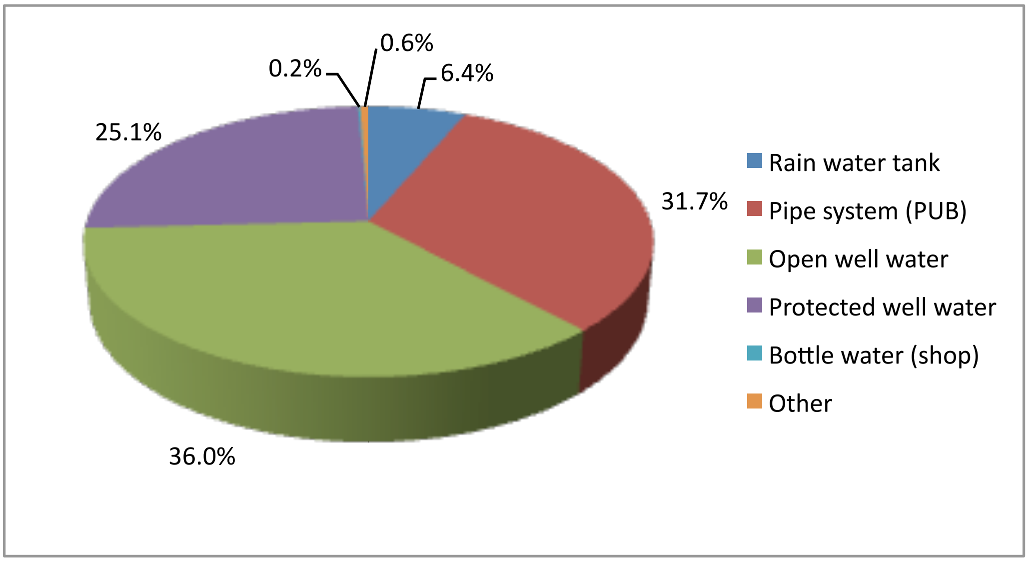
8.4.1 Drinking water

The main source of drinking water in Kiribati was from well water (protected and open well), used in three-fifths of all dwelling units; 31.7% of dwelling units accessed drinking water from the Government Public Utilities Board (PUB) pipe system, while 6.4% of dwelling units accessed rain water for their drinking water. The most common water source for urban dwellings was the PUB pipe system (67.2% of all dwelling units) while 88.5% of rural dwellings accessed water from wells.

Safe drinking water was available to 63.8% of all dwelling units (10,236 units), which included drinking water sourced from rainwater, pipe, protected well water and bottle water.

In 2005, 79% of rural households accessed water from wells as compared to 88.5% reported in 2010 Census indicating an increase in the number of households depending on well water.

Figure 8.6: Dwellings by source of drinking water, Kiribati 2010



8.4.2 Toilet facility

Table 8.2 shows the percent distribution of dwelling units by type of toilet facility. About 40% (6,410) of units in Kiribati did not have any toilet facility at all, with 29.7% using the beach, 6.7% using the 'sea' and another 3.6% using the 'bush' for a toilet facility. There were 1,496 urban dwelling units (22.3%) without a toilet facility and more than half the total rural households (52.6%) did not have a toilet facility.

Improved toilet facility accessibility was reported by 48.7 percent (7,871) of the dwelling units, which includes 12.0% with a flush toilet connected to a public sanitation system and another 36.8% with a flush toilet that was connected to its own septic tank.

The remaining dwelling units (41.3%) had access to non-improved toilet facilities such as pit latrines, atolletes (*kamkamka is* similar to composting toilet by which excreta and carbon-rich material are combined (vegetable wastes, straw, grass, sawdust, ash) and special conditions maintained to produce inoffensive composting smell), the beach, sea, bush, and other types of toilets.

In comparison to 2005 Census data, the number of households accessed to non-improved toilet facilities had declined. For instance, it was reported in 2005 that more than half of the households in Kiribati used beach for toilet facility. In 2010, the proportion of households using beach as toilet facility was lower to 29%. However, the data implied the need for the government to provide better sanitation facilities in the country.

Table 8.2: Types of toilet facilities by urban and rural households (%), Kiribati 2010

Toilet facility	Region		
	Urban	Rural	Kiribati
Flush toilet, public system	26.5	1.5	12.0
Flush toilet, own septic	38.9	35.3	36.8
Pit latrine	7.9	8.1	8.0
Beach	14.8	40.5	29.7
Atollete/*kamkamka**	2.6	1.8	2.1
Sea	6.2	7.0	6.7
Bush	1.3	5.2	3.6
Other	1.8	0.7	1.2
Total	**100.0**	**100.0**	**100.0**

*Note: * Similar to composting toilet by which excreta and carbon-rich material are combined (vegetable wastes, straw, grass, sawdust, ash) and special conditions maintained to produce inoffensive composting smell.*

8.4.3 Waste disposal

The most common method of waste disposal is a ground pit, used by 35.0% percent of dwelling units. followed by burning, reported by 21.9% of dwelling units. Both the beach and roadside point waste disposal methods were used by 14.1% of dwelling units (Table 8.3).

The most commonly used methods of waste disposal by rural households were ground pit (used by (37.9% of dwelling units) and burning (32.5% used by dwelling units). In South Tarawa, roadside point waste and ground pit were the most common methods.

Disposing waste in the sea was reported by 5.2% of all dwelling units: 6.4% of urban dwelling units and 4.4% of rural dwelling units.

Table 8.3: Method of waste disposal by urban and rural households (%), Kiribati 2010

Method of waste disposal	Urban	Rural	Kiribati
Ground pit	30.8	37.9	34.9
Burn	7.1	32.5	21.9
Beach	10.0	17.0	14.1
Road side point	30.1	2.4	14.0
Community pile point	12.1	2.0	6.2
Sea	6.4	4.4	5.2
Other places	3.7	3.8	3.8
Total	**100.0**	**100.0**	**100.0**

8.5 Household amenities

Wood and coconut shells were the main source of cooking fuel in Kiribati (used by 68.2% of dwelling units), followed by kerosene (used by 28.6% of dwelling units). The remaining dwelling units used other cooking fuel such as gas propane, electricity, copra mill residue, and others (Table 8.4).

Kerosene fuel use was highest in South Tarawa (59.6), followed by wood and coconut shells. In contrast, almost all rural households (93.0%) used wood and coconut shells as the main cooking fuels.

The 2010 census data indicated that very few households had access to clean cooking fuel, with only 0.1% of dwelling units using electricity and 2.5% using gas propane.

Table 8.4: Types of fuel used for cooking and lighting by urban and rural households (%), Kiribati 2010

Type of fuel used	Urban	Rural	Kiribati
Fuel for Cooking			
Copra mill residue	1.2	0.0	0.5
Kerosene	59.6	6.3	28.6
Wood / Coconut shells	33.5	93.0	68.2
Gas	5.4	0.4	2.5
Other	0.1	0.1	0.1
Electricity	0.2	0.1	0.1
Fuel for Lighting			
Solar	0.9	28.7	17.1
Public Utility Board electricity	88.7	10.5	43.2
Kerosene	8.7	53.0	34.5
Own generator	0.2	4.8	2.9
Other	1.6	2.9	2.4
Total	**100.0**	**100.0**	**100.0**

Overall, electricity was the main means of lighting in Kiribati, used by 43.2% of dwelling units and more commonly used by urban households (88.7%) than rural households (11.3%).

The second main source of lighting was kerosene, accounting for 34.5% of dwelling units. Kerosene was more popular in rural areas (53.0%) than in the urban area (8.7%).

Solar power was available to 17.1% of dwelling units, with more dwelling units in rural areas it (28.7%) than the urban area (1%).

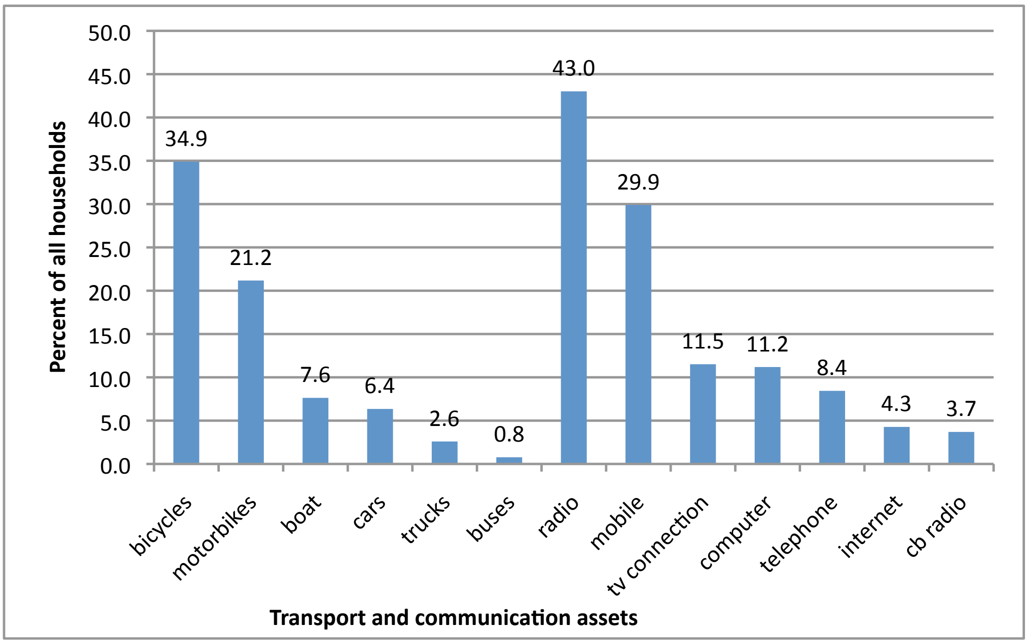
8.6 Ownership of capital goods and items

8.6.1 Transport and communication

Figure 8.7 shows that bicycles and motorbikes were owned by residents in 34.9% and 21.2% of dwelling units, respectively. By region, these were more commonly owned by members in rural dwelling units than urban dwelling units.

In terms of ownership of communication items, more than two-fifths of all dwelling units owned a radio and three in ten households owned a mobile phone. A computer and television were owned by the same proportion of dwelling units (more than 11%). A landline phones were used in 8.4% of dwelling units, while the Internet and citizen band (CB) radio were accessible by less than 5% of dwelling units.

Figure 8.7: Ownership of transport and communication assets, Kiribati 2010

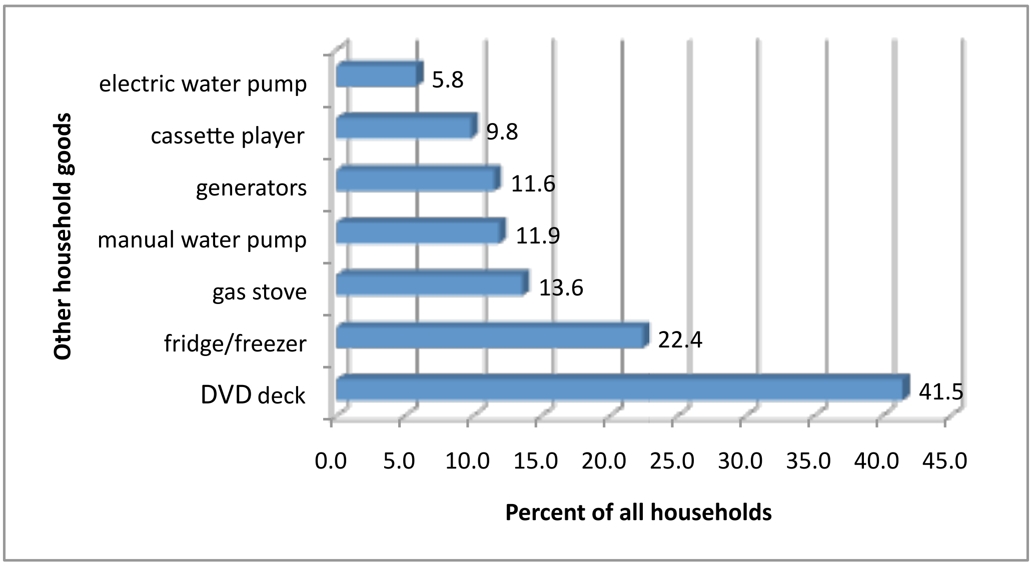


8.6.2 Other capital goods

Figure 8.8 shows the type of capital goods owned by households. A deck was the most popular capital good in Kiribati, owned by 41.5% of dwelling units; followed by a refrigerator or freezer, owned by 22.4% of dwelling units. A propane gas stove, generator and manual water pump were owned by 10% of dwelling units. A cassette player and electric water pump were owned by less than 10% of dwelling units.

Not surprisingly, appliances were more likely to be owned by urban than rural residents, with the exception of manual water pumps and generators, which were more likely to be used by rural residents.

Figure 8.8: Percent of dwellings that own other capital goods, Kiribati 2010



8.7 Private households involved in agricultural and fisheries activities

Based on questions asked about the types of agricultural food crops grown by household members, the data show that more than-three quarters of household members (78.5%) grew coconut trees, 60.3% grew pawpaw, 54.3% grew te kaina (pandanas trees), 54.3% grew 'short coconut trees locally known as "dwarf coconut trees', and 56.6% were engaged in tapping palms to make toddy (an alcoholic drink) (Fig. 8.9).

Rural households are more likely to grow food crops than urban households who typically only grow pawpaw and breadfruit.

Figure 8.9: Proportion of food crops grown by all households, Kiribati 2010

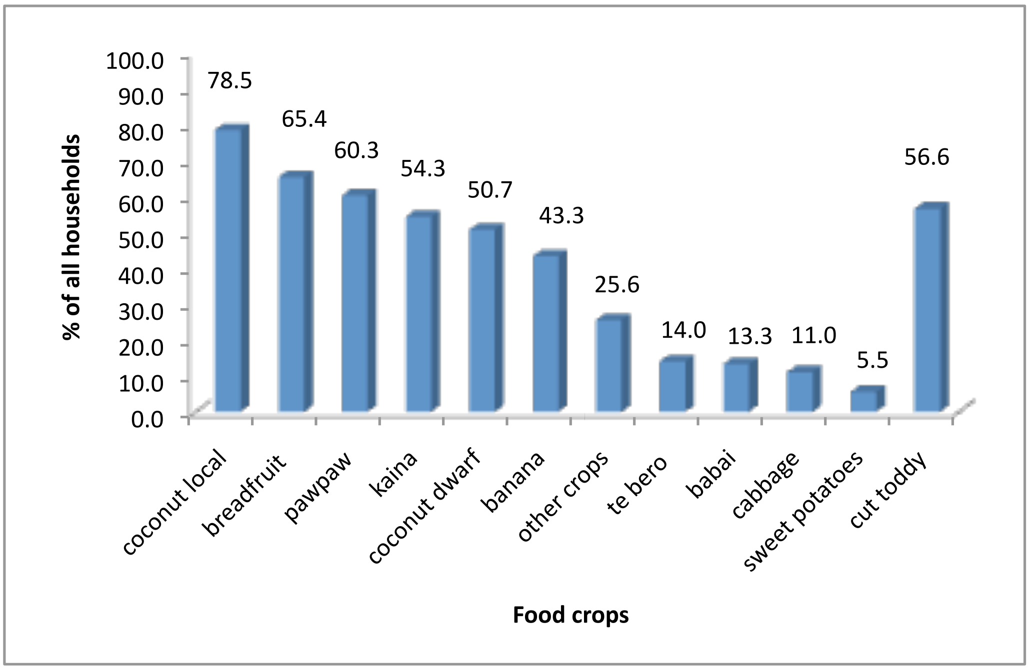
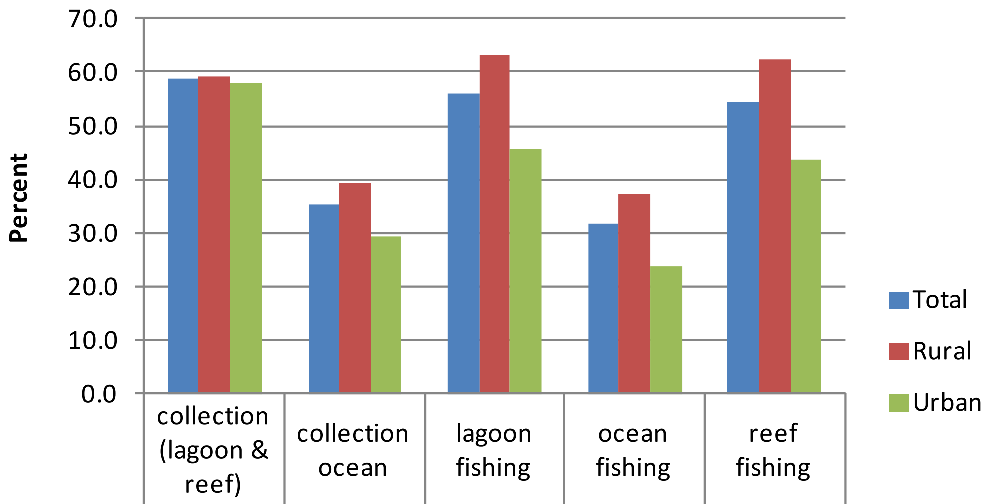


Figure 8.10 presents the proportion of dwellings (by region) whose household members were involved in fishing activities. Overall, more than half of all dwelling units had household members who were engaged in fishing (i.e. collecting in the lagoon or on the reef, lagoon fishing and reef fishing). Less than 40% of dwelling units had household members who were engaged in fish collection from the ocean and in ocean fishing. Rural household members are more likely to be engaged in fishing activities than urban household members.

Figure 8.10: Proportion of households by fishing activity, Kiribati 2010



	collection (lagoon & reef)	collection ocean	lagoon fishing	ocean fishing	reef fishing
Total	58.8	35.3	55.8	31.6	54.5
Rural	59.3	39.4	63.0	37.3	62.3
Urban	58.1	29.5	45.7	23.6	43.6

Method and place of fishing

8.8 Household income

Heads of households were asked about the main source of income for their household. Table 8.5 presents the percent distribution of dwelling units by main income source of household members. The data indicate that 50.2% of dwelling units had household members receiving income from wages, followed by 39.5% of dwellings whose members were receiving income from the sale of fish, crops and other items.

About 72% of urban households received income from wages, compared with 35% of rural households. While urban households are more likely to receive income from wages, rural households are more likely to receive income from the sale of fish and crops (49%) than urban households (26%). Urban households are more likely to receive income from own business (27%) than rural households (8%) Table 8.5).

Table 8.5: Distribution of urban and rural dwelling units by source of cash income, Kiribati 2010

Cash income source	Urban	Rural	Kiribati
Wages	71.7	34.8	**50.2**
Rental property	3.5	0.9	**2.0**
Seaman's remittances	17.9	9.1	**12.8**
Land rent	15.9	13.7	**14.6**
Sale of fish, crops	25.9	49.2	**39.5**
Other remittances	16.1	19.8	**18.3**
Own business	26.6	8.3	**15.9**

Chapter 9: Population Projections

9.1 Introduction

Population projections are procedures involving numerical calculations of a population's size and characteristics based on assumptions made about future trends in fertility, mortality and migration. Population projections are important tools used to provide better understanding of the determinants of future population change.

National population projections provide information on likely future population size, age-sex structure, fertility and mortality rates, annual population growth rates, and other demographic structures and summary indicators. Changes in population size and composition have many social, economic, environmental and political implications. For this reason, population projections serve as a basis for providing future population estimates required for sectoral planning and development, which requires evidence for informed development policies and programmes.

9.2 Methodology

A variety of methods can be used to project a nation's population. Some methods directly project the total population given the initial size of the population and assumptions on future rates of population growth. The cohort component method, however, can project population by age and sex, employing the initial age and sex structure of the population together with assumptions about future components of population change (fertility, mortality and migration). This method is capable of projecting the structure of a population by age and sex along with various indicators of population size, structure and change.

The cohort component projection method was employed in preparing the population projections presented in this chapter. The method divides the base population by age and sex (i.e. birth cohorts), and accounts separately for fertility, mortality and migration behaviour of each cohort as it passes through the projection period. At its core, the cohort component method follows people in a certain age group at a certain point in time as they survive *n* years and are *n* years older. During a projection interval of *n* years, deaths occurring within that group of people are subtracted, and international migration is added or subtracted, depending on net migration. Births that occur during a projection period are also exposed to the risk of deaths and then added as the youngest age group (United Nations 2006).

9.3 Projection inputs and assumptions

Input data

In order to project the future Kiribati population, the following types of inputs were used: 1) base population by age and sex; 2) assumptions of fertility; 3) assumptions of mortality; and 4) assumptions of migration.

Base population

The 2010 Kiribati census enumerated population by age and sex was the base used in the population projections. This base population was adjusted to mid-year 2010 (1 July 2010), taking into account changes in the three population components — fertility, mortality and migration. The United Nation's package PAS, procedure MOVEPOP was used to adjust the base population. The result is shown in Table 9.1. The evaluation of the 2010 Kiribati census age and sex distribution data showed that age-sex reporting is reliable.

Table 9.1: Enumerated and adjusted population by age group and sex, Kiribati 2010

Age group	Enumerated population (7 November 2010)				Adjusted mid-year population (1 July 2010)		
	Males	Females	Total		Males	Females	Total
0–1	1,555	1,441	2,996		1,543	1,430	2,973
1–4	5,571	5,425	10,996		5,529	5,384	10,913
5–9	5,739	5,287	11,026		5,696	5,247	10,943
10–14	6,198	5,968	12,166		6,151	5,923	12,074
15–19	5,582	5,344	10,926		5,540	5,304	10,844
20–24	5,242	5,124	10,366		5,202	5,085	10,287
25–29	4,070	4,346	8,416		4,039	4,313	8,352
30–34	3,223	3,498	6,721		3,199	3,472	6,671
35–39	2,682	2,943	5,625		2,662	2,920	5,582
40–44	2,908	3,208	6,116		2,886	3,184	6,070
45–49	2,519	2,715	5,234		2,500	2,695	5,195
50–54	1,813	2,079	3,892		1,799	2,063	3,862
55–59	1,349	1,578	2,927		1,339	1,566	2,905
60–64	919	1,066	1,985		912	1,058	1,970
65–69	642	878	1,520		637	871	1,508
70–74	470	770	1,240		466	764	1,230
75–79	181	324	505		180	322	502
80+	133	268	401		132	266	398
Total	**50,796**	**52,262**	**103,058**		**50,412**	**51,867**	**102,279**

Fertility assumptions

Fertility, measured as the total fertility rate (TFR), and the corresponding age-specific fertility rates (ASFRs) are required in order to develop population projections. These rates were derived from births in the 12 months prior the census (as described in Chapter 4).

Assumptions made about changes in future TFRs and ASFRs are based on careful examination of historical and current rates. These data show that fertility has declined in Kiribati, with a high TFR of about 7 births per woman in the 1960s, decreasing to 5 births per woman in the 1980s, and decreasing further to 4 births per woman in the 1990s. Similar findings on fertility rates declining have been highlighted around the world by researchers, demographers and the United Nations.

It is assumed that Kiribati's fertility will continue to decline in the future. Three possible scenarios on future fertility rates in Kiribati have been developed.

Assumption 1 – Constant (no-change scenario)
The current fertility rate of 3.8 live births per woman is kept constant in order to provide a benchmark against which impacts of different fertility scenarios on population growth can be assessed.

Assumption 2 – Slow decline in TFR
Fertility is assumed to decline from 3.8 births per woman to 3.0 births per woman by the end of the projection period (2030).

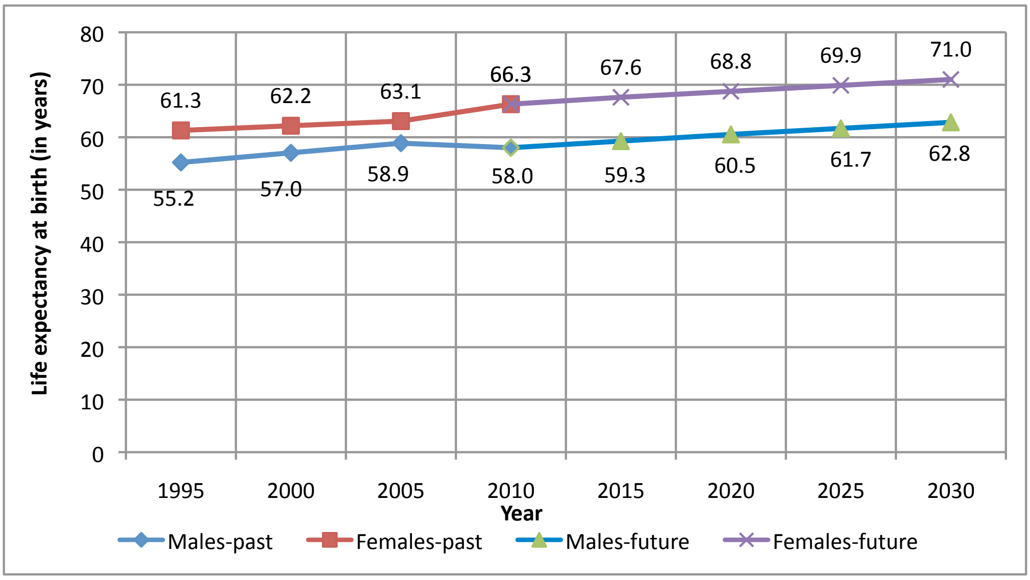
Assumption 3 – Fast decline in TFR
The current level of 3.8 births per woman is assumed to decline to replacement level (2.0 births per woman) by 2030.

Key criteria of a population projection are ASFRs for the start and end points of the projection. The start and end point ASFRs for Assumption 1 are the same because the TFR is constant throughout the projection. The end point ASFR for Assumption 2 was based on fertility data from the Cook Islands, Guam and Nauru where current TFRs are around 3.0 births per woman. The end point for Assumption 3 was based on fertility data from Australia, France, New Zealand and the USA where TFRs are around 2.0 births per woman.

Mortality assumptions
The future mortality level is assumed to continue its decline in Kiribati as based on past and current data, which indicate increasing life expectancy. A fast decline in mortality rates can be expected if further implementation and extension of health programmes and services are pursued in the future. However, more plausible mortality declines are assumed and applied in the projections.

Like most Pacific Island countries, Kiribati is experiencing a major non-communicable disease pandemic, which is reflected by virtually no change in life expectancy over the past two decades. Given prevailing morbidity and mortality conditions in Kiribati, mortality conditions are unlikely to change dramatically over the coming years. In light of this, the best assumption for medium-term population projections is a very slow change scenario between 2010 and 2030. Using the United Nations' working model 'very slow-growth' scenario, provides for life expectancy values for males to gradually improve from 58.0 to 62.8 years, and for females from 66.3 to 71.0 years by 2030.

Figure 9.1: Past and future estimated life expectancies, Kiribati 1995–2030



Migration assumptions

As already stated in Chapter 6, international migration in many developing countries is the most difficult component of population growth to measure. This is primarily due to the fact that data on past trends are often sparse or incomplete, and because the movement of people across international borders, which is often a response to rapidly changing economic, social, political and environmental factors, is a volatile process. Not only has international migration shown drastic changes in absolute numbers, but the direction of the flows has changed as well (United Nations 2006).

Having established a net migration rate of zero for the past decade using the balancing equation, reference to a slowing down of return migration from Nauru, plus more opportunities for I-Kiribati to move abroad for fixed periods (mainly for studies or training) or relocate there permanently, such as through the New Zealand Pacific Access Category scheme, could see the emergence of net emigration over the coming years.

Hence, the following three assumptions are used for the Kiribati 2010–2030 population projections.

Assumption 1 – Constant (no-change scenario). Net migration will remain at zero (counts of immigrants equal counts of emigrants), at the level prevalent during 2000–2010, with this scenario presented also for comparative purposes.

Assumption 2 – Net migration is assumed to be -100 people/year throughout the projection period, and most of this occurs by way of New Zealand's current annual quota of 75 people.

Assumption 3 – Net migration is assumed to grow from -100 to -200 people/year after 10 years of the 20-year projection period. With I-Kiribati return migration from Nauru no longer having a major impact as it did during 1995–2005, and more opportunities becoming available for I-Kiribati to relocate elsewhere, Assumption 3 appears to be the most probable migration scenario future for the coming years.

9.4 Projections scenarios

Seven population projection scenarios were prepared (Table 9.2) based on current levels of fertility, mortality and migration, resulting in seven combinations of the likely future changes in these three population components.

Table 9.2: Summary of prepared population projection scenarios, Kiribati 2010–2030

Projections scenarios	Fertility (TFR in 2030)	Mortality (2010–2030)	Migration (2010–2030)
Scenario 1	Constant TFR (3.8)	(62.8 years for males and 71.0 years for females by 2030)	Zero net migration (immigrants equal emigrants)
Scenario 2	Slow TFR decline to 3.0	(62.8 years for males and 71.0	Zero net migration (immigrants equal emigrants)
Scenario 3	"	years for females by 2030)	Net migration: -100 (2010–2030)
Scenario 4	"		Net migration: -100 (until 2020); -200 (2021 to 2030)
Scenario 5	Fast TFR decline to 2.0	(62.8 years for males and 71.0	Zero net migration (immigrants equal emigrants)
Scenario 6	"	years for females by 2030)	Net migration: -100 (2010–2030)
Scenario 7	"		Net migration: -100 (until 2020); -200 (2021 to 2030)

9.5 Measuring the impacts of fertility and migration on future population change

In Kiribati, fertility constitutes the most influential factor on population size and structure. Therefore, in order to measure the impact of change in fertility, three scenarios (1, 2 and 5), including migration assumption 1 (zero net migration) are examined. Thereafter, the impact of migration is measured by combining all three migration assumptions with fertility assumption 2 and comparing Scenarios 2, 3 and 4. Next, the most likely future population growth scenario (Scenario 4) is outlined in detail and compared with current growth rates (Scenario 1). Finally, a set of conclusions and policy implications relating to Scenario 4 (the most likely scenario) are discussed.

9.5.1 Projections results

Summary results

Table 9.3 summarises seven population projection scenario outcomes for Kiribati. In every scenario, Kiribati's population would increase throughout the projection period (2010–2030). In the lowest scenario (Scenario 7), Kiribati's population is projected to reach 136,000 by 2030 and under constant growth (Scenario 1) the population would be expected to reach 158,000 by 2030.

Table 9.3: Summary of population projection scenarios (in '000s), Kiribati 2010–2030

	2010	2013	2015	2020	2025	2030
Scenario 1	102.3	109.2	114.2	127.7	142.2	157.7
Scenario 2	102.3	109.2	113.9	126.2	138.5	150.6
Scenario 3	102.3	108.8	113.4	125.0	136.5	147.9
Scenario 4	102.3	108.8	113.4	125.0	136.0	146.7
Scenario 5	102.3	109.0	113.4	123.8	132.8	139.8
Scenario 6	102.3	108.7	112.8	122.6	130.9	137.3
Scenario 7	102.3	108.7	112.8	122.6	130.4	136.1

The impact of fertility

The three different fertility assumptions combined with zero net migration resulted in three different projections (Table 9.4 and Figure 9.2). These different projections highlight the impact of different levels of fertility on the future size of Kiribati's population. The higher the assumed fertility level, the higher the population outcome.

Table 9.4: Projected populations (in '000s) based on three fertility scenarios and zero net migration, Kiribati 2010–2030

Projection scenarios	**2010**	**2013**	**2015**	**2020**	**2025**	**2030**
Fertility assumptions						
Constant TFR 3.8 (Scenario 1)	102.3	109.2	114.2	127.7	142.2	157.7
Slow TFR decline to 3.0 (Scenario 2)	102.3	109.2	113.9	126.2	138.5	150.6
Fast TFR decline to 2.0 (Scenario 5)	102.3	109.0	113.4	123.8	132.8	139.8

The three population projection scenarios are discussed below.

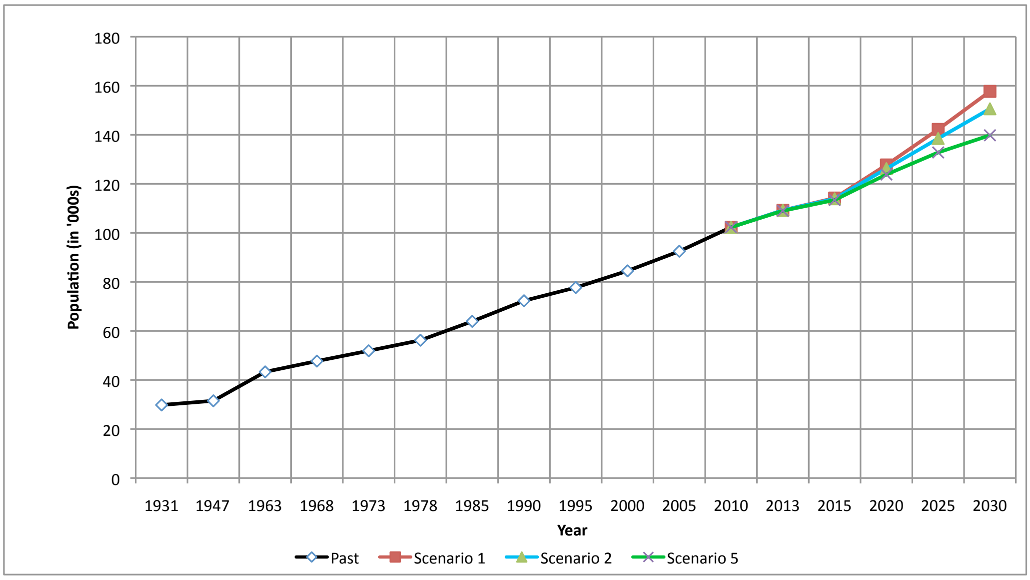
Constant TFR (Scenario 1): Assuming that the current fertility level of 3.8 births per woman remains constant during the entire projection period, a population of 128,000 would occur by 2020 and 158,000 by 2030.

Slow TFR decline (Scenario 2): Applying the slow TFR decline assumption (i.e. fertility decline from 3.8 births per woman to 3.0 births per woman by 2030) results in a population of 126,000 by 2020 and 151,000 by 2030.

Fast TFR decline (Scenario 5): Applying the fast TFR decline assumption (i.e. fertility decline of about 1.8 births per woman to 2.0 births per woman) results in a population of 124,000 by 2020 and 140,000 by 2030.

Figure 9.2 presents past and future population trends produced from census data and the three projection scenarios (Scenarios 1, 2 and 5) based on different fertility assumptions and zero net migration. Figure 9.2 shows that past trends of population growth will continue regardless of which projection scenario is used. The rate of increase for the 'fast TFR decline' scenario, where fertility rates fall to 2.0 births per woman by 2030 provides the closest match to past trends of growth. By contrast, the 'slow TFR decline' and 'constant TFR' projection scenarios would constitute additional increases in population growth rates from past trends.

Figure 9.2: Past and future population trends based on three fertility assumptions and zero net migration, Kiribati 1931–2030



The impact of migration

Table 9.5 takes into consideration the impact of net migration on the future population of Kiribati by comparing scenarios incorporating the three migration assumptions and the 'slow TFR decline' assumption.

In Scenario 2, the effects of life expectancy increases and declining TFR (since this scenario incorporates zero net migration) are observed. In Scenario 2, the population increases by around 48,000 to around 151,000 by 2030. In Scenario 3, a loss of 100 migrants per year in conjunction with the same fertility and mortality assumptions as Scenario 2 results in an increase in population to 148,000 by 2030, around 3,000 fewer than for Scenario 2 (due to out-migration of 100 people per year). In Scenario 4, the population would increase to around 147,000 by 2030, which is around 4,000 fewer people by 2030 when compared with Scenario 2. Scenario 4 projects around 1,200 fewer people by 2030 compared with Scenario 3, which is due to the increased out-migration in Scenario 4 after 2020 when compared with Scenario 3.

Table 9.5: Projected populations (in '000s) based on TFR decline to 3.0 births per woman and three net migration assumptions, Kiribati 2010–2030

Projection scenarios *	2010	2013	2015	2020	2025	2030
Zero net migration (Scenario 2)	102.3	109.2	113.9	126.2	138.5	150.6
Net migration: -100 (Scenario 3)	102.3	108.8	113.4	125.0	136.5	147.9
Net migration: -100 (2011–2020); -200 (2021–2030) (Scenario 4)	102.3	108.8	113.4	125.0	136.0	146.7

* All scenarios based on a slow TFR decline to 3.0 in 2030

It can be concluded from the data in Tables 9.4 and 9.5 that even a slow TFR decline from 3.8 to 3.0 births per woman would have a larger impact on constraining the Kiribati population size in the future than any of the proposed out-migration assumptions.

9.6 Most likely outcome (Scenario 4)

The ability of a projection scenario to accurately determine probable future population size and structure becomes more tenuous the further into the future the projection goes. Therefore, several projection scenarios need to be produced to allow demographers and planners to choose an outcome that seems most plausible and suited to planning strategies. Projection Scenario 4 constitutes the most likely outcome for Kiribati.

Of the seven scenarios explored, projection Scenario 4 has been chosen as the most likely outcome. Population changes aligned with those presented in Scenario 4 appear to be the most likely outcome because:

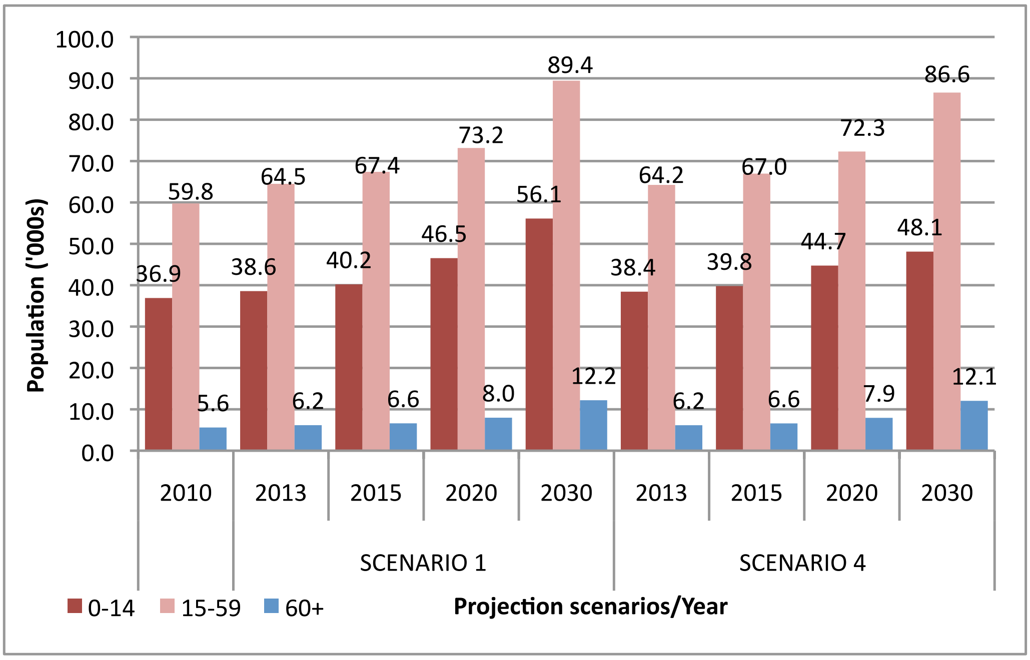
- The current fertility level of 3.8 births per woman is expected to decline as it has in Kiribati's recent past, and based on historical worldwide observations of countries with similar fertility rates in the past. A slow decline in TFR, reaching a TFR of 3.0 births per woman by 2030 is probable, based on the past trend in fertility decline that has been achieved. A fast TFR decline to 2.0 births per woman by 2030 seems to be overly optimistic for Kiribati.
- Although future migration patterns and levels are impossible to predict, net migration of -100 people per year until 2020 rising to -200 people per year from 2021 until 2030 appears to be the most realistic assumption for Kiribati. This is because: return migration from Nauru is no longer having a major impact as it did between 1995 and 2005; the New Zealand Pacific Access Category scheme currently accounts for 75 I-Kiribati emigrants per year; and there are more opportunities for I-Kiribati to move abroad for fixed periods (mainly for studies or training), which could well see the emergence of net emigration over the coming years. A net emigration of 200 people per year from 2020 onwards is entirely plausible.

In the following analysis, the most likely population projection scenario (Scenario 4) is compared with Scenario 1, which represents current conditions: a TFR of 3.8 births per woman and zero net migration. Table 9.6 presents future population indicators from these two scenarios.

Table 9.6: Population indicators, projection Scenarios 1 and 4, Kiribati 2010–2030

		SCENARIO 1				SCENARIO 4			
Population indicators	**2010**	**2013**	**2015**	**2020**	**2030**	**2013**	**2015**	**2020**	**2030**
Population ('000s)	102.2	109.2	114.2	127.7	157.7	108.8	113.4	125.0	146.7
Population by broad age groups (%)									
0–14 years	36.1	35.3	35.2	36.5	35.6	35.3	35.1	35.8	32.8
15–59 years	58.4	59.0	59.0	57.3	56.7	59.0	59.1	57.9	59.0
60 years and over	5.5	5.6	5.8	6.2	7.7	5.7	5.8	6.4	8.2
Dependency ratio	71	69	69	75	76	69	69	73	70
Median age	22	22	22.3	22.7	22.8	22.0	22.3	23.0	23.9
Crude birth rate (per 1,000 population)	30	30	30	30	28	30	29	27	23
Crude death rate (per 1,000 population)	9	8	8	8	7	8	8	8	7
Average annual growth rate (%)	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.0	1.8

Figure 9.3: Projected populations by age group, Scenarios 1 and 4, Kiribati 2010–2030



Overall, both scenarios project future population increases for Kiribati. In the most likely scenario (Scenario 4), the population would increase to about 125,000 people by 2020 and reach about 147,000 people by 2030 (Table 9.6). Scenario 4 results in about 11,000 fewer people in the Kiribati population in 2030 when compared with constant growth under currently prevailing circumstance (Scenario 1).

In Scenario 4, the proportion of the population aged 0–14 (as part of the total population) would decline by more than 3% as a result of a fertility decline to 3.0 births per woman in 2030. By contrast, in Scenario 1, the proportion of the population aged 0–14 is almost the same (about 36%) in 2010 and 2030 due to a constant fertility rate of 3.8 births per woman (Table 9.6).

In Scenario 4, the size of the population younger than 15 years would increase from 37,000 in 2010 to 40,000 by 2015, 45,000 by 2020 and 48,000 by 2030 (Fig. 9.3). In contrast, in Scenario 1, the population younger than 15 years would be about 56,000 by 2030. Constant fertility of 3.8 births per woman and zero net migration results in 8,000 more young people in Kiribati by 2030 than a slowly declining TFR to 3.0 births per woman and net emigration of 100 to 200 people per year.

The proportion of the population of working age (15–59) would remain steady at around 59% under Scenario 4 but would fall to around 57% under Scenario 1 by 2030 (Table 9.6). The size of the working age population would increase under both scenarios (Fig. 9.3). In Scenario 4, there would be 67,000 in the working age group by 2015, around 72,000 by 2020, and around 87,000 by 2030. In Scenario 1, the working age population would reach 89,000 by 2030. Therefore, although constant growth (Scenario 1) would mean a larger working age population, under Scenario 4 the working age population would become a larger proportion of the population (Table 9.6).

The proportion of the population aged 60 and over would increase to around 8% under both scenarios (Table 9.6). Similarly, the size of the population aged 60 and older would increase under both scenarios (Fig. 9.3). In the most likely scenario, this group would increase from around 6,000 in 2013 to 8,000 by 2020 and to 12,000 by 2030 (Scenario 4). The median age would increase from 22 years in 2010 to almost 24 years by 2030 under the most likely scenario due to lower fertility and out-migration of younger adults (Table 9.6).

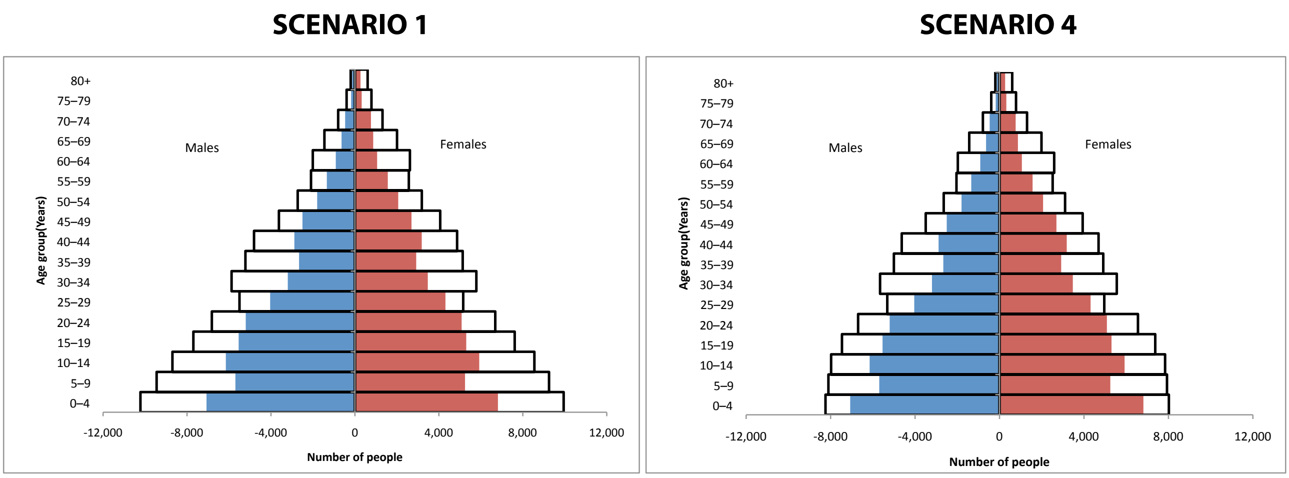
The two scenarios have different age-dependency ratios (Table 9.6): Scenario 4, the most likely scenario, has a volatile dependency ratio (due to declining future fertility and changing levels of out-migration). However, the dependency ratio for Scenario 4 would remain almost unchanged, with values of 71% in 2010 to 70% by 2030. By contrast, Scenario 1 has constant high fertility and the dependency ratio would increase to 76% by 2030. Youth dependency would place greater demands on a proportionately smaller working age population under Scenario 1, whereas under the most likely scenario (Scenario 4), a proportionately larger working age population would support a smaller dependent population in the future.

In the most likely scenario (Scenario 4), the projected crude birth rate (Table 9.6) would decline from 30 births per 1,000 population (reported in 2010) to 23 births per 1,000 population by 2030. This is a result of declining fertility rates. The crude death rate would also decline from around 9 deaths per 1,000 population to about 7 deaths per 1,000 population by 2030 as a result of improved life expectancy.

Kiribati's average annual population growth rate would be steady at 2.2% per year under Scenario 1. However, under Scenario 4, the growth rate would decline from 2.2% in 2010 to 1.8% by 2030 (Table 9.6). This decline in the growth rate is due to out-migration and reductions in fertility. Lower growth rates are more manageable for government planners aiming to house, educate, feed and provide employment, healthcare facilities and other services for their population.

The different impacts on population size and structure are further illustrated using population pyramids (Fig. 9.4). Shaded areas represent the enumerated 2010 population size by sex and age group, and the outlined areas represent the estimated (projected) population size by 2030. Scenario 1 is presented on the left and Scenario 4 (the most likely scenario) is presented on the right in Figure 9.4.

Figure 9.4: Kiribati population pyramids, Scenarios 1 and 4: 2010 (shaded) and 2030 (outlined)



The two pyramids clearly illustrate the impact of changes in fertility and migration. The different shape of the two pyramids shows the difference in the population size and structure by 2030, especially for those aged 0–19. Declining fertility (Scenario 4) combined with out-migration of 100–200 people per year results in a smaller population in younger age groups as compared with constant growth (Scenario 1). In addition, the impact of emigration on the future population size and structure of the Scenario 4 pyramid can be clearly seen by comparing the working age populations of both pyramids. There is little discernible difference in the populations aged 60 and older because these age groups are not actively involved in migration.

9.7 Conclusion and policy implications

In this chapter, a set of seven projection scenarios were presented that were based on the possible future changes in the three population components of fertility, mortality and migration. First, the summary outcome of the impact of fertility changes only (with zero net migration) on the future population size was highlighted and second, the impact of migration changes on future population size were presented. The results clearly indicate that even a slowly declining TFR (to 3.0 births per woman by 2030) would have a much greater constraining effect on future population size as compared with the effect of plausible levels of future emigration of 100–200 people per year.

Accordingly, if the Kiribati government wanted to constrain population growth, it would need to look at promoting family planning and to provide support and education to reduce family sizes. A TFR decline from 3.8 to 3.0 births per woman (Scenario 4) is more achievable by 2030 than reduction to replacement level (a TFR of 2.0 births per woman).

If the assumptions of Scenario 4 held true, the population would increase by 50% to about 147,000 people by 2030. The impact on the future population size and structure would require the Kiribati government to plan and cater for an increasing young, working age and elderly population. Emphasis would need to be placed on educating and retaining a skilled workforce (in light of increasing out-migration, which could potentially lead to a loss of skills workers). Jobs would need to be provided to retain skilled workers and cater for a working age population that would increase in overall size and as a proportion of the population as a whole. At the same time, opportunities would need to be sought for I-Kiribati people seeking employment outside of the country or wishing to emigrate permanently — both groups would likely provide a valuable source of financial remittance to the Kiribati economy.

Finally, because fertility falls, life expectancy rises and emigration occurs (due to growing population pressure on finite resources), it is inevitable that some ageing of the population will occur. The Kiribati government must ensure that adequate support is provided for families to look after their ageing relatives and that provisions are made for adequate healthcare facilities for a growing elderly population.

Obtaining customised population projections from the Statistics for Development Programme (SDP) of the Secretariat of the Pacific Community

This chapter presents a simple set of outputs from a range of projections. SDP can provide more in depth information to suit the specific needs of planning for schools, healthcare services, family planning and other social and economic developmental purposes. The following table provides an indication of some of the data that can be provided by SDP.

Population indicators	SCENARIO 4				
	2013	2015	2020	2025	2030
Population ('000s)	109.2	114.2	127.7	136.0	157.7
Total population by age ('000s)					
0 years	3.1	3.2	3.3	3.3	3.3
0-4 years	15.1	15.2	16.1	16.2	16.3
5-14 years	23.4	24.6	28.7	30.9	31.9
60 years and over	6.2	6.6	7.9	9.9	12.1
80 years and over	0.4	0.4	0.6	0.7	0.8
Female population by age ('000s)					
15-24 years	10.9	11.1	11.0	11.7	13.9
15-49 years	28.7	29.7	31.3	34.5	38.0
Births ('00s)	32.2	33.0	34.2	33.8	34.3
Deaths ('00s)	9.0	9.2	9.8	10.2	10.7

To enquire about customised population projections, please contact:
Gerald Haberkorn (email: geraldh@spc.int; Tel: +687-262000 ext 31121)

APPENDICES

Appendix 1: Number of women, mean parity and age-specific fertility rates and adjusted number of births by age of women, Kiribati 2010 (Brass P/F ratio)

Age Group	Number of Women	Children Ever Born	Births in Past Year	Mean Parity (P)	Age-Specific Fertility Rate (ASFR) f(i)	Cummulative fertility (ϕ)	Estimated Parity equivalent (Fi)	Fertility Rate for Conventional five-year age groups (f+(i))	P/F Ratio P(i)/F(i)	Adjusted fertility Rate: f+(i)= Kf+(i) where K = 1.04)	Adjusted number of births
(1)	(2)	(3)	(4)	(5)[1]	(6)[2]	(7)	(8)	(9)	(10)[3]	(11)[4]	(12)[5]
15-19	5344	471	202	0.0881	0.0378	0.1890	0.0741	0.0474	1.1897	0.0494	264.2
20-24	5124	3487	827	0.6805	0.1614	0.9960	0.6385	0.1710	1.0658	0.1782	913.2
25-29	4346	6926	837	1.5936	0.1926	1.9589	1.5710	0.1925	1.0144	0.2007	872.1
30-34	3498	9194	595	2.6284	0.1701	2.8094	2.4888	0.1655	1.0561	0.1724	603.2
35-39	2943	9963	346	3.3853	0.1176	3.3973	3.1922	0.1106	1.0605	0.1153	339.3
40-44	3208	12943	139	4.0346	0.0433	3.6139	3.5478	0.0375	1.1372	0.0391	125.5
45-49	2715	11579	18	4.2648	0.0066	3.6471	3.6392	0.0048	1.1719	0.0050	13.7
Total	**27178**				**0.7294**			**0.7294**		**0.7602**	**3131.2**
TFR					**3.65**			**3.65**		**3.80**	

[1] → (5) = (3)/(2)
[2] → (6) = (4)/(2)
[3] → (10)=(5)/((8)
[4] → (11) = The adjusted age-specific fertility rate is calculated by multiplying the age-specific fertility rate for the conventional age groups by a correction factor K, which is derived by taking the weighted average of the P/F ratios for age groups 20-24 and 25-29. K is calculated by the formula:

[P/F (20-24)*W(20-24)+P/F(25-29)*W(25-29)]/[W(20-24)+W(25-29)]
Where, P/F(20-24) and P/F(25-29) are P/F ratios for age groups 20-24 and 25-29, respectively, while
W(20-24) and W(25-29) are number of women in age groups 20-24 and 25-29.

[5] → (12)= The adjusted number of births for each age group of women is calculated by multiplying the adjusted age-specific fertility rate in column 7 by the number of women in the same age group in column 2.

Source: Indirect Methods, UN Manual X

Appendix 2: Arriaga's approach for estimation of ASFR for one point in time and the age pattern of fertility (Arriaga-Brass)

Month November
Year 2010
Fertility pattern is tabulated by age of woman at enumeration

Age Group of Woman	Children Ever Born	Age Specific Fertility Pattern (A.S.F.P.)	Fertility Consistent with C.E.B. (A.S.F.R.)	Fertility Pattern by Age at Survey Date	Fertility Pattern by Age at Birth of Child	Cumulation of			Age Specific Fertility Rates Based on Adjustment Factor for the Age Group		
						A.S.F.R.	Fertility Pattern by Age at Birth	Adjustment Factors	20 - 25	25 - 30	30 - 35
November 2010											
				Recorded	Calculated						
15 - 20	0.08814	0.03780	0.06109	0.03780	0.04744	0.06109	0.04744	1.28771	0.04821	0.04894	0.04858
20 - 25	0.68052	0.16140	0.16090	0.16140	0.17100	0.22199	0.21844	1.01626	0.17378	0.17639	0.17509
25 - 30	1.59365	0.19259	0.20195	0.19259	0.19254	0.42395	0.41098	1.03155	0.19567	0.19861	0.19714
30 - 35	2.62836	0.17010	0.18658	0.17010	0.16546	0.61052	0.57644	1.05912	0.16815	0.17068	0.16942
35 - 40	3.38532	0.11757	0.12822	0.11757	0.11062	0.73874	0.68706	1.07523	0.11242	0.11411	0.11326
40 - 45	4.03460	0.04333	0.09006	0.04333	0.03753	0.82881	0.72459	1.14383	0.03814	0.03872	0.03843
45 - 50	4.26483	0.00663	0.03283	0.00663	0.00483	0.86164	0.72942	1.18126	0.00491	0.00498	0.00494

Mean Age of Childbearing:	28.78119661	27.78153393			
Total Fertility Rate:	4.30818718	3.6471	3.70638875	3.76217479	3.73428177

Appendix 3: Arriaga's approach for estimation of ASFR for two points in time and the age patterns of fertility (Arriaga-Brass)*

First enumeration: November 2005
Fertility pattern is tabulated by age of woman at enumeration

Age Group of Woman	Children Ever Born	Age Specific Fertility Pattern (A.S.F.P.)	Fertility Consistent with C.E.B. (A.S.F.R.)	Fertility Pattern by Age at Survey Date	Fertility Pattern by Age at Birth of Child	Cumulation of A.S.F.R.	Cumulation of Fertility Pattern by Age at Birth	Adjustment Factors	Age Specific Fertility Rates Based on Adjustment Factor for the Age Group 20 - 25	25 - 30	30 - 35
November 2005 to November 2006											
				Re-corded	Calculated						
15 - 20	0.0740	0.0306	0.0567	0.0306	0.0389	0.0567	0.0389	1.4554	0.0455	0.0464	0.0459
20 - 25	0.6360	0.1475	0.1715	0.1475	0.1562	0.2282	0.1951	1.1693	0.1826	0.1859	0.1843
25 - 30	1.5780	0.1709	0.2083	0.1709	0.1715	0.4365	0.3667	1.1904	0.2006	0.2042	0.2024
30 - 35	2.6550	0.1628	0.2011	0.1628	0.1589	0.6376	0.5255	1.2132	0.1858	0.1891	0.1874
35 - 40	3.5820	0.1097	0.1073	0.1097	0.1042	0.7449	0.6297	1.1830	0.1218	0.1240	0.1229
40 - 45	4.1110	0.0495	0.0511	0.0495	0.0436	0.7961	0.6733	1.1824	0.0509	0.0519	0.0514
45 - 50	4.4950	0.0085	0.0189	0.0085	0.0062	0.8150	0.6795	1.1993	0.0073	0.0074	0.0074
Total Fertility Rate:			4.074759233		3.3975				3.972633784	4.044548371	4.008591077

Last enumeration: November 2010
Fertility pattern is tabulated by age of woman at enumeration

Age Group of Woman	Children Ever Born	Age Specific Fertility Pattern (A.S.F.P.)	Fertility Consistent with C.E.B. (A.S.F.R.)	Fertility Pattern by Age at Survey Date	Fertility Pattern by Age at Birth of Child	Cumulation of A.S.F.R.	Cumulation of Fertility Pattern by Age at Birth	Adjustment Factors	Age Specific Fertility Rates Based on Adjustment Factor for the Age Group 20 - 25	25 - 30	30 - 35
November 2009 to November 2010											
				Re-corded	Calculated						
15 - 20	0.08814	0.03780	0.06314	0.03780	0.04744	0.06314	0.04744	1.33086	0.05048	0.05057	0.05052
20 - 25	0.68052	0.16140	0.16926	0.16140	0.17100	0.23240	0.21844	1.06391	0.18193	0.18225	0.18209
25 - 30	1.59365	0.19259	0.20563	0.19259	0.19254	0.43803	0.41098	1.06582	0.20484	0.20521	0.20503
30 - 35	2.62836	0.17010	0.18187	0.17010	0.16546	0.61990	0.57644	1.07539	0.17604	0.17635	0.17620
35 - 40	3.38532	0.11757	0.09378	0.11757	0.11062	0.71368	0.68706	1.03874	0.11769	0.11790	0.11779
40 - 45	4.03460	0.04333	0.06022	0.04333	0.03753	0.77389	0.72459	1.06804	0.03993	0.04000	0.03997
45 - 50	4.26483	0.00663	0.02217	0.00663	0.00483	0.79606	0.72942	1.09137	0.00514	0.00514	0.00514
Mean Age of Childbearing:			27.91923378		27.78153393						
Total Fertility Rate:			3.980319485		3.6471				3.880170282	3.887161059	3.883665671

*=MORTPAK 4.1 procedure FERTPF, United Nations

Appendix 4: Estimated Kiribati fertility using Trussell's P/F Ratio, PAS procedure PF RATIO - Kiribati 2010

Age	Reported ASFR f(i)	Average CEB P(i)	Cumulative fertility Phi(i)	F(i)	P/F ratio
15-19	0.0378	0.0881	0.1890	0.0741	1.1897
20-24	0.1614	0.6805	0.9960	0.6385	1.0658
25-29	0.1926	1.5936	1.9589	1.5710	1.0144
30-34	0.1701	2.6284	2.8094	2.4888	1.0561
35-39	0.1176	3.3853	3.3973	3.1922	1.0605
40-44	0.0433	4.0346	3.6139	3.5478	1.1372
45-49	0.0066	4.2648	3.6471	3.6392	1.1719

Age code * 0

TFR 3.65

* Age code: ASFR based on age of mother at:

0 census/survey

1 birth of child

		Adjusted ASFR's				
		P2/F2	P3/F3	P4/F4	Avg(P3/F3,P4/F4)	Avg(P2/F2,P3/F3)
Age	ASFR *	1.0658	1.0144	1.0561	1.0352	1.0401
15-19	0.0474	0.0506	0.0481	0.0501	0.0491	0.0493
20-24	0.1710	0.1822	0.1735	0.1806	0.1770	0.1779
25-29	0.1925	0.2052	0.1953	0.2033	0.1993	0.2003
30-34	0.1655	0.1763	0.1678	0.1747	0.1713	0.1721
35-39	0.1106	0.1179	0.1122	0.1168	0.1145	0.1151
40-44	0.0375	0.0400	0.0381	0.0396	0.0389	0.0390
45-49	0.0048	0.0051	0.0049	0.0051	0.0050	0.0050
TFR	3.65	3.89	3.70	3.85	3.78	3.79

* Pattern corrected for one-half year between birth and reporting.

ASFR Age-specific fertility rate.

CEB Average number of children ever born.

Appendix 5: Population by mother and father survivorship - 2010

Age/Sex	Mother and Father living status							
	Mother				Father			
	Total	Yes	No	DK	Total	Yes	No	DK
Total	103,058	77,530	25,302	226	103,058	66,447	36,276	335
0–4	13,992	13,887	99	6	13,992	13,584	369	39
5–9	11,026	10,778	237	11	11,026	10,420	575	31
10–14	12,166	11,592	565	9	12,166	10,885	1,253	28
15–19	10,926	10,134	772	20	10,926	9,138	1,757	31
20–24	10,366	9,056	1,283	27	10,366	7,721	2,596	49
25–29	8,416	6,855	1,536	25	8,416	5,447	2,935	34
30–34	6,721	4,947	1,749	25	6,721	3,515	3,178	28
35–39	5,625	3,494	2,105	26	5,625	2,209	3,388	28
40–44	6,116	3,039	3,054	23	6,116	1,694	4,401	21
45–49	5,234	1,982	3,228	24	5,234	982	4,235	17
50–54	3,892	1,005	2,874	13	3,892	469	3,407	16
55–59	2,927	480	2,438	9	2,927	207	2,713	7
60–64	1,985	153	1,829	3	1,985	78	1,907	0
65–69	1,520	68	1,451	1	1,520	41	1,478	1
70–74	1,108	30	1,077	1	1,108	31	1,074	3
75+	1,038	30	1,005	3	1,038	26	1,010	2
Male								
Age								
Total	50,796	39,032	11,662	102	50,796	33,479	17,140	177
0–4	7,126	7,075	49	2	7,126	6,890	212	24
5–9	5,739	5,622	113	4	5,739	5,419	303	17
10–14	6,198	5,906	286	6	6,198	5,527	655	16
15–19	5,582	5,153	423	6	5,582	4,645	921	16
20–24	5,242	4,613	612	17	5,242	3,923	1,291	28
25–29	4,070	3,361	701	8	4,070	2,637	1,416	17
30–34	3,223	2,375	837	11	3,223	1,692	1,517	14
35–39	2,682	1,660	1,010	12	2,682	1,054	1,613	15
40–44	2,908	1,458	1,441	9	2,908	801	2,099	8
45–49	2,519	957	1,548	14	2,519	474	2,035	10
50–54	1,813	488	1,319	6	1,813	241	1,565	7
55–59	1,349	237	1,109	3	1,349	98	1,249	2
60–64	919	71	845	3	919	36	883	0
65–69	642	34	608	0	642	21	621	0
70–74	428	10	418	0	428	10	417	1
75+	356	12	343	1	356	11	343	2
Female								
Age								
Total	52,262	38,498	13,640	124	52,262	32,968	19,136	158
0–4	6,866	6,812	50	4	6,866	6,694	157	15
5–9	5,287	5,156	124	7	5,287	5,001	272	14
10–14	5,968	5,686	279	3	5,968	5,358	598	12
15–19	5,344	4,981	349	14	5,344	4,493	836	15
20–24	5,124	4,443	671	10	5,124	3,798	1,305	21
25–29	4,346	3,494	835	17	4,346	2,810	1,519	17
30–34	3,498	2,572	912	14	3,498	1,823	1,661	14
35–39	2,943	1,834	1,095	14	2,943	1,155	1,775	13
40–44	3,208	1,581	1,613	14	3,208	893	2,302	13
45–49	2,715	1,025	1,680	10	2,715	508	2,200	7
50–54	2,079	517	1,555	7	2,079	228	1,842	9
55–59	1,578	243	1,329	6	1,578	109	1,464	5
60–64	1,066	82	984	0	1,066	42	1,024	0
65–69	878	34	843	1	878	20	857	1
70–74	680	20	659	1	680	21	657	2
75+	682	18	662	2	682	15	667	0

Appendix 6: Child mortality indices based on number of children ever born and still alive, Kiribati males 2010*

Age group of woman	Reference date	United Nations Models (Palloni-Heligman Equations)					Reference date	Coale-Demeny Model (Trussell Equations)			
		Latin Am.	Chilean	So. Asian	Far East	General		West	North	East	South
Infant mortality rate											
15–20	Oct 2009	0.041	0.045	0.041	0.041	0.041	Dec 2009	0.043	0.043	0.043	0.041
20–25	Sep 2008	0.049	0.055	0.05	0.05	0.05	Sep 2008	0.051	0.047	0.053	0.053
25–30	Mar 2007	0.05	0.058	0.051	0.051	0.051	Dec 2006	0.051	0.046	0.055	0.055
30–35	Feb 2005	0.056	0.066	0.057	0.057	0.057	Oct 2004	0.057	0.05	0.062	0.061
35–40	Sep 2002	0.053	0.064	0.056	0.055	0.055	Apr 2002	0.053	0.047	0.06	0.061
40–45	Nov 1999	0.062	0.078	0.066	0.063	0.064	Aug 1999	0.063	0.054	0.071	0.071
45–50	Jul 1996	0.069	0.086	0.074	0.068	0.07	Aug 1996	0.067	0.057	0.078	0.077
Probability of dying between ages 1 and 5											
15–20	Oct 2009	0.014	0.006	0.012	0.011	0.012	Dec 2009	0.014	0.02	0.008	0.006
20–25	Sep 2008	0.019	0.009	0.017	0.016	0.017	Sep 2008	0.018	0.023	0.011	0.011
25–30	Mar 2007	0.02	0.009	0.018	0.017	0.018	Dec 2006	0.018	0.023	0.012	0.012
30–35	Feb 2005	0.024	0.012	0.022	0.021	0.021	Oct 2004	0.021	0.026	0.015	0.017
35–40	Sep 2002	0.022	0.011	0.021	0.019	0.02	Apr 2002	0.019	0.023	0.014	0.016
40–45	Nov 1999	0.028	0.016	0.029	0.025	0.026	Aug 1999	0.024	0.029	0.018	0.023
45–50	Jul 1996	0.034	0.019	0.034	0.027	0.03	Aug 1996	0.027	0.031	0.021	0.028

* = using procedure CEBCS of MORTPAK 4.1

Appendix 7: Child mortality indices based on number of children ever born and still alive, Kiribati females 2010*

Age group of woman	Reference date	United Nations Models (Palloni-Heligman Equations)					Reference date	Coale-Demeny Model (Trussell Equations)			
		Latin Am.	Chilean	So. Asian	Far East	General		West	North	East	South
Infant mortality rate											
15–20	Oct 2009	0.079	0.087	0.08	0.079	0.079	Nov 2009	0.084	0.082	0.084	0.08
20–25	Sep 2008	0.039	0.043	0.039	0.039	0.039	Sep 2008	0.04	0.037	0.042	0.042
25–30	Feb 2007	0.048	0.055	0.049	0.049	0.049	Nov 2006	0.049	0.044	0.053	0.052
30–35	Feb 2005	0.044	0.052	0.046	0.045	0.045	Sep 2004	0.045	0.04	0.049	0.05
35–40	Sep 2002	0.046	0.054	0.047	0.046	0.047	Apr 2002	0.045	0.041	0.051	0.052
40–45	Dec 1999	0.054	0.067	0.058	0.055	0.056	Aug 1999	0.054	0.047	0.062	0.063
45–50	Jul 1996	0.054	0.068	0.058	0.054	0.056	Aug 1996	0.052	0.045	0.061	0.063
Probability of dying between ages 1 and 5											
15–20	Oct 2009	0.044	0.019	0.038	0.036	0.037	Nov 2009	0.039	0.055	0.025	0.031
20–25	Sep 2008	0.013	0.006	0.012	0.011	0.011	Sep 2008	0.012	0.016	0.007	0.007
25–30	Feb 2007	0.018	0.009	0.017	0.016	0.016	Nov 2006	0.016	0.021	0.011	0.011
30–35	Feb 2005	0.016	0.008	0.015	0.014	0.014	Sep 2004	0.014	0.018	0.01	0.01
35–40	Sep 2002	0.017	0.009	0.016	0.015	0.015	Apr 2002	0.014	0.018	0.01	0.012
40–45	Dec 1999	0.023	0.012	0.023	0.02	0.02	Aug 1999	0.019	0.023	0.014	0.017
45–50	Jul 1996	0.023	0.012	0.023	0.019	0.02	Aug 1996	0.018	0.021	0.014	0.018

* = using procedure CEBCS of MORTPAK 4.1

Appendix 8: Abriged life table for males based on estimated infant mortality rate -q0, and using MORTPAK 4.1 (procedure MATCH) - Kiribati 2010

Age	m(x,n)	q(x,n)	l(x)	d(x,n)	L(x,n)	S(x,n)	T(x)	e(x)	a(x,n)
0	0.0521	0.0500	100000.0	5000.0	95931.2	0.9442	5971594.1	59.7	0.1863
1	0.0041	0.0161	95000.0	1533.2	376170.7	0.9868	5875662.8	61.8	1.5023
5	0.0013	0.0064	93466.8	593.9	465849.5	0.9940	5499492.1	58.8	2.5000
10	0.0011	0.0057	92873.0	526.7	463048.0	0.9929	5033642.6	54.2	2.5000
15	0.0018	0.0091	92346.2	837.5	459783.0	0.9888	4570594.6	49.5	2.6737
20	0.0027	0.0132	91508.8	1212.4	454640.8	0.9856	4110811.6	44.9	2.6054
25	0.0031	0.0154	90296.4	1390.3	448095.9	0.9832	3656170.8	40.5	2.5644
30	0.0037	0.0186	88906.1	1651.1	440564.4	0.9784	3208074.8	36.1	2.5979
35	0.0052	0.0255	87255.0	2221.3	431029.5	0.9689	2767510.4	31.7	2.6385
40	0.0077	0.0377	85033.7	3204.2	417631.2	0.9544	2336480.9	27.5	2.6477
45	0.0113	0.0551	81829.5	4505.3	398572.4	0.9307	1918849.7	23.4	2.6527
50	0.0179	0.0858	77324.3	6632.0	370936.9	0.8976	1520277.3	19.7	2.6350
55	0.0258	0.1217	70692.2	8605.5	332970.7	0.8486	1149340.5	16.3	2.6189
60	0.0410	0.1865	62086.7	11576.5	282556.1	0.7776	816369.8	13.1	2.5919
65	0.0605	0.2632	50510.2	13295.3	219705.0	0.6945	533813.7	10.6	2.5295
70	0.0865	0.3545	37214.9	13191.6	152583.2	0.6000	314108.7	8.4	2.4612
75	0.1192	0.4544	24023.3	10915.1	91552.4	0.4972	161525.5	6.7	2.3831
80	0.1625	0.5642	13108.2	7395.9	45519.9	0.3495	69973.1	5.3	2.2929
85	0.2336	...	5712.3	5712.3	24453.2	...	24453.2	4.3	4.2808

Appendix 9: Abriged life table for females based on estimated infant mortality rate -q0, and using MORTPAK 4.1 (procedure MATCH) - Kiribati 2010

Age	m(x,n)	q(x,n)	l(x)	d(x,n)	L(x,n)	S(x,n)	T(x)	e(x)	a(x,n)
0	0.0403	0.0390	100000.0	3900.0	96751.3	0.9570	6748806.6	67.5	0.1670
1	0.0027	0.0109	96100.0	1046.2	381743.3	0.9916	6652055.3	69.2	1.4605
5	0.0007	0.0033	95053.8	309.4	474495.7	0.9971	6270312.0	66.0	2.5000
10	0.0005	0.0026	94744.4	244.6	473110.7	0.9964	5795816.4	61.2	2.5000
15	0.0010	0.0050	94499.8	476.5	471406.7	0.9939	5322705.7	56.3	2.7076
20	0.0014	0.0070	94023.3	662.7	468543.5	0.9918	4851298.9	51.6	2.6265
25	0.0019	0.0094	93360.6	874.5	464703.3	0.9896	4382755.4	46.9	2.5991
30	0.0023	0.0115	92486.1	1066.7	459872.4	0.9866	3918052.1	42.4	2.6018
35	0.0031	0.0156	91419.4	1424.7	453714.8	0.9816	3458179.7	37.8	2.6260
40	0.0044	0.0217	89994.7	1951.4	445371.0	0.9736	3004464.8	33.4	2.6413
45	0.0065	0.0318	88043.4	2803.4	433633.4	0.9610	2559093.8	29.1	2.6516
50	0.0097	0.0473	85239.9	4033.1	416719.1	0.9419	2125460.4	24.9	2.6494
55	0.0146	0.0705	81206.8	5725.4	392522.7	0.9139	1708741.3	21.0	2.6401
60	0.0219	0.1043	75481.4	7871.1	358727.2	0.8725	1316218.6	17.4	2.6268
65	0.0334	0.1546	67610.3	10449.2	313000.8	0.8136	957491.4	14.2	2.6026
70	0.0501	0.2234	57161.1	12769.0	254659.1	0.7368	644490.6	11.3	2.5608
75	0.0738	0.3119	44392.0	13846.6	187632.5	0.6273	389831.5	8.8	2.5209
80	0.1159	0.4467	30545.5	13644.5	117703.3	0.4179	202199.0	6.6	2.4331
85	0.2000	...	16901.0	16901.0	84495.7	...	84495.7	5.0	4.9994

Appendix 10: Estimated number of deaths, and the crude death rate (CDR) based on life tables' age-specific death rate m(x,n) and the enumerated population by age and sex - Kiribati 2010

Age	Population			m(x,n)		Estimated deaths		
	Male	Female	Total	Male	Female	Male	Female	Total
0	1555	1441	2996	0.0521	0.0403	81	58	139
1	5571	5425	10996	0.0041	0.0027	23	15	38
5	5739	5287	11026	0.0013	0.0007	7	3	11
10	6198	5968	12166	0.0011	0.0005	7	3	10
15	5582	5344	10926	0.0018	0.0010	10	5	16
20	5242	5124	10366	0.0027	0.0014	14	7	21
25	4070	4346	8416	0.0031	0.0019	13	8	21
30	3223	3498	6721	0.0037	0.0023	12	8	20
35	2682	2943	5625	0.0052	0.0031	14	9	23
40	2908	3208	6116	0.0077	0.0044	22	14	36
45	2519	2715	5234	0.0113	0.0065	28	18	46
50	1813	2079	3892	0.0179	0.0097	32	20	53
55	1349	1578	2927	0.0258	0.0146	35	23	58
60	919	1066	1985	0.0410	0.0219	38	23	61
65	642	878	1520	0.0605	0.0334	39	29	68
70	470	770	1240	0.0865	0.0501	41	39	79
75	181	324	505	0.1192	0.0738	22	24	45
80	97	175	272	0.1625	0.1159	16	20	36
85+	36	93	129	0.2336	0.2000	8	19	27
Total	**50796**	**52262**	**103058**			**462**	**347**	**808**
CDR						**9.1**	**6.6**	**7.8**

Appendix 11: Completed life table for males - Kiribati 2010

Age	m(x,n)	q(x,n)	l(x)	d(x,n)	L(x,n)	S(x,n)	T(x)	e(x)	a(x,n)
0	0.0452	0.0436	100000.0	4355.8	96374.8	0.9517	5795746.9	58.0	0.1677
1	0.0033	0.0130	95644.2	1242.2	379498.1	0.9877	5699372.1	59.6	1.5218
5	0.0017	0.0085	94401.9	802.4	470003.8	0.9919	5319874.0	56.4	2.5000
10	0.0016	0.0077	93599.6	725.2	466184.8	0.9899	4849870.3	51.8	2.5000
15	0.0027	0.0133	92874.3	1233.6	461492.8	0.9844	4383685.5	47.2	2.6662
20	0.0035	0.0176	91640.7	1612.1	454305.1	0.9810	3922192.7	42.8	2.5816
25	0.0041	0.0203	90028.7	1826.1	445689.0	0.9778	3467887.7	38.5	2.5608
30	0.0049	0.0245	88202.5	2157.3	435816.1	0.9718	3022198.6	34.3	2.5912
35	0.0067	0.0328	86045.3	2824.5	423520.3	0.9605	2586382.5	30.1	2.6257
40	0.0097	0.0473	83220.8	3935.7	406783.8	0.9437	2162862.3	26.0	2.6319
45	0.0138	0.0670	79285.1	5310.7	383863.2	0.9172	1756078.4	22.1	2.6345
50	0.0212	0.1009	73974.4	7461.3	352080.6	0.8816	1372215.2	18.5	2.6155
55	0.0298	0.1389	66513.1	9241.0	310387.3	0.8297	1020134.6	15.3	2.6000
60	0.0461	0.2074	57272.1	11879.9	257532.9	0.7550	709747.3	12.4	2.5734
65	0.0672	0.2877	45392.2	13061.2	194438.7	0.6690	452214.4	10.0	2.5100
70	0.0947	0.3812	32331.0	12324.9	130081.6	0.5736	257775.7	8.0	2.4382
75	0.1288	0.4805	20006.1	9612.0	74620.5	0.4733	127694.1	6.4	2.3564
80	0.1725	0.5860	10394.1	6090.9	35314.7	0.3346	53073.6	5.1	2.2655
85	0.2423	...	4303.2	4303.2	17758.9	...	17758.9	4.1	4.1269

Appendix 12: Completed life table for females - Kiribati 2010

Age	m(x,n)	q(x,n)	l(x)	d(x,n)	L(x,n)	S(x,n)	T(x)	e(x)	a(x,n)
0	0.04713	0.04539	100000.0	4538.7	96306.3	0.94937	6630395.0	66.30395	0.18616
1	0.00359	0.01424	95461.3	1359.3	378379.4	0.98945	6534088.8	68.44749	1.45016
5	0.00071	0.00353	94102.1	332.1	469680.0	0.99682	6155709.3	65.41524	2.50000
10	0.00057	0.00283	93769.9	265.5	468185.9	0.99604	5686029.3	60.63808	2.50000
15	0.00111	0.00556	93504.4	519.9	466329.7	0.99334	5217843.4	55.80317	2.70615
20	0.00154	0.00768	92984.6	714.6	463224.3	0.99109	4751513.8	51.10002	2.62290
25	0.00204	0.01016	92270.0	937.6	459096.8	0.98875	4288289.5	46.47545	2.59677
30	0.00251	0.01245	91332.4	1137.2	453931.5	0.98561	3829192.7	41.92587	2.59871
35	0.00336	0.01668	90195.2	1504.6	447397.6	0.98042	3375261.2	37.42172	2.62164
40	0.00465	0.02298	88690.6	2037.7	438637.9	0.97220	2927863.6	33.01211	2.63699
45	0.00680	0.03346	86652.9	2899.7	426444.7	0.95914	2489225.7	28.72640	2.64809
50	0.01012	0.04943	83753.2	4140.2	409021.4	0.93950	2062781.0	24.62928	2.64632
55	0.01519	0.07330	79613.0	5836.0	384274.7	0.91072	1653759.7	20.77248	2.63703
60	0.02275	0.10789	73777.0	7960.0	349965.5	0.86851	1269484.9	17.20706	2.62318
65	0.03444	0.15904	65817.0	10467.2	303950.1	0.80866	919519.4	13.97085	2.59870
70	0.05155	0.22890	55349.8	12669.8	245792.9	0.73075	615569.3	11.12144	2.55672
75	0.07570	0.31859	42680.0	13597.5	179612.2	0.62078	369776.4	8.66393	2.51517
80	0.11820	0.45315	29082.4	13178.6	111498.9	0.41367	190164.2	6.53880	2.42665
85	0.20217	...	15903.8	15903.8	78665.2	...	78665.2	4.94631	4.94631

Appendix 13: Estimated number of deaths, and the crude death rate (CDR) based on completed life tables' age-specific death rate m(x,n) and the enumerated population by age and sex - Kiribati 2010

Age group	Population		m(x,n)		Estimated deaths		
	Male	Female	Male	Female	Male	Female	Total
0	1555	1441	0.0452	0.0471	70.3	67.9	138.2
1	5571	5425	0.0033	0.0036	18.2	19.5	37.7
5	5739	5287	0.0017	0.0007	9.8	3.7	13.5
10	6198	5968	0.0016	0.0006	9.6	3.4	13.0
15	5582	5344	0.0027	0.0011	14.9	6.0	20.9
20	5242	5124	0.0035	0.0015	18.6	7.9	26.5
25	4070	4346	0.0041	0.0020	16.7	8.9	25.6
30	3223	3498	0.0049	0.0025	16.0	8.8	24.7
35	2682	2943	0.0067	0.0034	17.9	9.9	27.8
40	2908	3208	0.0097	0.0046	28.1	14.9	43.0
45	2519	2715	0.0138	0.0068	34.9	18.5	53.3
50	1813	2079	0.0212	0.0101	38.4	21.0	59.5
55	1349	1578	0.0298	0.0152	40.2	24.0	64.1
60	919	1066	0.0461	0.0227	42.4	24.2	66.6
65	642	878	0.0672	0.0344	43.1	30.2	73.4
70	428	680	0.0947	0.0515	40.6	35.1	75.6
75	223	414	0.1288	0.0757	28.7	31.3	60.1
80	97	175	0.1725	0.1182	16.7	20.7	37.4
85+	36	93	0.2423	0.2022	8.7	18.8	27.5
Total	**50796**	**52262**			**513.8**	**374.7**	**888.5**
CDR					**10.1**	**7.2**	**8.6**