The Demographic Impact of the HIV/AIDS Epidemic in Papua New Guinea, 1990-2030

The scale of the HIV/AIDS epidemic in the country has reached the point where future demographic patterns are likely to be affected, possibly severely.

By Geoffrey Hayes*

The first case of human immunodeficiency virus (HIV) infection in Papua New Guinea was detected in the capital in 1987. After a relatively short period during which the epidemic was concentrated in certain "high-risk" groups, the disease spread throughout the country and by 2005 had become a "generalized epidemic" – with a 1 per cent HIV prevalence rate among adults aged 15-49. The most recent (2007) estimates suggest that the adult prevalence rate has risen to 1.6

* Consultant demographer and a former technical adviser in the UNFPA Country Technical Services Team, Suva, Fiji, e-mail: geoffreyhayes@hotmail.com.

per cent, confirming that the epidemic is continuing to grow rapidly (NACS, 2007).

The scale of the human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) epidemic in the country has reached the point where future demographic patterns are likely to be affected, possibly severely. Among the demographic impacts to be expected based on the experience of other countries with generalized epidemics are an increase in the number of deaths, particularly among young adults leading in turn to reduced life expectancy. The rate of population growth will drop as a higher death rate reduces the rate of natural increase. The number of births can also be expected to decline owing to the impaired fecundity of HIV positive women. Changes to the age structure follow from the concentration of excess AIDS mortality in the young adult age groups.

These demographic changes in turn have social and economic consequences. The number of orphaned children rises as parents succumb to the disease. The quality of the labour force may decline if AIDS deaths are concentrated in professional or more educated groups. Health systems may also come under increasing strain as larger numbers of AIDS sufferers seek hospital care or treatment. This article does not focus on these socio-economic consequences but rather on the more narrowly demographic dimensions, an understanding of which is a precondition for an analysis of such broader socio-economic effects.

Until recently the measurement of the potential impact of the AIDS epidemic in Papua New Guinea was impaired by a very limited surveillance system. While the present scale and quality of surveillance still remains inadequate, the addition of a number of surveillance points throughout the country over the past two years has facilitated a more accurate picture of the past and likely future trends of the AIDS epidemic. Analysis of this richer supply of surveillance data by the National AIDS Council Secretariat and UNAIDS (NACS, 2007) has made it possible to make plausible projections of the future course of the epidemic. The recent development of the AIM computer software (Stover, 2007) that allows epidemiological data to be imported directly into the DemProj population projection program (Stover and Kirmeyer, 2005) further permits the future demographic impact of AIDS to be estimated by combining epidemiological assumptions with demographic ones. This article presents the results of a preliminary study based on these two sets of data.

Data and methods

The methodology employed in this study was to carry out six separate population projections, three of which excluded AIDS-related deaths while three

incorporated them. By comparing the results of those two different projections, it is possible to estimate the specific impact of the AIDS epidemic under three sets of demographic assumptions. One limitation of the present analysis is that a single set of HIV/AIDS assumptions has been employed. Those assumptions have been generated by the Estimation and Projections Package (EPP) computer program developed by the World Health Organization (WHO) and the Joint United Nations Programme on HIV/AIDSUNAIDS, employing the most recent HIV/AIDS surveillance data available in Papua New Guinea (NACS, 2007).

All population projections are based on assumptions and are therefore uncertain. This is also true about the HIV/AIDS component. A population projection incorporating the impact of HIV/AIDS consequently makes use of two sets of assumptions – a demographic one and an HIV/AIDS one. This greatly complicates any measure of the impact of HIV/AIDS because demographic processes and the epidemic are mutually interconnected. It is therefore necessary to underscore the normal caveat attached to population projections; they are not predictions. All projections take the logical form of a conditional statement "If x… then y". In other words, if conditions "x" come to pass then consequences "y" will follow. It is the probability of "x" occurring that is uncertain rather than the relationship between "x" and "y", which is basically mathematical.

Demography

To estimate the future demographic impact of the HIV/AIDS epidemic it is first necessary to prepare a population projection (or series of projections) that ignores the epidemic entirely. It is normal demographic practice to base one projection on current population dynamics, the results of which show what would happen if present rates of birth, death and migration were to remain constant. This practice has been followed in this study and these assumptions form the basis for "Projection one". This projection is also referred to below as the "high" projection because it produces the highest growth rate and the largest population by the end of the projection period.

However, such a projection is not realistic because birth, death and migration rates rarely remain constant over a long period of time. Projections that aim for realism (as opposed to "experimental" projections) must be based upon assumptions about future rates of change. Typically, these assumptions are grounded in general (theoretical) knowledge of how population dynamics evolve through time, combined with specific knowledge of past demographic trends and processes in the country under study.

In general, the populations of less developed countries experiencing socio-economic development undergo a "demographic transition". The demographic transition model asserts that populations evolve from a situation in which birth and death rates are high, resulting in a low population growth rate, to a situation in which birth and death rates are low, resulting similarly in a low rate of population growth. Rapid population growth takes place during the historical transition between these two fundamentally different situations. The period of rapid growth arises from the fact that historically high death rates tend to decline before high birth rates as public health measures are introduced – often by colonial administrations. Eventually, birth rates will also fall as awareness of the declining death rates spreads and government programmes assist women to reduce their fertility. The length of the period between the falling death rate and the falling birth rate (and hence the period of rapid population growth) varies widely across countries and is difficult to predict – it can last for a 100 years or be as short as 20 years. Country-specific circumstances determine the length of the transition, but it tends to be shortest in countries that are undergoing rapid economic growth and which also have effective family planning programmes.

In Papua New Guinea, the pattern of demographic change over the past four decades since national censuses first commenced follows the broad outline of demographic transition albeit with significant differences owing to the country's particular history. At the national level, birth and death rates have been declining slowly for the past three decades virtually in tandem. Papua New Guinea has not experienced a period during which mortality dropped sharply with economic development and culture change while fertility continued at a high level – leading to the so-called "population explosion". Rather, the trend of both the birth and death rates has been one of slow, steady decline more or less in unison as a result of which the rate of natural increase has remained between 2.0 and 2.5 per cent per year for three decades. The most conservative assumption that could be made about future population patterns in Papua New Guinea, therefore, is that these past trends will continue in the future.

Fertility change

In the case of fertility it is not difficult to identify the scale of the historical trend. As table 1 shows, the total fertility rate (TFR) has declined from 5.4 in 1980, to 4.8 in 1996 and to 4.6 in 2000. The average rate of decline in the TFR over the 20-year period from 1980 to 2000 has been 0.04 per year (0.2 per each five-year period) which is close to the international average for low-income countries with weak family planning programmes – a category that includes Papua New Guinea

(Stover and Kirmeyer, 2005:15-16). On this basis it appears justified to make use of the same, slow rate of decline in fertility for the "middle" or "medium" projection, hereafter referred to as "Projection two".

Table 1. Total fertility rate (TFR), 1980-2000

	1980	1996	2000	1980-2000
TFR	5.4	4.8	4.6	5.4-4.6
Intercensal change	..	-0.6	-0.2	-0.8
Change per year	..	-0.04	-0.05	-0.04

Source: National Statistical Office (2003).

It is also customary, when preparing projections, to base one projection on the goals of the national population policy – or other government policies pertaining to population. Papua New Guinea's National Population Policy 2000-2010 (DNPM, 1999) aims to achieve a TFR of 3.0 by the year 2020. Assuming that the same rate of decline necessary to meet this goal continued through to 2030, the TFR in that year would be 2.2, or close to "replacement fertility". This assumption is the basis for "Projection three". This projection is also described herein as the "low" projection as it produces the lowest rate of population growth. The full set of fertility assumptions for the three projections is shown in table 2.

Table 2. Assumed total fertility rates 2000-2030, Projections one to three

Projection number	2000	2005	2010	2015	2020	2025	2030
Projection one	4.60	4.60	4.60	4.60	4.60	4.60	4.60
Projection two	4.60	4.40	4.20	4.00	3.80	3.60	3.40
Projection three	4.60	4.20	3.80	3.40	3.00	2.60	2.20

Mortality change

The historical picture is much less clear when it comes to mortality – which is the key variable when assessing the potential impact of HIV/AIDS. The life expectancy estimates from 1971 to 2000 are presented in table 3 and also plotted in figure 1. While the general trend is one of rising life expectancy, the rate of increase and the relationship between male and female life expectancy have been erratic and inconsistent over the years. Between 1971 and 1980, male life expectancy improved rapidly at a rate of about one year added per year. Since 1980, the rate of change has dropped to 0.32 year per year in the 1980-1981 period,

0.48 year in the 1991-1996 period and -0.32 year in the 1996-2000 period. Increases in female life expectancy are consistently upward but also at widely varying rates through time, ranging from 1.1 years per year during the 1970s to 0.06 year per year during the 1980s. It is also apparent that for those years in which sample survey (DHS) data were available (1991 and 1996) estimated male life expectancy was higher than female while the estimates based on census data (1971, 1980 and 2000) showed the opposite.[1]

Table 3. Life expectancy at birth in Papua New Guinea, 1971-2000

	Year of estimate				
	1971	**1980**	**1991**	**1996**	**2000**
Male	39.6	48.7	52.2	54.6	53.7
Annual change (years)	..	1.01	0.32	0.48	-0.23
Female	41.1	50.7	51.4	53.5	54.8
Annual change	..	1.10	0.06	0.42	0.32
Data source	Census	Census	Survey	Survey	Census

Sources: National Statistical Office (2003), Hayes (1996).

Figure 1. Life expectancy trends, 1971-2000
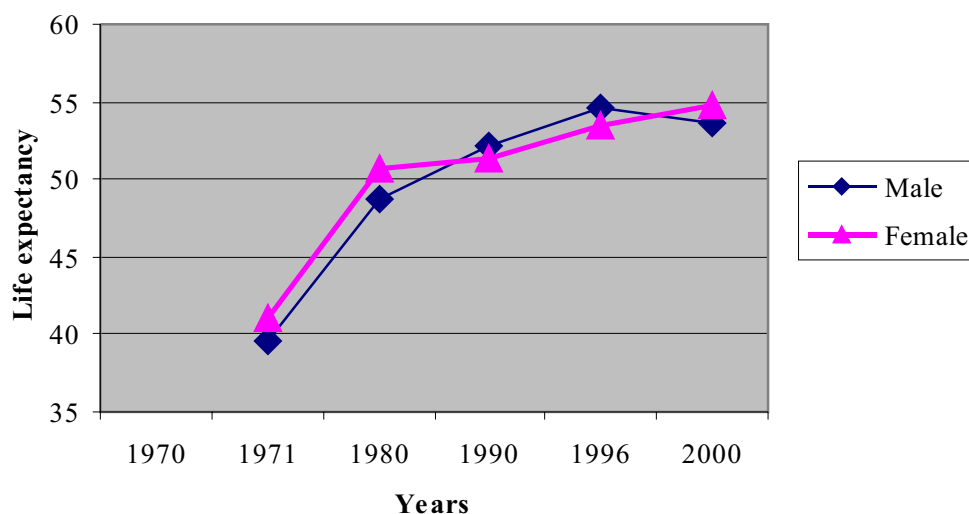
These inconsistencies make it difficult to identify a clear trend for the period from 1991 to 2000 – especially for females. From a methodological point of view the survey data should give a more correct picture of the relationship between male

and female life expectancy. This is because the surveys asked direct questions on both male and female adult mortality ("Is your own father still alive" and "Is your own mother still alive") whereas the census only asked about the survival status of mothers[2] and the analysis proceeded on the assumption that male life expectancy would be lower than female – as is the normal pattern in almost all countries. However, if female life expectancy is higher than male, it follows that sex ratios will tend to fall in older ages – a function of excess male mortality. In Papua New Guinea, however, the sex ratio increases with age so that above the age of 45 there is a substantial surplus of males, thus indicating either higher female mortality or an undercount of older females (or both). It is therefore plausible that in this country, female life expectancy is in fact lower than that of male and that the survey data give a more accurate picture of female life expectancy than the census data.

If this is the case then a simple extrapolation of the historical rate of change in life expectancy from the past into the future is problematic because it would reproduce the historical inconsistencies existing between years and sexes. There is little doubt that the normal pattern is for female life expectancy to be higher than that of male and therefore the pattern in Papua New Guinea can be described as an anomaly which can probably be explained by the particularly low social status accorded to women and girls. Whether social and cultural change will bring about a correction of this situation, and if so how soon, is an open question, yet it is not inappropriate to assume that this Pacific country will eventually conform to the usual pattern. If this assumption is accepted then a statistical means must be found to "normalize" the relationship between male and female life expectancy while also assuming that both would increase through time.

The approach taken in this study was to accept the 1991 life expectancy levels (Hayes, 1996), as well as the 1991 relationship between male and female life expectancy, and to progressively assume a faster rate of improvement in female life expectancy than for males such that the life expectancy of females would overtake that of males around 2010. This date is somewhat arbitrary, but an earlier date would not be consistent with the fairly slow pace of economic development during the 1990s and the persistence of gender inequality. This is the mortality assumption underlying "Projection two".

Because the pattern of life expectancy improvement in Papua New Guinea has been so erratic over the past many years, the rates of change generated by the United Nations model life tables have been used in this study rather than one from any intercensal period based on empirical data. For countries with life expectancy ranging from 55 to 65 years, the United Nations model life tables indicate that life expectancy has historically increased by 2.0 to 2.5 years every five years, or by 0.4

to 0.5 year per year (Stover and Kirmeyer, 2005). This is a pattern of change similar to those observed in many developing countries. In Papua New Guinea the rate of change between the 1991 and 1996 Demographic and Health Surveys fits within this range, but is either higher or lower in other periods. The long-run rate of increase in life expectancy (1971-2000) also falls within this range (0.486 for males and 0.472 for females). A case can therefore be made for employing the model life table rate of change to project life expectancy into the future.

Thus, "Projection two" assumes that male life expectancy will increase at the rate of 0.4 year per year from 2000 to 2030 and female life expectancy would increase by 0.45 year per year over the same period. These trends would result in male life expectancy reaching 68.2 years and female 69.4 years by 2030. Even with a faster rate of increase in female life expectancy, the difference between male and female life expectancy still remains small by 2030 with females living on average 1.2 years longer than males.

Finally, a third assumption was formulated to reflect the possibility that the mortality component of the demographic transition in Papua New Guinea might accelerate rather than simply continue at its historically slow pace. The assumption of a more rapid increase in life expectancy is analogous to the assumption of a faster decline in the TFR. These assumptions form the basis for "Projection three". The final set of mortality assumptions for all three projections is shown at 10-year intervals in table 4.

Table 4. Assumed life expectancy 2000-2030, Projections one to three

Projection number	2000		2010		2020		2030	
	M	F	M	F	M	F	M	F
Projection one	56.2	55.9	56.2	55.9	56.2	55.9	56.2	55.9
Projection two	56.2	55.9	60.2	60.4	64.2	64.9	68.2	69.4
Projection three	56.2	55.9	60.9	61.1	65.5	66.2	70.2	71.4

International migration

No assumptions are required for international migration as net international migration in this Pacific country is small and has a negligible impact on population change. It is unlikely that this will change in the future.

Base year population

The base year of a set of population projections is normally the most recent census, which in this case would be the 2000 census. But a projection to assess the impact of HIV/AIDS should ideally start from the onset of the epidemic. While HIV/AIDS was evident in Papua New Guinea by the late 1980s, the supply of epidemiological information prior to 1990 is inadequate to justify a starting date earlier than 1990. Consequently, 1990 has been selected as the base year for the projection rather than 2000, as would otherwise have been the case.

However, the use of 1990 as the starting year for the population projections raises technical problems because the census conducted in that year suffered from significant coverage error (Stott, 1992). In order to bring about a reasonable consistency between the 2000 census count and the 1990 census count as well as the estimated rates of natural increase derived from the 1991 Demographic and Health Survey, the 1996 DHS, and the 2000 census, it is necessary to adjust the 1990 census data to allow for underenumeration. Unfortunately, no information is available on the age pattern of the undercount in the 1990 census because of the limited scope of the post-enumeration check (PEC) conducted after the census.[3] Census undercounts are normally concentrated in certain ages – such as the under-five population or older women. In the absence of a detailed post-enumeration survey, one has to assume that the 1990 census undercount was across the entire age range. In effect, this is equivalent to an assumption that the undercount was due to entire census units being missed (rather than specific individuals across the entire country) and that the population characteristics of these missed units were the same as the national average. This may or may not be a valid assumption.

The method employed to adjust the 1990 census for underenumeration was to manually adjust all age-sex groups (using MS Excel) successively until the projected 2000 population reached the population enumerated in the 2000 census given the prevailing birth and deaths rates over the 1990-2000 period.[4] In the case of some age groups (0-4, 5-9, 10-14), further upward adjustment of the female population was performed in order to reduce the excessively high sex ratios in the census count, which could not be justified on the grounds of differential mortality and presumably were in error. The overall adjustment was 15 per cent of the total 1990 citizen population and slightly higher in some of the aforementioned age-sex groups.[5] The adjusted 1990 population was then used as the base for the projections for the 1990-2030 period. The age data were not smoothed to remove the effects of age-heaping.

HIV/AIDS data and assumptions

The HIV/AIDS data employed in the projection were imported into the SPECTRUM computer program from a data file produced by the Estimation and Projections Package (EPP), a computer program developed by WHO and UNAIDS to estimate and project the HIV infection rate in the context of a "generalized" epidemic.[5] The methods and assumptions used to construct these estimates are explained in the 2007 Consensus Report (NACS, 2007) and are not described here in detail. It suffices to say that the quality of these estimates is superior to that of earlier estimates using different methodology because the number of surveillance sites around the country has increased substantially in recent years. However, the demographic assumptions used in the EPP program may not be identical to those employed in the present article.

The estimated and projected adult HIV prevalence rate 2000-2030 is shown in figure 2. The pattern of change suggests exponential growth up to 2012 with the prevalence rate reaching a peak of 5.07 per cent of the adult population in that year. Thereafter the prevalence rate remains stable at the same 5.07 per cent. The rationale for maintaining the prevalence rate at just over 5 per cent through to 2030 is not provided in the 2007 report and for the purposes of this study, this rate has simply been taken at face value.[7]

Figure 2. Estimated and projected adult HIV prevalence rate, 1990-2030
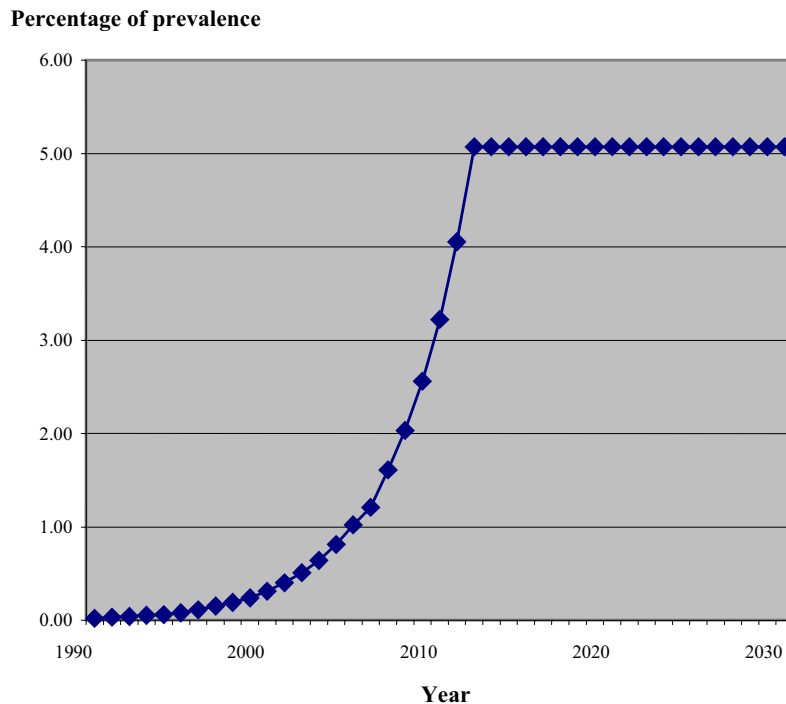
The method employed to measure the HIV/AIDS impact under different demographic scenarios is to first run Projections one to three using the SPECTRUM software (incorporating DemProj) without including HIV/AIDS data, following which the same projections are run again with the AIDS data included through the AIM sub-routine. The output from the second set of projections (here described as Projections four to six) includes new estimates of life expectancy and TFR that reflect the impact of AIDS on these indicators. These estimates are calculated by the AIM routine and are therefore outputs rather than inputs – as is the case in Projections one to three.

Results

Population growth

It is evident from table 5 that while the AIDS epidemic will have an impact on future population growth in Papua New Guinea, that impact will be relatively small in proportion to the total projected population size. The country will experience substantial population growth over the next two decades regardless of the AIDS epidemic. Comparing the middle projections (Projection two without AIDS and projection five with AIDS) it is apparent that by 2030, the population would reach 9.86 million in the absence of AIDS and 9.34 million with AIDS – a difference of about 520,000. This number is made up of the excess deaths that would occur because of the epidemic and the slightly fewer births that would occur owing to the reduced fertility of HIV positive women. While this is a large number in absolute terms, it represents only a little over 5 per cent of what the total population would have been in the absence of HIV/AIDS.
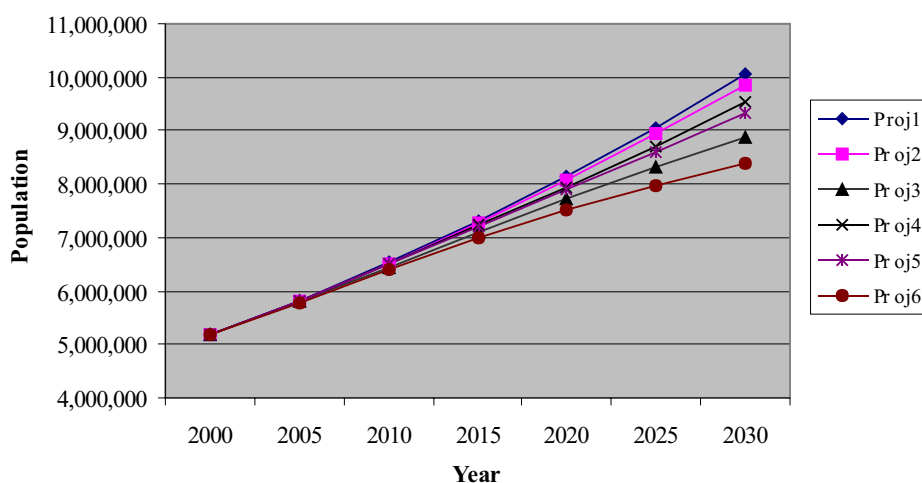
Table 5. Projected population of Papua New Guinea 2000-2030, with and without HIV/AIDS

Projection number	Year						
	2000	2005	2010	2015	2020	2025	2030
Without HIV/AIDS							
One (High)	5,183,558	5,821,540	6,533,860	7,308,890	8,148,760	9,063,580	10,067,100
Two (Medium)	5,183,558	5,817,683	6,520,009	7,276,389	8,085,420	8,946,887	9,855,327
Three (Low)	5,183,558	5,797,385	6,438,746	7,083,315	7,716,885	8,318,170	8,859,486

.../

Table 5. *(Continued)*

Projection Number	Year						
	2000	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**
With HIV/AIDS							
Four (High)	5,182,514	5,815,875	6,510,478	7,226,706	7,946,995	8,711,043	9,547,600
Five (Medium)	5,182,514	5,812,031	6,496,852	7,194,979	7,884,485	8,594,552	9,335,515
Six (Low)	5,182,514	5,791,789	6,416,065	7,004,350	7,524,156	7,985,906	8,380,551
Difference							
(High)	-1,044	-5,665	-23382	-82,184	-201,765	-352,537	-519,914
(Medium)	-1,044	-5,652	-23157	-81,410	-200,935	-352,335	-519,812
(Low)	-1,044	-5,596	-22680	-78,965	-192,729	-332,272	-478,935

Figure 3. Projected population growth 2000-2030 with and without AIDS under three demographic scenarios

The potential impact of HIV/AIDS is also apparent in the overall population growth rate. Comparing the two medium projections (two and five), the rate of population growth with HIV/AIDS would be about 16 per cent lower than it would have been in the absence of the epidemic – 1.6 per cent per annum rather than 1.9 per cent (table 6).

Table 6. Projected population growth rates in Papua New Guinea with and without HIV/AIDS (percentage)

Projection number	Year						
	2000	2005	2010	2015	2020	2025	2030
Without HIV/AIDS							
One (High)	2.3	2.3	2.3	2.2	2.1	2.1	2.1
Two (Medium)	2.3	2.3	2.2	2.1	2.1	2.0	1.9
Three (Low)	2.3	2.2	2.0	1.8	1.6	1.4	1.2
With HIV/AIDS							
Four (High)	2.3	2.3	2.2	2.0	1.8	1.8	1.8
Five (Medium)	2.3	2.3	2.1	1.9	1.8	1.7	1.6
Six (Low)	2.3	2.1	1.9	1.6	1.3	1.1	0.9
Difference							
(High)	0.0	0.0	-0.1	-0.2	-0.3	-0.3	-0.3
(Medium)	0.0	0.0	-0.1	-0.2	-0.3	-0.3	-0.3
(Low)	0.0	-0.1	-0.1	-0.2	-0.3	-0.3	-0.3

It is clear that the population of Papua New Guinea will continue to grow in the context of a generalized HIV/AIDS epidemic. Even the lowest of the projections (Projection six) suggests a population in 2030 that is 3.2 million higher than that of the year 2000. The medium projection incorporating AIDS (Projection five) suggests that the population would still grow by 4.2 million persons between 2000 and 2030. As Projection three implies, the rate of population growth would decline more quickly if fertility decline were to accelerate at the rate proposed in the National Population Policy than it would by means of the AIDS epidemic. The acceleration of the death rate to reduced population growth is obviously not a policy option in most societies.

Life expectancy

The main demographic effect of an HIV/AIDS epidemic is an increasing death rate, particularly among young adults, and this in turn will have an impact on life expectancy. Table 7 shows that regardless of which demographic scenario comes to pass, the HIV/AIDS epidemic will result in a significant increase in the number of deaths in Papua New Guinea. By 2030, the excess deaths caused by HIV/AIDS would rise by up to 23,191 annually depending on which projection

comes to pass. The largest increase in the number of deaths would occur according to Projection five; in this scenario the number of deaths would be 36 per cent higher than would otherwise have been the case in the absence of AIDS.

Table 7. Projected annual deaths with and without HIV/AIDS

Projection number	Year						
	2000	2005	2010	2015	2020	2025	2030
Without HIV/AIDS							
One (High)	56,446	64,431	73,109	82,619	93,449	105,662	119,275
Two (Medium)	56,446	57,572	58.240	59,321	60,356	62,005	63,680
Three (Low)	56,446	55,991	55,119	54,447	54,024	54,031	54,220
With HIV/AIDS							
Four (High)	56,746	65,708	77,708	96,200	113,427	125,400	138,832
Five (Medium)	56,746	58,846	62,847	73,180	81,541	84,068	86,871
Six (Low)	56,746	57,255	59,647	68,111	75,007	75,744	76,668
Difference							
(High)	300	1,277	4,559	12,581	19,978	19,735	19,557
(Medium)	300	1,274	4,607	13,859	22,063	22,063	23,191
(Low)	300	1,264	4,528	13,664	21,713	21,713	22,448

The potential impact of the increased deaths caused by AIDS on life expectancy is presented in table 8. In the absence of the HIV/AIDS epidemic, life expectancy could reasonably be expected to reach 70.2 years for males and 71.4 years for females by 2030, given a modest acceleration of past trends (projection two). In the "worst case" scenario, life expectancy could decline to 51.0 years for males and 49.3 years for females – a loss of 19.2 years and 22.1 years of life for males and females, respectively. In other words, under this scenario there would be virtually no improvement in life expectancy from 1980 through to 2030 – a period of 50 years.

However, this scenario would only occur under projection four, which assumes that in the absence of HIV/AIDS, life expectancy would otherwise have remained unchanged from 2000 to 2030. This is not very likely based on past experience. Taking the possibly more realistic scenario (Projection five) that life expectancy would continue to improve at the historical rate regardless of the AIDS epidemic (which implies that progress would continue to be made in combating

malaria and tuberculosis and other infectious diseases, even in the face of the AIDS epidemic), the reduction in life expectancy attributable to excess AIDS would be 7.2 years for males and 9.3 years for females.

Table 8. Projected life expectancy at birth with and without HIV/AIDS

Projection number	Year						
	2000	2005	2010	2015	2020	2025	2030
Males							
Without HIV/AIDS							
One (High)	56.2	56.2	56.2	56.2	56.2	56.2	56.2
Two (Medium)	56.2	58.2	60.2	62.2	64.2	66.2	68.2
Three (Low)	56.2	58.5	60.9	63.2	65.5	67.9	70.2
With HIV/AIDS							
Four (High)	55.9	55.6	54.4	52.1	51.1	51.0	51.0
Five (Medium)	55.9	57.5	58.3	57.4	57.9	59.5	61.0
Six (Low)	55.9	57.8	58.9	58.2	59.0	60.9	62.8
Difference							
(High)	0.0	-0.6	-1.8	-4.1	-5.1	-5.2	-5.2
(Medium)	0.0	-0.7	-1.9	-4.8	6.3	-6.7	-7.2
(Low)	0.0	-0.7	-2.0	-5.0	-6.5	-7.0	-7.4
Females							
Without HIV/AIDS							
One (High)	55.9	55.9	55.9	55.9	55.9	55.9	55.9
Two (Medium)	55.9	58.2	60.4	62.7	64.9	67.2	69.4
Three (Low)	55.9	58.5	61.1	63.7	66.2	68.8	71.4
With HIV/AIDS							
Four (High)	55.6	55.2	54.0	51.2	49.2	49.3	49.3
Five (Medium)	55.6	57.3	58.2	57.0	56.5	58.3	60.1
Six (Low)	55.6	57.7	58.8	57.9	57.5	59.6	61.7
Difference							
(High)	-0.3	-0.7	-1.9	-4.7	-6.7	-6.6	-6.6
(Medium)	-0.3	-0.9	-2.2	-5.7	-8.4	-8.9	-9.3
(Low)	-0.3	-0.8	-2.3	-5.8	-8.7	-9.2	-9.7

It is important to stress that this outcome presupposes that the adult HIV prevalence rate does actually level-off at 5.07 per cent in 2011 and remain constant thereafter. Should the prevalence rate continue to climb beyond this level, a plausible possibility in the light of the experience of several African countries, then the impact would obviously be even greater.

But even this rather positive scenario implies that the improvement in life expectancy would drop to the extremely low rate of about 4 years in total over the 30-year period from 2000 to 2030, an average of only 0.13 years per year. To the extent that life expectancy is a measure of the overall quality of life, this rate of change implies that the quality of life would barely improve over a period of three decades.

Births

While the main impact of an HIV/AIDS epidemic is on deaths, the number of births will also decline relative to what it might otherwise have been owing to the reduced fecundity of HIV-positive women.[8] As table 9 shows, the projected number of births is lower given the HIV/AIDS epidemic than it would have been in the absence of HIV/AIDS, but the difference is not very large – a reduction of about 5 per cent in the "Medium" projection.

Table 9. Projected annual births with and without HIV/AIDS

Projection number	Year						
	2000	2005	2010	2015	2020	2025	2030
Without HIV/AIDS							
One (High)	174,192	198,287	220,528	242,557	267,068	295,351	327,724
Two (Medium)	174,192	190,151	203,151	214,704	226,564	238,275	248,845
Three (Low)	174,192	181,577	184,029	182,921	179,021	170,510	156,088
With HIV/AIDS							
Four (High)	174,153	198,055	219,587	239,311	259,430	283,689	312,184
Five (Medium)	174,153	189,929	202,285	211,832	220,074	228,791	236,877
Six (Low)	174,153	181,365	183,244	180,475	173,881	163,655	148,452
Difference							
(High)	-39	-152	-941	-3,246	-7,638	-11,662	-15,540
(Medium)	-39	-222	-866	-2,875	-6,490	-9,484	-11,958
(Low)	-39	-212	-805	-2,446	-5,140	-6,855	-7,636

Age structure

Because HIV/AIDS is disproportionately concentrated in the young adult age range, the epidemic has the potential to change the age structure of the population. This is evident in figure 4, which shows a disproportional drop in the population affected by AIDS from age 25-29 and from 0-14 to 15-19 by the year 2030. The difference is not large by comparison with countries with a higher prevalence rate, but it is noticeable. Unexpectedly, the age groups most affected by AIDS are under 15 and over 35. Changes to the age structure on a scale necessary to bring about a shrinking labour force do not appear to be a likely prospect in Papua New Guinea – so long as the adult HIV prevalence rate does not rise above the maximum rate assumed in these projections.

Figure 4. Age distribution of projected population in 2030 ("medium projection") with and without AIDS
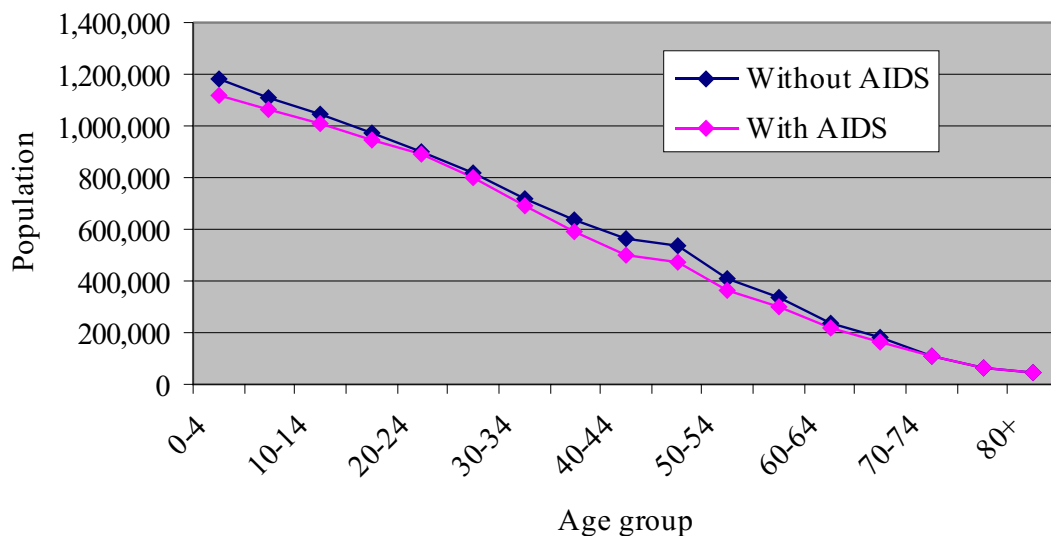
Conclusions and discussions

HIV was first detected in Papua New Guinea in the late 1980s. By 2005 it had become a "generalized epidemic" with an estimated 1 per cent of the adult population infected with the virus. While originally concentrated in urban areas, the disease has spread throughout the country and the national prevalence rate is now determined by the rate of spread in the rural areas where more than 80 per cent of the population lives. Analysis of the most recent surveillance data indicates that the adult prevalence rate reached 1.6 per cent in 2007 and this is projected to reach 5.1 per cent by 2012 after which it is expected to remain stable.

A series of population projections incorporating the impact of HIV/AIDS indicates that the demographic effects of AIDS were already emerging by 2000. Projected annual deaths in 2000 are 300 higher with AIDS than would have been the case without AIDS and the excess deaths attributable to AIDS rises steadily to reach more than 23,000 by 2030. Combined with a small decline in the expected births, the increased deaths results in a lower rate of natural increase, hence (in a population experiencing little net migration) a lower rate of population growth. By 2030, the population would be around 520,00 smaller than it would otherwise have been in the absence of AIDS and the growth rate would drop by approximately 16 per cent. The increase in the number of deaths would in turn have a significant impact on life expectancy. Depending on which set of demographic scenarios come to pass in the future, by 2030 life expectancy could decrease to the levels of the 1980s or rise only slightly.

Although the HIV/AIDS epidemic will reduce the population growth rate, the effect will not be sufficient to significantly slow down population growth. The middle projection suggests that the population could increase to 9.3 million by 2030 even allowing for the impact of AIDS. This would represent an increase of 4.2 million people over the period 2000-2030. Thus it appears that Papua New Guinea will face two related challenges over the next two to three decades. On the one hand, the population will continue to increase, although possibly at a slower rate than in the past. On the other hand, the AIDS epidemic will result in reduced life expectancy and therefore a lower overall quality of life. With population growth, and assuming a continual increase in the HIV prevalence rate, at least up to 2012, the number of HIV-positive persons will grow substantially, possibly reaching 300,000 by 2030. As greater numbers of infected persons seek hospital care or medical treatment for AIDS-related conditions, the health- care system would come under increasing strain.

The analysis reported here should be considered preliminary owing to the fact that only one possible scenario of the future trend in the adult HIV prevalence rate has been employed. The HIV prevalence rate trend curve (shown in figure 2) should be further refined for future analyses and other scenarios should be developed. While it may well be that Papua New Guinea will achieve the Millennium Development Goal 6 and its related target of halting the spread of HIV/AIDS by 2015 and beginning to reverse it, the most recent MDG report for the country expresses considerable skepticism that any of the goals can be achieved by the target date (Government of Papua New Guinea, 2004). Given the potential impact of HIV/AIDS on a wide range of socio-economic indicators, it is important to continue to refine the estimates and projections used to chart the potential course of the epidemic.

More work is also needed on the analysis of the demographic impact of the HIV/AIDS epidemic. This study examined a limited number of variables, not including such important ones as infant and child mortality. However, further demographic work should only be undertaken once the epidemiological data on HIV/AIDS have been further refined.

Acknowledgments

Endnotes

1. The 1991 survey was in fact conducted over a two-year period from 1991 to 1993. Little analysis was performed on the data from this survey and its results were never fully published. An analysis of the mortality data can be found in Hayes (1996).

2. Census takers in Papua New Guinea have long held the view that it is culturally insensitive to ask people about their father's survival status and that as a result the data obtained would be inaccurate. The survey results suggest that this is not the case.

3. The PEC conducted after the 1990 census itself was subject to error due to the time lapse after the census (Stott, 1992).

4. Reverse survival of the 2000 population did not produce satisfactory results, therefore manual methods were used.

5. The percentage adjustment of 15 per cent is within the range of the estimated coverage, which is of 79-87 per cent based on a limited post-enumeration check, as estimated by Stott (1992).

6. The data were supplied by UNAIDS and are used with permission.

7. A sharp cessation of an exponential growth curve followed by a levelling-off is characteristic of a "logistic" growth pattern. Normally, however, a logistical curve would be much smoother than is shown in figure 2 as the rate of change normally slows gradually as the upper asymptote is approached (Shryock, Siegel and Associates, 1975, 385).

8. Studies reported by Stover (2007:22) suggest that biological rather than behavioural factors are the underlying causes because most HIV-positive women are unaware of their seropositive status.

References

Department of National Planning and Monitoring (DNPM) (1999). *National Population Policy 2000-2010,* Waigani: Department of National Planning and Monitoring, Papua New Guinea.

Government of Papua New Guinea (2004). *Millennium Development Goals: Progress Report for Papua New Guinea 2004*, Waigani: Government of Papua New Guinea.

Hayes, G. (1996). *Estimates of Mortality in Papua New Guinea Based on the 1990 Census and the 1991 Demographic and Health Survey*. Port Moresby: UNFPA/ILO Project PNG/94/P01.

National Aids Council Secretariat (NACS) (2007). *The 2007 Consensus Report on the HIV Epidemic in Papua New Guinea,* Port Moresby: NACS.

National Statistical Office (1990). *Report on the 1990 National Population and Housing Census in Papua New Guinea,* Port Moresby .

_____ (2003). *Recent Fertility and Mortality Indices and Trends in Papua New Guinea,* Port Moresby

Shryock, Henry S., Jacob S. Siegel and Associates (1975). *The Methods and Materials of Demography*. 2 volumes, Orlando, Florida: Academic Press, United States of America.

Stott, H. (1992). "Post Enumeration Check, Papua New Guinea Census 1990: Estimates of Coverage", unpublished paper.

Stover, J. and S. Kirmeyer (2005). DemProj Version 4: A Computer Program for Making Population Projections. Washington, D.C.: The Futures Group.

Stover, J. (2007). *AIM Version 4: A Computer Program for Making HIV/AIDS Projections and Examining the Social and Economic Impact of AIDS,* Glastonbury, CT.: The Futures Group.

Current Status of Sexual and Reproductive Health: Prospects for Achieving the Programme of Action of the International Conference on Population and Development and the Millennium Development Goals in the Pacific

Repositioning family planning as an integral development strategy for poverty reduction and as a mechanism for achieving fundamental reproductive rights needs to be acknowledged at the highest political level.

By Annette Sachs Robertson*

The paradigm shift in population and development that occurred at the International Conference on Population and Development (ICPD) in Cairo, in 1994, from reduction in population growth for socio-economic progress to

_____

* CST Technical Adviser Reproductive Health Programme Assessment and Operations Research, UNFPA Subregional Office for the Pacific, Suva, Fiji, e-mail: robertson@unfpa.org.

ensuring sexual and reproductive health and rights as a fundamental human right and as a means for improving the quality of life, has also become apparent in the Pacific. The Millennium Development Goals (MDGs) provide the current global framework for development efforts and were formally endorsed in 2000 by 189 countries, including Pacific island countries. The importance of sexual and reproductive health was not fully articulated during the formulation of the MDGs as an explicit goal. However, during the World Summit convened in 2005, world leaders endorsed the fundamental human right of "universal access to sexual and reproductive health services" – an additional target to the MDG 5, as a result of intense lobbying by sexual and reproductive health advocates, including the Prime Minister of Tuvalu. The full integration of the MDGs into national sustainable development strategies and plans outlining an allocation of a certain percentage of the national budgets to poverty reduction is requiring a lengthy internalization and implementation process for many Pacific island countries. Part of the challenge for many of those countries has been the relevance of the poverty definition and the prevailing perception by some country leaders that "poverty of opportunity" is the more fundamental issue.

The core components of the essential package of sexual and reproductive health care include antenatal, perinatal, postpartum and newborn care; high quality family planning information and contraceptives; prevention and treatment of sexually transmitted infections (STIs), including HIV, reproductive tract infections and cervical cancer; elimination of unsafe abortion; prevention of sexual violence and the promotion of healthy sexuality (Glasier and others, 2006b). Underpinning the provision of this essential package is the recognition that services provided will be especially focused on marginalized or most at risk populations, such as unemployed young people, people living on outer islands or in peri-urban settlements, seafarers and sex workers. This integrated essential package is especially important for the prevention of maternal deaths, unintended pregnancies and STIs, including HIV infections. While it is widely recognized that sexual and reproductive health (SRH) is embodied within MDGs 4, 5 and 6, SRH is a fundamental cross-cutting issue that contributes to the achievement of all MDGs and thus poverty reduction (Langer, 2006).

The sociocultural and demographic heterogeneity of Pacific island countries and territories, whose populations range from 6.3 million in Papua New Guinea to 1,200 people in Niue, adds to the complexity of monitoring progress towards achieving the MDGs in the Pacific. The difficulty of determining whether valid data exist for relevant indicators and the ambiguity of interpretation of certain indicators and targets within the context of very small populations poses

significant challenges to monitoring progress towards the achievement of the MDGs. Furthermore, the reporting of summary statements with average figures does not adequately capture the disparities that exist across socio-economic groups, rural/urban groups or main island versus outer islands. To further complicate the issue, there is no single set of SRH indicators that would appear appropriate for the Pacific; the relatively conservative sociocultural setting poses some problems to the measurement of sexual behaviour; routine health information systems do not capture the needed community-based data; and national demographic health surveys have not been previously undertaken in many countries in the region. In addition, information on access to care is largely unavailable for the region. The status of sexual and reproductive health and prospects for achieving the MDGs, as outlined in this article, was written bearing in mind these aforementioned constraints.

Maternal health

Improving maternal health is outlined in both the ICPD Programme of Action and the MDGs framework. The MDG target is to reduce the maternal mortality ratio (MMR) by three quarters between 1990 and 2015, which is similar to the ICPD goal of reducing the MMR by 50 per cent between 1990 and 2000 and a further 50 per cent between 2000 and 2015. However, with the exception of Papua New Guinea, the difficulty in measuring maternal health and tracking trends of maternal mortality in Pacific island countries and territories, whose populations are less than a million, is largely owing to the statistical instability and random fluctuation of indicators of maternal mortality for small populations with rare events. It would seem in the absence of any other measure of maternal mortality that the actual number of maternal deaths or multi-year moving averages of maternal mortality ratio would be more appropriate than single year maternal mortality ratio figures. An aggregate indicator of maternal mortality that takes into consideration maternal deaths, near misses, perinatal/neonatal mortality and relevant process indicators should be seriously considered as a substitute for the MMR especially for the Pacific setting.

In table 1, the maternal mortality ratios and percentage of births by skilled health attendants for selected countries for the time frames 1990-2005 is summarized.

Since wide fluctuations of MMR occur when single-year values are reported, it is therefore more appropriate to use three-five moving averages of MMR. Figure 1 reveals three-year moving averages of MMR for selected countries.

Table 1. Reported maternal mortality ratios and percentage of births by skilled health attendants for selected Pacific island countries, 1990-2005

	Maternal mortality ratio		Percentage of births by skilled birth attendants	
	Circa 1990 (reference year)	Circa 2005 (reference year)	Circa 1990	Circa 2005
Fiji	41 (1988)	38 (2005)	98	99
Kiribati	225 (1995)	284 (2005)	60	63
Micronesia (Federated States of)	213 (1990)	317 (2004)	90	88
Papua New Guinea	370 (1990)	330 (2005)	33	41
Samoa	140 (1991)	22 (2005)	76	89
Solomon Islands	550 (1992)	142 (2006)	85.4	86
Tonga	40 (1990)	113 (2006)	94	96
Vanuatu	89 (1992)	105 (2005)	79	93

Source: Pacific MDG Report (2004); NSOs & MOHs (2004-2006); UNFPA (2007a).

Note:Tuvalu 1 death 2005, Palau last death 1995, Cook Islands last death 1995.

Figure 1. Maternal mortality ratios (using three-year moving averages) for selected Pacific island countries, 1990-2005
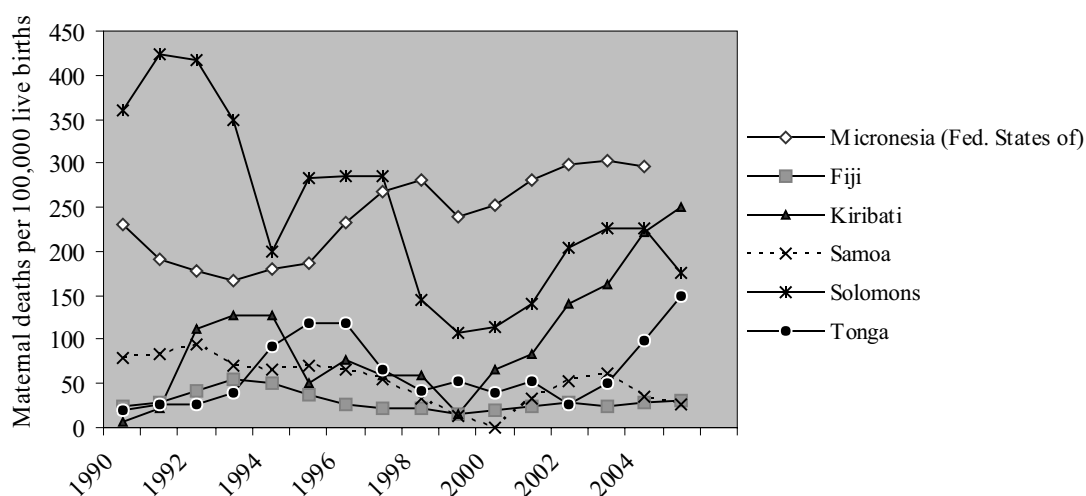
Sources: UNFPA (2006); SPC (2006); MOH Annual Reports (1990-2006).

In spite of these limitations and also when reflecting on absolute number of maternal deaths, some conclusions can be drawn. For Papua New Guinea and Solomon Islands, Melanesian countries with initially high MMRs, some decrease in maternal mortality over the 15-year period under review is evident. However, the figures for Papua New Guinea should be interpreted with some caution as they are indirect estimates from mortality probabilities (SPC, 2005). While the Regional MDG report of 2005 states that Solomon Island figures may be an underestimate, a recent emergency obstetric care facility-based survey confirmed a lower number of maternal deaths in 2006 (UNFPA, 2007b). With the current trend, it would appear that Solomon Islands may be on track to meeting its MDGs target. For the rest of the Pacific, there are several countries in which relatively high numbers of maternal deaths continue to be of concern and it is unlikely that Papua New Guinea, the Federated States of Micronesia and Kiribati will reach their MDG target for 2015 if relevant interventions are not strengthened.

Countries in the region with consistently low MMR and low absolute numbers of maternal deaths include Fiji, Samoa and Tonga (with the exception of 2005 when there were six deaths which differed from the usual 0-2 deaths that have occurred since 1996). The estimate of the MMR for Vanuatu is similarly based on low numbers (two deaths). For countries and areas in which the MMR is particularly inappropriate as an indicator of maternal health, such as in the Cook Islands, Niue and Palau, there has not been a maternal death since 1995. In Marshall Islands and Tuvalu, there were no maternal deaths reported during 2005 and 2006. The difficulty in analysing progress towards achieving MDG Goal 5 in the Pacific and the need to take into account multi-year averages is also echoed in two papers in this special issue of the *Asia-Pacific Population Journal* (Hayes, 2007a; Haberkorn, 2007).

Among Pacific countries in which maternal death remains a major issue, leading causes of maternal deaths include postpartum haemorrhage, pre-eclampsia, obstructed labour, puerperal sepsis, and complications of unsafe abortion. In Fiji, the major causes of maternal deaths have been a result of heart disease and thrombo-embolic phenomena.

With the exception of Papua New Guinea and Kiribati, all countries in the Pacific report percentages of births by skilled health attendants exceeding 85 per cent in 2005. Palau, Niue and Tuvalu report that 100 per cent of all births are attended by skilled health attendants (SPC, 2005). Between 1990 and 2005, small increases in the percentage of births by skilled health attendants are evident across the region, with the exception of the Federated States of Micronesia, the Marshall Islands and Kiribati (see figure 2).

Figure 2. Percentage of deliveries by skilled birth attendants, 1990-2005, in selected Pacific island countries
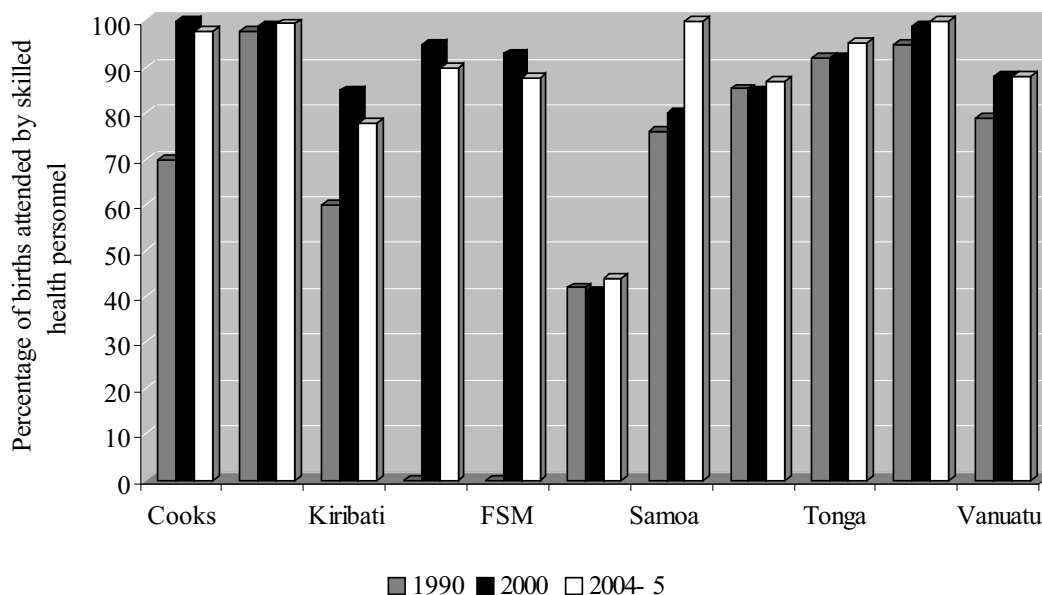
Sources: PRISM (2006); NSOs & MOHs (1990-2005); UNFPA (2006).

However, interpretations should be made cautiously as there are inconsistencies in the definitions of skilled birth attendant in some Pacific island countries. There is some evidence to suggest that WHO's definition of what constitutes a skilled birth attendant is not being adhered to for calculation of this indicator. Nonetheless, it would appear that the majority of countries have reached or will reach their MDG/ICPD target by 2015 for this indicator that poses as a proxy determinant of maternal health.

Correlations suggest strong negative correlations between MMR and percentage of births by skilled health attendants. As would be expected, strong positive correlations are observed between infant mortality rates and MMR as well as high teenage fertility rates and MMR. Countries with relatively high infant mortality rates (exceeding 40 per 1,000 live births) are the countries in which maternal deaths are of concern: Papua New Guinea, Solomon Islands, Kiribati and the Federated States of Micronesia. However, unlike for MMR, all countries in the region have seen decreases in infant mortality rates since 1990 and the majority (except Papua New Guinea) have reached the 2005 ICPD target of 50 per 1,000 live births or one third of the 1990 rate (Hayes, 2007a).

While unsafe abortion also contributes to maternal mortality, reliable information on unsafe abortion in the Pacific is not available.

Family planning and unmet need for contraception

While family planning was considered a central tenet of sexual and reproductive health and rights in the ICPD Programme of Action, family planning programmes were given lower priority in the period following 1994 globally, as well as in the Pacific. The lack of political commitment, subsequent to the 1990s, was due to a failure to recognize universal access to contraceptive information and services as an explicit strategy for poverty reduction and as a fundamental reproductive right, at a time when religious and political conservatism, especially related to adolescent sexuality, were re-emerging (Cleland and others, 2006). These influences, besides donor fatigue and competition for limited resources for HIV prevention, resulted in fewer resources being made available for family planning programmes. As a result, family planning was overlooked during the formulation of the Millennium Development Goals even though it should have been recognized as one of the main strategies for poverty reduction and a means of facilitating women's empowerment, especially in countries with high fertility rates. Contraceptive prevalence rate (CPR) was included as an indicator under Goal 6 of combating HIV/AIDS, malaria and other diseases but not under Goal 5 of improving maternal health (Freedman, 2003). Unmet need for contraception was not included as an indicator for determining the extent to which SRH has been attained.

In the Pacific, family planning programmes were initiated in the 1960s in an attempt to enhance socio-economic development through population reduction as well as to improve women's and children's health (House and Katoanga, 1999). However, the diminishing emphasis of family planning in the Pacific paralleled its global waning in the 1990s despite the fact that many Pacific island countries had some of the highest total fertility rates in the world, as well as highest population densities such as in Ebeye in RMI. Culturally, Pacific islanders have had a preference for larger families believing that it is an investment which will enrich them later in life, through the larger number of children contributing to their socio-economic welfare (House, 2002). However, while many Pacific leaders believe only poverty of opportunity exists, there is evidence of growing overt poverty in many urban and outer island or rural areas.

In the Cook Islands and Niue, owing to negative population growth resulting from emigration to New Zealand and other countries, Governments have preferred to invest in repopulation strategies rather than family planning.

While the preferred criterion for determining how successful family planning programmes have been unmet need for contraception – proportion of married, fecund women who wish to avoid further childbearing or postpone having a child for two years and are not currently using contraception – few countries in the

Pacific possess any measurements of this indicator. Demographic Health Surveys (DHSs) and Reproductive Health Surveys (RHSs) have not been a tradition in the Pacific, which is very unlike other regions in the world. Prior to 2006, only two countries in the Pacific (Papua New Guinea and Samoa) had had a DHS conducted previously, while the Cook Islands had a RHS, bringing to only three the number of countries which have had measures of unmet need for contraception. By now, with the pressing need to measure the impact on socio-economic progress of demographic and health indicators, only three countries have conducted a DHS: Solomon Islands, the Marshall Islands and Tuvalu. There is an urgent need for all countries in the Pacific to conduct a DHS or a similar survey. In the absence of information on unmet need, contraceptive prevalence rate is used to determine the extent to which couples or women are trying to limit the number of children and control the timing of their pregnancies by using contraception.

In table 2, the contraceptive prevalence rates, total fertility rates (TFR) and adolescent fertility rates are compared and contrasted for selected countries.

Table 2. Total fertility rate, age-specific fertility rate (15-19 years) and contraceptive prevalence rate in selected Pacific island countries, 1990-2005

	Total fertility rate		Age-specific fertility rate (15-19) (per 1,000 women)		Contraceptive prevalence rate (percentage)	
	Circa 1990	Circa 2005	Circa 1990	Circa 2005	Circa 1990	Circa 2005
Cook Islands	3.7	2.9	83.0	44.0	45.8	43.8
Fiji	2.9	2.7	65.0	39.0	31.0	35.5
Kiribati	4.5	3.5	51.0	71.0	17.4	22.1
Marshall Islands	6.9	4.5		94.0	30.6	42.0
Micronesia (Federated Sates of)	4.1	3.8	68.0	51.0	40.0	49.0
Samoa	...	4.6	22.0	45.0	18.0	31.0
Solomon Islands	4.8	...	101.0	69.0	10.6	10.0
Tonga	4.1	3.8	28.0	16.0	32.8	19.7
Tuvalu	3.4	3.7	30.0	39.0	39.0	31.6
Vanuatu	4.8	...	...	92.0	15.0	28.0

Sources: Pacific MDG Report (2004); MOH (2000-2005) and UNFPA Survey (2005-2007).

It is evident that for some countries which had particularly high levels of fertility (TFR >3), contraceptive prevalence rates were generally below 30 per cent in 2005 (Kiribati, Solomon Islands, Tonga and Vanuatu). To complicate any assessment of trends, it appears that under-reporting of contraceptive use may be occurring in some countries where significant declines in TFRs have occurred without concomitant increases in CPR. Women accessing contraceptives from private pharmacies, private practitioners and non-governmental organizations are often not routinely captured by the data compiled by the various ministries of health, on contraceptive prevalence rate. Validation of the CPR, especially by age, is urgently needed in most Pacific island countries. While measures of unmet need are not available for most of the Pacific, teenage fertility rates may serve as a proxy for unmet need in that age group. High teenage fertility rates in the Marshall Islands, Vanuatu, Kiribati, the Solomon Islands and the Federated States of Micronesia along with high total fertility rates suggest that unmet need among teenage girls in these countries may indeed be very high. Based on figure 3, it is evident that the Marshall Islands, Vanuatu, Kiribati and the Solomon Islands have among the highest teenage fertility rates in the world. This is particularly worrisome as approximately 60 per cent of the population is aged less than 25 in these countries and evidence is emerging that unsafe sexual behaviour among young people is highly prevalent in these countries (WHO, 2006).

Figure 3. Age-specific fertility rates (15-19 years) in selected countries of East Asia and the Pacific, 2004
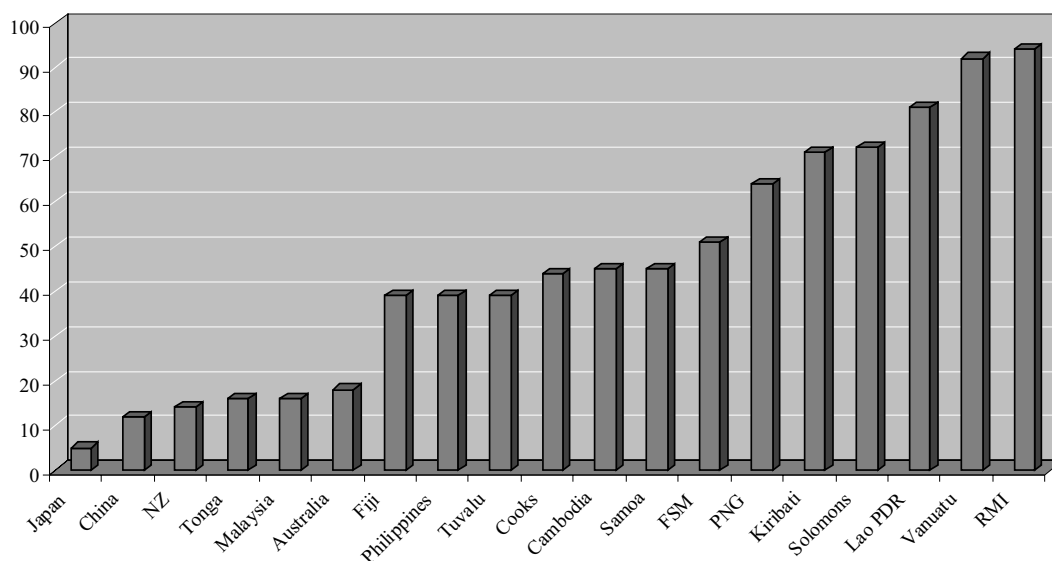
Sources: SPC (2005); UNFPA (2006); Selected PICs' MOH Annual Reports (2005).

The proposed ICPD targets relate to narrowing the gap between the proportion of contraceptive use and the desire to space or limit one's children by approximately 50 per cent by 2005 and 75 per cent by 2010. In the absence of data on unmet need and considering that the CPR may be under-reported, one can only surmise that none of the countries in the Pacific come close to reaching any potential targets of satisfying unmet need. In four countries (Cook Islands, Solomon Islands, Tonga, Tuvalu), the contraceptive prevalence rates appear to have decreased, while in other countries they have remained stagnant or increased very slightly (UNFPA, 2007a). In countries that have shown a slight increase over time, two countries remain below 30 per cent (Kiribati and Vanuatu). The need to measure unmet need for contraception and validate the CPR in Pacific island countries, through DHS or related surveys, should be considered of utmost urgency for determining the status of sexual and reproductive health of the population as well as women's reproductive rights and empowerment.

HIV and sexually transmitted infections

Goal 6 of the Millennium Development Goals, "Combat HIV/AIDS, malaria and other diseases", has six indicators that relate to HIV, three of which will be presented in this section. Limited data is available in the Pacific on HIV prevalence in the age group 15-24 or among pregnant women aged 15-24 years (SPC, 2005). While second generation surveillance studies have been undertaken in several Pacific island countries, pilot HIV surveillance and testing among pregnant women aged 15-24 years have yielded no new cases. To provide an idea of the status of HIV in the Pacific, the cumulative incidence of HIV cases and number of HIV cases in countries is illustrated in figure 4. The cumulative incidence (178 per 100,000) for Papua New Guinea is the highest in the Pacific and presents a generalized epidemic pattern – 1.6 per cent prevalence in the adult population (aged 15-49 years). Surveillance studies of antenatal women in Papua New Guinea reveal that the percentage of pregnant women that were HIV positive varied from 0 to 16.3 per cent in 2006 (National Aids Council, Papua New Guinea, 2007). The demographic impact of the HIV epidemic in this country has been discussed in an article published by Hayes in this issue of the *Asia-Pacific Population Journal.* It is estimated that by 2012 the prevalence of HIV will be 5 per cent in Papua New Guinea (Hayes, 2007b).

In the rest of the Pacific, while the absolute number of HIV cases is highest in Fiji, the cumulative incidence is highest in Kiribati and Tuvalu (exceeding 40 per 100,000 people). The current HIV situation in Kiribati and Tuvalu has largely been due to the importation of HIV by seafarers subsequent to their return from travels to

Asian countries and spreading it then to their families. In the Pacific, the mode of transmission of HIV has been predominantly heterosexual, while there is some evidence that perinatal transmission may be increasing in some countries.

Figure 4. Number of HIV cases and cumulative incidence of HIV cases in selected Pacific island countries, 2005
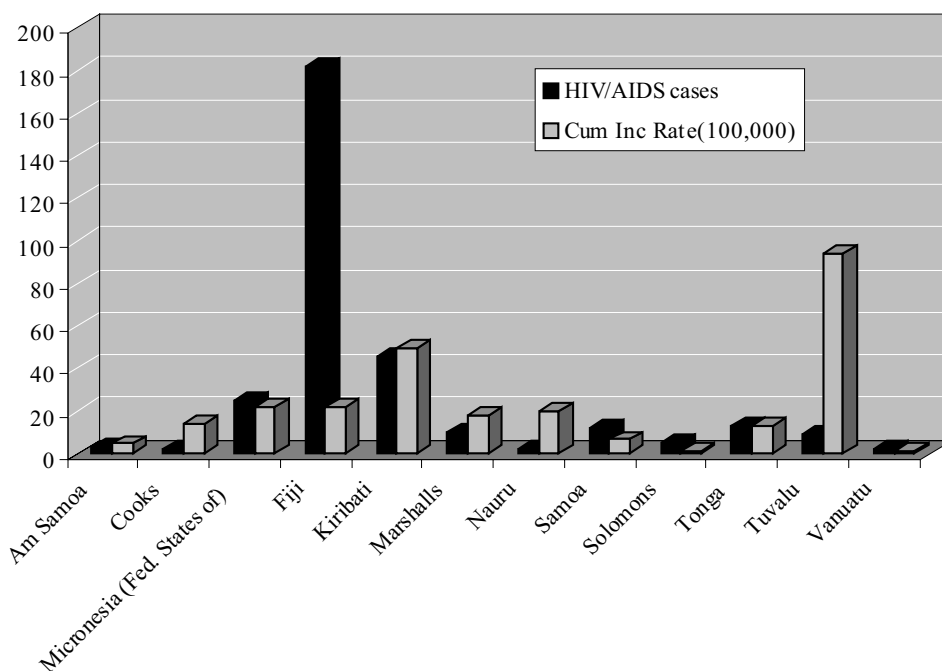
Source: SPC (2005).

Note: Papua New Guinea: 10,178 cases, cumulative incidence 178.8 per 100,000.

In table 3, results of the second generation surveillance studies (SGS) in six Pacific island countries are depicted for condom use at last high-risk sexual intercourse and percentage of population aged 15-24 with comprehensive and correct knowledge of HIV (WHO, 2006). It can be seen that low levels of condom use and low levels of comprehensive and correct knowledge about HIV exist in selected population groups in Fiji and Samoa. In Kiribati, the Solomon Islands and Vanuatu, there appears to be higher practice of condom use and awareness of HIV transmission, as a result of targeted on-going prevention activities.

Evidence suggests that there are high rates of STIs among Pacific island populations. Second generation surveillance studies revealed that the prevalence of chlamydia amongst pregnant women ranged from 6.4 per cent in the Solomon Islands to 29 per cent in Fiji (WHO, 2006). Of the six countries in which the study was undertaken, chlamydia prevalence among less than 25 year old pregnant women was

20 per cent or above in five countries (Fiji, Kiribati, Samoa, Tonga and Vanuatu). In Fiji and Samoa, chlamydia prevalence was higher than 30 per cent among women aged less than 25; rates that would be considered among the highest in the world.

Table 3. Indicators for high-risk sexual behaviour and condom use among at-risk population in selected Pacific island countries, 2005

	Fiji (n=303)	Kiribati (n=199)	Samoa (n=300)	Solomon Islands (n=374)	Vanuatu (n=326)
Condom use at last high risk intercourse – commercial	7.7	38.2	7.1	41.9	53.5
Condom use at last high risk intercourse – non-commercial	12.5	32.7	14.0	45.1	37.3
Percentage of population aged 15-24 years with comprehensive and correct knowledge of HIV	...	...	14.3	41.7	25.8

Source: WHO (2006).

Given the apparently high levels of unprotected sex, high prevalence of STIs, lack of knowledge about the disease and lack of adequate surveillance of HIV and STIs in many Pacific island countries, it is highly likely that halting or reversing the spread of HIV will only occur in countries, excluding Papua New Guinea, if effective interventions are strengthened among the population. In Papua New Guinea, the HIV situation is dire and it is unlikely that this country will achieve all of its goals and targets related to sexual and reproductive health and HIV by 2015. If SRH is to be realized in the Pacific, it is essential that the prevention and treatment of STIs, including HIV, is paramount among health promotion strategies targeting most at-risk populations.

Achievements

Although countries and territories in the Pacific have integrated reproductive health into primary health care, even prior to the ICPD in 1994, the quality of information and services in SRH care is in need of continued improvement. Some countries have adopted legislations/policies advancing reproductive rights but clearly there is need for further action. Pacific island countries have taken key measures to increase access to quality RH services through training and increased staffing, increased number of service delivery points and introduction of evidence-based guidelines in SRH, including family planning. In the Pacific ICPD +10 survey conducted by UNFPA, many countries reported taking action for promoting safe motherhood, such as improving antenatal care coverage, increasing percentage of

skilled birth attendants and instituting decentralized emergency obstetrics care (Robertson and Hayes, 2005). While many countries in the Pacific have expanded the choice of contraceptives, with implants and emergency contraceptives made available, access to these contraceptives for teenagers remains unsatisfactory.

Way forward

The need to advocate at the highest level for a strategic approach to SRH, including family planning and HIV, remains a challenge for most countries in the Pacific. Mobilizing governmental institutions, development partners, non-governmental organizations, professional associations and the private sector to harness their support to invest in SRH, family planning and STI/HIV services and to ensure reproductive health commodity security in the region should be considered a development priority. In most Pacific island countries, national reproductive health policies and/or strategies need to be updated or developed. Repositioning family planning as an integral development strategy for poverty reduction and as a mechanism for achieving fundamental reproductive rights needs to be acknowledged at the highest political level. While incorporation of SRH, including family planning and HIV, in national and subnational development plans has been achieved in most countries in the Pacific, the extent to which it has translated into national implementation strategies is unclear. There is an urgent need to promote access for all women and men, especially young people, living in rural areas and outer islands and disadvantaged or marginalized groups, to a full range of SRH information, family planning services and commodities. Strengthening national institutional capacity to identify and implement linkages for SRH and HIV has been discussed and strategies are currently being developed to better address this, including through pre- and in-service training in family planning and HIV counseling and testing. While four countries have updated their national family planning evidence-based guidelines (Federated States of Micronesia, the Solomon Islands, Tonga and Vanuatu), current family planning programmes in most countries should be strengthened. STI guidelines in the majority of countries need to be updated to reflect current epidemiological and drug-sensitivity patterns and available antibiotics. Obstetrical protocols in many countries have been introduced but there is a need to ensure that all service providers utilize those protocols and that women have access to quality comprehensive and basic emergency obstetrics care. There is also a need for targeted and sustained behavioural change communication campaigns in SRH, particularly in obstetrical care, family planning, STI and HIV prevention in groups most at risk. Concerted national efforts need to be made to strengthen SRH, including through repositioning family planning and upscaling STI/HIV programmes, and to address deeply-rooted gender-based inequities in order to achieve the Millennium

Development Goals and the Programme of Action of the International Conference on Population and Development in the Pacific.

References

Cleland, J. and others (2006). "Family planning: An unfurnished agenda", *Lancet*, 10.1016/s0140-6736 (06), pp. 47-64.

Freedman, L. (2003). Background Paper of the Task Force on Child Health and Maternal Health, United Nations Millennium Project, pp. 1-79.

Glasier, A. and A. Gulmezoglu (2006). "Putting reproductive health on the agenda", *Lancet*: 10.1016/S0140-6736 (06), pp. 2-3

_____ and others (2006). "Sexual and reproductive health: a matter of life and death", *Lancet*, 10.1016/S0140-6736 (06), pp. 11-23

Haberkorn, G. (2007). "Fertility and Mortality in the Pacific Islands", *Pacific Health Dialogue,* pp. 104-112.

Hayes, G. (2007a). *Achieving the MDGs in the Pacific: Policies and Strategies in Population and Erproductive Health,* United Nations Population Fund. (in press)

_____ (2007b). "The demographic impact of HIV/AIDS epidemic in Papua New Guinea 1990-2030", *Asia Pacific Population Journal,* December.

House, W. (2002). Goal Setting foe family Planning Programme: An Illustration from the Marshall Islands, UNFPA, Didcussion Paper No. 10, pp. 1-17

_____ and S. Katoanga (1999). "Reproductive health and family planning programmes in the Pacific island countries", *UNFPA Development Bulletin*, pp. 27-29.

Langer, A. (2006). "Cairo after 12 years: successes, setbacks and challenges", *Lancet*. 10.1016/S0140-6736 (06), pp. 4-6

National AIDS Council, PNG (2007). *The 2007 Estimation Report on the HIV Epidemic in Papua New Guinea.*

Robertson, A. and G. Hayes (2005). *ICPD+10: Progress in the Pacific*, UNFPA.

Secretariat of the Pacific Community (SPC) (2005). *Pacific Region Millennium Development Goals Report.*

United Nations Population Fund (UNFPA) (2007a). Status of Sexual and Reproductive Health. Presentation at UNESCAP-UNFPA Meeting, September 2007.

_____ (2007b). *Emergency Obstetrics/Family Planning Facility-based Survey in Solomon Islands.*

World Health Organization (2006). *Second Generation Surveillance Surveys of HIV, other STIs and Risk Behaviours in Six Pacific island countries 2004-2005.* World Health Organization, Secretariat of the Pacific Community, University of New South Wales, Global Fund.

Differential Mortality among Pacific Island Countries and Territories

Pacific island countries show highly variable patterns of mortality. While high mortality populations are affected particularly by infectious diseases and under-nutrition (especially children), adults in low mortality countries are afflicted with non-communicable diseases and injuries.

By Richard Taylor and Alan Lopez*

Pacific island countries and territories are at different stages of demograhic transition, with some populations still experiencing relatively high mortality and fertility and others manifesting lower mortality and declining fertility. These countries are also passing through the epidemiological transition, with a progressive increase in proportionate mortality from chronic diseases and

---

* Professor Richard Taylor, International Health, School of Population Health and Professor Alan Lopez, Medical Statistics and Head of School, the University of Queensland Herston QLD 4006, Australia, e-mail: r.taylor@sph.uq.edu.au

widening sex differentials in death rates (Taylor, Lewis and Sladden,1991; Taylor, Lewis and Levy,1989).

The availability of accurate and current data on mortality levels, causes of death and trends is of vital importance to assist countries to channel public and private resources into priority health-related activities. The consequence of inaccurate (usually lower) mortality data is an under-estimation of the gravity and urgency of health problems, often leading to under-investment in health development. Many international and aid agencies use infant and childhood mortality rates and life expectancy as part of the decision-making process for allocating funds. Trends in mortality can also provide a useful and simple overall assessment of the results obtained following investments in social and economic development, and health services.

The purposes of the present article are to: (a) document levels of uncertainty in mortality estimates in Pacific island countries, (b) identify the major quality and analytical problems affecting estimates of mortality in Pacific island countries, and (c) provide best possible estimates based on an assessment of published data and application of demographic techniques. The scope of the current exercise is limited to total mortality levels from the 1990s to 2005 and is an update of previously published studies (Taylor, 2001; Taylor, Bampton and Lopez, 2005).

A similar assessment of causes of death data and causes of death estimates is essential to help determine the need for priority health programmes.

The present study focuses on:

- Melanesia which refers commonly to Fiji, New Caledonia, Papua New Guinea, Solomon Islands, Vanuatu;

- Micronesia: Federated States of Micronesia, Guam, Kiribati, the Marshall Islands, Nauru, the Northern Mariana Islands, and Palau

- Polynesia: American Samoa, Cook Islands, French Polynesia, Niue, Samoa (formerly Western Samoa), Tokelau, Tonga, Tuvalu, Wallis and Futuna.

Methods

A systematic survey was undertaken of international and regional health and development agencies, as well as universities and research institutes in 1999-2000 known for their involvement in the production and dissemination of mortality data concerning the Pacific islands. A data collection instrument was sent to the health and statistics ministries/departments of Pacific island countries through the offices

of the World Health Organization (WHO) and its representatives in 1999-2000, requesting published and unpublished mortality data from 1990 onwards (Taylor, 2001). In total, 167 references to recent mortality information were obtained for the 21 States included in the survey. Mortality data was evaluated with respect to: (a) sources and methods, (b) plausibility, and (c) consistency. During 2006-2007 the survey has been extended with a review of reported mortality for most Pacific island countries using published reports and web sites of countries and international and regional agencies. Data on some Micronesian and Polynesian countries have not yet been updated.

Sources and methods

The primary source of mortality data was identified, and the methods used for computation and projections were ascertained as far as possible; these were evaluated with respect to known strengths and weakness of sources and methods. (Taylor, 2001; Taylor, Bampton and Lopez, 2005; United Nations, 1983; Lopez and others, 2002). Empirical data from vital registration that had been assessed for under-registration were preferred to the use of model life tables for imputation of adult mortality from child mortality, or as part of indirect methods (the model life tables used may not have been appropriate in several instances). Indirect methods were employed extensively, especially the children ever born/children surviving (CEBCS) method, as well as the widowhood and orphanhood techniques for adult mortality (United Nations, 1983). These methods are capable of providing reasonable estimates of mortality as long as recall of demographic events is accurate and appropriate model life tables are used to translate recorded proportions of children/siblings surviving into estimates of infant and child mortality. Vital registration data covering short periods for small populations are unreliable because of stochastic variation. Projections were examined with regard to methodology and assumptions, where these were available; projections were often based on standard assumptions about mortality decline over time from international rather than local data, and are therefore deemed unreliable (Lopez and others, 2002).

Plausibility

Infant and childhood mortality and life expectancy figures were evaluated with respect to plausibility compared with levels prevalent in other countries (e.g. infant mortality rates below 10/1000 are only usually seen in developed countries); the cause-structure of mortality, where it is reliably known (e.g. relatively low infant mortality is plausible in countries with relatively high life expectancy if considerable non-communicable diseases cause mortality among adults); and

reported changes in relation to previous estimates (e.g. sudden rises or falls in life expectancy and infant mortality over short periods are improbable).

Consistency

Finally, there is greater confidence in mortality estimates that are derived by independent methods requiring different assumptions yet which yield approximately similar results. However, estimates produced by different agencies may be consistently wrong because they tend to derive from each other, or are produced from the same faulty data source or based on inappropriate methodologies. Thus consistency must be judged in relation to the above-mentioned parameters; sources and methods, and plausibility.

The "best estimates" of life expectancy and infant mortality for each Pacific island country have been derived from the data and information available, following application of the above considerations. A range of uncertainty is given as the minimum and maximum estimates for life expectancy and infant mortality identified from the available data for each country from the 1990s to 2005. These data emanate from a range of country sources (especially Health and Statistics Departments), and from international and regional agencies including the Asian Development Bank (ADB), the Economic and Social Commission for Asia and the Pacific (ESCAP), the Secretariat for the Pacific Community (SPC), the United Nations Children's Fund (UNICEF), the United Nations Population Division, the United Nations Development Programme (UNDP), the United Nations Population Fund (UNFPA), the World Bank, and the World Health Organization (WHO).

Data presented in tables 1-3 from life tables have been rounded to the nearest whole year of life expectancy (at birth) and nearest number of deaths (per 1,000) for the infant mortality rate (IMR). Some IMRs shown in tables 1-3 were calculated by averaging the sex-specific values.

Table 1. Mortality estimates for Pacific island countries: Melanesia

Country/territory (year) Population (in thousands)	Best recent estimate available (and range of estimates)*					
	Year	Life expectancy at birth (years)		Year	Infant mortality (per 1,000)	Source and method of best recent estimate
		Males	Females			
Fiji (1997) 810	1996	65 (61-72)	69 (65-76)	1996	20 (7-26)	Demographic analysis of 1996 census [a/]
New Caledonia (1996) 197	1999	70 (67-73)	76 (73-77)	1999	6 (6-8)	Accurate vital registration [b/]

.../

Table 1. *(Continued)*

Country/territory (year) Population (in thousands)	Best recent estimate available (and range of estimates)*					
	Year	Life expectancy at birth (years)		Year	Infant mortality (per 1,000)	Source and method of best recent
		Males	Females			
Papua New Guinea (1990) 3,608	2000	55 (51-58)	54 (54-62)	1995	73 (61-73)	Life expectancy 2000 census analysis and surveys [c/]
Solomon Islands (1999) 404	1999	61 (61-70)	62 (62-74)	1999	66 (20-66)	Demographic analysis of 1999 census [d/]
Vanuatu (1999) 193	1999	66 (64-70)	69 (65-74)	1999	29 (17-39)	Demographic analysis of 1999 census [e/]

Sources: [a/] Rakaseta (1999); Secretariat of the Pacific Community (2001);Fiji Bureau of Statistics (1998) and Fiji Government (2006).

[b/] *Situation Sanitaire en Nouvelle-Caledonie (1999);* South Pacific Commission (1998); Secretariat of the Pacific Community (1998); Papua New Guinea National Statistics Office (1996) and National Statistical Office (2003).

[c/] Secretariat of the Pacific Community (1998); Papua New Guinea National Statistics Office (1996) and National Statistical Office (2003).

[d/] National Statistical Office (2003) and Solomon Islands National Statistics Office (2006).

Note: * The ranges for life expectancy and infant mortality are the work out the sources of this table and tables 2, 3 minimum and maximum estimates identified from a range of country and international and regional agency sources.

Table 2. Mortality estimates for Pacific island countries: Micronesia

Country/territory (year) Population (in thousands)	Best recent estimate available (and range of estimates)*					
	Year	Life expectancy at birth (years)		Year	Infant mortality (per 1,000)	Source and method of best recent estimate
		Males	Females			
Federated States of Micronesia (1997) 118	1994	64 (63-65)	67 (65-67)	1994	46 (20-46)	Life tables imputed from childhood mortality from indirect methods [a/]
Guam (1997) 146	1995	73 (70-73)	77 (74-77)	1995	9 (9)	Accurate vital registration [b/]
Kiribati (1999) 81	1995	59 (58-59)	65 (62-65)	1995	62 (53-67)	Demographic analysis of 1995 census [c/]

.../

Table 2. *(Continued)*

Country/territory (year) Population (in thousands)	Best recent estimate available (and range of estimates)*					
	Year	Life expectancy at birth (years)		Year	Infant mortality (per 1000)	Source and method of best recent
		Males	Females			
Marshall Islands (1999) 51	1994	60 (60-66)	63 (63-69)	1994	63 (14-63)	Life tables imputed from childhood mortality [d/]
Nauru (1992) 10	1991-1993	54 (54-55)	61 (61-64)	1991-1993	13 (11-25)	Hospital death registration data[a/]
Northern Mariana Islands (1995) 59	1994-1996	67 (67)	73 (73)	1992-1996	10 (7-10)	Vital registration data[e/] Probably accurate
Palau (1998) 19	1995	64 (64-66)	70 (69-74)	1995	20 (19-28)	Vital registration data[f/] Probably accurate

*Source*s: [a/] South Pacific Commission (1998).

[b/] Secretariat of the Pacific Community (1999).

[c/] Republic of Kiribati, Ministry of Health .

[d/] South Pacific Commission (1998).

[e/] Secretariat of the Pacific Community (2001) and Secretariat of the Pacific Community (1999).

[f/] South Pacific Commission (1998) and Secretariat of the Pacific Community (1999).

Notes: *****   The range for life expectancy and infant mortality are the minimum and maximum estimates identified from a range of country and international and regional agency sources.

Table 3. Mortality estimates for Pacific island countries: Polynesia

Country/territory (year) Population (in thousands)	Best recent estimate available (and range of estimates)*					
	Year	Life expectancy at birth (years)		Year	Infant mortality (per 1,000)	Source and method of best recent estimate
		Males	Females			
American Samoa (1999) 63	1995	68 (67-68)	76 (71-76)	1991-1995	13 (10-16)	Sources and methods unclear [a/]
Cook Islands (1999) 17	1995-2005	69 (59-71)	73 (65-75)	1991-1996	22 (4-34)	Vital registration data[b/]

.../

Table 3. *(Continued)*

Country/territory (year) Population (in thousands)	Year	Life expectancy at birth (years)		Year	Infant mortality (per 1000)	Source and method of best recent
		Males	Females			
French Polynesia (1996) 220	1995-2005	71 (70-71)	76 (75-77)	1996	6 (5-7)	Accurate vital registration data [c/]
Niue (1997) 2	1991-1997	70 (63-74)		1991-1996	18 (18-22)	Probably accurate vital registration data [d/]
Samoa (1999) 175	1998	65 (65-70)	72 (67-72)	1998	25 (11-25)	Vital statistics sample survey [e/]
Tokelau (1996) 1.5	1996	68 (68)	70 (70)	1991-1995	32 (32-38)	Vital registration data Probably accurate [a/]
Tonga (1999) 97	2000	70 (64-71)	72 (67-74)	1996	16 (8-24)	Demographic analysis of 1996 census [f/] Annual Report Ministry of Health [g/]
Tuvalu (1999) 11	1991	64 (64)	70 (70)	1990-1999	27 (16-56)	Life expectancy data from demographic analysis of 1991 census [h/]
Wallis and Futuna (1996) 14	1990-1995	67 (67-70)	71 (71-74)	1990-1995	15 (6-18)	Probably accurate vital registration [i/]

Sources: [a/] South Pacific Commission (1998).

   [b/] Secretariat of the Pacific Community (2001); Secretariat of the Pacific Community (1999); Demmke (1999); Secretariat of the Pacific Community (2004) .

   [c/] *Institut Statistique de Polynésie Francais. Etat-civil, Mai* (2006a and 2006b)

   [d/] Secretariat of the Pacific Community (2001) and Demmke (1999).

   [e/] Secretariat of the Pacific Community (2001); Secretariat of the Pacific Community (1999) and Government of Samoa, Department of Statistics and Secretariat of the Pacific Community (1999).

   [f/] Secretariat of the Pacific Community (2001) and Rakaseta (1999).

   [g/] Ministry of Health Tonga. (2006).

   [h/] Secretariat of the Pacific Community (2001); South Pacific Commission (1998); Rakaseta, Haberkorn, Demmke and Lepers (1998) and Tuvalu Government Statistics Office (2001).

Note: * The range for life expectancy and infant mortality are the minimum and maximum estimates identified from a range of country and international and regional agency sources.

Results

This analysis reveals uncertainty around mortality estimates for Pacific island countries and territories (tables 1-3). The ranges for life expectancy and infant mortality are the minimum and maximum estimates identified from the published and unpublished data obtained from a detailed review as described above. In some countries, life expectancy variations of 10 years or more were recorded. The review of published mortality estimates suggests that there is considerable use of under-enumerated death records or vital registration data, especially within countries, without any attempt to estimate and correct for under-enumeration. Both infant and adult mortality data are under-estimated in many Pacific island countries.

In some small island countries, especially with populations below 50 000, vital registration or death recording data are frequently used by countries to produce annual mortality estimates. The small number of deaths produces significant fluctuations from year to year with some mortality estimates being implausibly high and others implausibly low.

In some countries, adult mortality has been imputed directly from infant and under-five mortality using inappropriate life tables which do not reflect the Pacific island patterns of relationship between child and adult mortality. (Taylor, Lewis and Sladden, 1991; Taylor, Lewis and Levy,1989). An additional problem is that the infant and childhood mortality calculated from death registration or indirect methods may not be, in itself, accurate. Some estimates of mortality from indirect demographic methods do not produce plausible results (compared with previous estimates and similar countries), and this may be owing to uncorrected inaccuracies in the census or survey data, or uncritical analysis.

There are indications that projections are frequently employed to produce "current" mortality estimates (since mortality and life expectancy figures are given for the year of publication of the data), but projection methodology is hardly ever mentioned or described. There is indirect evidence that projections of life expectancy using as an increment a fixed fraction of a year of life expectancy per annum (such as half a year per annum) have been used in some countries, since published annual life expectancies increment by such fixed values each year from the last empirical estimate. Such increments are likely to be based on the generic models of mortality decline assumed by the United Nations (2003).

Based on an evaluation of data and methods, life expectancy across the Pacific appears to vary from a low in Papua New Guinea to a high in Guam and New Caledonia (table 1). Infant mortality was lowest in Guam and New Caledonia

(<10/1000) and relatively high (60-80/1,000) in several countries across Melanesia, Micronesia and Polynesia, although there is substantial uncertainty around these estimates.

Discussion

This study provides a critique of available mortality estimates for Pacific island countries using multiple sources of information published between the 1990s and 2005. The references acquired on mortality in Pacific island countries indicate that contradictory and unreliable estimates are often published with regard to levels of mortality in these countries.

In general, there is very poor documentation of data sources and methodology of mortality estimation in most published reports. The age-specific mortality rates upon which life expectancies are based are frequently not provided. There are significant differences between data published by different agencies for similar periods for many countries. It is usually not clear how such different estimates were derived. It may be the case that, for some countries, published mortality estimates are derived from similar neighbouring countries or regional averages, or imputed from macro-economic (for example, GDP per capita) or social data, which could explain some of the large differences existing between figures provided by different agencies.

Under-enumeration of deaths in vital registration data is common, yet few countries attempt to estimate and correct for under-enumeration. Mortality rates derived from these data are often implausibly low in relation to mortality reported from countries at similar levels of social and economic development and are inconsistent with measures of mortality derived from indirect demographic techniques. In some small island countries, especially with populations below 50,000, the small number of deaths produces significant fluctuations from year to year. Averages over 3-5 years, or in some cases 7-10 years, are required to avoid spurious high and low mortality estimates due to stochastic variation.

In some small island countries with extensive connections with more developed countries, out-migration of seriously-ill persons for treatment may lead to under-enumeration of deaths. This applies especially to States associated with New Zealand, the United States of America and France. Furthermore, sailors, expatriate workers or military personnel may die overseas and their death may not be registered in their country of origin, although they had originally been counted in the census. These deaths may be considerable in some island countries such as Kiribati and United States-associated Micronesian States.

Indirect demographic methods including the children ever-born/children surviving (CEBCS) techniques for infant and child mortality, and the orphanhood and widowhood methods for adult mortality, are extensively used in the census analyses for these populations. While these methods are valuable in populations without accurate vital registration, the results depend on the quality of the data reported in the census. Moreover, these approaches have their own methodological problems (United Nations, 1983; Lopez and others, 2002); and they can be inappropriately or inexpertly applied, thus producing spurious findings.

Model life tables from the United Nations or Coale-Demeny systems are extensively used to smooth empirical death data, or are employed at some stage in the variety of indirect methods used in mortality analysis from census or survey material (Murray and others, 2003; United Nations, 1981; Coale and Demeny, 1966). These model life tables are now well out of date and their ability to capture contemporary age-specific mortality patterns in countries at different stages of the health (epidemiological) transition is questionable (Murray and others, 2003). During the health transition, many populations experience a plateau in life expectancy at birth (at around 55-65 years) which may last for decades as reductions in infant and childhood mortality from infectious disease and under-nutrition are counter-balanced by increases in adult mortality from non-communicable conditions (especially cardiovascular disease). This was observed in Australia in males between 1945 and 1970 and in females between 1960 and 1970 (Taylor, Lewis and Powles, 1998a; 1998b) and is quite likely to be the case in many Pacific island countries given the documented proportional mortality (Taylor, Lewis and Sladden,1991; Taylor, Lewis and Levy,1989) and morbidity from non-communicable disease and risk factor prevalence (Taylor and others, 1992). This is seen, for example, in Nauru (Taylor and Thoma, 1985) and among Australian Aborigine (Cunningham and Condon, 1996, Cunningham and Yin, 2000) and also in Eastern Europe and in the former Soviet Union (Chenet and others, 1998; Shkolnikov and others, 1999). There may well be a variety of age-specific patterns of mortality that yield the same level of life expectancy, and these are not adequately covered by model life tables. The new model life table system proposed by Murray and others (2003) should help to overcome some of these problems in incorrect choice of a family of model life tables, but this system presupposes reasonable estimates of adult mortality.

Furthermore, there are problems in life expectancy projections. The average rate of improvement in life expectancy (years per annum) in countries at various levels of life expectancy depends on many factors, including the impact of risk factor dispersion on levels of mortality from non-communicable diseases.

Projections which incorporate a rate of increase in life expectancy (at birth) derived from past international experience rather than local data may be implausible for countries in the midst of the epidemiological (health) transition with an epidemic of non-communicable diseases. Some Pacific countries have shown a plateau in life expectancy during one or two decades, which is likely to be associated, to some extent with the emergence of non-communicable diseases (Taylor, Lewis and Powles, 1998a, 1998b).

Pacific island countries show highly variable patterns of mortality. While high mortality populations are affected particularly by infectious diseases and under-nutrition (especially children), adults in low mortality countries are afflicted with non-communicable disease and injuries. However, even the least-developed, high-mortality countries show urban-rural differentials with non-communicable diseases emerging as health problems in urban area (Taylor and others, 1992). In Nauru, non-communicable diseases and accidents, particularly for males, are sufficiently problematic to greatly increase adult mortality and reduce life expectancy. This cause structure of mortality also explains wide sex differentials in death rates, with much higher death rates in male. Compared with previous studies mortality appears to have declined over the past two decades in all Pacific island countries, with the smallest changes occurring in those States that already had relatively high life expectancy (such as Guam and American Samoa). Nevertheless, important differentials remain.

Reliable, current data on levels and causes of child and adult mortality are critical for prioritizing health sector interventions and health policy development in the Pacific islands, alike elsewhere. Vital registration systems, the internationally recognized "gold standard" for assessing levels, patterns and causes of mortality, are inadequate in most of these countries. The results highlight substantial uncertainty in mortality estimates and probable wide variation of mortality levels and patterns across the Pacific. The very different stages of the demographic and health transitions suggest that these States should not be grouped together in international health analyses.

References

Chenet, L. and others (1998). "Alcohol and cardiovascular mortality in Moscow; new evidence of a causal association", *Journal of Epidemiology & Community Health,* vol. 52, No. 12, pp. 772-774.

Coale, A. and P. Demeny (1966). *Regional Model Life Tales and Stable Populations*. Princeton, New Jercy, Princeton University Press.

Cunningham J. and J.R. Condon (1996). "Premature mortality in aboriginal adults in the Northern Territory, 1979-1991", *Medical Journal of Australia*, vol.165, no. 6, pp. 309-312.

_____ and P. Yin (2000). *Mortality of Aboriginal and Torres Strait Islander Australians. Australian Bureau of Statistics Occasional Paper, ABS Cat no.3315.0*. Canberra, Australian Bureau of Statistics.

Demmke, A. (1999). *Cook Islands Population Profile Based on 1996 Census: A Guide For Planners and Policy Makers*. Nouméa, New Caledonia, Secretariat of the Pacific Community.

_____ and F. Haberkorn (1999). *Niue Population Profile Based on 1997 Census: A Guide For Planners and Policy Makers*, Nouméa, New Caledonia, Secretariat of the Pacific Community.

Fiji Bureau of Statistics (1998). *1996 Fiji Census of Population and Housing: Analytical Report, Part 1 Demographic Characteristics,* Parliamentary Paper No. 49, Suva, Parliament of Fiji; 1998.

Fiji Government. Ministry of Information (2006). *Fiji Today 2000.* Accessed in 2006.

Gakidou, E., M. Hogan and A.D. Lopez (2004). "Adult mortality: time for a reappraisal", *International Journal of Epidemiology*, vol. 33, No. 4, pp. 710-717.

Government of Samoa, Department of Statistics and Secretariat of the Pacific Community (1999). *Analytic Report. Samoa Demographic and Health Survey,* Nouméa, New Caledonia, Secretariat of the Pacific Community.

Hayes, G. (1996). *Estimates of Mortality in Papua New Guinea Based On The 1990 Census and the 1991 Demographic and Health Survey,* UNFPA/ILO Project PNG/94/P01 "Integration of population factors into development planning", Port Moresby, Papua New Guinea.

Institute de la Statistique et des Études Économiques (1996). *Décès: Évolution du nombre de décès, Historique depuis 1965.* Accessed through http://www.isee.nc/tec/popsociete/popdeces.html, July 2006

Institut Statistique de Polynésie Francais. Etat-civil, Mai (2006a). *Espérance de vie en Polynésie Française de 1984 à 2005*, accessed through www.ispf.pf , August 2006.

_____ *(2006b). Principaux indicateurs démographiques de 1975 à 200'*, accessed through www.ispf.pf, August 2006.

L'Institut Territorial de la Statistique et des Etudes Economiques (2006). *Etat-civil - Résultats: PD4 - Espérance de vie à la naissance par sexe et province.* Accessed through http://www.itsee.nc/etatcivil/etciviltableaux.html, August 2006.

Lopez, A.D. and others (2002). *World Mortality in 2000: Life Tables for 191 Countries*, Geneva, World Health Organization.

Ministry of Health Tonga (2006). *Annual Report of the Minister of Health*, cited in 'Key Statistics' worksheet, table 'Health Indicators', available via SDT website http://www.spc.int/prism/country/to/stats/Social/Health/health.htm, March 2007.

Murray, C.J.L and others (2003). "Modified logit life table system: principles, empirical validation, and application", *Population Studies*, vol. 57, No. 2, pp. 165-182.

National Statistical Office (2003). *Recent Fertility and Mortality Indices and Trends in Papua New Guinea: A Report Based on the Analysis of 2000 Census Data. Port Moresby, Papua New Guinea.* Table III-4: "Average life expectancies at birth (in years) by sex and geographic sector for PNG and its regions and provinces derived from 1971, 1980 and 2000 Census and 1996 DHS data".

Papua New Guinea National Statistics Office (1996). *National Report on the 1996 Demographic and Health Survey*.

Rakaseta, V. (1999a). *Fiji Islands Population Profile Based on 1996 Census: A Guide for Planners and Policy Makers,* Nouméa, New Caledonia, Secretariat of the Pacific Community.

_____ (1999b). *Tonga Population Profile: A Guide For Planners and Policy Makers,* Nouméa, New Caledonia, Secretariat of the Pacific Community.

_____, G. Haberkorn, A. Demmke and C. Lepers (1998). *Tuvalu Population Profile: A Guide for Planners and Policy-Makers,* Noumea, New Caledonia, Secretariat of the Pacific Community.

Republic of Kiribati, Ministry of Health . *Fourth Kiribati National Health Plan 1999 -2002, vol 1, No 4*.

Secretariat of the Pacific Community (1998). *SPESS: Selected Pacific Economies – A Statistical Summary*, Number 14, Nouméa, New Calendonia, Secretariat of the Pacific Community.

_____ (1999). *Pacific Island Populations Data Sheet.* Compiled by the Population and Demography Programme, 1999. Nouméa, New Caledonia, Secretariat of the Pacific Community.

_____ (2001). SPC Statistics Section. http://www/spc.org.nc/statsen/english/publications/. Nouméa, New Caledonia: Secretariat of the Pacific Community. Accessed 2001.

_____ (2004a). *Pacific Island Populations 2004.* SPC Demography and Population Programme, http://www.spc.org.nc/, Nouméa, New Caledonia, Secretariat of the Pacific Community, accessed in 2004.

_____ (2004b). *Pacific Islands Populations 2004.* Accessed through http://www.spc.int/demog/en/index.html, November 2006. Data at 1999 represents period 1996-2002.

Shkolnikov, V.M. and others (1999). "Cancer mortality in Russia and Ukraine: validity, competing risks and cohort effects", *International Journal of Epidemiology,* vol. 28, No. 1, pp. 19-29.

Situation Sanitaire en Nouvelle-Caledonie (1999). *Annee 1999.*

Solomon Islands National Statistics Office (2006). *Population Census: 1999 Census of Population Summary*; and *1986 Census of Population Summary*. http://www.spc.int/prism/country/sb/stats/Social/Soc-Index.htm, accessed in September 2006.

South Pacific Commission (1998). *Pacific Island Populations – Revised Edition*. Report prepared by the South Pacific Commission for the International Conference on Population and Development 1994: Cairo, Egypt. Nouméa, New Caledonia, South Pacific Commission; 1998.

Taylor, R. (2001). "Strengthening capability for collection, evaluation, analysis, projection and reporting of mortality data from Pacific Island counties", Pacific Island mortality project. Report submitted to The World Health Organisation, Western Pacific Regional Office. Sydney: Department of Public Health and Community Medicine, Faculty of Medicine, University of Sydney.

_____, D. Bampton and A. Lopez (2005). "Contemporary patterns of Pacific Island mortality". *International Journal of Epidemiology,* vol. 34, pp. 207-214.

_____and others (1992). "Dietary intake, exercise, obesity and noncommunicable disease in rural and urban populations of three Pacific island countries", *Journal of the American College of Nutrition,* vol.11, No. 3, pp. 283-293.

_____ and K. Thoma (1985). "Mortality patterns in the modernized Pacific Island nation of Nauru", *American Journal of Public Health*, vol. 75, No. 2, pp.149-155.

_____, M. Lewis and J. Powles (1998a). "The Australian mortality decline: cause-specific mortality 1907-1990", *Australian & New Zealand Journal of Public Health,* vol. 22, No. 1, pp. 37-44.

_____ (1998b). "The Australian mortality decline: all-cause mortality 1788-1990", *Australian & New Zealand Journal of Public Health*, vol. 22, No.1, pp. 27-36.

_____, N.D. Lewis and S. Levy (1989). "Societies in transition: mortality patterns in Pacific Island populations", *International Journal of Epidemiology*, vol.18, No. 3, pp. 634-646.

_____, N.D. Lewis and T. Sladden (1991). "Mortality in Pacific Island countries around 1980: Geopolitical, socioeconomic, demographic and health service factors", *Australian Journal of Public Health*, vol. 15, No. 3, pp. 207-221.

Tuvalu Government, Statistics Office (2001). Excel file data.

United Nations (1981). *Model Life Tables for Developing Countries,* (Sales No. E81.XIII.7), New York.

_____ (1983). Manual X: Indirect Techniques for Demographic Estimation*, Population Studies,* No. 81, New York.

_____ (2003). *World Population Prospects: The 2002 Revision,* (Sales No. E.03.XIII.6), New York.

Vanuatu National Statistics Office. *Health Indicators.* http://www.spc.int/prism/Country/VU/stats/Social/health_indicators.htm, from the Ministry of Health and *1999 Census* – Vanuatu National Statistics Office, http://www.spc.int/prism/Country/VU/stats/Social/Demography/Population.htm

Poverty and Pro-poor Policies for Pacific Island Countries

If inequality is to be reduced, then the patterns of growth are important; growth must occur in the sectors in which the poor and low-income groups are more likely to be involved, namely agriculture, fisheries, construction, personal services, small-scale manufacturing and informal activities.

By David F. Abbott*

The Governments and people of the Pacific are faced with what many perceive to be difficult choices between traditions and modernity, affecting customs and culture, lifestyles and the many facets of daily life. Inevitably development and progress mean change. Information, education and travel all introduce new concepts into society, and change threatens traditional values.-

Thus over the generations development and progress must be accepted as dynamic processes. For example, the changes brought about by the introduction of

* Regional Macroeconomic and Poverty Reduction Adviser, UNDP Pacific Centre, Suva, Fiji, e-mail: david.abbott@undp.org.

religion to Pacific societies in the nineteenth century – now the heart of much of what is accepted as Pacific tradition and custom – were probably far greater than any changes now taking place as a result of current economic and social reforms.

In the modern context, development is leading to an increasing monetization of societies. This tends to result in greater individualism which in turn leads to both a broadening of horizons and a narrowing and weakening of ties among family members. The consequence of this process has been the appearance in many Pacific island countries and territories of rising levels of hardship and poverty, of increasing degrees of inequality, of growing numbers of disadvantaged and marginalized persons.

These changes are manifest in many outer island and rural areas where dependency ratios are rising as more elderly family members are being left to care for grandchildren, when the younger generation move to urban centres. Thus the elderly, while perhaps no longer always being cared for in the traditional Pacific way, are now becoming increasingly burdened with additional responsibilities. It is also seen in the attitude of young people who are no longer generally satisfied with the prospect of a traditional Pacific subsistence lifestyle.

In short, the Pacific region appears to be experiencing increasing levels of hardship and poverty and a marginalization of vulnerable groups. National development strategies aiming at alleviating hardship and poverty through the achievement of the Millennium Development Goals (MDGs) need to recognize these dynamics.

Thus while many countries and areas in the Asian and Pacific region, led by high growth rates in India and China and relatively strong performance in other parts of South-East Asia, have made substantial progress towards achieving the MDGs and have improved levels of human development, many others are lagging behind and struggling to achieve the Goals, including many in the Pacific region. In general progress towards achieving the MDGs, and consequently improved levels of human development, has been uneven in the Pacific.

Although the latest Human Development Report (UNDP, 2007) provides data on only six Pacific island countries, it ranks Tonga and Samoa as being 55th and 77th (of 177 countries) in the Human Development Index (HDI). Fiji, ranked 92nd in the HDI, is ranked 50th (of 108) in terms of its Human Poverty Index (HPI). The three Melanesian countries of Vanuatu, Solomon Islands and Papua New Guinea are ranked 120, 129 and 145, respectively in the HDI and 56, 53 and 90, respectively in the HPI.

Although generalizations can be misleading given the diversity of Pacific island countries' situation, the overall trend is that the Polynesian countries have been performing relatively well, the Micronesian countries of the north Pacific have been struggling to maintain gains already made, while Melanesian countries, notably those that have been impacted by natural disasters or where there has been conflict or civil/political tension, a reversal of earlier development progress is being witnessed. The result is that many countries in the Pacific are off-track to achieve at least five or more of the eight Millennium Development Goals.

Weak fiscal situations, the impact of global externalities, concern over the future impact of climate change, and high levels of domestic rural/urban migration are all factors which are adversely affecting the ability and commitment of Governments in the Pacific to implement the policy initiatives necessary to realize significant achievements towards the Millennium Development Goals.

Indeed the impact of oil price rises, climate change and demography, including the consequences of labour mobility and the growing threat of HIV/AIDS, are having profound affects on the likely long-term sustainability of some small island States. These issues therefore set very challenging policy agendas for human development in the Pacific islands.

Economic performance

In economic terms, growth rates in Pacific island countries have been generally low (3.3 per cent in 2006, with a forecast of 3.4 per cent in 2007, *Asian Development Outlook*, table 1) and, even when seemingly good as in Papua New Guinea riding the commodity boom, have not resulted in any noticeable reductions in poverty or inequality. In some countries, although the data may not be very robust, it would even seem that poverty and inequality have been increasing, with significant variations both within and between countries.

Although high commodity prices and other external conditions have all impacted largely negatively on the economies of the Pacific island countries, Papua New Guinea being the exception, growth has in large part, been constrained primarily by domestic factors. These include political instability, poor macro-economic management, corruption, poor governance, and a lack of will to implement much needed public sector and public enterprise reforms. Many such reforms, particularly in making the investment and regulatory environment more transparent for private sector growth and investment, and thus broadly pro-poor in likely outcome, would yield significant economic growth and poverty reducing gains at a minimum cost to the Governments in terms of foregone revenues or

up-front financial costs. Indeed Governments would ultimately gain significantly from greater tax revenues from new investments and employment creation.

Economic activity is increasingly becoming concentrated in urban centres. For example, recent work in Samoa suggested that some 70 per cent of GDP was being generated in the greater Apia area (ADB, 2001). It is perhaps little wonder then that many of those in the rural areas are migrating to the urban centres, hoping that they will be able to participate more fully in the formal economic activities of the country.

It is clear therefore that to date economic policies and growth strategies have not yielded the desired levels of pro-poor growth. Many countries are having difficulty balancing competing national priorities with severe resource constraints. Countries are struggling to enhance the effectiveness of limited, and in some cases, diminishing aid resources towards the achievement of better development outcomes. Therefore a much stronger pro-poor policy focus and commitment is required if progress is to be achieved.

Table 1. GDP growth in Pacific island countries and territories

Country/territory	2004	2005	2006	2007*
Cook Islands	3.1	2.7	0.8	2.5
Fiji	4.1	1.7	3.4	- 3.1
Kiribati	3.3	0.3	1.1	1.0
Micronesia (Federated States of)	-3.8	1.0	0.7	1.0
Nauru	-	-	-	-
Niue	-	-	-	-
Palau	4.9	5.5	5.7	5.5
Papua New Guinea	2.9	3.0	2.6	5.2
Marshall Islands	0.4	3.5	1.3	2.5
Samoa	3.7	5.5	2.6	3.1
Solomon Islands	4.5	4.4	6.1	6.3
Tonga	1.6	2.5	0.7	- 3.5
Tuvalu	4.0	2.0	3.0	2.5
Vanuatu	4.2	3.1	5.5	4.7
Average	**3.1**	**2.7**	**2.6**	**3.4**

Source: ADB, *Asian Development Outlook 2007 Update.*

Note: * Excluding Nauru and Niue, for whom GDP information was not available but including data from Timor-Leste.

Thus the future success of the region in achieving sustainable improvements in human development depends in large measure on more focused pro-poor policies, as well as more employment and growth-oriented strategies, being implemented with greater vigour and commitment.

The causes of the poor economic performance in the region provide the rationale not only for the development of better overall growth policies, but more specifically, pro-poor policies which will help those who are increasingly being left behind by the uneven distribution of the growth which is taking place.

Poverty in the Pacific

Until recently, poverty had not been considered as a serious issue in most countries of the region. Pacific societies have long been seen as traditional, caring for their family, clan or community through a culture of sharing, resulting in the continuing belief that poverty cannot and should not be a part of life. The suggestion that there might be poverty in some form is not, therefore, something that many Governments or people in the region have been prepared to accept. Indeed, the usual images of poverty with starving children, landless peasants, and men and women toiling with ox ploughs, do not generally spring to mind in relation to the Pacific. While Pacific island people might not be well off in financial or material terms, their strong family and community ties have traditionally provided social safety nets for the most disadvantaged and vulnerable.

Therefore, poverty in the Pacific island context does not generally mean hunger or destitution, but rather the continuous struggle to meet essential daily/weekly living expenses, particularly those requiring cash payments. Families constantly have to make choices between the competing demands for household expenditure and the limited availability of cash income to meet that expenditure; trade-offs are made between one bill and another, food or fees. Households deemed to be experiencing basic needs poverty are therefore facing hardship on a daily basis. They struggle to pay bills, and to purchase adequate and suitably nutritious food, regularly borrowing from "loan-sharks" who charge very high rates of interest for small unsecured loans in order to meet family commitments and community obligations. They are thus frequently, and occasionally constantly, in debt.

The latest available national poverty estimates suggest that overall, approximately one-in-four households across the region has a per capita income below the respective national poverty line (see table 2).

The figures also suggest that, with a couple of exceptions, hardship and poverty are equally felt by urban and rural families alike. This contrasts with most

other developing countries in the Asian and Pacific region where rural poverty tends to be higher than that experienced in urban centres. It suggests that whilst on the one hand the traditional subsistence lifestyle of the Pacific helps to underpin a minimum standard of living in the rural areas, the lack of overall economic growth in the economy as a whole and the urban areas in particular (a feature of most urban centres in Asia), is not enabling urban dwellers to improve their standards of living above the basic minimum.

Table 2. National basic needs poverty incidence: head count indices

Country	Population below national basic needs poverty line (percentage)			
	National	Urban	Rural	Data source
Cook Islands	12.0	na	na	1998 HIES
Fiji	25.5	27.6	22.4	1990/1991 HIES
Fiji	34.4	31.8	38.1	2002/2003 HIES
Kiribati	50.0	51.0	50.0	1996 HIES
Marshall Islands	20.0	na	na	1999 Census
Federated States of Micronesia	27.9	29.5	32.9	1998 HIES
Federated States of Micronesia (provisional)	36.7	42.0	35.0	2005 HIES
Papua New Guinea	37.5	na	na	1996 HIES
Samoa	20.3	23.3	17.9	2002 HIES
Solomon Islands (provisional)	22.7	32.2	18.8	2005/2006 HIES
Timor-Leste	39.7	25.0	44.0	2001 TLSS
Tonga	22.3	23.6	22.8	2002 HIES
Tuvalu	29.3	23.7	23.4	1994 HIES
Tuvalu (provisional)	25.9	29.8	24.7	2005 HIES
Vanuatu	40.0	na	na	1998 HIES

Source: ADB (2004a) and UNDP estimates.

Urban drift, leading to higher levels of unemployment and growing numbers of people living in squatter settlements and sub-standard housing conditions, result in a deteriorating social environment. Many of the poor live in low-quality housing without proper access to water, sanitation and other basic services. Poor housing conditions lead to poor health, poor employment prospects, and poor education

attainment. Children frequently miss school through ill-health or because school fees have not been paid. Adults are frequently poorly educated and thus unable to get anything but the lowest-paid and often casual employment, if such employment is even available. The cycle of poverty can therefore be perpetuated.

Increasing urbanization is placing ever greater burdens on urban infrastructure, basic services and environmental health. Greater resource allocation is necessary to meet the demands of the urban areas. As a consequence, there is growing inequity in access to basic services between the urban and rural areas, thus further exacerbating the desire to move to wherever services are perceived to be better.

Weak fiscal situations and poorly defined budget priorities compound the problems. Budget allocations are not necessarily responsive to the needs of the poorest and most disadvantaged; they are not focused on the need to achieve the Millennium Development targets at the aggregate level. Rarely are the budgets directly linked even to the national development strategies.

It has been argued (see for example ADB, 2004a, 2004f and 2005) that declining governance standards are also contributing to poor economic and MDG performance. High rates of population growth, particularly in the Melanesian and some Micronesian countries, make it more difficult to achieve real per capita increases in income, also putting pressure on government budgets. The increasing proportion of youth in the populations of many countries is leading to weakening in the overall social environment.

Lack of employment opportunities and in particular increasing youth unemployment, together with the growing numbers of people engaged in temporary labour mobility, both domestically and internationally, are becoming critical human development policy issues for many countries. The agenda of decent work for all is therefore very relevant to the Pacific region. The positive and negative impacts particularly on those, often the elderly, women and children, left behind in both rural and urban environments, is adding to the complexity of modernizing and monetizing Pacific island countries and meeting the human development needs of the most vulnerable.

Many disadvantaged groups do not have access to basic services such as telephone, electricity, financial services and basic goods. Lack of access to markets and poor knowledge of finance further marginalizes income opportunities for rural communities. Geographic impediments, inefficient state-owned enterprises and state-supported monopolies have historically obstructed the private sector from delivering services effectively, particularly in the rural areas.

The increasing prevalence of HIV/AIDS is now a significant human development challenge for an increasing number of Pacific island countries (see the article by Geoffrey Hayes in this same issue of the *Asia-Pacific Population Journal*). While most Pacific island countries have National Strategic HIV/AIDS plans and structures already in place, many of these plans are not costed and HIV/AIDS is not fully integrated in the overall development agenda. This is an area in which those countries will need support so as to integrate HIV/AIDS into their National Sustainable Development Strategies and work out appropriate financing strategies. Solid analysis, sharing of experience and policy options are required to convince policy makers and leaders that the epidemic requires more attention, pragmatism and resources if a human development disaster is to be averted. Efforts towards education and prevention need to continue in the face of increasing risks and rising HIV prevalence rates. Pacific island countries need to be further supported in their multisectoral response to include national leadership towards the epidemic, promote confidential and voluntary testing and counselling, provide universal access to treatment for those affected and infected, and address the stigma and discrimination often associated with the epidemic through right-based responses.

Notwithstanding the lack of substantive progress towards their achievement, many Pacific island countries and territories are now increasingly taking the Millennium Development Goals, localized where necessary, as core policy targets and are keen to integrate these Goals into national strategies, both as goals and performance indicators. While some notable progress is being made on MDG reporting, countries have yet to recognize the implicit linkages existing between the MDGs, national and sectoral planning and budget instruments, the Mauritius Strategy, the Pacific Plan and other frameworks, including those pertaining to rights-based issues.

Poverty and monetization

A critical factor in the poverty/hardship equation has been the increasing monetization of Pacific island societies. Many tend to blame this on increasing globalization and trade liberalization, but the reality is that this process is likely to continue at an accelerating pace. The Pacific region cannot escape this trend. As Domingo recently commented,[1] "Very soon, no corner of the world, no matter how remote, how backward, and how pristine, can remain as an isolated economic island. As economic, social, and political barriers and boundaries come down, the playing field will be further opened and leveled by powerful technologies that have become more available, accessible, affordable, installable, and portable". The challenge for Governments is to minimize the adverse impacts of these global

linkages on the poor and most disadvantaged and to maximize the positive benefits for the economies as a whole.

Monetization and globalization are not, however, the underlying causes of growing poverty and hardship. They are, rather, the inevitable consequences of development promoted by international agencies and desired by Governments and people alike. They must be seen as presenting opportunities as well as challenges. National strategies need to be developed to meet those challenges and to take advantage of those opportunities.

Fiscal policy and broader economic reforms are themselves contributing to the increasing monetization of Pacific island economies and the consequent pressure on household finances; thus the economic reforms are in many cases contributing directly to the increasing levels of hardship and poverty that are reportedly being experienced by many households.

Of course the monetization of traditional, subsistence-based societies brings with it changes that are often uncomfortable (for a detailed discussion, see ADB, 2002). How is this happening? Increases in user charges for government services, particularly for health and education place particular burdens on low-income households. Even where education is nominally free, there are frequently additional costs now imposed by schools for books, materials, and building and maintenance funds, often as a result in funding cut-backs or simply lack of resources from national budgets. Introducing improved transport and communication services raises demand and the need to pay for them. Promoting the private sector increases the availability of goods and services and also the need for money with which to purchase them.

Changes in taxes and tariffs and the introduction of broad-based consumption (or value-added) taxes are frequently regressive for low-income households unless there are specific exemptions for basic foodstuffs and other "essentials". Can the poor afford to pay? Where incomes are lowest and/or opportunities for employment or other income generation are limited there will be a tendency to migrate where opportunities are perceived to be greater. If this leads to rural depopulation, increasing dependency and a reduction in rural production or productivity, the situation becomes a self-feeding spiral.

The ratio of broad money supply (M2) to GDP in selected Pacific island countries is shown in table 3. In many countries, notably Kiribati, the Marshall Islands, Solomon Islands and Tonga, the ratio rose significantly in the period 1990-2002. In Samoa, the ratio fell in the early 1990s as the economy was hit by the cyclones of 1990 and 1991, the taro blight of 1993, and the financial crisis of the

national airline in 1994-1995. However, since 1995, the ratio has risen again as economic and public sector reforms have stimulated growth. Solomon Islands saw a decline in the ratio during the tensions of the turn of the century, but the ratio has climbed steadily as the recovery programme has progressed. Similarly, Fiji appears to have experienced a decline in the ratio after the 2000 coup, but again the ratio increased as the economy recovered through 2006.

The result of this monetization is that now even families in the most remote rural or outer island villages have to find cash for everyday needs, be it for school fees, utilities, newly essential store goods, social obligations, or church donations. Where social obligations could once have been met with woven-mats, traditional food, or other home-produced items, now there is an ever-increasing need to make cash or purchased contributions. All these add to the financial burdens experienced by families and consequently to their need for economic opportunities.

Table 3. Increasing monetization: money supply (M2) in percentage of GDP

Country	1990	1995	2002	2005	2006
Cook Islands	47.9	34.2	45.3	43.9	na
Fiji	50.9	55.0	39.3	44.2	na
Kiribati	na	51.1	71.2	na	na
Marshall Islands	na	46.3	71.8	na	na
Micronesia (Federated States of)	na	46.8	34.0	na	na
Papua New Guinea	35.2	29.7	30.6	33.0	40.8
Samoa	46.8	33.9	37.4	41.0	43.1
Solomon Islands	26.9	30.5	27.1	37.1	40.9
Tonga	27.0	31.5	40.6	47.3	47.8
Tuvalu	100.2	81.4	82.6	na	na
Vanuatu	104.1	111.5	109.6	105.9	103.4

The traditional flows of remittances, both factor incomes and unrequited transfers, into some countries (particularly Kiribati, Samoa, Tonga and Tuvalu) together with the increasing flows now being generated for Fiji from the global security industry, are giving rise to what many of the respondents in recent participatory assessments of hardship (PAH) termed laziness or over-dependence on others. This "easy money" was perceived by many to be a disincentive for young people to actively look for work. In Tonga and Tuvalu, remittances

equivalent to 48 per cent and 38 per cent of GDP in 2002, respectively were the most important source of foreign exchange revenues and a very important source of income for many families. In Kiribati and Samoa, where remittances were equivalent to 12 per cent of GDP in 2001 and 21 per cent of GDP in 2002, respectively, this source of income was also extremely important to many individual households. The recently introduced "Approved Contractor Scheme" enabling Pacific nationals to take up temporary work opportunities in New Zealand will add to the remittance flow.

Building financial literacy skills and providing financial services to those who were previously not in the formal cash economy is essential if the benefits of remittances are not to be wasted. The inclusion of entrepreneurship teaching in schools is another initiative that would assist young people to be better equipped for a monetized future.[2]

Youth unemployment: a critical poverty issue

One of the difficulties in defining the extent of unemployment in island societies is that in official terms a person active in the subsistence economy is classed as being economically active and thus "employed" in the official ILO definition[3] can also claim to be "unemployed" in that he/she is seeking work in the formal economy. It is in this category that young people working in the village/subsistence environment are often deemed to be the "unemployed" in the sense that they do not have formal jobs, but are actually employed according to the official definitions.

For example, in their recent national censuses, Kiribati, Samoa, and Vanuatu all reported relatively low levels of youth unemployment but high rates of youth engaged in unpaid family activities or being not economically active. By contrast, the Marshall Islands and Federated States of Micronesia both reported high levels of unemployment, i.e., over 60 per cent and 35 per cent, respectively. In Micronesia, the rate was reported as 50 per cent in Chuuk, the largest state.

The scale of the potential youth unemployment problem can be gauged from education, employment, and census data that suggest that in general only around one fourth to one third of all those finishing school will likely be able to find regular work in the formal sector. Youth unemployment, however we care to define it, is therefore one of the most critical issues facing Governments of the Pacific region.

With increasing urbanization, the core of genuinely unemployed youth is certainly growing, particularly among those young people who have come to urban

centres for education and have failed to find work after finishing or quitting school (drop-outs and push-outs). Traditionally, those who could not find work in the formal sector would have been returned to the village and become economically active in rural agriculture or fishing, either for home consumption or for sale in the local market. They were unemployed in the sense of not having a formal job though willing to take work if it were available, but they nevertheless actively contributed to national output. This may no longer be the norm.

In recent years there has been a change in attitudes towards subsistence or traditional agriculture as a preferred lifestyle choice (or even an accepted inevitability). Rising rural dependency ratios and declining populations in some of the remoter regions of many countries provide evidence to support this. Although it may be true that some young people are "taking life easy" on the back of remittances, there are, nonetheless, many others who are un- or under-employed and therefore becoming a serious policy concern for Governments.

Youth are frequently reluctant to return to the traditional village environment because they have less freedom. Many prefer to have low-paid urban work, but which at least gives them cash for themselves. In the village, situation they would work as unpaid family workers and would be reliant on occasional ad-hoc cash payments from relatives. Many others perhaps prefer to be unemployed in urban centres and live off relatives, thus placing an additional burden on their families. Hanging around urban areas, drifting into petty crime, drugs, and alcohol, these young people are the social problems of today and the poor of tomorrow. Their contribution to national output is now probably negative. Rural safety nets are threatened; urban safety nets frequently do not exist.

Many of these young people are experiencing changed attitudes to traditional roles and responsibilities; for example the exposure to "outside influences" including cash, "western values" and mores in social relations; the easier availability of alcohol and drugs, access to DVD/videos and television programmes showing antisocial behaviour that many then take to be the norm. On the more positive side, access to information and knowledge through the internet is providing greater opportunities for understanding the place of the Pacific in the global context.

Cumulatively however, these influences are perceived to be leading to a weakening in traditional family ties and discipline within the family environment; this may be especially true where children live away from their parents with relatives in order to attend school or when they drift to the urban centres in search of work and join the growing numbers of unemployed youth. In the wider context,

there are increasing concerns for the impact on social cohesion and the increase in domestic tensions and violence within households.

In the participatory assessments which were conducted by the Asian Development Bank in nine Pacific island countries over 2001-2005, the people and the youth themselves were fully aware of the dangers. They placed high priority on the need for more organized youth facilities and activities and for acquiring more technical skills. They also placed high priority on the creation of new jobs or economic opportunities to actively engage the growing numbers of young people in the formal economy and to give them opportunities for advancement.

The youth unemployment figures and the annual gap between the number of graduates and the number of new jobs point to several policy issues. One option is to broaden the employment base by creating more low-paid, low-skilled employment in agriculture, tourism, or industry to enable households to increase the number of employed persons; another option is to deepen the employment base by strengthening vocational and technical training to raise skill levels so more young people have the skills and knowledge to create their own enterprises or could move to higher-skilled, higher-paid employment. This is becoming an increasingly important issue with the growing availability of opportunities for working overseas on temporary labour schemes. In reality, the preferred choice would likely be a combination of broadening and deepening the employment base to satisfy both needs.

Pro-poor policies

Poverty reduction and hardship alleviation interventions aimed at pro-poor growth and achieving the Millennium Development Goals need to be adapted to particular circumstances, with due attention paid to the identified priorities and needs of those who are most disadvantaged. A one-size-fits-all policy approach needs to be avoided. A stronger, more consultative and participatory conceptual framework for setting and implementing development priorities and strategies that will help to achieve the Millennium Development Goals is needed.

Within this complex environment the need for more clearly defined pro-poor policies and development strategies linked to adequate resource allocation to address the critical issues is clear.

Within the broad policy context described in the earlier paragraphs, the characteristics of the policy measures which might deliver pro-poor growth can be broadly summarized as follows in terms of target beneficiaries and impacts;

- Labour rather than capital intensive; policy should aim to utilize a nation's most abundant and under-utilized resources, its people; unemployment, especially youth unemployment, is one of the most significant policy issues for all Pacific island countries, addressing this is critical if poverty reduction and hardship alleviation is to be realized.

- Target assets which the poor possess; in the Pacific almost everyone in the rural areas has access to land and/or marine resources; those in the urban centres have their labour; thus policies which are pro-poor would aim to improve the productivity and economic opportunities offered for the sustainable utilization of the land and marine resources by the rural poor; and in the urban centres would seek to create an environment in which new employment and economic opportunities for the often low or unskilled labour that constitute the majority of the urban poor.

- Target sectors in which the poor are employed or engaged; employment and household income and expenditure surveys all suggest that the poor are more likely to be engaged in agriculture and fishing (and subsistence cropping generally), construction, garment-making, other small-scale manufacturing industries and in personal services.

- Create income and employment for the poor and disadvantaged:

  - Youth and other unemployed (low-skilled)

  - Women

  - Other disadvantaged groups (elderly, disabled, displaced people, rural-urban migrants); what is required are policies that both increase the number of employment opportunities as well as increasing productivity

Box 1

Patterns of growth are important

- Growth in sectors in which poor are more likely to be involved, agriculture, fisheries, construction, retailing, small-scale manufacturing, personal services and informal activities

- Rural sector must be made more attractive

Key issues for creating an enabling environment for economic opportunities to be created for the poor

- Access to resources and assets

- Access to basic services

- Access to rural financial services, credit facilities and financial literacy programmes

- Decentralization, local empowerment and participation

- Good governance

- Land reform

- Access to transport and markets

- Access and other support to extension services

and the level of real incomes for the lowest paid such that they can be raised from "working poverty"

- Target areas where poor live (urban or rural); this criteria adds the spatial dimension the targeting of pro-poor policies

- Reduce inequality; and

- Maintain competitive prices for the products that the poor produce and for the essentials which they need to purchase; this means ensuring a competitive external exchange rate and a progressive domestic tax structure.

Growth is a necessary but not sufficient condition for poverty reduction. If inequality is to be reduced, then the patterns of growth are important; as already noted growth must occur in the sectors in which the poor and low-income groups are more likely to be involved, namely agriculture, fisheries, construction, personal services, small-scale manufacturing and informal activities. The rural sector in particular must be made more attractive.

Low incomes, hardship and poverty can be self-perpetuating and there is much evidence to suggest that these conditions, the vicious circle of self-perpetuating poverty can persist across generations; a household with a low income often has a poor diet, this can lead to poor health and an impaired ability to concentrate. As a result, children in low-income household are less likely to be able to maximize the benefits of any schooling that might be available, resulting in poor educational attainment and lack of skills. These conditions limit ability to take advantage of opportunities, and lead to unemployment, low income, social exclusion, and thus the cycle is perpetuated. Pro-poor and inclusive policies are required to break this cycle.

Endnotes

1. Surviving globalization, Rene P. Domingo, Professor, Asian Institute of Management, Businessworldonline.com, Manila, Philippines, Monday, 21 June 2004.

2. United Nations Development Programme (UNDP) continues to support programmes for financial inclusion and entrepreneurship development in schools.

3. Unpaid family workers are deemed to be employed if they work at least one third of the normal working hours.

References

Asian Development Bank (ADB) (2001). *Apia Urban Management Study,* Working paper 6.

_____ (2002). *Kiribati: Monetization of an Atoll Economy,* Manila.

_____ (2004a). *Hardship and Poverty in the Pacific: Strengthening Poverty Analysis and Strategies*, Pacific Department, Manila.

_____ (2004b). *Governance in the Pacific: Focus for Action 2005-09*, ADB Pacific Series, ADB Manila.

_____ (2005). *Governance in the Pacific: Focus for Action 2005-2009,* Manila.

United Nations Development Programme (UNDP) (2007). *Human Development Report 2007/08*, New York.

Availability, Accessibility and Utilization of Pacific Island Demographic Data – Issues of Data Quality and User Relevance

While ensuring that data are available, and available on time it is imperative to ensure also that they are of good quality – reliable (of sound quality) and valid (meaning that they do measure what they are meant to). This requires skilled and experienced staff in place, right throughout Pacific island countries and territories' national statistical systems, and not merely at the level of section or agency head.

By Gerald Haberkorn and Arthur Jorari*

The Pacific region is comprised of 22 island countries and territories – featuring some 7,500 islands of which around 500 are inhabited-spread over an area

* Gerald Haberkorn, Manager, Statistics and Demography Programme and Arthur Jorari, Secretariat of the Pacific Community, e-mail: demography@spc.int.

of 30 million square kilometres and stretching from the Northern Marianas Islands in the north-west Pacific Ocean to Pitcairn in the south-east.[1] Representing an enormous diversity in physical geography and culture, languages and socio-political organization, size and resources endowment, some countries and areas such as Nauru and Niue, consist just of one coral island, whereas others, like Papua New Guinea and the Federated States of Micronesia comprise literally of hundreds of islands. Melanesia comprise large, mountainous and mainly volcanic islands, endowed with natural resources, rich soil and an abundant marine life. Micronesia and Polynesia, by contrast, comprise of much smaller islands and their natural resources are limited to the ocean; they mostly comprise of small atolls with poor soil, with elevations usually between one and two metres (Kiribati, Marshall Islands, Tokelau and Tuvalu). There are also some islands of volcanic origin with more fertile lands (such as Samoa, Tonga, the Federated States of Micronesia and the Cook Islands).

Although containing just 0.1 per cent of the world's population, the Pacific region is home to one third of the world's languages, testimony to an enormous cultural diversity, and to substantial social, political and behavioural complexities. This situation is most pronounced across Melanesia, where over 700 languages are spoken in Papua New Guinea alone, and more than 100 each in the Solomon Islands and Vanuatu. These vast differences are unknown throughout Micronesia and Polynesia, where one national language is the norm in most countries. There are distinct differences in social organization and cultural practices between the three broad subregions, even allowing for some variations within countries. For example, throughout Melanesia, social and political status and power are usually acquired on the basis of individual merit and effort. In most of Polynesia they are achieved on the basis of patrilineal descent. In Micronesia, the situation is more complex: on high islands and more fertile atolls, there are close similarities to the Polynesian system, whereas on less endowed atolls, age plays a more prominent role with political control traditionally exercised by a councils of elders.

In light of these sociocultural, biophysical, economic and political complexities it comes as no surprise to observe a rich demographic diversity in a regional population of just over 9.3 million people (SPC, 2007):

- In terms of population size, Papua New Guinea dominates the Pacific islands demographic landscape, accounting for two in three Pacific islanders with a population of 6.3 million people. It is the second largest population in Oceania, one third the size of Australia but 50 per cent larger than New Zealand;

- Population size ranges from 6.3 million in a country such as Papua New Guinea to around 1,500 inhabitants in Niue for example;

- Fertility ranges from 4.8 live births per woman to a low of 1.6, with some territories showing similar intraregional variations along ethnic lines;

- The median age varies from 18.6 to 33.2;

- Life expectancy for male varies between 53 and 73 years, and for female between 55 and 78 years;

- Infant mortality ranges from a low of 5 per 1,000 live births to a high of 68 per 1000;

- Annual population growth rates range from a negative -2.4 per cent to a high 2.7 per cent, with sustained net emigration largely responsible for the negative growth of less than 1 per cent throughout Polynesia, the Federated States of Micronesia and the Marshall Islands;

- While 3 in 4 Pacific islanders reside in rural areas, urbanization is becoming a major population and development challenge across the region. With 9 countries and territories currently have more than 50 per cent of their populations living in urban areas, with an additional two not lagging far behind.[2]

Against this backdrop of biophysical, cultural, social, economic and political diversity, it is readily apparent that policy development and planning throughout the Pacific region has to be truly population-based to deliver meaningful and sustainable development outcomes. People drive and benefit from social and economic development, they interact, with their sociocultural and biophysical environment, their everyday life, in turns impacts on resources availability and sustainable use for current and future generations.

Although it is increasingly recognized that people are the key drivers and beneficiaries of development and that population dynamics and resource utilization are interdependent formulating effective and meaningful development policies and plans is often hampered by a lack of timely, quality and relevant data and information – even regarding quite basic and non-controversial demographic statistics such as those pertaining to fertility, mortality and migration.

Availability, accessibility and utilization of demographic data

National censuses of population and housing provide the very foundation for demographic and social statistics, including education and labour force data, and many population-based development indicators for all Pacific island countries and territories. Some countries and territories have a household survey programme in place, undertaking periodic Household Income and Expenditure Surveys (HIES) or Demographic and Health Surveys (DHS) while all French and American Pacific territories have well functioning civil registration systems.[3] But for most Pacific island countries and territories, censuses provide the main empirical evidence for social and economic policy development and planning, and are the only source of reliable information on fertility, mortality and migration.

Table 1. Pacific island countries and territories, 2010 round of censuses

Pacific island country/area	2010 round of censuses	Latest available census report
Palau	2005 May (2010)	2005
Kiribati	2005 November (2010)	2005 [*]
Niue	2006 September (2011)	2006 [*]
Tokelau	2006 Tokelau (2011)	2006
Samoa	2006 November (2011)	2001
Tonga	2006 November	2006 [*]
Cook Islands	2006 December (2011)	2001
Fiji	2007 September	1996
Marshall Islands	2009 June	1999
Solomon Islands	2009 November	1999
Vanuatu	2009 November	1999
Micronesia (Federated States of)	2010 April	2000
Papua New Guinea	2010 July	2000
Nauru	2012 September	2002
Tuvalu	2012 November	2002

Notes: United States Pacific island territories undertake a census every ten years under the jurisdiction of the United States Census Bureau; French Pacific island territories undertake a census every 5 to 7 years, under jurisdiction of INSEE, France.

[*] pre-publication drafts available for all three countries.

All countries and territories in the Pacific have conducted a census during the 2000 world round of censuses – the only region in the world for which this has been the case. Eight countries have already completed a census since 2005, while in preparation for the 2010 world census programme, six of these same countries plan to undertake a second census within five years (table 1). In terms of accessibility to census data and information, outputs vary from country to country. They range from traditional census reports, comprising of an administrative section, a summary of key findings across basic census themes and a set of basic tables, to fairly comprehensive dissemination strategies, featuring a collection of distinct outputs and products, as well as an active and ongoing programme of dissemination and information management. This includes census data user seminars, online access to key demographic summary data and indicators via national websites and the Secretariat of the Pacific Community's (SPC) PRISM website,[4] comprehensive and fully interactive population Geographic Information Systems (SPC PopGIS), as well as extensive population data utilization workshops and policy dialogues involving policy analysts, planners and policymakers.[5]

With traditional census reports providing a good snapshot of a country at specific points in time, their usefulness is somewhat limited to planners, policy analysts and policy makers, who require more than periodic snap-shots and details, such as information about specific population groups at different points in time, in specific locations, pursuing different economic activities at different ages. Timely data are also required on births, deaths and migration, to understand the population dynamics, both affecting and resulting from specific social and economic development outcomes. Planners require access to census data at their fingertips, on their desktops, so they can pursue thematic enquiries in line with specific information needs and demands. Desktop based population GIS systems, such as those developed by the SPC and online census databases popularized by CELADE for many Latin-American and Caribbean countries, represent the high-end of census data accessibility.

Timeliness and thematic coverage impose some obvious limitations on census data use, which can be supplemented by administrative databases, such as vital registration systems and the cross-border capture of international migration flows. But as indicated earlier, only six Pacific island territories under the United States of America's and French jurisdiction currently have vital registration systems in place that can be used to derive reliable fertility and mortality estimates. While many of the smaller countries have made substantive improvements in birth registration over the past decade, the accurate recording of

births remains a problem throughout Melanesia, with death registration a challenge in virtually all Pacific island countries.[6] Recent experiences in the Cook Islands introducing a modest child allowance, and the Marshall Islands tightening up their administrative procedures and giving outer islands health authorities a greater role in the recording of births and deaths, show that simple and innovative measures can yield tangible dividends in timely and accurate coverage.

The regular undertaking of population or other multipurpose household surveys, such as Demographic and Health surveys, are an obvious complementary source of demographic data and derived population-based development indicators. Papua New Guinea conducted a fully-fledged DHS in 1996 and 2006, while Samoa carried out a more limited survey in 2002, with the aim to provide more reliable and timely information on births and deaths in these countries. A comprehensive regional pilot project is currently underway and managed by SPC, in partnership with the Asian Development Bank (ADB), AusAID and Macro International, and supported also by NZAid and the United Nations Population Funds (UNFPA), to test the suitability, effectiveness and sustainability of this methodology for the Pacific region.

While data availability and improved user access are obvious preconditions to data utilization, it has been our experience over the past two decades that simply making more statistics available to a wider audience without paying attention to user demand and absorptive capacity is an exercise in futility. Assuming that available demographic and other socio-economic data and information will automatically feed into the formulation of policies and plans is a fallacy, which is also detrimental to evidence-based decision-making.

The authors' experience since the early 1990s has been that paying greater attention to user demand in terms of content and presentation translates into greater data use. Also, the pursuit of a multi-pronged dissemination and communication strategy referred to earlier has had a greater impact on data utilization than the more "passive" dissemination of voluminous census tables and dense reports.

Absorptive capacity, that is both the ability and time to make use of existing data and information, is another challenge faced by many national statistical and development planning agencies throughout the region. Even the best developed and effectively delivered data dissemination and information management and communication strategies will be unsuccessful if intended or potential data users lack the skills to "read" and interpret data and statistics, are unable to articulate their data

and information needs, or in case planners and policy makers operate in an environment that does not embrace a culture of evidence-based decision-making.

An additional challenge for most statistical agencies to provide the very ingredient for informed decision-making, is their perennial struggle with securing and maintaining adequate human resources to cope with an ever increasing pressure to produce and process information. Apart from being chronically short-staffed,[7] many offices lack a critical mass of skilled and experienced statisticians, and experience ongoing losses of their most experienced staff to other government agencies or the private sector perceived to provide better overall working conditions. Much of the growing pressure on National Statistical Offices (NSOs) and other statistical agencies in line ministries to produce and process data and information appears to be external, with considerable lesser demand generated internally. Having been the traditional recipient of annual and quite extensive statistical questionnaires from various United Nations agencies, development banks and other developments partners, the "statistical response burden" on Pacific Islands NSOs and other sectoral statistical agencies has increased quite substantially in recent years, owing to a plethora of international reporting requirements, such as, those related to the pursuit of the Millennium Development Goals. The goals of the Convention on the Elimination of Discrimination against Women (CEDAW) and those of the United Nations General Assembly Special Session on HIV/AIDS (UNGASS).

Issues of data quality

Permeating availability, access and utilization is the issue of data quality and related aspects of timeliness. Following the 2000 census round, and the dissemination of demographic statistics and population indicators, there has been a growing concern about data quality, which have been reported to be not always of the highest standard in recent years. Whether real or merely "perceived as real" is largely inconsequential for data, as once out in the public domain, irreparable damage can be done, by even a single "wrong" figure, which can cast doubt on a country's or agency's entire data and information management system. The collection, processing, analysis and reporting of demographic statistics and indicators has made steady progress since the 1970s and 1980s, in some countries and territories.

However, there are three areas of immediate concern for the quality of Pacific Island demographic data and indicators: flaws in data collection, misunderstanding timeliness and ignoring context, and arbitrary dissemination and representation of official statistics.

Flaws in data collection [8]

Although it is recognized that no census or survey can be perfect, it is essential to do away, as much as possible, with errors, omissions and inconsistencies Professional best-practice in this context suggests detailed operational plans to be in place and quality field staff recruited and provided with comprehensive training. Also, careful data checks and edits need to be performed both during and after data collection and processing phases, with appropriate adjustments and corrections made prior to tabulating data, analysis and writing the report. While "not reported" or "not stated" categories are permitted in coding and classification, it is desirable to keep the number of such cases to an absolute minimum, so that they do not impact on the overall reliability and validity of the data under consideration. Along similar lines, internal consistency checks are a matter of routine data edits, to avoid reporting for example on 14 year old girls with 6 children or on octogenarians with surviving parents. From the 2000 round of censuses, as well as from many household surveys conducted in recent years, it transpired that detailed plans, comprehensive quality control strategies and data edits have either not been in place or have been regularly compromised owing to a combination of funding and time constraints. A failure to develop quality control measures and management strategies led in many instances to "coverage" and "content" errors.

During the 2000 round of censuses errors pertaining to population coverage occurred mostly as a result of a neglect of basics principles in conducting surveys, such as operating with complete and accurate data, census maps, complete dwelling or household lists, consistent differentiation between *de jure* and *de facto* residents, and consistent follow-up of absentees during census night. Census plans, which contain provisions for quality control strategies need to be systematically prepared and used to avoid short comings. But with many countries operating under severe resource constraints and without previous census experiences during the 2000 census round, simple coverage errors were not resolved in the field. To the authors' knowledge, Papua New Guinea was the only country to conduct a post-enumeration survey.

Content errors occurred most frequently as a result of incorrect reporting or recording of the characteristics of persons, households or housing units. In Pacific island censuses and household surveys, content errors are largely caused by poorly- designed questions or poor sequencing of questions, insufficient pilot-testing of interview forms and of enumerator performance, poor communication between respondents and enumerators, mistakes in coding and

data entry, errors in manual and computer editing, and erroneous tabulations of results.

Problems related to population coverage and content errors are compounded by a lack of historical documentation spelling out all operational stages during past censuses and surveys, including manuals, codes, edit and tabulation specifications. In the absence of such documentation, new census and survey management teams find it difficult to be consistent with previous practices, and thus, major errors can be introduced.

Misunderstanding timelines and ignoring context

A second major flaw in the quality of demographic data and indicators lies not so much in the data themselves, but in the misrepresentation of demographic realities for the sake of timeliness. With demographic events, particularly chance events such as infant, child and maternal deaths subject to random variation (*stochastic interference)*, such data and derived indicators ought to be represented in multi-year (rolling) averages rather than as individual year indicators. This is a particular concern in small populations. In the case of maternal mortality, this caution is applicable in all Pacific island countries and territories but for Papua New Guinea, where the denominator (100,000 live births) is bigger than the total populations of 13 countries, and fives times that of the actual number of annual births in the Pacific island second largest country, Fiji, with a 2007 population of 832,000.

**Figure 1. Number of infant deaths and infant mortality rate,
Cook Islands, 1991-2002**
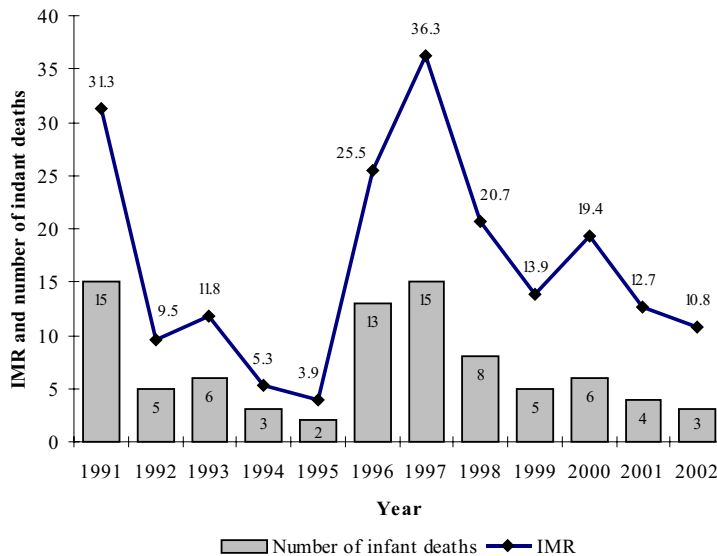
Source: *Demographic Profile of the Cook Islands, SPC, 2005.*

The Secretariat of the Pacific Community has been reporting period, or multi-year averages as a matter of routine for all populations under 50,000, as well as for most populations under 250,000. Notwithstanding the intrinsic common sense of this practice, the authors have come across many situations where, in the name of timeliness, single-year data and derived indicators were preferred over "older five-year averages, or longer time-series, which were ignored altogether.

Figure 1, presenting the number of registered infant deaths and corresponding infant mortality rates for the Cook Islands, from 1991 to 2002, illustrates the inherent danger of reporting single-year demographic event data, and the disservice that could have been provided to the Government, had the 2005 Demographic profile simply reported a recent IMR of 10.8, instead of providing both a reference to the actual number of deaths (3 infant deaths in 2002), as well as a more robust multi-year average of 21 for the period 1996 to 2002.

Table 2. Births to teenage mothers, 1999-2006, Pacific island countries

Year	Numbers of births to females aged 15 to 19	Females aged 15 to 19	Teenage fertility in percentage
1991	**268**	**2,238**	**12.0**
1992	248	2,331	10.6
1993	267	2,428	11.0
1994	272	2,528	10.8
1995	263	2,633	10.0
1996	**269**	**2,743**	**9.8**
1997	261	2,856	9.1
1998	315	2,975	10.6
Census 1999	**319**	**3,128**	**10.2**
2000	299	3,200	9.3
2001	**281**	**3,273**	**8.6**
2002	**207**	3,335	6.2
2003	258	3,406	7.6
2004	253	3,433	7.4
2005	299	3,403	8.8
2006	**266**	**3,318**	**8.0**

Source: Haberkorn (2007). "Pacific islands population and development – facts, fiction and follies"*, New Zealand Population Review* (forthcoming).

Accurate data on infant mortality is very important because in the absence of data amenable to direct or indirect estimation of adult mortality, demographers rely on infant mortality as the most readily available mortality indicator to select a model life table, in order to provide much needed age-specific survivorship probabilities and life expectancy estimates-data most useful for evidence-based planning of health and social services (including making realistic provision for retirement/pension funds).

The potential damage of ignoring time series altogether, as well as reporting raw numbers instead of ratios, is nicely illustrated in a recent example from a medium-sized Pacific island country, whose current annual health report identified a substantial increase over the past five years in the number of births to teenage mothers, from 207 in 2002, to 266 in 2006 (table 2).

While factually correct, the year 2002 proved to be an odd year out, which is reflected by extending the timeline back by a further five years to 1996. This revealed nearly the same number of births (N=269) , as did a further five-year step back in time, to 1991 (N=268). These figures clearly indicate a persistent number of births to teenage mothers over a 15 year period – yet, highlight annual fluctuations. What these figure do not show, however, and hence have the potential to send policy development on a wrong spin, is that teenage births are actually declining, with about the same number of births in 2006 affecting 3,318 women aged 15-19 (8 per cent), compared to an estimated 2,740 teenage women in 1996 (9.8 per cent) and 2,240 in 1991 (12 per cent).

This confusion, incidentally, lies also behind the difficulty faced by many policy makers to understand the concept and implications of the population momentum – that even substantial reductions, such as halving fertility rates in high fertility countries, will not have a miraculous, instantaneous impact when twice as many women today, have half as many births compared with women 15-20 years ago.

The danger of ignoring context in small populations poses another serious threat to data quality, in terms of providing misleading information. Annual spikes in infant or child mortality are often due to specific and localized disease outbreaks rather than being necessarily indicative of a general downturn in child health; a sudden surge in reported sexually transmitted infections (STIs) after major social gatherings like sporting events and art festivals are a perennial favourite, alike unusual variations in monthly birth rates nine months after such events. Usually these sudden increases are not indicative of a structural change pertaining to sexual practices or fecundity, but are merely highlighting a

temporary and localized change. In addition, dramatic variations over time, in maternal mortality rates in small populations for example, are often indicative of an unfortunate chance event and are not necessarily a reflection of prevailing reproductive health conditions (see Haberkorn, 1997). Regarding the latter, small population size does have its advantages for demographic and epidemiological surveillance and reporting, in that it is possible to contextualize specific individual events allowing portrayal of more realistic scenarios, such as when reported maternal deaths can be properly re-classified as deaths not caused by pregnancy or child-birth.

Arbitrary dissemination and representation of official statistics

Closely related to the previous emphasis on misrepresenting factual information is, it seems a quite arbitrary dissemination and portrayal of official statistics. A recent glance at nine major technical and development agencies websites, who are the most frequently sourced suppliers of policy and planning relevant population data and indicators, looking at only a selection of Pacific island countries, and focusing on the most basic and unambiguous population statistics, population size, exemplifies this malaise (table 3) (see Haberkorn, 2007). While not everyone may agree with the authors' projections, or with some of the underlying assumptions used for this analysis these projections serve as useful anchor, or "reference" points.

Looking at the Marshall Islands, for example, only WHO and the US State Department provide estimates similar to those of SPC while the others are between 15 and 20 per cent higher. The most likely reason for these discrepancies is possibly the fact that the massive net-emigration from the Marshall Islands from 1990 onwards, were not accounted for although it averages about 530 departures between 1990 and 1999, and exceeds 170 departures per year since 2000. Regarding Papua New Guinea, most agencies tend to under-estimate the current population by as much as half a million people, except for – WHO, the United Nations Population Division and ESCAP, the figure displayed in table 3 was obtained by applying a 4 per cent correction factor to the 2000 projection base population, in line with the reported undercount of the 2000 census in Papua New Guinea. Regarding the Solomon Islands, population estimates present a variation of about 50,000 below or above the SPC's most recent projections.

This cursory snapshot of how population sizes are reported across the international development spectrum is Symptomatic of the malaise experienced when reporting and using basic statistical facts in small population environments. It also highlights the implicit danger in leading to "outright policy follies down

stream, in providing the wrong denominator for many development indicators, such as crude birth and death rates, the calculation of population growth, per capita income and the establishment of poverty lines, health incidence and prevalence rates, as well as 'guiding' policy development, determining countries' development status (LDC) and their 'selection' as priority countries" (Haberkorn, 2007).

Table 3. Current national population size estimates for a selection of Pacific island countries

Pacific island countries	SPC Projection 2007	UN Poplation Division	Un Demo-graphic Yearbook	UNESCAP Population Data Sheet	WHO WPRO Manila	ADB (Basic Statistics)	World Bank (indicator Database)	US census Bureau	US State Depart-ment	CIA Factbook
Marshall Island	52,700	62,000 2007	62,000 2005	62,000 2007	56,000 2007	60,000 2005	63,266 2005	61,782 2007	56,417 2005	61,815 2007
FSM	110,600	110,000 2005	110,000 2005	111,000 2005	115,000 2007	107,000 2006	129,000 2005	107,862 2007	108,000 n.d.	107,862 2007
PNG	6,332,800	6,331,000 2007	5,887,000 2005	6,331,000 2007	6,288,000 2007	5,930,000 2005	5,748,000 2005	5,796,000 2007	5,800,000 2005	5,795,887 2007
Solomon Islands	503,900	495,660 2007	478,000 2005	496,000 2007	539,000 2007	496,272 2006	486,000 2005	566,842 2007	552,438 2006	566,842 2007
Vanuatu	227,100	226,000 2004	211,000 2005	226,000 2007	236,000 2007	221,507 2006	221,000 2005	211,971 2007	221,506 2006	211,971 2007
Samoa	179,500	187,000 2007	185,000 2005	187,000 2007	188,000 2007	179,186 2006	180,000 2005	176,615 2007	179,186 2006	214,265 2007
Tonga	101,400	100,000 2007	102,000 2005	100,000 2007	109,000 2007	101,100 2006	102,000 2005	116,921 2007	101,169 2006	116,921 2007

Note: UNESCAP commonly draws on data supplied by the United Nations Population Division, supplemented by national data; the CIA Factbook commonly relies on the US Census Bureau for its information.

The picture becomes more complex and confusing when it focuses on demographic indicators, or when a particular agency publishes several values for the same indicator for a specific country, based on the interpretation of different fellow agencies of a same database.

Challenges to improve availability, access and utilization of data

With all Pacific island countries and territories having completed a census during the 2000 worldwide round of census taking, and eight countries having already embarked on the 2010 round, the availability of census data and information is not an issue. Yet, key challenges remain in further facilitating access to data, data quality and timely reporting.

Civil or vital registration, particularly the accurate and timely registration of deaths, will remain a major challenge for most Pacific island countries for years to come. Without tangible benefits, it is unwise to expect rural folk to travel for miles, possibly incurring considerable travel costs, merely to tell an anonymous bureaucracy about the birth or death of a family member. With the vast majority of births in most Pacific island countries attended by midwives, nurses or traditional birth attendants, it is imperative to empower those health workers with the ability to register birth and issue a birth certificate. Death registration remains far more challenging, as deceased people in rural areas are usually buried on the day and without the need for a death certificate.

Collecting information on international migration should not be too taxing an issue, particularly in countries that collect international arrival and departure information. Bottlenecks remain in the management/administration of simple collection systems and access to proper resources (trained manpower, working computers, safe storage of forms at airports, regular collection).

Like with civil registration and international migration, maintaining up-to-date social and labour force statistics, such as annual education and labour force updates, is only possible in the context of an efficient administration and management structure, which constantly updates administrative databases (e.g. education; tax office), or has provisions in place for running a comprehensive annual household survey programmes.

While ensuring that data are available, and available on time, it is imperative to ensure also that they are of good quality – reliable (of sound quality) and valid (meaning that they do measure what they are meant to). This requires skilled and experienced staff in place, right throughout Pacific island countries and territories' national statistical systems, and not merely at the level of section or agency head. With databases compiled and maintained at much lower levels of professional rank and status, it is imperative that operating staff have adequate numeracy skills with appropriate training provided on an ongoing basis, and that quality assurance procedures are in place and adhered to – two areas that can be improved on further across the region.

Two key challenges remain regarding data access, both of which could be easily overcome with simple measures such as making data freely accessible to users, preferably electronically via national/regional websites, and providing such data and information in a format that meets the specific information requirements of different users. Such simple modifications to the management of public data will have immediate and tangible benefits: increased utilization of data – which are put

directly in the hands of users – increased data accessibility with users able to derive data/information demands according to their specific requirements, and cost-effectiveness. [9]

Such a policy change requires that three concomitant developments take place, initiated by Governments:

(a) Introduction of safeguards (data encrypting) that protect the integrity and confidentiality of data;

(b) Support to and nurture of a culture of evidence-based decision - making, ranging from policy-analysis to policy development and planning; and

(c) Pursuance of a change in management culture, where national statisticians are seen, and see themselves, as the custodians or managers of a public good, rather than as owners of data and information.

While ensuring that a policy framework is in place for good quality data being available and freely accessible to a wide range of users, it is equally imperative for data providers (National Statistical Offices) and key users (National Planning Offices) to develop comprehensive data and information dissemination and communication strategies, informing users about the availability of different products. This aspect is critical to data and information management in general, as it is a fatal mistake, as explained earlier to assume that putting data into the public domain will automatically translate into effective and sustained utilization of data.

Strategies to address some of these challenges

Addressing data quality has to be an integral part of an ongoing political commitment to a culture of evidence-based decision-making at national and regional level, and must come along with, a recognition that the provision of quality data requires a quality labour force as well as adequate resources to collect, process, tabulate, analyse and disseminate those data. It also requires considerably more attention paid to the need to translate data into information, as numbers per se have no informative value for anyone not trained or versed in extracting information in such ways.

Skill training, capacity-building is an ongoing process, particularly in the context of small Pacific island statistics and planning offices, which experience a high degree of staff turn-over, including regular "losses" particularly of the most trained and experienced members to positions associated with more prestige, better pay and career advancement opportunities in agencies, the private sector or in others countries. All stakeholders, including Pacific island countries and

territories' development partners need to recognize and acknowledge that capacity-building and capacity supplementation in specialized fields such as demography and population profiling, economic statistics, poverty analysis, epidemiology and health surveillance, are ongoing activities, representing existing demands that cannot be stopped at will.

Current activities involving the Secretariat of the Pacific Community associated with the 2010 round of censuses, as well as the Demographic and Health, and the Household Income and Expenditure surveys, illustrate some of these problems rather clearly: out of the eight Pacific island countries and territories that have already embarked on a census under the current 2010 world census programme, only the Cook Islands, Fiji and Samoa could rely on staff with previous census expertise and progress activities on their own, while some, such as Kiribati and Tonga started anew (with all senior staff but one in Kiribati having moved since the last census). Even with experienced and well-staffed offices on board, neither the Cook Islands nor Fiji have the means to undertake demographic analyses, depending on external technical assistance for such, and other specialized analytical and technical activities – assistance provided by the Secretariat of the Pacific Community's Statistics and Demography programme, in collaboration with other agencies, such as UNFPA, and more recently also the national statistical agencies of Australia and New Zealand.

Pacific island countries require continued technical assistance for undertaking national censuses and, to some extent, financial assistance. Regarding the technical side of things, census planning/operational design/management, data processing and demographic analysis remain key challenges, with a regional approach being a preferred option, in terms of cost-effectiveness, maximum impact and sustainability (sustaining regional, rather than creating a temporary national capacity in different countries). By contrast, experience has shown short-term national-bilateral initiatives to be less efficient, effective and sustainable.

Being more pro-active in disseminating quality data and information in a timely fashion, and to do so in a format that is both user-relevant and user-friendly, requires a paradigm shift in the way data producers interact with data users: where data producers seek the views of data users regarding their needs and demands, and where the latter articulate their priority data needs. Such data producer-user dialogues ought to represent an ongoing process, covering all stages of census and survey planning, including the development of comprehensive data/information dissemination strategies; not only containing different data and information products,[10] but also a staged programme of data release and data users workshops/seminars, to maintain the ongoing interest of users.

Conducting a regular census, and maintaining an ongoing household survey programme as well as administrative databases, are the responsibility of each and every Government. As regards census taking, this is enshrined in law in most countries, which means, at least inter alia, that the resourcing of censuses is a national responsibility. While most countries managed to fund at least the basics of their most recent census operations, either through recurrent national and/or external development budgets, ensuring adequate resources are available is of utmost importance to avoid downstream operational shortcuts impacting on the overall quality of census data, as discussed previously.

Expected outcomes – better policy, more informed planning

Following the emphasis throughout this paper on the fact that access to and utilization of high quality and timely data is essential for evidence-based decision-making in both public and private sectors, as well as across a broad spectrum of policy and development applications, expected outcomes on policy development and planning can be considered rather self-evident: the lack of data or timeliness, data compromised or of dubious quality can jeopardize both access to and utilization of those data. The latter is further compromised by the absence of analytical and communication skills to read and interpret numbers, and "tell the story", that is the ability to provide information in such a way that it becomes meaningful to intended and potential users, so that even the most evidence-averse politicians might one day share "the Australian Treasurer's view of demography as "sexy" (Haberkorn, 2007).

Key implications on policy development and planning present themselves. With censuses representing the very foundation for most Pacific island countries' national statistical and information management systems, it is critical that censuses are conducted at regular intervals, preferably every five or ten years,[11] and are well resourced and given high political billing.

To ensure that censuses collect data and provide information that is useful to key users (such as a country's policy development and planning agencies, as well as selected private sector agencies), producers-users committees ought to be established, so that they can provide advice on data collection and information management in general. For this to be successful, it is critical that these committees be ably chaired at the highest political level. Considering the key roles censuses play in a country's overall national statistical system, these committees ought to advice on the broad spectrum of public data collection and information management.

To give data collection and analysis, as well as information management in general the political cloud and status it deserves in the wider context of policy development and planning, agencies and staff involved, ought to gain commensurate recognition, and not appear at the lower end of budgetary appropriation and staff pay-scales.

Facing both high staff turnover, which is compounded with usually small office size, and generally low levels of resourcing at national level, regional capacity becomes of paramount importance, while the provision of technical assistance and training must be recognized as an ongoing commitment by regional agencies and their development partners.

Having addressed critical bottlenecks of data collection and information management,[12] and with adequate resources available for national agencies to fulfill their duties, it is of paramount importance that data collected and information produced be efficiently disseminated and communicated. Also, agencies involved in the process ought to have a more pronounced customer/client and stakeholder focus, a greater service than product orientation and ought to be guided by user-relevance and user-friendliness in all operations, rather than by tradition and by their usual inclination.

Finally, to be able to "tell a story" in such a way that it leads to better policy and more informed planning, requires a culture of evidence-based decision-making. More strategic population advocacy and partnershipcreation play a critical role in this connection, with a special focus on national policy makers and politicians.

Population advocacy in the broadest sense is essential to policy success. Development policy and strategies addressing the impact of unabated high population growth on sustainable social and economic development, of the impact of high rates of urbanization on regional and rural development efforts, the urgent need to develop effective strategies to address the Pacific islands' "youth bulge" – to name just three key population challenges faced by the region, all have very little chance of success without widespread support, through civil society and the political sphere. The Pacific Parliamentary Assembly for Population and Development (PPAPD) created in 1997, and the UNFPA-SPC partnership in developing measures to integrate population into national and sectoral policy development and planning, are tangible expressions of meaningful population advocacy. Nevertheless, one has to step up the pace, not just at the national level (through parliamentarians, as well as provincial administration and town councils), but also and most importantly, through concerted efforts in assisting policymakers and politicians to actually use the information received and translate it into action.

One has to recognize that not all politicians, in the Pacific alike elsewhere, have had the benefit of formal, tertiary or professional education, and hence do not necessarily genuinely understand statistics; the difference between numbers and rates, between rates and ratios, between estimates and projections, etc. To counter this, one has to be more proactive and help make the changes happen, which may involve helping design and administer population and development induction programmes for newly elected parliamentarians, and provide ongoing population policy debriefs for current members. If it is possible to successfully engage traditional leaders in week-long workshops on conflict resolution and dispute settlement, utilizing both indigenous and introduced techniques,[13] one can envisage a more active population advocacy along similar lines, addressing population and development issues through countries' modern leadership, such as parliamentarians, provincial administrators and town councilors.

Endnotes

1. This section draws heavily from Haberkorn, G. and others (1998), *Pacific Island Populations*, Secretariat of the Pacific Community, Nouméa.

2. Nauru, Guam, Northern Mariana Islands (>90 per cent); Cook Islands, Marshall Islands, Palau, New Caledonia (>63 per cent); French Polynesia and American Samoa (> 50 per cent). Applying recent inter-censal urban-rural growth differentials to Fiji and Tuvalu, could bring these two countries' urbanization rate in 2007 close to, or above 50 per cent as well.

3. The three French Pacific territories are French Polynesia, New Caledonia and Wallis and Futuna; the three United States of America Pacific territories are American Samoa, the Northern Mariana Islands and Guam.

4. Pacific Regional Information System; see: http:www.spc.int/prism

5. Several such activities have been jointly planned and implemented with UNFPA in recent years, at national and subregional levels.

6. Notwithstanding legal requirements in for many countries to register births and deaths, enforcement of rules is lacking, and access to registration facilities is difficult particularly in outer islands and throughout most rural areas, where three out of four Pacific islanders live.

7. At present, half of the Pacific islands national statistical agencies have ten staff or less, a figure which includes administrative staff and data entry clerks. Even larger offices with around 30 staff members tend to have only few people who have more than high school qualifications. Only Papua New Guinea and Fiji, and perhaps Samoa, have a critical mass of experienced staff.

8 For a more comprehensive account on challenges pertaining to population data capture and quality, see: Jorari and Haberkorn, 2004, "Providing context – reporting facts: upcoming challenges in

improving data capture and quality in the 2010 round of censuses"; International Association of Official Statistics satellite meeting, Wellington, New Zealand, April 2005.

9. Anecdotalevidence suggests that few, if any countries manage to recover the publication costs incurred on their products, or retain any profits (with incomes in most countries credited to the public purse, rather than the NSO budget).

10. For example, fortnightly/monthly release of thematic summary fact sheets, well ahead of release of full census tables, summary report, demographic analysis, population profile, thematic reports (e.g. education; labour force; agricultural activities, housing) – all posted on the NSO website – as well as the production of CD-Rom based population Geographic Information Systems.

11. Most established analytical and data presentation procedures work on the basis of five-year age-groups, cohorts and time intervals.

12. This should also see a review of national statistical legislation, which in many countries is several decades old and out of touch with technological developments such as electronic data dissemination.

13. See http://www.uq.edu.au/acpacs, for details on the current AusAID-funded and University of Queensland implemented pilot programme with the Vanuatu National Council of Chiefs on building/enhancing capacity of traditional leadership in Vanuatu.

References

Haberkorn, G. (1997). "Children never born, being half-dead and vanishing migrants: on the interface between demography 76 and planning in the Pacific Islands', invited paper, International Union for the Scientific Study of Population XXIII International Conference, Beijing 11-17 October, 1997).

_____ (2007). "Pacific islands population and development – facts, fiction and follies", *New Zealand Population Review* (forthcoming).

Secretariat of the Pacific Community (SPC) (2007). Pacific Island Populations 2007, *Population Data Sheet,* SPC, Noumea.