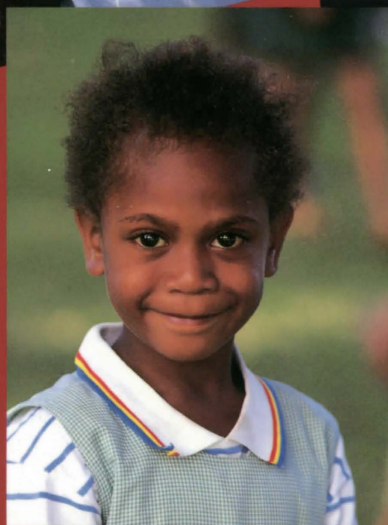


PACIFIC 2010

Pacific Policy Paper

9



Challenging the Future

Rodney V. Cole (editor)

National Centre for Development Studies • Research School of Pacific Studies
The Australian National University

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2010

Challenging the Future

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oreword

Rodney Cole

‘ Men must pursue things which are just in present,
and leave the future to the divine Providence ’

thus wrote Francis Bacon in his seventeenth century
masterpiece, *Advances in Learning*.

It is interesting to conjecture what Bacon might think, at the end of the twentieth century, about the prospects of ‘divine Providence’ catering for the needs of the world’s population as it grows at unprecedented rates, not least of all in many South Pacific island states. Particularly in Melanesia, if growth rates remain at present levels, they must ultimately threaten prospects of reasonable levels of sustainability.

The relatively leisurely pace of the seventeenth century bears little relation to the often hectic pace of the present day; indeed the rate of change in most aspects of modern living can only accelerate as the end of the twentieth century approaches. Of the issues facing today’s leaders none can be more important than rapidly growing populations. While Bacon was undoubtedly correct in urging pursuit of issues relevant to the needs of the present, at the same time the needs of the future must not be neglected.

Just what the population of individual islands might have been at the time of original contact by European seafarers is not easy to determine. What is clear, however, is that the initial

consequences of contact were disastrous in demographic terms. The impact of introduced diseases after hundreds of years of isolation was horrific, leading to severe depopulation, often in particular areas, with implications for land use and settlement. Later in some countries, particularly Solomon Islands and Vanuatu, the recruitment of labour (often by force) for plantation work in Queensland and Fiji compounded the rate of population decline.

In the latter half of the nineteenth century, in order to offset labour shortages brought about by introduced diseases, stricter control of labour recruitment from other island groups, and a reluctance of the indigenous population to engage in long-term labour contracts, the British government gave way to pressures from the plantation community in Fiji and agreed to the indenture of time-contract labour from India. While the terms of indenture provided for the return to their place of recruitment of those brought to Fiji, few availed themselves of the option. Decisions by Indian indentured labourers to take advantage of the opportunities in their adopted country, Fiji, were to have far reaching economic, political and demographic consequences.

In the wake of World War II an expansion of health services in the colonial territories of the Pacific, initiated as part of an attempt to prepare the islands for future independence, had a dramatic effect on endemic diseases such as malaria (where it occurred), yaws, pulmonary tuberculosis and leprosy. The fall in mortality rates resulting from these measures coupled with an emphasis on preventive health care and child immunization services set the scene for a dramatic rise in population growth in the 1970s and beyond.

At the time most Pacific island states gained political independence the age of cheap air travel arrived. At the same time the Pacific came to be seen as a region with political significance, with votes to be wooed in the arena of international politics. Over time the political leadership of the island states became adroit in playing the 'aid game', ensuring a strong and regular flow of largesse, first from former colonial powers but now, at the beginning of the 90s, from the world at large.

Given the narrow resource base of many island states, aid in its numerous forms, has been a major contributor to the economic well-being of both dependent and independent countries

in the Pacific Ocean region. Within most Pacific island states there can be little doubt that aid has wrought massive changes in the lifestyle of many people and in the way governments think and operate. Improvements in health and education systems, the expansion of infrastructure affecting productive capacity, better domestic and international communications have all contributed to irreversible changes in the pattern of everyday living. Like people everywhere, the inhabitants of the South Pacific island states now want more out of life than subsistence affluence. They want, and quite reasonably expect, what their neighbours in the industrial countries of the region enjoy. The island people of today want better standards of living, health, housing, education and leisure. These wants can only be met through improved incomes, regular employment and a move away from traditional village lifestyles.

The implications of this desire for change are not unique to the Pacific, but what does cause problems for national leaders, as well as the purveyors of development assistance, is the limited capacity of the islands, on purely physical and domestic resource grounds, to respond in a meaningful and sustainable manner. Population growth at or above world levels, a natural desire to move to urban centres where greater opportunities are considered to exist and a clamour for services and gainful employment all place great pressures on both the political and bureaucratic leadership to deliver the goods. Planning and implementation capacity is acknowledged to be under stress and while the need for structural change within the economy and government is readily acknowledged, the pressures involved in day-to-day management leave little room for the sorts of adjustments that are necessary if the countries are to prosper in the long term.

If it is difficult for the island leaders and their financial mentors to keep pace with the needs of the moment, how much more complex is the problem of planning for the needs of future generations? Indeed, the World Bank has expressed the view that the traditional Five-Year Plan 'in most countries has concentrated almost exclusively on the public sector and on the allocation of government resources, and appears to have largely been driven by aid considerations'. As an alternative the Bank has proposed a new approach whereby 'the planning process should be limited to the identification and clear statement of medium- and

long-term economic and social objectives and to the formulation of a coherent strategy to achieve them'. Thus 'strategic and macroeconomic planning at the national and sectoral levels' would become the major role of governments. (World Bank 1990:37, 38).

In order to alert Pacific island governments and those responsible for the design and delivery of development assistance to the island states of the South Pacific, the National Centre for Development Studies at the Australian National University has developed and is implementing a series of forward looking research projects, *Pacific 2010*.

Initiation of such a research program was taken up in February 1992 by a group comprising representatives of the island governments, graduate students from the Pacific, as well as academic staff associated with the Centre in Canberra. The outcome of this planning workshop, which focused on the implications of population levels 20 years hence, was an initial list of five projects (subsequently expanded to nine) which the Centre's Islands/Australia Program was requested to design and initiate. These projects, which, for the most part will be carried out with financial support from Australia's International Development Assistance Program, are as follows:

- The effects of rapid population growth on the provision of services in island capital cities.
- Women and education in the South Pacific.
- The outlook for natural resources and the environment.
- Enhancing income-earning opportunities in the informal sector.
- Women in the formal sector workforce (a pilot study in Solomon Islands in association with the International Labour Office of the South Pacific).
- Access to land, modes of production and opportunities for niche markets in the agricultural sector.
- The function of island labour markets and the need for flexibility.

- Encouraging direct foreign investment and the local use of domestic savings.
- Policy options for human resource development.
- Population growth and quality health service delivery.

Pacific 2010 will be a base on which those of us concerned for the future of the Pacific can build. It is the intention of the Islands/Australia Program that as papers emerging from the individual projects become available they will be presented for discussion and evaluation in the country or countries to which they refer. The outcome of this peer and technical evaluation will determine the future direction of individual projects. It is our sincere hope that the initial review of these 'issue' papers will result in a decision to proceed with the study to the point where firm options and proposals for action can be submitted to governments or to regional bodies for positive action.

Those of us involved in the implementation of *Pacific 2010* believe, unlike Sir Francis Bacon, that the future of the next generation lies not in the hands of 'divine Providence' but our own. Will you join with us in meeting the challenge?

Pacific 2010

Challenging the future

Foreword	R.V. Cole	v
Contributors		xvi
 A doomsday scenario?	Rowan Callick	1
Population, development and growth	Ken Gannicott	12
 Population projections 1990–2010		
An introduction	Christine McMurray	43
Papua New Guinea	Christine McMurray	50
Fiji	Kesaia Seniloli	65
Vanuatu	G.M. Arif	80
Solomon Islands	Christine McMurray	91
Kiribati	Habte Tesfaghiorgis	105
Western Samoa	Reupena Muagututia	117
Tonga	Kalo Funaki	126

Tables

1	Pacific Islands: projections of school-age population 1990–2010	16
2	Fiji: school enrolments and educational expenditure, 1991–2011	18
3	Kiribati: school enrolments and educational expenditure, 1990–2010	19
4	Papua New Guinea: school enrolments and educational expenditure, 1990–2010	20
5	Solomon Islands: school enrolments and educational expenditure, 1991–2011	21
6	Tonga: school enrolments and educational expenditure, 1989–2014	22
7	Vanuatu: school enrolments and educational expenditure, 1989–2014	23
8	Western Samoa: school enrolments and educational expenditure, 1991–2011	24
9	Growth rates of real GDP used to project GDP for each country	25
10	Projected economically active population, 1991–2011	29
11	Wage employment in the South Pacific, 1990	31
12	Public and private sector employment in the South Pacific	32
13	Gross domestic investment and economically active population, 1991–2011	37
14	Savings and investment, 1986–88	38

Papua New Guinea

P1	Population trends, 1966–80	51
P2a	Fertility and mortality assumptions made for population projections, 1980–2010	53
P2b	Constant rates of fertility and life expectancy, by province, assumed for the NCDS2 population projection, 1980–2010	54
P3a	Projected population, 1980–2010	55
P3b	NCDS2 population projections by province, 1980–2010	55
P4	Inter-period average annual population growth rates, 1980–2010	56
P5	Age structure of projected population, 1990–2010	57
P6	Projected school-age population, 1980–2010	58
P7	Assumed school enrolment rates, 1980–2010	59

P8	Projection of school enrolments, 1980–2010	59
P9	Projection of working-age population, 1980–2010	60
P10	Assumed labour force participation rates, 1980–2010	60
P11	Projection of labour force, 1980–2010	61
P12	Projection of population of major urban and other areas, 1980–2010	63

Fiji

F1	Population trends, 1966–86	66
F2	Fertility, mortality and migration assumptions made for population projections, 1986–2010	67
F3	Projected population, 1986–2010	69
F4	Inter-period average annual population growth rates, 1986–2010	70
F5	Age structure of projected population, 1986–2010	71
F6	Projected school age population, 1986–2011	72
F7	Assumed school enrolment rates, 1986–2011	73
F8	Projection of school enrolments, 1986–2011	74
F9	Projection of working-age population, 1986–2011	75
F10	Assumed labour force participation rates, 1986–2011	76
F11	Projection of labour force, 1986–2011	77
F12	Assumed labour force participation rates by employment status	77
F13	Projection of labour force by employment status, 1986–2011	78
F14	Past and projected urban populations, 1966–2010	79

Vanuatu

V1	Population trends, 1967–89	80
V2	Fertility and mortality assumptions made for population projections, 1989–2014	82
V3	Projected population, 1989–2014	83
V4	Inter-period average annual population growth rates , 1989–2014	83
V5	Age structure of projected population, 1989–2014	84
V6	Projected school-age population, 1989–2014	85
V7	Assumed school enrolment rates, 1989–2014	86
V8	Projection of school enrolments, 1989–2014	86

V9	Projection of working-age population, 1989–2014	88
V10	Assumed labour force participation rates, 1989–2014	88
V11	Projection of labour force, 1989–2014	89
V12	Projection of Port Vila population, 1989–2014	90

Solomon Islands

S1	Population trends, 1970–86	92
S2	Fertility and mortality assumptions made for population projections, 1991–2011	94
S3	Projected population, 1986–2011	95
S4	Inter-period average annual population growth rates, 1986–2011	95
S5	Age structure of projected population, 1991–2011	96
S6	Projected school-age population, 1986–2011	97
S7	Assumed school enrolment rates, 1991–2011	98
S8	Projection of school enrolments, 1986–2011	99
S9	Projection of working-age population, 1986–2011	100
S10	Assumed labour force participation rates, 1991–2011	100
S11	Projection of labour force, 1986–2011	101
S12	Projection of rural and urban population, 1986–2011	103

Kiribati

K1	Population trends, 1978–90	105
K2	Fertility and mortality assumptions made for population projections, 1990–2010	107
K3	Projected population, 1990–2010	107
K4	Inter-period average annual population growth rates, less developed and developed regions, 1990–2010	108
K5	Age structure of projected population, 1990–2010	108
K6	Projected school-age population, 1990–2010	110
K7	Assumed school enrolment rates, 1990–2010	111
K8	Projection of school enrolments, 1990–2010	111
K9	Projection of working-age population, 1990–2010	112
K10	Assumed labour force participation rates, 1990–2010	113
K11	Projection of labour force, 1990–2010	114
K12	Past and projected urban populations, 1973–2010	115

Western Samoa

W1	Population trends, 1971–91	117
W2	Fertility, mortality and migration assumptions made for population projections, 1991–2011	119
W3	Projected population, 1986–2011	120
W4	Inter-period average annual population growth rates, 1986–2011	120
W5	Age structure of projected population, 1986–2011	120
W6	Projection of school-age population, 1986–2011	121
W7	Projection of school enrolments, 1986–2011	122
W8	Projection of working-age population, 1986–2011	122
W9	Assumed labour force participation rates, 1986–2011	123
W10	Projection of labour force, 1986–2011	124
W11	Projection of labour force by employment status, 1986–2011	124

Tonga

T1	Population trends, 1966–89	126
T2	Fertility, mortality and migration assumptions made for population projections, 1989–2014	128
T3	Projected population, 1989–2014	129
T4	Inter-period average annual population growth rates, 1989–2014	130
T5	Age structure of projected population, 1989–2014	130
T6	Projected school-age population, 1989–2014	131
T7	Assumed school enrolment rates, 1989–2014	131
T8	Projection of school enrolments, 1989–2014	132
T9	Projection of working age population, 1989–2014	133
T10	Projection of labour force, 1989–2014	133

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Pacific 2010

A doomsday scenario?

Rowan Callick

Demographers paint pictures that not everyone finds easy to read. They indicate trends that may appear remote and abstract. Those adversely affected hope that the future may be softened by unforeseen strokes of better fortune. Here journalist Rowan Callick strives to use his experience and understanding of the region to present a more colourful picture, a grim and challenging picture, but one that is nevertheless disturbingly close to the drier portrait available from the data. He stresses that his is a doomsday scenario—one that can yet be avoided, given urgent action by the island countries, aid donors and other partners in development, including banks and investors. He presents a vivid bad dream, but in the awareness of the significance of dreams in South Pacific cultures: they require deep consideration, followed by the appropriate, active response.

When those pioneer families first populated the Pacific islands, after heroic journeys across thousands of miles of perilous seas, they made homes; they adapted their traditions to their new surroundings; they dreamed a little—not about progress, a twentieth century concept—but surely about a secure future for their children, their grandchildren and beyond. Islanders have always looked to the future. But only comparatively recently have they begun to think of the future

in terms of change. In *taim bilong tumbuna*—the days of old, in Tok Pisin— island populations were constrained by disease and natural disaster. In more recent times, the faster growing populations of Polynesia have been able to ease their land pressures by migrating to New Zealand, Australia and the west coast of North America; Micronesians have travelled to work in Nauru and elsewhere, or on ships; while Melanesia has had the land mass to sustain increased populations.

But times are changing. Migratory opportunities are diminishing, in part as the world economy has slowed. The Nauru phosphate mine is gradually preparing to close down and in parts, even of Melanesia, such as in areas of the Papua New Guinea Highlands, arable land is now running short. Life cannot continue as it is now lived. So much is clear. What does this mean? What will life be like for the children or grandchildren of today's islanders? More pressingly, what will life be like in 2010, when today's graduate will still be only halfway through his or her working life?

A doomsday scenario

The *doomsday scenario*, with the added element of imagination, reads something like this.

The population of the islands—even leaving aside the French Pacific and Micronesia—almost doubles, to 9 million. To put this in context, New Zealand's total population today is just 3.4 million.

The proportion of the workforce with paid jobs falls from 13 per cent today to less than 10 per cent. The non-formal sector, chiefly agriculture and fishing, therefore needs to absorb nearly 3 million additional people.

Education costs double in the region, or triple if all eligible children are able to attend secondary schools. If gross domestic product (GDP) continues to grow at the same rate as in the 1980s, Papua New Guinea will have to spend 21 per cent of its GDP on education, and Vanuatu 16 per cent—three times their present rate of expenditure—just to keep pace.

The situation that made Fiji unique, accelerating its economic development—its population of landless Indians forced by lack of any alternative to seek paid work—will recur elsewhere. Young people brought up in the region's growing towns will lose their option of subsisting on their ancestral lands, not because they are hypnotised by the bright lights but because that option of returning 'home' permanently is closed to them. The land is already being farmed to the limit by relatives.

But opportunities for formal employment in the towns have also bogged down. Young people, and the not so young, end up waiting for the previous generation to retire or die as they queue for the few jobs available, chiefly in the public service and tourism. The older generation, still hanging on, was promoted early to the best positions, in the time of high hopes engendered by localization. Increasing numbers of islanders thus seek work overseas, in some desperation, to keep their families alive. But as growing numbers of the elderly return to their island homes to retire, this places new and great stresses on the formal health system and on informal social networks unused to catering for large groups of elderly people.

There are still no government welfare payments, and since commodity prices have suffered a decade-long slump, relatives on the land are unable to help out. There are beggars on the streets of every South Pacific town, in contrast with both the aspirations to high living beamed via television advertisements to most homes even in the slums, and the lifestyles of the tourists enjoying resorts on the remotest islands. Malnutrition is spreading, and is already endemic in squatter settlements of towns—especially in Port Moresby (population perhaps 500,000) and Suva (population perhaps 300,000). While general health levels remain high, new problems have surfaced—including, of course, AIDS—many of whose victims have returned from the towns to die in their home villages without the disease ever being diagnosed as such. The changed diet of town dwellers, dependent substantially on imported, processed food, has greatly increased the proportion of deaths from heart disease and cancers.

The French have maintained their high profile, high cost presence as the sole surviving colonizers of the South Pacific. And a sense of superiority of French culture is effortlessly conveyed, as thousands of islanders seek work in the French colonies, even as domestic servants. Others find ingenious ways to infiltrate Australia and New Zealand, often posing as Torres Strait islanders or Maoris.

The children of migrants claim they are reviving (in Auckland, Sydney, Los Angeles and Vancouver) a culture being lost 'back home' via semi-professional dance groups, painters, carvers and richer forms of traditional cooking. Indeed, some claim that the migrant artists have incorporated the 'high culture' of their peoples, compared with the degraded residue in the islands, chiefly revived for tourists only.

The private sector—much of which has survived since colonial days, more recent investors having departed as their tax breaks and other incentives have diminished—increasingly expresses its annoyance at being taxed higher amounts to maintain the fraying fabric of government services in these fast growing towns. Stock exchanges have been opened in Port Moresby, Apia and Port Vila following Suva's modest beginning. But few floats have been successful, due to a lack of general liquidity. Public companies that survive expend a huge effort on convincing shareholders to maintain their investments rather than liquidating them in the face of undue pressure for money from relatives.

A number of government services and assets have been privatized without back-up or competition (since they were monopolies). Some of those services have simply lapsed.

Both in the towns and in the country, 'self-reliance', sometimes radicalized as 'direction action', has become a catchword, as governments have been forced to retract services, in the wake of aid donors turning their attention elsewhere. This has its positive side—people in a community supporting their own school or clinic, or building their own road, jetty or even basic airstrip. But they have often had to seek some direct foreign help themselves, dealing with logging, fishing or mining companies or

with tourism operators, to obtain the costly imported materials needed to complete such projects to the standards villagers now require.

Neighbouring communities compete to attract such foreign partners. The direction action also entails, in some areas, gangs of youths 'doing their own thing'—extracting money from the foreign companies or tourists or islanders themselves, as their own local form of tax, sometimes accompanied by threats, subtle or not. Some of this returns to circulate in the wider local community, so the anti-social element is tolerated and harboured.

Coconuts are no longer dried for sale overseas as copra. The market has finally collapsed. But fresh coconuts are sold in markets. Some small-scale manufacturing of coconut oil soap continues for the tourism industry. Marijuana, however, is flourishing as a domestic and export crop, on remote islands and in isolated valleys, with the authorities turning a blind eye, since it has become an important source of foreign currency. More traditional narcotics, kava and betel nut, have become major commodities, traded internationally. This trade has produced its first islander millionaires, who are negotiating to establish markets in Australia, New Zealand and Southeast Asia.

In most island nations, an élite has developed with privileged access to the remaining aid income, and to government revenues from the resource industry. This group now speaks English as its first language, and members have closer social contacts with counterparts spread through the island, than with most rural dwellers and those without formal education in their own countries.

The region's increasingly close integration into East Asia has led to a change in diet, with more spices now used in cooking, and to a greater number of Asian workers arriving. Some artisans stay on after being engaged on aid projects. Mosques are now found in almost every island capital.

Privately funded education networks are superseding under-funded state systems. Church schools have undergone a revival. Church-run technical colleges and universities have rapidly overtaken government institutions in prestige, and thus in attracting the best quality students. Despite the continuing distractions provided by political anxieties about foreign environmental incursions, home-grown pollution has spiralled. A number of lagoons, especially in Micronesia, have become no-go zones where swimming, washing and even canoeing is barred by health inspectors until rehabilitation programs can be put in place. The Port Moresby public water supply, when it is available, is no longer safe for drinking. Population and space pressures have led to ever shorter crop rotations on smaller islands and in parts of the Papua New Guinea Highlands, where women farm almost vertical slopes. Land degradation is thus common, with top soil washing down rivers and into the sea.

Much of the surviving rainforest in the region has been logged in the last 20 years, despite moratoriums, bans and the urging of foreign non-government organizations. Landowners have pressured to have a share in the 'development process' that has made a few of their neighbours rich, especially where minerals and oil have been located. Deals have been increasingly cut direct with the developers, mostly from Singapore and Malaysia where resources have dried up. Coastal fisheries have been placed under threat from over-fishing. The trade concessions that gave the islands privileged access to markets in Australia, New Zealand, Europe and North America—and briefly during the 1990s encouraged manufacturers to run plants in the region, especially in Fiji, Tonga and Western Samoa—finally dribbled away. Instead of importing capital in such a manner, the South Pacific has now turned to exporting labour, to the extent that skills shortages yawn wide open back home, and there has been a degree of de-localization as expatriates have had to be recruited to fill the gaps.

Gloomy enough a prospect. But fortunately, as yet only a nightmare, based on the emergingly grim statistical prognostications of the *Pacific 2010* program.

Pacific 2010

The alternatives depicted by *Pacific 2010* remain stark. Pacific islanders lack sufficient savings to develop their region in pace with their aspirations and dreams, as opposed to their nightmares. Most forecasts assume a static or declining level of direct aid, concessional loans and even commercial capital available to the region, as other priorities take precedence. The South Pacific, it is said in such quarters, has had a good enough run, and now is its chance to stand on its own two feet. This means, above all, accelerating the conceptual shift on the part of the region's decision makers, from a traditional emphasis on the importance of distribution of wealth—where a chief or big man gains stature from his gifts and from the generosity of his feasts—to an emphasis on production, on building, managing and re-investing that wealth. A new type of generosity is thus required—one that may mean standing by to make room for people with special talents, especially to do business profitably. This shift can only take place through an example being set by the South Pacific's leaders themselves—politicians, senior officials and traditional chiefs.

As such leaders travel increasingly widely in East Asia, it would be understandable if they were to seek to emulate the comfortable, generous lifestyles of their counterparts there. But those rapidly developing societies have achieved their goals only after undergoing decades, first, of considerable constraint and discipline combined with industrial—and industrious—effort. Self-made businessmen have inevitably sacrificed their time, and family commitments too, in order to build their fortunes, which have often been based in any case on large domestic markets. In the absence of substantial capital, the potentially wealth-creating inputs available in the South Pacific are land and labour. But while in Polynesia it is much easier to gain reliable access to land for development, such land is simply in desperately short supply, and exports will have to take the place of reliance on the fractured local markets.

The *Pacific 2010* project will provide the region's leaders with some of the factual tools they need in order to focus on their choices as never before. But as time ticks by, their options and their ability to determine outcomes will diminish.

A better outcome

Fortunately this is not the end of the story. The appropriate domestic policies, implemented wholeheartedly by island nations—not just governments, but the communities as a whole—can yet, with the support of a friendly external environment, turn the grim trends around. Essentially, the policies that count can be grouped in three areas.

Population

Children are, of course, a great blessing. But in the not too distant past, the sense of blessing was always enhanced by the awareness that many did not survive long. Today, as *Pacific 2010* makes graphically clear, the region's population growth is careering, albeit happily for now, beyond control. Already, the next generation's options are thereby diminished. There is less land for each clan or family, fewer resources to go round both in the village and in the nation as a whole. Yet couples in the South Pacific, not less than elsewhere, are capable of responding intelligently to information (backed up by appropriate resources) that demonstrates the advantage of planning their family size. This involves the active cooperation of the community, and especially of the churches. It entails, above all, convincing islanders that their country's economic future is bright, and they will not need to rely on a large number of children as their only route to long-term security. Research has tended to show that successful family planning programs have coincided with the emergence of a self-confident middle class. This underlines the importance of tackling issues in an integrated way; economic restructuring and population policies are not options, but essential joint ingredients for solutions to the South Pacific nightmare.

Cleaning up the environment

For thousands of years, the region has been ecologically self-balancing. Humans have been deeply aware of their affinity with the natural world, which has constantly demonstrated its remarkable capacity

for lush regeneration. Yet now, because of both the rapid rise in populations and the arrival of new technologies, islanders have begun to impose their will on their physical world, in a way unknown previously. The dangers are not always readily apparent. As the size of a village grows, the slash-and-burn agricultural cycle may return ever more quickly to land that would formerly have long laid fallow; thus the nutrients are leached from the soil. As islands over-populate, lagoons—used in effect as drains and rubbish dumps—are no longer capable of flushing away the garbage. Nature can no longer be presumed to regulate itself. This means an active strategy on the environment—not just through insisting, rightly, on stringent safeguards when new developments are planned, but also through reassessing how sustainable the present domestic practices are. This need not mean a return to the ‘appropriate technology’ drive of the 1970s (to which many islanders understandably responded with scepticism: ‘If it’s appropriate for us here, why not for you in Sydney/Auckland/London?’). But it might well mean, for instance, a rediscovery of the value of naturally ‘bio-degradable’ traditional means of packaging foodstuffs. This is an area where regional cooperation is of huge value, for the problems are so similar around the South Pacific. As with other elements of the *Pacific 2010* nightmare, the starting point, is a briskly conducted, effective audit of the range of environmental problems confronting each nation.

Economic adjustment The South Pacific has, in history, shifted from a life of subsistence affluence tempered by the tragedies of early deaths, warfare and natural disasters, through the ‘fatal impact’ of the arrival of the Europeans, to a period of largely benign—or indifferent—colonialism followed by the neo-colonialism of substantial bilateral aid. The frenetic globalization of economic life is the new shock to the system. Whether the impact is fatal or not, depends on the region’s response.

Major economic adjustments have been avoided in the past just because bilateral aid has been abundantly available, and with little accountability. Aid has provided a cushion, especially for capital budget items and for balance of payments support. Bilateral donors—in part because most are former colonizers and continue to feel a sense of guilt about the past relationship—are reluctant to impose the sorts of conditions that are now normal among multilateral donors.

In the past, this has tended to cast the latter as the villains of the development scene. Yet increasingly, these multilateral donors are proving helpful guides to overdue change. A good example is Papua New Guinea after the Bougainville rebellion closed down the copper mine, the country's single main source of income. The World Bank, in partnership with Papua New Guinea, devised an adjustment strategy that has actually proved a vital circuit-breaker to effect new policies that had previously been discussed and either put in the 'too hard' basket or only limply implemented.

Countries, like families, will respond to such emergencies in different ways. Nothing can happen without the consent and, indeed, enthusiasm of the host country, which must also maintain the 'social contract' that ensures its people are not shut out of the process. But the longer such economic restructuring is postponed, the more socially and politically controversial—and divisive—it will be when finally introduced.

The best starting point, though, is a frank discussion between donors and recipients, or between bankers and borrowers, based on the best available information. Without a full and honest analysis, no solution is possible—just as a medical cure requires the correct diagnosis. Such information is best shared, as far as practical, within the whole national community. As both Papua New Guinea and Fiji have demonstrated over the last five years, when confronted with their own economic crises, when the wider community is fully acquainted with the sometimes brutal facts, it is remarkable how people are willing to accept even radical change.

The optimistic idea that floated through the 1960s and 1970s, that countries can build from their newfound political independence towards full scale economic independence is no longer an option. Such dreams are very hard to discard, especially for the generation that brought a country to nationhood. But it is clear that even the giants such as the United States cannot stand alone economically. This is a trend the South Pacific cannot buck.

The required reforms may best be delivered together, for presentation purposes, as a single package. They may ultimately involve tighter budgetary discipline, measures to enhance competitiveness, corporatization and privatization, reform of the financial sector, adjustment of exchange rates, alteration of the way

wages are determined and reorganization of government priorities so that a greater proportion of the budget is spent on education, health and infrastructure. In that process, some institutions that seemed important at an earlier stage of national evolution may have to disappear altogether.

In the place of a fierce nationalism, a greater sense of international interdependence will have to emerge—perhaps starting within the South Pacific Forum. The success stories, economically and politically, will be those emphasizing openness and links—trade, investment, even the movement of skilled workers, foreigners and nationals, in and out of the country—rather than those emphasizing a defiant independence.

A greater focus within the region on free trade would help to frame the right mentality. And this is a vital factor. For the South Pacific falls far short of generating the savings it needs to develop at the pace its people wish—or even to prevent an actual decline in living standards, as *Pacific 2010* warns. The region desperately needs to be able to call on the savings of foreigners, through aid, loans and/or investment. Yet there is a worldwide shortage of such savings. The South Pacific has to compete for its share. Without a culture that is more genuinely encouraging of foreign investment and of foreign managers it will simply go elsewhere, except in the rare cases of those physical resources that are of world rank, such as Papua New Guinea's gold.

People constantly hold up examples of development practice elsewhere in the world as models for the South Pacific. Such models have their uses, but essentially the challenge before today's South Pacific leaders—not their successors—is to take action boldly, in their own way, before looming disasters impose their own grim patterns on the next generation and beyond. There is still time to act before events start to move out of control and the nightmare becomes reality.

Population, development and growth

Ken Gannicott

It is hardly surprising that population growth has received relatively little attention in the South Pacific. Bakker (1990) and Ahlburg (1986) have discussed population issues in the region, but when Fiji, Kiribati, Papua New Guinea, Solomon Islands, Tonga, Vanuatu and Western Samoa together contain fewer than 4.5 million people, such small numbers have made population issues a minor component of the development debate in the South Pacific. Neither the traditional Malthusian concern that population growth will sooner or later come up against the limits of resource supply, nor the neo-Malthusian scare-mongering of *The Limits to Growth* (Meadows et al. 1972), nor even the optimistic claim from Julian Simon (1982) that people constitute 'the ultimate resource' has seemed particularly relevant in the South Pacific.

Small populations, scattered settlement and high net migration from the Polynesian countries have meant that the grand demographic issues of farm land availability, deforestation, rapid urban growth, and the structural transformation of the labour force to provide productive employment, have appeared to be issues of concern only to countries such as China, India, Indonesia, and, increasingly, sub-Saharan Africa. Contemporary travellers in the South Pacific (see, for example, Young 1985 and Winchester 1991) continue to add to long-held perceptions of the region as an idyllic Blue Lagoon where, like Gauguin, one can escape 'everything that is artificial and conventional [and can] enter into Truth, become one with nature and after the disease of civilization, life in this new world is a return to health' (Gauguin, *Noa Noa*, quoted in Winchester 1991:448). Even the sharp-tongued and hard-to-please Paul Theroux admits to finding home and happiness in *The Happy Isles of Oceania* (Theroux 1992).

“The conclusion that rapid population growth has slowed development is by no means straightforward or clearcut. Under certain conditions moderate population growth can be beneficial. In Europe, Japan and North America economic growth has been accompanied by moderate population growth, which may have stimulated demand, encouraged technological innovation, and reduced investment risks. Moderate labor force growth, combined with extra spending on education, can also mean continuous upgrading of the labor force with better educated workers. In sparsely populated countries, faster population growth shortens the time required to reach the population size that provides the economies of scale in transport, communications, social services, and production. Some developing countries could benefit from such economies of scale, especially in rural areas. And a big population can increase a country's economic as well as political and military power; in a world of economic and political uncertainty, countries such as India and China can seem to benefit from the sheer size of their domestic markets.

But these benefits derive from a moderate increase in population. Most developing countries are experiencing growth that, by historical standards, is faster than that. Even in uncrowded countries, the long-term benefits of having more people must be weighed against the immediate costs of coping with rapid growth. In those few countries lacking the people to exploit their natural resources, immigration from neighbouring countries, if politically feasible, would be less costly and more effective than a fast natural rate of population growth... The economic success of many small countries—Denmark, Hong Kong, Singapore, and Switzerland — shows that urbanization and trade provide other means to achieve the scale economies of a large population. [And] compared with Europe, Japan, and North America in their periods of fastest population growth, income in developing countries is still low, human and physical capital are less built up, and in some countries political and social institutions are less well established.”

(World Bank 1984:79).

Notwithstanding the different scale of population issues in the South Pacific, there is a belated recognition that the rate of population growth is relatively high, averaging 2.2 per cent across the region. Growth rates are particularly high in the Melanesian countries, reflecting declining mortality but very high fertility rates. In the other countries, fertility rates are lower but still high by international standards (World Bank 1991b:2). While high rates of emigration mean that net population growth rate is low in Western Samoa and Tonga, a change of policy in the recipient countries would shift attention to the fact that natural increase in Tonga and Samoa is relatively high at 2.2 and 2.9 per cent respectively (World Bank 1991b:3). Vanuatu provides a clear example of the new awareness of rapid population growth. Despite the fact that Vanuatu's indigenous population was growing at the high rate of 2.8 per cent per year, the attitude of the Second National Plan 1987–91 was benign, remarking that 'at the moment there is no particularly urgent problem related to the growth, size, structure and movement of population' (Vanuatu National Planning and Statistics Office 1988:149). By contrast, the forthcoming Third Plan describes a reduction in the number of births 'as the only viable policy measure on a national level' (Vanuatu National Planning and Statistics Office 1992:7).

If there is much of the traditional Pacific still to delight the contemporary traveller, it is also true that one does not have to look far to observe the consequences of rapid population growth and high rates of internal migration. In Kiribati, population density on the main atoll of South Tarawa has reached 1,354 persons per square kilometre (World Bank 1991b:155), a density nearly 60 per cent greater than that of Bangladesh (UNDP 1992:171). Long-established practices of using the beach as a tip and the lagoon as a sewer—entirely appropriate in conditions of light settlement—are no longer viable, and conditions of environmental health in South Tarawa have become extreme. In Vanuatu, the capital Port Vila has been growing at around 12 per cent per year since 1986 (UNICEF/Vanuatu Government 1991:74) and there is now acute concern about the provision of housing, health, education and job opportunities. Rapid urban development, manifested most visibly in squatter settlements lacking adequate sanitation, is putting severe pressure on the pristine waters of the Port Vila lagoon, a major component of Vanuatu's tourist industry. In Solomon Islands, one can ignore the unnecessary

personal remarks of Theroux while still acknowledging the accuracy of his critical observations about conditions in Honiara—conditions which arise largely from high population growth and internal migration (Theroux 1992:148–150).

I am not concerned with population policy as such, nor with the details of each country's experience of population growth. Demographic projections for each country, taking account of country-specific issues, are described in detail in subsequent chapters. This is an overview of population growth, highlighting the implications for economic and social development that cut across the countries of the region. I start by looking at education, and the prospects for being able to fund sufficient places to cope with increases in the school-age population. I then examine the employment prospects for a rapidly growing labour force. In the final section of the chapter I argue that the countries of the region must increase their economic growth rates above the very low levels experienced in the 1980s. Without an improvement in economic growth, the increasing school-age population will place an intolerable burden on the financing of education in the Melanesian countries and insufficient jobs will be created to cope with the rise in the number of people of working age.

Schooling and the growth of population

The implications of a fast growing school-age population are clear. More school-age children require more spending on education, even if the objective is just to maintain current enrolment rates and current standards. As all developing countries want to improve their schools both quantitatively and qualitatively, they will have to generate more national savings or else divert investments from other areas such as health, power or transport. If a country is unable or unwilling to make those sacrifices, spending must be spread over a larger group of school children (to the detriment of school quality), or a growing number of children will have to be excluded from education (World Bank 1984).

School-age population is expected to increase very substantially in several countries of the South Pacific (Table 1). Based on an assumption of declining fertility and continued (although declining) migration, Tonga would experience a large fall in its school-age population, and Fiji and Western Samoa are expected to face only small increases. By contrast, the Melanesian countries of Papua New

Table 1
Pacific Islands: projections of school-age population 1990–2010

	School-age population		Percentage increase
	1990	2010	1990–2010
Fiji	213,320	219,460	2.9
Kiribati	23,700	28,590	20.6
Papua New Guinea	1,150,210	1,460,290	27.0
Solomon Islands	101,170	173,540	71.5
Tonga	30,880	23,910	-29.2
Vanuatu	44,930	91,830	104.4
Western Samoa	62,800	67,300	7.2
Total	1,627,010	2,064,920	26.9

Note: Age groups are: Fiji 6–17, 1991–2011; Kiribati: 6–19, 1990–2010; Papua New Guinea 6–18, 1990–2010; Solomon Islands 8–19, 1991–2011; Tonga 6–18, 1989–2009; Vanuatu 6–18, 1989–2014; Western Samoa 5–19, 1991–2011.

Source: Compiled from information in the country chapters.

Guinea, Solomon Islands and Vanuatu confront increases that are large in both absolute and percentage terms. In Papua New Guinea the school-age population (6–18 years) could increase by 27 per cent. In Solomon Islands, the number of school-age children could increase on average by 3,600 every year for the next 20 years, an annual rate of growth of 2.7 per cent. In Vanuatu the school age population could increase by 77 per cent by 2009, an annual rate of increase of 2.9 per cent.

The crucial issue in interpreting these projections is that even these large increases do not capture the full extent of the consequences for provision of education. Since their independence a decade or so ago, the countries of the South Pacific have made considerable progress in increasing their enrolment rates, but substantial numbers of the 1990 school-age population still do not attend school. High rates of enrolment in primary education in Tonga, Western Samoa, and, to a lesser extent, Kiribati were achieved in the early years of this century, long before independence. In Kiribati, only about 30 per cent of primary school leavers go on to secondary school, and 50 per cent of these drop out before completion of the full secondary cycle. In Vanuatu, only around 70 per cent of the 6–14 age group was enrolled in full-time education in 1989, and little more than 20 per cent of Year 6 leavers enrolled in junior secondary school. In Papua New Guinea, much progress has been made since

independence in expanding school enrolments, but gross enrolment of the primary age group is still no more than 75 per cent.

In these circumstances, several countries face the formidable task of trying to extend provision of education to an increasing proportion of the age group, at a time when the age group itself is increasing at high rates (Table 1). In order to explore the resource implications of this twin challenge, estimates of the costs of different enrolment targets in the light of the increases in the school-age population are made for each country (Tables 2–8).

A glance at the results for Papua New Guinea (Table 4) will illustrate the procedure. Using the projections in the Papua New Guinea country study, columns 1, 2 and 4 of Table 4 show the projected number of school enrolments between 1990 and 2010. These projected enrolments are derived by (i) assuming that by 2010 Papua New Guinea will achieve 100 per cent primary enrolment, 50 per cent enrolment of the 13–16 age group in lower secondary school, and 20 per cent enrolment of the 17–18 year group in upper secondary, and then (ii) applying these enrolment rates to the projected numbers of the total population in these age groups. If we make the further assumption that educational costs will be held constant (in real terms) at their 1990 level, the total cost of educating these numbers is readily calculated.¹ This cost is shown in column 5, and is expressed as a percentage of projected GDP in column 7. The projection of GDP in that column assumes that the Papua New Guinea economy will grow in the future at the same low rate as during the 1980s. Under this set of assumptions it can be seen that by 2010 education spending would be absorbing over 9 per cent of GDP (see table).

Even this level of spending implies that 20 years from now Papua New Guinea will still not be able to offer the basic 10 years of schooling to all children. Given the progress made with primary enrolments during the 1980s, together with what was recently described as 'a stock of human capital [which] is appallingly low' (Stein 1991:55), it could be argued that on both economic and social grounds Papua New Guinea should aim for a 100 per cent enrolment of the 13–15 age group by 2010. Columns 3, 6 and 8 of Table 4 show the implications of this higher enrolment target. It can now be seen that providing everyone in the 6–15 age group with schooling,

¹ The implication that there are no economies of scale available seems appropriate in this region of scattered population settlement and village schools.

Table 2
Fiji: school enrolments and educational expenditure, 1991–2011

	School enrolments			Cost				
	Primary school 6–11 years ^a	Secondary school 12–17 years ^b		Total ^c (US\$ million)		Proportion of GDP ^d (per cent)		
						'Low GDP'	'High GDP'	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1991	106940	66290	66290	61.3	61.3	4.8	4.8	4.4
1996	103480	75760	79880	65.4	67.6	4.8	4.9	3.7
2001	101710	74270	82660	64.2	68.6	4.4	4.7	3.0
2006	108100	72130	85760	64.7	71.8	4.1	4.5	2.4
2011	112080	74220	93260	66.8	76.8	3.9	4.5	2.0
Unit cost at 1989 prices US\$	248	525						

^a Assumes enrolment rate increases from 92 per cent in 1986 to 100 per cent in 2011.

^b Column 2 assumes a moderate increase in the enrolment ratio from 78 per cent at junior secondary (12–15 years) and 41 per cent at senior secondary (16–17 years) in 1986 to 81 per cent and 45 per cent respectively in 2011. Column 3 assumes a more rapid increase in enrolments, reaching 100 per cent of the junior secondary age group and 60 per cent of the senior secondary group in 2011.

^c Column 4 shows the cost of enrolments in columns 1 and 2. Column 5 shows the cost of enrolments in columns 1 and 3.

^d Columns 6 and 7 express columns 4 and 5 respectively as a proportion of GDP, where GDP is projected to grow at the same low rate as the 1980s. Column 8 expresses column 5 as a percentage of GDP, where GDP is projected to grow during the 1990s at the high rate forecast by the World Bank.

Source: Enrolment projections are from the Fiji country chapter. Cost data are from Fiji Bureau of Statistics, *Social Indicators for Fiji*, Suva, 1988: Table 4.11, and converted to constant 1989 prices through World Bank, *Pacific Island Economies: towards higher growth in the 1990s*, Washington, D.C., 1991:141. The GDP projections are calculated from World Bank, *Pacific Islands Economies: towards higher growth in the 1990s*, Washington, D.C., 1991:114, 131 (Low GDP) and 121, 131 (High GDP).

in a situation of rising numbers in that age group, will require a 224 per cent increase in Papua New Guinea's educational spending from 1990 to 2010, absorbing 12.4 per cent of GDP in the latter year.

The final column of Table 4 examines the consequences of a much higher rate of economic growth in the future. Whereas columns 7 and 8 show the results if the Papua New Guinea economy grows at the same low rate as the 1980s, the 'High GDP' assumption of column 9 uses the more optimistic GDP forecasts recently made by the World Bank (World Bank 1991a). Given a policy

Table 3
Kiribati: school enrolments and educational expenditure, 1990–2010

	School enrolments				Total ^d		Cost		
	Primary school 6–12 years ^a	Junior secondary school 13–15 years ^b	Senior secondary school 16–19 years ^c		(US\$ million)		Proportion of GDP ^e (per cent)		
	(1)	(2)	(3)	(4)	(5)	(6)	'Low GDP'	'High GDP'	
1990	11646	1461	1461	1296	1.9	1.9	5.2	5.2	5.1
1995	13662	1533	2603	1610	2.2	2.4	5.7	6.3	5.5
2000	13614	2572	4180	1963	2.5	2.9	6.1	7.0	5.2
2005	13455	2709	4967	2467	2.6	3.2	6.0	7.2	4.6
2010	15080	2960	5920	2277	2.8	3.5	6.1	7.5	4.1

Unit cost at constant 1990 prices(US\$)

107 230 230

^a Assumes enrolment rate increases from 90 per cent in 1990 to 100 per cent in 2010.

^b Column 2 assumes an increase in the enrolment rate from 30 per cent in 1990 to 50 per cent in 2010. Column 3 assumes a more rapid increase in enrolments, reaching 100 per cent of the age group in 2010.

^c Assumes an increase in the enrolment rate from 22 per cent in 1990 to 30 per cent in 2010.

^d Column 5 shows the cost of enrolments in columns 1, 2 and 4. Column 6 shows the cost of enrolments in columns 1, 3 and 4.

^e Columns 7 and 8 express columns 5 and 6 respectively as a proportion of GDP, where GDP is projected to grow at the same low rate as the 1980s. Column 9 expresses column 6 as a proportion of GDP, where GDP is projected to grow during the 1990s at the high rate forecast by the World Bank.

Source: Enrolment projections are from the Kiribati country chapter. Primary school unit cost is from World Bank, *Pacific Regional Post-Secondary Education Study*, Washington, D.C., 1992:8. Secondary unit cost was calculated as the enrolment-weighted average of costs at the government secondary school and the Catholic schools, where costs in each type of school were taken from World Bank, *Post-Secondary Education and the Labor Market in Kiribati*, Washington D.C., 1992. The GDP projections are calculated from World Bank, *Pacific Islands Economies: towards higher growth in the 1990s*, Washington, D.C., 1991:26, 182 (Low GDP) and 170, 182 (High GDP).

of economic restructuring, the Bank argued that Papua New Guinea could grow very rapidly (10.1 per cent per year) from 1991–93 under the impetus of a minerals boom, with negligible growth in the mid-1990s as that boom abates, but thereafter achieving sustainable broad-based growth of 2.0 per cent per year as the benefits of restructuring percolate through the economy.

In order to avoid a confusing array of possibilities, the 'High GDP' column shows only the spending implications of the higher enrolment targets. The crucial role of faster economic growth

Table 4
Papua New Guinea: school enrolments and educational expenditure,
1990–2010

	School enrolments ('000)				Total ^d (US\$ million)		Cost		
	Primary school 6–12 years ^a (1)	Junior secondary school 13–15 years ^b	Senior secondary school 17–18 years ^c	Proportion of GDP ^e (per cent)					
		(2)	(3)	(4)	'Low GDP'	'High GDP'			
		(5)	(6)	(7)			(8)	(9)	
1990	534.0	126.5	126.5	22.4	241.8	241.8	7.3	7.3	7.3
1995	640.9	143.5	169.0	25.9	283.4	298.1	8.0	8.4	6.7
2000	744.8	177.6	264.3	30.4	336.2	386.2	8.8	10.2	8.0
2005	807.6	213.5	374.9	40.0	391.2	484.4	9.6	11.9	9.1
2010	755.4	239.0	478.1	45.4	405.2	543.2	9.3	12.4	9.2

Unit cost at
constant 1990

prices (US\$) 229 577 2078

^a Assumes enrolment rate increases from 80 per cent in 1990 to 100 per cent in 2010.

^b Column 2 assumes an enrolment rate increasing from 30 per cent in 1995 to 50 per cent in 2010. Column 3 assumes an enrolment rate increasing from 30 per cent in 1990 to 100 per cent in 2010.

^c Column 4 assumes an enrolment rate increasing from 13 per cent in 1990 to 20 per cent in 2010.

^d Column 5 is the cost of enrolments in columns 1, 2 and 4. Column 6 is the cost of enrolments in columns 1, 3 and 4.

^e Columns 7 and 8 express columns 5 and 6 respectively as a percentage of GDP, where GDP is projected to grow at the same rate as during the 1980s. Column 9 expresses column 6 as a percentage of GDP, where GDP is projected to grow during the 1990s at the high rate forecast by the World Bank.

Source: Enrolment projections are from the Papua New Guinea country chapter. Cost data are from Gannicott and McGavin 1991 and converted to 1990 prices using World Bank, *Papua New Guinea, Structural Adjustment, Growth and Human Resource Development*, Washington, D.C., 1991:155. The GDP projections are calculated from World Bank, *Pacific Islands Economies: towards higher growth in the 1990s*, Washington, D.C., 1991:2, 139 (Low GDP) and 28, 139 (High GDP).

in coping with a rapidly rising population can then be seen at a glance. If GDP continues to grow only slowly, spending 9.3 per cent of GDP on education will still leave half the children in the 13–15 age group unable to gain access to junior secondary school. With a fast-growing economy, however, spending virtually the same percentage of GDP (9.2 per cent) will permit Papua New Guinea to provide 10 years of education to all its children.

While we have focused on Papua New Guinea to illustrate the methodology, the results for all the other countries

Table 5
Solomon Islands: school enrolments and educational expenditure,
1991–2011

	School enrolments				Total		Cost ^d		
	Primary school 8–13 years ^a	Junior secondary school 14–16 years ^b	Senior secondary school 17–19 years ^c		(US\$ million)		Proportion of GDP ^e (per cent)		
	(1)	(2)	(3)	(4)	(5)	(6)	'Low GDP'	'High GDP'	
1991	49650	9730	9730	4770	13.8	13.8	7.2	7.2	6.8
1996	56010	10960	15208	5680	15.7	17.2	7.5	8.2	6.8
2001	66280	12730	21994	6370	18.3	21.4	8.0	9.3	6.7
2006	78500	16810	31408	8910	23.3	28.2	9.3	11.3	7.0
2011	93560	20630	41260	11620	28.7	35.7	10.5	13.0	7.0

Unit cost at
constant 1990

prices (US\$) 138 339 755

^a Assumes enrolment rate increases from 90 per cent in 1991 to 100 per cent in 2011.

^b Column 2 assumes an enrolment rate increasing from 40 per cent in 1991 to 50 per cent in 2011. Column 3 assumes an enrolment rate increasing to 100 per cent in 2011.

^c Assumes a constant enrolment rate.

^d Column 5 shows the cost of enrolments in columns 1, 2 and 4. Column 6 shows the cost of enrolments in columns 1, 3 and 4.

^e Columns 7 and 8 express columns 5 and 6 respectively as a percentage of GDP, where GDP is projected to grow at the same low rate as during the 1980s. Column 9 expresses column 6 as a percentage of GDP, where GDP is projected to grow during the 1990s at the high rate forecast by the World Bank.

Source: Enrolment projections are from the Solomon Island country chapter. Cost estimates are calculated from World Bank, *Vanuatu Education and Training Sector Report*, Washington, D.C., 1985; and K. Gannicott and P. McGavin, 'Schooling in the Solomon Islands: financing expansion through fees', in K. Gannicott (ed.), *Education for Economic Development in the South Pacific*, Pacific Policy Paper 6, National Centre for Development Studies, Australian National University, Canberra, 1990; and converted to 1990 prices using World Bank, *Pacific Island Economies: towards higher growth in the 1990s*, Washington, D.C., 1991. The GDP projections are calculated from World Bank, *Pacific Islands Economies: towards higher growth in the 1990s*, Washington, D.C., 1991:2b, 225 (Low GDP) and 209, 225 (High GDP).

can be interpreted similarly. The specific enrolment assumptions for each country are described in the relevant table, and Table 9 summarizes the assumptions used to project GDP for each country. The actual growth rates for the decade of the 1980s provide the basis for the 'Low GDP' projections in Tables 2–8, and the 'High GDP' calculations use the recent World Bank projections of the faster growth that would be possible from structural and policy reform in the region (World Bank 1991a; 1991b).

Table 6
Tonga: school enrolments and educational expenditure, 1989–2014

	School enrolments ^a		Cost		
	Primary school 6–11 years (1)	Secondary school 12–19 years (2)	Total (US\$ million) (3)	Proportion of GDP ^b (per cent)	
				'Low GDP' (4)	'High GDP' (5)
1989	13976	12960	4.9	4.9	4.9
1994	14866	12150	4.8	4.1	4.1
1999	12540	13050	4.7	3.5	3.4
2004	11240	11960	4.3	2.7	2.6
2009	11100	9820	3.7	2.0	1.9
2014	12100	9770	3.8	1.8	1.7

Unit cost at constant
1989/90 prices
(US\$)

110

257

^a Based on a continuation of the existing enrolment rate of 98 per cent for primary and 78.5 per cent for secondary school.

^b Low GDP assumes that GDP will continue to grow at the same rate as during the 1980s. High GDP assumes that GDP will grow during the 1990s at the high rate forecast by the World Bank.

Source: Enrolment projections are from the Tonga country chapter. Cost data are from Tonga, *Development Plan Six*, 1991: 295. GDP projections are calculated from World Bank, *Pacific Island Economies: towards higher growth in the 1990s*, World Bank, Washington, D.C., 1991:26, 261 ('Low GDP') and 251, 261 ('High GDP').

Despite the apparent precision of the calculations, the estimates are subject to a substantial margin of error. Much uncertainty surrounds the unit costs of education. Different sources give different estimates which often vary significantly. While there is general agreement that education in Papua New Guinea is very costly, there is much discussion about the true range of costs (Gannicott 1987; Tan and Mingat 1989; McGavin 1991). The latest World Bank estimates of unit costs for Fiji (World Bank 1992a:8) are only 70 per cent of the price-corrected estimates calculated from the Fiji Bureau of Statistics. In Kiribati the very high cost of US\$842 at the government secondary school (World Bank 1992a:8) is quite unrepresentative of average secondary schooling costs: nearly 80 per cent of secondary students attend private schools whose unit costs are around US\$140. An accurate estimate of educational expansion involving additional school building will require a careful disentangling of recurrent and capital costs.

Table 7
Vanuatu: school enrolments and educational expenditure, 1989–2014

	School enrolments				Cost ^d				
	Primary school 6–12 years ^a	Junior secondary school 13–15 years ^b		Senior secondary school 17–18 years ^c	Total ^d (US\$ million)		Proportion of GDP ^e (per cent)		
	(1)	(2)	(3)	(4)	(5)	(6)	'Low GDP' (7)	'High GDP' (8)	(9)
1989	19993	2600	2600	1170	6.2	6.2	4.3	4.3	4.3
1994	23748	3672	4896	1890	8.6	9.4	5.6	6.1	5.3
1999	30420	4746	7463	2820	11.3	13.1	6.9	7.9	5.9
2004	35140	6136	10738	3540	13.6	16.8	7.7	9.5	6.1
2009	40720	7970	15054	4670	16.8	21.7	8.8	11.3	6.3
2014	46660	10290	20580	6150	20.8	27.7	10.1	13.4	6.4

Unit cost at constant 1990 prices (US\$) 199 688 688

^a Assumes that 100 per cent enrolment will be achieved by 1994.

^b Column 2 assumes that the enrolment rate will rise to 50 per cent by 2014. Column 3 assumes that the enrolment rate will rise to 100 per cent by 2014.

^d Column 5 shows the cost of enrolments in columns 1, 2 and 4. Column 6 shows the cost of enrolments in columns 1, 3 and 4.

^e Columns 7 and 8 express columns 5 and 6 respectively as a percentage of GDP, where GDP is projected to grow at the same rate as during the 1980s. Column 9 expresses column 6 as a percentage of GDP, where GDP is projected to grow at the high rate forecast by the World Bank.

Source: Enrolment projections are from the Vanuatu country chapter. Cost estimates are from UNICEF/Vanuatu Government, 1991:65. GDP projections are calculated from the data in Table 9.

Similarly, the phenomenon of under- and over-age enrolments in all countries of the South Pacific implies a more complex relationship between current enrolment rates, projections of the age groups, and unit costs than is captured in Tables 2–8. The sometimes considerable disparity between gross and net enrolment rates means that some of those forecast to be in the nominal secondary school age group (and therefore listed in the tables as incurring secondary school costs) may actually be attending primary school. Given the long time period of the projections, the magic of compound interest generates large differences in outcomes from small initial variations in GDP growth rates.

Even with all the caveats that need to be made, the broad thrust of the calculations is clear. First of all, there is a clear

Table 8
Western Samoa: school enrolments and educational expenditure,
1991–2011

	School enrolments		Cost		
	Primary school	Secondary school	Total (US\$ million)	Proportion of GDP ^c (per cent)	
	5–14 years ^a	15–19 years ^b		'Low GDP'	'High GDP'
	(1)	(2)	(3)	(4)	(5)
1991	35200	17500	6.6	5.8	5.7
1996	38100	16500	6.7	5.4	5.0
2001	42100	17200	7.3	5.3	4.5
2006	44100	18300	7.7	5.1	4.0
2011	45300	19800	8.0	4.9	3.6
Unit cost at constant 1989/90 prices (US\$)	98	182			

^a Assumes an increase in the enrolment rate from 84 per cent in 1991 to 100 per cent by 2011.

^b Assumes an increase in the enrolment rate from 84 per cent in 1991 to 90 per cent by 2011.

^c Column 4 expresses column 3 as a percentage of GDP, where GDP is projected to grow at the same rate as during the 1980s. Column 5 expresses column 3 as a percentage of GDP, where GDP is projected to grow during the 1990s at the high rate forecast by the World Bank.

Source: Enrolment projections are from the Western Samoa country chapter. Cost estimates are from World Bank, *Pacific Regional Post-Secondary Education Study*, Washington, D.C., 1992:8; The GDP projections are calculated from World Bank, *Pacific Island Economies: towards higher growth in the 1990s*, World Bank, Washington, D.C., 1991:26, 339 ('Low GDP') and 324, 339 ('High GDP').

difference between the Melanesian countries (Papua New Guinea, Solomon Islands and Vanuatu) and the others. In Fiji and Western Samoa the school-age population will be growing only slowly, and in Tonga there is a projected substantial decline. Moreover, all three countries have already achieved virtually universal primary enrolment and very high secondary enrolment. In these circumstances, the total cost of educating the school-age population will be roughly constant in real terms, and will fall as a percentage of GDP, especially if their economies grow at the 'High GDP' rates. By contrast, Papua New Guinea, Solomon Islands and Vanuatu not only start from much lower enrolment rates (particularly at secondary level) but face large increases in the underlying school-age population.

Table 9
Growth rates of real GDP used to project GDP for each country

	'Low GDP' 1980-88	'High GDP'	
		1990-94 ^a	1995-99 ^a
Fiji	0.9	5.8	5.0
Kiribati	1.3	3.3	4.5
Papua New Guinea	1.4 ^b	10.1 ^c	0.3 ^d 2.0 ^e
Solomon Islands	1.8	4.6	4.7
Tonga	3.1 ^f	3.2	3.5
Vanuatu	1.5 ^f	4.2	4.6
Western Samoa	1.9 ^f	2.8	3.5

^a Forecast. ^d 1994-96.

^b 1983-90. ^e 1997-2000.

^c 1991-93. ^f 1983-88.

Source: World Bank, *Papua New Guinea, Structural Adjustment, Growth and Human Resource Development*, Washington D.C., 1991:28,140 for Papua New Guinea; World Bank, *Pacific Island Economies: towards higher growth in the 1990s*, Washington D.C., 1991:26,121, 170, 209, 251, 288, 324 for all other countries.

It hardly needs to be emphasized that the total costs projected for 2010 exceed what these latter three countries are likely to be able to afford. GDP percentages of 10-13 per cent amount to twice what they have been spending in recent years. In 1989 Papua New Guinea spent 5.0 per cent of GDP on education, Solomon Islands spent 5.3 per cent, and Vanuatu spent 5.5 per cent (UNDP 1992:156-157). These were already high figures by the standards of other developing countries: in 1989 the average for all developing countries was 3.6 per cent (UNDP 1992:157). Some idea of the massive task confronting the Melanesian countries can be gained by noting that of 127 developing countries listed in UNDP's recent *Human Development Report*, only one (Libya) spent more than 10 per cent of GDP on education.

Comparisons with past spending become even more daunting in light of the fact that the projected GDP percentages for 2010 include primary and secondary school costs only. In Papua New Guinea, for example, the 5.0 per cent of GDP spent on education in the late 1980s included that country's extraordinarily expensive tertiary system. The unit cost of Papua New Guinea's higher education was 1,050 per cent of per capita GNP, compared to the Asian average of 153 per cent (Tan and Mingat 1989:61). This accounted for around 20 per cent of total educational expenditure

(World Bank 1984), and adjusting Table 4 for a similar proportionate spending takes even the lowest GDP percentage for 2010 to almost 12 per cent for education as a whole.

Moreover, the total costs shown in Tables 2–8 not only imply large absolute amounts of expenditure, but also go against the recent trend of educational financing. In South Pacific countries, as in many developing countries, both the share of GDP devoted to education and the share of education spending in government budgets have tended to fall in recent years. In the Solomon Islands, government expenditure on education fell as a proportion of all government spending between 1983 and 1987 (Gannicott and McGavin 1987:11). In Vanuatu even the conservative assumption that leaves 50 per cent of the age group without secondary education in 2014 implies almost a tripling of expenditure in real terms, whereas real expenditure on education has fallen dramatically in recent years. In real terms, public educational expenditure declined by 21.5 per cent between 1985 and 1992, and over the same period fell as a percentage of total public spending from 23.1 per cent to 19.2 per cent (Vanuatu Department of Education 1992).

The most plausible conclusion is that the combination of rapidly growing school-age population and slow-growing GDP will make it impossible for these three countries to make much quantitative progress with their education systems. Even 20 years from now it will not be possible for Papua New Guinea, Solomon Islands and Vanuatu to provide a basic 10 years of schooling to everyone of school age.

This deeply pessimistic conclusion has the value of focusing on what needs to be done if these countries are to succeed in extending schooling to everyone. First of all, a population policy can play a role by reducing the numbers in the underlying age group. The financing requirements (Tables 2–8) reflect the combined effect of the rise in school-age population and the rise in enrolment rates. It is possible to derive at least some indication of those costs which are attributable to population growth as such. For example, it can be quickly calculated from Table 5 that if the Solomon Islands school-age population were to remain roughly constant at the 1991 level, enrolment of 100 per cent of the primary, 100 per cent of junior secondary and 20 per cent of the senior secondary age group would cost US\$19.46 million at 1990 prices. This is 7.1 per cent of projected

'Low GDP' in 2011, compared to 13 per cent with population growth included. The additional 5.9 per cent of GDP is the cost of achieving the same enrolment objectives but of doing so for the much greater numbers created by rapid population growth.

Second, it must be emphasized that more children can be educated if school unit costs are reduced. Countries such as Vanuatu or Solomon Islands which face problems of bringing schooling to isolated groups of rural children will always face relatively high costs. In a region where there is considerable evidence that average school quality is low, there is also a strong argument for increased funding of key learning resources, such as textbooks. There is a risk in the South Pacific, as in many developing countries, that the combination of tight public funding and rapidly rising numbers of the school-age population will mean that quantitative enrolment targets are met only by allowing the quality of instruction to decline drastically. Nevertheless, the logic of the calculations in Tables 2-8 suggests that an important task of policy must be to find ways of reducing costs. Much work has been carried out in recent years examining the ways in which policies such as cost recovery in higher education, a reallocation of expenditure within the education sector, and decentralized management can lead to the containment of unit costs and the generation of funds for the expansion of compulsory schooling without jeopardizing quality (World Bank 1986; 1988).

Finally, and perhaps most important, the calculations bring home the close relationship between population, education and economic growth. In an economy which is experiencing slow economic growth, the burden of trying to extend schooling to a greater percentage of the age group, while the absolute size of that age group is itself increasing, imposes virtually impossible financing requirements. If, however, economic growth is faster, the financial burden falls to a manageable level. Vanuatu provides a striking example. With an economy that continued to grow no faster than the 1.5 per cent per year experienced during the 1980s, Vanuatu would have to spend 13.4 per cent of GDP in 2014 in order to offer 10 years of schooling to everyone in the age group. If, however, the economy grows at the much faster rates considered feasible if structural economic reforms are carried out (World Bank 1991b), that same educational objective can be achieved with a comfortable 6.4 per cent of GDP.

Educational growth and economic growth have a two-way relationship: sustainable economic growth is unlikely without adequate investment in human capital, and without economic growth the resources will not be available to cope with a rising population and increased educational aspirations. The projections demonstrate clearly that without faster and more sustained economic growth, the Melanesian countries of the South Pacific will face daunting difficulties in educating their populations. It follows that an important part of the answer to the problem of educating these rising numbers of children lies in the wider issue of a faster rate of growth of the economy as a whole.

Employment and growth of the labour force

From the demographic point of view, an important characteristic of school-age populations is that their rate of growth will start to slow 5 or 6 years after a decline in fertility. It is, therefore, entirely feasible that long-term projections of school-age population will turn out to be wide of the mark because they are dependent on assumptions about fertility which may well change during the period of the forecast. By contrast, the growth of working-age population is more or less fixed for 15 to 20 years. Those people entering the work force between now and 2010 are already born or will be born within the next few years. They will enter the labour force from 2005 onwards, and will still be there in 2050.

There are considerable difficulties in judging the pattern of migration of young adults, with obvious consequences for Tonga, Western Samoa and Fiji, and projecting that fraction of the working-age population which will be economically active. Men and women generally have different rates of labour force participation. Social and cultural issues are important in determining whether women take part in economic activity, especially during the child-rearing years. When developing countries contain large numbers of people who work mainly in subsistence agriculture, but also occasionally undertake wage employment or are self-employed in the formal sector workforce, it can be difficult to gather consistent measures of economic activity and labour force participation. Most seriously, labour force participation is at least partly a function of perceived economic opportunities, so observed or assumed low rates

Table 10
Projected economically active population, 1991–2011

	1991	2011	Projected increase 1991–2011 (per cent)	Average annual increase 1991–2011	Average annual increase 1980s
Fiji	243190	348930	43	5287	2740 (1986–90)
Kiribati	32350 (1990)	55510 (2010)	72	1158	810 (1985–90)
Papua New Guinea	1304850 (1990)	2019504 (2010)	55	35733	34591 (1980–90)
Solomon Islands	131610	264390	102	6637	5504 (1976–96)
Tonga	23320 (1989)	25650 (2009)	10	117	274 (1976–86)
Vanuatu	53640 (1989)	104670 (2009)	95	2552	2128 (1986–91)
Western Samoa	47790	56230	18	422	420 (1981–86)

Source: All projections 1991–2011 are derived from the country chapters. Data for the final column, 'average annual increase 1980s', are derived from: Fiji, *Round Table Meeting on Development Assistance Requirements*, Suva, 1991 (for Fiji); unpublished data from the Ministry of Finance and Economic Planning (for Kiribati); country chapter data (for Papua New Guinea); Solomon Islands, *Socio-Economic Development Strategies and External Assistance Priorities*, Honiara, 1988 (for Solomon Islands); Tonga, *Development Plan Six*, 1991:66 (for Tonga); Vanuatu, *Socioeconomic development strategies and external assistance priorities*, paper prepared for Round Table Meeting, Geneva, 1988 (for Vanuatu); Western Samoa, *Socio-Economic Situation: development strategy and assistance needs*, Apia, 1988 (for Western Samoa).

of participation may understate the numbers who would like to have employment.² In many countries the definition of the labour force and estimates of participation rates are matters not just of statistical but of considerable conceptual difficulty. This difficulty acknowledged, Table 10 brings together the data from the country population studies in which assumed participation rates are used to derive projections of the labour force.

Even with the considerable degree of speculation implicit in Table 10, it is apparent that in most of the seven countries

2 A closely-related phenomenon has been observed in Australia during 1992, when marginal reductions in the rate of unemployment have resulted not from the unemployed finding work, but from discouraged workers withdrawing from the labour force and, hence, no longer being registered as actively looking for work.

under review the average number of people joining the workforce each year for the next 20 years will exceed the numbers in the recent past. As before, there are strong differences between Tonga and Western Samoa and the remaining countries. It is also doubtful whether the apparently large contrast between the future and the recent past in Fiji should be taken at face value: data for the period 1986–90 reflect the surge in emigration following the coups. On balance, it seems likely that future labour force growth for Fiji, Tonga and Western Samoa will not be much different from their recent experience. As with the projections of school-age population, Kiribati, Papua New Guinea, Solomon Islands and Vanuatu show the highest rates of increase of the labour force, with the latter two countries facing a doubling of their workforce by 2010.

The crucial feature is that even these projected high numbers of the labour force understate the magnitude of the problem of future employment growth. The economically active population includes those working in the subsistence sector of the economy, as well as those in formal employment (Table 10). In most countries of the South Pacific the proportion of the labour force in wage employment is very small (Table 11). In a region consisting of a total economically active population of 1.8 million in 1991, there were only 370,000 wage-earning job opportunities.

The record of the Pacific island countries in creating employment is poor. In Fiji, wage employment increased on average by 1,100 a year between 1976 and 1986, while the economically active population was increasing by 6,500 per year. The result was that the proportion of the workforce in wage employment fell from 52 per cent in 1976 to 42 per cent in 1986. Allowing for changes in definition between the 1985 and 1990 censuses, cash employment in Kiribati increased by 293 jobs per year, well short of the 810 annual average increase in the workforce. In Solomon Islands, wage and salary employment grew by a respectable 3.7 per cent per year between 1978 and 1987, but this translates to an annual average addition of only 722 wage jobs, well below the 5,500 who were joining the labour force each year, and there has been no increase in wage employment since then (Bartsch 1990:118).

In Papua New Guinea, formal sector employment grew by only 0.5 per cent per year during the 1980s (World Bank 1991a:30). A growth rate of 0.5 per cent implies that barely 1,000 wage

Table 11
Wage employment in the South Pacific, 1990

	Wage labour (^{'000})	Share of labour force (per cent)
Fiji (1986)	101	42
Kiribati	9	26
Papua New Guinea	214	16
Solomon Islands	25	19
Tonga	14	60
Vanuatu	10	19
Western Samoa	20	42

Source: The estimates of wage labour are taken from World Bank, *Papua New Guinea, Structural Adjustment, Growth and Human Resource Development*, Washington D.C., 1991, (for Papua New Guinea); from estimates by the author using unpublished data from the Ministry of Finance and Economic Planning (for Kiribati); from World Bank, *Pacific Island Economies: towards higher growth in the 1990s*, Washington D.C., 1991 (for all other countries). These estimates use the data in Table 10 to derive the percentage shares in the labour force for each country.

jobs were being generated each year, in an economy where 36,000 people per year were joining the economically-active population. Growth rates of employment are not available for Vanuatu, but it is known that in 1986, total wage employment amounted to no more than 10,000, at a time when over 2,000 people were joining the labour force each year. As the Government of Vanuatu has itself remarked,

the size of the formal sector is small compared to the potential number of people seeking employment and it cannot be relied upon to absorb all would-be entrants into the labour market. Prospects for employment creation in the wage paying sector of the economy are limited. Many school leavers will therefore have no alternative but to find jobs in the more traditional activities or become self-employed (Vanuatu 1988:51).

It is clear that workforce growth in these countries has exceeded by a large measure their recent job-creating capacity. There are strong grounds for believing that, in the absence of faster economic growth, future wage employment creation will be even lower than in recent years. An important feature of wage employment in the region is that much of it has been in the public sector (Table 12).

Even accepting that Table 12 provides only rough orders of magnitude rather than precise estimates, it is clear that around 40 per cent of wage jobs in the region are located in the public

Table 12
Public and private sector employment in the South Pacific

	Private	Public	Total	Public as percentage of total
Fiji (1986)	63553	38102	101655	37
Kiribati (1990)	2550	5950	8500	70
Papua New Guinea (1990) ^e	158000	56300	214300	26
Solomon Islands (1987)	9006	14485 ^a	23491	62
Tonga (1986)	..	..	14000	..
Vanuatu (1986)	..	..	10000	..
Western Samoa (1987)	16000	4039	20000	25

^a Includes central and local government, statutory authorities and cooperatives.

^e Estimate.

Source: World Bank, *Papua New Guinea, Structural Adjustment, Growth and Human Resource Development*, Washington DC., 1991; World Bank, *Pacific Island Economies: towards higher growth in the 1990s*, Washington, D.C., 1991; estimates for Kiribati are based on unpublished data from the Ministry of Finance and Economic Planning.

sector. Already large, relative to the rest of the economy in all countries, it is unlikely that the public sector can contribute significantly to future job growth. In the late 1970s and early 1980s public sector employment grew very quickly as the countries of the South Pacific moved towards independence. Not only were there many jobs needing to be localized, but the bright hopes for the post-independence years encouraged a rapid expansion of public sector activity in education, health, and infrastructure spending. More recent years have seen tough economic times, tight financial constraints on the public budget and strict limits on new public sector hiring.

Earlier sections of this chapter described 'Low GDP' and 'High GDP' scenarios, with the former characteristic of the sluggish economic performance of the 1980s and the latter showing the more rapid and sustainable growth that could follow structural reform in the region. Rapid economic growth in the future could indeed transform the outlook for jobs. Papua New Guinea provides the most striking example. Under the 'High GDP' scenario, formal sector employment could grow from 214,000 in 1990 to 327,000 in 2000 (World Bank 1991a:30). This is an annual average growth rate of 4.3 per cent, which, if continued to 2010 would mean a total of 498,000 wage jobs in that year. This is still only 25 per cent of the projected labour force, but

nevertheless represents a substantial improvement on the current proportion of those with wage jobs. It seems likely that in these circumstances the capacity of the informal sector to absorb the balance of the labour force would not be too severely tested.

If, however, the necessary structural reform does not take place, an alternative scenario of very low economic growth and a failure to create more private sector wage jobs becomes all too plausible. Using again the example of Papua New Guinea, a public sector constrained by fiscal limits, a capital-intensive mining sector with limited employment-creating possibilities, and lack of non-mining private sector development could plausibly combine to produce future formal employment growth no faster than the 0.5 per cent per year characteristic of the 1980s. This would give a total of only 234,000 wage jobs in 2010, at a time when the economically active population had reached over two million (Table 10).

Indeed, it is possible that a worst-case scenario could paint an even grimmer outlook. The projected labour force of 2.02 million assumes relatively modest participation rates of 49 per cent for women and 55 per cent for men, as well as increasing school enrolments for the 15–19 age group. It could be argued that in an overwhelmingly subsistence economy the nuances of participation rates have little practical significance, and that what really matters is the total adult population dependent on that sector for its livelihood. And, in a slow-growing economy unable to finance additional educational opportunities, most of the 15–19 age group would be looking for work. The relevant comparison then becomes the 3.06 million people who will constitute the 15–54 age group in Papua New Guinea in 2010. Fewer than 250,000 of these would have wage jobs, leaving the subsistence sector to absorb nearly 3 million people, almost twice as many as now.

All these calculations offer further examples of the compounding effect of growth rates over long periods of time and need to be interpreted in that light. It is also true that these latter calculations are for Papua New Guinea, where the absolute numbers are much larger than in the island economies of the South Pacific. While the absolute scale of the problem is different in the island economies, calculations for Vanuatu and Solomon Islands lead to similar results in proportionate terms.

It is hardly necessary to spell out the economic and social strains likely to follow from a scenario of very low economic growth and a failure to create many more private sector wage jobs than hitherto. Without a fast rate of job creation in the private sector, simple arithmetic dictates the consequence of a rapidly rising labour force: increasing proportions of the labour force will have to look to the informal sector for employment, or become unemployed.

It is a familiar argument that Western concepts of unemployment have to be set aside in developing countries. A large subsistence sector, and ease of movement back into it through the clan or extended family, combined with cultural taboos on the public admission of being unemployed, often mean that failure to find cash employment does not lead to open unemployment: there is, instead, a return to working in the subsistence economy. But already during the 1980s there have been unambiguous signals that the subsistence sector, even in a South Pacific of subsistence affluence, has not been able to provide an adequate cushion against the slow growth of wage job opportunities.

In Fiji, the vast majority of labour force entrants (nearly 5,000 annually) who could not obtain wage employment became own-account small-scale traders or farmers, or unpaid family workers. Ostensibly only around 450 became unemployed, but if we add to this the census category of discouraged workers who were not actively seeking work because of perceived poor employment prospects, and therefore not included among the economically active, the effective unemployment rate rises to 11 per cent. Rates of urban unemployment for young Fijian males reached over 30 per cent by the mid-1980s (World Bank 1991b:109). In Papua New Guinea, Stein reports, with nice understatement, 'a fairly high level of youth unemployment' (1991:54). The unemployment rate in the 1980 census was 17 per cent overall and around 25 per cent in urban areas. As the World Bank commented in a recent survey,

considering the trends in unemployment since 1980, the 1990 census is likely to indicate a higher rate of unemployment in that year. In addition, the dominance of the subsistence sector in the Papua New Guinea economy and slow growth in agriculture imply substantial numbers of underemployed, causing the formal data on unemployment to understate the extent of Papua New Guinea's unemployment problem (World Bank 1991a:4).

Recent labour force experience in the South Pacific can therefore be summarized as follows

- wage employment grew at a slower rate than the economically active population
- a high proportion of those wage jobs were created in the public rather than private sector
- the inability of new entrants to the labour market to be absorbed in wage employment meant that most became own-account or unpaid workers
- open unemployment, concentrated in urban areas and among young entrants to the workforce, reached high levels in some countries.

Despite the uncertainty of projections with a 20 year horizon and the paucity of labour market data, there can be little doubt that the task of coping with a rapidly increasing working population will, in most countries of the South Pacific, be more challenging than in the past. On even the approximate calculations made here, it does not seem unduly alarmist to note that a scenario of very low economic growth and a failure to create many more private sector jobs than hitherto will lead to unprecedented economic and social strains.

Explaining low employment growth

At the most primitive level of explanation, the reason for low employment growth lies in the low rates of economic growth in the South Pacific, but this merely begs further questions. In many developing countries, an explanation of low rates of economic growth starts with the fact that both the investment ratio (gross domestic investment as a percentage of gross domestic product) and the amount of capital available per worker are very low. Even where such countries have relatively high investment ratios, absolute amounts of capital may be low simply because GDP is low. For example, in 1989 Mozambique had an investment ratio of 33 per cent, identical to the figure for Japan, but Japan had a gross domestic investment of US\$7,090 per capita compared to Mozambique's US\$30 per capita (World Bank 1991c).

Levels of investment are directly affected by the growth rate of working-age population. Developed countries can increase the capital available to new workers even at low rates of investment, simply because the workforce is increasing only slowly. Developing countries generally have low absolute levels of investment per new worker, and when they also have rapid population growth they must continually increase the amount of investment just to maintain capital per worker. For incomes to rise, investment needs to grow faster than the labour force.

By international standards the countries of the South Pacific show high investment levels relative to GDP (Table 13). The World Bank has noted that 'during a decade in which many Latin American and African countries witnessed pronounced erosion in investment, the Pacific Member Countries managed...very high, sustained levels of domestic investment' (World Bank 1991b:8). If all investment in these countries had been allocated to new entrants to the workforce in the year those investments were made, each additional worker would have had amounts of investment that exceed the amounts available in other low and middle income countries.

It follows from basic arithmetic that, with unchanged levels of investment, the amount of investment per new worker will decline in those countries where the working population will increase more rapidly in the future (Table 13). It needs to be emphasized, however, that even the Melanesian countries with fast growing working populations would still have amounts of investment per worker that are very respectable by the standards of other developing countries.

It follows from this that one of the main concerns of rapid population growth in developing countries—that already low levels of investment will be spread over increasing numbers of workers to the detriment of economic and employment growth—receives little support in the South Pacific. Investment ratios and absolute amounts of investment per worker are high by international standards, and though the rapid growth of population in Papua New Guinea, Solomon Islands and Vanuatu might well lead to capital widening in the absence of additional investment, even the projected rapid increase in the working population of these countries is unlikely to reduce capital per new worker to unacceptably low levels.

Table 13
Gross domestic investment and economically active population,
1991–2011

	Investment ratio (per cent of GDP)	Gross domestic investment 1988 (US\$ million)	Gross domestic per capita 1988 (US\$) ^a	Gross domestic investment per new worker 1988 (US\$ '000)	Gross domestic investment per new worker 2010 (US\$ '000)
Fiji	13.1	141.4	190	51606	26745
Kiribati	30.8	27.2	399	33582	23489
Papua New Guinea	23.5	820.8	215	23729	22970
Solomon Islands	38.6	61.7	196	11210	9296
Tonga	28.7	..	..	..	..
Vanuatu	31.7	33.6	221	15789	13166
Western Samoa	29.5	36.6	230	87143	86730
Sub-Saharan Africa	15	..	50	..	..
East Asia	34	..	170	..	..
South Asia	22	..	70	..	..
Latin America and Caribbean	20	..	430	..	..

^a 1988 for all countries except Papua New Guinea (1989).

Source: World Bank, *Papua New Guinea, Structural Adjustment, Growth and Human Resource Development*, Washington D.C., 1991; World Bank, *Pacific Island Economies: towards higher growth in the 1990s*, Washington, D.C., 1991; World Bank, *World Development Report, 1991*, Washington D.C., 1991.

But while the total amounts of investment seem to have little explanatory value in the South Pacific, a major feature of investment in the countries of the region is that a relatively low proportion of gross domestic investment is financed by domestic savings. For all countries but Fiji, high rates of investment were sustained not by domestic savings but by remittances and official transfers (Table 14).

The high number of Tongans and Western Samoans working overseas means that remittances have been the largest single source of investment funds in these two countries, but for the other countries official transfers—that is to say, foreign aid, usually on grant or highly concessional terms—have been the major source of funding for the high rates of investment.

This method of funding has had a direct and important consequence for the growth of employment. Wage employment opportunities have grown very slowly, and a high proportion of such jobs has been in the public sector. This is a direct result of the

Table 14
Savings and investment, 1986–88

	Fiji	Kiribati	Papua New Guinea (1989)	Solomon Islands	Tonga	Vanuatu	Western Samoa
Gross national savings	16.2	57.9	12.6	22.9	23.6	35.0	41.6
Net factor income	-3.1	30.1	-5.0	-1.2	5.2	-1.7	0.3
Net current transfers	0.9	64.8	2.5	26.9	36.1	33.9	48.0
Private	-0.8	7.6	-3.7	2.2	29.2	6.8	32.1
Official	1.7	57.2	6.2	24.7	6.9	27.1	15.8
Gross domestic savings	18.3	-37.0	15.1	-2.8	-17.7	2.8	-6.7
Gross domestic investment	15.0	30.8	23.5	30.9	29.4	31.7	31.5
Current account deficit (+)	-1.1	-27.0	10.8	8.0	5.8	-3.3	-10.0

Source: World Bank, *Pacific Island Economies: towards higher growth in the 1990s*, Washington, D.C., 1991:10 for all countries except Papua New Guinea. Data for Papua New Guinea are calculated from World Bank, *Papua New Guinea, Structural Adjustment, Growth and Human Resource Development*, Washington D.C., 1991:144.

fact that large aid inflows have been used mainly for public sector projects. The Pacific countries need investments in infrastructure, and such investments do not have a quick payoff in economic growth and employment generation. It is also true that natural features of the region, such as the fragmentation of population among scattered islands or remote highland provinces, make it necessary for governments to undertake larger investments per capita in administrative and social overheads than in most developing countries (World Bank 1991b:28). The fact remains, however, that the employment which has been created has been in the public rather than private sector, and capital-intensive infrastructural investment has meant that these high rates of public investment have had a very low employment impact.³

- 3 This argument needs to be supplemented in the case of Papua New Guinea to allow for the fact that Papua New Guinea's relatively high investment ratio is dominated by the mining sector. Public investment outside the mining sector declined throughout the 1980s, as did private non-mining investment. The highly capital-intensive nature of mining in Papua New Guinea (and weak links with the rest of the economy) means that the mining sector does not generate significant employment opportunities, and the major task for employment growth is to generate investment in the private non-mining economy.

The indirect effects of this public sector emphasis need to be kept in mind. It is not simply that governments dominate these economies in the direct sense of running state enterprises or controlling government spending. The real problem is that the large aid-financed government sector creates a spillover effect of regulation, licensing and control, of incentives that vary between industries and firms, of *ad hoc* interventions in the market, and of inward-looking high-cost development, dominated by large investments in infrastructure, and creating a policy environment inimical to private sector investment.

...large inflows of aid tend to foster growth in the Government sector at the expense of the private sector. Among the PMCs [Pacific Member Countries], Government dominates the formal economy and relies on continuing aid; these inflows underpin high wages in the government and have disincentive effects on other sectors in the labor market, in particular agriculture... In the absence of clearly articulated development priorities and projects...aid has not contributed as effectively as it might to the development of PMC economies (World Bank 1991b:79).

Much work has been carried out in recent years on economic development in the South Pacific and Papua New Guinea, and it would be safe to say that the major issues inhibiting economic development in the region are now well understood. It is also well understood that economic growth is a multifaceted phenomenon, and there is rarely any quick fix. Any analysis that takes only a partial view of the growth process is likely to leave vital aspects out of consideration. This does not imply that there is no value in tackling specific aspects of the problem of faster economic growth. A useful division of research issues focusing upon employment growth sufficient to absorb the growing populations between 1991 and 2011 could be found under four headings.

To find ways of generating a policy environment that will stimulate private investment in productive sectors

This involves the development of policies to promote the competitiveness of the private sector, to provide a climate for private investment through the removal of distortions in exchange rates, wages, and tax and trade policies, and a reduction in the regulatory hurdles to private activity. A detailed analysis of these issues should

take place at the sectoral level, so that detailed and specific problems in agriculture, transport and communications, can be addressed.

To find ways for the more effective use of external assistance

Given the low (and sometimes negative) domestic savings characteristic of the region, there will remain a continuing need for external assistance if high rates of investment are to be maintained: the essential task in the future is to explore ways in which aid can be channelled to the private sector to support the development of private sector employment opportunities.

To improve the efficiency of the public sector

The public sector has become an important feature of all the region's economies, and indeed is likely to remain so, given the importance of continued investment in infrastructure and human resources. An important role for all countries is to improve the capacity of the public sector to support private sector development, through public expenditure restructuring, tax reform, public pricing policies, and modified investment priorities to reduce public sector involvement in services that can be provided more efficiently by the private sector.

To explore and implement cost-effective policies for human resource development

Confronting the Melanesian countries in particular are very large increases in school-age population. At current educational costs, Papua New Guinea, Solomon Islands and Vanuatu will be unable to provide basic education for all their children, at a decent quality of schooling, without spending proportions of GDP that have been unmatched in any other country. As noted earlier, much work has been carried out in recent years examining the ways in which distance education, policies of cost recovery in higher education, a reallocation of expenditure within the education sector, and decentralized management can lead to the containment of unit costs and the expansion of compulsory schooling without compromising the quality of education.

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Population projections 1990–2010

An introduction

Christine McMurray

Information on population size and growth rates is a basic ingredient for successful social and economic planning. Planners need to know how many people they are catering for, not only in the present but also in the future.

Although national development plans commonly span a five-year period, planners also formulate long-range targets for economic growth and sectoral development. This requires estimates of population size in 20 or more years time. Some countries, especially those with limited land area, assess the maximum population which can be accommodated at a reasonable living standard. Their planners need to know how many years it would take to reach maximum capacity, and how changes in fertility, mortality and migration could slow population growth.

Baseline population data are usually derived from censuses. Fertility, mortality and migration rates may be derived from censuses or from surveys, vital registration, health statistics or immigration records.

In recognition of the need for population data, most countries in the world invest large sums in carrying out regular censuses. Usually the interval between censuses in developing countries is about ten years, but some countries, such as Western Samoa, carry out a census as often as every five years.

The most important result from a census is the population total at one point in time. This can be compared with the previous census total to estimate the inter-censal growth rate. Most

censuses also collect information on the age, sex and birthplace of each person. It is also common for a census to collect information on education and economic activity, which can be used to make specific projections of the school age population and the labour force. Some censuses include questions on the number of children ever borne by each woman and whether or not children and other relatives are alive.

Much of the information collected in a census can be incorporated into projections of population size, but the minimum requirement is only two items of information: total population and an estimate of the annual growth rate. Multiplying one by the other will produce a rough estimate of population size at any year in the future. For example, this approach is used by the World Bank for countries of less than 100,000 people. However, these estimates are very rough as they do not take into account the age and sex composition of the population, or likely changes in fertility and mortality. Most projections are made only after careful consideration of previous trends in fertility, mortality and migration, trends in other countries with similar characteristics and any official population policy objectives.

Yet whichever method is used, population projections are simply 'best guesses' about what will happen in the future. Although this may not be very satisfactory from the planner's point of view, it is unavoidable. Projections are necessarily based on assumptions about future trends in population growth, and there is no technique which guarantees an accurate prediction of future trends. For this reason they should always be read in conjunction with the assumptions upon which they are based and any qualifying statements which indicate their limitations.

The preferred technique for making projections, and the one used here, is the component method with specific assumptions about trends in fertility and mortality levels. The population is divided into cohorts (age groups). Each cohort is projected separately by adding births and subtracting deaths, and where appropriate, net migration. An advantage of this method is that it provides estimates of particular age groups, which is important for planning purposes.

Projections in this volume have been made with either the Population Council's computer package FIVFIV or the ODA package, PEOPLE. For each country, population data by five-year age groups, separately for each sex, were taken from the latest final census figures. Recent demographic data were reviewed and assumptions were made about future trends in the total fertility rate (TFR), the age specific

fertility rate (ASFR), life expectancy at birth, the infant mortality rate (IMR) and the expected distribution of deaths. These data were used to project the population over a 20 year period.

Published census figures have generally been used as a basis for the projections in this volume. Existing official projections have been presented where available, such as for Papua New Guinea and Solomon Islands, and new projections have been made only where it was considered necessary. Although a range of projections is presented for each country, the number has generally been restricted to three or four, except where there is good reason.

Authors made their own judgements as to which fertility, mortality and migration rates to use, on the basis of past trends and current population policies. The papers discuss the reliability of the base data, any adjustments to the age/sex distribution that have been made and any information as to the level of enumeration errors. In some cases the base data were derived from one source, and fertility, mortality and migration rates from other sources. While these are probably the best estimates that can be made with the available data, readers should recognize that if actual rates differ from the assumed rates, the resulting population size would be different from the projected size.

For Kiribati, Papua New Guinea, Solomon Islands and Vanuatu it was assumed that international migration will continue to be negligible. Projections with both constant and reduced levels of migration were made for Fiji, Tonga and Western Samoa. This involved making estimates of future numbers of in and out migrants to add and subtract from each cohort, along with births and deaths.

Although every effort has been made to make the projections in this volume as realistic as possible, it must be remembered that their reliability is affected by two factors in particular. The first is the difficulty of obtaining reliable baseline data. Virtually every census has some degree of error. Almost inevitably some people will be missed from the enumeration, while others may be counted twice. If the level of error is the same in two successive censuses, a comparison is valid, but this is not so if one census has a higher level of underenumeration than the other. This can be seen in the Papua New Guinea paper in this volume, where it is shown that the growth rate in the intercensal period 1980-90 ranges from 2.1 per cent to 2.6 per cent, depending on the level of error assumed.

Although it is not necessary to know the intercensal growth rate if using cohort methods, it is still important to have an accurate indication of the size of the population. Moreover,

cohort methods require accurate information on the age and sex of the population. Although the sex of living people is usually reported accurately, age is often not known or misreported. It is common for people to round their age to the nearest five or ten years, which results in 'age heaping'. Adjustments can be made to smooth out these irregularities and the use of five-year age groups helps to reduce the effects of heaping, but still age errors affect the reliability of projections.

Information on fertility and mortality is also subject to misreporting. This is particularly true of dead children, who may not be mentioned at all and hence excluded from both total births and total deaths. Age at death is often unknown for adults in countries where there is no system of birth registration and low levels of schooling. The baseline fertility and mortality rates used for these projections have been derived from census reports, which generally include a cross-check using indirect estimation techniques, or from health statistics, but they must still be treated as estimates.

Migration is probably the most unpredictable demographic process, and is certainly the one which can increase or decrease most rapidly. Migratory movements are often subject to misreporting or omission. Many people may not remember their place of residence at a previous date, while illegal migrants may misreport their birthplace for fear of deportation. The baseline levels used here are generally the rates per thousand reported in the census, but like fertility and mortality they must be treated as estimates.

The second major difficulty in making population projections is selecting appropriate and reasonable assumptions about future trends in fertility, mortality and migration rates. For this reason it is most common to make several projections using different assumptions rather than just one projection. Usually this includes one projection that assumes no change from present rates, one that assumes substantial change and one intermediate between the two.

The advantage of making a set of projections is that it presents a range of possible population outcomes rather than a single estimate. This helps convey the message that it is not possible to make accurate population predictions, and gives some flexibility, allowing for 'best' and 'worst' scenarios. Despite this, planners usually want a single population figure at a specific point in time rather than a range of options. Presented with a set of projections, most people tend to select the middle or 'medium variant' projection, even though it may not be the most likely outcome. It is therefore important to look at the

projections in the context of social attitudes and national policy and decide which one seems most probable.

A further complication arises when making projections of specific groups such as school pupils and labour force. It is tedious and confusing to readers to present several different assumptions about enrolment or participation rates for each of the three or four basic projections. However, selecting only one base projection implies that it is more correct than the others, even though it may be only one of several possible scenarios. In each of the following country studies the author has selected the base they think is most plausible, but this is not intended to exclude alternative scenarios. In some cases time will show that a different projection should have been selected, or that none of the projections was adequate as a base. Again the reader should look at the results in context.

There is also the question of the level of accuracy. The usual convention is to present projection results in thousands, or even in tens of thousands in large countries. To suggest a precise number of people would be spurious accuracy, given the many assumptions and estimates involved. However, in small Pacific countries the total number in any five-year age group may be well below a thousand, so it is necessary to move to a finer level of detail. In this volume, projections for small countries are presented in actual numbers rounded to the nearest ten, but this should in no way be taken as an indication that they are more correct than projections rounded off to the nearest thousand.

In practice small population size may itself create the impression of substantial fluctuations in fertility, mortality and migration rates from year to year. For example, a population of 10,000 might experience 50 deaths in one year, 40 deaths the next and 45 in the third year. This suggests that there has been first a 20 per cent decline in mortality and then a 13 per cent increase, even though the rate may actually have been steady at an average of 45 over many years. Fluctuations from year to year have proportionally less impact on rates in larger countries, so small countries tend to have more erratic data.

This volume contains projections of total population, school enrolments, labour force and rural/urban distribution, all at the national level. Because of time and space constraints, provincial totals are included only for Papua New Guinea, with some discussion of urban growth rates in selected countries. Although international migration has been treated as negligible in four of the countries discussed here, they all have high levels of internal migration. This leads to wide variation in regional growth rates, which has important

implications for economic planning. The tendency to move from less developed to more developed areas, especially to the largest urban areas, leads to imbalances between local population numbers, infrastructure and wage employment, a major concern for planners.

It should be remembered that continuous population growth is the normal situation in most countries in the world, except where there are high levels of out migration or very low fertility rates. Steady population growth is generally regarded as healthy, as it rejuvenates the labour force and stimulates economic growth. The issue of concern is thus not population growth itself but the speed with which it occurs.

All projection scenarios in this volume show increasing total numbers over the 20 year period. However, the magnitude of increase varies widely, both between countries and between projections for the same country. The objective of the following chapters is to give substance and meaning to the concept of different rates of population growth. Although the numbers are presented in considerable detail, they are simply the population numbers that would exist if certain levels of fertility, mortality and migration prevail. If different levels prevail, the numbers would be different. Lower rates of fertility lead to smaller numbers. High rates of out migration also lead to smaller numbers, but if fertility is still high there is always the potential for rapid increase should many migrants return or destination countries close their borders.

The age structure of the population is vitally important in determining the rate of growth. The higher the proportion of the population under age 15 the greater the potential for growth. This is because there are more young women to reproduce in the future. Reductions in the fertility rate can be offset by large numbers of women reproducing.

These projections are intended as a basis for discussion of, and planning for, future populations. This includes both actions which promote a desirable rate of population growth and actions which provide for the expected numbers. The projections should be used to estimate future demands for basic needs such as food, shelter and employment, and facilities such as schools and hospitals.

Finally, it must be remembered that projections quickly become obsolete. Even though projections may span a 20 year period, they should be replaced with more up to date projections whenever new data become available. Every census should form the basis for a new set of national projections. New projections may also be

needed if a population survey reveals a change in fertility, mortality or migration rates.

Population growth is a dynamic process, highly subject to change. There is only a short history of census taking and population monitoring in most of the Pacific. As a consequence, there is considerable uncertainty about population growth prospects in the region. As more data become available and more is learned about factors affecting population change, population projections will become more realistic portrayals of future population growth.

Papua New Guinea

Population projections, 1990–2010

Christine McMurray

Papua New Guinea is a difficult country in which to collect comprehensive population data. Settlement is scattered throughout the country, and much of the land area comprises steep, forested mountains. Although some coastal areas are accessible with good communications, many settlements in the interior and highland areas have no road access and can only be reached by walking along difficult foot trails. At times access problems are compounded by warfare between villages. There are more than 700 languages spoken in Papua New Guinea, and at least half of the village population speak only the local *tok ples*, live a traditional lifestyle and have no education.

It is obviously extremely difficult and expensive to collect reliable population data under these conditions. Consequently there is some uncertainty about recent trends in fertility and mortality. Estimates from the 1966 and 1980 Census are generally considered reliable, but those from 1971 were less satisfactory (Table P1). It is now generally agreed that the 1971 Census analysis overestimated fertility, and that the apparent decline between 1971 and 1980 was artificial (Bakker 1984; Walsh 1987). In view of this Rafiq's (1979a) original estimate of 7.1 was adjusted downwards by Bakker (1984).

Analysis of the 1990 Census is still in progress, but it is apparent that there are higher levels of under enumeration compared with the 1980 Census. Since estimates of fertility and mortality are not yet available for 1990, it is possible only to guess at trends in recent years. In view of the current national prevalence of family planning of below 4 per cent (Papua New Guinea, Department of Finance and Planning 1991), the poor state of national health services and the persistence of high maternal mortality (Gillett 1990), it is unlikely that there has been a substantial decline in fertility or mortality

Table P1
Papua New Guinea: population trends, 1966–80

	1966	1971	1980
Population	2150317	2435409	2978057
Average annual growth rate (per cent)	2.2	2.2	2.3
Total fertility rate ^a	6.2	5.4 ^a	5.3
Life expectancy at birth (years)			
Male	43.7	48.1	48.7
Female	43.5	48.3	50.7
Infant mortality rate (per '000)			
Male	162	133	78
Female	156	128	66

^a Total fertility rate adjusted by Bakker (1984).

Source: M.L. Bakker, 'Preliminary fertility estimates derived from 1980 Census data for geographical sub-divisions of Papua New Guinea', *Working Paper 7*, National Statistics Office, Port Moresby, 1984; M. Rafiq, 'Measurement of changes and differentials in fertility', in Ronald Skeldon (ed.), *The Demography of Papua New Guinea*, Monograph 11, Institute of Applied Social and Economic Research, Port Moresby, 1979:33–46; M. Rafiq, 'Mortality decline', in Robert Skeldon (ed.), *The Demography of Papua New Guinea*, Monograph 11, Institute of Applied Social and Economic Research, Port Moresby, 1979:71–6.

at the national level in the past decade. It is more likely that the population growth rate has remained constant, or even increased slightly compared with that for 1980.

Projection methodology

Five projections of the citizen population of Papua New Guinea are presented here. Three projections were selected from a set of five made by Bakker (1985a) using base data from the 1980 Census. To these have been added two new projections, NCDS1 and NCDS2. As final figures from the 1990 Census are not yet available by age and sex, the NCDS projections are also based on 1980 figures. The 1980 Census is thought to have been more complete than that of 1990, and so may provide a better basis for making projections.

Bakker's projections were made using the Population Council's computer package FIVFIV with revisions incorporated by the South Pacific Commission (Bakker 1985a:2).

Bakker's projections are well known, and the method used and the assumptions made are fully documented in Bakker (1985b). Separate fertility and mortality rates were used for each province to produce combined projections at the national level.

The NCDS projections were produced with FIVFIV Version 10.0 for IBM compatible microcomputers (Shorter and Pasta 1987). NCDS1 uses one set of assumptions for the whole country and is a projection of the national total citizen population for 1980. NCDS2 uses provincial totals for 1980 and makes separate assumptions about fertility and mortality for each province.

Assumptions

Neither Bakker's nor the NCDS projections included migration as international migration is negligible in Papua New Guinea (Tables P2a and P2b). Although migration could increase in future years (McMurray and Lucas 1989), it is not thought to be a certainty and therefore is not included in the present projections.

The three Bakker (1985a) projections are his Scenario A, referred to as positive population policy, which was his low variant; Scenario B, qualified pride in numbers, his medium variant, and Scenario D, constant fertility, his high variant with a gradual decline in mortality. NCDS1 assumes declining mortality and rapidly declining fertility after 1990, in line with the targets set in the National Population Policy of June 1991 (Papua New Guinea, Department of Finance and Planning 1991:18-19).

NCDS2 is a constant variant, combining separate projections for 20 provinces, as an alternative to Bakker's constant variant, Scenario C. It is presented only to allow comparison of projected provincial totals with those totals recorded in the preliminary figures from the 1990 Census. It therefore assumes no change in the rates derived from the 1980 Census.

Bakker's very high variant, Scenario E, is not presented since it assumed an increase in the total fertility rate to 7.5. Bakker himself says this would be improbable (1985a:19) and, although analysis of the 1990 Census has not been completed, the general consensus is that fertility rates have been more or less constant in the intercensal period. Furthermore, in view of recent government initiatives to adopt a national population policy and to seek donor assistance with its implementation (Papua New Guinea, Department of Finance and Planning 1991), it seems unlikely that there would be a future increase to such a high level. Rather, there is likely to be a downturn in the high fertility of the New Guinea Islands region, where education levels are high. However, this may be partly offset by an increase in fertility in the Highlands and more remote areas, where fertility has been depressed in

Table P2a
**Papua New Guinea: fertility and mortality assumptions made for
 population projections, 1980–2010**

	1980	1990	1995	2000	2005	2010
Bakker's Scenario A: low variant						
Total fertility rate	5.30	4.15	3.66	3.22	2.84	2.50
Life expectancy at birth						
Male	Gradual increase from 48.70 in 1980					
Female	Gradual increase from 50.70 in 1980					
Bakker's Scenario B: medium variant						
Total fertility rate	5.30	4.95	4.75	4.57	4.39	4.22
Life expectancy at birth						
Male	Different rates of increase in each province					
Female	Different rates of increase in each province					
Bakker's Scenario D: high variant						
Total fertility rate	5.30	5.30	5.30	5.30	5.30	5.30
Life expectancy at birth						
Male	Gradual increase from 48.70 in 1980					
Female	Gradual increase from 50.70 in 1980					
NCDS1: population policy targets, national level only						
Total fertility rate	5.3	4.9	4.4	3.2	3.2	3.2
Life expectancy at birth						
Male	48.7	49.7	50.2	50.7	51.2	51.7
Female	50.7	51.7	52.2	52.7	53.2	53.7

Note: Bakker used the Brass Logit system to construct his mortality assumptions and does not supply exact life expectancy in years in the accompanying notes. Assumptions explained in text.

Source: M.L. Bakker, 'Preliminary fertility estimates derived from 1980 Census data for geographical sub-divisions of Papua New Guinea', *Working Paper 7*, National Statistics Office, Port Moresby, 1984; M.L. Bakker, 'Population projections for the citizen population of Papua New Guinea for the period 1980 to 2015', *Seminar on Population Growth and its Implications*, National Statistical Office, Port Moresby, 1985; M.L. Bakker, 'Population projections for the citizen population of Papua New Guinea for the period 1980 to 2015: supplementary technical notes', *Seminar on Population Growth and its Implications*, National Statistical Office, Port Moresby, 1985.

the past as a result of poor maternal health. The net effect overall is most likely to be constant or slightly increasing fertility rather than a substantial increase.

Table P2b

Papua New Guinea: constant rates of fertility and life expectancy, by province, assumed for the NCDS2 population projection, 1980–2010

	Total fertility rate	Life expectancy at birth	
		Male	Female
Western	5.4	46.2	49.5
Gulf	5.4	47.8	46.9
Central	5.7	50.9	51.9
National Capital District	5.0	56.1	57.3
Milne Bay	5.9	58.3	55.8
Northern	6.0	48.8	49.6
Southern Highlands	5.2	41.1	47.2
Enga	4.8	45.8	48.8
Western Highlands	4.8	50.8	53.6
Chimbu	4.3	51.0	49.9
Eastern Highlands	4.7	51.0	56.3
Morobe	5.3	50.7	51.5
Madang	5.9	49.4	52.3
East Sepik	5.8	49.1	49.4
West Sepik	5.4	41.2	43.1
Manus	5.3	51.4	52.5
New Ireland	6.1	51.6	53.7
East New Britain	5.9	53.2	52.8
West New Britain	6.8	50.5	52.7
North Solomons	6.6	60.2	59.3

Source: Papua New Guinea, National Statistics Office, *Preliminary Release of Figures from 1980 Census*, National Statistics Office, Port Moresby, n.d.

Population projection results

Both Bakker's Scenario A and NCDS1 depict a rapid decline in fertility in the national total projected figures for the citizen population at 5 year intervals for the period 1980–2010 (Tables P3a and P3b). However, NCDS1, which is a projection of the 1991 National Population Policy fertility targets, results in a substantially larger population by 2010 compared with Bakker's Scenario A. This is because Bakker's projection assumes the fertility decline commenced in 1985. It now appears that this did not happen.

The pre-release figures from the 1990 Census for each province are also presented for comparison with the projected NCDS2 figure, except for North Solomons which was omitted from the 1990 Census because of political instability (Table P3b).

Comparisons between the NCDS2 projections by province for 1990 and the preliminary census results show considerable

Table P3a
Papua New Guinea: projected population, 1980–2010 ('000)

	1980	1985	1990	1995	2000	2005	2010
Scenario A: low	2978	3337	3698	4074	4466	4843	5194
Scenario B: medium	2978	3323	3727	4182	4706	5288	5929
Scenario D: high	2978	3330	3751	4258	4872	5586	6420
NCDS1	2978	3319	3700	4136	4625	5160	5742

Source: Derived from assumptions in text.

Table P3b
Papua New Guinea: NCDS2 population projections by province,
1980–2010 ('000)

	1980	1990 (projected)	1990 ^a (Census)	2000	2010
Western	79	97	109	123	154
Gulf	64	80	68	101	124
Central	117	148	141	192	246
National Capital District	124	151	193	196	255
Milne Bay	128	168	157	224	294
Northern	77	98	97	127	164
Southern Highlands	236	280	303	336	403
Enga	165	279	238	396	654
Western Highlands	266	316	291	382	460
Chimbu	178	199	184	225	255
Eastern Highlands	277	332	300	406	494
Morobe	311	387	364	489	610
Madang	211	271	270	352	454
East Sepik	222	287	248	369	469
West Sepik	114	126	135	169	204
Manus	26	33	33	44	55
New Ireland	66	84	87	111	145
East New Britain	133	170	184	223	288
West New Britain	89	120	128	163	219
North Solomons	126	174	..	242	336
Total	3009	3801	3530	4868	6282

^a Total excludes North Solomons.

Source: Derived from assumptions in text.

variation between data sets, with the NCDS2 figure sometimes exceeding and sometimes being less than the 1990 Census count. Some of this variation could be explained by internal migration, especially into the National Capital District, but other discrepancies may be due to Census undercounts in 1990. The national total figure projected by

NCDS2, 3.8 million, exceeds the 1990 total by about 300,000, or by about 100,000 more than the Census total plus the projected population of North Solomons province. As the 1990 Census probably undercounted the total population by at least 100,000, the comparison of totals suggests that fertility and mortality levels have remained more or less constant in the period 1980–1990.¹

The NCDS2 projection for the year 2010 is close to Bakker's Scenario D, which assumes constant fertility and declining mortality. It is some 380,000 higher than Bakker's constant projection, Scenario C (not shown). This is largely because Bakker assumed a single national total fertility rate and life expectancy at birth, whereas the use of separate provincial rates means that provinces of different sizes contribute differing proportions of overall growth.

The most striking feature of Table P3a is that even the lowest growth projection, Scenario A, yields a total of 5.2 million by 2010, while the rapid growth model, Scenario D, yields 6.4 million. These represent increases of 37 per cent and 69 per cent respectively compared with the NCDS2 projected figures for 1990. The percentage increase is even greater if compared with the 1990 Census count of 3,511,700 citizens.

All projected growth patterns except Bakker's Scenario A, would result in an acceleration of the growth rate in the short term, even though some would eventually produce a decline (Table P4). This continued substantial growth in population size is a result of the

Table P4
Papua New Guinea: inter-period average annual population growth rates, 1980–2010 (per cent)

	1980–89	1990–94	1995–99	2000–04	2005–10
Scenario A: low variant	2.19	1.96	1.85	1.63	1.41
Scenario B: medium variant	2.27	2.33	2.39	2.36	2.31
Scenario D: high variant	2.33	2.57	2.73	2.77	2.82
NCDS1	2.19	2.25	2.26	2.21	2.16

Source: Derived from Tables 3a and 3b.

1 This comment is based on newspaper reports of difficulties with collecting the Census in remote areas, and comments by observers in Papua New Guinea. Problems included a higher than anticipated reliance on the line-up system, very short periods of training of enumerators, low education level of enumerators and cuts to the Census budget.

Table P5
Papua New Guinea: age structure of projected population, 1990–2010
 (per cent)

	1990	1995	2000	2005	2010
Scenario A: low variant					
0–14	40.8	41.0	41.7	42.2	42.2
15–64	56.8	56.3	55.6	55.1	55.1
65+	2.4	2.7	2.6	2.7	2.7
Scenario B: medium variant					
0–14	40.4	39.9	39.7	39.3	38.6
15–64	57.2	57.4	57.6	57.8	58.4
65+	2.5	2.8	2.7	2.9	2.9
Scenario D: high variant					
0–14	40.8	41.0	41.7	42.2	42.2
15–64	56.8	56.3	55.6	55.1	55.1
65+	2.4	2.7	2.6	2.7	2.7
NCDS1					
0–14	41.5	40.6	39.4	35.5	32.4
15–64	55.9	56.8	58.2	62.2	64.7
65+	2.6	2.6	2.4	2.3	2.9

Source: Derived from Tables 3a and 3b.

momentum established by the young age structure of the population. That is, the sheer numbers of girls reaching reproductive age results in a percentage increase in the growth rate, even if their completed family size will eventually be smaller than that of their mothers. Around 40 per cent of the population is under age 15 in all scenarios up to the year 2000 (Table P5). Any reduction in total fertility rate will not have much effect until the females aged under 15 at the beginning of the projection period are ready to stop childbearing.

Projection of school age population

To avoid generating a confusing array of possibilities, the following projections of school age population and labour force are based only on NCDS1, the variant with rapidly declining fertility. In fact, this scenario probably does not represent the most likely growth pattern to the year 2010. Rather, while some decline in fertility is expected, the rapid decline targeted by the 1991 National Population Policy seems overly ambitious. However, this option was selected as providing a plausible estimate of the lower boundary of expected population size.

Table P6
Papua New Guinea: projected school-age population, 1980–2010

	1980	1990	1995	2000	2005	2010
Primary (6–12)						
Males	303490	330630	372960	413700	428250	384930
Females	277460	311940	360000	397900	412080	370440
Total	580950	642570	732960	811600	840330	755370
Junior secondary (13–16)						
Males	148950	178550	183590	207030	231800	243820
Females	126070	163360	172270	199630	222560	234230
Total	275020	341910	355860	406660	454360	478050
Senior secondary (17–18)						
Male	65160	86300	89470	92130	110330	115780
Female	51880	79430	81210	88580	105850	111090
Total	117040	165730	170680	180710	216180	226870

Source: Based on Projection NCDS1.

Even with the assumption of rapidly declining fertility, the number of people of secondary school age could increase by 80 per cent by 2010 (Table P6). However, not all would be expected to attend school, as Papua New Guinea is still well short of attaining full enrolment, even of primary school pupils. The number of children of primary school age could increase by 45 per cent by 2005 and may then decline if the 1991 National Population Policy fertility targets are achieved.

It is difficult to calculate exact enrolment rates by age, as many pupils in Papua New Guinea are older than the expected age for their school grade. The assumed enrolment rates are therefore guesses derived from the 1980 Census rather than based on detailed calculations of current rates. The assumed increases are based partly on stated official policy targets (Table P7).

The assumed enrolment rates would result in vastly increased numbers which would need to be absorbed into the school system by 2010 (Table P8). This is particularly marked in primary schools, where numbers could increase by 74 per cent if the objective of 100 per cent enrolment is achieved. It should be remembered that the basis for this projection, NCDS1, assumes a rapid decline in fertility, which is probably unachievable. The actual school-age population in 2010 is likely to be substantially higher than those shown in Table P6.

Table P7
Papua New Guinea: assumed school enrolment rates, 1980–2010

	1980		2010
Primary (6–12)	0.74	gradually increasing to	1.00
Junior secondary (13–16)	0.30	gradually increasing to	0.50
Senior secondary (17–18)	0.10	gradually increasing to	0.20

Table P8
Papua New Guinea: projection of school enrolments, 1980–2010

	1980	1990	1995	2000	2005	2010
Primary (6–12)						
Males	225890	274750	326090	379640	411550	384930
Females	206520	259220	314760	365140	396010	37044
Total	432410	533970	640850	744780	807560	755370
Junior sscondary (13–16)						
Males	45180	66060	74050	90400	108940	121910
Females	38240	60440	69480	87170	104600	117120
Total	83420	126500	143530	177570	213540	239030
Senior secondary (17–18)						
Male	6630	11650	13570	15510	20410	23160
Female	5270	10720	12320	14910	19580	22220
Total	11900	22370	25890	30420	39990	45380

Source: Based on Projection NCDS1.

Projection of labour force

The 1980 Census asked about the activity of all individuals aged 10 years and over. However, since the majority of 10–14 year olds are presumed to be at school, working age will be considered here as 15–54 years. Three age groups will be considered: 15–19 which is expected to be eroded by increasing school enrolments; 20–24 which comprises the bulk of new entrants to the labour force; and 25–54 which is the major working-age group.

Under the declining fertility assumption of NCDS1 almost every group would at least double in size between 1980 and 2010 (Table P9). This indicates that the demand for employment would be substantial, even if present labour force participation rates continued.

It is difficult to estimate labour force participation rates when many people in the labour force are internal migrants who

Table P9
Papua New Guinea: projection of working-age population, 1980–2010

	1980	1990	1995	2000	2005	2010
Males						
15–19	167050	216700	224480	236300	277150	292620
20–24	134940	195030	211600	219200	230870	270920
25–54	481770	614890	714250	827090	923870	1025230
Females						
15–19	135680	198980	205490	226880	266040	280850
20–24	121060	173530	194220	200570	221570	259960
25–54	320110	509210	647910	751140	833100	935040
Total						
15–19	302730	415680	429970	463180	543190	573470
20–24	256000	368560	405820	419770	452440	530880
25–54	801880	1124100	1362160	1578230	1756970	1960270

Source: Based on Projection NCDS1.

Table P10
Papua New Guinea: assumed labour force participation rates, 1980–2010

	1980		2010
Wage jobs			
Male			
15–19	0.19	gradually declining to	0.10
20–24	0.29	constant	0.29
25–54	0.29	constant	0.29
Female			
15–19	0.10	constant	0.10
20–24	0.15	constant	0.15
25–54	0.15	constant	0.15
Non-wage jobs			
Male			
15–19	0.39	gradually declining to	0.20
20–24	0.49	constant	0.49
25–54	0.49	constant	0.49
Female			
15–19	0.44	gradually declining to	0.20
20–24	0.55	constant	0.55
25–54	0.55	constant	0.55

Source: Based on assumptions in text.

Table P 11
Papua New Guinea: projection of labour force, 1980–2010

	1980	1990	1995	2000	2005	2010
Wage jobs						
Males						
15–19	31740	34350	32210	30360	31460	29260
20–24	39130	56560	61360	63570	66950	78570
25–54	139710	178320	207130	239860	267920	297320
Females						
15–19	13570	19900	20550	22690	26600	28090
20–24	18160	26030	29130	30090	33230	38990
25–54	48020	76380	97190	112670	124970	140260
Non-wage jobs						
Males						
15–19	64620	70100	65510	61480	63330	58520
20–24	66120	95570	103680	107410	113130	132750
25–54	236070	301300	349980	405270	452690	502360
Females						
15–19	59160	70840	64930	62620	62790	56170
20–24	66580	95440	106820	110310	121860	142980
25–54	176060	280060	356350	413130	458210	514270
Total						
15–19	169090	195190	183200	177150	184180	172040
20–24	189990	273600	300990	311380	335170	393290
25–54	599860	836060	1010650	1170930	1303790	1454210

Source: Based on Projection NCDS1.

rotate between paid employment and subsistence agriculture. The 1991 National Population Policy estimates that around 70 per cent of the population is economically active in subsistence and informal activities, and fewer than 10 per cent are in the formal wage sector. The policy also proposes reducing internal migration by promoting a more equitable distribution of social and economic services to the population and a reduction in the numbers of school leavers seeking employment by encouraging them to remain in school longer (Papua New Guinea Department of Finance and Planning 1991:14, 26).

In view of this, it was assumed for the projection that labour force participation would remain constant for ages 20–54. However, participation was assumed to decline in the youngest working-age group 15–19, as increasing numbers remain at school in line with official targets. Participation in wage versus non-wage jobs is also

assumed to remain constant, with women having a lower participation in wage jobs and a higher participation in non-wage jobs, compared with men (Table P10).

However, it must be stressed that these assumptions are presented as a baseline estimate, and that actual rates could differ markedly in response to changes in social and economic conditions. Participation rates are more likely to change than to remain constant, but it is difficult to predict the direction of change.

If labour force participation rates do not increase, the projection indicates that there would be a substantial increase in the labour force aged 20–54, even if fertility were to decline sharply (Table P11). This would generate a strong demand for employment, especially in the wage sector. The small decline in the demand for employment in the youngest working-age group, as a result of increasing numbers remaining at school, would depend on an expansion of school capacity. If this were not to occur the demand for employment would be even greater.

Urbanization

In 1980 only 10 per cent of the population was living in major towns in Papua New Guinea. However, a comparison of the 1966 and 1980 Censuses indicates that this group was increasing at an average annual rate of 7.2 per cent in the intercensal period (Walsh 1987:15). This is very rapid when compared with an average growth rate of 2.2 per cent for the population as a whole.

It is difficult to predict future rates of growth in major towns, as they depend on a host of social and economic factors. However, although 1990 Census results are not yet available, appearances suggest that the 1966–80 rate of urbanization was probably sustained during the period 1980–90. The projection presented here therefore uses constant 1966–80 growth rates to subdivide the total population projected by NCDS1 into major towns and other.

If growth in major towns were to continue at the 1966–80 rate, 43 per cent of the citizen population could be urban by the year 2010 (Table P12). It is stressed that the use of constant rates is somewhat arbitrary since it is impossible to guess the future course of urbanization. Nonetheless, this scenario is not implausible since the substantial growth of the population as a whole under NCDS1 would almost certainly lead to pressure on the available agricultural land. Large-scale migration to urban areas is a typical consequence when the rural sector is unable to absorb the available labour force.

Table P12
Papua New Guinea: projection of population of major urban and other areas, 1980–2010

Variant	1980	1990	1995	2000	2005	2010
Urban						
Number ('000)	303.3	607.8	860.5	1218.2	1724.7	2441.6
Per cent of total population	10	16	21	26	33	43
Other						
Number ('000)	2674.8	3092.2	3275.5	3407.8	3435.3	3300.4
Per cent of total population	90	84	79	74	67	57
Total	2978.1	3700.0	4136.0	4625.0	5160.0	5742.0

Source: Based on Projection NCDS1.

Such an increase in the urban population would generate a huge demand for employment, housing and social services in urban areas. The demand for wage employment would be of particular concern, as substantial capital investment is required to provide jobs in urban areas. Provision of housing could also strain resources. Even if cheaper types of housing were permitted, the supply of household services essential to health, such as water, electricity and garbage disposal, would be a burden on municipal authorities.

It is therefore apparent that planners need to take a holistic view of population growth in Papua New Guinea. Consideration needs to be given not only to overall population growth but also to likely trends in school enrolments, labour force and urbanization.

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Fiji

Population projections, 1986–2010

Kesaia Seniloli

The 1986 Census counted 715,375 people in Fiji, comprising 46.0 per cent ethnic Fijians, 48.7 per cent Fijian Indians and 5.3 per cent other ethnicities. The ethnic Fijian population was declining until 1921, mainly due to a high mortality rate from infectious diseases contracted from early European settlers and visitors. The growth rate of ethnic Fijians then increased steadily to a maximum rate of 3.1 per cent between 1956 and 1966 and has since declined to 2.4 per cent in 1986.

The Fijian Indians are mostly descendants of indentured labourers, who arrived between 1874 and 1916. Their annual growth rate was over 3 per cent until 1966, but has since declined to 2 per cent, below that of the ethnic Fijians. The lower rate of growth of the Fijian Indian community is partly due to a lower and more rapidly declining total fertility rate and a shorter life expectancy, compared with ethnic Fijians (Table F1). Emigration is also an important demographic factor in Fiji. Emigration peaked in 1987 after the political coup, when over 14,000 Fijian Indians and 3,000 ethnic Fijians emigrated, but has since declined rapidly with 4,000 Fijian Indians and 680 ethnic Fijians emigrating in 1990 (Fiji, Bureau of Statistics 1991).

Projection methodology

Three projections were made using the Population Council's computer package, FIVFIV Version 10.0 for IBM compatible microcomputers (Shorter and Pasta 1987). All projections used a base population, by age and sex, derived from the 1986 Census (Fiji, Bureau of Statistics 1989a). Labour force activity rates, school enrolments and proportions of urban–rural populations were also derived from 1986 Census results.

Table F1
Fiji: population trends, 1966–86

	1966	1976	1986
Population	476727	588068	715375
Ethnic Fijians (per cent)	42.4	44.2	46.0
Fijian Indians (per cent)	50.5	49.8	48.7
Intercensal annual growth rate (per cent)	3.2	2.1	2.0
Total fertility rate			
Ethnic Fijians	5.6	4.3	4.1
Fijian Indians	5.6	3.7	2.8
Infant mortality rate (per '000)			
Ethnic Fijians	50.0	36.5	23.5
Fijian Indians	79.0	44.0	29.0
Life expectancy at birth (years)			
Ethnic Fijians	..	62.3	64.2
Fijian Indians	..	61.0	62.4

Source: Fiji, Bureau of Statistics, *Report on Fiji Population Census 1986: analytical report on the demographic, social and economic characteristics of the population*, Suva, 1989.

Emigration figures were based on data from departure cards of persons who indicated that their reason for leaving Fiji was to emigrate or that they were staying away for more than a year (Fiji, Bureau of Statistics 1991). Figures therefore are not the net balance of arrivals over departures. Bedford (1991) suggests that many who indicated short visits overseas in their departure cards eventually stayed for a longer period. It is therefore difficult to ascertain accurately the extent of emigration from Fiji. Age-sex specific emigration rates are the same as those used by the Fiji Bureau of Statistics (1989b) in its projection of the 1986 population.

Assumptions

Separate projections were made for the ethnic Fijian and Fijian Indian populations, while other races were assumed to follow the trends of the ethnic Fijians. Because mortality levels are relatively low for both ethnic Fijians and Fijian Indians, all projections assume that life expectancies at birth for both communities will increase only modestly. This is because the infant mortality rate may decline further, while adult mortality could increase as a result of having an ageing population. Three scenarios are considered with respect to fertility and emigration (Table F2).

Table F2
Fiji: fertility, mortality and migration assumptions made for population projections, 1986–2010

	1986– 90	1991– 95	1996– 2000	2001– 05	2006– 10
Mortality assumptions for all projections					
Ethnic Fijians life expectancy at birth (years)					
Males	64.3	65.5	66.5	67.3	68.1
Females	66.0	67.7	68.4	69.1	70.8
Fijian Indians life expectancy at birth (years)					
Males	60.0	60.5	61.0	61.5	62.0
Females	65.9	67.0	68.0	69.0	70.1
Fertility and migration projections					
High variant					
Total fertility rate					
Ethnic Fijians	4.1	4.1	4.1	4.1	4.1
Fijian Indians	2.7	2.6	2.5	2.4	2.3
Migration ^a					
Ethnic Fijians					
Males	3.3	zero after 1991			
Females	2.1	zero after 1991			
Fijian Indians					
Males	22.1	zero after 1991			
Females	13.8	zero after 1991			
Medium variant					
Total fertility rate					
Ethnic Fijians	3.9	3.7	3.5	3.3	3.1
Fijian Indian	2.6	2.4	2.2	2.0	2.0
Migration ^a					
Ethnic Fijians					
Males	3.3	zero after 1991			
Females	2.1	zero after 1991			
Fijian Indians					
Males	22.1	declining gradually to			
Females	13.8	declining gradually to			
Low variant					
Total fertility rate					
Ethnic Fijians	3.8	3.5	3.2	2.9	2.6
Fijian Indian	2.5	2.3	2.1	2.0	2.0
Migration ^a					
Ethnic Fijians					
Males	3.3	declining to			
Females	2.1	declining to			
Fijian Indians					
Males	22.1	13.8	constant after 1991		
Females	13.8	8.6	constant after 1991		

^a Net number of migrants per 1000.

Source: Based on definitions in text.

The high variant assumes a constant fertility for ethnic Fijians, to reflect the scenario which may occur if the contraceptive prevalence rate, which has remained static since the 1960s, and the high rate of teenage pregnancies, are maintained. The fertility of Fijian Indian women is assumed to decline very slowly, to reflect a possible scenario whereby the momentum for declining fertility slows after the rapid fall during the last two intercensal periods. Migration of both ethnic Fijians and Fijian Indians was assumed to stop after 1991. This could occur in response to the economic recession currently experienced by the major destination countries New Zealand, Australia, the United States and Canada, or to tighter immigration policies in the destination countries.

The medium variant assumes that ethnic Fijian fertility will decline gradually in line with that observed in the last intercensal period, 1976–86. The total fertility rate for Fijian Indians is assumed to decline to 2.0 by 2001 and then remain constant. Ethnic Fijian emigration was again assumed to decline to zero by 1991. For Fijian Indians the assumed emigration trend was a gradual decline after 1990 to 40 per cent of the 1990 figure by 2010. This was based on the premise that emigration could decline in response to the economic circumstances and tighter immigration policies of the destination countries.

The low variant assumes that the total fertility rate will decline more rapidly, to 2.6 by 2010 for ethnic Fijians and stabilize at 2.0 by 2006 for Fijian Indians. This could occur if the gradual fertility decline observed in ethnic Fijians gains momentum or if political instability continues and leads to a further depression of Fijian Indian fertility. Ethnic Fijian emigration is assumed to decline gradually to 40 per cent of the 1990 figure by 2010. Fijian Indian emigration is assumed to be constant after 1990. This was based on the scenario of continued political instability and a concomitant downturn in the economy.

Population projection results

It appears that the total population of Fiji could increase by 60 per cent and reach 1,160,000 by the turn of the century if emigration stops and fertility rates remain about the same as in 1986 (high variant). Even if fertility declines rapidly and migration continues, as in the low variant,

Table F3
Fiji: projected population, 1986–2010 ('000)

	1986	1991	1996	2001	2006	2010
High variant						
Ethnic Fijians	329	378	429	484	546	616
Fijian Indians	349	349	381	412	445	474
Total	715	778	865	958	1058	1163
Medium variant						
Ethnic Fijians	329	366	409	456	504	553
Fijian Indians	349	346	356	365	373	383
Total	715	744	800	857	915	976
Low variant						
Ethnic Fijians	329	365	402	439	476	511
Fijian Indians	349	346	355	361	367	371
Total	715	743	788	831	874	914

Note: Based on assumptions in text.

the total population could increase by 30 per cent to 914,000 (Table F3). Each population projection indicates that ethnic Fijian numbers probably exceeded those of Fijian Indians by 1991, in contrast to the 1986 Census figure which showed more Fijian Indians than ethnic Fijians.

The projections reported here use similar fertility and mortality assumptions to those used in the projections made by the Fiji Bureau of Statistics (1989b). However, the medium and low variants of the Bureau of Statistics projections assumed that migration would continue at higher, though declining rates, compared with the assumptions presented here. In fact, migration has slowed considerably, close to levels assumed in these projections. The Fiji Bureau of Statistics projected total populations of 1,148,308 for the high variant, 941,841 for the medium variant and 836,202 for the low variant by 2011 are thus lower than those in Table F3 (Fiji, Bureau of Statistics 1989b).

The high variant estimates that the total population could increase at an annual rate of 1.7 per cent between 1986 and 1996 and about 2.0 per cent in the next period, 1996–2006. The medium variant shows an overall annual rate of increase of about 1.4 per cent for the population during the projected period whereas the low variant shows an annual rate of growth of about 1.0 per cent in a scenario of rapid fertility decline and some emigration. The Fijian Indian population is projected to increase much more slowly than the ethnic Fijian population (Table F4). Under the medium variant, for example, the

Table F4
Fiji: inter-period average annual population growth rates, 1986–2010
(per cent)

	1986– 90	1991– 95	1996– 2000	2001– 05	2006– 10
High variant					
Ethnic Fijians	2.8	2.6	2.8	2.4	2.4
Fijian Indians	.	1.8	1.6	1.6	1.3
Medium variant					
Ethnic Fijians	2.2	2.3	2.8	2.0	1.9
Fijian Indians	-0.2	0.6	0.5	0.4	0.5
Low variant					
Ethnic Fijians	2.1	2.0	1.8	1.6	1.4
Fijian Indians	-0.2	0.8	0.3	0.3	0.2

Source: Based on assumptions in text.

ethnic Fijian growth rate would decline from 2.2 to 1.9 per cent per year between 1991 and 2010, while the Fijian Indian growth rate would decline from 0.6 to 0.5 per cent per year over the same period.

All projections indicate a decline in the proportion of children under 15 years over the projected period (Table F5). However, the numbers in this age group will increase by 109,000 according to the high variant, by 22,000 according to the medium variant and by 920 according to the low variant. The assumed course of fertility decline in the medium and low variants is reflected in the increasing proportions in the working-age group, 15–64, and in the older population (Table F5). The projections all show an ageing population as reflected in the doubling of the numbers in the 65+ age group by 2010.

Projection of school-age population

In Fiji, children begin school at 6 years of age and attend primary school for at least 6 years. They may then continue on to primary classes 7 and 8 or attend secondary school. For these projections all 12–19 year olds were considered eligible for secondary schooling, which was divided into junior secondary (12–15 years) and senior secondary (16–17 years) age groups. The projected school-age population was based on the medium variant projection, which assumed that fertility and migration continue to follow the declining trends of recent years.

Table F5
Fiji: age structure of projected population, 1986–2010 (per cent)

	1986	1991	1996	2001	2006	2010
High variant						
Ethnic Fijians						
0–14	39.3	39.0	38.3	37.5	37.2	36.9
15–64	57.2	57.5	58.0	58.5	58.5	58.7
65+	3.5	3.6	3.7	4.0	4.3	4.5
Fijian Indians						
0–14	37.7	37.2	33.0	29.8	28.6	27.6
15–64	60.0	60.4	64.1	66.7	67.2	67.4
65+	2.3	2.4	2.9	3.5	4.2	5.0
Total						
0–14	37.8	37.3	35.3	33.8	33.1	32.6
15–64	59.0	59.4	61.0	62.2	62.4	62.5
65+	3.3	3.4	3.7	4.0	4.5	4.9
Medium variant						
Ethnic Fijians						
0–14	39.3	38.8	37.2	35.2	33.7	32.3
15–64	57.2	57.6	59.0	60.7	61.7	62.8
65+	3.5	3.6	3.8	4.2	4.6	4.9
Fijian Indians						
0–14	37.7	35.9	31.7	27.5	25.7	24.6
15–64	60.0	61.5	65.2	69.7	69.5	69.4
65+	2.3	2.6	3.1	3.8	4.8	6.0
Total						
0–14	37.8	38.9	34.4	32.4	30.7	29.5
15–64	59.0	57.7	61.8	63.5	64.7	65.5
65+	3.3	3.4	3.8	4.1	4.6	5.0
Low variant						
Ethnic Fijians						
0–14	39.3	38.6	36.7	34.1	32.0	29.9
15–64	57.2	57.8	59.4	61.7	63.3	65.0
65+	3.5	3.6	3.9	4.3	4.7	5.1
Fijian Indians						
0–14	37.7	36.6	32.4	28.3	26.8	26.0
15–64	60.0	61.0	64.7	68.1	68.9	68.7
65+	2.3	2.4	2.9	3.6	4.4	5.3
Total						
0–14	37.8	38.6	35.9	32.6	30.9	29.7
15–65	59.0	57.9	60.2	63.1	64.4	65.2
65+	3.3	3.5	3.8	4.3	4.7	5.1

Note: Total includes other races.

Source: Based on assumptions in text.

Table F6
Fiji: projected school age population, 1986–2011

	1986	1991	1996	2001	2006	2011
Primary (6–11)						
Ethnic Fijians						
Males	25360	29150	30900	32440	34420	36340
Females	23910	27380	29280	30980	22830	34650
Fijian Indians						
Males	26770	26860	22460	19710	19060	18300
Females	25520	26520	22760	20050	19330	18570
Total	106860	114990	110080	107060	111441	112080
Junior secondary (12–15)						
Ethnic Fijians						
Males	14520	16710	19470	20440	21870	22860
Females	13850	15820	18250	19400	20600	21810
Fijian Indians						
Males	15000	16610	17350	14120	12630	12240
Females	14650	16290	17440	14590	13080	12620
Total	61140	68370	75900	71660	70440	72090
Senior secondary (16–17)						
Ethnic Fijians						
Males	6870	7500	8890	10110	10290	11050
Females	6670	7100	8410	9470	9840	10560
Fijian Indians						
Males	7150	7090	8480	8120	6170	6110
Females	7170	7060	8430	8360	6510	6370
Total	29400	29960	35820	37750	34250	35290

Note: Total includes other races.

Source: Based on medium variant assumptions in text.

The total secondary school-age population is projected to increase by around 20 per cent from 90,540 in 1986 to 107,380 by 2011 (Table F6). The primary school-age population is projected to increase by only 5 per cent by 2011. The slower growth rate of this group is due to the assumed fertility decline.

Primary school education in Fiji is free but not compulsory. The primary school enrolment rate has hovered at over 90 per cent for the last two decades (Fiji, Bureau of Statistics 1989a:113) and appears to be increasing gradually. Secondary school education is not free, but there is a means tested fee remission scheme. The proportion of children attending school decreases after 12 years of age and only about 50 per cent of children aged 16 years still attend school (Fiji, Bureau of Statistics 1989a). Most secondary schools select senior students on the

Table F7
Fiji: assumed school enrolment rates, 1986–2011

	Actual		1996	Assumed		
	1986	1991		2001	2006	2011
Conservative scenario						
Primary (6–11)	0.92	0.93	0.94	0.95	0.95	0.95
Junior secondary (12–15)	0.78	0.79	0.80	0.81	0.81	0.81
Senior secondary (16–17)	0.41	0.41	0.42	0.43	0.44	0.45
Full enrolment scenario						
Primary (6–11)	0.92	0.93	0.94	0.95	0.97	1.00
Junior secondary (12–15)	0.78	0.79	0.84	0.89	0.95	1.00
Senior secondary (16–17)	0.41	0.41	0.45	0.50	0.55	0.60

Source: Based on assumptions in text.

basis of results in the Fiji Junior Certificate Examination after 8 years of schooling. The enrolment rate of 16–17 year olds is presently around 41 per cent.

Two scenarios are considered in projecting the number of school enrolments. The first, conservative scenario, assumes that enrolment rates for all school sectors will increase only slightly (Table F7). This trend could occur if the burden of expenses for things such as uniforms and textbooks, as well as school fees and the costs of boarding in urban areas while attending secondary schools, limit the number of children able to avail themselves of an education. This scenario is similar to the expectations of the Fiji Ministry of Education.

The second scenario assumes a more rapid increase in enrolments, up to 100 per cent by 2011 for primary and junior secondary. This could occur if the government adopts a policy to provide 10 years education for every child. Enrolment at senior secondary level is assumed to increase from 41 per cent to 60 per cent by 2011 (Table F7). This pattern could occur if new secondary schools were built in rural areas.

There is evidence that the enrolment rates for ethnic Fijians and Fijian Indians differ, especially for secondary schooling (Fiji, Bureau of Statistics 1989a:113; Gannicott 1990:9). However, for simplicity, these projections consider the population as a whole.

The projected school enrolments were calculated by applying the assumed enrolment rates in Table F7 to the school-age population, projected in Table F6. Under the conservative scenario of a gradual and slight increase in enrolments, the need for extra school places would almost parallel the increase in the projected population

Table F8
Fiji: projection of school enrolments, 1986–2011

	1986	1991	1996	2001	2006	2011
Conservative scenario						
Primary (6–11)	98310	106940	103480	101710	105870	106480
Junior secondary (12–15)	47690	54010	60720	58040	57060	58340
Senior secondary (16–17)	12050	12280	15040	16230	15070	15880
Full enrolment scenario						
Primary (6–11)	98310	106940	103480	101710	108100	112080
Junior secondary (12–15)	47690	54010	63760	63780	66920	72090
Senior secondary 16–17)	12050	12280	16120	18880	18840	21170

Source: Based on medium variant assumptions in text.

increases for each age group. Nevertheless, an extra 14,000 secondary school places would be needed, an increase of around 24 per cent on 1986 enrolments. Primary enrolments would increase by 8 per cent or 8,000 places (Table F8). The second scenario, of a rapid increase in enrolments after 2001, would require the provision of many more places at secondary schools. Junior secondary enrolments could increase by 51 per cent or 24,000 places, while senior secondary enrolments could increase by 75 per cent or 9,000 places (Table F8).

Projection of labour force

In Fiji, the working-age population consists of people aged 15–64 years. Three age groups are considered: 15–19 year olds overlapping senior secondary school; 20–24 year olds who by 2011 will comprise children born around 1990; and 25–64 year olds. The total working-age population, based on the medium variant projection, could increase by around 50 per cent from 419,950 in 1986 to 638,400 by 2011. Most of the increase will be in the 25–64 age group which is projected to increase by 70 per cent.

Male participation in the labour force has remained fairly constant at over 95 per cent since 1966 for all age groups except 15–19 year olds. Participation by this group declined between 1966 and 1976, but has since remained fairly constant. Female participation has increased dramatically over the same period from around 7 per cent in 1966 to around 17 per cent in 1976. This increase was largely due to a change in the definition of labour force, but even so, female participation has continued to increase to around 23 per cent in 1986, due to more Fijian Indian women entering the labour force (Fiji, Bureau of Statistics 1989a:126).

Table F9
Fiji: projection of working-age population, 1986–2011

	1986	1991	1996	2001	2006	2011
Ethnic Fijians						
Males						
15–19	17180	18530	21840	24890	25720	27400
20–24	16500	16480	18380	21680	24710	25550
25–64	61280	70940	81480	928670	106590	122580
Females						
15–19	16750	17620	20660	23360	24520	26190
20–24	16590	16320	17490	20530	23220	24400
25–64	60040	70860	81590	92370	105120	119910
Fijian Indians						
Males						
15–19	18010	17450	20590	20170	15920	15150
20–24	18440	14820	15740	19040	18810	14810
25–64	68240	70990	74750	79360	86760	93360
Females						
15–19	18090	17500	20550	20720	16770	15860
20–24	18720	15890	16340	19510	18430	16050
25–64	67790	76180	83950	91480	101210	110280
Total						
Males						
15–19	37200	37530	44440	47300	43500	44120
20–24	36860	32590	35650	42700	41740	42210
25–64	137300	148410	163310	180120	202410	226320
Females						
15–19	36660	36570	43110	46050	43100	43570
20–24	37120	33250	35270	41920	45000	42250
25–64	134820	152990	172030	191220	214900	239940
Total male and female						
15–19	73860	75000	87550	9330	86600	87690
20–24	73970	65840	70920	84620	86750	84460
25–64	272110	301400	335340	371330	417300	466260

Note: Total includes other ethnicities.

Source: Based on medium variant assumptions in text.

These projections assume that the labour force age-specific participation rates will remain constant at 1986 levels for all groups except 15–19 year old males. These projections are assumed to decline in line with school enrolment assumptions (Table F10). The participation rate for 15–19 year old females is held constant because although more are assumed to remain at school, this is likely to be offset

Table F10
Fiji: assumed labour force participation rates, 1986–2011

	1986	1991	1996	2001	2006	2011
Ethnic Fijians						
Males						
15–19	0.60	0.56	0.52	0.48	0.44	0.40
20–24	0.90		constant			0.90
25–64	0.95		constant			0.95
Females						
15–19	0.25	0.25	0.25	0.25	0.25	0.25
20–24	0.34		constant			0.34
25–64	0.29		constant			0.29
Fijian Indians						
Males						
15–19	0.58	0.544	0.51	0.47	0.435	0.40
20–24	0.94		constant			0.94
25–64	0.94		constant			0.94
Females						
15–19	0.18	0.18	0.18	0.18	0.18	0.18
20–24	0.23		constant			0.23
25–64	0.17		constant			0.17

Source: Fiji, Bureau of Statistics, *Report on Fiji Population Census 1986: analytical report on the demographic, social and economic characteristics of the population*, Suva, 1989.

by increased participation in the labour force. The rates used were those obtained from the 1986 Census (Fiji, Bureau of Statistics 1989a:126).

If the labour force activity rates remain constant, then under conditions of declining fertility and migration, the male labour force could increase by around 85,000 or 65 per cent between 1986 and 2011. The female labour force could increase by at least 25,000 or 80 per cent over the same period, possibly more if participation rates for this group continue to increase (Table F11).

These projections divided employment status into two groups: wage jobs and other activities, which includes own account workers and unpaid family workers. The participation rate in wage jobs versus other activities was assumed to remain constant at levels reported in the 1986 Census (Table F12).

Under these assumptions, the number of people employed or seeking work in either wage jobs or other activities would almost double between 1986 and 2011 in the case of ethnic Fijians, and would increase by around 20 per cent in the case of Fijian Indians. Overall, there could be a need to provide an extra 44,000 wage jobs and an extra 67,000 positions as either own account workers or unpaid family workers.

Table F11
Fiji: projection of labour force, 1986–2011

	1986	1991	1996	2001	2006	2011
Ethnic Fijians						
Males						
15–19	10310	10380	11360	11950	11320	10960
20–24	14850	14830	16540	14510	22240	23000
25–64	58220	67400	77410	83580	101260	116450
Females						
15–19	4190	4410	5170	5840	6130	6550
20–24	5640	5550	5950	6980	7890	8300
25–64	17410	20545	23660	26790	30480	34770
Fijian Indians						
Males						
15–19	10450	9490	10500	9480	6930	6060
20–24	17240	13860	14720	17800	17590	13850
25–64	64140	66730	70260	74600	81550	87760
Females						
15–19	3260	3150	3700	3730	3020	2860
20–24	4310	3650	3760	4490	4560	3690
25–64	11190	12570	13850	15090	16700	18200
Total						
Males						
15–19	21960	20740	22900	22500	19060	17650
20–24	33820	29850	32640	39090	41810	38510
25–64	129750	140280	154390	165670	191440	214610
Females						
15–19	7900	7920	9340	10060	18940	9780
20–24	10560	9560	10190	12110	13120	12580
25–64	30620	34840	39400	44010	49670	55800

Note: Total includes other ethnicities.

Source: Based on medium variant assumptions in text.

Table F12
Fiji: assumed labour force participation rates by employment status

	Wage jobs	Other activities
Ethnic Fijians		
Males	0.32	0.68
Females	0.53	0.47
Fijian Indians		
Males	0.49	0.51
Females	0.52	0.48

Source: Fiji, Bureau of Statistics, *Report on Fiji Population Census 1986: analytical report on the demographic, social and economic characteristics of the population*, Suva, 1989.

Table F13
Fiji: projection of labour force by employment status, 1986–2011

	1986	1991	1996	2001	2006	2011
Ethnic Fijians						
Males						
Wage jobs	26600	29810	33700	36810	43140	48130
Other activities	56510	63340	71600	78200	91680	102280
Females						
Wage jobs	14440	16170	18430	20990	23590	26300
Other activities	12800	14330	16340	18610	20920	23320
Fijian Indians						
Males						
Wage jobs	45000	44140	46790	44920	51970	52750
Other activities	46830	45940	48690	51950	54090	54910
Females						
Wage jobs	9750	10070	11080	12120	12630	12870
Other activities	9000	9300	10230	11190	11650	11870
Total	220930	233100	256860	279810	309670	332430
Wage jobs	95790	100190	110000	114840	131330	140050
Other activities	125140	132910	146860	159970	178340	192380

Source: Based on medium variant assumptions in text.

Urbanization

The 1986 Census recorded considerable internal migration in Fiji, especially from the outer islands to the urban and peri-urban areas of the main island, Viti Levu (Fiji, Bureau of Statistics 1989a:90). The proportion of the total population living in urban areas increased from 33.4 per cent in 1966 to 37.2 per cent in 1976 and 38.7 per cent in 1986. By 1986, 32.7 per cent of ethnic Fijians, 41.9 per cent of Fijian Indians and 66 per cent of other races lived in urban areas (Fiji, Bureau of Statistics 1989a:12).

The projection of the urban population of Fiji assumed that the urban share of the total population would follow the trend observed between 1976 and 1986. Thus, the urban share of the total population is assumed to increase by 1.5 per cent per 10 year period, from 38.7 per cent in 1986 to 42.5 per cent in 2010.

The urban population is projected to increase by 50 per cent, from 276,850 in 1986 to 414,800 in 2010. This compares with a 36 per cent increase in the total population over the same period, under the medium variant.

The large increase in the urban population would result in great increases in demand for urban infrastructure, housing and cash employment.

Table F14
Fiji: past and projected urban populations, 1966–2010

	1966 ^a	1976 ^a	1986 ^a	1996 ^b	2010 ^b
Urban share of total population (per cent)	33.4	37.2	38.2	40.2	42.5
Urban population ('000)	159.3	218.8	276.9	321.6	414.8
Total population ('000)	476.7	588.1	715.4	800.0	976.0

^a Actual urban and total populations.

^b Projected urban and total populations, based on medium variant.

Source: Fiji, Bureau of Statistics, *Report on Fiji Population Census 1986: analytical report on the demographic, social and economic characteristics of the population*, Suva, 1989.

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Vanuatu

Population projections, 1990–2014

G.M. Arif

Vanuatu has a relatively high rate of population growth, although it has slowed over recent decades. Between 1979 and 1989, the ni-Vanuatu population increased by an average 2.8 per cent per year to 142,219, compared with 3.1 per cent between 1969 and 1979 (Vanuatu 1991:37). There are probably several reasons for the high growth rate. First, although the total fertility rate has declined from 6.5 in 1979 to 5.3 in 1989, the crude birth rate remains high at 38 births per thousand population. This is likely to continue for some time because of the young age structure of the ni-Vanuatu population. Second, the crude death rate has declined from 12 per thousand population in 1979 to 9 per thousand in 1989. The decline in infant mortality is especially marked, from an estimated 94 per thousand births in 1979 to about 45 per thousand in 1989. Third, unlike

Table V1
Vanuatu: population trends, 1967–89

	1967	1979	1989
Population	..	111251	142630
Population (ni-Vanuatu)	77988	104371	139480
Per cent urban	10.0	14.4	18.4
Annual growth rate (per cent)	..	3.1	2.9
Infant mortality rate (per '000)	123	94	45
Total fertility rate	6.7	6.5	5.3
Life expectancy at birth (years)			
Males	51.0	56.2	61.5
Females	51.0	53.7	64.0

Source: Vanuatu, *National Population Census May 1989: main report*, Statistics Office, Port Vila, 1991.

other Pacific countries, there is very little overseas migration by ni-Vanuatu to depress the current high population growth rate (Table V1). However the proportion of non-indigenous people in Vanuatu has dropped from 6 per cent in 1979 to 2 per cent in 1989, and the departure of these people has contributed to the overall decline in the birth rate.

Despite the recent reduction, infant mortality in Vanuatu is still relatively high for the Pacific region. Most infant deaths are due to infectious diseases, especially malaria and respiratory infections, with malnutrition often an underlying cause of lowered resistance. Life expectancy has been longer for males than females although figures were not available from the 1989 Census at the time of writing. Complications during pregnancy or delivery due to malaria or anaemia are major morbidity factors for women, and increase the risk of neonatal death due to low birth weight (UNICEF and Vanuatu Government 1991:56).

The population of Vanuatu is predominantly rural, with 80 per cent living outside Port Vila and Luganville. However, there is considerable internal migration from rural to urban areas. During the last decade the populations of Port Vila and Luganville have experienced annual net migration rates of 1.4 and 3.1 per cent respectively (Vanuatu 1991:Table 12.3). In some rural areas, for example, Paama, net out-migration is sufficiently high to cause a population decline (Vanuatu 1991:33).

Projection methodology

Three computer-generated population projections are presented here to depict the impact of different levels of fertility and mortality on the total ni-Vanuatu population by age and sex. The base year population, by age and sex, for the projection is derived from the 1989 Census (Vanuatu 1991). The projections were made using the Population Council's software package, FIVFIV Version 10.0 for IBM compatible computers, documented in Shorter and Pasta (1987).

Assumptions

The 1989 Census estimated that the total fertility rate had declined to 5.3 in 1989 (Vanuatu 1991:28). The high variant depicts a scenario of rapid population growth which would occur if the total fertility rate remains constant at 5.3. The other variants assume that fertility will decline in the future. This could be inferred from three socioeconomic development

Table V2
**Vanuatu: fertility and mortality assumptions made for population
 projections, 1989–2014**

	1989– 94	1995– 99	2000– 04	2005– 09	2010– 14
Total fertility rate					
High variant	5.3	5.3	5.3	5.3	5.3
Medium variant	5.3	5.1	4.9	4.7	4.3
Low variant	5.3	5.0	4.5	4.0	3.3
Life expectancy at birth					
Male	61.5	63.0	64.2	65.2	66.0
Female	64.0	65.5	67.0	68.0	69.0

Source: Based on definitions in text.

indicators of the country: a high level of female education, declining infant mortality and an increasing level of urbanization. The medium variant assumes that the total fertility rate will decline gradually to 4.3 at the end of the projection period, 2014. The low variant, although unlikely, assumes a rapid decline in the total fertility rate to 3.3 by the end of the projection period.

Life expectancy at birth increased from 51 years for both sexes in 1967 to 64 for females and 61.5 years for males in 1989. In the absence of current data on mortality, this considerable reduction in mortality since 1967 provides an empirical basis for assumed trends in the projection period. Males and females are given a life expectancy of 66 and 69 years respectively by the year 2014 in all three projections.

Population projection results

Even if fertility declines by 38 per cent, as assumed in the low variant, the population of ni-Vanuatu would increase by 88 per cent from 139,480 in 1989 to 262,840 in 2014. If the current high level of fertility continues during the next two decades, the population of ni-Vanuatu would double to around 298,730 (Table V3).

The projected population for the year 2014, under the medium variant is similar to that projected by Bedford for mid-period 2009–14 (1989: Table 35). However, Bedford's other mid-period population projections, using constant fertility, are higher than the projections presented here, mainly because of differences in both base year population and fertility assumptions. For instance,

Table V3
Vanuatu: projected population, 1989–2014

	1989	1994	1999	2004	2009	2014
High variant	139480	161800	188170	219300	255880	298730
Medium variant	139480	161800	187000	215420	247270	280860
Low variant	139480	161800	186420	212110	238440	262840

Source: Derived from assumptions in text.

Table V4
Vanuatu: inter-period average annual population growth rates, 1989–2014
(per cent)

	1989–94	1995–99	2000–04	2005–09	2010–14
High variant	2.97	3.02	3.06	3.09	3.10
Medium variant	2.97	2.90	2.83	2.76	2.55
Low variant	2.97	2.83	2.58	2.34	1.95

Source: Based on assumptions in text.

Bedford's high variant assumed a constant total fertility rate of 6.5 which is substantially higher than the value assumed in this chapter.

The differences in the ages of the projected populations are reflected in the projected growth rates (Table V4). The growth rate implied by the high variant increased from the present level of 3.0 per cent per year to 3.1 per cent per year at the end of the projection period. This increase is due entirely to the assumed reduction in mortality, as the fertility is assumed to remain constant. By contrast the projected growth rates in both the medium and low variants would decline to 2.6 and 2.0 per cent per year respectively. This is a result of assumed fertility declines which reduce the birth rate to such an extent that it more than compensates for the decline in the death rate.

The age structure of the ni-Vanuatu population is almost unchanged in the high projection, although the share of adult population would increase slightly (Table V5). However, if fertility declines even gradually, the proportion of people under 15 years of age would decrease, and the proportion of the working population, aged 15 years and above, would increase by the year 2014. The proportion of elderly people would not increase substantially in any of the projections.

Projection of school age-population

In Vanuatu children can begin primary education at age 6 and progress through 6 classes. They may then enter secondary education where the first 3

Table V5
Vanuatu: age structure of projected population, 1989–2014 (per cent)

	1989	1994	1999	2004	2009	2014
High variant						
0–14	44.4	43.9	42.8	42.5	42.4	42.3
15–64	52.0	52.8	54.1	57.7	54.6	54.4
65+	3.6	3.3	3.1	2.8	3.0	3.1
Medium variant						
0–14	44.4	43.9	42.5	41.4	40.3	39.0
15–64	52.0	52.8	54.4	55.7	56.5	57.7
65+	3.6	3.3	3.1	2.9	3.3	3.3
Low variant						
0–14	44.4	43.9	42.3	40.5	38.1	35.1
15–64	52.0	52.8	54.6	56.6	58.6	61.4
65+	3.6	3.3	3.1	2.9	3.3	3.5

Source: Based on assumptions in text.

years are spent in preparation for the Vanuatu Form III Leaving Certificate Examination. Those who achieve an acceptable standard may then receive a further 4 years of schooling. Thus, school-age population projections have been prepared for ages 6–11, 12–14 and 15–18.

Although in most chapters of this volume the medium variant has been selected as a basis for school and labour force projections, the high variant has been selected for Vanuatu. This is because of a perception within the country that fertility will remain high. The family planning prevalence rate was below 10 per cent in 1988, with no evidence of a change in attitude or policy which could lead to an increase in the near future. However, these projections should be regarded as depicting the maximum potential school and labour force populations, as any decline in fertility would result in smaller numbers.

Under the high variant the school-age population, 6–18 years, could be almost double the current size of the school-age population, 44,930, exceeding 91,000 by 2014. Even if fertility declines rapidly, the school age population would still be expected to increase dramatically.

The 1989 Census reported that 74 per cent of 6–11 year olds were at primary school in 1989 (Table V6). However, the total number of children at primary school (25,000) exceeded the number of children of primary age (23,990) (Vanuatu 1991: Table B49). Thus there are enough places at present to accommodate all the 6–11 year olds and

Table V6
Vanuatu: projected school-age population, 1989–2014

	1989	1994	1999	2004	2009	2014
Primary (6–11)						
Males	12610	14180	15600	17930	20790	23820
Females	11380	12960	14820	17210	19930	22840
Total	23990	27140	30420	35140	40720	46660
Junior secondary (12–14)						
Males	5100	6450	7080	7840	9040	10500
Females	4740	5790	6480	7500	8670	10080
Total	9840	12240	13560	15340	17710	20580
Senior secondary (15–18)						
Males	5660	7280	8930	9630	10810	12560
Females	5440	6700	8020	8950	10400	12030
Total	11100	13980	16950	18580	21210	24970
Total (6–18)						
Males	23370	27910	31610	35400	40640	46880
Females	21560	25450	29320	33660	39000	44950
Total	44930	53360	60930	69060	79640	91830

Source: Based on high variant assumptions in text.

the enrolment of primary-aged children is assumed to be 100 per cent by the year 2000. This is justifiable because the projection is intended to serve as a basis for estimating the number of extra school places that would be required by 2014. It is also plausible that the proportion of primary school children aged 6–11 years will increase because of a government objective to enrol 95 per cent of 6 year olds by 1994 and also because the number of students repeating classes is likely to decrease (Vanuatu 1988:34).

Although primary education is potentially available to all at present, few continue on to secondary level. Department of Education statistics (South Pacific Economic and Social Database) indicated that there were 1,440 males and 1,163 females in Years 7–9, compared with 5,100 males and 4,770 females in the 12–14 years age group. Thus the 1989 enrolment rate was assumed to be 28 per cent for males and 25 per cent for females, again reflecting the number of school places available to the age group. In fact, 75 per cent of 12–14 year olds were attending school in 1989, but most were in primary school. As the age of primary school entry declines, more 12–14 year olds will be seeking places in junior secondary school.

Table V7
Vanuatu: assumed school enrolment rates, 1989–2014

	1989	1999	2014
Primary (6–11)	0.75	1.00	1.00
Junior secondary (12–14)			
Conservative scenario			
Males	0.28	gradually increasing to	0.50
Females	0.25	gradually increasing to	0.50
Full enrolment scenario			
Males	0.28	gradually increasing to	1.00
Females	0.25	gradually increasing to	1.00
Senior secondary (15–18)			
Males	0.12	gradually increasing to	0.25
Females	0.08	gradually increasing to	0.25

Source: Based on assumptions in text.

Table V8
Vanuatu: projection of school enrolments, 1989–2014

	1989	1994	1999	2004	2009	2014
Primary (6–11)						
Males	9460	12340	15600	17930	20790	23820
Females	8540	11280	14820	17210	19930	22840
Total	18000	23620	30420	35140	40720	46660
Junior secondary (12–14)						
Conservative scenario						
Males	1440	2130	2690	3370	4250	5250
Females	1160	1740	2270	3000	3900	5040
Total	2600	3870	4960	6370	8150	10290
Full enrolment scenario						
Males	1440	2750	3960	5570	7770	10500
Females	1160	2320	3560	5250	7370	10080
Total	2600	5070	7520	10820	15140	20580
Senior secondary (15–18)						
Males	700	1090	1610	1930	2380	3140
Females	470	800	1210	1610	2290	3010
Total	1170	1890	2820	3540	4670	6150

Source: Based on high variant assumptions in text.

Two scenarios were considered for projecting junior secondary school enrolments. The conservative scenario, of enrolments increasing to 50 per cent by 2014, assumes that the proportion of 12–14 year olds attending school would not increase but that they would be able to attend junior secondary school. The second scenario assumes enrolment in junior secondary school would increase to 100 per cent by 2014.

The projection assumes that in 1989 the enrolment rate at senior secondary school was 12 per cent for males and 8 per cent for females. Enrolment of both sexes is assumed to increase to 25 per cent by 2014. Given these enrolment rates, a vast increase in the number of school places would be needed by 2014 (Table V8). Primary school places would need to increase by 160 per cent to cope with the increased population. Projected increases in enrolment at secondary school are even greater, where both the enrolment rate and the population are assumed to increase. The required number of places is projected to increase by between 300 and 700 per cent for junior secondary school and by around 400 per cent for senior secondary school.

Projection of labour force

In 1989, about 84 per cent of the total population aged 15 years and above were economically active, and participation in the labour force was higher for males than females. The majority of the country's population is involved in the agricultural sector, although the proportion working in agriculture declined slightly from 77 per cent in 1979 to 74 per cent in 1989. At the time of the 1989 Census, less than 1 per cent of the total economically-active population was unemployed, although many agricultural workers stated that they would like to have worked for wages, if such work had been available (Vanuatu 1991:56).

The size of the working-age population, 15 years and above, would increase from 77,490 in 1989 to 172,410 in 2014, under the high projection (Table V9).

For the projection of the labour force, economic activity rates derived from the 1989 Population Census are applied: 89 per cent for males and 79 per cent for females (Vanuatu 1991:50). These rates are assumed to remain constant over the projection period except for the 15–19 year old group where a steady decline is assumed because an increasing proportion is projected to remain at senior secondary school (Table V10). The projected labour force is divided into wage and non-wage workers. At present, 82 per cent of the economically active females and 65 per cent of the economically active males are non-wage

Table V9
Vanuatu: projection of working-age population, 1989–2014

	1989	1994	1999	2004	2009	2014
Males						
15–19	6950	8880	10970	11940	13360	15510
20+	32420	37150	43770	52290	61540	71880
Females						
15–19	6740	8190	9860	11050	12830	14890
20+	31380	36500	42960	50910	59780	70130
Total						
15–19	13960	17070	20830	22990	26190	30400
20+	63800	73650	86730	103200	121320	142010
15+	77490	90720	107560	126190	147510	172410

Source: Based on high variant assumptions in text.

Table V10
Vanuatu: assumed labour force participation rates, 1989–2014

		1989		2014
15–19 years	Males	0.80	decreasing gradually to	0.71
	Females	0.72	decreasing gradually to	0.63
20+ years	Males	0.89	constant	0.89
	Females	0.79	constant	0.79
Distribution of labour force by sector (per cent)				
Wage jobs	Males	0.35	constant	0.35
	Females	0.18	constant	0.18
Non-wage jobs	Males	0.65	constant	0.65
	Females	0.82	constant	0.82

Source: Vanuatu, *Vanuatu National Population Census May 1989: main report*, Statistics Office, Port Vila, 1991.

workers, largely involved in subsistence agriculture. It is assumed that these proportions will remain constant throughout the projection period.

The size of the labour force is likely to double between 1989 and 2014 (Table V11). Most of the economically active population will probably be involved in the non-wage sector, predominantly in agricultural activities. However, by 2010, it is likely that young people entering the labour force will have completed at least junior secondary school and may demand greater opportunities for employment in the wage sector.

Table V11
Vanuatu: projection of labour force, 1989–2014

	1989	1994	1999	2004	2009	2014
Labour force						
15–19 years						
Males	5560	6930	8230	8720	9620	11010
Females	4850	5900	6900	7400	8340	9380
Total	10410	12830	15130	16120	17960	20390
20+ years						
Males	28850	33060	38950	45650	57440	63970
Females	24790	28840	33940	40220	47230	55400
Total	53640	61900	72890	85860	104670	119370
Labour force by employment status						
Wage jobs						
Males	12040	14000	16510	19030	23470	26240
Females	5340	6250	7350	8570	10000	11660
Total	17380	20250	23860	27600	33470	37900
Non-wage jobs						
Males	22370	25990	30670	35330	43590	48740
Females	24300	28490	33490	39050	45570	53120
Total	46670	54480	64160	74380	89160	101860
Total labour force	64050	74730	88020	101980	122630	139760

Source: Based on high variant assumptions in text.

Urbanization

Since the population of Port Vila has been influenced by internal migration during the past decade, it is worth examining the possible effects of both internal migration and natural growth on the size of the Port Vila population. The population of Port Vila (ni-Vanuatu only) is projected for the next 25 years, using a base year population by age and sex derived from the 1989 Census. Mortality (life expectancy) assumptions used for the national population projection are also employed for Port Vila's projection.

Urban fertility in Vanuatu is lower than the national level of fertility (Vanuatu, 1986). The high variant therefore assumes a constant total fertility rate of 4.5 for the projection of Port Vila's population. The medium variant assumed that the total fertility rate for Port Vila would decline to 3.5 by the end of the projection period. To study the effect of internal migration on the population growth of Greater Port Vila, it is assumed that net migration to Port Vila will increase modestly from the current rate of 1.4 per cent per year to about 2.0 per cent at the end of the projection period.

With a modest increase in net migration into urban areas and constant fertility, Port Vila's population could increase almost three-fold from 16,830 in 1989 to around 49,620 in 2014. If the total fertility rate declines to 3.5, Port Vila's population could still increase by two and a half times by 2014. Immigration from other islands to the urban area of Luganville has been higher than that to Port Vila during the past decade, at 3.1 per cent per year. Thus the above projections are conservative projections of the level of urbanization that could occur.

Vanuatu is likely to undergo very rapid population growth during the next 20 years. Planners will need to consider ways of providing the infrastructure necessary to meet its housing, educational, health and employment needs.

Table V12
Vanuatu : projection of Port Vila population, 1989–2014

	1989	1994	1999	2004	2009	2014
High variant	16830	21750	27470	33790	40990	49620
Per cent of total population	12.0	13.6	14.8	15.8	16.6	17.4
Medium variant	16830	21630	26840	32320	38280	44870
Per cent of total population	14.8	13.5	14.5	15.4	16.0	16.6

Source: Based on high variant assumptions in text.

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Solomon Islands

Population projections, 1990–2011

Christine McMurray

The average annual rate of increase of the Solomon Islands population increased from less than 1 per cent per year in the 1950s to around 2.4 per cent between 1959 and 1970 and has since increased further to around 3.5 per cent. As a result, the total population has almost doubled since 1970, from 160,988 to 285,176 in 1986 (Table S1).

In the absence of in-depth analyses prior to 1970, it is not possible to determine long-term trends in fertility and mortality. However, Solomon Islanders have probably always tended to have large families, and high mortality rates probably checked population growth in the past. New infectious diseases caused many deaths in the late nineteenth and early twentieth centuries, while endemic diseases such as malaria, yaws, tuberculosis and leprosy sustained high mortality rates until the 1950s (Solomon Islands 1989:109).

During the nineteenth century a virtual slave-trade existed in Solomon Island labour. European traders, known as 'blackbirders', used press gang strategies to recruit Solomon Islanders to work in the Queensland and Fijian sugar plantations. Although many eventually returned to Solomon Islands there was a substantial reduction in the number of males of reproductive age from about 1870 to the early 1900s (Connell 1988:1). Subsequently the main island, Guadalcanal, was involved in military battles during World War II and the consequent loss of life and social disruption left deep scars on Solomon Island society (Connell 1988:2).

The return to peace and relative social stability after World War II, coupled with the expansion of health services, reduced mortality and prepared the ground for rapid population growth. In 1956 a mass campaign to give every individual a penicillin injection dramatically reduced the incidence of infectious diseases.

Malaria eradication campaigns commenced in the 1960s and the incidence of malaria was substantially reduced in the 1970s, although it has since increased again. The 1980s saw increased emphasis on preventive health care, including child immunization programs.

The 1970 Census found that Solomon Islands was one of the few nations where female life expectancy (43 years) was lower than that for males (59 years). Deaths in childbirth, poor nutrition and lowered resistance to infection from repeated childbearing were major contributors to high female mortality. Female life expectancy has since improved markedly to 61.4 years compared with 59.9 for males by 1986 (Solomon Islands, 1989:v). The infant mortality rate declined rapidly from 70 per thousand in 1970 to 46 per thousand in 1976. By 1986 this had further declined to 40 for males and 36 for females due to efficient child health services and immunization campaigns in the 1980s (Solomon Islands 1989: 110). This is a very low level for a developing country.

In 1986 the total fertility rate was still high at 6.1 children per woman. However it has declined from an average of 7.4 in the 1970–76 intercensal period (Solomon Islands 1989:92). The extremely high growth rate between 1970 and 1986 was due to the combination of a youthful age structure and low infant mortality with the high fertility rate (Table S1). Detailed analysis of fertility trends indicate that fertility may have peaked around 1984 and had only just begun to decline in 1986 when the census was taken (Solomon Islands 1989:v). Increased age at marriage as girls remained in school longer, and earlier cessation of childbearing could account for this downturn in fertility (McMurray 1990). Modern contraception probably did not have much impact prior

Table S1
Solomon Islands: population trends, 1970–86

	1970	1971–76	1977–86
Population	160998	196823	285176
Average annual growth rate (per cent)	..	3.4	3.5
Total fertility rate	6.6	7.3	6.3
Life expectancy at birth (years)			
Male	59	54	59.9
Female	43	54	61.4
Infant mortality rate (per '000)			
Male	70	46	40
Female	70	46	36

Source: Solomon Islands, 1986 *Population Census, Report 2.B: data analysis*, Statistics Office, Ministry of Finance, Honiara, 1989.

to 1986, but further vigorous promotion of family planning could lead to reductions.

In 1986 more than 94 per cent of the total population were Solomon Islanders, with small percentages of Gilbertese, Polynesians, Europeans, Asians and mixed origins (Solomon Islands 1989:11). As with other Melanesian populations, international migration of Melanesian Solomon Islanders is negligible. However, there is considerable internal migration, especially from outer islands to Guadalcanal, and from Malaita. This has led to crowding and a shortage of housing and wage employment in the capital, Honiara.

Projection methodology

Since there have been no recent or major population surveys in Solomon Islands, the projections shown are those made by Groenewegen for the official report on the 1986 Census (Solomon Islands 1989). Groenewegen made three national projections of the citizen population, using the Population Council's computer package FIVFIV, Version 8, 1986, for IBM compatible microcomputers (Shorter and Pasta 1987). The projections of school-age population, labour force and urban growth were made by the author with FIVFIV, Version 10.0, 1989, using the same assumptions as Groenewegen's N.2.F. projection.

Assumptions

Groenewegen based his projections on a smoothed age structure derived from the 1986 Census. Projection N.1.F assumes fertility and mortality remain constant at 1986 levels. This is probably an unlikely scenario, but serves as a reference point for comparing the impact on potential numbers of any fertility reduction (Table S2).

Groenewegen states that N.2.F assumes 'moderate' declines in both fertility and mortality. However, by international standards his assumption of a decline in total fertility rate from 6.1 children per woman in 1986 to only 3.6 by 2011 is rapid. The assumed fertility decline in N.3.F is even more rapid and follows the target set by the Solomon Islands Population Committee in September 1988. The population policy proposed a decline in total fertility rate from 6.1 to 3.7 by 1996, and to 2.6 by 2011 (Solomon Islands 1988b).

It is recognized, both in Solomon Islands and elsewhere, that this very low fertility target may be overly ambitious in the short term. There has not been a coordinated government effort to

Table S2
Solomon Islands: fertility and mortality assumptions made for population projections, 1991–2011

	1991	1996	2001	2006	2011
High variant N.1.F					
Total fertility rate	6.1	6.1	6.1	6.1	6.1
Life expectancy at birth					
Male	59.9	59.9	59.9	59.9	59.9
Female	61.4	61.4	61.4	61.4	61.4
Medium variant N.2.F					
Total fertility rate	6.1	5.5	4.9	4.2	3.6
Life expectancy at birth					
Male	59.9	62.4	64.9	67.4	69.9
Female	61.4	64.6	67.8	71.0	74.2
Low variant N.3.F					
Total fertility rate	6.1	3.7	3.3	3.0	2.6
Life expectancy at birth					
Male	59.9	62.4	64.9	67.4	69.9
Female	61.4	64.6	67.8	71.0	74.2

Source: Solomon Islands, *1986 Population Census, Report 2.B: data analysis*, Statistics Office, Ministry of Finance, Honiara, 1989:250–1.

implement the policy, and family planning prevalence was below 10 per cent in 1990. Nonetheless, this projection is included here to provide an indication of the minimum population size that could be expected under a scenario of rapid fertility decline.

Projections N.2.F and N.3.F assume a steady improvement in adult life expectancy throughout the projection period. All three projections assume international migration would continue to be negligible.

Population projection results

All projections indicate a large increase in the population size of Solomon Islands (Table S3). At constant rates of fertility and mortality (N.1.F) the total population would double between 1991 and 2011. Even if the rate of fertility declined rapidly to the levels targeted by the National Population Policy (N.3.F), the population in 2011 would still be 51 per cent greater than in 1991, or 74 per cent greater than in 1986. The slower, but still rapid, decline in fertility assumed in projection N.2.F would result in an increase of 78 per cent in the 20 year period.

These substantial increases would occur even if fertility were to decline rapidly, largely because the population has a very young age structure. In 1986, 47.2 per cent of males and 46.9 per cent of females were aged under 15 years. This generates considerable population momentum, as there are still a large number of young women who will reach childbearing age within the next two decades. Although their completed family size would eventually be smaller than that of the previous generation, the effect is not evident until they have ceased childbearing.

In both scenarios N.1.F and N.2.F the growth rates are expected to increase before they decrease (Table S4), even though the assumed constant fertility rate of 6.1 in N.1.F is less than for the period 1970–76, while N.2.F assumes declining fertility. This is because of population momentum, which means that in the short term the large numbers entering the reproductive ages offset the effects of lower fertility. Only the very rapid fertility decline assumed in N.3.F is sufficient to offset the effects of population momentum and give a sustained reduction in average annual growth rates (Table S4).

The constant projection (N.1.F) results in little change in the very high percentages aged 0–14 years (Table S5). However,

Table S3
Solomon Islands: projected population, 1986–2011

	1986	1991	1996	2001	2006	2011
High variant N.1.F	279660	331510	394160	469380	558270	662700
Medium variant N.2.F	279870	328730	384060	446550	513430	583890
Low variant N.3.F	280350	322770	362370	401710	444760	488550

Source: Solomon Islands, *1986 Population Census, Report 2.B: data analysis*, Statistics Office, Ministry of Finance, Honiara, 1989:252–4.

Table S4
Solomon Islands: inter-period average annual population growth rates, 1986–2011 (per cent)

	1986– 90	1991– 95	1996– 2000	2001– 05	2006– 11
High variant N.1.F	3.06	3.52	3.55	3.53	3.49
Medium variant N.2.F	2.88	3.16	3.06	2.83	2.61
Low variant N.3.F	2.51	2.34	2.08	2.06	1.90

Source: Derived from Table S3.

Table S5
Solomon Islands : age structure of projected population, 1991–2011
(per cent)

	1991	1996	2001	2006	2011
High variant N.1.F					
0–14	46.1	45.6	46.2	46.4	46.3
15–64	51.3	51.7	51.1	50.9	51.0
65+	2.6	2.7	2.7	2.7	2.7
Medium variant N.2.F					
0–14	45.5	43.7	42.3	40.7	38.7
15–64	51.9	53.5	54.6	56.1	57.8
65+	2.6	2.9	3.0	3.3	3.5
Low variant N.3.F					
0–14	44.4	40.3	35.8	32.8	31.1
15–64	52.9	56.7	60.8	63.4	64.7
65+	2.7	3.0	3.4	3.8	4.2

Source: Solomon Islands, 1986 *Population Census, Report 2.B: data analysis*, Statistics Office, Ministry of Finance, Honiara, 1989:252–4.

both the rapid fertility decline assumed in N.2.F and the very rapid decline assumed in N.3.F lead to a noticeable redistribution of the population by 2011. This is particularly marked for N.3.F, which would lead to a reduction of the proportion of the population aged under 15 years by almost 30 per cent.

Projection of school-age population

In Solomon Islands primary school is assumed to be for ages 8–13 years, lower secondary from 14–16 years and upper secondary from 17–19 years. The following projections of school age population and school enrolments are based on Groenewegen's medium variant, N.2.F, with 'moderate' decline in fertility. This variant was selected as being more attainable than N.3.F, even though N.3.F is based on the target set in the Solomon Islands Population Policy of 1988 (Solomon Islands, 1988b).

None of the age groups have attained one hundred per cent enrolment to date and the older age groups would not be expected to achieve it as some teenagers inevitably enter the working population (Table S6).

Habu (1989) discusses the difficulties of estimating primary school enrolments in Solomon Islands, where the legal age for beginning primary school is 6–9 years. He quotes estimates from *Statistical Bulletin* No. 38/84 based on the 7–14 age group which are, surprisingly, up to 20 per cent less than adjusted rates for ages 6–14. The

Table S6
Solomon Islands: projected school-age population, 1986–2011

	1986	1991	1996	2001	2006	2011
Primary (8–13)						
Males	25060	28670	32210	37480	42100	47920
Females	23060	26500	30020	35770	40090	45640
Total	48120	55170	62230	73250	82190	93560
Junior secondary (14–16)						
Males	10460	12660	14380	16240	18900	21130
Females	9620	11660	13270	15180	18050	20130
Total	20080	24320	27650	31420	36950	41260
Senior secondary (17–19)						
Males	9130	11310	13400	14830	17300	19820
Females	8440	10370	12410	13630	16440	18900
Total	17570	21680	25810	28460	33740	38720

Source: Based on projection N.2.F.

enrolment rates used here are derived from the 'Primary School Enrolment Survey 1987' (Solomon Islands, 1988c) and Groenewegen's smoothed estimated attendance rates based on the 1986 Census (Solomon Islands 1989:170). It is hard to determine whether these estimates are more likely to under- or over-state enrolments, but it is recommended that they be treated as minimum estimates of the future demand for education.

For simplicity the assumed enrolment rates for males and females are the same, although in reality females tend to have lower enrolment rates than males (Table S7). It is assumed that enrolments would gradually increase to 100 per cent of eligible children in primary school, 50 per cent in lower secondary school, and 20 per cent in upper secondary school by 2011.

The difficulties of estimating secondary school enrolment rates are similar to those for primary school enrolment, given variable percentages progressing from primary school to secondary school and between each secondary form. The 1989–94 Education Plan has the objective of making places available to all pupils up to Form 5 (Habu 1989). However, that is an ambitious target and since this projection is intended to provide minimum estimates, the average enrolment rate is assumed to reach only 50 per cent by 2011.

The numbers enrolled in primary school would, under population growth scenario N.2.F and the enrolment rates shown in Table S7, would double between 1986 and 2011 (Table S8). Lower secondary

Table S7
Solomon Islands: assumed school enrolment rates, 1991–2011

	1991		2011
Primary (8–13)	0.9	gradually increasing to	1.00
Junior secondary (14–16)	0.4	gradually increasing to	0.50
Senior secondary (17–19)	0.2	gradually increasing to	0.20

Source: Solomon Islands, *1986 Population Census, Report 2.B: data analysis*, Statistics Office, Ministry of Finance, Honiara, 1989:170.

enrolment would increase by around 150 per cent for both males and females, while the demand for upper secondary places would triple.

It must be emphasized that the assumptions used in these projections are conservative compared with the objectives of the Education Plan 1989–94, as described in Habu (1989). The primary school enrolment rates are based on ages 8–13 years, although Habu recommends that all children should commence school at age 6 years. These can therefore be considered as minimum estimates of likely numbers requiring education by 2011. Any lowering of the age of entry into primary school or expansion of the proportions enrolled would require a greater increase in expenditure on schools and staff.

Projection of labour force

Perceptions of the labour force can vary considerably depending on the age groups selected, definitions of work and the reference period used.

The 1986 Census used a one week reference period in the individual questionnaire, and a one year reference period for questions about household economic activities. The 1986 Census report states that working age in Solomon Islands is 14 years and over, and 87 per cent of males and 84 per cent of females were economically active, including village work and work for money (Solomon Islands 1989:180). The most common activity was unpaid village work with only 35 per cent of males and 13 per cent of females working for money in the census reference period. About two-thirds of those who did earn money also performed unpaid village work, so may have been only part-time or casual workers. More males were engaged in work for money or a combination of village work and work for money, and more females were exclusively employed in village work.

Increasing numbers of 14–19 year olds can be expected to be enrolled in secondary schools, and hence not in the labour force (Table S8). It is not clear from the 1986 Census report what

Table S8
Solomon Islands: projection of school enrolments, 1986–2011

	1986	1991	1996	2001	2006	2011
Primary (8–13)						
Males	22550	25800	28990	33910	40210	47920
Females	20760	23850	27010	32370	38290	45640
Total	43310	49650	56000	66280	78500	93560
Lower secondary (14–16)						
Males	4180	5060	5750	6580	8600	10570
Females	3850	4660	5210	6150	8220	10070
Total	8030	9730	10960	12730	16820	20640
Upper secondary (17–19)						
Males	2010	2490	2950	3320	4570	5950
Females	1860	2280	2730	3050	4340	5670
Total	3860	4770	5680	6370	8910	11620

Source: Based on projection N.2.F.

proportion of all 14–19 year olds were economically active. Only 40 per cent of those who were not working indicated that this was because they were students, but this may have been because most schools were closed for more than a week before the Census (Solomon Islands 1989:188). However, if the national objective of making secondary schooling up to Form 5 available to all were realized, the proportions in the youngest working-age group (14–19 years) would be expected to decline substantially.

The 14–19 year age group can be expected to include fewer economically active individuals as school enrolments increase; the 20–24 year olds can be considered as new job seekers and the 25–60 year olds as the major economically-active group (Table S9). For practical purposes the upper limit of working-age was considered to be 60 years.

It is difficult to predict trends in labour force participation. While it can be expected that there would be an increase in wage job participation with increasing economic development, economic stagnation could lead to a decline in participation rates. For the projection shown here the participation rates reported in the 1986 Census were assumed to remain constant for the 20–24 and 25–60 age groups throughout the projection period (Solomon Islands 1989:181), but those for age group 14–19 were assumed to decline, in line with the projected increase in school enrolments.

Table S9
Solomon Islands: projection of working-age population, 1986–2011

	1986	1991	1996	2001	2006	2011
Males						
14–19	19580	23970	27780	31070	36200	40950
20–24	12840	15720	19380	22680	25210	29490
25–60	43640	52020	62730	76430	92330	109810
Females						
14–19	18060	22030	25680	28810	34500	39030
20–24	11890	14520	17800	21000	23310	28130
25–60	40960	48740	58600	71110	85810	101930
Total						
14–19	37640	46000	53460	59880	70700	79980
20–24	24730	30240	37180	43680	48520	57620
25–60	84600	100760	121330	147540	178140	211740

Source: Based on projection N.2.F.

Table S10
Solomon Islands: assumed labour force participation rates, 1991–2011

		1991		2011
Wage jobs				
Males	14–19	0.13	gradually declining to	0.07
	20–24	0.36	constant	0.36
	25–60	0.36	constant	0.36
Females	14–19	0.05	gradually declining to	0.03
	20–24	0.13	constant	0.13
	25–60	0.13	constant	0.13
Non-wage jobs				
Males	14–19	0.20	gradually declining to	0.12
	20–24	0.51	constant	0.51
	25–60	0.51	constant	0.51
Females	14–19	0.27	gradually declining to	0.17
	20–24	0.71	constant	0.71
	25–60	0.71	constant	0.71

Source: Solomon Islands, 1986 Population Census, Report 2.B: data analysis, Statistics Office, Ministry of Finance, Honiara, 1989:180–1.

For wage jobs the participation rate of males and females aged 14–19 was assumed to be half that for males and females aged 20–24 and 25–60 (Table 10). It was also assumed that by 2011 these rates would decline to only 25 per cent of those for age group 20–60, as more teenagers remained at school. For non-wage jobs the participation rates for teenagers were assumed to be about 40 per cent of those for ages

Table S11
Solomon Islands: projection of labour force, 1986–2011

	1986	1991	1996	2001	2006	2011
Wage jobs						
Male						
14–19	3530	4320	5000	5590	6520	7370
20–24	4620	5660	6980	8160	9080	10620
25–60	15710	18730	22580	27510	33240	39530
Female						
14–19	1080	1320	1540	1730	2070	2340
20–24	1550	1890	2310	2730	3030	3660
25–29	5330	6340	7620	9250	11160	13250
Non-wage jobs						
Male						
14–19	4900	5990	6950	7770	9050	10240
20–24	6550	8020	9880	11570	12860	15040
25–60	22260	26530	31990	38980	47090	56000
Female						
14–19	6320	7710	8990	10080	12070	13660
20–24	8480	10350	12690	14970	16620	20060
25–60	29210	34750	41780	50700	61180	72680
Total						
14–19	15830	19340	22480	25170	29710	33610
20–24	21200	25920	31860	37430	41590	49380
25–60	72510	86350	103970	126440	152670	181460

Source: Based on projection N.2.F using assumptions shown in Table 10.

20–24 and 25–60 in 1991, and to decline to around 20 per cent by 2011. For the age group 20–24 and 25–60 participation rates in both wage jobs and non-wage jobs were assumed to remain constant (Table S10).

Overall, Table S11 indicates a dramatic increase in the number seeking employment. For the 20–60 year old age group the number of males and females seeking employment in either wage or non-wage jobs is expected to double by 2011. Also, despite the assumed declining participation rates for the 14–19 year olds, the number in this age group could increase by more than 70 per cent.

These projections assume constant participation of the bulk of the labour force in non-wage jobs. However, it is more likely that the demand for employment would be greater in the wages sector, as large numbers of better educated school leavers enter the labour force. In that case the demand for wage job creation would be even greater than the minimum estimates suggested here. Birks and Marau comment ‘...serious unemployment threatens within 5 years in Solomon Islands, despite substantial economic growth and continued

progress in education and training' (1984:1). The projection presented here suggests that this situation is very likely to continue.

Urbanization

A usual consequence of increased demand for wage employment is increased migration to urban areas. In most countries the majority of rural-urban migrants are aged between 15 and 40, that is, in both the prime working and the prime reproductive ages. In Solomon Islands there are high levels of internal migration, both between islands and from rural to urban areas. The main urban destination is the capital, Honiara. This centre has already experienced pressure on its employment creation capacity, and also on urban services such as housing, schools and sanitation. The 1986 Census report showed that Honiara had grown at an average of 6.9 per cent per year in the intercensal period, while the rate for all urban areas, including Honiara, was slightly lower at 6.7 per cent. Smaller and more remote centres such as Auki experienced a decline, while larger centres generally experienced an increase in growth rates.

Attempts to guess the rate at which future urban growth will occur are necessarily speculative. Activities which generate village employment could slow urbanization, while either large scale employment generation in urban areas or general economic stagnation could stimulate migration to urban areas.

The following projection of urban growth was made mathematically by applying the 1976-86 urban growth rate to the N.2.F projection for the period 1991-2011 to calculate the proportions which would be urban and rural at each projection period. It refers to total numbers only as it is not cohort based and does not take into account different rates of rural to urban migration amongst different age groups.

If urban growth were to continue at constant rates, the proportion of the population in urban areas would increase from only 13 per cent in 1986 to 32 per cent in 2011 (Table S12). This would represent an almost five-fold increase in actual numbers. Urban growth of 6.8 per cent is not extreme by world standards, and higher rates of increase would be plausible.

Although this is only one possible scenario of urban growth, it seems inevitable that the relative size of urban areas will increase dramatically in Solomon Islands as the demand for wage employment draws people away from rural areas. Moreover, it is likely that much of this growth would take place in Honiara. This would generate a growing demand for housing, schools, health facilities and

Table S12
Solomon Islands: projection of rural and urban population, 1986–2011

	1986	1991	1996	2001	2006	2011
Urban						
Number	36920	51300	71280	99040	137620	191220
Per cent of total population	13.0	15.3	18.1	21.6	26.0	31.6
Rural						
Number	246590	283630	322080	359700	392380	414500
Per cent of total population	87.0	84.7	81.9	78.4	74.0	68.4
Total	283510	334930	393360	458740	530000	605720

Source: Based on projection N.2.F (totals differ slightly from Groenewegen's owing to different calculations of base population).

other urban services, as well as for employment opportunities. Only substantial growth in rural employment opportunities would reduce migration and avoid severe pressure on urban facilities.

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Kiribati

Population projections, 1990-2010

Habte Tesfaghiorgis

The population of Kiribati has doubled in the past 50 years, growing from 31,500 in 1947 to 72,300 in 1990. Prior to 1947, the growth rate was slow, at 0.4 per cent per year, but the population has since been increasing at over 2 per cent per year. The high growth rate is due to both declining mortality and high fertility.

Mortality, especially child mortality, has declined dramatically. The number of children dying before reaching their fifth birthday declined from about 190 deaths per thousand live births in 1964

Table K1
Kiribati: population trends, 1978-90

	1978	1985	1990
Population (de facto)	56210	63880	72300
Crude birth rate ('000)	33.5	37.5	29.4
Crude death rate ('000)	14.0	14.0	9.2
Rate of natural growth (per cent)	2.0	2.4	2.0
Total fertility rate	4.4	4.9	3.8
Infant mortality (per '000)	87.0	82.0	65.0
Expectation of life at birth			
Males	50.0	51.0	57.7
Females	54.0	55.0	62.8

Note: The number of Kiribatis known to be overseas was 2,299 or 3.4 per cent in 1985. These figures indicate that the number of Kiribatis overseas accounts for only a small share of the total population.

Sources: Kiribati, *Report on the 1978 Census of Population and Housing*, Ministry of Home Affairs and Decentralisation, Tarawa, 1983:75-137 (for 1978); H. Booth, *Population Census of Kiribati: demographic analysis*, unpublished paper prepared for Statistics Office, Ministry of Finance, Kiribati, 1985 (for 1985); H. Tesfaghiorgis, *Analytical Report on Fertility, Mortality and Population Projections of Kiribati*, unpublished paper prepared for Statistics Office, Ministry of Finance, Kiribati, 1990 (for 1990).

to 88 per thousand live births in 1989 (Tesfaghiorghis 1990). The expectation of life at birth for males improved from 50 years in 1978 to 57.7 years in 1990 and for females, it rose from 54 to 62.8 years over the same period (Table K1). The total fertility rate is high. It was estimated at 3.8 children per woman in 1990, although it has declined from around 7 children per woman in the mid-1960s.

Projection methodology

Population projections for the period 1990–2010 are based on the de facto population enumerated in the 1990 Census. The 1990 enumerated population totals by sex were accepted as a correct base population, but the reported age–sex distribution was adjusted for reporting and omission errors. Three sets of population projections were prepared from the combination of three fertility assumptions with one mortality assumption. The projections were performed using the computer software package, *People*.

Assumptions

Three assumptions of fertility were made (Table K2). The high variant assumes a continuation of the current fertility level, which would result if significant increases in contraceptive use rate are not achieved. The other variants are based on the premise of a moderate or fast reduction in fertility as a consequence of a strong family planning program effort. The medium fertility decline is based on the assumption that replacement fertility would be reached in 30 years; that is, the total fertility rate would decline linearly from 3.8 children per woman in 1990 to 2.8 children by 2010. The rapid fertility decline is based on the assumption that replacement fertility would be reached in 20 years, that is, Kiribati's total fertility rate would drop to 2.17 children by 2010 (Table K2).

All projections assume that life expectancy at birth would increase from 60.2 years in 1990–95 to 66.5 years in 2006–2010 for males and from 65.3 years in 1990–95 to 71.6 years for females over the same period. These assumed mortality declines follow the United Nations (1989:16) pattern of moderate mortality decline for populations which have already achieved an expectation of life at birth of 60 years or more.

Due to lack of data and also due to the small effect of international migration on the population size of Kiribati, international migration is assumed to be nil in the projections.

Table K2
**Kiribati: fertility and mortality assumptions made for population
 projections, 1990–2010**

	1990– 95	1996– 2000	2001– 05	2006– 10
Total fertility rate				
High variant	3.80	3.80	3.80	3.80
Medium variant	3.50	3.26	3.03	2.80
Low variant	3.50	2.99	2.55	2.17
Life expectancy at birth				
Male	60.2	62.5	64.5	66.5
Female	65.3	67.6	69.6	71.6

Source: Based on definitions in text.

Population projection results

The projections indicate that the future population of Kiribati would be considerably larger under all variants (Table K3). By 2010 the base population of 72,300 could increase by between 60 per cent and 38 per cent to 115,980 under the high variant and 99,820 under the low variant. In the case of the medium variant, Kiribati's population would reach 105,300 by the year 2010, an increase of 46 per cent. Thus by 2010, there could be an additional 33,000 people who would need to be fed, schooled, employed and housed.

These large population increases would occur despite the substantial fertility decline assumed in the medium variant because it takes at least 15–20 years for any decline in fertility to have an effect on population size and because of the growth potential inherent in the age structure.

Except for the low variant, these projected population growth rates for Kiribati are higher or similar to the projected medium variant growth rates for less developed countries (Table K4). Under the

Table K3
Kiribati: projected population, 1990–2010

	1990	1995	2000	2005	2010
High variant	72300	80650	90490	101910	115980
Medium variant	72300	79770	87860	96440	105300
Low variant	72300	79600	86710	93500	99820

Source: Derived from assumptions in text.

Table K4
**Kiribati: inter-period average annual population growth rates,
 less developed and developed regions, 1990–2010 (per cent)**

	1990– 95	1996– 2000	2001– 05	2006– 10
High variant	2.18	2.30	2.38	2.41
Medium variant	1.97	1.93	1.86	1.76
Low variant	1.92	1.71	1.51	1.31
Less developed countries	2.06	1.92	1.74	1.56
Industrialized countries	0.48	0.45	0.38	0.32

Sources: Derived from assumptions in text and United Nations, *World Population Prospects 1988*, Population Studies No.106, New York, 1989 :35.

Table K5
Kiribati: age structure of projected population, 1990–2010 (per cent)

	1990	1995	2000	2005	2010
High variant					
0–14	40.8	38.8	37.1	35.7	36.3
15–64	56.1	57.8	59.1	60.2	59.4
65+	3.1	3.4	3.8	4.1	4.3
Median age (years)	19.4	20.4	21.2	21.9	22.5
Medium variant					
0–14	40.8	38.1	35.2	32.1	31.2
15–64	56.1	58.4	60.9	63.6	64.0
65+	3.1	3.5	3.9	4.3	4.8
Median age (years)	19.4	20.7	22.0	23.3	24.7
Low variant					
0–14	40.8	38.0	34.4	30.0	27.6
15–64	56.1	58.5	61.7	65.6	67.4
65+	3.1	3.5	3.9	4.4	5.0
Median age (years)	19.4	20.7	22.3	24.1	26.2

Source: Based on assumptions in text.

high variant the growth rate would rise from 2.18 per cent per year in the 1990–95 period to 2.41 per cent per year in 2006–2010. A strong family planning program would lead to a decline in the rate of population growth to 1.76 per cent per year by 2010 in the medium variant, and 1.31 per cent per year in the low variant.

While the age structure would change little under the high variant, there would be substantial age structure changes under both the medium and low variants (Table K5). In general the population,

as measured by increases in the median ages, would grow older, especially under the low variant. The share of the working-age population would increase from 56 per cent in 1990 to 64 per cent in 2010 under the medium variant and to 67 per cent under the low variant. The proportion of children under 15 years would decline from 41 per cent in 1990 to 31 per cent in 2010 under the medium variant, and to 28 per cent under the low variant. Despite this the absolute number of children would continue to increase due to the growing number of females of reproductive age. For example, the median projection indicates that the number of children under 15 years could increase from 29,510 in 1990 to 32,860 in 2010. A decline in the actual number of children would not occur until after 2015.

Projection of school age population

The government is the main provider of primary education following amalgamation of mission primary schools into a unified system of education under government control (Kiribati, Ministry of Education 1987). Schooling is compulsory for children aged 6–13 years. Churches are the main providers of secondary education, with the government owning only one of the 7 academic secondary schools.

Kiribati children begin school at age 6 and attend primary school for 7 years. Children may then continue at primary school for classes 8 and 9 or enrol in an academic secondary school. For the projections, all children aged 13–15 were considered eligible for junior secondary school. Senior secondary school includes Forms 4–7, corresponding to the 16–19 year old age group.

The projections of school-age population are based on the medium variant with modestly declining fertility because it is considered the most plausible population projection. The total school-age population is expected to increase by 21 per cent between 1990 and 2010: 17 per cent for primary, 22 per cent for junior secondary and 29 per cent for the senior secondary school-age population. The relatively slower growth of the primary school-age population is due to declining fertility.

As primary education is compulsory for children aged 6–12 years, primary school enrolment is projected to immediately reach 100 per cent in 1995 and remain constant thereafter.

Secondary school enrolment ratios for 1990 were calculated by relating 1987 enrolment data to the 1990 school-age populations. The enrolments for junior and secondary schools were derived by dividing the total secondary enrolments roughly into 1,450 junior secondary and 1,286 senior secondary, based on 1987 enrolment data. Also, 15 per cent of the 1987 primary enrolments were 13–15 years

Table K6
Kiribati: projected school-age population, 1990–2010

	1990	1995	2000	2005	2010
Primary (6–12)					
Males	6550	7530	7280	6970	7640
Females	6390	7240	7050	6830	7440
Total	12940	14770	14330	13800	15080
Junior secondary (13–15)					
Males	2440	2770	3280	3050	2990
Females	2430	2710	3150	2970	2930
Total	4870	5480	6430	6020	5920
Senior secondary (16–19)					
Males	2940	3370	3820	4490	3830
Females	2950	3340	3730	4320	3760
Total	5890	6710	7550	8810	7590
Total	23700	26960	28310	28630	28590

Source: Based on medium variant assumptions in text.

old. Therefore, the total junior secondary population enrolment, 3,665, was arrived at by adding 15 per cent of those enrolled in primary schools to the estimated 1,450 enrolled in junior secondary schools. These rough calculations give 1990 enrolment ratios of about 75 per cent for junior secondary and 15 per cent for senior secondary.

As education for children aged 13 years is compulsory, enrolment ratios for children aged 13 years old are assumed to gradually reach 100 per cent. Given the compulsory education of 13 year olds, the enrolment ratio of the junior secondary population is assumed to rise gradually from 75 to 90 per cent. The enrolment ratio of the senior secondary population is assumed to double, rising from 15 per cent to 30 per cent (Table K7).

Under these assumptions, the total enrolment would rise from its current level of 17,510 students to 22,690 by 2010, representing a growth of 30 per cent. Although the enrolment increase would be concentrated in the primary school age population in absolute terms, much of the relative growth would be in the secondary school sector. Senior secondary enrolments could increase by 77 per cent between 1990 and 2010, while junior secondary enrolments would increase by 45 per cent and primary school enrolments would increase by 20 per cent over the same period.

Table K7
Kiribati: assumed school enrolment rates, 1990–2010 (per cent)

	1990	1995	2000	2005	2010
Primary (6–12)	97	100	100	100	100
Junior secondary (13–15)	75	80	85	90	90
Senior secondary (16–19)	15	20	25	30	30

Source: Based on assumptions in text.

Table K8
Kiribati: projection of school enrolments, 1990–2010

	1990	1995	2000	2005	2010
Primary (6–12)	12550	14770	14330	13800	15080
Junior secondary (13–15)	3670	4380	5470	5420	5330
Senior secondary (16–19)	1290	1340	1890	2640	2280
Total	17510	20490	21690	21860	22690

Source: Based on medium variant assumptions in text.

Projection of labour force

The projected working-age population is based on the medium variant projections, which assumed a moderate decline in fertility. The effect of fertility and mortality reductions on the labour force is to increase the burden of employment creation due to the rapid growth of the working-age population, while lessening the childhood burden. The population aged 15 years and over is projected to increase by 69 per cent during the projection period from 42,790 in 1992 to 72,450 in 2010. The implications of such large growth for employment provision are enormous.

Economic activity in Kiribati is categorized into cash or village work. The major source of employment is village work, accounting for 73 per cent of total employment in 1978 and 65 per cent in 1990. The increase in cash sector employment was largely due to a dramatic increase in jobs in the forestry and fisheries industries. Most of those engaged in cash work were employees, but the contribution of self-employment to total cash employment increased from 6.4 per cent in 1985 to 25.9 per cent in 1990. Cash sector employment is concentrated in the urban area, South Tarawa, although its share of total cash employment dropped from 60 per cent in 1985 to 45 per cent in 1990 (Kiribati 1983, 1986, 1991).

Table K9
Kiribati: projection of working-age population, 1990–2010

	1990	1995	2000	2005	2010
Males					
15–19	3730	4270	4870	5560	4800
20–24	3210	3680	4220	4820	5520
25+	13820	16060	18690	21740	25270
Females					
15–19	3740	4220	4740	5350	4710
20–24	3280	3710	4190	4710	5320
25+	15030	17440	20190	23310	26830
Total					
15–19	7470	8490	9610	10910	9510
20–24	6490	7390	8410	9540	10850
25+	28850	33500	38880	45050	52100

Source: Based on medium variant assumptions in text.

The overall labour force participation rate, that is, the share of the labour force as a percentage of the population aged 15 years and over, increased from 68 per cent in 1985 to 76 per cent in 1990. This increase is mainly due to increased female labour force participation, especially in urban areas, which rose from 48 per cent in 1985 to 68 per cent in 1990. By contrast, male participation in the labour force declined from 89 to 84 per cent overall and from 80 to 72 per cent for 15–24 year old males over the same period (Kiribati 1986, 1991). The unemployment level in Kiribati was 2.8 per cent in 1990, although it was higher in urban areas, for example 4.4 per cent in South Tarawa.

In these projections, the national male labour force participation rates are assumed to rise to the 1990 urban age specific participation rates by 1995 and to remain constant throughout the projection period, except for young males aged 15–24, whose activity rate has been declining. Given the expectation of increasing school enrolments among 15–19 year olds, further activity decline for this group is assumed.

Village work is the major form of employment in general and more so among the female labour force. Cash work, however, is more important among adult males aged 25–49 years, as more than 50 per cent of the labour force in this age category was in the cash sector. The distribution of the labour force by sex–age groups and cash and non-cash workers was assumed to remain constant throughout the

Table K10
Kiribati: assumed labour force participation rates, 1990–2010 (per cent)

	Participation in labour force		Participation by employment sector, 1990	
	1990	2010	Cash	Village
Males				
15–24	72.0	declining to	65.0	26.2
25–34	92.5	constant	92.5	68.7
35–49	94.0	constant	94.0	52.5
50+	79.6	constant	79.6	63.0
				39.7
				57.9
Females				
15–24	61.3	declining to	60.0	18.8
25–34	77.1	increasing to	82.4	25.9
35–49	75.0	increasing to	80.8	23.7
50+	57.9	increasing to	62.0	11.4
				86.5

Note: The difference of row totals from 100 per cent for each sex by given age in theory represents the unemployed component of the labour force.

Source: Kiribati, *Kiribati Population Census, 1990: summary results*, Statistics Office, Tarawa, 1991.

projection period (Table K10). In fact the labour force distribution is unlikely to remain constant but it is difficult to predict the types of changes that may occur. On the one hand, the rapid growth of the labour force could result in ever growing numbers of unemployed persons, forcing them back to village work. Alternatively, the distribution of the labour force between cash and village workers may be influenced by substantial structural changes to the economy which could result in more cash jobs.

Projections of the labour force were made by applying the assumed age–sex specific labour force participation rates and labour force distribution to the projected working-age population given in Table K9. The total labour force is projected to grow from 32,350 persons in 1990 to 55,510 in 2010. The absolute increase in the total labour force amounts to 23,160 persons (Table K11).

With respect to cash and non-cash employment, there could be a total of 19,200 in or seeking cash employment in 2010 compared to 11,050 in 1990. The labour force in non-cash sector employment is projected to increase from 20,410 persons in 1990 to 34,860 in 2010, with females making up the larger share of this category (Table K11).

Table K11
Kiribati: projection of labour force, 1990–2010

	1990	1995	2000	2005	2010
Cash workers					
Males					
15–24	1310	1350	1550	1770	1760
25+	6620	7680	8920	10350	12010
Females					
15–24	810	890	1010	1140	1130
25+	2310	2850	3280	3760	4300
Total	11050	12770	14760	17020	19200
Village workers					
Males					
15–24	3440	3550	4060	4640	4610
25+	5500	6400	7450	8670	10080
Females					
15–24	3350	3700	4170	4700	4680
25+	8120	10080	11670	13470	15490
Total	20410	23730	27350	31480	34860
Total ^a	32350	37530	43250	49830	55510

^a Total includes unemployed.

Source: Based on medium variant assumptions in text.

Urbanization

The population of Kiribati is mostly concentrated in the Gilberts group of islands. However, there is a growing tendency for a population redistribution towards the Line and Phoenix group of islands, with major population shifts also within the Gilberts group of islands. There have also been increasing population movements to urban South Tarawa. The urban share of total population increased from 28.3 per cent in 1973 to 34.8 per cent in 1990 (Table K12).

The trends in past population shifts are extrapolated to project the urban population (South Tarawa) compared with the rest of Kiribati. South Tarawa's share of the total population was projected to increase by 70 per cent to comprise 39 per cent of the total population by 2010 (Table K12). This will result in massive increases in demand for urban infrastructure, housing and employment. A caveat is, however, necessary. As the projected population redistribution is based on the extrapolation of past trends, it has to be recognized that any future differential development of island groups will alter the projected population distribution.

Table K12
Kiribati: past and projected urban populations, 1973–2010

	1973	1978	1985	1990	2010
South Tarawa	14670	18030	21390	25150	41070
Per cent	28.3	32.1	33.5	34.8	39.0
Kiribati	51930	56210	63880	72300	105300

Sources: Projections based on medium variant assumptions in text. Kiribati, *Report on the 1978 Census of Population and Housing*, Vol.2, Ministry of Home Affairs and Decentralization, Tarawa, 1983; Kiribati, *Report on the 1985 Census of Population*, Vol.1, Statistics Office, Tarawa, 1986; Kiribati, *Kiribati Population Census 1990: summary results*, Statistics Office, Tarawa, 1991.

Conclusion

The projections show that Kiribati will have a much larger population 20 years from now compared to its base population of 72,300. Despite the substantial fertility decline incorporated in the medium variant projection, there would be considerable increases in the school-age population, rapid growth of the working-age population and a concentration of the country's population in the urban area. If the current fertility level continues, the consequent population problems would be severe. This projection exercise points to the urgent need for limiting population growth through an appropriate population policy. As the effect of fertility reduction on population growth and structure takes a long period to materialize, strong family planning programs need to be implemented immediately.

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Western Samoa

Population projections, 1991–2011

Reupena Muagututia

Western Samoa consists of seven small islands with 99.9 per cent of the population living on Upolu, where the capital Apia is located, and Savaii. The 1986 Census of Population counted about 157,000 persons, compared to 156,000 persons enumerated during the 1981 Census. With an increase of a little over a thousand, the intercensal annual growth rate is about 0.1 per cent. The rate of increase of Western Samoa's population declined after independence from 3.3 per cent per year between 1956 and 1961 to about 0.6 per cent in the 1970s. Despite a decline in the total fertility rate, the country's birth rate remained relatively high at 30 per thousand. The major reason for the low population growth rate is a high level of emigration of working-age people (20–45 years) to seek employment in countries like American Samoa, Samoa, New Zealand and Australia. The net annual emigration rate has varied between 16 and 22 per thousand during the past decade (Table W1).

Table W1
Western Samoa: population trends, 1971–91

	1971	1976	1981	1986	1991 ^a
Population ('000)	147	152	156	157	160
Intercensal annual growth rate (per cent)	2.2	0.7	0.6	0.1	0.3
Crude birth rate (CBR)	..	..	31.0	29.5	..
Crude death rate (CDR)	..	..	7.4	5.0	..
Net out-migration rate	..	..	16.7	28.0	..

^a Provisional.

Sources: Western Samoa, *Census of Population and Housing*, Department of Statistics, Apia 1971, 1976, 1981, 1986; Western Samoa, *Vital Statistics Survey 1982–90*, Department of Statistics, Apia; *Canberra Times*, 17 January 1992:9.

Projection methodology

Three computer projections are presented here to depict the impact of different levels of fertility and migration on the total Western Samoan population, by age and sex. The enumerated population and the age-specific fertility rate from the 1986 Census are used as the base data for these projections (Western Samoa 1986).

Assumptions

All projections assume that mortality will continue to fall, in line with the trend observed in recent years. Life expectancy at birth has increased from 56 years for males and 58 years for females in 1962, to 63 and 65 years in 1986 (United Nations 1991). All projections assume a quinquennial gain of two years in life expectancy up to the year 2001 and a gain of 1.5 years after 2001. All projections assume an equal sex ratio among migrants although the proportion of males has varied between 52 and 56 per cent since 1979 (Western Samoa 1984, 1988, 1990, 1991).

The constant variant assumes that fertility and migration will continue in their present patterns throughout the projection period. The total fertility rate has remained unchanged since 1976 and a constant total fertility rate of 4.5 children per woman is applied. The annual net migration rate is set at 18 per thousand. The high variant assumes that fertility will remain constant but that emigration will cease after 1996. Although this is unrealistic it does indicate the underlying rate of natural increase in the absence of emigration.

The declining variant assumes that the total fertility rate will decline from 4.5 to 3.5 children per woman by 2011 and that emigration will decline from 18 per thousand to a medium level of 13 per thousand over the same period.

This seems to be the most plausible scenario, reflecting the current level of social development in Western Samoa. Receiving countries may limit immigration due to the current economic crisis, but will probably continue to receive some immigrants from Western Samoa, either because of policies such as those which allow family reunions or through illegal immigration. A further decrease in the total fertility rate is anticipated, on the basis of current improvements in family planning services, both by the Government Family Planning Program and the Western Samoan Family Health Association.

Table W2
**Western Samoa: fertility, mortality and migration assumptions made for
 population projections, 1991–2011**

	1991	1996	2001	2006	2011
Mortality assumptions for all projections					
Life expectancy at birth (years)					
Males	63	65	67	68.5	70
Females	65	67	69	70.5	72
Constant variant					
Total fertility rate	4.5	4.5	4.5	4.5	4.5
Net number of emigrants (per 1000 population)	18.0	18.0	18.0	18.0	18.0
High variant					
Total fertility rate	4.5	4.5	4.5	4.5	4.5
Net number of emigrants (per 1000 population)	18.0	13.0	–	–	–
Low variant					
Total fertility rate	4.5	4.3	4.0	3.8	3.5
Net number of emigrants (per 1000 population)	18.0	17.0	16.0	14.5	13.0

Source: Based on definitions in text.

Population projection results

Under the most plausible scenario of declining fertility and medium emigration (the low variant), the population of Western Samoa would increase by around 12 per cent, from 157,000 in 1986 to 180,000 in 2011. A similar population increase is projected if fertility and emigration continue at 1986 levels (the medium variant). However, if fertility remains high but emigration is stopped, the population could increase by 64 per cent, to 257,000 in 2011 (Table W3). The inter-period growth rate is projected to increase from 0.55 per cent per year to 2.81 per cent if emigration stops, but would decrease slowly under the other variants (Table W4). The age structure of the population does not change much under any of the projections, although the working-age population would increase slightly under the variants where migration stops or declines (Table W5).

The results of the population projections are similar to those made by other authors using comparable assumptions. Ahlburg (1991) assumes a growth rate of 0.5 per cent per annum and projected populations of 258,700 by 2010 if emigration stops, and 176,000

if emigration continues at its current level. Bulatao et al. (1990) projected a population of 242,000 by 2010, assuming a very low emigration rate, and Bakker (1990) projected a population of 178,000 by 2010, assuming a constant growth rate of 0.7 per cent per year.

Table W3
Western Samoa: projected population, 1986–2011 ('000)

	1986	1991	1996	2001	2006	2011
NCDS projections						
Constant variant	157	162	167	172	174	175
High variant	157	162	168	193	223	257
Low variant	157	162	167	172	177	180

Source: Based on assumptions in Table W2.

Table W4
Western Samoa: inter-period average annual population growth rates, 1986–2011 (per cent)

	1986–91	1992–96	1997–2001	2002–06	2007–11
Constant variant	0.55	0.63	0.56	0.33	0.11
High variant	0.55	0.80	2.76	2.84	2.81
Low variant	0.55	0.66	0.60	0.50	0.34

Source: Derived from Table W3.

Table W5
Western Samoa: age structure of projected population, 1986–2011 (per cent)

	1986	1991	1996	2001	2006	2011
Constant variant						
0–14	41.2	39.9	40.5	41.7	42.8	43.0
15–64	55.4	56.1	55.1	53.7	52.8	53.3
65+	3.4	4.0	4.4	4.6	4.4	3.8
High variant						
0–14	41.2	39.9	40.3	39.4	39.6	39.6
15–64	55.4	56.1	55.3	56.5	56.8	57.2
65+	3.4	4.0	4.4	4.1	3.6	3.2
Low variant						
0–14	41.2	39.9	39.9	39.8	39.2	37.5
15–64	55.4	56.1	55.7	55.6	56.4	58.6
65+	3.4	4.0	4.4	4.6	4.4	3.9

Source: Based on assumptions in text.

Projection of school-age population

School in Western Samoa is neither compulsory nor free, yet 87 per cent of school-age children were enrolled in schools in 1986. Children are eligible to go to school at age five and generally spend 9 years in primary school and 5 years in secondary school. In these projections primary school age is taken as 5–14 years and secondary school age as 15–19 years.

The projection of the school age-population is based on the most plausible variant (low variant), which assumes that fertility and emigration will each decline by about 25 per cent over the projection period. Under these conditions, the total school-age population (5–19 years) could increase by 3,400 between 1986 and 2011. Most of the change would be in the primary school-age population which is projected to increase by 2,600 while the high-school-age population would increase by around 800.

Western Samoa's Sixth Development Plan singled out education as one of the priority components of its future social development strategy, thus emphasizing the provision and easy access of all Western Samoan children to schooling and equal opportunities for learning from lower primary to the end of secondary education. The enrolment ratio for primary schooling is assumed to increase from 80 per cent to 100 per cent by the year 2011. The enrolment ratio for secondary level is assumed to increase from 82 per cent to 90 per cent by the end of 2011.

Table W6
Western Samoa: projection of school-age population, 1986–2011

	1986	1991	1996	2001	2006	2011
Primary (5–14)						
Males	23000	22600	22600	23000	23600	23300
Females	19700	19300	20200	21800	22300	22000
Total	42700	41900	42800	44800	45900	45300
Secondary (15–19)						
Males	11500	11500	10800	11000	10800	11400
Females	9700	9500	9000	9000	10000	10600
Total	21200	20900	19800	20000	20800	22000
Total (5–19)						
Males	34500	34000	33400	34000	34400	34700
Females	29400	28800	29200	30800	32300	32600
Total	63900	62800	62600	64800	66700	67300

Source: Derived from low variant assumptions in text.

Enrolment in primary schools could increase by 33 per cent, while secondary school enrolments are projected to increase by 23 per cent between 1986 and 2011. This could generate a demand for up to 13,600 additional school places by 2011.

Table W7
Western Samoa: projection of school enrolments, 1986–2011

	1986	1991	1996	2001	2006	2011
Primary (5–14)						
Males	18400	19000	20300	21600	22300	23300
Females	15800	16200	17800	20500	21400	22000
Total	34200	35200	38100	42100	44100	45300
Secondary (15–19)						
Males	9400	9600	9200	9200	9500	10300
Females	7900	7900	7300	7700	8800	9500
Total	17300	17500	16500	17200	18300	19800
Total (5–19)						
Males	27800	28600	29500	31100	31800	33600
Females	23700	26900	25100	28200	30200	31500
Total	51500	52700	54600	59300	62400	65100

Source: Derived from declining variant assumptions in text.

Table W8
Western Samoa: projection of working-age population, 1986–2011

	1986	1991	1996	2001	2006	2011
Males						
15–19	11480	11380	10760	10950	10780	11410
20–24	8500	10620	10520	9900	10080	9890
25+	28480	29420	32350	35070	37060	39210
Total	48460	51420	53630	55920	57920	60510
Females						
15–19	9660	9500	9040	9040	9980	10590
20–24	7300	8650	9480	8020	8000	8930
25+	26440	27630	29370	30800	33850	35980
Total	43390	45780	46890	47860	51830	55500

Source: Based on assumptions in text.

Projection of labour force

The 1986 Census (Western Samoa 1989:29) defines the labour force as being comprised of people aged 10 years and over. However, this projection defines the working-age population as those 15 years and above, since almost 90 per cent of people under 15 years old are at school.

The total working-age population is projected to increase by 24 per cent, from 92,000 to around 116,000. The largest increase is in the 25+ age group, which could grow by 24 per cent.

The labour force projection is based on age groups and sex-specific economic activity rates derived from the 1986 Census except for the 15–19 years age group. All rates except for the 15–19 years age group are assumed constant over the projection period (Table W9), with an average participation rate of 76.2 per cent for males and 19.4 per cent for females, although male labour force participation has declined slightly in recent years (Western Samoa 1989:29). Persons in the 15–19 years age group are assumed to be attending school. The participation rate in the formal and informal labour force is also assumed to remain constant with 68.7 per cent of the female labour force and 26.9 per cent of the male labour force being employed in the formal sector (Western Samoa 1989: Table 30).

The size of the labour force is likely to increase from 45000 in 1986 to 56000 in 2011. Most of the labour force growth would be in the 25+ age group which could increase by as much as 37 per cent due to declining migration. The 20–24 year old group is projected to increase by 18 per cent (Table W10). Although it is likely that most of the economically active population would be involved in the agriculture

Table W9
Western Samoa: assumed labour force participation rates, 1986–2011

	1986	1991	2011
Males			
15–19	0.21	declining to	0
20–24	0.92	constant	0.92
25+	0.95	constant	0.95
Females			
15–19	0.06	declining to	0
20–24	0.34	constant	0.34
25+	0.19	constant	0.19

Source: Western Samoa, *Report of the Census of Population and Housing 1986*, Department of Statistics, Apia, 1989.

sector the number of persons aged 15 years and above seeking employment in the formal sector could increase from 15000 in 1986 to 19000 by the end of the projection period (Table W11). This trend suggests that even if emigration declines only modestly employment opportunities will need to be created in the formal sector.

Table W10
Western Samoa: projection of labour force, 1986–2011

	1986	1991	1996	2001	2006	2011
Males						
15–19 years	2410	1590	750	–	–	–
20–24	7820	9770	9680	9110	9270	9100
25+	27060	27950	30730	33320	35210	37250
Total	37290	39310	41160	42430	44480	46350
Females						
15–19	580	290	–	–	–	–
20–24	2480	2940	3220	2730	2720	3040
25+	5020	5250	5580	5850	6430	6840
Total	8080	8480	8800	8580	9150	9880

Source: Derived from low variant assumptions in text.

Table W11
Western Samoa: projection of labour force by employment status, 1986–2011

	1986	1991	1996	2001	2006	2011
Formal						
Males	10030	10570	11070	11410	11970	12470
Females	5550	5830	6050	5890	6290	6790
Total	15580	16400	17120	17300	18260	19260
Informal						
Males	27260	28740	30090	31020	32510	33880
Females	2530	2650	2750	2690	2860	3090
Total	29790	31390	32840	33710	35370	36970
Total labour force						
Males	37290	39310	41160	42430	44480	46350
Females	8080	8480	8880	8580	9150	9880
Total	45370	47790	49960	51010	53630	56230

Source: Derived from low variant assumptions in text.

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Tonga

Population projections, 1989–2014

Kalo Funaki

Tonga's rate of population growth increased throughout this century until 1966, when it reached a high of 3.2 per cent per year (Bakker 1979:10). Since then the rate of population increase has declined rapidly and a negative average annual growth rate of -1.3 per cent per year was recorded between 1986 and 1989 (Tonga 1991b). The significant decline in Tonga's population growth rate is largely explained by the high level of emigration, especially of working age people in search of employment and economic prosperity in countries such as New Zealand, Australia and the United States. In the absence of emigration the average annual population growth would exceed 2 per cent, due to high fertility and declining mortality (Table T1).

The total fertility rate has declined gradually from 7.12 children per woman in 1966, but was still high at around 4.7 in 1986. Infant mortality has halved since 1956, from around 90 per thousand to

Table T1
Tonga: population trends, 1966–89

	1966	1976	1986	1989
Population	77429	90085	94649	91056
Intercensal annual growth rate (per cent)	3.1	1.5	0.5	-0.7
Total fertility rate	7.12	..	4.7	3.8
Life expectancy at birth				
Male	52.2–55.6	..	61.0	63.9
Female	52.3–57.2	..	64.0	67.6
Infant mortality (per '000)	59	..	43	26

Source: Tonga, *Population Census 1986*, Statistics Department, Tonga, 1991a; Tonga, *Report of the Ministry of Health for the Year 1989*, Ministry of Health, Nuku'alofa, Tonga, 1990; Tonga, *Statistical Abstract 1989*, Statistics Department, Nuku'alofa, Tonga, 1991.

around 43 per thousand in 1986. As a result, life expectancy has increased moderately for both males and females, although more so for females. These patterns reflect the effectiveness of health care programs adopted by the government to improve infant and maternal health.

Although emigration will probably continue to significantly affect population growth, the high level of emigration may taper off within the near future. This view is based on the assumption that economic conditions in Tonga will improve considerably if the main objective of the Sixth Development Plan, to improve employment opportunities for all, is achieved. In order to meet this objective the Tonga Government is, for the first time, investing in human resources development and planning (Tonga 1991c).

The 1986 Census for the Kingdom of Tonga enumerated 94,649 people. The Department of Statistics estimated Tonga's total population in 1989 at just over 91,000, representing an average annual fall of around 1.3 per cent between 1986 and 1989 (Tonga 1991a:1). This estimate is not consistent with that of the Ministry of Health which estimated Tonga's total population as 97,471, an average annual increase of around 1 per cent over the same period (Tonga 1990:33).

The estimate provided by the Statistics Department is considered more plausible because over 5,000 Tongans are known to have left for New Zealand between December 1986 and February 1987 (Douglas and Douglas 1989:537). This was in response to a move by the New Zealand Government to allow visa-free entry for a period of three months. Also, those people holding an entry permit were allowed to extend it for a further 12 months, provided they were sponsored by a New Zealand resident. The scheme was terminated after two months due an unexpectedly heavy inflow of islanders, especially from Tonga, Western Samoa and Fiji. The New Zealand press claimed there were 5,000 Tongan overstayers in New Zealand at the end of the period.

Projection methodology

These projections have used the population estimate made by the Tongan Statistics Department (Tonga 1991b) for the base year data. The age-sex distribution of the 1989 population was estimated by applying the age-sex distribution of the enumerated 1986 population to the 1989 population estimate. A total fertility rate of 3.8 children per woman was used for the base year population.

Four projections were made to depict the impact of different levels of fertility and migration on the Tongan population. The projections were made using the Population Council's software package, FIVFIV for IBM compatible computers (Shorter and Pasta 1987).

Assumptions

Mortality, especially of infants and women, has declined in recent years and may continue to do so. All projections assume a moderate increase in life expectancy at birth for both sexes.

Two assumptions are made regarding fertility. The first assumes that the total fertility rate will remain constant at 1989 levels. Given that the estimates indicate a big decline in fertility between 1986 and 1989 (Table T1) it is plausible that fertility could stabilize and fluctuate around 3.8 children per woman. The second scenario assumes that fertility will continue to decline throughout the projection period, from 3.8 to 3.0 children per woman.

Table T2
Tonga: fertility, mortality and migration assumptions made for population projections, 1989–2014

	1989		2014
High variant			
Total fertility rate	3.8	constant	3.8
Migration (per cent)	1.85		0
Medium variant			
Total fertility	3.8	gradually declining to	3.0
Migration (per cent)	1.85		0
Low variant 1			
Total fertility rate	3.8	constant	3.8
Migration (per cent)	1.85	constant	1.85
Low variant 2			
Total fertility rate	3.8	gradually declining to	3.0
Migration (per cent)	1.85	gradually declining to	1.0
All projections			
Life expectancy at birth (years)			
Males	64	increasing gradually to	72
Females	68	increasing gradually to	74

Source: Based on definitions in text.

Migration is a crucial explanatory variable in the population structure and growth of Tonga. Three assumptions are made regarding the future course of migration (Table T2). The first assumes zero net migration after 1994. Although this is unrealistic, it indicates underlying levels of natural increase for each fertility assumption. The second assumption is that migration will continue at its present level, estimated at 1.85 per cent per year, throughout the projected period (Tonga 1991a:vii). The third assumption is for a gradual decline in emigration, after 1994, reaching 1 per cent per year by the end of the projected period. This could occur in response to depressed economic conditions and tighter migration policies in host countries. Also, an improved commitment to human resources development planning could further improve local economic conditions for potential emigrants, providing the necessary incentive for them to remain in Tonga.

Ahlburg's estimate of the age distribution of migrants from Tonga during 1986 (Ahlburg 1991) was used in these projections and the age distribution of these emigrants was assumed to remain constant.

Population projection results

The size of the projected populations vary considerably among the variants. If fertility remains constant and migration stops after 1994 (high variant), the population could increase by 55 per cent from 91,000 in 1989 to around 140,000 by 2014 (Table T3). A gradual decline in fertility would still result in a 48 per cent increase in the population, if migration ceases. If migration continues, however, the population could decline slightly until 2004 before resuming positive but slow growth.

The inter-period average annual growth rates vary from around 2 per cent under the zero emigration scenarios, to 0.5 per cent or less if migration continues (Table T4). Bos et al. (1991) assume

Table T3
Tonga: projected population, 1989–2014

	1989	1994	1999	2004	2009	2014
High variant	91060	90040	98990	110620	124950	141130
Medium variant	91060	90040	98600	108850	121220	134990
Low variant 1	91060	90040	89550	89680	90620	92090
Low variant 2	91060	90040	89420	88860	89110	90550

Source: Derived from assumptions in text.

Table T4
Tonga: inter-period average annual population growth rates, 1989–2014
 (per cent)

	1989– 93	1994– 98	1999– 2003	2004– 08	2009– 14
High variant	-0.23	1.90	2.22	2.44	2.43
Medium variant	-0.23	1.82	1.98	2.15	2.15
Low variant 1	-0.23	-0.11	0.03	0.21	0.32
Low variant 2	-0.23	0.04	0.12	0.13	0.14

Source: Derived from assumptions in text.

Table T5
Tonga: age structure of projected population, 1989–2014 (per cent)

	1989	1994	1999	2004	2009	2014
High variant						
0–14	40.6	38.7	35.0	32.9	34.9	36.2
15–64	55.3	56.7	60.1	62.1	60.1	59.0
65+	4.1	4.6	4.9	5.0	4.9	4.8
Medium variant						
0–14	40.6	38.7	34.8	31.8	32.9	33.6
15–64	55.3	56.7	60.3	63.1	62.0	61.4
65+	4.1	4.6	4.9	5.1	5.1	5.0
Low variant 1						
0–14	40.6	38.7	36.5	34.0	35.1	36.0
15–64	55.3	56.7	58.1	60.1	58.7	57.8
65+	4.1	4.6	5.4	6.0	6.3	6.2
Low variant 2						
0–14	40.6	38.7	36.1	32.7	33.2	33.2
15–64	55.3	56.7	58.6	61.3	60.6	60.6
65+	4.1	4.6	5.4	5.9	6.3	6.2

Source: Derived from assumptions in text.

growth rates of around 1 per cent per year in their projection of the Tongan population, which would result in a population of 130,000 by 2015.

All variants indicate an increase in the proportion of people aged 15 years and over, due to improved life expectancy. On the other hand, the proportion of 0–14 year olds appears to decrease under all variants (Table T5).

Projection of school age population

The projection of school age population was based on the scenario of a gradual decline in fertility and migration (low variant 2), as this was considered the most plausible variant. Under this scenario the primary school-age population would decline by 20 per cent from 14,260 in 1989 to 12,300 in 2014. The secondary school age population would decline by 25 per cent over the projection period, from 16,620 to 12,520 (Table T6).

Education in Tonga is widespread and widely accepted and this is reflected in Tonga's high level of literacy and enrolment rates. School is compulsory for 6 to 14 year olds, unless they have completed at least 6 years of primary schooling (Tonga 1987:12).

The 1986 Census revealed that 98 per cent of children of primary school-age were attending primary school. For the secondary school-age group (12–18 years), the enrolment rate is 77 per cent for males and 80 per cent for females (Tonga 1991a:xix). It is difficult to calculate the exact enrolment rate by age since there are some students in Tonga who are older than the expected age for their schooling level. These rates are assumed to remain constant throughout the projection period (Table T7). Furthermore, for discussion purposes it is assumed

Table T6
Tonga: projected school-age population, 1989–2014

	1989	1994	1999	2004	2009	2014
Primary (6–11)						
Males	7380	7830	6550	5800	5730	6230
Females	6880	7340	6250	5670	5600	6060
Total	14260	15170	12800	11470	11320	12300
Secondary (12–18)						
Males	8680	8020	8510	7780	6260	6230
Females	7940	7560	8220	7550	6330	6300
Total	16620	15580	16730	15330	12590	12520

Note: Based on low variant 2 assumptions in text.

Table T7
Tonga: assumed school enrolment rates, 1989–2014

	Males	Females
Primary (6–11 years)	0.98	0.98
Secondary (12–18 years)	0.77	0.80

Source: Tonga, *Population Census 1986*, Statistics Department, Nuku'alofa, 1991.

Table T8
Tonga: projection of school enrolments, 1989–2014

	1989	1994	1999	2004	2009	2014
Primary (6–11)						
Males	7230	7670	6410	5680	5610	6110
Females	6740	7200	6130	5560	5480	5940
Total	13970	14870	12540	11240	11090	12050
Secondary (12–18)						
Males	6680	6180	6550	5990	4820	4790
Females	6350	6050	6580	6040	5070	5040
Total	12930	12250	13130	12030	9890	9830

Source: Based on low variant 2 assumptions in text.

that children would commence primary schooling at 5 years of age and would commence secondary school at 12 years of age.

Both primary and secondary school enrolments would decrease under the assumption of a gradual decline in fertility and migration (Table T8). Since the total projected number of 12–18 year olds in 2014 could be around 12,520, there would be sufficient places, based on 1989 levels, to enrol all of this age group if they wished to attend school.

Projection of labour force

Two projections of the working-age population (15–64 years) have been made. The first, based on assumptions of constant fertility and zero migration, indicates the population would increase by 66 per cent or 33,000 between 1989 and 2014. The second, more plausible projection is based on assumptions of declining fertility and migration. Under this scenario, the working-age population would increase by 13 per cent or 6,000 people over the projection period (Table T9).

According to the 1986 Census, 46 per cent of the total working-age population were in the labour force, of which 79 per cent were males and 21 per cent were females. The labour force was divided equally between wage workers (50.6 per cent) and non-wage workers (49.4 per cent). Of those working in wage jobs, 68 per cent were male and 32 per cent were female, while non-wage jobs were comprised of 94.7 per cent male and 5.3 per cent female workers.

The projection of labour force was obtained by applying the participation rates listed above to the projected working-age population, assuming a gradual decline in fertility and migration.

Table T9
Tonga: projection of working age population, 1989–2014

	1989	1994	1999	2004	2009	2014
High variant						
Males	24680	25450	29770	34620	38000	42250
Females	25680	25600	29710	34050	38000	41020
Total	50360	51050	59480	68670	76000	83270
Low variant						
Males	24680	25450	26610	28410	28490	29450
Females	25680	25600	26220	27290	26890	27420
Total	50360	51050	52830	55700	55380	56870

Source: Based on assumptions in text.

Table T10
Tonga: projection of labour force, 1989–2014

	1989	1994	1999	2004	2009	2014
Non-wage workers						
Male	10910	11060	11440	12060	12000	12320
Female	610	620	640	680	670	690
Total	11520	11680	12080	12740	12670	13010
Wage workers						
Male	8050	8160	8440	8900	8850	9090
Female	3750	3800	3940	4150	4130	4240
Total	11800	11960	12380	13050	12980	13330
Total labour force						
Male	18960	19220	19880	20960	20850	21410
Female	4360	4420	4580	4830	4800	4930
Total	23320	23640	24460	25790	25650	26340

Source: Based on assumptions in text.

Participation rates were assumed to remain constant throughout the projection period. If these conditions hold, the labour force will increase by about 3,000 people between 1989 and 2010.

Conclusion

The projections indicate that providing that some emigration continues, the population of Tonga is unlikely to increase significantly during the projection period. Thus there will be little extra demand for school places or for job creation. However, the loss of people through emigration could

result in deskilling of the labour force which would in turn limit economic development. Investment in infrastructural development and employment creation may be necessary to ensure continued economic expansion.

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A Doomsday Scenario

'By 2010, population growth in the Pacific islands is careering beyond control: it has doubled to 9 million: malnutrition is spreading and is already endemic in squatter settlements . . . there are beggars on the streets of every South Pacific town . . . levels of unemployment are high . . . expenditure on education has tripled, although there are still no government welfare payments . . . deaths from AIDS, heart disease and cancers have greatly increased, government services have been privatized or in many cases have lapsed . . . aid donors have turned their attention elsewhere . . . crime has increased . . . trade in narcotics, marijuana, kava and betel nut has produced its first island millionaires . . . pollution and land degradation has spiralled . . . much of the surviving rainforest has been logged . . . coastal fisheries have been placed under threat from over fishing . . . skills shortages in the labour market yawn wide . . .'

Gloomy enough a prospect. But fortunately only a nightmare, based on the emergingly grim statistical prognostications of Ken Gannicott and demographers of the *Pacific 2010* program of research at the National Centre for Development Studies.

'Essentially, the challenge before today's South Pacific leaders is to take action boldly . . . before looming disasters impose their grim patterns on the next generation and beyond . . . *Pacific 2010* provides some of the factual tools needed to focus choices as never before . . . There is still time to act before events start to move out of control and the nightmare becomes reality.'

Rowan Callick, lead writer for the Financial Review and specialist on Papua New Guinea and the South Pacific islands

'This is a thought provoking and forward looking book for Pacific and Australian policy makers and island watchers'

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