EAST-WEST CENTER
PROGRAM ON POPULATION

ASIA-PACIFIC POPULATION RESEARCH REPORTS

Number 7 February 1996

Demographic and social change in the island nations of the Pacific

Dennis A. Ahlburg

Dennis A. Ahlburg is professor of industrial relations and public policy at the Industrial Relations Center, Carlson School of Management, and the Center for Population Analysis and Policy, Humphrey Institute of Public Affairs, University of Minnesota. His area of specialization is the Pacific region. He prepared this Research Report while serving as a visiting fellow at the Program on Population of the East-West Center.

The report is an updated and expanded version of a lecture that Professor Ahlburg presented as part of the Distinguished Lecturer Series commemorating the Program on Population's Twenty-Fifth Summer Seminar on Population, held in Honolulu and Taipei during June–July 1994.

Most Pacific Island nations have small populations. Several of those populations are growing rapidly as a result of high fertility rates, young age structures, and low or declining mortality rates. International migration relieves population pressures caused by rapid population growth in some Polynesian and Micronesian countries. Nevertheless, rapid population growth may be hampering the region's development efforts. Although urbanization levels are generally low, in several countries population growth has led to high levels of population density, which may be placing stress on the land and other resources. Pacific nations spend more of their national budgets on education and health care than do developing countries in general, but their educational outcomes are poorer and in some cases their health outcomes are also below those of the average developing country.

Projected declines in fertility, mortality, and migration will slow the region's rates of population growth over the next 35 years. Nevertheless, all countries of the Pacific will experience substantial population increases, and growth rates will remain high in several Melanesian and Micronesian countries. Accommodating the additional numbers of people will pose major challenges to their governments and societies.

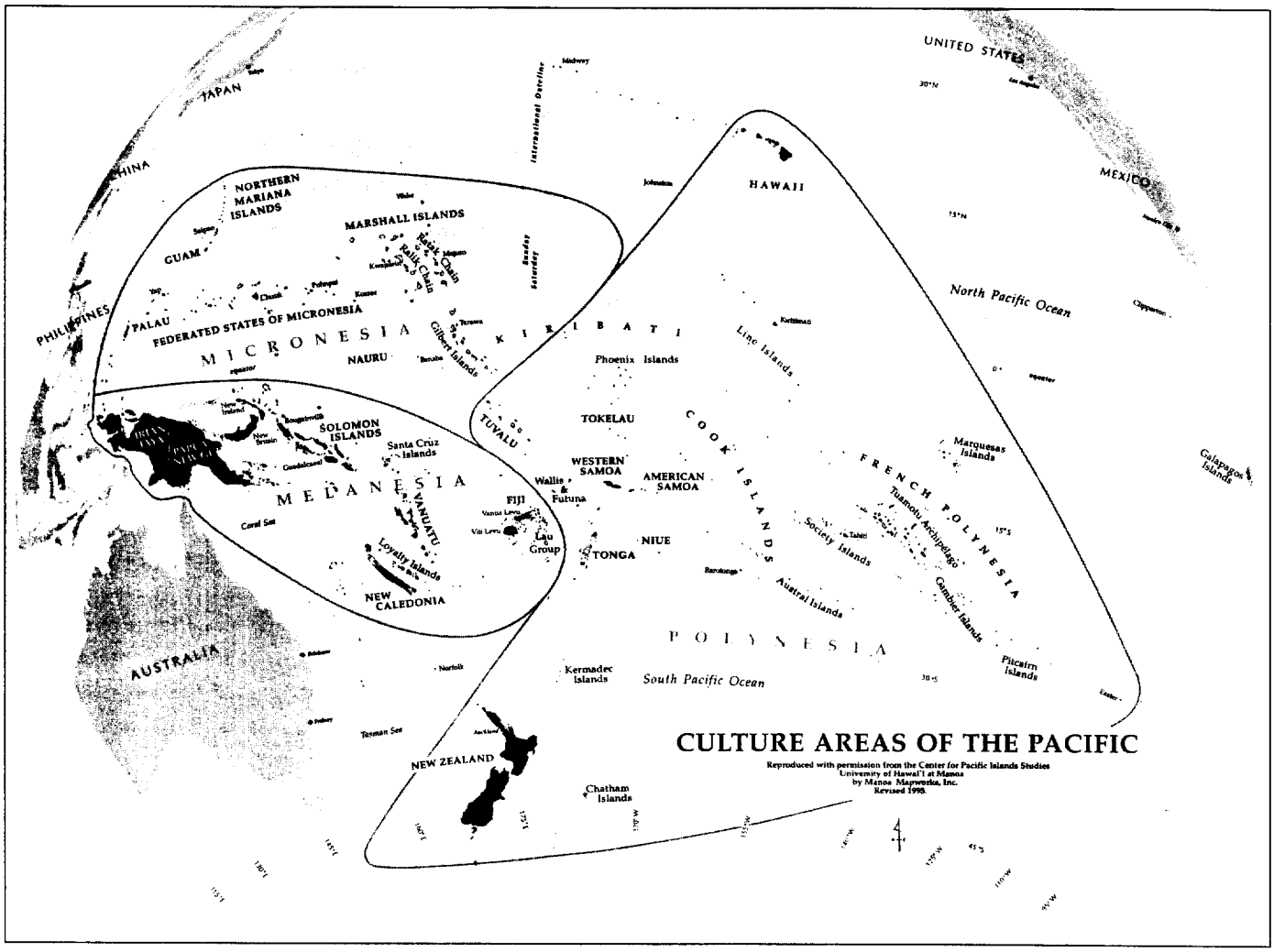
The island nations of the Pacific are undergoing population growth and other demographic changes that are affecting the region's societies, economies, and natural environment. Some of the effects of population growth can be positive—for example, creating a larger home market for Pacific Island producers and giving a nation a more prominent voice in regional and international affairs. Many observers, however, now believe that rapid population growth in the Pacific is causing or exacerbating a variety of social and economic problems. Among those problems are high unemployment and delinquency, environmental degradation caused by urban growth and the expansion of agriculture and natural-resource extraction, and strains within families. Throughout much of Polynesia, population growth is thought to be responsible for a significant degree of overseas migration and a decline in the observance of traditional family obligations.

CHARACTERISTICS OF SMALL ISLAND NATIONS

Small island nations tend to have lower fertility and mortality rates and higher rates of internal and external migration than do most developing countries. These demographic differences may be traced to their distinctive social and economic characteristics (Caldwell, Harrison, and Quiggin 1980). Small island nations generally have higher levels of gross national product and foreign aid per capita than do most developing nations. The Pacific Islands in particular are more urbanized and more Western in language, institutions, and religion as a result of their historic ties to Australia, New Zealand, the United States, and countries in Europe.

In 1990 the average gross national product per capita for the Pacific nations shown in Table 1, excluding American Samoa and Nauru, was about US $1,500, far exceeding the average of about US $320 for all developing nations. In addition, per capita aid to Pacific nation recipients is much higher than to developing countries as a group. In 1988 it averaged US $225, as compared with less than US $10 for all developing countries (World Bank 1993b, vol. 1, p. 2). Several Pacific countries and territories shown in Table 1 have special ties to developed countries that account for their high incomes per capita.

Another difference between small island states and developing countries in general lies in their occupational structures. Developing countries tend to have about 60 percent of their labor force in agriculture. Of the nine Pacific nations for which I have agricultural labor force statistics, only three—Papua New Guinea, Western Samoa, and Vanuatu—have as large or a larger share of their population in agriculture (World Bank 1993b, ix, table 4.3).



POPULATION SIZE

Most Pacific Island nations have populations of fewer than one-half million. Of the 21 Pacific nations and territories listed in Table 1, only Fiji and Papua New Guinea have more than one-half million inhabitants. Some observers believe that small population size, together with geographic isolation and a poor resource endowment, limits the development prospects of Pacific nations.

For at least some of the nations, these concerns appear to be misplaced. With the exception of certain small atoll economies, the islands of the Pacific are well endowed with natural resources, and technological developments have decreased their isolation. Papua New Guinea has extensive minerals and forests; Fiji and the Solomon Islands are also rich in minerals, forests, and agricultural lands; and virtually all Pacific Islands have abundant fisheries. Rapid technological developments in air transport and communications have sharply reduced the islands' isolation. Satellite telecom-

Table 1. Geographic, demographic, and economic indicators: Pacific Island countries, recent years

Subregion and country	Land area (km^2)	Sea area (1,000 km^2)	Population (1,000), 1992	Population density (persons/km^2), 1992	Total GDP (US mil $), 1991	GNP per capita (US $), 1991	GNP annual per capita growth, 1980–91	Annual inflation (%), 1980–91	Aid per capita (US $), 1982
Melanesia									
Fiji	18,272	1,300	757	41	1,499	1,930	-0.2	6.1	56
New Caledonia	19,000	1,740	178	9	u	3,530[a]	u	u	1,138
Palau	494	u	16[b]	32	u	3,289[c]	u	u	u
Papua New Guinea	462,243	u	4,100	9	3,734	830	-0.6	5.2	102
Solomon Islands	27,990	1,340	373[d]	14	211	690	3.5	12.4	126
Vanuatu	12,000	680	166	14	177	1,150	2.8[e]	5.0	221
Micronesia									
Federated States of Micronesia	701	2,500[f]	110[g]	157	194[h]	1,554[c,h]	0.8[i]	u	u
Guam	541	u	146	270	u	21,000[a]	u	u	u
Kiribati	810	3,600	76	106	38[h]	720	0.8[i]	5.4	258
Marshall Islands	181	1,942	52	287	76	1,610[h]	0.8[i]	u	u
Nauru	21	320	10	476	u	u	u	u	u
Northern Marianas	471	u	57[j]	121[j]	u	u	u	u	u
Polynesia									
American Samoa	200	u	53	265	u	21,000[a]	u	u	u
Cook Islands	240	1,800	19	79	u	3,416[c]	u	u	581
French Polynesia	3,300	5,000	210	64	u	3,530[a]	u	u	1,169
Niue	259	390	2[b]	8	u	3,051[c]	u	u	1,294
Tokelau	10	290	2[b]	200	u	u	u	u	1,188
Tonga	720	700	97[k]	135	127	1,280[h]	2.1[e]	u	177
Tuvalu	26	900	10	384	u	1,068[c]	u	u	827
Wallis and Futuna	255	u	14	55	u	u	u	u	u
Western Samoa	2,934	130[f]	163[l]	56	145	960	1.0[e]	11.6	u

Sources: Land area: Hughes, Ahlburg, and Lee (1986, table 1.1); SPC (1994a, 62); UNFPA (1992, table 1); World Bank (1993b, table 1a; 1995, table 1.2). Sea area: Hughes, Ahlburg, and Lee (1986, table 1.1); World Bank (1995, table 1.2). Population: Levin (1993), except where noted. Population density: author's calculations. Total GDP, 1991: World Bank (1993a, table 1.2; 1993b, table 3; 1995, chapter 7, various tables). GNP per capita, 1991: World Bank (1993b, tables 1 and 1a; 1995, tables 1.2 and 2.1). GNP annual per capita growth, 1980–91: World Bank (1993b, tables 1 and 1a); 1995: World Bank (1993b, tables 1.2 and 2.1). Annual inflation, 1980–91: World Bank (1993b, tables 1 and 1.a). Aid per capita: Hughes, Ahlburg, and Lee (1986, table 1.1).

Note: This and subsequent tables include the U.S. dependent territories of American Samoa and Guam.

u—data are unavailable.

a. Estimate from World Bank (1993b, table 1a).

b. Source: UNDP (1994, table 2).

c. Gross domestic product (GDP).

d. Alternative estimates are 346,000 (World Bank 1995, table 1.2) and 355,400 (UNDP 1994, table 2).

e. Real GDP growth, 1983–93.

f. Source: World Bank (1995, chapter 7).

g. Source: World Bank (1995, table 1.2). Alternative estimates are 104,000 (UNDP 1994, table 2) and 117,000 (Levin 1993).

h. 1993 GDP.

i. Real GDP, 1988/9–1992/3.

j. 1994 mid-year estimate, from SPC (1994a, 62).

k. Source: UNDP (1994, table 2). Alternative estimates are 97,400 (ADB 1993, 323), 104,000 (Levin 1993), and 93,000 (World Bank 1995, table 1.2).

l. Source: UNDP (1994, table 2). Alternative estimate is 200,000 (Levin 1993).

munications make distance cost-neutral. It has therefore become feasible to integrate small remote island nations into regional economies at costs affordable to the islands (Hughes, Ahlburg, and Lee 1986, 108). The Pacific economies face a more favorable trading environment than many other developing countries because they have ready access to markets in most industrialized countries.

FERTILITY AND FAMILY PLANNING

In contrast with most island nations, several Pacific countries have extremely high fertility, although in others fertility is more moderate (Table 2). In the Solomons and the Marshall Islands, women bear an average of six or seven children. These fertility rates are among the highest in the world. In Western Samoa, the Federated States of Micronesia, Papua New Guinea, and Vanuatu, recent total fertility rates exceed four children per woman. (The total fertility rate represents the number of children a woman would have over her lifetime if current age-specific fertility rates were to continue.) In contrast, the average total fertility rate for all developing countries is 3.9, and in the developed world the average is 1.9 (UN, DESIPA 1993, table A12).

Over the past four decades, fertility rates have fallen substantially in Fiji and Guam and in Polynesia. A recent report on the Marshall Islands indicates a remarkable decrease in fertility: between 1988 and 1993 the crude birth rate fell 33 percent, largely as a result of the introduction of the contraceptive Norplant (Johnson 1994, 41). If the report is accurate, and fertility reduction is sustained, this development will have a significant effect on that country's future. Birth rates have not fallen much in other areas of the Pacific, such as Papua New Guinea, the Solomon Islands, and the Federated States of Micronesia. High or moderately high fertility combined with low mortality and a substantial proportion of women in the childbearing age span produces rapid population growth.

One reason why fertility rates are high in the Pacific Islands is that contraceptive use is lower there than in many other developing countries and very low compared with that in countries having similar levels of income per capita (Kane and Lucas 1985; World Bank 1993a, 1993b). In several low-income developing countries, 30–60 percent of married women of childbearing age use contraceptives, and many middle-income developing countries have contraceptive use rates of 40–70 percent. Comprehensive data on contraceptive use in the Pacific are difficult to find, and estimates for a country can vary considerably. Reliable statistics on contraceptive use are clearly needed.

From available data (which can vary considerably among sources), it appears that levels of contraceptive use in Polynesian countries range from less than 10 percent to around 30 percent of women in the reproductive age span. In Tonga the level is 23 percent. Contra-

PACIFIC ISLANDS AND THEIR SOCIETIES

The following excerpt is reprinted with the permission of Peter Pirie from page 2 of Pacific transitions: Population and change in island societies, *AsiaPacific Issues No. 6, July 1995 (Honolulu: East-West Center).*

The Pacific islands include a range from low coral atolls with few resources to large islands with significant populations that are relatively well endowed with natural resources. Beginning about 40,000 years ago, Papuan-speaking peoples moved into Melanesia, followed about 7,000 years ago by Austronesian-speaking peoples who moved through Melanesia and on into Micronesia and Polynesia. The Pacific population is now marked by diversity and isolation; even those in the same country are often isolated by the vast distances between islands or, on larger islands, by rugged terrain and dense forests. As of 1990 about six million people lived in the Pacific islands, 3.7 million in Papua New Guinea and about 800,000 in Fiji, with the remaining 1.5 million spread among the other islands.

Traditionally, the societies and peoples of the Pacific have been divided into three major cultural areas: Melanesia, Micronesia, and Polynesia. [See map on page 2.] Melanesia is most populous and largest in land and natural resources; Micronesian and Polynesian islands are by comparison small, scattered, and generally have few natural resources.

- Melanesia consists of Papua New Guinea, the Solomon Islands, Vanuatu, New Caledonia, and Fiji (Melanesian but with Polynesian cultural influences). With about 1,200 languages, Melanesia is marked by diverse and culturally fragmented societies (although in recent years a Melanesian identity has developed) with a generally egalitarian social structure.
- Micronesia, marked by somewhat diverse but hierarchical societies, consists of Kiribati, the Federated States of Micronesia, Palau, Guam, the Marshall Islands, Nauru, and the Commonwealth of the Northern Marianas. All except Kiribati and Nauru have been under U.S. jurisdiction, Guam as a territory and the others as a UN trusteeship, with heavy dependence on external aid.
- Polynesia, more culturally homogeneous than the other areas but also traditionally marked by hierarchical societies, consists of the Cook Islands, French Polynesia, Niue, Western and American Samoa, Tokelau, Tonga, Tuvalu, and Wallis and Futuna. People on the larger island groups such as Western Samoa and Tonga have adequate land and marine resources, but those on resource-poor atolls are heavily dependent on external aid.

ceptive use is especially low in many Micronesian countries, the exceptions being Kiribati (27–38 percent) and the Marshall Islands (31 percent), although the latter figure is in dispute. Among Melanesian countries, use rates are also quite low: 10–25 percent in the Solomon Islands and Papua New Guinea and possibly a slightly higher proportion in Vanuatu (Kane and Lucas 1985, 3). Recent estimates from the World Bank (1993a, various tables) suggest much lower levels: around 3–4 percent for Vanuatu and the Solomons.

In 1990, 27 percent of Fijian women were reported to be using contraception (World Bank 1993a, 55). Use among ethnic Fijian women is considerably less than that of Indo-Fijians and is consistent with their higher total fertility: 4.1 children per woman in 1986, compared with 2.8 among Indo-Fijians. By contrast, during the mid-1970s almost 60 percent of Fijian women were reported to be using contraception. Family planning programs in several other Pacific countries have become weaker in recent years, and this may be one explanation of why fertility has remained high throughout much of the region.

MORTALITY AND CAUSES OF DEATH

Life expectancies at birth have risen over the past quarter-century throughout the region (Table 3). In 11 of the 13 Pacific nations for which data are available, life expectancies in 1992 exceeded the average life expectancy of 61 years for all developing nations in 1985–90, the only exceptions being Kiribati and Papua New Guinea. Several Pacific nations have achieved life expectancies approaching the developed-country average of 74 years (UNDP 1993, table A15).

The infant mortality rate, defined as the number of infants under 12 months of age who die per 1,000 live births, is a good indicator of mortality decline and the corresponding gain in life expectancy at birth. In 1992 most countries in the Pacific region had infant mortality rates below 50, and several countries—notably French Polynesia and New Caledonia—had rates at the low levels typical of economically advanced countries. In contrast, Papua New Guinea (at 67) and Kiribati (at 99) are notable for their high rates. For low-income developing countries in general, the average rate is about 70 infant deaths per 1,000 births, and for middle-income developing countries it is about 50 (World Bank 1991, table 28). Since 1970, most Pacific nations have experienced decreases in the infant mortality rate of between 30 and 70 percent. In the developing world in general, the rate has fallen by 45 percent since 1965.

A recent study investigated the main causes of death in the Pacific nations (Taylor, Lewis, and Levy 1989). Infectious diseases are responsible for more than 20 percent of deaths in the malarious Melanesian countries of Papua New Guinea, Solomon Islands, and Vanuatu and in Kiribati and the Federated States of Micronesia. In contrast, those diseases

Table 2. Total fertility rates: selected Pacific Island countries, 1950–55 to 1993

Subregion and country	1950–55	1956–60	1960–65	1966–70	1970–75	1976–80	1980–85	1985–90	1993
Melanesia	6.3	6.4	6.2	6.0	5.8	5.6	5.3	5.0	u
Fiji	6.6	6.8	6.0	5.0	4.2	4.0	3.8	3.2	3.2
Papua New Guinea	6.2	6.3	6.3	6.2	6.1	5.8	5.6	5.2	5.4
Solomon Islands	6.4	6.4	6.4	6.5	7.2	7.1	6.4	5.8	5.8
Vanuatu	u	u	u	u	u	u	u	u	5.3–6.5
Micronesia	5.9	6.3	6.2	5.9	5.5	5.3	5.0	4.7	u
Fed. States of Micronesia	u	u	u	u	u	u	u	u	5.6
Guam	5.5	5.8	6.0	4.7	4.1	3.5	3.1	2.8	3.3
Kiribati	u	u	u	u	u	u	u	4.3–4.9	u
Marshall Islands	u	u	u	u	u	u	u	u	7.2
Polynesia	7.4	7.5	7.3	6.8	6.3	5.8	5.2	4.5	u
American Samoa	u	u	u	u	u	u	4.5	u	u
French Polynesia	6.0	6.4	6.5	6.2	5.2	4.2	3.8	3.6	3.2
Tonga	u	u	u	u	u	u	u	4.1–4.9	u
Western Samoa	u	u	u	u	u	u	u	u	4.8

Sources: 1950–55 to 1985–90: UN, DESIPA (1993, table A12). 1993: SPC (1994b, various tables); World Bank (1994a, table 1.1).

Note: Data may vary considerably by source. Ranges are given where discrepancies are large.
u—data are unavailable.

account for fewer than 5 percent of deaths in American Samoa, Cook Islands, Guam, Tokelau, and the Northern Marianas. Respiratory disease is another leading cause of death in Melanesia and in Niue and Tokelau. Fiji, most of Polynesia, and eastern Micronesia have high rates of death from cardiovascular disease, which accounted for more than 25 percent of all deaths in the late 1980s. Cancer causes more than 15 percent of deaths in Guam, Palau, American Samoa, French Polynesia, Cook Islands, and Tonga. External causes such as accidents and poisoning are a major cause of death in New Caledonia, American Samoa, Nauru, the Federated States of Micronesia, Palau, and the Northern Marianas. Suicide is a serious problem among teenagers in Polynesia and Micronesia.

Mortality data worldwide indicate that as life expectancy rises, death from infection falls and death from cardiovascular disease and other diseases associated with late middle age rises. Papua New Guinea, Solomon Islands, Vanuatu, Kiribati, and the Federated States of Micronesia—some of the Pacific countries with the lowest life expectancies—exhibit a traditional pattern in which infectious diseases predominate as a cause of death. As these countries develop and their life expectancies rise, they are likely to begin exhibiting a "modern" cause-of-death pattern such as that found in Guam, Cook Islands, American Samoa, Niue, Palau, and Northern Marianas. The other Pacific countries are at various points along the transition from the traditional pattern to the modernized pattern. Not surprisingly, one study of the Pacific region has found that life expectancy is greater where income and aid per capita are higher and where the average level of education and the provision of health services, as measured by the number of doctors per capita, are also higher (Taylor, Lewis, and Sladden 1991).

A major cause of illness among infants and children is gastrointestinal disease, particularly diarrhea. This group of diseases is clearly linked to impure

Table 3. Life expectancy, infant mortality, and mortality under age 5: selected Pacific Island countries,1970 and recent years

Subregion and country	Life expectancy at birth		Infant mortality (deaths per 1,000 births)		Mortality under age 5 (deaths per 1,000 live births), circa 1990
	1970	circa 1991	1970	circa 1991	
Melanesia					
Fiji	62	63	50	26	31–41
New Caledonia	64	73	41	17	21
Papua New Guinea	46	50	125	54–67	71–80
Solomon Islands	54	61	52	30	65
Vanuatu	50–60	55–63	100	30–45	58–91
Micronesia					
Fed. States of Micronesia	u	63	u	36–51	44–72
Kiribati	52	53–60	87	60–99	80
Marshall Islands	u	u	u	43	u
Polynesia					
Cook Islands	65	71	37	28	32
French Polynesia	61	70	47	15–22	26
Niue	62	66	33	12	12
Tokelau	u	62–68	u	30–45	30
Tonga	58	69	60	22–41	31
Tuvalu	59	67	u	34–43	56
Western Samoa	62	65	36	21–33	35–59
All developing countries				74[a]	104

Sources: Life expectancy and infant mortality in 1970: Hughes, Ahlburg, and Lee (1986, table 1.2) as cited from Government of Australia, *Report of the Committee to Review Australian Overseas Aid Programme* (Canberra: Australian Government Publishing Service, 1984); South Pacific Commission, *1980 Statistical Summary* (Noumea, 1982); World Bank, *The World Bank Atlas*, 1985 (Washington, D.C., 1985). Life expectancy circa 1991: Larson (1995, table A-3); UNDP (1994, table A1); World Bank (1993b, tables 1 and 1a); SPC (1994a, various tables). Infant mortality circa 1991: Larson (1995, table A2); SPC (1994a, various tables); UNDP (1994, table 4); World Bank (1994b, various tables). Mortality under age 5: Larson (1995, table A2); UNDP (1993, table 11); World Bank (1994b, various tables).

Note: Data may vary considerably by source. Ranges are given where discrepancies are large.

u—data are unavailable.

a. 1990 data.

drinking water and inadequate sanitation. Problems in these areas tend to be greatest in Melanesia and are more severe in rural than in urban areas. Investment by households in roof runoffs and proper water storage, by communities in village drinking water and latrines, and by governments in water reservoirs and sewerage works will be required to reduce illness and death from these causes.

Child survival appears to be directly related to the provision of maternal and child health services in the Pacific region (Table 4). With the exception of Papua New Guinea, the vast majority of births are attended by health personnel, and the incidence of low birth-weight babies is below the average for developing countries. Levels of early child immunization in 1981 were higher in Fiji, Western Samoa, the Solomons, and Papua New Guinea than the average for all developing nations. Since then, however, improvement in several of the Pacific nations has lagged behind gains made by developing countries as a group.

Table 4. Measures of child health: selected Pacific Island countries, recent years

Measure	Fiji	Papua New Guinea	Solomon Islands	Vanuatu	Tonga	Western Samoa	All developing countries
Births attended by health personnel (%), 1983–89	98	20	80	86	95	50–95	55
Low birth-weight babies (%), 1980–88	14	25	9	u	u	3	18
One-year-olds immunized (%)							
1981	65	49	39	u	u	99	24
1988–90	87	74	58	55	90	90	70
Mothers breastfeeding at one year (%)	u	u	u	66	u	40	73
Children malnourished (%), 1980–90							
Underweight (< age 5)	u	35	u	20	u	u	35
Wasting (12–23 months)	u	u	15	u	u	u	13
Stunting (24–59 months)	u	u	34	19	u	u	40

Sources: Larson (1995, tables 7 and 8); UNDP (1992, table 11).

Note: Data may vary considerably by source. Ranges are given where discrepancies are large.

POPULATION GROWTH

Mainly as a result of natural increase (larger numbers of births than of deaths), Pacific Island nations tend to have moderate to high rates of population growth. As shown in Table 5, during the late 1980s, 10 of 18 countries had annual population growth rates higher than the average annual rate of 2.0 percent for all developing countries during that decade (World Bank 1991, table 26). A 2 percent growth rate will double a population's size in about 36 years, and a 3 percent growth rate will double it in about 24 years. If the 1986–90 growth rates shown in Table 5 were to continue, six of the Pacific nations would double their populations in about 20 years or less.

In some of the countries, however, high rates of natural increase are offset by significant out-migration. For ex-

Table 5. Annual rates of population change (in percentages): selected Pacific Island countries, 1960–65 to 1986–90

Subregion and country	1960–65	1966–70	1970–75	1976–80	1980–85	1986–90
Melanesia						
Fiji	3.3	2.3	2.0	1.9	2.0	0.8
New Caledonia	3.2	4.3	3.4	1.1	2.0	1.6
Papua New Guinea	2.2	2.4	2.4	2.5	2.3	2.3
Solomon Islands	3.0	3.1	3.4	3.5	3.5	3.4
Vanuatu	2.5	2.9	3.0	3.0	2.7	2.5
Micronesia						
Fed. States of Micronesia	2.7	2.9	3.2	2.3	2.7	3.4
Guam	2.4	2.4	2.2	2.2	2.5	2.1
Kiribati	1.4	2.2	1.8	1.4	2.1	2.0
Marshall Islands	2.7	2.9	3.2	2.8	4.0	3.6
Northern Mariana Islands	2.7	2.9	3.2	2.3	2.9	16.1
Polynesia						
American Samoa	3.0	3.0	1.6	1.8	3.8	3.7
Cook Islands	1.2	1.7	–1.6	–1.4	–0.4	–0.4
French Polynesia	3.2	3.6	3.2	3.0	2.8	2.6
Niue	1.2	–0.3	–4.1	–3.7	–4.7	–5.2
Tonga	3.0	1.9	1.5	0.8	0.5	0.5
Tuvalu	1.2	0.8	1.5	4.1	4.1	4.0
Wallis and Futuna Islands	1.0	1.0	1.0	3.9	2.9	1.3
Western Samoa	2.9	2.3	1.1	0.6	0.2	0.1

Source: UN, DESIPA (1993, table A2).

DENNIS A. AHLBURG

Fertility rates in several Pacific Island countries are among the highest in the world—six or seven children per woman.

ample, the low or negative population growth in the Cook Islands, Niue, Tonga, Western Samoa, and Fiji during the late 1980s was due to heavy out-migration rather than to low rates of natural increase. In other countries, rapid population growth has occurred primarily as a consequence of significant in-migration to a small population base. A startling example is the Northern Mariana Islands, where the population grew by more than 16 percent during the late 1980s. Rapid growth, whether due to natural increase or to in-migration, has produced attendant social and economic pressures throughout the region.

Table 5 indicates that population growth slowed in half of the Pacific countries during the period from the early 1960s to the late 1980s but accelerated in most of the others. Because population growth has been heavily influenced by international migration in recent decades, it is instructive to examine migration patterns in the region.

INTERNATIONAL MIGRATION

Migration data for the Pacific are sketchy because many countries have no reliable way of estimating inflows and outflows. Much of the available information on actual numbers of migrants represents an educated guess. Nevertheless, some general patterns and trends are clearly discernible.

International migration in the Pacific is largely a Polynesian and Micronesian phenomenon. The major sending countries are in Polynesia and include Tonga, Wallis and Futuna, the Cook Islands, and Western Samoa (Table 6). Each of these countries loses between 5 and 10 persons per 1,000 residents each year. During the 1980s the volume of out-migration became so great in Tonga and Western Samoa that their population size remained constant despite high rates of natural increase. Most of the migrants from Tonga and Western Samoa have been going to New Zealand, the United States, and Australia. Fiji has experienced significant out-migration since two coups d'etat in 1987, losing principally skilled workers and professionals. Out-migration is thus viewed by some as a demographic and social safety valve.

Whereas Polynesia is the major sending subregion of the Pacific, Micronesia is the major receiving subregion. The Polynesian islands of American Samoa and Guam are also net receivers. Micronesia and American Samoa have become a destination not only for other Pacific Islanders, but also for Filipinos and Koreans (Franco 1993, 162). American Samoa is a major destination for migrants from Western Samoa and, to a lesser extent, Tonga, Tokelau, and Niue.

In Micronesia, migration explains the 250 percent increase in the population

Table 6. Estimated net numbers of migrants per 1,000: selected Pacific Island countries, 1993

Subregion and country	1993
Melanesia	
Fiji	-8.6
New Caledonia	0.6
Papua New Guinea	0
Solomon Islands	0
Vanuatu	0
Micronesia	
Fed. States of Micronesia	11.6
Guam	3.0
Kiribati	0.6
Marshall Islands	0
Nauru	0.4
Northern Mariana Islands	0
Palau	2.1
Polynesia	
American Samoa	6.0
Cook Islands	-5.3
French Polynesia	0
Tonga	-10.4
Tuvalu	0
Wallis and Futuna	-9.5
Western Samoa	-3.1

Source: Personal correspondence from Michael J. Levin, U.S. Bureau of the Census.

of the Northern Mariana Islands since 1980. In that year, 67 percent of the Marianas' population of nearly 18,000 were native-born. By 1993 the population was three and a half times as large, but by then only 36 percent of the population was native-born. Of the foreign residents recorded in that year, 20 thousand were Filipino workers (Eastly 1994, 15). Foreign-born residents accounted for slightly more than half of Guam's population in 1990; one in five was Filipino (Ahlburg and Na 1995, 3).

Saipan has long been a destination for migrants from other states in Micronesia. Since 1986, when the Federated States of Micronesia and the United States signed the Compact of Free Association, Guam has attracted between 3,000 and 5,000 migrants from the Federated States, most of them men in their 20s and 30s (Rubinstein 1993, 259). As a result of the agreement, great numbers of migrants from Micronesia are expected to move to Hawaii and the mainland United States.

The predominant direction of migration flows in the Federated States of Micronesia is unclear. According to unpublished data from the U.S. Bureau of the Census (Michael J. Levin, personal correspondence), net migration has been increasing there; but Bos et al. (1992, 338) estimate a loss of about six residents per 1,000 residents per year. Levin (1992) notes that the net rate of migration in the Federated States of Micronesia is highly unstable and has probably switched from positive to negative.

The primary motive for migration in the Pacific, as elsewhere, is economic improvement for migrants and their families. The primacy of economic incentives in the decision to migrate has led to a belief that migrants are young, primarily male workers who go overseas, possibly acquire skills or education, and then return home—in other words, that migration is circular. Even though this pattern may describe Pacific migration of an earlier time, it no longer appears to do so. Migration now seems to be permanent, and permanent return is unlikely.[1]

Family migration from the Pacific to the United States and Australia is now more common than the migration of single men (Connell 1980; Connell and McCall 1990; Ahlburg and Levin 1990). Among Polynesian migrants to the United States and American Samoa whom I studied with Michael Levin, the sexes were reasonably well balanced in number, and a majority of the migrants had married (Ahlburg and Levin 1990). Within 10 years of arriving in the United States, 60 percent of Tongans and 75 percent of Western Samoans had taken out United States citizenship, indicating their intention to remain. Micronesian migration to Saipan fits this newer pattern. Migration to Guam, which used to be dominated by young, single males, has changed in recent years: today, Micronesians in Guam have reestablished family structures that look very much like those back home (Rubinstein 1993).

Some Pacific Islands have high rates of out-migration—mainly to Micronesia, New Zealand, the United States and its Pacific territories, and Australia.

In a 1994 study of American Samoa's 1980 and 1990 censuses, I found that in 1990 a smaller percentage of the population consisted of migrants who had returned from living in the United States and also that in 1990 proportionately fewer return migrants were economically successful as compared with nonmigrants. This finding is consistent with a pattern of reduced return migration. My own observations in American Samoa (Ahlburg 1994), as well as research on Asian migration to the Middle East (Russell 1986), challenge the assumption that migrants who acquire skills overseas return home and apply them productively there. Anecdotal evidence suggests that this assumption may be false elsewhere in the Pacific as well.

Sustained out-migration soon means that a significant proportion of a country's population resides overseas. I have estimated that some 39,000 Tongans and 76,000 Western Samoans were living overseas in 1989 (Ahlburg 1991, 16). These numbers represent 40 percent and 48 percent, respectively, of the two countries' home populations in that year.

Permanent migration can benefit the home country as long as migrants send home a large flow of remittances. I have estimated that in 1989 the average Tongan migrant remitted $850 and the average Western Samoan remitted $500 from the United States (Ahlburg 1991, 20). Brown and Connell (1993b, 69) have put the average annual value of cash and goods remitted per migrant at US $991 for Tongans and US $706 for Western Samoans. Other researchers have estimated remittances (in US dollar equivalents) at $36 for Niueans, $525 for Kiribatis, and about $200 for Cook Islanders (see Ahlburg 1991, 24).

These remittances have great importance for the home countries. According to my calculations, remittances sent to Tonga and Western Samoa in 1989 equaled 45 percent and 40 percent, re-

1. Chapman (1991, 289) argues that this dichotomous characterization of migration as circular or permanent is not productive. He asserts that "each is an integral part of a broader, regional system of mobility." See Hayes (1991) for further discussion of approaches to understanding migration in the Pacific.

spectively, of the countries' gross domestic product. The amounts remitted were more than three times as large as Tongan and Western Samoan export earnings and allowed residents to enjoy a higher standard of living than would have been possible in the absence of such support. In both countries a more equal distribution of income has resulted from the inflow of remittances (Ahlburg 1995, 1996; Brown and Connell 1993a).

The conventional view is that remittances are used predominantly for consumption and thus have little effect on savings or investment (Yusuf and Peters 1985; Ahlburg 1991) However, on the basis of recent survey data from Tongans and Western Samoans living in Brisbane, Australia, Brown (1994, 351) argues that a sizable proportion of migrants remit mainly for investment purposes and that such migrants tend to remit and save more than other migrants. He asserts, in addition, that most remittance-dependent households save or invest domestically a substantial amount of the remittances they receive (p. 356). Brown and Connell (1993b) report that in-kind remittances and long-distance business activities involving out-migrants have led to the growth of an active informal retail sector in Tonga. Clearly, further investigation of this important issue is needed.

Remittances can have adverse economic effects on the recipient country that are often overlooked because of the respite they give from rapid population growth and the flow of cash they bring. Large remittance flows can lead to an increase in the value of the exchange rate and a rise in wages, both of which decrease the competitiveness of exports and import-replacement industries. These effects can distort or stall a country's economic development. The same effects can result from foreign aid. Whether out-migration and the attendant flow of remittances are a viable development option for some Pacific nations over the long term is a matter of debate (Ahlburg 1991; North 1994).

One thing is clear, however. With their high rates of out-migration, sending countries of the Pacific have not been forced to curb their high fertility rates. It is also likely that traditional customs have not changed as much as they would have done if large-scale migration of the educated and skilled young had not occurred.

URBANIZATION

Urbanization, a worldwide phenomenon, occurs not only as a result of natural increase but also as people in search of better opportunities move to urban centers within their own or their adopted countries. For the low-income countries of the developing world, 36 percent of the population is urban (World Bank 1991, table 31). Among the 19 Pacific Island nations for which data are available, most have urbanization levels well below that average, Fiji being the notable exception (Table 7). Rates of urban growth have recently been the highest in the Solomon Islands, the Marshall Islands, Papua New Guinea, and Tonga.

Urbanization is often used as a measure of the potential environmental damage that a growing population's increasingly urban concentration can cause. Population density, a measure of population pressures throughout a country, suggests that human populations can have environmental impact on rural as well as urban areas. Although many Pacific countries do not have particularly high degrees of urbanization, several have very high levels of population density. The average population density for all developing countries is 80 persons per square kilometer. As we have seen in Table 1, population density is well above that average in Nauru, Tuvalu, the Marshall Islands, American Samoa, Guam, Tokelau, the Federated States of Micronesia, Tonga, and Kiribati.

Increased urbanization and population density need not necessarily result in environmental degradation. They can

Table 7. Urbanization and urban growth: selected Pacific Island countries, recent years

Subregion and country	Urban population (% of total), 1993	Urban population growth per year (%), 1985–90
Melanesia		
Fiji	40	1.2
Papua New Guinea	16	4.3
Solomon Islands	15	6.6
Vanuatu	28	2.8
Micronesia		
Kiribati	35	3.4
Marshall Islands	30	5.8
Polynesia		
Cook Islands	25	–0.4
Tonga	21	4.3
Western Samoa	23	0.8
All developing countries	63	5.0[a]

Sources: ADB (1993, table 4); UNDP (1993, table 10; 1994, table A3).

a. During 1980–91 (World Bank 1993b, table 31). Figure is for low-income countries, excluding China and India.

even benefit a country's economy and social infrastructure by providing a market large enough to encourage local manufacture of goods or sufficient demand for the provision of better communication systems, schools, and health facilities. A government's land-use and pricing policies can influence the effects of population concentration on the environment just as they can lead to a rise in urbanization and population growth in the first place (Connell and Lea 1993).

One study of urbanization in developing countries has found that population growth in itself is not the leading cause of the growth of cities (Kelley and Williamson 1984). More important causes are government policies that subsidize urban living costs and reduce the return to agriculture, largely by controlling the price of food. This appears to be the case in the Pacific, where labor and other markets are even more distorted in favor of urban areas than in most developing countries (Hughes, Ahlburg, and Lee 1986, 94). Urbanization in the Pacific is also closely linked to high per capita aid flows that further distort the balance between urban and rural prices. These effects on urban growth are the indirect result of government policies that were designed for other purposes.

Another factor that contributes to urban growth is the gap between urban and rural areas in the provision of such public services as health-care facilities, safe drinking water, and sanitation—services in which urban areas have a clear advantage (Table 8). The difference is small in Western Samoa but quite large in the Melanesian countries. As for safe drinking water, the inequality is considerably greater in Papua New Guinea than in the average developing country. For sanitation, the gap is much greater in Vanuatu than in the developing world at large.

Some Pacific cities are growing rapidly, and this growth, attributed mainly to in-migration, has been blamed for a deterioration in safety and the quality of life. Port Moresby, the capital of Papua New Guinea, is often cited as an example of migration-induced urban blight. Connell and Curtain (1982) argue, however, that there is no causal relationship between recent migration and urban crime levels in Papua New Guinea. King (1993) has found that urban growth in Papua New Guinea slowed during the 1980s and that, in contrast with the previous decade, most of that growth was due to natural increase, rather than migration. Analyzing urban growth in Melanesia, Connell and Lea (1993, 25) have reached a similar conclusion: natural increase in urban areas may now be as important a contributor to urban growth as migration. This is clearly so in Fiji and may be the case in Papua New Guinea as well (p. 55).[2]

A comparison of the capital cities of Suva and Port Moresby indicates that Suva, in its concentration of population, dominates Fiji to a greater extent than Port Moresby dominates Papua New Guinea. This difference may reflect the diverse development strategies pursued in the two countries. Decentralization has been an important policy in Papua New Guinea but not in Fiji. Nevertheless, with the growing dominance of Port Moresby as Papua New Guinea's major city, it is likely that the government's decentralization policy has only retarded, not stopped, the increasing concentration of the country's urban population. Similar trends may be expected elsewhere in the Pacific, perhaps accompanied by social problems similar to those in Port Moresby and Suva.

Table 8. Rural-urban differences in social indicators: selected Pacific Island countries, 1960, 1990, and 2000 (projected)

Indicator	Fiji	Papua New Guinea	Solomon Islands	Vanuatu	Kiribati	Tonga	Western Samoa	All developing countries
Urban population (%)								
1960	30	3	u	u	u	u	u	22
1990	39	16	9	21	35	21	21	37
2000	43	20	u	u	u	u	u	45
Rural population with access to services (%), 1988–90								
Health	u	96	u	75	u	u	100	u
Water	69	20	58	64	54[a]	71[a]	77	60
Sanitation	65	56	u	33	u	u	91	40
Urban population with access to services (%), 1988–90								
Health	u	100	80[a]	100	85[a]	100[a]	100	90
Water	96	94	82	100	65[a]	100[a]	100	85
Sanitation	91	54	73	82	53[a]	72[a]	95	76
Urban population annual growth rate (%)								
1960–90	3.2	8.6	u	u	u	u	u	4.0
1990–2000	2.3	4.8	u	u	u	u	u	4.0

Sources: Urban population (%): UNDP (1991, table 20); Table 7 of this report (Kiribati and Tonga). Rural and urban access to services: UNDP (1993, table 10); Larson (1995, table A6). Urban population growth rate: UNDP (1991, table 20).

u—data are unavailable.

a. Estimate for whole nation from Larson (1995).

2. Connell and Lea's study provides an excellent discussion of the problems attending the growth of cities in Fiji, Papua New Guinea, Vanuatu, and the Solomon Islands.

Projections of urban population to 2000 indicate that the rate of urban growth is slowing in both Fiji and Papua New Guinea (Table 8). Nevertheless, the urban growth rate in Papua New Guinea will remain high and well above the average for all developing countries. In particular, urban growth is extremely high in Port Moresby, which in 1990 already had a population of 190,000 (King 1993, 69). If the current rate continues, within 15 years the city's population will double.

POPULATION GROWTH AND DEVELOPMENT

Various studies have concluded that many Pacific countries have the potential for solid economic growth on a sustainable basis. For example, a recent study by the World Bank (1991, vi) suggests that the economies of Fiji, Kiribati, the Solomon Islands, Tonga, Vanuatu, and Western Samoa could grow indefinitely at 2.5 percent annually. During the 1980s, however, many Pacific nations did not perform this well. The six economies studied by the World Bank grew at an average rate of only 0.6 percent per annum, in sharp contrast to 5 and 7 percent per annum, respectively, in comparable island nations of the Caribbean Sea and Indian Ocean. Economists have attributed the modest economic performance of the Pacific nations to several factors, including human-resource bottlenecks and high rates of population growth.

The two factors are related: rapid population growth can inhibit a nation's ability to improve the education, skills, and health of its people. Indeed, this appears to have happened in at least some Pacific nations during the 1980s. But how, precisely, does rapid population growth inhibit economic growth?

Some economists argue that rapid population growth slows economic growth both by reducing aggregate savings and investment and by diverting investment from industry and infrastructure to less productive "welfare" expenditures such as health and education. Others point out that investments in health and education, particularly the education of girls, have high rates of return—that is, they boost the development process rather than retarding it. Nevertheless, both groups agree that rapid population growth strains a nation's resources and, if too rapid, may cause its living standard to fall. (For discussions of this topic, see Cassen 1994; Ahlburg, Kelley, and Mason 1996.)

As we have seen, several nations in the Pacific have extremely high rates of population growth that may be hampering their development efforts. Even in countries where out-migration prevents high rates of natural increase from resulting in rapid population growth, there may still be significant pressure on resources. Many migrants are in their 20s when they migrate. While growing up, they receive public health and education resources; but they leave just when they become productive.

In a study of 17 Pacific nations' population trends and economies during the 1970s, I did not find a simple statistically significant relationship between population growth and economic growth (Ahlburg 1988). Similarly, a comparison of Pacific nations' population growth rates with their economic growth rates during the 1980s reveals no consistent pattern of association. Some countries had population growth rates above average and economic growth rates below average; examples are Papua New Guinea and the Solomon Islands. Other countries with population growth rates below average also had economic growth rates below average; Fiji and Tonga represent this group.

Many factors besides population growth can affect economic growth. For example, foreign aid in its many forms can overcome the negative impact of population growth on an economy or even encourage rapid population growth. The Marshall Islands, Guam, French Polynesia, American Samoa, and the Federated States of Micronesia have rates of population growth exceeding the average for developing countries; but because of their special associations with France or the United States, they have per capita incomes comparable to the World Bank's average for high-income countries, which was about US $21,000 in 1991 (World Bank 1993b, table 1).

I have found evidence, however, that those Pacific nations with the highest rates of population growth have higher levels of infant mortality, poorer health-care service delivery (as measured by the number of residents per doctor and per hospital bed), and lower levels of education—that is, larger proportions of people with no formal education—than do countries with lower population growth rates (Ahlburg 1988, 53). Infant mortality, health-care services, and education are important indicators of a country's quality of life and level of social development. They also have important implications for long-run economic development. Although I have found no evidence that rapid population growth in the Pacific has a strong negative impact on overall economic growth in the short run, I have found it to be associated with lower levels of education and health care and higher levels of infant mortality, any one of which may reduce a nation's potential for future economic growth.

Some Pacific nations have special relationships with developed countries (mostly with France, New Zealand, and the United States) that allow them to accommodate rapid population growth while enjoying high levels of income, and others have high natural rates of

population growth but only low actual rates of population growth due to outmigration. Nevertheless, most Pacific nations need to be concerned about rapid population growth. Developed countries may not continue indefinitely to welcome migrants from the Pacific, and therefore nations with high birth rates need to consider population policies that encourage smaller families. In addition, population policies that are integrated with development planning that fosters human-resource improvements—in particular, education and health care—are more likely to be successful than ones that have no links to an overall development plan.

EDUCATION

Education is the cornerstone of human-resource development. The returns to investment in education, particularly the education of girls, are higher than the returns to almost any other investment—provided, of course, that the education is appropriate to the recipients' needs (Psacharopoulos 1982). The percentage of a national budget spent on education does not necessarily indicate whether the investment in education has been effective (Jones 1992). Countries can spend large amounts of money on education and still fail to develop their young people into a valuable human resource.

Although comparable data are difficult to obtain, it appears that for some Pacific countries, the quality of education is not equal to the resources spent on it. As Table 9 indicates, four Pacific countries—Fiji, Tonga, Vanuatu, and Kiribati—spend a greater share of their budgets on education than the average for all developing countries; nevertheless, they have less adult literacy, fewer average years of schooling completed, lower primary teacher-pupil ratios, lower levels of primary and secondary school enrollment, or higher primary drop-out rates than the developing world as a whole. In a number of countries, such as the Solomon Islands and Kiribati, a majority of primary school teachers are untrained or only partially trained.

Table 9 also reveals a positive aspect of educational performance in the Pacific. In all the countries listed in the table except Papua New Guinea, the educational advantage of males over females is smaller than in developing countries on average. For all developing countries, literacy is 43 percent higher for males than for females (70 percent versus 49 percent). In the Pacific the male advantage in literacy is 88 percent in Papua New Guinea but only 38 percent in Solomon Islands, 19 percent in Vanuatu, 13 percent in Fiji, 1 percent in Kiribati, and zero in Tonga. Within the developing world the mean number of years of schooling is 1.9 years greater for males than for females. Except in Papua New Guinea, gender differences in years of schooling are smaller in the Pacific countries, ranging from 0.4 years in Tonga and the Solomon Islands to 1.2 years in Vanuatu. Nevertheless, governments in the region should give more attention to educating girls, not just because education improves their life chances but also because it is associated with lower fertility levels.

School enrollment and standards of education tend to be higher in urban than in the rural areas, and urban schools attract the best teachers. Rural enrollments in some Pacific countries are still as low as 25 percent for boys in the early years of primary school, and zero for girls.

Secondary enrollment in Pacific countries is also low in relation to the average for developing nations. The highest levels of enrollment have been achieved, together with reasonably high standards of education, in Western Samoa, Tonga, and Fiji. Many of the most educated students from these countries emigrate to Australia, New Zealand, the United States, or Canada.

DEACON RITTERBUSH

Critics of Pacific Island education stress the need for training in science, technology, and manual skills and trades. Much of the formal education in the region emphasizes traditional academic subjects of little relevance to Pacific Islanders' lives.

Within the region's education community there is a debate about the form that education should take. Pacific Island education tends to be formal, and school curricula emphasize traditional academic subjects such as English literature. Critics have argued that more emphasis should be placed on mathematics and science because those subjects are more suited to an increasingly scientific and technological world. These observers also recommend greater emphasis on training for manual skills and trades. Policymakers should consider the content of school curricula in discussions of development strategies and attempt to reach broad consensus.

In short, education deserves increased priority, given its importance to Pacific nations' development. As we have seen, more funds for education do not neces-

sarily result in better outcomes. Education systems need to be made more efficient, teacher training improved, and curricula made more relevant to the countries' human resource needs. (See also Gannicott 1989.)

HEALTH AND NUTRITION

Investments in health, like those in education, can have a high rate of social and economic return. Few data are available on access to health services in Pacific nations, but access appears to be less of a problem in the Pacific than in many other developing areas.

Existing data on the number of persons per doctor, per nurse, and per hospital bed indicate that the provision of medical services is generally much better in the Pacific than in the developing world as a whole (Table 10). Fiji, Tonga, and Kiribati have about twice as many doctors per capita as the average for developing countries, and all the Pacific nations for which data are available have more nurses per capita as well. However, compared with their Pacific neighbors and the developing world at large, the Solomon Islands, Papua New Guinea, and Vanuatu have a low ratio of doctors to population. Several studies of mortality in the Pacific link a low doctor/population ratio to higher mortality rates (Ahlburg 1988; Taylor, Lewis, and Sladden 1991).

The relatively good provision of health services in the Pacific should come as no surprise. Many Pacific nations spend two to three times as much of their budgets on health care as do other developing nations. This investment re-

Table 9. Education measures: selected Pacific Island countries, recent years

Measure	Fiji	Papua New Guinea	Solomon Islands	Vanuatu	Kiribati	Tonga	Western Samoa	All developing countries
Adult literacy rate (%)								
1970	75	32	51	u	95	100	98	u
1985, ages 15+								
Total	80	47	54	53	93	99	90	60
Men	85	60	62	57	93	99	u	70
Women	75	32	45	48	92	99	u	49
Mean years of schooling (ages 25+), 1980								
Total	4.9	0.9	1.0	3.7	6.1	7.1	5.0	3.5
Men	5.4	1.2	1.2	4.3	6.5	7.3	5.5	4.4
Women	4.4	0.6	0.8	3.1	5.7	6.9	4.5	2.5
Primary pupil/teacher ratio, 1986–88	30	32	21	24	u	u	27	35
Enrollment ratios, 1986–88								
Primary	100	73	48	6[a]	84	98	68[a]	90
Secondary	56	13	11	8	32	84	70	90
Primary dropout rate, 1986–88	50	33	51	u	u	u	u	44
Public expenditure on education (as % of total public expenditure), 1987–88	20	u	12	25	15	17	u	15
Public expenditure on primary education (as % of all levels), 1987–88	51	u	u	61		u	61	42

Sources: Adult literacy, 1970: Hughes, Ahlburg, and Lee (1986, table 1.2); 1985: UNDP (1991, table 5); Larson (1995, table A5). Mean years of schooling: UNDP (1991, table 5); Larson (1995, table A5). Primary pupil/teacher ratio: UNDP (1991, table 14). Enrollment ratios: UNDP (1991, table 14); Larson (1995, table A5). Primary dropout rate: UNDP (1991, table 15). Public expenditure on education and public expenditure on primary education: UNDP (1991, table 15).

u—data are unavailable.

a. Estimates by Hughes, Ahlburg, and Lee (1986).

sults in generally lower mortality levels than in other developing countries, but there are notable exceptions. According to my own calculations, Papua New Guinea spends twice the proportion of its national budget on health as do developing countries in general, yet its life expectancy is 13 percent lower, and its maternal mortality rate is more than three times the average rate for all developing countries. The reasons for this disparity are not immediately apparent.

The one aspect of health-care delivery in which Pacific countries appear to lag far behind developing countries at large is the provision of family planning services. As mentioned earlier and shown in Table 10, contraceptive prevalence in the Pacific is generally low, on the order of 10–30 percent of women in the reproductive age span, as compared with 49 percent for all developing countries. Opinions vary on whether the low contraceptive use among Pacific islanders is due to limited access to contraceptives or to a low demand for family planning. Research is needed on the relative importance of contraceptive demand and supply.

Contraceptive prevalence is an important health and development indicator, for several reasons. Contraception gives couples the ability to achieve their desired family size. By enabling them to space births, it also has positive effects on the health of children and their mothers, thereby saving lives and scarce public and private resources. A high rate of contraceptive prevalence not only lowers mortality and morbidity, but also tends to slow the rate of population growth.

Malnutrition among Pacific Island children is a cause for concern. In Vanuatu, 20 percent of children under 5 years of age are malnourished; in Papua New Guinea the figure is 35 percent (Larson 1995, 17). Wasting and stunting are a significant problem among older children in the Solomon Islands and Vanuatu. (Wasting is defined as significantly low weight in relation to height and is evidence of acute undernutrition during the period immediately preceding measurement. It is often associated with fluctuations in food supply or recent illness, such as diarrhea. Stunting is defined as significantly low height in relation to a child's age and is associated with inadequate nourishment over an

Table 10. Health services and reproductive health measures: selected Pacific Island countries, recent years

Measure	Fiji	Papua New Guinea	Solomon Islands	Vanuatu	Kiribati	Tonga	Western Samoa	All developing countries
Population with access to health services, 1987–90	99	96	80	80	85	100	100	72
Contraceptive prevalence, late 1980s	27–32	10–20	10–25	3–25	27–38	23–39	20	49
Maternal mortality (per 100,000 births), 1988	68–150	700–1,000	549	92–138	127	70–80	46	420
Population per doctor, 1984–89	2,030	6,070	7,420	5,000	1,967	1,667	3,570	5,080
Population per nurse, 1984–89	490	880	679	450	u	557	410	1,870
Population per hospital bed, 1980–85	364	299[a]	179	162	208	284	229	u
Public health expenditure (as % of GNP), circa 1990	2	3	4	2	6	4	4	4

Sources: Access to health sources: UNDP (1993, table 12); Larson (1995, table A6). Contraceptive prevalence: Kane and Lucas (1985, 3); Larson (1995, table A7); UNDP (1993, table 23); World Bank (1994a, various tables). Maternal mortality: ADB (1993, table 2); Larson (1995, table A2); UNDP (1993, table 12); World Bank (1994b, various tables). Population per doctor and population per nurse: UNDP (1993, table 12). Population per hospital bed: World Bank (1994b). Public health expenditure: Larson (1995, table A4); UNDP (1993, table 12).

Note: Data may vary considerably by source. Ranges are given where discrepancies are large.
u—data are unavailable.
a. 1987–92 estimate.

extended period of time.) Although data are lacking for other countries of the region, it is likely that child malnutrition exists elsewhere as well.

Information on breastfeeding practices in the Pacific is also scarce. In the nations for which data are available, the prevalence of breastfeeding is below the average for all developing countries. Low levels of breastfeeding have been linked elsewhere to higher levels of malnutrition and fertility. For these reasons, the United Nations Children's Fund (Larson 1995, 15) recommends that mothers breastfeed their infants for one year and supplement the infants' diet with other foods after six months.

Malnutrition among children is not only an important human concern. It is also an important economic concern because the children of today will become the workers of tomorrow. By preventing individuals from reaching their full physical and intellectual potential, malnutrition threatens a nation's development prospects.

Apart from the child malnutrition just noted, malnutrition has not been a serious problem in most Pacific nations. Of the seven countries for which data are reported in Table 11, all except the Solomon Islands recently had an average daily calorie supply per capita greater than the recommended daily requirement.

During the 1980s, domestic food production rose by an average of 15 percent in the developing world. In contrast, all of the Pacific nations for which data are available, with the exception of Papua New Guinea, had decreases in domestic food production during that period (Table 11). This does not necessarily mean that food *consumption* declined. It is possible that as production fell, so did food exports, permitting more of the locally produced foods to be consumed locally; or it might mean that food imports increased to compensate for the decline in production. In either case, the decline in domestic food production is troubling because it likely led to increased dependence on foreign aid and remittances (Fairbairn-Dunlop 1994).

PROJECTED POPULATION TRENDS

Population growth in the Pacific Island nations over the next quarter-century has major implications for education, job creation, health services, and the proportion of the population that is elderly. To meet the needs of the future population, policymakers need some idea of its future size and age structure, and well-prepared population projections are preferable to uninformed guesses.

Because projections are based on assumptions about future fertility, mortality, and migration, they are only as accurate as the assumptions on which they are based. It is extremely difficult to predict human behavior, particularly over a 20- or 30-year period. Despite the inaccuracies of projections, they are an important planning tool, in part because they allow policymakers to work through the implications of various assumptions about future fertility, mortality, and migration.

A variation on this approach is that of Callick (1993), who on the basis of 20-year projections of current demographic trends paints a "doomsday" scenario of the region's future. His point, which has often been missed, is that if current policies and trends continue, this scenario—or something like it—is a possible outcome. Callick intended his article to stir discussion and prompt corrective action.[3] That is the purpose of the projections that follow.

A further cautionary note is needed. The population projections presented here do not take into account the demographic impact of the human immunodeficiency virus (HIV) and acquired immune deficiency syndrome (AIDS). As of early or mid-February 1995, 645 cases of HIV/AIDS had been reported in 14 Pacific Island nations (SPEHIS 1995, table A-1). The reported number of cases of this sexually transmitted disease (STD) underestimates the total prevalence of HIV/AIDS. Although we currently have

Table 11. Nutrition and food production: selected Pacific Island countries, recent years

Subregion and country	Daily calorie supply (as % of requirements), 1986–90	Food-production index, 1986–90 (1979–81 = 100)
Melanesia		
Fiji	108	80
Papua New Guinea	114	103
Solomon Islands	84	82
Vanuatu	100	77
Polynesia		
Western Samoa	103	99
All developing countries	107	115

Sources: UNDP (1991, 1993, table 13).

3. Another useful projection exercise in the same collection as Callick's is that by Gannicott (1993). For a more optimistic view of the Pacific region's future, see Pirie (1994).

no firm knowledge of the likely impact of the HIV/AIDS pandemic in the Pacific, sexual practices in the Pacific suggest that the virus is likely to become a serious problem in a number of countries.

Several aspects of the disease have important demographic, social, and economic implications for the Pacific nations. First, HIV/AIDS affects men and women in their prime economic and reproductive years. Statistics from Pacific countries collected by the South Pacific Commission and the STD/AIDS Unit of the Papua New Guinea Department of Health indicate that in all but one of the countries, HIV is concentrated in the 20–29 year age group and AIDS in the 30–39 age group. The exception is Papua New Guinea, where both HIV and AIDS are concentrated in the 20–29 year age group (Duncan 1995, 149). Second, worldwide the infection ratio is 1 male to every 1.2 females. Females also contract the disease at an earlier age on average and therefore lose more years of expected life than do males (Becker 1990, 1610). Research suggests that a significant epidemic in Pacific Island nations (that is, with 5 to 10 percent of their populations infected) would lower the population growth rate by one-half to one percentage point per year (Ahlburg, Larson, and Brown 1995b, 7). The health-care costs of a person with HIV or AIDS are more than 10 times the average expenditure on health care per capita and several times the national income per capita (Ahlburg, Larson, and Brown 1995b, 18). A significant epidemic may decrease economic growth and negatively affect human development (Ahlburg and Larson 1995; Duncan 1995).

Given the best available estimates of current fertility, mortality, and migration, how much larger are the Pacific populations likely to become? What are the expected increases in each major age group—the young, the working-age population, and the elderly? These questions can be rephrased as questions about required social infrastructure: How many schools will be needed? How many jobs will have to be created? What proportion of the larger population will require support from those working? How many more doctors, nurses, and hospital beds will be needed?

PROJECTED POPULATION GROWTH

Population projections prepared by the U.S. Bureau of the Census for 19 Pacific countries are reported in Table 12, and the implied rates of growth are shown in Table 13. The projections assume that fertility will decline in all the countries between 1993 and 2030. The fertility declines are assumed to be largest for the high-fertility Melanesian countries, where the total fertility rate in most cases is projected to fall to slightly more than two births per woman. Life expectancy is assumed to increase significantly in many countries. The assumed gains will be greatest in the high-mortality Melanesian countries and in several Polynesian and Micronesian countries. Migration rates are assumed to remain unchanged or else to decline slowly.

The United Nations (UN, DESIPA, 1993) and the World Bank (Bos et al. 1992) have also prepared projections of future population size and growth rates for the Pacific. Where the projections differ most, the degree of uncertainty is greatest.

The populations of all Pacific nations are projected to grow over the next 35 years. The increases range from a low of about 20 percent for Nauru and the Federated States of Micronesia to dramatic growth for Papua New Guinea (98 percent), the Northern Marianas (106 percent), Solomon Islands (144 percent), and Marshall Islands (287 percent). By 2030, Papua New Guinea's population is projected to exceed 8 million, Fiji's to exceed 1 million, and the Solomon Islands' to approach 1 million. For all countries of the region, however, *rates* of growth are projected to decline—in some cases to zero.

DENNIS A. AHLBURG

As a result of projected declines in fertility and increased life expectancy, the proportions of elderly Pacific Islanders, especially those 70 and older, will rise dramatically over the next several decades.

International migration is also projected to decline, in many cases to net levels of zero—that is, the number of in-migrants balancing the number of out-migrants (Table 14). Migration is more difficult to forecast than fertility or mortality because it is determined to a greater extent by social and political events, particularly by governments' policies, which can change suddenly. Recent developments suggest that opportunities are likely to diminish for Pacific islanders to migrate to metropole countries with which their countries have former colonial ties.

WORKING-AGE POPULATIONS

Table 15 converts the projected population increases for men and women in four broad age groups into an index of change so that the implications for job creation can be seen easily. The number of persons in each age group in 1990 has been set at 100, and the projected number in that age group for each subsequent year has been calculated in relation to the number in 1990. In Fiji, for example, for every 100 males of ages 15–39 in 1990, 114 males are projected to be in that age group in 2000. The index for a particular age group and year also indicates the percentage of growth for the age group between 1990 and that year. As an example, the index of 114 Fijian males 15–39 years old in 2000 indicates that the number of males in that age group is projected to grow by 14 percent between 1990 and 2000 (114–100 = 14 percent). Table 15 reveals projected increases of between 37 and 147 percent in the region's working-age populations over the next 35 years.

If we assume that labor force participation rates will remain constant, then these rates of population growth in the working-age groups indicate how much the labor force is projected to grow in each Pacific country. If unemployment rates are also assumed to remain constant, then the projected population growth rates indicate the amount of growth in jobs that will be required over the next 35 years for workers of each sex and age group.

The projections indicate that job creation will be an enormous challenge for the nations of the Pacific. For many of them the number of new jobs needed over the next 35 years will more than double. The demand for new jobs will be greatest among workers who are in their middle and late working ages. In the Federated States of Micronesia, for example, there will be a fourfold increase in needed jobs for female workers of ages 40–54 and for male workers of ages 55–64.

THE DEPENDENCY BURDEN

In 1990 the Pacific nations had between 44 and 58 percent of their populations under age 20 (Table 16). Because of projected declines in fertility rates, the pro-

Table 12. Projected population size (in thousands): Pacific Island countries, 1993–2030

Subregion and country	1993	1995	2000	2010	2020	2030	1993–2030 % increase
Melanesia							
Fiji	757	773	823	933	1,037	1,133	50
Palau	16	17	18	20	21	22	38
Papua New Guinea	4,101	4,295	4,812	5,925	7,044	8,140	98
Solomon Islands	373	399	470	620	767	911	144
Vanuatu	166	174	193	230	266	298	80
Micronesia							
Fed. States of Micronesia	118	123	133	141	143	143	21
Guam	146	153	171	202	230	255	75
Kiribati	76	79	87	95	98	99	30
Marshall Islands	52	56	68	100	144	201	287
Nauru	10	10	11	11	12	12	20
New Caledonia	178	185	200	230	255	278	56
Northern Mariana Islands	49	51	57	71	86	101	106
Polynesia							
American Samoa	53	57	69	85	86	86	62
Cook Islands	19	19	20	22	24	24	26
French Polynesia	210	220	245	294	343	392	87
Tonga	104	106	110	119	128	137	32
Tuvalu	10	10	11	12	15	16	60
Wallis and Futuna	14	14	15	17	18	19	36
Western Samoa	200	209	235	288	341	392	96

Sources: Personal correspondence from Michael J. Levin, U.S. Bureau of the Census; calculations by the author.

Note: Projections for 1995 and subsequent years are based on 1993 estimates. Fertility, mortality, and migration assumptions underlying the projected population figures are available from the author. The United Nations (UN, DESIPA 1993, table A2) and Bos et al. (1992, various tables) have also projected the future size of Pacific Island populations to 2030, and their projections are somewhat different from those presented here.

portion of young people will fall throughout the region. By 2030, it is likely to be around 30 percent for most nations.

In contrast, the proportions of elderly will rise dramatically as a result of the lower fertility rates and projected declines in mortality (Table 17). In the more slowly growing populations of Fiji, French Polynesia, and Kiribati, the size of the 60 and older age group will roughly treble between 1990 and 2030. Among those 70 and older, the projected increases are especially dramatic: 167 percent in Tonga, 300 percent in New Caledonia, 383 percent in Papua New Guinea, and 414 percent in Fiji (calculated from data in Bos et al. 1992).

The proportions of young and old people in a nation indicate the size of the support load that the working-age population must carry. Demographers measure this support load by the dependency ratio—the number of persons under age 15 plus those over age 59 divided by the number of persons of working ages (15–59 years).

As Table 18 indicates, the Pacific nations have extremely high dependency ratios. In the Solomon Islands, for example, in 1990 there were 103 dependents for every 100 persons of working age. By 2030, there are projected to be only 53 dependents per 100 persons of working age. The high dependency ratios in the Solomons, Federated States of Micronesia, and Vanuatu place a heavy burden on those societies to support their young and old people. Although the numbers of young and old people will continue to grow, the Pacific nations' working-age populations will grow faster, so that their dependency ratios will decline. As long as productive employment can be created for the region's growing labor forces, the pressure of caring for the young and old should diminish. The critical challenge for Pacific nations and families is to generate the economic resources needed to

Table 13. Projected population growth per year (in percentages): Pacific Island countries, 1993–2030

Subregion and country	1993	1995	2000	2010	2020	2030
Melanesia						
Fiji	1.0	1.2	1.3	1.3	1.1	0.9
Palau	1.8	1.8	1.4	1.1	0.5	0.5
Papua New Guinea	2.3	2.3	2.2	2.3	1.9	1.6
Solomon Islands	3.5	3.4	3.1	3.2	2.4	1.9
Micronesia						
Fed. States of Micronesia	3.4	3.4	3.3	0.6	0.1	0.0
Guam	2.5	2.4	1.9	1.8	1.4	1.1
Kiribati	2.0	2.0	1.8	0.9	0.3	0.1
Marshall Islands	3.9	3.9	3.9	3.8	4.4	4.0
Nauru	1.4	2.0	0.0	0.0	0.9	0.0
New Caledonia	1.8	1.8	1.6	1.5	1.1	0.9
Northern Mariana Islands	3.0	2.4	2.4	2.4	2.1	1.7
Polynesia						
American Samoa	3.9	3.8	3.5	2.3	0.1	0.0
Cook Islands	1.2	1.1	1.0	1.0	0.9	0.0
French Polynesia	2.3	2.2	2.0	2.0	1.7	1.4
Tonga	0.8	0.9	0.8	0.8	0.8	0.7
Tuvalu	1.7	1.6	1.3	0.9	2.5	0.7
Vanuatu	2.4	2.2	2.0	1.9	1.6	1.2
Wallis and Futuna	1.2	1.1	1.5	1.3	0.6	0.6
Western Samoa	2.4	2.4	2.3	2.2	1.8	1.5

Source: Personal correspondence from Michael J. Levin, U.S. Bureau of the Census.

Note: Projections for 1995 and subsequent years are based on 1993 estimates. Fertility, mortality, and migration assumptions underlying the projected population figures are available from the author.

Table 14. Projected net number of migrants per 1,000: selected Pacific Island countries, 1995–2030

Subregion and country	1995	2000	2010	2020	2030
Melanesia					
Fiji	–6	–4	–2	–1	0
New Caledonia	*	0	0	0	0
Papua New Guinea	0	0	0	0	0
Solomon Islands	0	0	0	0	0
Vanuatu	0	0	0	0	0
Micronesia					
Fed. States of Micronesia	12	12	np	np	np
Guam	3	3	np	np	np
Kiribati	1	np	np	np	np
Marshall Islands	0	0	0	0	0
Polynesia					
American Samoa	6	6	np	np	np
Cook Islands	–5	np	np	np	np
French Polynesia	0	0	0	0	0

Source: Personal correspondence from Michael J. Levin, U.S. Bureau of the Census.

*Less than 0.5.

np—not projected.

Table 15. Indices of projected working-age population groups, by sex: selected Pacific Island countries, 1990–2030 (1990 = 100)

Subregion, country, and year	Both sexes	Men, by age group				Women, by age group			
		15–64	15–39	40–54	55–64	15–64	15–39	40–54	55–64
Melanesia									
Fiji									
1995	105	105	106	110	117	105	106	115	124
2000	109	109	114	127	128	109	111	133	153
2010	117	116	124	154	172	118	119	160	200
2020	127	126	122	183	233	128	119	179	282
2030	137	135	119	231	261	139	115	225	294
Papua New Guinea									
1995	113	113	113	109	108	114	113	108	110
2000	126	125	129	124	115	127	129	122	11
2010	152	149	160	171	155	153	157	154	164
2020	173	171	190	228	213	176	207	216	196
2030	196	192	206	293	254	200	226	290	311
Solomon Islands									
1995	118	117	126	120	114	118	125	120	117
2000	137	136	149	147	129	138	151	147	150
2010	175	173	200	220	157	177	205	213	183
2020	211	207	243	420	257	214	254	320	300
2030	244	239	280	453	414	248	291	440	450
Vanuatu									
1995	117	116	119	122	75	118	113	114	150
2000	136	133	139	133	100	138	127	157	200
2010	174	169	184	189	150	178	180	214	300
2020	212	186	229	277	225	218	227	314	450
2030	247	238	265	366	350	256	257	443	650
Micronesia									
Fed. States of Micronesia									
1995	114	113	118	120	100	114	110	150	100
2000	128	126	127	120	100	130	119	200	100
2010	160	158	164	220	150	162	162	250	250
2020	188	185	191	340	300	192	195	375	300
2030	216	211	209	420	500	220	214	500	450
Kiribati									
1995	110	111	113	125	100	109	114	125	100
2000	120	120	127	150	100	120	129	150	100
2010	139	140	133	150	100	137	150	175	200
2020	157	157	160	225	150	154	164	200	150
2030	174	177	167	300	177	174	179	275	250
New Caledonia									
1995	108	107	111	108	140	109	112	118	120
2000	115	113	120	123	140	118	124	127	140
2010	130	127	129	162	180	134	136	173	180
2020	144	138	129	200	220	149	133	236	220
2030	155	148	129	208	300	162	133	245	320
Polynesia									
French Polynesia									
1995	114	114	121	115	140	116	119	127	125
2000	129	128	133	131	160	130	131	145	175
2010	153	150	155	192	200	155	148	227	225
2020	173	169	164	285	260	176	157	327	325
2030	192	188	167	285	420	197	164	327	575

Table 15 *(continued)*

Tonga									
1995	106	106	104	80	67	108	100	100	133
2000	112	114	109	100	67	115	105	100	67
2010	125	126	122	180	100	127	124	167	133
2020	138	140	135	260	167	142	138	200	167
2030	156	156	139	280	300	158	138	233	267
Western Samoa									
1995	108	107	105	88	100	110	103	100	100
2000	117	116	118	113	100	119	112	100	100
2010	140	137	139	238	125	142	145	178	125
2020	162	157	155	325	200	167	170	256	175
2030	184	178	166	375	375	191	194	300	325

Source: Author's calculations, based on projections by Bos et al. (1992).

care for increasing numbers of people who are too young or too old to work.

SCHOOL ENROLLMENT

Table 19, which forecasts school enrollments for three age groups in six Pacific nations to 2030, is based on projected increases in the number of school-age children and two alternative assumptions about enrollment rates. The first assumption is that enrollment rates will remain constant at their 1995 levels. The second is that all children of ages 5–14 will attend school and 60 percent of those in the 15–19 age group will also attend school. For countries that have already achieved or exceeded this level of school enrollment, I assume that current rates will be maintained. In 1990, however, most Pacific countries did not have 100 percent of primary-age children enrolled in school, and in most the secondary enrollments were below 60 percent. The projections based on the second set of assumptions therefore reflect a stated objective of many Pacific governments: to improve their nations' educational levels by increasing school enrollments.

As in Table 15, the projections are expressed as indices, in this case based on the numbers of children enrolled in 1990. A value less than 100 represents a decline since 1990 in the number of children needing to be educated. Such declines indicate reduced pressure on national education budgets and are a consequence of projected declines in fertility. In contrast, a value higher than 100 indicates an increase in the number of school places needed to keep enrollment at its 1990 level.

Except in Fiji and Tonga, population growth will mean increased demand for school places, particularly for students aged 15–19, even if 1990 enrollment rates are merely maintained, as in the first assumption. Given the countries' projected rates of population growth, raising enrollment rates to meet the goals implied by the second assumption would result in dramatic increases in the number of school places required. For most of the countries, two to four times as many places in primary schools would be needed. A 60 percent enrollment rate for students aged 15–19 would necessitate a fivefold increase in school accommodations for the Solomon Islands and a sixfold increase in Papua New Guinea.

Added to concerns about the quality

Table 16. Projected percentages of population under 20 years of age: selected Pacific Island countries, 1990–2030

Subregion and country	1990	1995	2000	2010	2020	2030
Melanesia						
Fiji	47	46	42	35	31	29
Papua New Guinea	52	52	51	47	40	35
Solomon Islands	58	55	53	49	42	35
Vanuatu	56	53	52	49	42	36
Micronesia						
Fed. States of Micronesia	56	53	49	45	38	32
Kiribati	49	49	49	41	36	33
New Caledonia	44	40	37	33	30	28
Polynesia						
French Polynesia	50	46	42	38	32	29
Tonga	51	50	47	41	35	30
Western Samoa	52	51	49	44	36	33

Source: Author's calculations, based on projections by Bos et al. (1992).

of education in many Pacific nations (Larson 1995, 19), these projections show that population growth will make it extremely difficult for the Pacific countries to meet the education goals set forth in their development plans. Government budgets are likely to remain tight. That means that individual families may have to pay a larger proportion of the costs of educating their children, increased educational efficiency must occur, or the quality of the education may decline.

MEDICAL SERVICES

Projected population growth in the six countries between 1990 and 2030 will also cause the demand for health services to rise sharply (Table 20). Merely to maintain the ratios of services to the population levels that existed in 1990, these countries will have to provide significantly more medical personnel and hospital beds each decade. For example, by 2030 Fiji is projected to need an additional 308 doctors, 1,360 nurses, and 2,267 hospital beds. If Papua New Guinea experiences the rate of population growth that has been projected, it will need two and a half times as many doctors in 2030 as it had in 1990 merely to maintain 1990-level services. If access to medical services is to improve, correspondingly larger numbers of doctors, nurses, and hospital beds will be needed. And correspondingly more money will be needed to fund those improvements in health services. With tight government budgets, families will have to pay an increased share of the cost of health care, increased efficiency must be realized, or the quality and quantity of care will decrease.

Table 17. Projected percentages of population 60 years of age and older: selected Pacific Island countries, 1990–2030

Subregion and country	1990	1995	2000	2010	2020	2030
Melanesia						
Fiji	5	6	7	9	13	16
Papua New Guinea	5	5	5	6	7	9
Solomon Islands	5	5	5	5	7	9
Vanuatu	5	5	5	5	7	9
Micronesia						
Fed. States of Micronesia	6	7	6	5	8	11
Kiribati	4	6	8	8	7	11
New Caledonia	8	9	9	11	13	17
Polynesia						
French Polynesia	6	7	7	9	11	16
Tonga	7	9	7	7	9	14
Western Samoa	7	7	6	6	7	11

Source: Author's calculations, based on projections by Bos et al. (1992).

Table 18. Projected dependency ratios: selected Pacific Island countries, 1990–2030

Subregion and country	1990	1995	2000	2010	2020	2030
Melanesia						
Fiji	74	68	60	54	58	60
Papua New Guinea	85	86	85	70	57	53
Solomon Islands	103	95	87	77	60	53
Vanuatu	96	88	88	75	62	58
Micronesia						
Fed. States of Micronesia	98	92	86	68	58	54
Kiribati	75	83	87	64	53	54
New Caledonia	68	65	60	55	57	62
Polynesia						
French Polynesia	78	68	68	60	52	61
Tonga	80	91	82	59	56	58
Western Samoa	85	87	82	65	52	55

Source: Bos et al. (1992, various pages).

CONCLUSION

The developing nations of the Pacific face formidable challenges over the next few decades, in part because their populations are young, fertility rates are high, and mortality rates are low and falling. These countries must find ways to provide education, jobs, and health services for their rapidly growing populations. As the elderly segments of their populations become larger, new services will be required to meet their needs. These developments will strain the resources of the region's governments and families.

Economic growth is the key to job creation and a pressing concern in the Pacific. Little uncertainty exists about the number of jobs that will be needed in the next 10 to 20 years because most of the people who will be needing jobs are already born. The pursuit of economic growth, in particular growth that creates jobs and decreases inequality, should therefore be a top priority of Pacific Island governments. Policies that interfere with job creation should be scrutinized carefully.

Given projected future population growth, the number of school places will have to rise significantly just to maintain student enrollments at current levels. Several governments have indicated a desire to increase enrollments. In some countries reform is needed of educational content and delivery. Moreover, although most Pacific nations do better than many developing nations at educating girls to the same level as boys, inequalities exist. Reducing the gender gap in education will enhance women's life chances and in all probability lead to lower fertility and improved child and maternal health.

A few Pacific nations may be able to attain these goals without spending a disproportionate share of their budgets on education, but many will not. If government budgets remain very tight, educators will be forced to find ways of delivering more education with fewer resources and families will probably have to pay a greater share of the cost of educating their children.

If fertility does not decline as rapidly as projected, the social and economic challenges facing the Pacific Island nations will be even greater than anticipated.

Continued population growth will place great strains on the Pacific nations' health resources. As with education, these societies will have to do more with less, and families will likely have to assume a greater share of health care costs. Meeting this challenge is vital to the development of the region's human resources.

The population projections presented in this report assume that Pacific Island fertility will decline from its currently high levels. If fertility does not decline as rapidly as projected, the rates of population growth and the challenges outlined here will be even greater than anticipated. It is not clear how Pacific nations will meet these demographic, economic, and social challenges. What *is* clear is that population policies and programs need to become an integral part of Pacific nations' development plans and not treated as isolated policy initiatives.

Table 19. Indices of projected school enrollments under two alternative assumptions: selected Pacific Island countries, 1990–2030 (1990 = 100)

Assumption, subregion, and country	Ages 5–9					Ages 10–14					Ages 15–19				
	1995	2000	2010	2020	2030	1995	2000	2010	2020	2030	1995	2000	2010	2020	2030
Assumption 1: Continuation of recent enrollment ratio[a]															
Melanesia															
Fiji	94	88	77	79	78	106	98	85	83	85	113	120	105	93	100
Papua New Guinea	115	130	133	128	124	114	132	158	150	141	105	120	157	161	156
Solomon Islands	102	131	148	144	128	104	107	150	150	148	122	130	168	192	186
Vanuatu	109	136	150	150	159	105	120	160	165	175	112	124	176	194	194
Polynesia															
Tonga	117	117	100	100	100	109	127	118	109	109	85	77	108	92	85
Western Samoa	120	130	125	125	125	100	115	130	120	120	95	95	130	120	125
Assumption 2: 100% enrollment for ages 5–14 and 60% enrollment for ages 15–19															
Melanesia															
Fiji	94	88	77	79	78	106	98	85	83	85	121	129	113	100	107
Papua New Guinea	157	178	182	175	170	156	181	216	205	193	485	554	725	743	720
Solomon Islands	213	273	308	300	288	217	223	313	313	308	385	411	531	606	587
Vanuatu	303	378	417	417	442	292	333	444	458	486	118	131	185	204	204
Polynesia															
Tonga	167	167	143	143	143	156	181	169	156	156	85	77	108	92	85
Western Samoa	176	191	184	184	184	147	169	191	176	176	95	95	130	120	125

Source: Author's calculations, based on data from UNDP (1993) and projections by Bos et al. (1992).

a. Recent enrollment ratios are presented in Table 9.

Table 20. Projected numbers of additional doctors, nurses, and hospital beds needed per decade: selected Pacific Island countries (1990 = base)

Subregion, country, and medical need	1990	2000	2010	2020	2030
Melanesia					
Fiji					
Doctors	338	31	59	92	126
Nurses	1,488	138	260	406	556
Hospital beds	2,480	230	433	677	927
Papua New Guinea					
Doctors	645	168	328	473	619
Nurses	4,449	1161	2,261	3,265	4,273
Hospital beds	18,822	4,913	9,567	13,812	18,077
Solomon Islands					
Doctors	43	16	32	47	61
Nurses	465	171	349	517	669
Hospital beds	1,672	614	1,254	1,857	2,402
Vanuatu					
Doctors	27	10	20	31	40
Nurses	339	121	251	379	498
Hospital beds	530	189	393	593	779
Polynesia					
Tonga					
Doctors	29	3	7	11	16
Nurses	254	31	64	97	144
Hospital beds	251	30	63	96	142
Western Samoa					
Doctors	46	8	18	29	39
Nurses	413	70	165	258	348
Hospital beds	717	122	287	448	604

Source: Author's calculations, based on data from UNDP (1993) and projections by Bos et al. (1992).

ACKNOWLEDGMENTS

Thanks are due to Sandra Ward for her excellent editing, to Michael Levin for providing unpublished data, to Peter Pirie for permission to use the boxed insert about the Pacific Islands that appears on page 4, and to Manoa Mapworks, Inc., for permission to reproduce their map of the Pacific Islands (page 2).

REFERENCES

ADB (Asian Development Bank). 1993. *Key indicators of developing Asian and Pacific countries, 1993*, Vol. 24. Manila: Oxford University Press.

Ahlburg, Dennis A. 1988. Is population growth a deterrent to development in the South Pacific? *Journal of the Australian Population Association* 5:46–57.

_____. 1991. *Remittances and their impact: A study of Tonga and Western Samoa*. Pacific Policy Monograph No. 7. Canberra: Research School of Pacific Studies, Australian National University.

_____. 1994. Return migration from the United States to American Samoa: Evidence from the 1980 and 1990 censuses. *Pacific Studies* 17:71–84.

_____. 1995. Migration, remittances, and the distribution of income: Evidence from the Pacific. *Asian and Pacific Migration Journal* 4(1): 157–67.

_____. 1996. Remittances and the income distribution in Tonga. *Population Research and Policy Review* 15 (forthcoming).

Ahlburg, Dennis A., Allen C. Kelley, and Karen Oppenheim Mason. 1996. *The impacts of rapid population growth in developing countries*. Heidelberg: Springer-Verlag.

Ahlburg, Dennis A., and Heidi J. Larson. 1995. Sexual activity in the Pacific and HIV/AIDS risks. *Pacific Health Dialog* 2(2): 103–6.

Ahlburg, Dennis A., Heidi J. Larson, and Tim Brown. 1995a. Health care costs of HIV/AIDS in the Pacific. *Pacific Health Dialog* 2(2): 14–19.

_____. 1995b. *The potential demographic impact of HIV/AIDS in the Pacific*. Unpublished manuscript, Program on Population, East-West Center, Honolulu.

Ahlburg, Dennis A., and Michael J. Levin. 1990. *The Northeast Passage: A study of Pacific Islander migration to American Samoa and the United States*. Pacific Research Monograph No. 23. Canberra: National Centre for Development Studies, Australian National University.

Ahlburg, Dennis A., and In-gang Na. 1995. *Labour market discrimination against migrants in Guam*. Paper presented at the Annual Meeting of the Population Association of America, San Francisco, April.

Becker, Charles M. 1990. The demo-economic impact of the AIDS pandemic in sub-Saharan Africa. *World Development* 18:1599–1619.

Bos, Eduard, My T. Vu, Ann Levin, and Rodolfo A. Bulatao, eds. 1992. *World population projections, 1992–93*. Washington, D.C.: World Bank.

Brown, Richard P. C. 1994. Migrants' remittances, savings and investment in the South Pacific. *International Labour Review* 133:347–67.

Brown, Richard P. C., and John Connell. 1993a. The global flea market: Migration, remittances and the informal economy of Tonga. *Development and Change* 24:611–47.

_____. 1993b. *Migration and remittances in Tonga and Western Samoa.* Vol. 1, *Main report.* Bangkok: International Labour Organization.

Caldwell, John, G. E. Harrison, and P. Quiggin. 1980. The demography of microstates. *World Development* 8: 953–67.

Callick, Rowan. 1993. A doomsday scenario? In Rodney V. Cole, ed., *Pacific 2010: Challenging the future,* pp. 1–11. Pacific Policy Paper No. 9. Canberra: National Centre for Development Studies, Australian National University.

Cassen, Robert, ed. 1994. *Population and development: Old debates, new conclusions.* New Brunswick, New Jersey: Transactions Publishers.

Chapman, Murray. 1991. Pacific Islands movement and socioeconomic change: Metaphors of misunderstanding. *Population and Development Review* 17:263–92.

Connell, John. 1980. *Remittances and rural development: Migration, dependency, and inequality in the South Pacific.* Occasional Paper No. 22. Canberra: National Centre for Development Studies, Australian National University.

Connell, John, and R. Curtain. 1982. Urbanization and inequality in Melanesia. In R. J. May and H. Nelson, eds., *Melanesia: Beyond diversity,* pp. 461–500. Canberra: Australian National University Press.

Connell, John, and John P. Lea. 1993. *Planning the future: Melanesian cities in 2010.* Pacific Policy Paper No. 11. Canberra: National Centre for Development Studies, Australian National University.

Connell, John, and Grant McCall. 1990. *South Pacific Islanders in Australia.* Occasional Paper No. 9. Sydney: Department of Geography, University of Sydney.

Duncan, R. C. 1995. HIV/AIDS: Adding to the Pacific nightmare. *Pacific Health Dialog* 2(2): 147–52.

Eastly, Michael. 1994. Labour abuse story stirs CNMI immigration debate. *Pacific Magazine* 19:15–16.

_____. 1992. *The Kiribati economy: Development options and prospects for growth.* International Development Issues, No. 26. Canberra: Australian Government Publishing Service.

Fairbairn-Dunlop, Peggy. 1994. Mother, farmer, trader, weaver: Juggling roles in Pacific agriculture. In Àtu Emberson-Bain, ed., *Sustainable development or malignant growth?,* pp. 73–90. Suva: Marama Publiations

Franco, Robert W. 1993. Movement networks and "relative" economies in Samoa and Micronesia. In Grant McCall and John Connell, eds., *A world perspective on Pacific Islander migration: Australia, New Zealand, and the U.S.* Pacific Studies Monograph No 6. Sydney: Centre for South Pacific Studies, University of New South Wales.

Gannicott, Kenneth G. 1989. *Education for economic development in the South Pacific.* Pacific Policy Paper No. 6. Canberra: National Centre for Development Studies, Australian National University.

_____. 1993. Population, development, and growth. In Rodney V. Cole, ed., *Pacific 2010: Challenging the future,* pp. 12–42. Pacific Policy Paper No. 9. Canberra: National Centre for Development Studies, Australian National University.

Hughes, Helen, Dennis A. Ahlburg, and Sun-Hee Lee. 1986. Human resources development in the Pacific Islands developing countries. In *Human resources development in Asia and the Pacific: Its social dimension,* pp. 82–118. Bangkok: UNESCO.

Johnson, Giff. 1994. Birth rate in Marshalls continues nose dive. *Pacific Magazine* 19:41.

Jones, Gavin. 1992. Population and human resources development. *Asia-Pacific Population Journal* 7:23–48.

Kane, Penny, and David Lucas. 1985. *Population problems in the South Pacific Islands: An overview.* Unnumbered working paper. Canberra: National Centre for Development Studies.

Kelley, Allen, and Geoffrey Williamson. 1984. *What drives Third World city growth?* Princeton, New Jersey: Princeton University Press.

King, David. 1993. Urbanization in Papua New Guinea: Trends from 1966 to 1990. In Tukutau Taufa and Caroline Bass, eds., *Population, family health, and development,* Vol. 1. Port Moresby: University of Papua New Guinea Press.

Larson, Heidi J., ed. 1995. *The state of Pacific children, 1995.* Suva: United Nations Children's Fund.

Levin, Michael J. 1992. *Determinants of fertility in the island ecosystem: Methods of analysis.* Paper presented at the International Symposium on Fertility and Insularity, sponsored by the Conseil Generale, Reunion, May.

_____. 1993. *Islands demography.* Informal presentation for the Population Division, United Nations, March 12.

North, David. 1994. Cure the Dutch disease or else. *Pacific Islands Monthly* 64:24–5.

Pirie, Peter. 1994. *Demographic transition in the Pacific Islands: The situation in the early 1990s.* East-West Center Working Papers, Pacific Islands Development Series, No. 5. Honolulu: East-West Center.

_____. 1995. *Pacific transitions: population and change in island societies.* AsiaPacific Issues, No. 20. Honolulu: East-West Center.

Psacharopoulos, G. 1982. The economics of higher education in developing countries. *Comparative Education Review* 26:139–59.

Rubinstein, Donald. 1993. Movements in Micronesia: Post-compact (1987)

Micronesian migrants to Guam and Saipan. In Grant McCall and John Connell, eds., *A world perspective on Pacific Islander migration: Australia, New Zealand, and the U.S.*, pp. 259–63. Pacific Studies Monograph No. 6. Sydney: Centre for South Pacific Studies, University of New South Wales.

Russell, Sharon. 1986. Remittances from international migration: A review in perspective. *World Development* 14(6): 677–96.

SPC (South Pacific Commission). 1994a. *Pacific Island populations: Report prepared by the South Pacific Commission for the International Conference on Population and Development, 5–13 September 1994, Cairo.* Noumea.

_____. 1994b. *Pacific Islands population update.* Noumea.

SPEHIS (South Pacific Epidemiological and Health Information Service). 1995. *SPESIS Circular.* Noumea: South Pacific Commission.

Taylor, Richard, Nancy Davis Lewis, and Sue Levy. 1989. Societies in transition: Mortality patterns in Pacific Island populations. *International Journal of Epidemiology* 18:634–46.

Taylor, Richard, Nancy Davis Lewis, and Tim Sladden. 1991. Mortality in Pacific Island countries around 1980: Geopolitical, socioeconomic, demographic and health service factors. *Australian Journal of Public Health* 15:207–21.

UN (United Nations). DESIPA (Department for Economic and Social Information and Policy Analysis). 1993. *World population prospects: The 1992 revision.* New York.

UNDP (United Nations Development Programme). 1991. *Human development report 1991.* New York: Oxford University Press.

_____. 1992. *Human development report 1992.* New York: Oxford University Press.

_____. 1993. *Human development report 1993.* New York: Oxford University Press.

_____. 1994. *Pacific human development report 1994.* Suva.

UNFPA (United Nations Population Fund). 1992. *The South Pacific.* Programme Review and Strategy Development Report. New York.

World Bank. 1991. *World development report 1991: The challenge of development.* Oxford: Oxford University Press.

_____. 1993a. *Pacific Island economies: Toward efficient and sustainable growth.* Vol. 1, *Overview.* Washington, D.C.

_____. 1993b. *World development report 1993: Investing in health.* Oxford: Oxford University Press.

_____. 1994a. *Health priorities and options in the World Bank's Pacific member countries.* Washington, D.C.

_____. 1994b. *Social indicators of development.* Baltimore: Johns Hopkins University Press.

_____. *1995. Pacific Island economies: Building a resilient economic base for the twenty-first century. Country Dept. III, East Asia and Pacific Region.* Washington, D.C.

Yusuf, Shahid, and R. Kyle Peters. 1985. *Western Samoa: The experience of slow growth and resource imbalance.* World Bank Staff Working Paper No. 754. Washington, D.C.: World Bank.

Asia-Pacific Population Research Reports provide an informative discussion of research on important population issues facing the Asia-Pacific region. Published several times a year, this series and its companion series, **Asia-Pacific Population Research Abstracts**, are intended for social and health scientists, policymakers, program managers, and the interested public. All submissions are peer-reviewed. The opinions expressed in the series are those of the authors and not necessarily those of the East-West Center. Research Reports and Abstracts may be reproduced for educational purposes.

ISSN 1079-0284

Correspondence to the author should be addressed to: Professor Dennis A. Ahlburg, Industrial Relations Center, Carlson School of Management, University of Minnesota, 519 Management and Economics, 271–19th Avenue South, Minneapolis, MN 55455,U.S.A.
E-mail: dahlburg@csom.umn.edu
Fax: (612) 624-8360

Copies of this and other Research Reports and Abstracts may be requested from the East-West Center Publication Sales Office, 1777 East-West Road, Honolulu, HI 96848, U.S.A.
E-mail: ewcbooks@ewc.hawaii.edu
Telephone: (808) 944-7145
Fax: (808) 944-7376.

Also available in this series:

Is the situation of women in Asia improving or deteriorating? by Karen Oppenheim Mason with the assistance of Amy Cardamone, Jill Holdren, and Leah Retherford. No. 6, September 1995.

What can we say about fertility trends in Bangladesh? An evaluation of the 1991 population census, by Andrew Kantner, Charles Lerman, and Mohammed Yusuf. No. 5, June 1995.

Aging in Asia: Setting the research foundation, by Albert I. Hermalin. No. 4, April 1995.

How Japan and the newly industrialized economies of Asia are responding to labor scarcity, by John G. Bauer. No. 3, March 1995.

Scenarios for the AIDS epidemic in Asia, by James Chin. No. 2, February 1995.

Asia's recent fertility decline and prospects for future demographic change, by Ronald Freedman. No. 1, January 1995.

The U.S. Congress established the East-West Center in 1960 to foster mutual understanding and cooperation among the governments and peoples of the Asia-Pacific region, including the United States. Principal funding for the Center comes from the U.S. government, with additional support provided by private agencies, individuals, and corporations and more than 20 Asian and Pacific governments.

The Center promotes responsible development, long-term stability, and human dignity for all people in the region and helps prepare the United States for constructive involvement in Asia and the Pacific.
President: Kenji Sumida

The Program on Population conducts research and offers professional education focusing on population issues, with emphasis on demographic and human resource trends, their social and economic causes and consequences, and their policy implications in Asia, the Pacific, and the United States.
Director: Andrew Mason

Printed on recycled paper with soy-based ink.