DEMOGRAPHIC PRESSURES ON HEALTH, EDUCATION, AND EMPLOYMENT RESOURCES IN THE SOUTH PACIFIC REGION

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Population projections by age and sex are presented for Fiji, Papua New Guinea, Western Samoa, the Solomon Islands, Tonga, and Vanuatu. These projections are used to generate projections of the school-age population and the potential labor force. Based on these population projections the nations under study are predicted to experience an increase of between 30 and 100 percent in demand for infant and child health services, school places, and jobs over the next twenty years. The success of each nation in meeting this challenge will be instrumental in its economic and social development.

Recent population forecasts for many Pacific countries show increasing population pressure on relatively scarce resources over the remainder of this century. Rapidly growing populations present these nations with critical human resource problems, namely, how to educate, train, and employ their expanding population.

Apart from indications from population projections and some brief discussions in development plans, there is little information on the size of the human resource challenge facing these nations. In this article I present projections of the population by age and sex for Fiji, Papua New Guinea, Western Samoa, the Solomon Islands, Tonga, and Vanuatu that make clear the problems facing these nations.[1] Once the size of the problem is known, more informed policy choices can be made.

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Method

Forecasts of the total population such as those reported in Ahlburg (1987) are useful in that they tell us by how much the quantity of raw human resources (population) will increase. However, for policy purposes it is important to have an understanding of the age, sex, educational, and labor market status of the future population.

To illustrate how this may be done, I take the age and sex structure of each nation as reported in the census closest to 1975.[2] For Fiji, the Solomon Islands, Tonga, and Western Samoa this was 1976. For Vanuatu the last census was 1979 and for Papua New Guinea, 1980. I then multiplied the age-specific population estimate by one minus the corresponding age-specific mortality rate to age and advance the age-group by five years. This estimate was then multiplied by one minus the census-based mortality for the next age group and so on until each group reached 65+ years. This Markov-like procedure allows me to generate population estimates by age and sex for 1976-2001 for four countries and 1979-2004 and 1980-2005 for the others.

To complete the matrix we need estimates of the population 0-4 years of age for the years after the last census. These were obtained by multiplying forecasts of total population estimated by Ahlburg (1987) by the percentage of the population aged 0-4 years recorded in the last census.

These estimates assume that the census mortality rates remain constant for the next twenty years. This is a conservative assumption, particularly for a nation such as Papua New Guinea where significant mortality declines are expected. The age-specific and total population figures are therefore likely to exceed my estimates in those nations that experience reductions in mortality.

The estimates of the population by age and sex also form the basis for estimates of the population 5-24 years of age enrolled in school and for estimates of the economically active population by age and sex. The population estimates are multiplied by the census proportions of individuals aged 5-24 years currently enrolled in school to yield estimates of enrollment by age and sex for each country. The population estimates can be multiplied by the census proportions of the population who are economically active to yield estimates of the economically active population by age and sex.

To succinctly summarize these forecasts, indices of population, school enrollment, and working-age population were constructed by assigning the relevant 1981 population, enrollment, or working-age population figure a value of one hundred and expressing the 2001 figure relative to

this base. For example, in Table 1 the entry for Fiji in the total population column is 152, which means that over the twenty-year period Fiji's population is expected to increase by 52 percent.

To simplify the discussion, males and females are added together and the discussion focuses on age. The age-sex specific forecasts are available from the author on request.

Forecasts of Increases in the Supply of Human Resources

If the population ages with the assumed mortality rates and with the fertility implied by the autoregressive model, Fiji, Tonga, and Western Samoa will experience about a 50 percent increase in human resources (total population) and Papua New Guinea a 60 percent increase. The population of the Solomon Islands is expected to increase more than twofold and that of Vanuatu to increase by 80 percent.

The methodology used disregards possible effects of migration and also future reductions in mortality. Out-migration leads to an overestimate of local population growth, and, conversely, lower death rates lead to an underestimate. The autoregressive forecasts reported by Ahlburg (1987) implicitly incorporate information on these elements of population change. These forecasts are also presented in Table 1. They indicate lower rates of population growth where migration is important, namely in Tonga, Western Samoa, and, to a lesser extent, Fiji. They indicate higher rates of growth in Vanuatu and the Solomon Islands where mortality rates may fall. They also indicate a lower rate

TABLE 1 **Indices of Projected Population Growth in Selected Pacific Countries, 1981-2001 (1981 = 100)**

	Total Population	Total Population Based on Autoregressive Model	Population		
			Aged 0-4	Aged 5-14	Aged 15-64
Fiji	152	140	143	138	159
Papua New Guinea	157[a]	140	144[a]	138[a]	170[a]
Solomon Islands	210	219	216	213	206
Tonga	145	130	132	122	159
Vanuatu	181[b]	191	191[b]	172[b]	182[b]
Western Samoa	150	117	117	113	179

[a]1980-2000 (1980 = 100).
[b]1979-1999 (1979 = 100).

of population growth for Papua New Guinea. However, the estimates for Papua New Guinea are influenced by the 1980 census, which showed an intercensal growth rate of 2.3 percent. McMurray (1985) has challenged this estimate. The United Nations (1985) and Goodman, Lepani, and Morawetz (1985) use an estimate of 2.8 percent per annum. If this estimate is correct then the index of population growth would be 174, that is, a 74 percent increase in population.

If we use these estimates to indicate rough upper and lower bounds on the increase in the quantity of raw human resources, Fiji will experience a 40 to 50 percent increase, Papua New Guinea a 40 to 75 percent increase, Western Samoa a 20 to 50 percent increase, the Solomon Islands a 110 to 120 percent increase, Tonga a 30 to 45 percent increase, and Vanuatu a 80 to 90 percent increase. The expected increase in population for all countries with low-income economies over the same period is 45 percent (World Bank 1987:254).

The predicted increases in population by age are also reported in Table 1. They indicate decreases in the young dependency ratio (population 0-14 years/population 15-64 years) for Fiji, Western Samoa, and Tonga. Increases are likely for Vanuatu and the Solomon Islands. The position for Papua New Guinea is not clear because of the data problems already noted.

The forecasts above indicate that the six Pacific countries under study will experience large increases in the supply of raw human resources over the next twenty years. For most of these countries the increases will exceed that for all low-income developing countries. The large increase in numbers of people presents several human resource challenges. These are, at a minimum, the provision of infant and child health services, education, and jobs. The success of each nation in meeting these challenges will be instrumental in the economic and social development of these nations.

Infant Health Services

In 1980 Fiji, Western Samoa, Tonga, and the Solomon Islands had infant mortality rates that were below the average for all developing nations. The rate for Papua New Guinea was slightly below it (68 versus 72) and the rate for Vanuatu much higher (Ahlburg 1986; World Bank 1987:258-259). This situation reflects, in part, the relatively high expenditures on health in the Pacific. The shares of public expenditures allocated to public health range from 11 to 15 percent (Hughes, Ahlburg, and Lee 1987: 103).

From Table 1 it is clear that there will be a strong increase in the demand for infant and child health expenditures over the next twenty years, particularly in Vanuatu, Papua New Guinea, and the Solomon Islands, which have higher infant mortality rates than most Pacific nations. Increases in demand ranging from 20 to 120 percent are predicted. This demand as well as recent outbreaks of malaria and increasing concern about cardiovascular and cerebrovascular diseases and diabetes could severely strain public health budgets and may lead to a deterioration in the relatively favorable standard of health in the island nations.

Education

Increases in the school-age population (5-19 years of age) are also predicted to be relatively large. These are broken down into 5-9, 10-14, and 15-19 years of age in Table 2. The increased demand for school places, given constant enrollment rates, will exceed 30 to 40 percent in all nations except Western Samoa. In the Solomons and Vanuatu demand for schooling at all levels will approximately double.

The assumption of constant enrollment rates is conservative and is likely to hold only for those aged 5-14 in Fiji, Tonga, and Western Samoa. When 100 percent enrollment is assumed for those aged 5-14 and 60 percent enrollment for those 15-19, the predicted increases in demand for education for Papua New Guinea, the Solomon Islands,

TABLE 2 **Indices of Projected School Enrollments in Selected Pacific Countries, 1981-2001 (1981 = 100)**

	Case 1: Enrollments assuming current enrollment ratios			Case 2: Enrollments assuming 100% enrollment for ages 5-14 and 60% enrollment for ages 15-19		
	Aged 5-9	Aged 10-14	Aged 15-19	Aged 5-9	Aged 10-14	Aged 15-19
Fiji	143	132	115	150	152	193
Papua New Guinea[a]	138	138	153	464	305	987
Solomon Islands	217	209	210	667	363	497
Tonga	136	110	110	152	135	129
Vanuatu[b]	175	170	170	283	266	453
Western Samoa	118	109	110	144	115	122

[a]1980-2000 (1980 = 100).
[b]1979-1999 (1979 = 100).

and Vanuatu are extremely large--between 500 and 1000 percent for those aged 15-19. Since these nations have lower enrollment rates than many other developing nations (see Ahlburg 198660; World Bank 1987:262-263) increases in desired enrollments are likely and the rising enrollment scenario is more likely than that assuming constant enrollment rates. These forecasts also indicate that many more teachers and schools have to be provided if the predicted demand for education is to be met rather than turned back by selective enrollment policies.

The position of education in the Pacific appears to be critical. The estimated returns to investment in education, particularly at early levels of development, are higher than the returns to almost any other investment, provided, of course, that the output of education is of appropriate quality and relevance (Psacharopoulus 1982). Education is the cornerstone of human resource development. However, the predicted increase in the school-age population threatens to swamp the education system.

Jobs

Predicted increases in the working-age population are presented in Table 3. The smallest increases, about 60 percent, are predicted for Fiji and Tonga. Larger increases, 70 to 80 percent, are projected for Papua New Guinea, Samoa, and Vanuatu. The largest increase, 106 percent, is projected for the Solomon Islands. The rates of increase are roughly equal for males and females.

Increases are somewhat smaller for ages 15-39 years in those nations where population growth is slowing, namely, Fiji, Samoa, and Tonga. The evidence is less clear for Vanuatu. In Papua New Guinea and the

TABLE 3 **Indices of Projected Working-Age Population Groups in Selected Pacific Countries, 1981-2001 (1981 = 100)**

				Aged		
	Total	Male	Female	15-39	40-54	55-64
Fiji	159	159	159	142	213	207
Papua New Guinea[a]	170	164	177	166	159	149
Solomon Islands	206	204	208	219	176	167
Tonga	159	161	157	158	168	144
Vanuatu[b]	182	177	189	178	198	189
Western Samoa	178	182	175	173	212	153

[a]1980-2000 (1980 = 100).
[b]1979-1999 (1979 = 100).

Solomon Islands the demand for jobs will be greatest among workers at the youngest ages. Using data on the working-age population, rather than those economically active as I have, implies an assumption of constant labor force activity rates over the period 1980 to 2000. Activity rates are quite high for males in Fiji, Tonga, and Western Samoa (except for those 60-64 years) and so the estimates of the increased need for jobs reported in Table 3 are likely to be unbiased. However, activity rates for females in all countries and for males in the Solomon Islands (activity rates for Vanuatu and Papua New Guinea are unavailable) are low. For females the rates are between 2 and 27 percent. For males in the Solomon Islands the rates are between 20 and 49 percent. If activity rates continue to rise the demand for jobs will be much greater than indicated in Table 3. Yusuf and Peters (1985:6) found evidence of rising female participation rates in Western Samoa.

The likely increase in the demand for jobs in Tonga and Samoa is overstated because out-migration is particularly strong among the young. However, the indices in Table 3 are useful for they indicate the pressure on job creation that would occur if migration were to stop.

There is some evidence to suggest that the island nations of the Pacific are currently having difficulty producing sufficient jobs to employ the annual crop of school-leavers (Walsh 1982; Ahlburg 1986). The result of the supply of labor exceeding demand (in the absence of flexible wages) has been unemployment, particularly for the young. For example, in Fiji in 1976 three out of four people classified as unemployed were young, inexperienced workers aged 15-24 years (Walsh 1982:40). The evidence from Table 3 indicates that increased pressure on the labor market will be experienced by Pacific Island nations over the next twenty years.

Summary and Conclusion

The populations of many Pacific Island nations are likely to increase by 50 to 100 percent over the next twenty years. These increases exceed the average rate for all low-income developing nations. The predicted rates of population increase imply roughly similar increases in the demand for infant and child health services, education, and jobs.

The island nations face very large increases in the demand for health services, education, and jobs. A population that is healthy, educated, and employed is a critical element in the development of a nation. If the island nations fail to turn their large population increases into valuable human resources, their future development is at risk. Given the magni-

tude of the task ahead, it is unlikely that just spending more money, whether it is generated internally or comes from loans or aid, will suffice. The nations need to increase the efficiency of their health and education systems and their labor markets. In addition, they need to critically evaluate their general lack of a population policy.

NOTES

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1. These countries were selected as the first group of countries to be studied intensively as part of the Islands-Australia Project being carried out by the National Centre for Development Studies, Australian National University. They were chosen on the basis of the size of their population and economy. The smaller nations are now being studied in the second phase of the project.

2. Although several nations have had more recent censuses, all of the data needed for the calculations in this paper were not available for all countries. For comparability across countries a roughly common starting point was chosen. More recent data may change the quantitative analysis somewhat, but not the basic conclusions of the paper.

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