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NATIONAL POPULATION CENSUS

MAY 1989

RECENSEMENT NATIONAL DE LA POPULATION

MAI 1989

DEMOGRAPHIC AND MIGRATION ANALYSIS

Spécial Recensement

Statistics Office
Port Vila
August 1993

Bureau de la Statistique
Port Vila
Août 1993

DEMOGRAPHIC

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Preface

Vanuatu conducted its third census of population in May 1989. The Census Main Report was published in July 1991, the Population Atlas was published in September 1991 and the Household Agricultural Activity was published in October 1991. The results have been extensively used by the Government of Vanuatu, institutions abroad and the people of Vanuatu at large.

The main tabulations from the 1989 Census were contained in the *Main Report of the 1989 Population Census*. This report *Demographic and Migration Analysis* contains further detailed analysis of the census results, covering fertility, mortality, population projections, migration and urbanisation . Chapters 1 to 5 were written by Dr A. C. Muthiah, while he was the Population Specialist with the South Pacific Commission (SPC) and chapters 6 and 7 were written by Dr K. S. Seetharam, ESCAP Population Regional Adviser on Population Development. The text was then edited and revised by Mr C. Daffin, the Census and Survey Adviser to the Statistics Office.

Special thanks are due to the two authors who contributed to this analytical report: Dr A. C. Muthiah and Dr K. S. Seetharam, I would also like to express my sincere gratitude to Mr C. Daffin, who produced further tables, edited and revised the report to produce the final form. I would also like to thank SPC, ESCAP and the British Government for providing the services of the above three people.

Finally I would like to thank the United Nations Fund for Population Activities, UNFPA for providing funds for the project and for continuing to fund the printing of the report.

Jacob Isaiah
Acting Principal Statistician

August 1993

Preface

Vanuatu a conduit son troisième recensement de la population en 1989. Le rapport principal fut publié en juillet 1991, l'atlas de la population et le rapport sur les activités agricoles paraissant respectivement en septembre et en octobre 1991. Les résultats du recensement ont constitué une source d'informations appréciable pour le Gouvernement de Vanuatu, les institutions étrangères et les gens de Vanuatu au sens large.

Les principaux chiffres, tableaux et analyses issus du recensement se trouvent dans le *Rapport principal du recensement de la population de 1989*. Le présent rapport, *Analyse démographique et des migrations*, contient des analyses plus détaillées des résultats du recensement, couvrant la fertilité, la mortalité, les projections de population, les migrations et l'urbanisation.
Les chapitres 1 à 5 ont été écris par le Dr. A.C. Muthiah, alors expert démographique à la Commission du Pacifique-Sud (CPS). Les chapitres 6 et 7 furent rédigés par le Dr. K.S. Seetharam, conseiller en developpement des populations au sein de l'ESCAP. Les chapitres ont ensuite été édités et revus par Mr. C. Daffin, conseiller en enquêtes et recensement auprès du Bureau de la Statistique.

Mes remerciements vont aux deux auteurs, messieurs A.C. Muthiah et K.S. Seetharam, qui ont contribué à ce rapport d'analyse. J'amerais également exprimer ma particulière gratitude à Mr. C. Daffin, qui a produit les tableaux additionels, édité et revu le rapport jusqu'à sa forme finale. Je remercie aussi la CPS, l'ESCAP et le gouvernement britannique pour avoir fourni les services de ces trois personnes.

Enfin, j'aimerais remercier le Fond des Nations Unies pour les activités de population, le FNUAP, qui a assuré le financement du projet et des rapports qui ont suivi.

Jacob Isaiah
Statisticien en chef par intérim

Aôut 1993

SUMMARY

Population Distribution				
	Port Vila	Luganville	Rural	Vanuatu
1989 De-facto	19,311	6,983	116,650	142,944
Percentage	13.5	4.9	81.6	100.0
Annual Growth 1979-1989	5.8	2.9	1.9	2.4
ni-Vanuatu	16,827	6,659	115,989	139,475
Annual Growth 1979-1989	4.3	5.1	2.5	2.8

Vital Rates		
Total Fertility Rate	(1988-89)	5.3
Expectation of Life	(Male)	61.5
Expectation of Life	(Female)	64.2
Infant Mortality Rate	(1985)	45.0
Under Five Mortality	(1985)	58.0
Crude Birth Rate		38.0
Crude Death Rate		9.1
Natural Increase		2.9
Growth Rate		2.8

The ni-Vanuatu population of Vanuatu grew at an annual growth rate of 2.8 percent, from a population of 104,371 in January 1979 to 139,475 in May 1989. The growth rate had slightly declined from the 3.2 percent which occurred during 1967-79. The Total Fertility Rate had also declined from around 6.5 during 1974-78 to 5.3 in 1988-89. The expectation of life for both sexes had increased to around 61 for males and 64 for females and child mortality had declined considerably. The Infant Mortality Rate declined from around 106 in 1963 to 45 in 1985.

Under the assumption that fertility will continue to decline to a Total Fertility Rate of 3-4 by the year 2009, the population of Vanuatu would by that time have increased by a factor of 1.5 to 1.7. This would imply an increase in population density to more than 19 persons per square kilometre from 12 in 1989. The population would continue to grow at a rate of 2-2.5 percent per annum, even in the year 2009. Children of school going age would number around 60-70 thousands in the year 2009 compared to 45,000 in 1989. Persons of working age would be almost double the number that there was in 1989.

Estimates of child mortality and fertility were obtained using specific questions asked of the women in reproductive ages on children ever born, children surviving and the date of birth of last child and by application of indirect methods of estimation. Though the extent of non-response to these questions was rather high, data quality was reasonable otherwise.

Fertility estimates from the 1989 Census compare well with others available from the 1986 Urban Census and the Vanuatu Vital Statistics Survey. A re-look at the 1967 data on children ever born and children surviving suggested a downward revision of the earlier reported child mortality estimate. Given this revision, the infant mortality had declined by more than 50 percent during 1963-85.

The estimate of adult mortality, on the other hand, had to be based on sex specific age distributions from the 1979 and 1989 censuses. There are reasons to suspect that coverage was not of the same degree in both these censuses and this change affected males and females differently. However, several methods of indirect estimation were applied to this data and the best estimate was based on several factors, including suitability and robustness of the method given the data. Sex specific life tables were obtained by combining the child and adult mortality estimates.

Mortality has declined considerably between 1967-79 and 1979-89. However, a comparison of the estimates of the expectation of life from the first two censuses and the 1989 Census may exaggerate this decline as the earlier estimates are argued to be under estimates due to the downward revision of child mortality noted earlier. The male advantage noted for Vanuatu in mortality noted for the period 1967-79 was rejected and was attributed to data problems.

Estimates of child mortality and fertility are presented for smaller geographical areas such as Districts and Local Government Regions in addition to urban and rural areas separately. Urban areas and Central 1 and Central 2 districts among rural areas enjoy low child mortality. Rural District Central 1 also has lower fertility compared to that of the urban area. Social differences in these demographic parameters are also presented. Women with schooling in rural areas have a clear child mortality advantage compared to women without schooling. Generally, both in fertility and child mortality, differentials are less pronounced in urban than in rural areas.

The report on the demographic analysis of the 1979 Census clearly came out with recommendations favouring questions in a census that will permit indirect estimates of child mortality, adult mortality and fertility. This recommendation continues to be valid in view of the paucity of data from other sources to be used in estimating vital rates.

A summary of the vital rates obtained (per 1000 when applicable) from the 1989 census data is provided above. These rates refer to the inter-censal period unless indicated otherwise.

Vanuatu appears to experience mortality levels similar to that of the Solomon Islands and occupies a middle level among Melanesian countries in the region. Fiji and New Caledonia enjoy lower mortality and Papua New Guinea has a distinctly higher mortality. The same middle position applies to fertility as well though the Solomon Islands has a higher fertility rate than Vanuatu.

The analysis of migration data indicates that internal migration in Vanuatu has been gaining momentum and that a large part of this movement is toward the urban areas of Port Vila and Luganville; with Port Vila absorbing an overwhelming proportion of urbanward migrants. It is also clear that net out-migration from most islands/LGRs has drained part of the natural increase, and in a few it has even exceeded the growth due to natural increase. This has contributed to the declining share of the population in most of the islands, though in absolute terms the population has been increasing in most islands/LGRs, except Paama and Shepherds where the population is declining.

Migration in Vanuatu also has been highly selective of young adults in the age range 15-29, with obvious impacts on the age-structure of both sending and receiving areas. Sex selectivity has not been very pronounced as both males and females have been migrating to Port Vila and Luganville in search of better economic opportunities. In general the pattern of population mobility in terms of islands of origin has also remained unchanged.

RESUME

Répartition de la population				
	Port Vila	Luganville	Rural	Vanuatu
1989, de fait	19,311	6,983	116,650	142,944
Pourcentage	13.5	4.9	81.6	100.0
Croissance annuelle 1979-1989	5.8	2.9	1.9	2.4
ni-Vanuatu	16,827	6,659	115,989	139,475
Croissance annuelle1979-1989	4.3	5.1	2.5	2.8

Indicateurs démographiques	
Taux de fertilité total (1988-89)	5.3
Espérance de vie (Hommes)	61.5
Espérance de vie (Femmes)	64.2
Taux de mortalité infantile (1985)	45.0
Mortalité en-dessous de cinq ans (1985)	58.0
Taux brut de natalité	38.0
Taux brut de mortalité	9.1
Croissance naturelle	2.9
Taux de croissance	2.8

La population ni-Vanuatu du pays a cru au rythme annuel de 2,8%, passant de 104 371 en janvier 1979 à 139 475 en mai 1989. Ce taux de croissance est donc inférieur à celui de la période 1967-79 (3,2%). Le taux de fertilité total s'est également abaissé, atteignant 5,3 sur la période 1988-89 contre 6,5 en 1974-78. L'espérance de vie à la naissance est désormais de 61 ans pour les hommes et de 64 ans pour les femmes. La mortalité infantile a décliné considérablement. Le taux de mortalité infantile est maintenant de 45 pour 1000 alors qu'il s'élevait encore à 106 pour 1000 en 1963.

Sous réserve que le taux de fertilité poursuive sa baisse pour se situer entre 3 et 4 (pour 100) en l'an 2009, la population du Vanuatu devrait être multipliée d'ici-là par 1,5 ou 1,7. Cela impliquerait une forte augmentation de la densité de population, qui atteindrait alors 19 personnes par km2 (contre 12 actuellement). La population continuerait de croître au rythme annuel de 2%-2,5%, même en l'an 2009. Le nombre d'enfants en âge d'aller à l'école devrait se situer à cette date entre 60 000 et 70 000, contre 45 000 en 1989. Les personnes en âge de travailler doubleraient de nombre en 20 ans.

Les estimations sur la mortalité infantile et la fertilité ont été obtenues par application de méthodes indirectes et en questionnant les femmes en âge de reproduction sur la date de naissance du dernier-né, le nombre d'enfants nés et le nombre de ceux qui ont survécu. Même si le taux de non-réponse à ces questions fut relativement élevé, la qualité des données reste bonne.

Les estimations sur la fertilité obtenues lors du recensement de 1989 sont cohérentes avec celles issues du recensement urbain de 1986 et de l'enquête démographique. Un nouveau regard sur les données 1967 quant aux nombre de naissance et le nombre d'enfants ayant survecu a conduit à réviser à la baisse les précédentes estimations de la mortalité infantile. Selon les nouveaux chiffres, la mortalité infantile a diminué de plus de 50% entre 1963 et 1985.

L'estimation de la mortalité adulte doit être quant à elle fondée sur la répartition de la population par âge et par sexe en 1979 et en 1989. Il y a des raisons de penser que la couverture de la population par le recensement de 1989 à été meilleure qu'en 1979 et que ceçi aie affecté les hommes et les femmes différemment. Plusieurs méthodes d'estimation indirecte ont donc été étudiées, le critère de choix étant la fiabilité des statistiques calculées. Les tables d'espérance de vie par sexe furent obtenues en combinant les estimations des mortalités infantile et adulte.

La mortalité a considérablement reculé entre les périodes 1967-79 et 1979-89. Cependant, la comparaison des estimations des espérances de vie entre les deux premiers recensements et celui de 1989 pourrait conduire à exagérer ce recul. En effet, les estimations de 1967 et 1979 ont vraisemblablement été sous-estimées. En fait, l'affirmation d'une moindre mortalité pour les hommes notée dans les précédents rapports doit être rejetée car provenant de problèmes de données.

Les estimations sur la mortalité infantile et la fertilité sont disponibles pour chaque gouvernement provincial et pour chaque district, avec une distinction spéciale zone rurales / zones urbaines. Ces dernières, ainsi que les districts centraux 1 et 2 bénéficient d'un taux de mortalité infantile faible. Le district rural central 1 connaît également une fertilité peu élevée par rapport aux zones urbaines. Ces paramètres démographiques sont également influencés par des facteurs sociaux. Les femmes ayant été à l'école ont un taux de mortalité infantile bien plus bas que celles n'ayant pas eu d'éducation scolaire. Cet avantage est plus marqué dans les zones rurales que dans les deux villes de Vanuatu.

Le rapport sur l'analyse démographique du recensement de 1979 recommendait l'inclusion de questions dans les futurs questionnaires qui permettraient des estimations indirectes de la mortalité infantile et adulte ainsi que de la fertilité. Ces recommendations restent valides du fait de la rareté des sources alternatives permettant de calculer ces indicateurs démographiques.

Un résumé des principaux indicateurs dérivés des données du recensement de 1989 est présenté çi-dessus. Ces taux se réfèrent à la période 1979-1989, sauf mention contraire.

Vanuatu connaît un niveau de mortalité très proche de celui des îles Salomons et occupe un rang intermédiaire par rapport à ses autres voisins mélanésiens. La Nouvelle-Caledonie et les îles Fidji bénéficient d'une faible mortalité, beaucoup plus élevée dans le cas de la Papouasie-Nouvelle-Guinée. On retrouve la même conclusion en ce qui concerne le taux de fertilité, même si il est plus élevé aux îles Salomons qu'au Vanuatu.

L'analyse des données du recensement révèle que les migrations internes à Vanuatu ont gagné en ampleur, principalement en direction des deux centres urbains de Luganville et surtout de Port Vila. Il est sûr que les migrations urbaines ont compensé, voire excédé dans certains cas, la croissance naturelle de la population dans les îles. En termes relatifs, chacun des gouvernements provinciaux et des îles hébergeaient en 1989 une moins grande part de la population ni-Vanuatu, même si en termes absolus elles étaient plus peuplées qu'en 1979, aux exceptions notables de Paama et des Shepherds.

Les migrations internes à Vanuatu ont particulièrement touché les jeunes adultes de 15 à 29 ans, ce qui n'est évidemment pas sans effet sur la pyramide des âges dans les zones d'immigration et d'émigration. Ce vaste mouvement migratoire en direction de Luganville et de Port Vila concerne aussi bien les femmes que les hommes, à la recherche de meilleures opportunités économiques. Les tendances de mobilité de population ne sont pas affectées par l'île d'origine.

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7 URBANISATION

1 INTRODUCTION

There have only been three national censuses of Vanuatu. The first two were conducted in January 1967 and 1979 and the most recent in May 1989. This latter census was the first since Vanuatu became independent in 1980.

More general results and tabulations of the 1989 Census can be found in a separate report, the 'Main Report' of the Census. While the Main Report contains preliminary estimates of demographic statistics this demographic and migration report presents a more detailed analysis of the data. Hence, the estimates of fertility, mortality and migration patterns derived in this report can be considered to replace those given in the Main Report.

In this report demographic estimates are produced for the ethnic ni-Vanuatu population only, as 98 percent of the population had ni-Vanuatu ethnicity. These estimates are used to project the size of the ethnic ni-Vanuatu population under various assumptions of fertility, mortality and migration. Throughout this report the term ni-Vanuatu is used to denote ethnic ni-Vanuatu and excludes naturalised citizens. For this report ni_Vanuatu ethnicity is defined to include full ni-Vanuatu and part ni-Vanuatu. Full ni-Vanuatu are those that claimed to be pure indigenous people of Vanuatu and part ni-Vanuatu are those who were of mixed race but claimed to have some indigenous ancestry.

The 1989 Census obtained a de facto total population of 142,944 of which 139,475 were ethnic ni-Vanuatu. There were 71,748 ni-Vanuatu males and 67,727 females, resulting in a sex ratio of 106. The ni-Vanuatu population had grown from 72,243 in 1967 to 104,371 persons in 1979, at an average annual rate of growth of 3.1 percent. During 1979-89, the annual growth rate had declined to 2.8 percent. The sex ratio of the population was 113 in 1979 compared to 106 in 1989. If this change in growth rate had to be explained in terms of a change in the coverage of men and women in these two censuses, then the estimated growth rate for 1979-89 might be a slight over estimate.

The 1989 Census had questions on children ever born and children surviving from women of reproductive ages. This information is analysed to arrive at indirect estimates of child mortality. In addition women of reproductive ages were also asked questions on the date of birth of last child. This in combination with children ever born data is used in indirectly estimating fertility. No specific data was collected in the 1989 Census that could be used in indirectly estimating adult mortality. Age-sex distributions of the 1979 and 1989 Censuses are the only data that could be used in estimating adult mortality. The changing quality of age-sex data and the extent of coverage of men and women in these two censuses have direct implications for the reliability of the estimate of adult mortality. However, attempts are made to obtain the best estimate given the data and its quality.

Other sources of data were examined to supplement the estimates from the 1989 Census. A system of vital registration has been in place in Vanuatu for a number of years. The extent of registration of births was estimated to be around 20-25 percent in 1982 (Booth, 1985). Even this was selective in that births were registered only when there was a need to produce a birth certificate for purposes such as applying for a passport. The extent of registration of deaths was even poorer. Hence this source cannot be used in the estimation of vital rates.

Data from the 1983 Census of New Caledonia is used in arriving at the international migration figures for Vanuatu. New Caledonia is the main destination for international migrants from Vanuatu. Even here the number of migrants is low. It is unlikely that the number of migrants to other countries is significant. Data from the Vanuatu Statistics Office on international migration is also used.

Hospital birth records and Health Department records were examined for possible use in estimating vital rates. A rough estimate of rates of birth and child mortality for a few years revealed that they were too low to be acceptable. In addition, hospital/health events can be highly selective. For these reasons these sources of data were not used.

The demographic estimates available from the 1967 and 1979 National Censuses, 1986 Urban Census and 1987-90 Vanuatu Vital Statistics Sample Survey are used in trend analysis as well in evaluating the validity of estimates obtained from 1989 Census.

The report also presents population projections for the ni-Vanuatu population. Fertility and mortality assumptions were formulated based on (i) analysis of trends using the few available estimates from previous censuses and a multi-round survey and (ii) discussions with the personnel of Statistics, Planning and Health Departments of the Government of Vanuatu. Supplementary data was collected from the Departments of Education and Fisheries.

The 1989 Census questionnaire covered the topic of migration quite well with the inclusion of five questions relating to internal migration. However, due to problems of enumeration only the two questions on place of birth and home island are considered to give data of suitable quality. Hence these are the only questions analysed in any depth in the migration and urbanisation sections of this report.

The report presents chapters on child mortality, adult mortality, fertility and population projections, migration and urbanisation. The three chapters on demographic estimates present: (i) description of available data, (ii) evaluation of data, (iii) methods of estimation including assumptions underlying the methods, (iv) estimates, (v) comparison of the estimates with estimates available from other sources and (vi) trend analysis based on available estimates. Each chapter ends with a chapter summary.

2 CHILD MORTALITY

2.1 Census Questions for Estimation of Child Mortality

Census questions on Children Ever Born (CEB) and Children Surviving (CS) were asked of all women between the ages of 15 and 49 inclusive. Analysis of the responses to these questions enables indirect estimates of child mortality.

A filter question on fertility was first asked:

Qn. 48 Have you ever given birth to a child?

Women who answered 'no' to this question were asked no further questions. Women answering 'yes' were asked the following questions:

Qn. 49 Out of all the children you have given birth to, how many are still alive now?

Qn. 50 Out of all the children you have given birth to, how many are dead now?

Qn. 51 What is the total number of children you have ever given birth to?

As can be seen, the questions were not asked specifically for each sex of child and Qn. 49 did not distinguish between children living at home and living elsewhere. Specific instructions were given to enumerators to exclude children who were adopted in and include children who were adopted out.

The two categories of women for whom the fertility and child survival status are fully known are as below:

(i) those who answered 'no' to Qn.48 and are reporting to be childless (these were coded as 'blanks' for Qns. 49-51) and

(ii) those who answered 'yes' to Qn.48 and fully answered Qns.49-51.

Women who answered 'yes' to Qn.48 but had not answered Qns. 49-51 are those reporting to have had children but for whom the number of CEB is not known. For those who did not answer Qn. 48 itself, it is not known whether they had children at all. These categories are further discussed in the section on evaluation of data[1].

2.2 Evaluation of the Data

The restriction of questions to certain ages is sometimes known to cause a clustering at ages just below and just above the specified age range. No such clustering is evident at age 14. A slight heaping does occur at age 50 as indicated in Table 2.1. This heaping appears to have occurred by drawing women from age 51 and not from 49 and thus is not relevant to the purpose at hand. Also, the numbers involved are too small to be of any significance.

Table 2.1: Number of ni-Vanuatu Women by Age

Age	Number of Women
48	432
49	435
50	438
51	285
52	255

The sex ratio (number of male births for every 100 female births) of CEB is a simple but effective indicator of one aspect of data quality. Any differential under-reporting by sex can result in sex ratios that are too high or too low. However, a sex ratio in the expected range does not mean that there is no under-reporting of births. It either means that both sexes are completely reported or both sexes are equally under-reported. CEB data by sex was not collected. However, data was collected by sex for the last birth. The sex ratios of births in the one year preceding the census by age group of mother are given in Table 2.2.

Table 2.2: Sex Ratio at Birth by Age of ni-Vanuatu Women

Age of Women	Sex Ratio
Below 20	105
20 - 29	110
30 - 39	105
40 and above	106
All Ages	108

In Pacific Island Nations the sex ratio at birth is in the range of 104-106 or an average of 105. The sex ratio obtained for Vanuatu is 108 which is outside the expected range. Sex ratios by age of mother appear to be well within the expected range of 104-106, though among mothers of ages 20-29 it is higher at 110. Births among women of ages 20-29 contribute to the slightly higher over-all sex ratio. In view of the relatively small number of births involved and the consistency of sex ratios by age of mother, except in one age group, there exists no strong reason to suspect differential under-reporting by sex of child[2].

As presented in Table 2.3 below, there is only full information available on CEB and CS for 87.3 percent of the women enumerated. The percentage of women with complete information increases with age, only 75 percent in the youngest age group increasing to 93.2 percent at ages 45-49.

As indicated earlier, there are two categories of women for whom complete data on fertility and child survival is not available:

(1) women who did not answer Qn.48. 'Have you ever given birth to a child? (Hence we do not even know if they had given birth to any child - column 2 in Table 2.3)

(2) women who answered 'yes' to Qn.48 but did not provide answers to Qns.49-51 that ask the number of children born and alive.

This second group of women are known to have had a child but we do not know how many (column 3). This second group constitutes a rather small number of 228 (0.7%). The percentage of such women by age varies from .1 to 1.7.

However the number of women who are 'not stated' to Qn.48 itself (and whose fertility status is completely unknown) is rather large, constituting 12 percent of women. This category was further analysed to gain a better understanding of its effect on the estimates of fertility and child mortality.

Table 2.3: Percentage Distribution of ni-Vanuatu Women by Availability of Data on Children Ever Born (CEB) and Children Surviving (CS)

Age Group (1)	% whose CEB & CS fully not reported (2)	% reported to have had children but CEB & CS not reported (3)	% whose CEB & Cs fully reported (4)	Number of Women (5)
15-19	24.0	1.7	74.3	6738
20-24	10.4	1.0	88.7	6341
25-29	5.2	0.3	94.5	5754
30-34	12.7	0.3	87.0	4545
35-39	8.3	0.1	91.5	3706
40-44	8.8	0.3	90.9	2678
45-49	6.4	0.4	93.2	2248
All	12.0	0.7	87.3	100.0
Number	3838	228	27944	32010

An analysis of the percentage 'not stated' for Q.48 (for which no information at all is available on CEB and CS) by age and marital status indicates that the highest percentage occurs among those who did not state their marital status (74.2%), see Table 2.4. However such women number only 356. It appears likely that answers for these women were obtained neither from themselves nor from members of their family but from someone else. The second highest percentage of non-reporting occurs among never married women (21.1%). Slightly more than a quarter of never married teenagers did not report whether they had a child or not. A very high proportion of these 'not stated-never married teenagers' would be childless (Four fifths of never married teenagers who answered Qn.48 report to be childless). Among never married women of ages 20 and above the 'not stated' percentage is around 13-17 except for women of ages 35-39 with 8 percent. Among ever married women (currently married, widowed or separated) the percentage not stated is 5-6.

Table 2.4: Percentage 'not stated' to Qn. 48 by Age and Marital Status

Age Group	Marital Status				All
	Never Married	Currently Married	Widowed/Separated	Not Stated	
15-19	25.9	5.5	11.1	64.7	24.0
20-24	15.3	3.3	4.1	77.2	10.4
25-29	13.5	2.2	4.3	75.9	5.2
30-34	16.8	11.2	3.0	84.0	12.7
35-39	8.0	8.0	3.2	75.9	8.3
40-44	13.1	8.1	4.3	68.8	8.8
45-49	17.4	5.6	7.6	31.3	6.4
All	21.1	6.2	5.1	74.2	12.0
Number Not Stated	2163	1268	51	356	3838
Number of Women	10211	20323	999	477	32010

Table 2.5 provides the percentage 'not stated' to Qn 48 for the 11 rural Local Government Regions (LGR) and 2 urban areas. Except for Epi (where only 357 women of reproductive ages were enumerated) all other areas have at least five percent of women not responding to this question. In five rural areas the percentage is more than 10. Though the problem is particularly worse in Santo(Rural)/Malo, Malakula, Ambrym and Tafea, the problem appears to be widespread and national rather than localised in specific areas. One could suggest that it is a general problem of enumeration, perhaps arising from lack of proper training/supervision of enumerators on this part of the questionnaire. Though every region seems to have had this problem, it cannot be ruled out that remote/less accessible areas within regions were relatively more affected. If this were the case, the result would be to underestimate fertility/child mortality levels, as such areas are usually characterised by high mortality and fertility.

The women for whom no data is available on CEB and CS can be treated either as (i) childless and included or as (ii) 'not stated' and excluded in estimating child mortality. Fortunately, child mortality estimates are not sensitive to these variants but estimates of fertility will be. In the section on fertility, this problem is further explored. Child mortality figures presented are based on 'not stated' women treated as childless. This leads to the same estimates as are obtained by excluding these women.

Table 2.5: Percentage 'not stated' to Qn. 48

Area	Percentage
Banks/Torres	10.4
Santo (Rural)/Malo	16.9
Ambae/Maewo	8.7
Pentecost	9.3
Malakula	14.9
Ambrym	17.8
Epi	2.0
Paama	5.1
Shepherds	5.5
Efate (Rural)	8.1
Tafea	15.3
Port Vila	9.2
Luganville	8.1
All	12.0

The mean number of CEB reported by the older age womwen can also give an indication as to the poor quality of data, see Table 2.6. A decline in mean CEB at the older ages can indicate that reporting of CEB deteriorates with age, if an increase in fertility in the past is unlikely. As Table 2.6 shows that the mean CEB continues to increase with age of women. The rate of increase in CEB by age declines gradually from ages 20-24, though the decline between the last two age groups can be seen to be sharp and thus indicative of slight reporting problems.

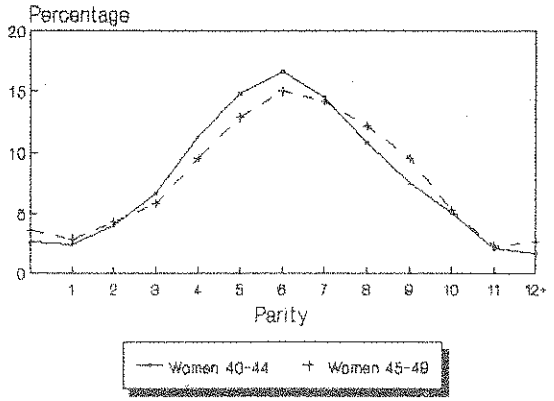
Table 2.6: Mean Number of CEB by Age of Women and method of treating 'not stated'

Age Group	Mean CEB	
	Not Stated Treated as Childless	Not Stated Treated as Not Stated
15-19	0.19	0.14
20-24	1.21	1.07
25-29	2.58	2.44
30-34	4.08	3.55
35-39	5.01	4.59
40-44	5.87	5.34
45-49	6.03	5.62

The shape of the curve of parity distributions for ever married women can also give clues to problems in the data quality. Parity is the number of children previously born alive to a women; ie "parity 2 women" are women who have had two children up until the time of the census. Figure 2.1 plots the parity distributions for ever married women of ages 40-44 and 45-49 who had reported their number of CEB. Women of ages 40-44 and 45-49, for all practical purposes, represent completed fertility experiences.

The percentage generally increases with the number of CEB, up to parity 6 and then declines. The older women of ages 45-49 have higher percentages in the higher parities (7 and above) when compared to women of ages 40-44. The percentage in parity 0 is slightly higher than that in parity 1 for both groups of women. Except for this minor observation, the shape of the curve appears quite reasonable for both groups of women. As in the case of sex ratio at birth, an unreasonable looking distribution may indicate

Figure 2.1: Parity Distribution of Ever Married Women by Age



reporting problems but a reasonable looking distribution may not necessarily be an indicator of good reporting. This is because the shape of the curve for surviving children alone would be similar to the one for children ever born. However, there is no indication from the parity distributions that the data on CEB are of questionable quality.

The evaluation of the data presented above indicates one serious reporting problem, namely a very high proportion of women who did not answer Qn.48. However, this appears to be a country-wide problem and not localised in any particular region. A high proportion of the women not answering fertility question are also never married and in the age group 15-19. It is assumed that these women will not be atypical in terms of child mortality and hence would not bias estimates of child mortality obtained from the data.

2.3 Method Used for Estimating Child Mortality

Of the children ever born to women of child bearing ages, the proportions who died provide estimates of the probabilities of dying between birth and exact ages of childhood, when adjusted for fertility pattern (in five year age groups). The method to convert the proportion of children dead into probabilities of dying that was originally developed by Brass (Brass and Coale, 1986; Brass, 1975) and later modified by Trussel (Trussel 1975) was used. The computer program 'QFIVE' developed by the United Nations was used in obtaining the results (United Nations, 1989).

This method necessarily has several simplifying assumptions, given below, in addition

to the basic assumption that the reported proportion dead are correct.

(1) It is assumed that the mortality risks of children of women who do not report their child bearing experience (not stated category for children ever born and children dead) is similar to those mothers who do report this experience. This assumption is particularly crucial to the Vanuatu data in view of the higher percentages of 'not stated'. This assumption also means that children of mothers who did not survive to the census date as well as 'movers', experience childhood mortality similar to that for children of all other women. This proportion of women is likely to be small for Vanuatu as a whole.

(2) It is also assumed that the mortality risks of children depend entirely on their age and not on other factors such as the age of the mother or parity. In reality the children of first para and births that occur to women of ages less than 20 experience higher mortality risks. For this reason the mortality levels obtained from younger mothers should be treated cautiously.

(3) Thirdly the method assumes that the fertility has remained constant in the recent past. This does not appear to be the case for Vanuatu. This can result in slight over-estimates of child mortality.

(4) Finally, it is assumed that mortality in the recent past, if changing, had been changing over time at a roughly constant rate. Under this condition of steady mortality change over time, a reference date can be estimated for each probability of dying such as q(1), q(2), q(3) etc. where q(1) refers to the probability of death before reaching exact age 1 and so on.

It was indicated earlier that CEB data for older women of Vanuatu might slightly overstate the proportion childless. This may also mean that there is a general tendency to under report in all parities.

If this were to be largely from omission of dead children and if this tendency is present among younger women as well, then the result would be to under estimate child mortality.

On the other hand, the fact that fertility had declined in the recent past (as discussed in the chapter on fertility) would result in over estimating child mortality. It is argued that the extent of these two biases are likely not only to be small in magnitude but to some extent compensatory and thus will not be considered further.

2.4 Estimates of Child Mortality

The estimates of child mortality for both sexes combined for the whole of Vanuatu are presented in Table 2.7. The results relating to all of Vanuatu provide estimates of q(1), q(2), q(3), q(5) etc. where q(x) is the probability of death between birth and exact age x. For example q(5) or probability of death between birth and exact age 5 (or commonly known as Under Five Mortality) is .076 or 76 per 1000 births. This estimate relates to the time point approximately of February 1983 as provided in the column headed 'Reference Date'.

Each of the q(x) values presented in Table 2.7 can be converted to a common index namely Under-Five Mortality, q(5), the probability of death between birth and exact age 5. This involves choosing a Model Life Table and interpolating between the q(x) values.

The usual choice of model life table for the Pacific Island countries is the West Model of Coale and Demeny. For example the q(2) value of 60 lies between the West Model Life Table levels of 19 and 20, level 19.41 exactly. The corresponding q(5) value obtained for the West Model Life Table level of 19.41 is 69.

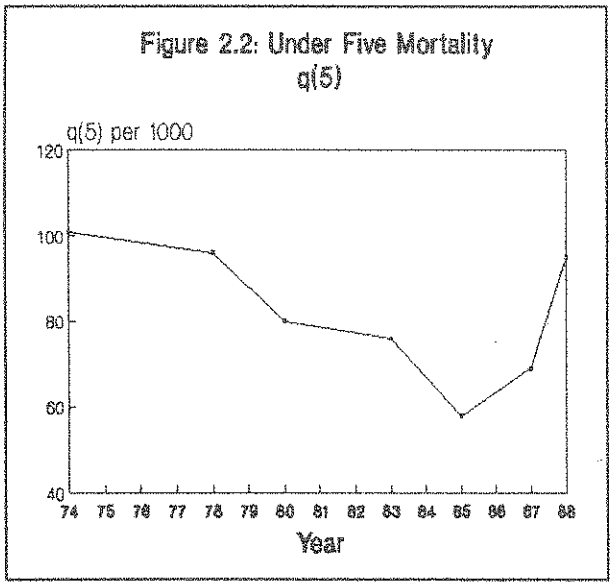
Such conversion to equivalent Under Five Mortality (UFM) is done for all ages of women and presented in column 'q(5)/1000' of Table 2.7. Reference dates presented apply to the q(5) equivalents as well. UFM is relatively more robust, compared to the Infant Mortality Rate (IMR), to the choice of Model Life Table and hence is particularly suitable for trend analysis.

As can be seen from Table 2.7 or Figure 2.2, the UFM declines from 101 in 1974 to about 58 per 1000 in 1985 and then increases to 69 in 1987 and 95 in 1988. The increase in UFM during 1985-88 has to be further examined.

The most recent estimate relating to 1988 is based on births to very young mothers of ages 15-19. To start with, this age group has a relatively small number of reported deaths (57) and consequently provides a less reliable estimate. In addition, births to very young mothers such as those of 15-19 are known to have high risks of child mortality.

Table 2.7: Estimates of Child Mortality - Both Sexes Combined					
Age Group of Women	Age (x)	q(x) /1000	Reference Date	q(5) /1000	Corresponding West Model Level
15-19	1	69	May 88	95	17.85
20-24	2	60	Mar.87	69	19.41
25-29	3	54	May 85	58	20.10
30-34	5	76	Feb.83	76	18.97
35-39	10	88	Aug.80	80	18.69
40-44	15	112	Nov.77	96	17.77
45-49	20	128	Nov.74	101	17.51

Such high risks of death are also associated with births of first parity. A very high proportion of births occurring to women of ages 15-19 are of first para (about 75% in this case). For these reasons, the high rate of child mortality obtained from this age group cannot be considered representative of the whole population.



The same comments, but to a lesser extent, apply to the estimate for 1987, which is based on births occurring to women of ages 20-24 and which shows an increase from the estimate for 1985. These births to women aged 20-24 are affected to the extent that they contain a proportion (a) of births that occurred when these women were 15-19 and (b) of births that were of first parity. Assuming that reproductive patterns did not change much during the five years preceding the census, the percentage of CEB to women of ages 20-24 that occurred while they were of ages 15-19 would only be about 14 percent (932 children ever born in ages 15-19 and 6774 in 20-24). But then a very high proportion of the remaining 86 percent of births would be of first para and thus likely to experience relatively high risks of death compared to births of higher parity. The mean age at marriage for Vanuatu women using 1989 Census data is 22.6 years and only 12.8 percent of 15-19 and 57.8 percent of 20-24 age group women are ever married. This reinforces the argument that a good proportion of births to women of ages 20-24 is likely to be of first para. It appears then that the child mortality rates obtained from women of ages 20-24 are also likely to be unacceptably higher than that for the general population of Vanuatu.

An alternate explanation for the observed increase in UFM during 1985-88 could be because of negative changes in the levels of health service provision and natural calamities during this period. A review of these factors does not support the possibility of such an increase in child mortality. Hence the recent estimates of child mortality obtained from women of ages 15-24 had to be rejected as unrepresentative of the experience of the population.

Hence the mortality experience of women of ages 25-29 appears most appropriate in deriving the most recent estimates of child mortality. The estimates derived from older age groups such as 30-34 and above not only date back in time but also suffer, to some degree, from relatively higher problems of recall as well as higher mortality associated with very high parity births.

The choice of Model Life Table also influences the IMR estimated. The West model is considered to be suitable for the Pacific. The choice of a model is dependant on the relationship between the risk of dying as an infant, q(1), and

the risk of dying between ages 1 to 4, q(4)-q(1). For populations with extensive breast feeding, it can be speculated that child mortality levels would be relatively higher with respect to infant death rates, as breast feeding lowers infant death rates and weaning adds to the risk of death in childhood ages. From the available evidence it appears that breast feeding is common and prolonged among Vanuatu women[3]. For the current mortality levels that appear feasible for Vanuatu, East and South Models would not be suitable as they represent relatively lower child mortality compared to infant mortality (at very low levels of child mortality values of the South Model overlaps and is close to that of the East Model). The choice is then between the North Model with relatively high child mortality with respect to infant mortality and the West Model which is the 'average' model. The IMR corresponding to the North Model is 41 while that corresponding to the West Model is 45. The Infant Mortality Rate (IMR) for Vanuatu could then be placed in the range of 41-45 per 1000 births[4].

The **Infant Mortality Rate** corresponding to a q(3) of .054 obtained for women of ages 25-29 and based on the West Model Life Table is .045 or **45 per 1000 births in 1985** for all of Vanuatu.

2.5 Comparison with Other Estimates of Child Mortality

Estimates of IMR are available from three other sources: (i) indirect estimate derived from the 1967 Vanuatu Census Data, (ii) indirect estimate derived from the 1979 Vanuatu Census Data and (iii) direct estimate derived from the Vanuatu Vital Statistics Sample Survey conducted during 1987-90.

The estimates from the 1967 census are based on data on children ever born and children dead. The data were collected for all women above the age of 14. The mean parity by age clearly declines from age 50 thus suggesting omission of CEB [5], though the mean parity steadily increases up to age 50. The plotting of the distribution of completed fertility for ever married older women also reveals, as in the 1989 data, a slight tendency to overstate zero parities.

The 1979 Census did not include questions on CEB and CS and hence estimates are derived from Model Life Tables based on adult mortality obtained from the age distributions of the 1967 and 1979 Censuses. This approach does not provide robust estimates, even under the best of circumstances. It appears that the quality of the 1979 Census data was rather poor and hence this estimate should be regarded as an 'approximation' (Booth, 1985).

The Vanuatu Vital Statistics Sample Survey (VVSS) is a prospective study of about 20,000 of the population conducted during 1987-90 with one of the objectives being to obtain direct estimates of child mortality. Visits, approximately every 6 months, were made to the sampled clusters to collect data on births and deaths, in addition to other required information (Government of Vanuatu, 1992).

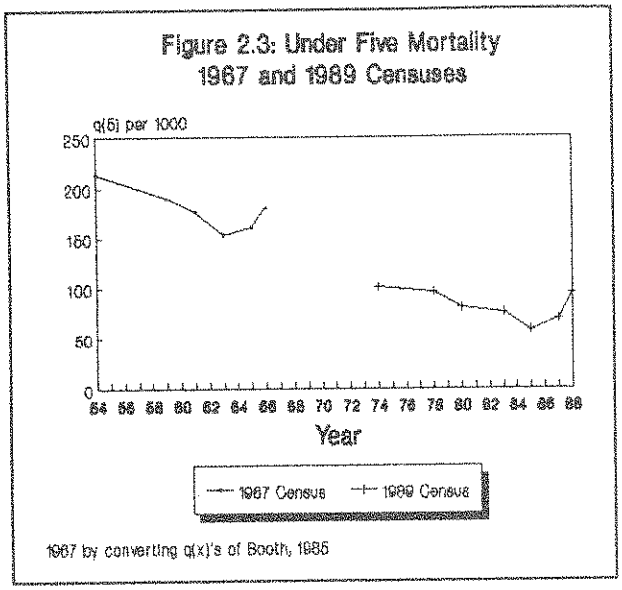
Table 2.8 provides the IMR and the reference years from the three sources discussed:

Table 2.8: Available Estimates of IMR for Vanuatu

Source	Reference Year	IMR
1967 Census	1966	122.7
1979 Census	1973?	94.0
1989 Census	1985	45.0
VVSS	1988	28.6?

More than halving of the IMR in a decade from 94 to 45, given the socio-economic and medical service changes, is considered to be rather unlikely. There had always been speculations that the estimated IMR of 122.7 in the middle sixties, which formed a basis for the estimate of IMR from 1979 Census, was rather high. For this reason it was decided to look again at the 1967 census data.

Figure 2.3 presents the graph of the common index $q_{(5)}$, obtained from various age groups of women, derived by using the 1967 and 1989 Censuses. As could be seen, the patterns are similar in both censuses. Just as in the 1989 Census data, the $q_{(5)}$ obtained from the two youngest age groups indicate an increase in child mortality. Based on available data on health service provision and natural disasters relating to the relevant periods, such an increase in child



mortality does not appear feasible. The increasing trend in the 1967 census data could also be better explained by the higher proportion of first births among the younger women of ages 15-24 that experience higher than the average child mortality conditions than the general population. It would then be appropriate not to consider the estimates of child mortality obtained from the two youngest age groups of women but obtain estimates using the women aged 25-29. The reported estimate of IMR of 122.7 (Booth, 1985) comes from the women of ages 15-19. It is recommended that the IMR of 105.8 corresponding to the women of 25-29 and referring to the year 1963 is adopted. This means that the IMR in 1966 and in 1973 would be considerably lower than the levels presented earlier and the decline during 1963-85 to an IMR of 45 is more plausible.

There is another aspect in Figure 2.3 that adds to the confidence of the estimates arrived at. The decline in $q_{(5)}$ during 1954-63 is much sharper than that during 1974-85. This is what would be expected, as at lower levels of child mortality further declines become harder to achieve. Though the reporting problems of older women in 1989 might have contributed to the lack of a sharp decline, it appears less likely based on the assessment of quality of data presented earlier.

VVSS is a sample survey and as such the estimate of IMR is subject to sampling error. From the sample data an approximate 95 percent confidence limit for the estimate of IMR can be calculated as 18.6 to 38.6, for the period 1987-90, or on an average for 1988-89. The higher value of this range is just below the 1985 IMR. Partly this would be due to the possible decline in IMR during 1985-89. However there were also indications that VVSS IMR might be a slight under estimate (Vanuatu Government, 1992).

2.6 Differentials in Child Mortality

(a) Geographic Differentials:

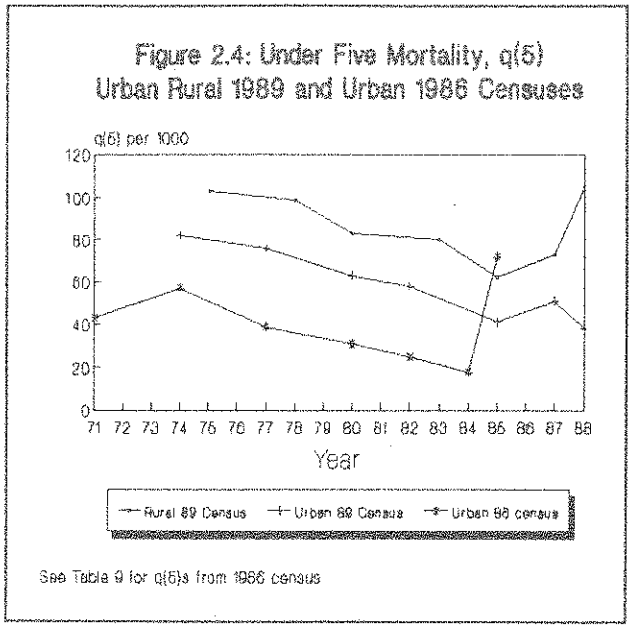
Table 2.9 provides estimates of child mortality for rural and urban areas separately from the 1989 Census and estimates for the urban area from the 1986 Urban Census. The 1989 estimates will be discussed first.

Table 2.9: Estimates of Under Five Mortality - Both Sexes Combined, Rural-Urban

Age Group of Women	1989 Census				1986 Census	
	Rural		Urban		Urban*	
	q(5) /1000	Reference Date	q(5) /1000	Reference Date	q(5) /1000	Reference Date
15-19	105	May 88	38	Aug 88	72	May 85
20-24	73	Mar 87	51	May 87	18	Feb. 84
25-29	62	May 85	41	Apr 85	25	Apr. 82
30-34	80	Mar 83	58	Oct 82	31	Jan. 80
35-39	83	Oct 80	63	Jan 80	39	May 77
40-44	99	Feb 78	76	Jan 77	57	Aug. 74
45-49	103	Feb 75	82	Feb 74	43	Sep. 71

*Estimates obtained by using P(i) and S(i) values provided in NPSO, 1988, as inputs to QFIVE program, Trussel Version

As expected, UFM is lower in urban than in rural areas: 62 per 1000 births in rural and 41 in urban areas (Corresponding IMRs are 48 and 34) for the year 1985. Child mortality had steadily declined since the mid-seventies to mid-eighties, both in urban and rural areas, but the rate of decline in urban areas was slightly higher than that of rural areas, see Figure 2.4.



The UFM of urban areas was about 80 percent of that in rural areas during the mid seventies but this changed to about 66 percent in the mid eighties. The urban/rural differentials in child mortality had then been slightly widening in the recent past, though both areas are experiencing declines. This could partially be explained in terms of possible reporting problems. Women in rural areas with relatively lower levels of education might under report the child deaths that occurred in the past. This would contribute to the lower rate of decline in rural areas. However, evaluation of the available data does not support this possibility.

The estimates obtained from the 1986 urban Census are around half the levels obtained from the 1989 Census. As there is no reason to suspect over reporting of dead children in the 1989 Census, the 1986 urban estimates are considered to be too low and are not further discussed.

Table 2.10: Estimates of Under Five Mortality by Geographical Areas.

AREA	For the Most Recent Time Point Available		For the Earliest Time Point Available		% Decline in 10 Years
	q(5) /1000	Reference Date	q(5) /1000	Reference Date	
Rural Districts:					
Central 1	57	Mar 85	68	Sep.74	15
Central 2	55	Aug 85	108	June 75	49
Southern	60	Mar 85	100	May 74	37
Northern	74	May 85	119	May 74	35
Urban	41	Apr 85	82	Feb.74	45
Island Groups:					
Efate	42	Jan 85	65	Jun 73	33
Ambae/Maewo	47	Aug 85	78	Jun 76	44
Malakula	55	May 85	116	Feb 75	52
Tafea	60	Mar 85	100	May 74	37
Shepherds/Ambrym/ Paama/Epi	62	Jun 85	86	Sep 75	24
Pentecost	63	Nov 85	104	Jun 76	42
Santo/Malo	82	May 85	151	Jan 76	50
Banks/Torres	103	Mar 85	110	Sep 72	5

The differentials presented here onwards use UFM in view of its relative robustness compared to IMR. Percentage declines in UFM are also presented (declines are adjusted to 10 year periods). It has to be kept in view that declines may be understated by varying degrees among the sub groups of women. The reporting by older women may vary in quality depending upon their characteristics, such as education. The differentials are also presented for rural and urban areas separately, as accessibility to health services varies considerably between urban and rural areas.

Child mortality was estimated for the four rural districts and is presented in Table 2.10. A comparison reveals that the Central 2 district enjoys the lowest mortality (UFM in 1985: 55 and IMR:43), followed by Central 1 (UFM in 1985: 57 and IMR:45), Southern (UFM in 1985: 60 and IMR:46) and finally Northern district with the highest mortality (UFM in 1985: 74 and IMR:56).

Central 2, Central 1 and Southern districts appear to have similar levels of mortality where as the Northern District has a distinctly higher level. Three districts other than Central 2 have experienced declines during 1975-85 in the order of 35-45 percent but the Central has experienced a more modest decline of 15 percent.

In order to further explore these geographical differentials, data on variables relevant to mortality were examined. A lower fertility (TFR), a higher proportion of women with schooling (% of women with 7+ years of schooling) and a higher percentage participating in the cash economy (% men in wage work and production for sale) could be hypothesised to be associated with lower child mortality.

The two areas, Urban and Central District 1, which have high proportions of educated women, higher participation in the cash economy and lower fertility (TFR 4.4 and 4.6 respectively), enjoyed low levels of mortality even in the middle seventies (UFM: 82 in Urban areas and 68 in Central 1). However, mortality in the urban area declined much more sharply (45%) while the decline in Central 1 was only 15 percent.

Central 2, Southern and Northern Districts with relatively lower proportions of educated women, lower levels of participation in the cash economy and higher fertility (TFR of 5.9 to 6.3), experienced relatively higher levels of child mortality during the mid-seventies (UFM: 108 in Central 2, 119 and 100 respectively in Northern and Southern districts). But the declines during 1975-85 are impressive. Central 2 experienced as high a decline as in Urban areas (49%) and the other two districts around 35 percent.

This child mortality profile of districts has to be further explored by looking at the evolution of provision of health services in these areas.

Table 2.10 above also presents estimates of UFM for the rural Local Government Regions (LGR). In view of the small numbers involved, the regions, Ambrym, Paama, Epi and Shepherds were grouped together. Conveniently these regions are also geographically contiguous. It would also have been preferable to have combined Banks/Torres with some other region but for the isolated nature of this island group. However, the estimates for LGRs must be interpreted cautiously in view of the small number of deaths and women involved and should only be treated as broad indications.

The highest child mortality occurs in Banks/Torres (UFM: 103 and IMR: 74). This is also the region that registers the lowest percentage decline during 1975-85 (5%). At the other end, Efate appears to enjoy the lowest child mortality levels comparable to that of urban areas. In fact, during the mid-seventies child mortality appeared to have been lower in Efate than in the urban areas (This last observation is true in the Ambae/Maewo region as well). The Pentecost, Santo/Malo and Banks/Torres regions have higher child mortality than the rural average. However, the Malakula, Tafea, Ambrym group and Pentecost regions cluster close to the rural average of UFM 62 and IMR 48, leaving Efate and Ambae/Maewo with distinctly lower than average levels and Santo/Malo and Banks/Torres regions with distinctly higher than average levels for rural areas. Child mortality has declined during 1975-85 in all regions, the range of percentage decline being 24-52 in a 10 year period, except in Banks/Torres region with only 5 percent decline.

(b) Social Differentials:

Maternal education has been identified to be strongly associated with infant and child mortality. Table 2.11 below, provides estimates of child mortality by maternal education, for Vanuatu, rural and urban areas. Broad indications of decline during 1975-85 are also given. The table also presents the relative risk of child mortality as a percentage of the highest risk subgroup.

Table 2.11: Estimates of Under Five Mortality (UFM) by Maternal Schooling, Urban, Rural and Vanuatu

Maternal Schooling	1985		1974/1975		% Decline in UFM in Ten Years
	UFM	% to Highest Risk Category	UFM	% to Highest Risk Category	
VANUATU					
Never Attended	97	100	118	100	17.5
Attended	49	51	88	75	42.5
1-6 Years	53	55	86	73	37.7
7 + Years	40	41	92	78	52.6
RURAL					
Never Attended	101	100	120	100	16.0
Attended	51	50	90	75	42.6
1-6 Years	55	54	88	73	37.5
7 + Years	44	44	92	77	49.3
URBAN					
Never Attended	---	---	---	---	---
Attended	41	---	80	---	44.0
1-6 Years	48	---	78	---	34.7
7 + Years	---	---	---	---	---

--- Results not presented due to insufficient numbers of women

The children of women with the highest schooling experience only 40 percent of the risk of children born to women who had no schooling at all. Even the children of women with some schooling (1-6 years) experience only 55 percent of the rates for children of mothers with no schooling. The child mortality rates are strongly negatively related to maternal education. The rates of decline in child mortality during 1975-85 are clearly positively related to maternal education, causing the differentials by maternal schooling to increase significantly between 1975 and 1985. During the mid-seventies children of mothers with schooling enjoyed only about 25 percent advantage but in 1985 it was around 50 percent.

There is a high concentration of educated women in urban areas. The mortality advantage of women with schooling can partly be attributed to their living in areas with better health facilities. However, estimates of child mortality by maternal education separately for urban and rural areas confirm the mortality advantage to the children of women with higher levels of schooling, irrespective of where they live.

Children of women with schooling who live in rural areas enjoy almost the same relative advantage in mortality as the children in urban areas. However, in every schooling group for which estimates are available, urbanites enjoy lower levels of mortality compared to those living in rural areas. This relative urban advantage is smaller in magnitude compared to that found for maternal education.

Child mortality is also examined for the several religious groups and results for all of Vanuatu and for rural and urban areas are presented in Table 2.12 below.

Children born to Catholic, Presbyterian and SDA mothers have relatively lower child mortality levels (about 65 percent of those from mothers claiming custom as their religion). Children born to Anglican mothers and children from those with customary religion experience relatively higher levels of child mortality. This pattern is confirmed by estimates for rural areas. Mortality among children of customary religion mothers has declined by about 40 percent during 1975-85 which is comparable to those of other religions except Anglicans among whom the decline was of much smaller magnitude.

Table 2.12: Estimates of Under Five Mortality (UFM) by Religion, Urban, Rural, Vanuatu

Religion	1985		1974/1975		% Decline in UFM in Ten Years
	UFM	% to Highest Risk Category	UFM	% to Highest Risk Category	
VANUATU					
Customary	81	100	132	100	38.5
Anglican	72	89	98	74	25.1
Catholic	54	67	97	73	43.2
Presbyterian	51	63	98	74	46.4
SDA	53	65	102	77	49.7
RURAL					
Customary	79	100	133	100	38.7
Anglican	81	103	98	74	16.5
Catholic	55	70	102	77	47.2
Presbyterian	53	67	100	75	46.6
SDA	59	75	102	77	41.5
URBAN					
Customary	--	--	--	--	--
Anglican	--	--	--	--	--
Catholic	--	--	--	--	--
Presbyterian	41	--	80	--	43.0
SDA	--	--	--	--	--

--- Results not presented due to insufficient numbers of women

2.7 Summary

Indirect estimates of child mortality were made based on data on CEB and CS. The quality of the data appears reasonable in several respects, except that 12 percent of women in reproductive ages had not reported their fertility and child survival experiences. A high proportion of these women are never married and in ages 15-19. Estimates are arrived at by treating these women as childless. It is assumed that these women are not atypical in their child mortality experience.

The probability of dying before reaching exact age 1 is estimated to be 45 per 1000 births in the year 1985. Child mortality had declined by about 40 percent during the period 1975-85. A re-analysis of 1967 census data on CEB and CS offers a revised estimate of IMR of 106 in 1963 in comparison to the earlier reported IMR of 123 in 1965. This suggests that IMR had declined by about 58 percent during 1963-85.

The IMR is estimated to be 48 per 1000 in rural and 34 in urban areas. Child mortality had been declining both in urban and rural areas during 1975-85, although the rate of decline is slightly higher in urban than in rural areas. This had resulted in a widening of urban rural differentials. Estimates of child mortality are also presented for the rural Local Government regions.

Child mortality by maternal education reveals significant mortality advantage to children of mothers with schooling in both rural and urban areas. Children of mothers with Catholic, Presbyterian and SDA religions enjoy better mortality conditions compared to children of mothers with Anglican or customary religions.

3 ADULT MORTALITY AND LIFE TABLES

The 1989 Census did not include any questions on survival of kin, as neither did the 1967 and 1979 Censuses. A question on orphanhood or widowhood would have permitted indirect estimates of adult mortality. Adult mortality can therefore only be estimated using the age-sex distributions from the 1979 and 1989 Censuses. In a population closed to migration (or when the volume and age-sex characteristics of intercensal migrants are known and can be used to adjust the population), the age-sex distributions of persons from two successive censuses n years apart can be used to estimate intercensal adult mortality. This is because the population aged x+n at the second census are the survivors of population aged x at the earlier census.

This approach is theoretically simple and straightforward, requires very basic census information and makes no assumptions concerning age patterns of mortality. But in practice this method usually results in unreliable estimates. The reasons lie in the quality of age-sex data, the extent to which migration can be handled effectively and in the comparability of two censuses in terms of their age-sex specific completeness of enumeration.

Generally the quality of data and the completeness of enumeration of censuses improve over time. This adversly affects the useability of successive censuses for mortality estimation. Even when grouped age data are used, systematic under or over reporting of age can cause problems. For these reasons, the UN Manual on Indirect Methods of estimation cautions as below: " .. in many cases, inter-censal survival estimates are better indications of the completeness of the two censuses enumeration than of the level of inter-censal mortality.". It is obvious that estimation of adult mortality by applying inter-censal survival techniques should not only be carefully done but such estimates should be critically examined.

The registration of births and deaths in Vanuatu is poor. During 1987-90 a national multi-round sample survey collected data on deaths for a period of about 30 months providing information on age specific death rates. However, the sample size, which was determined in order to obtain estimates of infant mortality, does not permit reliable estimates of age-specific adult mortality. Though this source of information is explored later, adult mortality estimates have to be arrived at from the age-sex distributions obtained from the 1979 and 1989 Censuses.

3.1 Evaluation of the Data

(a) Age Sex Data:

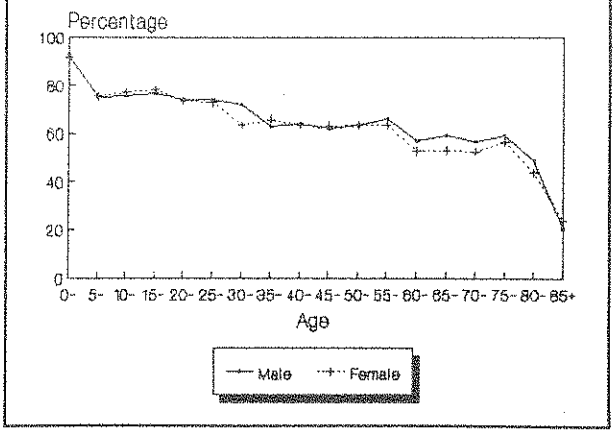
In Vanuatu, as in most developing countries, not all people are able to report their date of birth or even their age accurately. Age was not recorded for 4.8 percent of women and 5.3 percent of men. These missing ages were later imputed. Table 3.1 provides further details:

Table 3.1: Quality of Age Reporting by Sex

	Male	Female
At Least Year and Month of Birth Reported	54.6	53.9
Year of Birth Only Reported	20.0	20.6
Age Only Reported	20.1	20.8
Age Imputed	5.3	4.8
Age Only Reported/Age Imputed	25.4	25.6

There is no sex differential in the pattern of age/date of birth reporting. For about one quarter of the population the date/year of birth was not reported and age only was either reported or estimated.

Figure 3.1: % Reporting Month & Year /Year of Birth by Age and Sex, 1989



As presented in Figure 3.1 above the percentage reporting year and Month/year of birth declines with age for both sexes. For 92 percent of those aged 0-4 accurate age data is available. For those aged 85 and over accurate age reporting occurs only for 20-24 percent. Between these two age groups the percentage gradually declines from around 75 percent for ages 5-9 to under 50 for ages 80-84.

The tendency for respondents (or enumerators) to report certain ages at the expense of others is called 'digit preference' or 'age heaping'. Myer's index provides a measure of such digit preference. The index, theoretically, is a minimal estimate of the 'proportion of persons in the population for whom age with an incorrect final digit is reported'. It has a range of 0 to 90, with 0 representing no preference and 90 when every one is reported to be in just one digit. Myer's index does not take into account the past trends of birth, death and migration and thus the index values are valuable in providing indications of error rather than precise measurements of it.

Table 3.2: Digit Preference by Sex

Digit	Male		Female	
	Percent	Deviation	Percent	Deviation
0	10.73	+0.73	11.09	+1.09
1	9.18	-0.82	8.79	-1.21
2	9.21	-0.79	9.32	-0.68
3	9.15	-0.85	9.12	-0.88
4	9.88	-0.12	11.18	+1.18
5	10.20	+0.20	10.41	+0.41
6	10.35	+0.35	10.00	0.00
7	9.70	-0.30	9.09	-0.91
8	10.08	+0.08	9.78	-0.22
9	11.48	+1.48	11.22	-1.22
Myer's Index		2.86		3.90

The index for Vanuatu is 2.86 for males and 3.90 for females, see Table 3.2. This would signify a low level of digit preference. Digit 9 appears to be slightly preferred among men while it is slightly less preferred among women. Women seem to prefer digit 4 slightly more than expected.

Age data is mostly used after grouping into five year age groups. This helps to reduce the effect of irregularities that affect any analysis when using 'single year of age' data. However, other reporting errors may remain even when age is grouped. The quality of the grouped age data can be evaluated using 'Age Ratios'. Age ratios are calculated as a ratio of the population in an age group to one third of the sum of the population in that same age group and the age groups preceding and following it[6]. If there had been no extreme fluctuations in the past in the rates of birth, death and migration, this ratio should approximately be equal to 100. Any deviation from 100 would signify data quality problems.

As Table 3.3 indicates, for males aged over 30 the ratios deviate considerably from 100. The age groups 35-39, 45-49 and 55-59 appear to have gained at the expense of the age groups immediately preceding them. The deviations in the ratios for females are smaller compared to those for males. For males, 7 age groups exhibit possible deviations of 6 percent or more compared to only 2 age groups for females.

Table 3.3: Age Ratios by Sex

Age Group	Male		Female	
	Ratio	Deviation	Ratio	Deviation
5-9	103.0	-3.0	101.2	+1.2
10-14	99.3	-0.7	99.1	-0.9
15-19	95.2	-4.8	94.8	-5.2
20-24	98.4	-1.6	101.0	+1.0
25-29	104.0	+4.0	103.7	+3.7
30-34	91.9	-8.1	97.4	-2.6
35-39	108.7	+8.7	101.7	+1.7
40-44	88.1	-11.9	93.1	-6.9
45-49	115.3	+15.3	104.7	+4.7
50-54	84.6	-15.4	90.1	-9.9
55-59	109.4	+9.4	98.5	-1.5
60-64	102.5	+2.5	103.1	+3.1
65-69	106.0	+6.0	102.0	+2.0
Accuracy Index		7.0		3.4

An improvment or deterioration in the quality of data between two censuses can cause problems for estimating mortality. Myer's index for the 1979 Census was 8.9 for males and 7.9 for females, which is much higher than the indices for

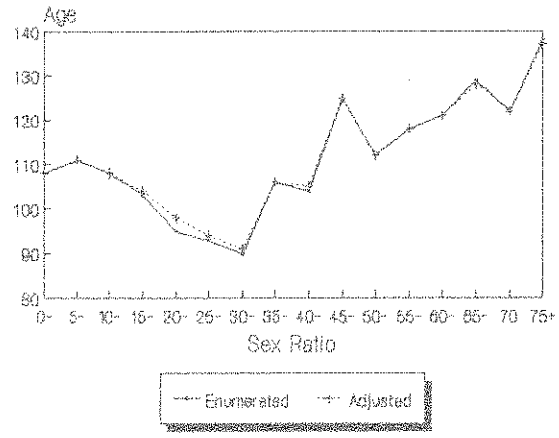
the 1989 Census, being 2.9 and 3.9 respectively. Though digit preference in 1989 was not as bad as in the 1979 Census, the mean Age ratios indicate that the quality of age data for males may have become worse between 1979 and 1989. In 1979 the accuracy index for male age ratios was 5.2 compared to 7.0 in 1989. For females the index values were 3.3 and 3.4 in 1979 and 1989 respectively, not very different. However, the pattern of deviations among both males and females in 1979 is broadly similar to those in 1989.

Age Specific sex ratios for the enumerated population and for the population adjusted for migration and other factors are presented in Table 3.4 and in Figure 3.2. The sex ratio of the population is a function of the sex ratio at birth and sex differentials in mortality and migration. The sex ratio for Vanuatu works out to be 106 males per 100 females before adjusting for migration and other factors and 107 after adjustment.

Table 3.4: Sex Ratios by Age Before and After Adjustment for Intercensal Migration and Other Factors

Age Group	Before Adjustment	After Adjustment
0-4	108	108
5-9	111	111
10-14	108	108
15-19	103	104
20-24	95	98
25-29	93	94
30-34	90	91
35-39	106	106
40-44	105	105
45-49	125	125
50-54	112	112
55-59	118	118
60-64	121	121
65-69	129	128
70-74	122	122
75 +	138	138
All	106	107

Figure 3.2. Age Specific Sex Ratios Enumerated and Adjusted, Vanuatu, 1989



The age specific sex ratios are about 109 in the ages below 10, then continue to decline up to the age 34 and then steadily increases to reach 129 in the age group 65-69. A combination of several factors operate to produce this pattern; under-enumeration of women, age mis-statement and differential mortality. The low sex ratio in ages 20-34 should be particularly noted. Though this could have been caused by sex selective migration or men working in ships and boats, adjustment for these factors had only slightly improved the sex ratio in these ages.

The important thing to note in the current context is that the sex ratio has declined from 113 in 1979 to 106 in 1989. In every age group the sex ratio in 1989 is less than was the case in 1979 and in ages above 50 this is considerably so. It is likely that the 1989 Census enumerated women relatively more accurately than was the case in 1979, though the possibility exists that males are less well counted in the 1989 Census.

(b) Comparison of Reported Age Distribution with Stable Age Distribution:

Visual impressions of how closely reported age distributions resemble chosen 'stable' age distributions offer another method of evaluating age data. Even when the population of interest is not strictly a 'stable' population, this comparison can provide clues to the quality of age data. Such a comparison is generally robust to the choice of mortality level and the growth rate. When the population age distribution is seen to be close to a stable age distribution, certain stable population methods can be applied to obtain estimates of birth rate. The procedure involves determining the

sequence of birth rates b(x), for x = 5,10,15,..., calculated by interpolating between appropriate stable populations (Coale and Demeny,1966) that have the same proportion of the population under age x as that of the population of interest. The cumulated age distributions are used for this purpose. The obtained estimates of b will be nearly constant for a truly stable population. Deviations indicate not only the extent to which a given population may not be stable but also the problems in age data due to age misreporting and age selective omissions.

Figure 3.3: b values by comparison to Level 19 West Stable Population - Male

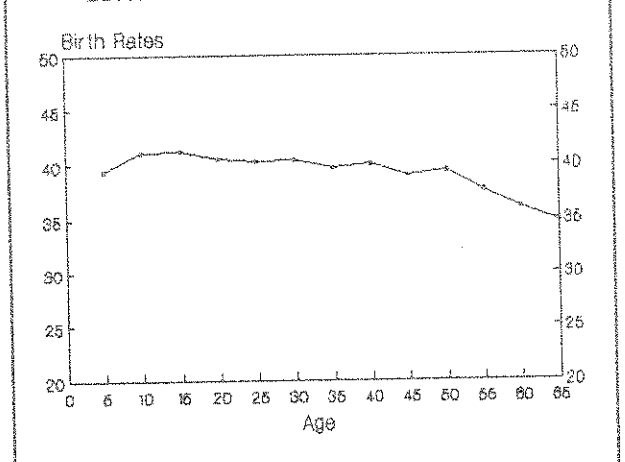
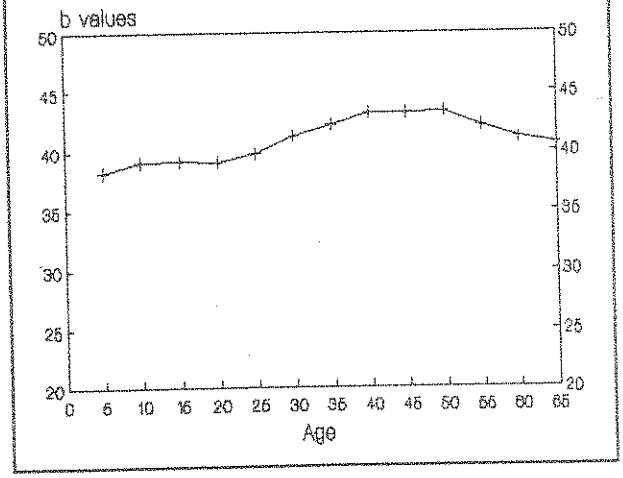


Figure 3.4: b values by comparison to Level 19 West Stable Population - Female



The stable b values for each sex (corresponding to Coale and Demeny level 19) are presented in Figures 3.3 and 3.4 above. (The age distribution after adjusting for migration etc. was used. See the following section on 'Adjustment for migration and other factors'.) The b values for males are remarkably constant up to age 50 and then sharply decline indicating possible problems in the reporting of age, though other possibilities such as higher mortality in the past also exist. Comparatively, the reported age distribution for females deviates considerably from constancy. Up to age 20 the reported proportions are lower than the standard and between ages 30 and 50 the proportions are higher than the standard. However, both male and female values are quite near constancy compared to results from several other developed nations (United Nations, 1983).

(c) Census Coverage in the 1979 and 1989 Censuses:

As both 1979 and 1989 Censuses did not have a post enumeration survey, it is difficult to evaluate the comparability of the two censuses in terms of coverage. The assumption of reasonably similar coverage/completeness in these two censuses is essential for the application of inter-censal survival methods. The growth rate of males during 1979-89 is .026 compared to .031 for females. This may mean that the female population was counted better in 1989 than was the case in 1979 though the other possibility that males were less well counted in 1989 does exist. The sex ratio becoming more balanced in 1989 compared to 1979 reinforces the possibility that women were better counted in 1989. This, though an improvement in the quality of census data, presents problems in applying inter-censal estimation techniques.

3.2 Adjustment for Migration and Other Factors

Both the censuses of 1979 and 1989 provide 'de facto' counts of the ni-Vanuatu population (the 1979 Census collected data on both 'de facto' and 'de jure' populations). However, there are specific sub-populations that have to be considered to ensure that both censuses counted them similarly. The 1980's saw a great increase in the number of students who go overseas to study. Though there were certainly students studying abroad in 1979, most of these students would have been counted in the 1979 Census as the census was conducted in January and the school year generally begins only in February. On the other hand, the census of 1989 was conducted in May, the middle of the school year and hence the 1989 Census would not have counted most of the students studying overseas.

The number of government sponsored overseas students for 1989 was readily available from the Training and Scholarships Co-ordination Unit of the Vanuatu Government. But the age-sex distribution of such students was available only for 1991 and this was applied to the 1989 student count. Estimates of the number of 'private' students (both English and French speaking) and their age-sex distribution were also obtained from the same source.

The second sub-group was men working on boats and ships. These men would not have been counted in both the censuses. However, the number of such men had increased since 1979. So it was decided to include 50 percent of men working in boats and ships in 1989 to the 1989 population. The number of such men and their age distribution were obtained from the Department of Fisheries of the Government of Vanuatu.

The third sub-group consists of international migrants. The data on international migration available from departure cards were examined and found not to be entirely satisfactory in terms of definitions and consistency with data available from the 1989 Census of New Caledonia, which is the main migration destination for the ni-Vanuatu. For this reason, the data on ni-Vanuatu living in New Caledonia in 1989 but who were born in Vanuatu and living in Vanuatu at the time of the 1983 census of New Caledonia were used. The institut territorial de la statistique et des etudes economiques (ITSEE) of New Caledonia provided special tabulations of the figures required. These figures were proportionally adjusted for the small net return migration of 75 individuals during 1979-83 as indicated by the immigration data from Vanuatu. The age sex distribution of these three groups are provided in Table 3.5.

Table 3.5: Age Sex Distribution of 1979-89 ni-Vanuatu Migrants to New Caledonia, Students Abroad in 1989 and Fishermen in Ships or Boats in 1989

Age Group	Migrants to New Caledonia 1979-89		Students		Fishermen	
	Male	Female	Male	Female	Male	Female
0-4	0	0	0	0	0	0
5-9	11	8	0	0	0	0
10-14	30	23	80	80	0	0
15-19	56	30	169	154	27	0
20-24	28	16	152	36	81	0
25-29	21	25	33	9	81	0
30-34	25	21	11	3	27	0
35-39	16	10	1	1	0	0
40-44	14	6	0	0	0	0
45-49	9	2	0	0	0	0
50-54	3	1	0	0	0	0
55-59	1	0	0	0	0	0
60-64	1	0	0	0	0	0
65+	2	4	0	0	0	0
All	217	146	446	283	216	0

= 1308 ✓729

Table 3.6: Age Sex Distribution of Enumerated and Adjusted Population

Age Group	Migrants and Others to be Included		Enumerated Population		Adjusted Population	
	Male	Female	Male	Female	Male	Female
0-4	0	0	12303	11368	12303	11368
5-9	9	6	11120	9986	11129	9992
10-14	103	98	8950	8254	9053	8352
15-19	226	177	6954	6738	7180	6915
20-24	215	49	6017	6341	6232	6390
25-29	89	29	5365	5754	5454	5783
30-34	45	19	4097	4545	4142	4564
35-39	14	9	3918	3706	3932	3715
40-44	11	5	2798	2678	2809	2683
45-49	7	1	2809	2248	2816	2249
50-54	2	1	1701	1517	1703	1518
55-59	1	0	1521	1291	1522	1291
60-64	1	0	1361	1124	1362	1124
65-69	1	3	1103	857	1104	860
70-74	0	0	659	540	659	540
75-79	0	0	488	314	488	314
80+	0	0	584	466	584	466
All	724	397	71748	67727	72472	68124

The final figures by age and sex to be added to the 1989 enumerated population, as well as the adjusted age sex distribution of the 1989 population, are provided in Table 3.6. This adjusted 1989 population was utilised in the methods used to estimate adult mortality.

3.3 Method 1: Preston and Bennett Method

The Preston and Bennett method estimates mortality among adults by comparing two consecutive census age distributions. The two cross sectional observations of the population are used to estimate inter-censal growth rates for each age group. These growth rates are cumulated and used to obtain life table values of ${}_5L_x$, the number of person years that would be lived within an age interval. This in turn is used to estimate the expectation of life at adult ages, e_x.

Though there are no precise estimates available for mortality in Vanuatu past experience indicates that fertility and mortality have been declining for some time. Under this situation, the Preston and Bennett method is suitable, as this method does not require assumptions of stability. The population is assumed to be closed to migration and this has been addressed in adjusting the 1989 population for migration. Estimation of growth rates from the same age groups in both censuses, as well as the accumulation of these rates, assist in reducing the impact of age reporting errors. The Vanuatu data, with an intercensal interval of 10.33 years, can be used straight away without adjusting it for an interval of 10 years. The inter-censal life table derived by applying this method is a weighted average of the period-specific life tables prevailing during the inter-censal period. The significant disadvantage of this method is that inter-censal growth rates are usually not known with high accuracy, especially when the completeness of coverage differs between censuses.

Table 3.7: Estimates of Inter-censal Adult Mortality by Application of Preston and Bennett Method - **Males**

Age Group	Growth Rate $_5r_x$	Estimated Life Expectancy at Age x e_x	West Life Level	Ratio of Estimated e_x to West Level 18
0-4	.025164	---	---	----
5-9	.025853	52.0	11.83	0.863
10-14	.021547	47.9	11.59	0.857
15-19	.016828	47.1	14.41	0.919
20-24	.023113	46.5	17.69	0.992
25-29	.031370	44.1	19.41	1.035
30-34	.033205	42.4	21.92	1.106
35-39	.030000	37.7	21.88	1.106
40-44	.027829	33.3	22.06	1.114
45-49	.037367	29.8	22.96	1.154
50-54	.026058	26.4	23.00	1.204
55-59	.019831	25.4	---	----
60-64	.037654	20.5	---	----
65-69	.048767	16.5	---	----
70-74	.035848	13.3	---	----
75-79	.026274	9.2	---	----
80+	.047901	---	---	----

Table 3.7 above presents data on age specific growth rates ($_5r_x$), the expectation of life (e_x) at various ages and the corresponding West Model Levels for the male population of Vanuatu. The last column provides the ratio of estimated expectation of life (e_x) to those of Male West Level 18 at various ages. This ratio between the ages of 5 and 55 can be used in assessing the estimates. A strong age trend in ratios would be indicative of errors, mostly due to differentials in the completeness of the censuses. Nearly constant ratios would signify acceptable estimates.

The growth rates vary considerably by age. As expected, the age sequence of estimates of life expectancy declines over age, though not regularly. However, as judged from the West Model levels, there is a clear positive correlation between age and the model life table levels. In other words, younger age groups experience high mortality which improves with older age groups. This is contrary to what would be expected. The levels at very young ages are impossibly low and the levels at older ages are impossibly high.

Figure 3.3 plots the ratio of estimated e_x to the West Model level 18 for males. The figure shows a clear trend in the ratios, increasing with age. Also the mean ratio for the first five age groups is .933 and for the last five age groups is 1.137. These deviate from the over all mean of 1.035, indicating differential completeness of coverage.

Figure 3.5: Ratio of Estimated e(x) to West Level 18 by age, Male

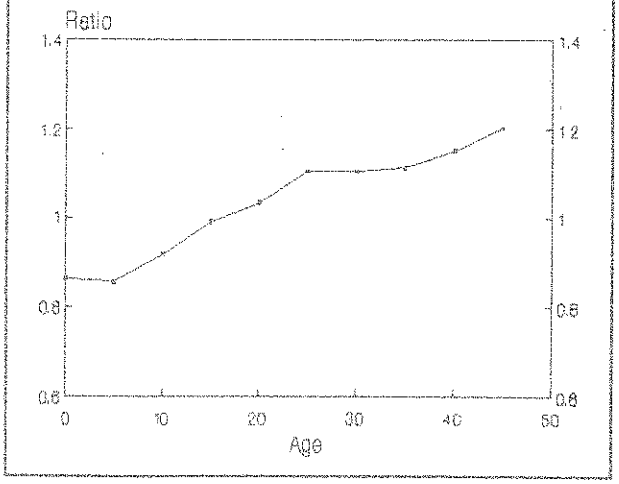


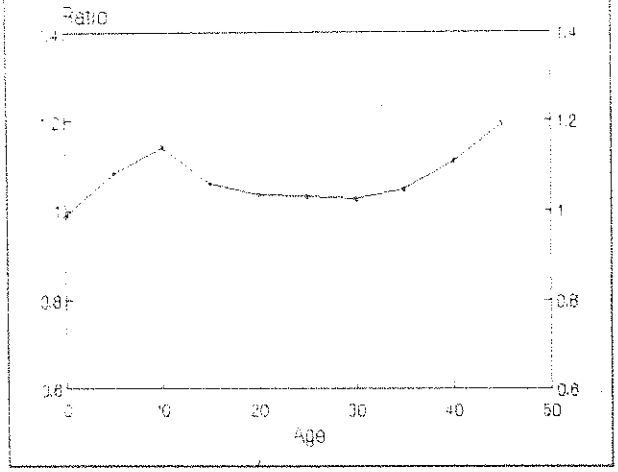
Table 3.8: Estimates of Inter-censal adult mortality by Application of Preston and Bennett Method - **Females**

Age Group	Growth Rate $_5f_x$	Estimated Life Expectancy at Age x e_x	West Life Level	Ratio of Estimated e_x to West Level 18
0-4	.026600	---	---	----
5-9	.028255	62.4	17.48	0.988
10-14	.025929	63.6	21.37	1.083
15-19	.021525	61.8	23.17	1.142
20-24	.029727	52.6	20.39	1.060
25-29	.039928	46.8	19.35	1.033
30-34	.045231	42.2	19.21	1.030
35-39	.038216	37.6	19.01	1.024
40-44	.036343	34.0	19.95	1.047
45-49	.039909	31.4	21.99	1.110
50-54	.037065	28.9	23.64	1.194
55-59	.033207	27.1	---	----
60-64	.054654	22.1	---	----
65-69	.053652	16.8	---	----
70-74	.051855	12.9	---	----
75-79	.031398	8.7	---	----
80 +	.090987	---	---	----

The results of applying the Preston and Bennett method to the female population are presented in Table 3.8 above. The age specific growth rates not only exhibit a large variation but are considerably higher in most ages compared to the growth rates for males. The expectation of life declines with age as expected, except in the age group 10-14. The estimated expectation of life appears too high in age groups above 50 and too low in age groups below 10.

Figure 3.3 plots the ratios of the estimated e_x values to the female West Model level 18 e_x value. Though there is some irregularity, there is no age trend in the ratios as was the case with males. Also the mean ratio for the first five age groups is 1.061 and the last five age groups is 1.081, which are close to the overall mean of 1.071. This suggests that there may not be much age differential in the completeness of the census coverage. However, the uniformly higher growth rate among females and the corresponding estimates of the expectation of life suggest that the obtained expectation of life could be higher than actual, as a result of the possibly better coverage of women in the 1989 Census compared to the 1979 Census.

Figure 3.6: Ratio of Estimated e(x) to West Level 18 by age,Female



3.4 Method 2: Application of Forward and Backward Projections

Method 2 for estimating adult mortality consists of projecting the initial population forward to the date of the second census, using survival ratios from a range of model life tables. The projected population for each mortality level is cumulated over ages 5, 10, 15, ...up to ages 60 or so. These cumulated projected populations are compared with the cumulated enumerated population from the second census. A level of mortality in a given family of life tables is selected, using interpolation, so that the survived population aged x and above in the first census matches the enumerated population aged x + 10 and above in the second census. This method is applied to several ages and a mean/median level of mortality is arrived at.

It is also possible to backwardly project the population of the second census for various levels of mortality, cumulate at ages x and above and compare with the corresponding cumulated observed populations in the earlier census to arrive at the indicated level of mortality for each age group. There is no theoretical basis to choose one projection over the other and both forward and backward projections are applied to the Vanuatu data.

The methods assume that the enumerated population in various age categories is not severely distorted by age miss-statement. The strength of the methods lies in the accumulation, which results in a substantial degree of compensation for age errors.

The results presented in Table 3.9 clearly have several problems. The application of backward and forward projections come up with levels that are unacceptably different. The backward projection results in implausibly high levels of model life tables (high expectations of life) for most age groups, especially in the older age groups. This is likely to be largely the result of age exaggeration in older ages which was noted earlier when the age ratios were discussed. The levels of mortality for females obtained by applying forward projection is rather consistent between ages 10 and 40, the mean level being 20.19. The forward projection for males results in almost steadily increasing levels with age.

Table 3.9: Estimates of Inter-Censal Adult Mortality by Sex by Application of Forward and Backward Projections

Age Group	Interpolated West Model Mortality Level			
	Applying Forward Projection		Applying Backward Projection	
	Male	Female	Male	Female
5-9	10.50	18.34	15.43	21.09
10-14	13.50	20.70	18.42	23.01
15-19	16.91	20.70	20.99	23.16
20-24	18.87	19.10	22.44	22.29
25-29	21.33	19.57	>24	22.86
30-34	23.32	19.99	>24	23.35
35-39	22.81	21.10	>24	>24
40-44	22.89	23.02	>24	>24
45-49	>24	>24	>24	>24
50-54	>24	>24	>24	>24
55-59	>24	>24	>24	>24
60-64	>24	>24	>24	>24

3.5 Method 3: Preston's Method of an Integrated System for Demographic Estimation from Two Age Distributions.

The age/sex distributions from two consecutive censuses and an independent estimate of child/infant mortality are used as inputs in estimating the inter-censal level of mortality and birth rate. This method combines Brass's one-parameter logit mortality system with the generalised stable population equations and hence is called an 'integrated method'. A model life table pattern for ages above 5 has to be assumed, usually a level and pattern that correspond to the independently estimated child mortality. There is no need that the two censuses are separated by exactly 5 or 10 years. As in the case of the Preston-Bennett method, inter-censal growth rates are assumed to be fairly reliable.

The age specific growth rates during 1979-89, a child mortality estimate for both sexes of 58 and a chosen life table of level 20, corresponding to this child mortality, were initially used as inputs. A revised run was made using a life table level of 18 that corresponds to the average of the male and female estimates with the lowest mean square error and least number of sign changes. A grouped mean procedure, with its reduced sensitivity to outliers, was used in fitting a line to the dependent and independent variables in an effort to obtain the estimate that has smallest mean square error.

Depending on the age range chosen the expectation of life at birth varied between 60.39 and 66.81 for females and between 54.02 to 62.66 for males. Though this range is too large to be acceptable, the grouped mean square procedure allows the best estimate to be obtained using the appropriate age groupings. The estimates obtained in this way correspond to the West level 17.39 for males and 18.67 for females. A weighted average of these levels with the number of males and females as weights gives a level of 18.01.

3.6 Choice of Estimate of Adult Mortality

A closer examination of available estimates will be presented in this section from the point of the relative accuracy and consistency of the estimates by sex and then by the method of estimation.

Table 3.10: Quality of Age and Sex Data, 1979 and 1989

Measure of Data Quality	1979		1989	
	Male	Female	Male	Female
Myer's Index	8.9	7.9	2.9	3.9
Mean Deviation of Age Ratios*	5.2	3.3	7.5	3.6
Sex Ratio	113		106/107**	

* Based on ages 5-59
** Before and after adjustment for migration etc.

Table 3.10 provides a comparative picture of the quality of the age data in the 1979 and 1989 Censuses.

The Myer's index provides a measure of digit preference which is slightly lower for males than for females in 1989. However, the intercensal methods of estimating adult mortality use age groups rather than individual ages. For this reason age ratios, that provide a measure of the quality of grouped data, are more relevant. The mean of the deviations from 100 of the age ratios for females is less than half that of males in 1989.

In addition the mean deviation of age ratios for females had hardly changed from that of 1979. On the other hand the mean deviation of age ratios for males in 1989 had changed for the worse compared to 1979. The age sex specific ratios presented in Table 3.3 (on page 16) indicate that among males the age ratios for ages 30-60 deviate markedly from 100 (mean 11.5 percent and range 8-15) compared to females (mean 4.6 percent, 7 in ages 40-44, 10 in 50-54 and all others 3 or less).

On the other hand, a comparison with the b values from stable populations give a different picture. The b values are nearly constant for males where as for females they markedly deviate from constancy suggesting age errors in female data. Also the sex ratio had declined from 113 in 1979 to a more acceptable 106/107 in 1989. This could have happened either because the women were counted in 1989 better than they were in 1979 or that the counting of men had deteriorated since 1979. This has clear implications for the inter-censal estimates of mortality. It is perhaps more likely that women were counted better in 1989 than in 1979. If this were the case, the inter-censal estimates of mortality for females would understate the mortality levels for women.

There appears to be no clear advantage in using either female or male data for arriving at adult mortality estimates. It appears advisable to take an average of the levels obtained for males and females separately.

Among the three methods used, application of the forward and backward projections results in inconsistent estimates. Estimates by application of backward projection are clearly too high both for males and females. However, the estimates for females by application of forward projection are relatively reasonable and consistent in the age range 10-34. Mortality slightly improves over time and the mean West Model level for this age range is 20.01. On the other hand, for males, forward projection comes up with inconsistent results what ever age range is considered. Mortality consistently increases over time.

The Preston and Bennett method results in relatively consistent estimates for females but not for males. The mortality for females slightly improves over time in the age range 10-44 and the mean level of the West Model Life Table varies between 20.0 and 20.6, depending on which age group is used. This level appears to be too high given the previous estimates of mortality as well as the given growth rate during 1979-89. Among males, as in the case of forward projection, mortality clearly deteriorates over time what ever age range is considered. The mean level varies from 18.7 to 21 depending on the age range used.

Though Preston's integrated method comes up with an unacceptably large range of estimates, depending on which age group is considered, the grouped mean procedure for fitting a line offers a way of minimising mean square errors. Also this method uses additional information on child mortality in arriving at estimates of adult mortality. Both the Preston and Bennett method and the integrated method use the data on inter-censal growth rates but it is argued that the estimates from the integrated method are preferable for the reasons listed above, as well as that the male/female estimates are relatively more consistent.

Hence the average of the estimates of adult mortality for males and females by application of Preston's integrated method will be adopted as the estimate for Vanuatu. Though the estimates from the 1967/1979 Censuses had indicated a male advantage in mortality (Booth, 1985), it was decided to adopt the same level of the West Model Life Table for both sexes for two reasons: (i) the recent evidence from the VVSS indicates a female advantage in adult ages (Government of Vanuatu, 1992) and (ii) adult mortality estimates from the Censuses of 1967/1979 suffered from data quality problems which may have been why a male advantage was perceived, (See Roger, undated). If women were less well counted in 1979 compared to the 1967 census, this will partly explain the female disadvantage in mortality.

Table 3.11: Inter-Censal Estimates of Death Rates and Expectation of Life by Age and Sex.

Age	Males		Females	
	Death Rates m(x,n)	Expectation of Life e(x)	Death Rates m(x,n)	Expectation of Life e(x)
0	.04674	61.5	.04671	64.2
1	.00343	63.3	.00343	66.3
5	.00192	60.2	.00187	63.1
10	.00155	55.8	.00139	58.7
15	.00279	51.2	.00205	54.1
20	.00347	46.9	.00285	49.6
25	.00369	42.6	.00332	45.3
30	.00420	38.4	.00384	41.0
35	.00516	34.1	.00453	36.8
40	.00680	30.0	.00548	32.6
45	.00936	25.9	.00705	28.4
50	.01349	22.0	.00991	24.3
55	.01965	18.4	.01406	20.4
60	.02944	15.0	.02163	16.7
65	.04404	12.0	.03368	13.3
70	.06746	9.3	.05478	10.3
75	.10473	7.1	.08868	7.8
80	.18661	5.4	.17279	5.8

3.7 Life Tables for Vanuatu

Having obtained estimates of child and adult mortality it is rather straight forward to calculate a Life Table for Vanuatu. The program COMBIN of the United Nations MortPak-Lite, was used to combine the estimated child mortality with the adult mortality to produce a Life Table. The q(1) of 45 for 1985 was adopted as the intercensal child mortality for both sexes combined. The mortality at age 20 is that from the West Model level 18. Table 3.11 above presents the death rates and the expectation of life at various ages for males and females separately and Appendices 1 and 2 present the full Life Tables by sex.

The expectation of life at birth for the inter-censal period is **64.2 for females** and **61.5 for males**.

3.8 Estimation of Inter-Censal Death Rates

Using the age specific death rates and the adjusted inter-censal age specific population a **death rate of 9.1** is obtained.

3.9 Comparison with Other Estimates of Mortality

Table 3.12: Estimates of Expectation of Life by Sex

	Male	Female
1967-79 (Booth, 1985)	56	54
VVSS (SO, 1992)	65.1	69.8
1979-89	61.5	64.2

Table 3.12 presents the available estimates of the expectation of life for Vanuatu. As discussed earlier, the male advantage in mortality for the period 1967-79 is likely to be due to data problems. The high sex ratio in 1979 compared to the more acceptable sex ratio in 1989 reinforces this point. The VVSS is a sample survey and hence estimates produced from it have are subject to sampling error. In addition, there are indications that deaths may have been under reported in this survey and hence the higher values of expectation of life. The age sex pattern of mortality, however, is broadly similar to the one obtained from the 1979/89 Censuses.

Mortality certainly has declined between 1967/79 and 1979/89. But there are two reasons to believe that the figures for 1967/79 under estimate the expectation of life and thus exaggerate the decline in mortality: (i) the revised estimate of child mortality based on the 1967 census data is lower than the earlier reported estimate. The reported higher estimate was used as an input in estimating other parameters of mortality. If the revised estimate is used as input, then a higher expectation of life would be arrived at. (ii) the higher sex ratio in 1979, if it is a result of under counting of women, would result in under estimating the expectation of life for women. However the same can be used to argue that expectation of life for women obtained from 1979/89 Censuses is an over estimate.

3.10 Summary

The age-sex distribution of ni-Vanuatu in 1989 was adjusted to incorporate the net immigration that occurred during 1979-89. Also other subgroups of students and fishermen were considered and incorporated to make 1979 and 1989 populations comparable from the point of adult mortality estimates.

Three inter-censal methods were applied to the sex specific age distributions. An average of the levels obtained for males and females by application of Preston's integrated method was argued to be the best estimate given the data and its quality. West model level of 18 was arrived at for both females and males. The female advantage in mortality reported based on the analysis of 1967/1979 Census data was considered and rejected for various reasons including (i) the VVSS results of female advantage and (ii) the possibility that 1967/1979 results were spurious due to data problems.

The child mortality rate estimated earlier was combined with the arrived level of adult mortality to produce sex specific life tables for Vanuatu. The inter-censal expectation of life for males is 61.5 years and that for females is 64.2 years. Application of age specific death rates from these life tables to the adjusted inter-censal population resulted in a death rate of 9.1.

4 FERTILITY

4.1 Census Questions for Estimating Fertility

The census asked questions on the date of birth of the last live birth as given below:

Qn.52 Can you tell me the date of birth of your last child?

Qn.53 When you gave birth to your last child, was he/she alive when he/she was born?

Yes (Go to Qn.55) No (Ask Qn.54)

Qn.54 Did that baby show any sign of life during birth?

Yes (Go to Qn.55) No (Finish Interview)

Qn.55 Is that baby a male or a female?

These questions were restricted to women of ages 15-49 and who reported that they had at least one live birth. The CEB information, asked of the same sub group of women, would also be used in estimating fertility[6].

4.2 Evaluation of the Data

The quality of the CEB data and the sex ratio of births in the year preceding the census were already presented in the chapter on 'Child Mortality'. The sex ratio at birth appears reasonable and does not suggest any sex selective reporting problems.

Table 4.1: Percent Childless and 'Not Stated' by Age of Women

Age Group	Not Stated		Childless	
	Number	Percent	Number	Percent
15-19	1731	25.7	4307	63.9
20-24	719	11.3	2028	31.9
25-29	318	5.5	633	11.0
30-34	589	13.0	200	4.4
35-39	314	8.5	139	3.8
40-44	243	9.1	87	3.2
45-49	152	6.8	99	4.4
All	4066	12.7	7493	23.4

The 12.0 percent of women aged 15-49 who did not answer question 48 (Have you ever given birth to a child?) were not asked the questions on date of birth of last live birth or on CEB. Another 0.7 percent of women reported to have had a child did not report their CEB and the date of birth of the last child. Such a high proportion for whom fertility information is not available can affect the fertility estimates, depending on how they are treated. Table 4.1 presents (i) the number and percent of 'not stated' cases combining both kinds of 'not stated' and (ii) percent childless by age of women.

Since the proportion childless by age is not linearly related to the proportion 'not stated', the condition for applying the El-Badry correction is not present. Hence it is not possible to apply this procedure to estimate the 'real' proportion childless.

There are two ways of treating the women for whom no fertility information is available.

(i) All 'not stated' women are considered childless. This would result in under estimating fertility to the extent that the 'not stated' category contains women who had given birth to one or more children.

(ii) All these women are treated as 'not stated' and are excluded from the denominator. This is equivalent to assuming that the respondents who had 'not stated' have a similar distribution of children ever born/births in the year preceding census to that of women who reported their number of children ever born. This would result in over estimating fertility as this category is likely to contain a higher proportion of childless women compared to those who answered Qn.48.

As noted in the evaluation of data in Section 3.1 earlier, a high proportion of women who did not answer the questions on fertility were not only of young ages but also were never married. Only one third of this 'not stated' category were currently married. So a very high proportion of these women are likely to be childless. In addition, when women with no fertility information are treated as childless the proportion childless is not unacceptably high, Table 4.1. For these reasons, these women were

treated as childless in the analysis. The implication of this decision is that the fertility estimate may be a slight under-estimate[7].

4.3 Method of Estimation and Estimates of Fertility

The Vanuatu Census had a floating census night with the enumeration taking place during 8-22 May 1989. The births in the last one year was arrived at by taking the births that occurred during the period 8 May 1988 to 7 May 1989[8]. In addition there were 322 births in 1988 that did not have data on month of birth. These births were pro-rated and included.

Though the data on births in the last one year and the number of women, both by age of women, can be used to directly estimate Age Specific Fertility Rates (ASFR) and the Total Fertility Rate (TFR), there are certain errors that are usually present in data from censuses in developing countries. One important error in the data on births in the last one year is imprecision in the reference period. Though the question asked was date of birth of last child, usually answers such as 'a year ago' etc. are converted by enumerators into dates and months of birth and thus subject to time reference errors.

Hence the P/F ratio method, developed by Brass (Brass et al., 1968) is applied to the data on births in the last one year and children ever born. In simple terms, this method adjusts the age pattern of fertility derived from the information on births in the last one year by the level of fertility implied by the average parity of women in age groups 20-24 or 25-29 or an average of these two age groups. This adjustment factor is provided in terms of P/F ratios. Though the basic assumption in applying this method is that fertility had not been changing in the recent past, the selection of P/F ratios from younger ages can yield valid results if the declines in fertility have been mostly confined to older age groups. It is also assumed that time reference errors are independent of the mother's age. This method does not provide corrections for omission of births, omitted equally by all age groups of women such as children who die very young. The P/F ratio method was later modified by Arriga (1983) and was extended to the case of changing fertility. Arriga's method was applied to the Vanuatu data using the United Nation's software Mortpak-Lite (United Nations, 1988).

Table 4.2: Estimates of ASFRs by Application of Arriga's Method

Age Group	Fertility Rates by Age at Census	Fertility Rates by Age at Birth	Average Parity	Adjustment Factors	Adjusted Fertility Rates
15-19	.0595	.0735	0.138	1.2474	.0813
20-24	.2168	.2278	1.068	1.1750	.2520
25-29	.2470	.2450	2.436	1.1062	.2710
30-34	.1974	.1917	3.554	1.1045	.2120
35-39	.1422	.1362	4.587	1.1511	.1507
40-44	.0698	.0641	5.337	1.1971	.0709
45-49	.0289	.0234	5.618	1.2119	.0259
TFR		4.81			5.32

The Adjusted ASFRs (using the adjustment factor for the age 25-29)[10], TFRs and other details obtained by using the two variants of the estimated number of women and applying Arriga's version of P/F ratio method are presented in Table 4.2.

Given the current ASFRs, a ni-Vanuatu woman gives birth to 5.32 children in her life time. The Age Specific Fertility Rates portray a late peak pattern with the highest fertility occurring in ages 25-29. Of the total of 5.3 children per woman, slightly less than half a child is a result of teenage reproduction, 4.4 while the women are of ages 20-39 and half a child while the women are in their late reproductive period of 40-49. A typical ni-Vanuatu women ends up bearing 1.2 children during ages 35 to 49.

4.4 Comparison with Other Estimates of Fertility

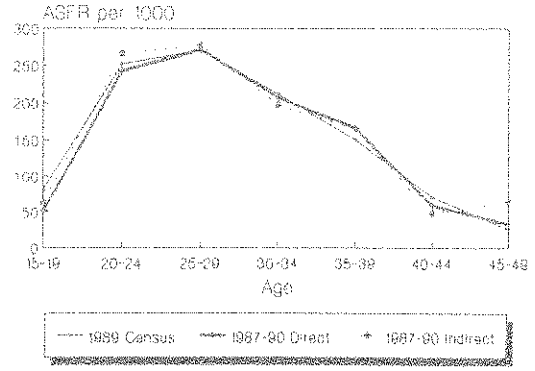
Fertility estimates for Vanuatu are available from three sources: (i) the 1967 and 1979 Censuses, (ii) the 1989 Census and (iii) the 1987-90 Vanuatu Vital Statistics Survey (VVSS), see Table 4.3 below.

Table 4.3: Estimates of TFR for Vanuatu		
Source	Year	TFR
Vanuatu		
1967,1979 Censuses (Booth, 1985)	1967-7	6.58
	1974-7	6.50
Vital Statistics Direct	1987-9	5.20
Vital Statistics Indirect	1989-9	5.41
1989 Census	1988-8	5.32
Vanuatu Urban		
1986 Census	1986-8	4.62*
	1985-8	4.57**
1989 Census	1988-8	4.39

* By applying Trussel version of P/F Ratio method to input figures provided in NPSO, 1989.
** By applying Arriga's version of P/F Ratio method to the input figures provided in source above.

From the VVSS two estimates are presented. The first is a direct estimate based on the births reported in 6 monthly intervals for a period of three years. The second is an indirect estimate based on retrospectively reported births in the last year of the survey and children ever born.

Figure 4.1: Age Specific Fertility Rate 1987-90 and 1988-89



1987-90 figures from NPSO, Vanuatu, 1992

The 1989 Census and the VVSS provide estimates for a roughly comparable period. The TFRs from these two sources are remarkably close (5.20/5.41 and 5.32). One can therefore confidently place the TFR for Vanuatu for the latter part of the 1980s to be in the range 5.2 - 5.4. The age pattern of ASFRs from these two sources are also quite similar, given that the estimates from the VVSS are subject to sampling error, Figure 4.1. The age pattern of the VVSS direct estimate is closer to that of the 1989 Census estimate than is the VVSS indirect estimate.

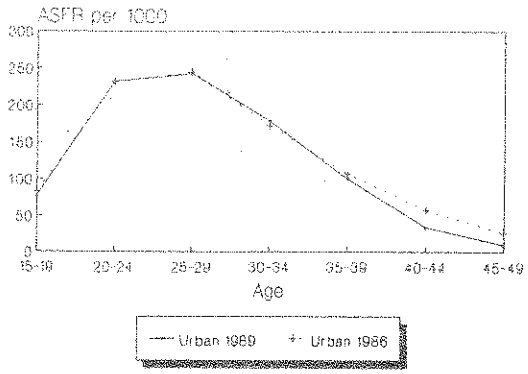
From the available figures in Table 4.3 it can be seen that fertility remained at the same high level during 1967-78 and 1974-78 but declined by more than one child to around 5.3 in the years 1988-89.

Table 4.4: Age Specific Fertility Rates, Rural, Urban, 1989 Census		
Age Group	ASFRs per 1000	
	Rural	Urban
15-19	97.1	86.1
20-24	274.5	238.7
25-29	289.5	245.1
30-34	237.0	191.8
35-39	169.6	100.9
40-44	80.8	34.2
45-49	29.7	10.0
TFR	5.89	4.53

Estimates are also available for urban areas from the 1986 and 1989 Censuses and are presented in Table 4.4 above.

The 1989 estimate of TFR is slightly less than that for 1986. The ASFRs portray a similar age pattern of fertility, see Figure 4.2, except in the older ages of 40-49 where the 1989 rates are lower than those of 1986. It is indicative that the slightly lower level of fertility in 1989 compared to 1986 can be explained by a slight decline in fertility among women of older ages.

Figure 4.2: Age Specific Fertility Rates Urban 1986 & 1989



1986 figures from NPSO, Vanuatu, 1988

4.5 Differentials in Fertility

(a) Geographic Differentials:

Table 4.4 above provides ASFRs and TFRs for urban and rural areas obtained from the 1989 Census. On average rural women bear 1.3 more children than their urban counterparts. Of this excess fertility about 1 child occurs in the latter part of reproduction, namely ages 30 and above. That is urban women experience only 83 percent of the national average of 5.3 children compared to 105 percent for rural women.

Table 4.5 below presents the TFR and the number of children born after age 30 for the 4 Rural Districts and for the 8 Island groups of Vanuatu. In societies where the TFR is 5 or higher the fertility planning that exists is mostly effected through controlled fertility in later years of reproduction. Hence the achieved fertility after age 30 can be used as an index that discriminates fertility planners from non planners.

Table 4.5: Total Fertility Rates and Fertility During Ages 30-49 by Geographical Areas

Area	TFR	Fertility in Later Reproductive Life (30-49)
Rural Districts:		
Central 1	4.6	1.6
Central 2	5.9	2.7
Southern	5.9	2.7
Northern	6.3	2.7
Urban	4.4	1.6
Island Groups:		
Efate	4.3	1.5
Ambae/Maewo	5.5	2.2
Malakula	5.8	2.7
Tafea	5.9	2.7
Shepherds/Ambrym	5.0	1.9
Pentecost	6.8	3.5
Santo/Malo	6.4	2.8
Banks/Torres	7.4	3.5

The Northern District has the highest TFR of 6.3 followed by the Southern and Central 2 Districts, with a TFR of 5.9. Central 1 District has the lowest TFR of 4.6, which is very close to that of the urban area.

Among the rural regions, Banks/Torres (7.4), Pentecost (6.8) and rural Santo/Malo (6.4) are clearly high fertility LGRs, with more than 6 births per woman. Efate (4.3) and the Ambrym, Paama, Epi and Shepherds group (5.0) are low fertility LGRs with 5 or less children per woman. Tafea (5.9), Malakula (5.8) and Ambae /Maewo (5.5) occupy the middle position with more than 5 but less than 6 children per woman.

For the high fertility group, the mean number of children born after age 30 is 3.3, for the medium fertility group 2.5 and for the low fertility group 1.7. In other words among relatively high fertility areas a large proportion of the excess fertility is accounted for by their women continuing to have high fertility in later ages of reproduction.

(b) Social Differentials:

Tables 4.6 and 4.7 below respectively present estimates of TFR and Children born in the latter part of reproductive life by maternal schooling and religion. Separate estimates for this sub groups are provided for urban and rural areas separately.

Women with the highest level of schooling (7 or more years) bear about 1.4 children less than women who had never been to school. Even little schooling makes a difference as women with 1-6 years of schooling bear only 5.7 children on average compared to 6.6 for women with no schooling at all. These observations apply to all women of Vanuatu as well as to rural women. For a given level of schooling urban women appear to bear 1.0-1.2 children less than their rural counterparts. The differentials by schooling appear to be of much smaller magnitude among urban women. All of the strong differentials observed can be explained largely by differentials in latter ages of reproduction.

Women of Customary, Anglican and Catholic religions are clearly high fertility groups. Women of Anglican or Presbyterian women living in urban areas have lower fertility compared to their counterparts in rural areas. As in the case of maternal schooling, from the available data, the differential among urban women by religion is very small, if at all.

Table 4.6: Total Fertility Rates and Fertility in Later Reproductive Ages by Maternal Schooling, Urban, Rural.

Maternal Schooling	TFR			Fertility in Later Reproductive Life (30-49)		
	Rural	Urban	Vanuatu	Rural	Urban	Vanuatu
Never Attended	6.7	---	6.6	3.2	---	3.1
Attended:	5.8	4.7	5.7	2.5	1.9	2.4
1-6 years	5.9	4.9	5.7	2.6	1.9	2.4
7 + years	5.4	4.7	5.2	2.4	2.0	2.3

--- Results not presented due to insuficient number of women

Table 4.7: Total Fertility Rates and Fertility in Later Reproductive Ages by Religion, Urban, Rural.

Religion	TFR			Fertility in Later Reproductive Life (30-49)		
	Rural	Urban	Vanuatu	Rural	Urban	Vanuatu
Anglican	5.7	4.8	6.4	3.2	1.7	2.9
Catholic	6.7	---	6.3	3.2	---	3.0
Presbyterian	5.4	4.7	5.3	2.3	2.0	2.3
SDA	5.8	---	5.4	2.4	---	2.1
Customary	7.3	---	7.3	3.9	---	3.9

--- Results not presented due to insufficient number of women

Women of Customary, Anglican and Catholic religions are clearly high fertility groups. Women of Anglican or Presbyterian women living in urban areas have lower fertility compared to their counterparts in rural areas. As in the case of maternal schooling, from the available data, the differential among urban women by religion is very small, if at all.

Table 4.8: Estimation of Crude Birth Rate by Application of Reverse Survival Technique

Age	$_nL_x$	Reported Population	Estimated No. of Births	Mid-Period Population	Birth Rate per 1000	Period
0-4	4.7500	23671	4983	130026	38.3	85-89
5-9	4.6975	21106	4493	113005	39.8	79-84

The Total Fertility Rate for Vanuatu in 1988-89 was 5.3. The rural rate was 5.9 and the urban rate 4.5.

4.6 Estimation of Birth Rates

(a) Reverse Survival Method:

In a population that is closed to migration (or one in which migration is taken into account by adjusting the population figures), children whose current age is x are just the survivors of births that occurred x years ago. Therefore, the number of births x years ago can be estimated if the number of children aged x now and their mortality in the years between now and x years ago are known.

The reported children (of both sexes) under the age of 10 and an estimate of child mortality are used to estimate the number of births in the 0-4 and 5-9 years preceding the census[1]. For these two periods the estimated number of births, the mid-period population, and the birth rates as well as other life table parameters corresponding to child mortality estimates (West level 20.1) are given in Table 4.8 above. The rates indicate a small decline in the birth rate.

(b) Use of Model Stable Populations:

Based on the probability of surviving to age 5 and the proportion of the population under age 15, a model stable population, that matches these parameters, can be selected and its birth rate determined. Such an estimate of the birth rate closely matches the average birth rate during the 15 years preceding the census, even in the case of non-stable populations. This birth rate has to be adjusted to reflect the observed growth rate of the population in case this differs from the growth rate corresponding to the selected stable parameters. The proportion under 15 for both sexes combined results in a birth rate of 39.2[12].

(c) Birth Rate Based on Estimated Age Specific Fertility Rates (ASFRs):

Application of estimated ASFRs to the adjusted number of women 15-49 in 5 year age groups results in a Crude Birth Rate of 39.3 for 1988-89. The birth rates obtained by using various methods are presented in Table 4.9.

Table 4.9: Estimates of birth rates

Method	Period	Birth Rate
Stable Population Estimate	1975-89	39.2
Reverse Survival	1979-84	39.8
	1985-89	38.3
Applying ASFRs	1988-89	39.3

The birth rate from the stable model analysis, as well as that from reverse survival, are averages for a number of years, more so in the case of the stable population estimates. Even so, the estimates do not seem to reflect the decline observed in the Total Fertility Rates presented earlier. Partly, this can reflect the increasing proportion of women in reproductive ages to the total population. The reverse survival estimates do come up with a decline in the birth rate during 1979-89. However, the most recent estimate obtained by application of ASFRs to the adjusted number of women results in a higher birth rate than for the inter-censal period. The inter-censal estimate is around 38. The small increase in the birth rate in 1988-89 can partly be explained by the increasing proportion of women of reproductive ages to the total population as presented in Table 4.10.

Table 4.10: Percentage of Women to Total Population by Age

Age	% Women to Total Population	
	1979	1989
15-19	5.3	4.8
20-24	4.5	4.5
25-29	3.7	4.1
30-34	2.7	3.2
35-39	2.3	2.7
40-44	1.8	1.9
45-49	1.4	1.6
All	21.8	23.0

4.7 Summary

Estimates of fertility are obtained by applying Arriga's version of the P/F ratio method of Brass and by assuming that the women who had not reported their fertility experience are childless. Note that a very high proportion of these women were 'never married young women' but some will have had children in the year preceding the census. Therefore the method may produce a slight under-estimate.

The TFR for 1988-89 is 5.32. This estimate is very close to the one obtained in the Vanuatu Vital Statistics Survey relating to 1987-90. This rate implies a decline of fertility by about 18 percent from a TFR of 6.5 during 1974-78. Rural women have a TFR of 5.9 compared to 4.5 among urban women. Estimates of fertility are presented for rural LGRs and by maternal education and religion. In rural areas women with schooling enjoy a lower fertility, in urban areas such differentials do not exist. In rural areas women of Catholic, Anglican and Custom religions have higher fertility levels.

Estimates of the Crude Birth rate were made by applying the reverse survival method, model population analysis and by using the estimated ASFRs. The inter-censal estimate was 38 per 1000 population. The estimate for 1988-89 was 39 per 1000 population.

The intercensal Crude Birth Rate was 38 per 1000.
The CBR for 1988-89 was 39 per 1000.

5 POPULATION PROJECTIONS

The projection of the size of a population as well as its characteristics are basic inputs to any national development plan. Population projections form the basis for policies concerning not only demographic phenomenon such as fertility, mortality and migration but also other sectoral issues such as health and education. Projections are not predictions but future scenarios given a certain set of assumptions on fertility, mortality and migration based on existing data. Population projections are effective planning tools in assessing the impact of planned changes in fertility, mortality and migration. The projections presented here are based on three sets of assumptions as detailed below.

The projections are for every five years for a total of 30 years from 1989 to 2009 for the ni-Vanuatu population of Vanuatu[13]. The computer software used was version 3.0 of PEOPLE (Overseas Development Administration and Economic Planning Unit, 1992).

5.1 Base Population

In order to estimate inter-censal mortality the 1979 and 1989 Censuses populations were made comparable by adjusting them to include net migrants during 1979-89. For a projection exercise these net out migrants should not be included. The Census figures refer to May 16 and these have to be projected forward to mid year estimates (30 June 1989) inorder to make population projections. The mid year estimates are based on an annual growth rate of 2.8 percent for the ni-Vanuatu population and are given in Table 5.1. The figures have been rounded to the nearest hundred.

It is sometimes advisable to 'smooth' the age distribution before using it for population projections. The age accuracy indices reported earlier indicate only moderate reporting errors in age for both sexes and so smoothing has not been applied to these data.

Table 5.1: Projected Mid Year Population by Age and Sex

Age	Male	Female
0-4	12,300	11,400
5-9	11,200	10,000
10-14	9,000	8,300
15-19	7,000	6,800
20-24	6,000	6,400
25-29	5,400	5,800
30-34	4,100	4,600
35-39	3,900	3,700
40-44	2,800	2,700
45-49	2,800	2,300
50-54	1,700	1,500
55-59	1,500	1,300
60-64	1,400	1,100
65-69	1,100	900
70-74	700	500
75-79	500	300
80+	600	500
Total	72,000	68,100

5.2 Fertility Assumptions

The Total Fertility Rate (TFR) in 1988-89 was 5.32. The extent of contraceptive practice in Vanuatu appears to be very low. In 1988, the health program recorded only 2,383 users of contraception, which is 7.3 percent of women in reproductive ages, compared to about 5.8 in 1987 (Ministry of Health, Vanuatu, 1988). The 1983 Maternal and Child Health Survey (Osteria, 1984) reports 24.4 percent of women in reproductive ages using one or other method of contraception[14]. However the TFR had declined from 6.5 during 1974-78 to 5.32 in 1988-89. In over a decade, the TFR had declined by more than one child.

As experiences in other developing countries indicate, and given the level of fertility in Vanuatu, once the fertility had begun declining, this process is likely to accelerate for a while

and then the rate of decline may slow down. This is the pattern of decline assumed for the projections. When fertility declines, the age pattern of fertility also undergoes a change. At a lower level of fertility, child bearing is more concentrated in the middle ages. At older ages child bearing is at a reduced level compared to younger ages. By examining low fertility countries in the region, a low fertility age pattern was arrived at for the later periods of projection. For 1989, the reported age pattern of fertility for Vanuatu was used, Table 5.2.

Table 5.2: Assumed Age Patterns of Fertility

Age	1989	2009	
	%	TFR 4 %	TFR 3 %
15-19	7.6	7.2	7.5
20-24	23.7	25.8	29.3
25-29	25.5	26.0	27.0
30-34	19.9	20.1	20.1
35-39	14.2	12.5	11.3
40-44	6.7	6.6	4.8
45-49	2.4	1.8	0.2
Total	100	100	100

Three variations in fertility change are assumed and summarised in Table 5.3. They are:

(i) fertility remains at the 1989 level during the whole projection period,

(ii) TFR declines from 5.32 to 4.00 by the year 2009

(iii) TFR declines to 3.00 by the year 2009.

Table 5.3: Fertility Assumptions

	1989	2009
Assumption I	5.64	5.64
Assumption II	5.64	4.00
Assumption III	5.64	3.00

Assumption (i) is perhaps the most unlikely. However, this is presented for comparative purposes. Similarly assumption (iii) perhaps is a bit exaggerated. Fertility, compared to mortality, is a more complex phenomenon in terms of policies and programs addressing change. In contrast, the decline in mortality is well accepted, though resources to be spent on such declines may often be subject to discussion. For this reason, impacts on population size and characteristics for three scenarios of fertility decline but only two of mortality change are presented.

5.3 Mortality Assumptions

The estimated expectation of life of 61.5 for males and 64.2 for females is fairly high compared to countries such as Papua New Guinea and Solomon Islands in Melanesia. At this level, further declines in mortality may mainly have to come from declines in infant mortality. Two variants in mortality change are applied:

(i) mortality will not decline during the projection period. As in the case of fertility, this is unlikely. However, this is presented for comparative purposes.

(ii) the expectation of life for both sexes will increase by 5 years during 1989-2009.

The increase in the expectation of life is assumed to be linear during the projection period, unlike fertility decline which gains momentum initially and slows down during later periods.

Table 5.4: Mortality Assumptions

	Expectation of life at birth			
	Male		Female	
	1989	2019	1989	2019
Assumption I	61.5	61.5	64.2	64.2
Assumption II	61.5	66.5	64.2	69.2

5.4 Sex Ratio at Birth and International Migration

The sex ratio at birth is assumed to be 108, based on the figures in Booth (1985) as well as the 1989 figures.

The extent of international migration in the future is hard to predict as it is also a function significantly of what happens outside the country in terms of economic and immigration policy changes in receiving countries. However, the rate of international migration during 1979-89 was very low involving a net out migration of only 300 persons and there are no reasons to expect this will change in the near future. Hence, it is assumed that future levels of international migration will be too low to be of any significance to the population size. International migration is assumed to be zero in all the variants of the projections.

5.5 Projections

Three projections are presented below in Table 5.5, depending on which variation in the fertility/mortality change is assumed. The 'High' variant is perhaps the most unlikely but is presented for comparative purposes. The variant would have the lowest number of people in 2009, followed by medium and high variants.

Table 5.5: Projection Scenarios

Projection	Fertility Assumption	Mortality Assumption
High	I - No Decline	I - No Decline
Medium	II - Decline to 4	II - Decline
Low	III - Decline to 3	II - Decline

5.6 Projected Population Size and Growth Rates

Table 5.6 and Figure 5.3 present the projected population size for selected years for the three projections, the figures are rounded to the nearest thousand.

Depending on the extent of decline in fertility the population of Vanuatu could be between 217,000 to 255,000 in 2009. The more likely scenario of medium projection results in 236,000 people by the year 2009, an average increase of about 48,000 people every ten years. This would mean that the population density will increase, from 12 in 1989, to about 19 per square kilometre. This also means that the population would have doubled by the year 2017. A higher decline in fertility would result in a population of around 217,000 in 2009.

Table 5.6: Projected Population Sizes

Year	High	Medium	Low
1989	140,000	140,000	140,000
1994	163,000	161,000	159,000
1999	189,000	183,000	178,000
2004	220,000	208,000	197,000
2009	255,000	236,000	217,000

Figure 5.1: Projected ni-Vanuatu Population (in 1000s) 1989-2009

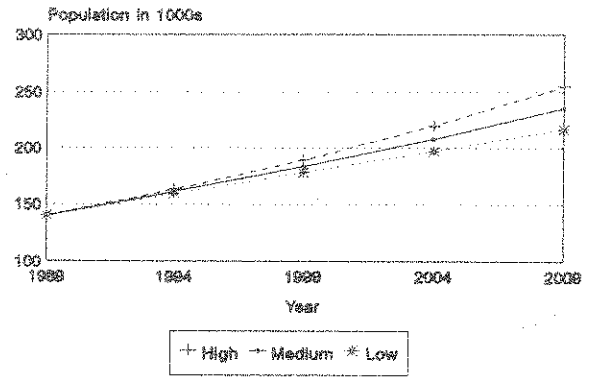


Table 5.7 presents the implied growth rates for the medium and low projections. In the medium projection, the growth rate will gradually decline to 25.1 per 1000 in the year 2009. At this rate of growth, the population will double again in less than 30 years. If the decline in fertility is to a TFR of 3, the corresponding growth rate and doubling time are 19.5 and 36 years.

Table 5.7: Projected Rates of Growth

Period	Projection	Growth Rate
1994-1999	Medium	26.2
	Low	22.4
1999-2004	Medium	25.6
	Low	20.8
2004-2009	Medium	25.1
	Low	19.5

5.7 Projected Population Structure

In addition to size, the age structure of future populations are also of interest. The needs and contributions of people undergo enormous changes during their life cycle. A rising proportion of young children or older population, for example, has implications for the patterns and levels of required services as well as for the economic activity of the country.

The percentage of people aged 65+ increases to 3.4/3.7 in the year 2009, Table 5.8 below. The proportion of persons aged 15 or less would decline markedly, more so in the low projection. The end result of these two changes is a decline in the Dependency Ratio (Number of persons in ages less than 15 and above 64 for every 100 persons of age 15-64). This ratio declines to a low level of 59 in the low projection in the year 2009 compared to 92 in 1989 in response to the decline in fertility to a TFR level of 3. If the fertility decline were to be more moderate, the ratio would decline to around 70.

Table 5.8: Projected Structure of Population in Percentages

Age	1989	1999		2009	
		Medium	Low	Medium	Low
<15	44.4	41.0	39.2	37.8	33.3
15-64	52.0	55.9	57.6	58.8	63.0
65+	3.6	3.1	3.2	3.4	3.7
Dependency Ratio	92.4	78.9	73.3	70.1	58.7

5.8 Projected Population of Working Ages

Table 5.9: Mid Year Projections of the Working Age Population by Sex (medium projections)

Age	1989	1994	1999	2004	2009
Male					
15-24	13,000	16,000	20,000	23,000	25,000
25-49	19,000	22,000	26,000	30,000	37,000
50-64	5,000	6,000	7,000	8,000	9,000
All Male	37,000	44,000	53,000	61,000	71,000
Female					
15-24	13,000	15,000	18,000	18,000	23,000
25-49	19,000	23,000	26,000	26,000	36,000
50-64	4,000	5,000	6,000	6,000	10,000
All Female	36,000	43,000	50,000	50,000	69,000
All	73,000	87,000	103,000	111,000	140,000

The number of people of working ages (15-64) in future years and their sex distribution are presented in Table 5.9 above. Not all of these persons would be available for work for many reasons. In the 1989 Census, 89 percent of men and 80 percent of women were classified as economically active. These figures provide an upper limit of the number of people who would be available for work in future years.

It should be noted that only medium projections are given as the figures for all three projection assumptions do not differ significantly until after the year 2004, as people who enter the

working age group (age 15) in 2004 or earlier had already been born in 1989 or earlier and thus any decline in fertility during 1989-2004 will not affect the working age population until after 2004.

The working age population would, by the year, 2009 be about twice the figure in 1989. The proportion of the working age population to total population would have increased from about 52 percent in 1989 to 59 percent in the year 2009.

The growth in the number of women aged 15-49 (from 32,000 in 1989 to 59,000 in 2009) has implications for the number of births in any year. An increasing number of women in the reproductive ages will offset the effect of a declining fertility.

5.9 Projected School Age Population

Table 5.10: Projected School Age Population

Age	1989	1994		1999		2004		2009	
		Medium	Low	Medium	Low	Medium	Low	Medium	Low
6-11	24,000	27,000	27,000	29,000	28,000	31,000	28,000	34,000	28,000
12-14	10,000	12,000	12,000	14,000	14,000	15,000	14,000	16,000	14,000
15-18	11,000	14,000	14,000	17,000	17,000	19,000	19,000	20,000	18,000
All	45,000	53,000	53,000	60,000	59,000	65,000	61,000	70,000	60,000

The age groups of 6-11, 12-14 and 15-18 are chosen to reflect the Vanuatu schooling system. Vanuatu children can receive 6 years of primary education, then three years of secondary education for Form III Leaving Certificate followed by four more years of secondary education. At the time of the 1989 Census, 74 percent of children aged 6-11, 69 percent of children aged 12-14 and 25 percent of children aged 15-18 were attending school. The figures presented would refer to the number of children needing educational services if universal education is the goal.

The number of children of primary school age would increase from 24,000 in 1989 to 28,000/34,000 by 2009, depending on how much fertility declines. This is the age group that exhibits the largest difference between the two projections. A larger decline in fertility can mean a smaller number of children aged 6-11, a difference of 6,000. Overall, by 2009 there will be an estimated one third to one half additional children of school going age, compared to the number in 1989.

5.10 Summary

Population projections under three sets of assumptions on fertility and mortality are presented, international net migration was assumed to be zero. In the most likely scenario of 'medium' projection, which assumes that fertility will decline to a TFR of 4 in the year 2009, the population would have doubled by the year 2017. From the year 2009 the population would continue to grow at an annual rate of 2.4, which implies a further doubling time of 29 years.

Under the assumptions of declining fertility, the Vanuatu population would have become a bit 'older', but still having 33/38 percent of its population in ages below 15. The working age population would have increased by 2 times and the school age population by 1.3/1.5 times depending upon how high was the fertility decline.

6 INTERNAL MIGRATION

6.1 Introduction

Migration has played an important role in the patterns of population change in Vanuatu and has been the subject of investigation by many scholars (Connel, 1985; Haberkorn, 1987 and Population Monograph No.2, South Pacific Commission, 1989). For instance, the size and direction of international migration has affected the trend of population growth of Vanuatu, as seen in Table 6.1. The most significant of these movements in the recent past has been the emigration of non-ni-Vanuatu residents after independence in 1980 and of the ni-vanuatu citizens to New Caledonia for employment in the nickel mining industry. Though statistics relating to the latter are not available, incidence of the former can be seen from the enumerated population of non-ni-Vanuatu at different dates given in Table 6.1.

Table 6.1: Indicators of Population Change Vanuatu: 1967-1989

Year	De Facto Population	Rate of Growth	Non ni-Vanuatu (De facto)	Rate of Change
1967	77,988	-	5,746	-
1979	111,251	3.0	6,880	1.5
1989	142,944	2.4	3,469	-6.6

Sources: Statistics Office, National Population Census: 1989, Main Report. South Pacific Commission, Population of Vanuatu. Population Monograph No. 2, December 1989.

Note: Being the de-facto population the above figures include visitors who were enumerated in the respective censuses.

While international migration has influenced the rate of population growth in Vanuatu, migration among the different islands or island groups has resulted in a significant redistribution of the population, a trend that has accelerated during recent years, see Table 6.2. There is a need to understand the dynamics of these changes and to take account of their implications in the planning and policy process. The 1989 Population Census provides the most recent data that can throw light on the trends relating to internal migration.

Table 6.2: ni-Vanautu Resident Population Distribution and Intercensal Rates of Growth 1979-89 by LGR of Usual Residence

LGR of Usual Residence	1979[a]	%	1989[b]	%	Difference	1979-89 Rate of Growth
Banks/Torres	4,849	4.7	6,045	4.3	-0.4	2.1
Santo/Malo	17,276	16.6	24,710	17.7	+1.1	3.5
Ambae/Maewo	9,501	9.2	10,875	7.8	-1.4	1.3
Malakula	14,800	14.3	19,221	13.8	-0.5	2.5
Pentecost	9,331	9.0	11,437	8.2	-0.8	2.0
Ambrym	6,141	5.9	7,287	5.2	-0.7	1.7
Paama	2,214	2.1	1,761	1.3	-0.8	-2.2
Epi	2,486	2.4	3,651	2.6	+0.2	3.7
Shepherds	4,364	4.2	4,022	2.9	-1.3	-0.8
Efate	15,462	14.9	27,964	20.1	+5.2	5.7
Tafea	17,290	16.7	22,457	16.1	-0.6	2.5
Vanuatu	103,714	100	139,430	100	+6.3	2.9

Note: a) Excludes 657 persons for whom usual residence was not reported.
b) Excludes 45 persons for whom LGR of usual residence was not reported.

6.2 Objectives and Scope

This section begins with an analysis of the internal migration patterns in Vanuatu, focusing attention on the magnitude and trends of internal migration, the characteristics of migrants and on the direction of these movements.

As the contribution of the non ni-Vanuatu resident population to internal migration is not significant the analysis is limited to ethnic ni-Vanuatu migration patterns. The analysis, based primarily on the 1989 and 1979 Census data, builds upon the extensive work carried out earlier using the 1979 Census data (Haberkorn, 1987).

Furthermore, the analysis is based mainly on the data obtained from the question on place of birth, as it facilitates comparison between the 1979 and 1989 Censuses. The data derived from it are thought to be of relatively better quality than the data derived from the other migration questions which were asked in 1989.

While much of the analysis concentrates on migration among local Government Regions (LGR) attention is also paid to inter island migration, and to migration towards Port Vila and Luganville, the two urban centres in Vanuatu.

Section 8 of this report deals with the patterns of urbanisation, the role of internal migration to urbanisation and urban growth, and the differentials in rural-urban characteristics.

6.3 Data and Their Quality

In the 1979 Census, information relating to internal migration was obtained by ascertaining the island of birth and has been tabulated for the defacto population of each of the LGRs. The use of the defacto population should not vitiate the general patterns of internal migration, as the number enumerated in an LGR different from their LGR of usual residence is likely to be very small. However, as has been indicated in the earlier analysis (Haberkorn, 1989) the use of island of birth has affected the volume and patterns of the migration of children. This is because in a fairly significant number of cases, the island of birth reported were those where the hospitals are located and not the island of usual residence of the mother. In other words, part of the migration patterns as recorded by the data are spurious and do not reflect reality.

In comparison, the 1989 Census included a number of questions relating to internal migration. These were:

(i) Residence status at the village or town of enumeration, and year of first arrival;

(ii) Residence one year ago (1988);

(iii) Residence at the time of independence (1980);

(iv) Place of usual residence of mother at the time of birth (in lieu of place of birth).

In addition, an additional question relating to 'home island' was also asked in the 1989 Census which provides information about a persons affiliation towards an island to which he/she traditionally belongs.

The data from the 1989 Census can be potentially very useful in understand the emerging trends and patterns of internal migration. However, it is necessary to evaluate the data before any extensive use can be made of them.

As a first step the percentages of those for whom relevant information is "not stated" are given in Table 6.3. Judging from the percentage not stated (15.5) year of the first arrival data seems to suffer from serious deficiencies. Data relating to 1980 residence are also likely to be of questionable accuracy, though the percentage not stated is considerably smaller (5.3). The not stated categories for other questions are of the order of one percent.

Table 6.3: Number and Percentage of Not Stated, Selected Questions

Questions	Number	Percent
Year of First Arrival	22,146	15.5
Usual Residence (LGR)	45	0.0
1988 Residence	1,762	1.3
1980 Residence	5,363	5.3
Homeplace (ni-Vanuatu)	1,370	1.0
Place of Birth	3	0.0

Source: Computed from: Statistical Office, National Population Census, May 1989. Main Report.

However, net migration for Port Vila and Luganville for the period 1988-1989, based on information relating to 1988 residence shown in Table 6.4, seem to be improbable. Luganville has a net out-migration of 153, while Port Vila gained only 63! The two urban centres have been gaining population due to migration during recent years, as reflected by the rates of growth of population in the two islands of Efate and Santo where the two urban centres are located (Table 6.2). Hence the figures do not seem plausable.

A number of factors could account for this. First, being limited to one year 1988-89, the volume of net migration is likely to be smaller in comparison with a ten year period. The number of the not-stated category of 1988 residence, though relatively small, could affect the figures. Second, as the enumeration was carried out on a minor school holiday and as the majority (400 out of 600) of enumerators were secondary school children, while being usual residents of one of the urban centres, seem to have reported their usual place of residence where they were at the date of enumeration, which in nearly every case was their respective home village or town.[14]

Third, the reporting of 'usual residence' for the population that were resident in institutions seems to have not been followed uniformly. A review of the records indicate that the information was not reported in many cases. While the above factors could affect all migration estimates its relative effect is likely to be more significant for the 1988-1989 estimates, due to the smaller numbers involved.

In view of the above considerations the data from place of birth and/or 'home island' seem to be best suited for the analysis. Even here information on 'home island' relates to one's affinity and would not provide a satisfactory picture of migration which necessarily must involve a change of usual place of residence. Also information on 'home island' refers to the island and cannot be separated for Port Vila and Luganville which constitute only parts of Efate and Santo islands respectively.

Finally, information on place of birth as ascertained in the 1989 Census, theoretically at least, should eliminate/minimise the effect of births taking place at hospitals away from mother's usual place of residence. Therefore, subsequent analysis primarily utilises data derived from information on the place of birth (as elicited by asking question on mother's usual residence). This poses a problem

Table 6.4: Net-migration 1988-1989 to Port Vila and Luganville for those Aged 1 or Over by LGR of Usual Residence

LGR of Residence	Net Migration	
	Port Vila	Luganville
Banks/Torres	+8	-47
Santo(R)/Malo	-19	-80
Ambae/Maewo	-22	-54
Pentecost	-36	+8
Malakula	+25	-14
Ambrym	-15	+48
Paama	+34	+21
Epi	+8	+8
Shepherds	-17	+5
Efate (R)	-11	-17
Tafea	+94	+26
Port Vila		
Urban	-	-27
Semi-urban	-	-30
Luganville		
Urban	+27	-
Semi-urban	+30	-
TOTAL	+63	-153

Source: Computed from Statistics Office, National Population Census, Main Report, Table B12.

of comparability with the 1979 Census, which as noted earlier was affected by the reporting of the place of birth particularly amongst children.

Other limitations are common to data obtained from place of birth and are discussed in detail elsewhere (United Nations, 1970). These include, among others, failure to take account of return migration and multiple movements.

6.4 Overall Levels and Trends

Table 6.5 below presents the volume and proportion of lifetime migrants, defined as those born in an LGR (or island) different from the one in which they were enumerated, amongst the LGRs (and islands) from the 1979 and 1989 Censuses. It can be seen from the figures given in the table that 14.8 percent of the ni-Vanuatu resident population were enumerated in a different LGR in 1989 than their LGR of birth.

The proportion is higher (17.4) if islands are used as the area units. The corresponding figures for 1979 were 15.3 and 18.5 respectively.

Table 6.5: ni-Vanuatu Internal Migrations: Volume and Rates: 1979 and 1989

Area Unit	1979			1989		
	Migrants	Population	Percent	Migrants	Population	Percent
LGR	15,820	103,714	15.3	20,637	139,475	14.8
Island	19,209	103,714	18.5	23,261	139,475	16.7

Source: Special Tabulations, Census of Vanuatu, 1989 and South Pacific Commission, Population of Vanuatu, op cit, 1989.

These figures indicate the following. First, the extent of inter-LGR or inter-island movement is fairly high accounting for approximately one-sixth of the population. Second, migration amongst islands within LGRs is fairly small in comparison with migration amongst islands which also involves movements across LGR boundaries. Third, during the period 1979 - 1989, the extent of population movement seems to have remained fairly steady. The slight decline in percentages may be attributable to the effect of change in the way information on place of birth has been ascertained in the 1989 Census.

6.5 Net Lifetime Migration by LGR and Islands

The impact of these movements is different among different LGRs and islands, and this would affect the pattern of population change and redistribution taking place within Vanuatu. Table 6.6 presents data pertaining to lifetime in, out and net migration in Vanuatu for the years 1979 and 1989.

As can be seen from the table the LGRs of Efate and Santo, where the two urban centres of Port Vila and Luganville are located, are the only ones (with the exception of Epi which shows a slight gain) that have been gaining population due to migration.

Most of the population redistribution due to lifetime migration, amounting to 11,523 persons

Table 6.6: ni-Vanuatu Lifetime In, Out and Net Migration by LGR: 1979 and 1989

LGR of Usual Residence	1979			1989		
	In	Out	Net	In	Out	Net
Banks/Torres	590	582	+8	459	982	-523
Santo/Malo	3,961	2,048	+1,913	5,055	2,030	+3,025
Ambae/Maewo	808	1,593	-785	802	2,028	-1,226
Malakula	1,264	1,638	-374	1,291	2,146	-855
Pentecost	525	1,221	-696	536	1,880	-1,344
Ambrym	991	1,152	-161	404	1,862	-1,458
Paama	520	2,039	-1,519	277	2,168	-1,891
Epi	498	348	+150	569	417	+152
Shepherds	795	1,572	-777	380	2,309	-1,929
Efate	5,273	2,224	+3,049	10,335	1,989	+8,346
Tafea	595	1,403	-808	529	2,826	-2,297
Vanuatu	15,820	15,820	0	20,637	20,637	0
						(+11,523)

Source: Special tabulations, Census of Vanuatu, 1989 and South Pacific Commission, Population of Vanuatu, op cit, 1989.

and comprising 14.8 percent of the resident ni-Vanuatu population, is accounted for by Efate and Santo/Malo. All the other LGRs have been losing population due to migration and in some LGRs like Ambrym and Shepherds the net loss has increased significantly during recent years.

Table 6.7: ni-Vanuatu Lifetime In, Out and Net Migration by Islands: 1979 and 1989

LGR of Usual Residence	Island of Usual Residence	1979			1989		
		In	Out	Net	In	Out	Net
Banks/ Torres	Torres	73	50	+23	49	49	0
	Ureparapara	70	23	+47	34	33	+1
	Mota Lava	192	288	-96	112	404	-292
	Vanua Lava	297	199	+98	328	172	+156
	Mota	59	146	-87	29	119	-90
	Gaua/Santa	347	58	+289	359	86	+273
	Mere Lava	124	389	-265	80	651	-571
Santo/ Malo	Santo	3,403	2,027	+1,376	4,787	1,935	+2,852
	Aore	230	599	-369	405	252	+153
	Malo	1,026	120	+906	387	367	+20
Ambae/ Maewo	Ambae	490	1,553	-1,063	636	1,929	-1,293
	Maewo	579	301	+278	243	176	+67
Malakula	Malakula	1,264	1,638	-374	1,291	2,146	-855
Pentecost	Pentecost	525	1,221	-696	536	1,880	-1,344
Ambrym	Ambrym	991	1,152	-161	404	1,862	-1,458
Paama	Paama	537	1,883	-1,346	284	2,112	-1,828
	Lopevi	-	173	-173	1	64	-63
Epi	Epi	498	348	+150	569	417	+152
Shepherds	Tongoa	310	1,063	-753	217	1,509	-1,292
	Tongariki	142	215	-73	84	273	-189
	Buninga	68	46	+22	21	81	-60
	Emae/Makura	345	270	+75	116	418	-302
	Mataso	37	85	-48	9	95	-86
Efate	Efate	5,638	2,802	+2,836	1,177	2,106	+9,071
	Nguna/Pele	504	257	+247	182	499	-317
	Emau	212	246	-34	91	499	-408
Tafea	Erromango	376	58	+318	102	133	-31
	Tanna	543	1,619	-1,076	603	2,545	-1,942
	Aniwa	69	46	+23	19	92	-73
	Futuna	23	233	-210	61	238	-177
	Aneityum	237	100	+137	45	119	-74
Vanuatu		19,209	19,209	0	23,261	23,261	0
				(6,824)			(12,745)

As each of the LGRs is composed of a number of islands, it would be of interest to examine the migration patterns amongst the islands. Pertinent information for the years 1979 and 1989 are brought together in Table 6.7 above.

In general, the pattern of migration has remained unaltered with Efate and Santo gaining significantly due to migration. Also, the islands which had recorded net lifetime gains until 1979 had registered either a loss or a decline in lifetime gains by 1989. From Table 6.7, all islands south of and including Malakula (except Efate and Epi) have experienced net losses, whereas to the north of Malakula, all islands in the Santo/Malo group and a few other islands have recorded marginal gains due to migration. The lifetime interchange of population due to migration amongst islands, totalling 23,261 persons, represents 16.7 percent of total ni-Vanuatu residents.

6.6 Net Migration During 1979-1989

Utilising the data presented in Table 6.6 it is also possible to estimate net gains or losses due to migration among the LGRs during the intercensal period 1979 and 1989. These estimates are shown in Table 6.8. Once again, Efate and Santo have been the principal gaining LGRs due to migration during 1979 - 1989 with Epi showing marginal gains. All other LGRs have lost their population due to migration.

The net migration can also be decomposed into the contribution made by the in-born and out-born populations as shown in Table 6.8. For each of the LGRs except Efate there has been net out migration among the inborn during the period. For Efate it reflects return migration during 1979-1989 to Efate among the previous out-migrants.

Patterns of migration among the out-born show that a number of LGRs, particularly in the south, have lost from among previous in-migrants to these islands during the period; in other words reflecting higher levels of return or further migration out of these LGRs than what they had gained during the period.

The total redistribution of the population due to migration during 1979-89 amounted to 6,922 persons which, in relation to the resident population, amounts to 5 percent.

Table 6.8: Estimates of ni-Vanuatu Net-Migration during 1979-1989 by LGR of Usual Residence

LGR	Among Inborn	Among Outborn	Net Migrants
Banks/ Torres	-458	-72	-530
Santo/ Malo	-187	+1,490	+1,303
Ambae/ Maewo	-594	+75	-519
Malakula	-672	+153	-519
Pentecost	-781	+64	-717
Ambrym	-825	-488	-1,313
Paama	-333	-191	-524
Epi	-104	+121	+17
Shepherds	-894	-335	-1,229
Efate	+13	+5,589	+5,602
Tafea	-1,563	-7	-1,570
Vanuatu			+6,922

Source: Computed from Table 7.5 using an overall Survival ratio of 0.90.

6.7 Primary, Secondary and Return Migration 1980-1989

Though the reporting of 1980 residence is affected by a relatively high percentage of the not-stated category, the information is used to decompose migrants during 1980-89 into three categories, primary, secondary and return.

Primary migrants are defined as those who reported the 1980 LGR of residence as their LGR of birth but were residing in a different LGR in 1989. Secondary migrants comprise those for whom LGR of birth, 1980 and 1989 residence were all different. Return migrants are those whose 1980 residence differed from their LGR of birth but in 1989 were enumerated in their LGR of birth.

Relevant information is presented in Table 6.9. The table also provides data on non-migrants and those who had migrated prior to 1980 but were at the same LGR in 1980 and 1989. It should be noted that the information provided in the table excludes those born after 1980 and for whom the relevant information was not stated.

Table 6.9a: Distribution of the ni-Vanuatu Resident Population Born After 1980 by Migration Categories by LGR of Residence and Sex.

LGR	Non-Migrants			1980-89 Return Migrants			1980-89 Primary Migrants		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Banks/Torres	1,765	1,867	3,632	134	71	205	48	44	92
Santo/Malo (Rural)	4,134	3,778	7,912	183	152	335	136	192	328
Ambae/Maewo	3,235	3,203	6,438	192	120	312	102	109	211
Pentecost	3,413	3,718	7,131	212	117	329	54	76	130
Malakula	5,860	5,481	11,341	280	169	449	203	261	464
Ambrym	2,277	2,240	4,517	167	94	261	48	56	104
Paama	424	542	966	93	73	166	31	39	70
Epi	1,060	1,003	2,063	57	33	90	128	104	232
Shepherds	1,073	1,272	23,445	131	98	229	40	46	86
Efate (Rural)	1,212	1,122	2,334	194	135	329	138	146	284
Tafea	6,765	7,132	13,897	299	172	471	70	65	135
Port Vila Urban	1,349	1,352	2,701	126	148	274	1,893	1,725	3,618
Semi-Urban	1,678	1,576	3,254	51	42	93	420	289	709
Luganville Urban	392	411	803	205	208	413	809	804	1,613
Semi-Urban	593	565	1,158	55	22	77	361	273	634
VANUATU	35,230	35,262	70,492	2,379	1,654	4,033	4,481	4,229	8,710

Note: Excludes those born after 1980 and those for whom LGR of birth and LGR of residence in 1980 are not stated.

Table 6.9b: Distribution of the ni-Vanuatu Resident Population Born After 1980 by Migration Categories by LGR of Residence and Sex.

LGR	1980-89 Secondary Migrants			Before 1980 Migrants			Total Residents		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Banks/Torres	28	15	43	82	102	184	2,057	2,099	4,156
Santo/Malo (Rural)	94	86	180	165	178	343	4,712	4,386	9,098
Ambae/Maewo	36	47	83	96	102	198	3,661	3,581	7,242
Pentecost	8	19	27	70	95	165	3,757	4,025	7,782
Malakula	86	88	174	166	256	422	6,595	6,255	12,850
Ambrym	18	27	45	45	102	147	2,555	2,519	5,074
Paama	13	11	24	32	54	86	593	719	1,312
Epi	33	41	74	69	86	155	1,347	1,267	2,614
Shepherds	17	21	38	42	68	110	1,303	1,505	2,808
Efate (Rural)	52	51	103	152	168	320	1,748	1,622	3,370
Tafea	41	28	69	57	65	122	7,232	7,462	14,694
Port Vila Urban	365	332	697	2,313	1,906	4,219	6,046	5,463	11,509
Semi-Urban	126	137	263	221	201	422	2,496	2,245	4,741
Luganville Urban	346	311	657	461	391	852	2,213	2,125	4,338
Semi-Urban	118	84	202	279	237	516	1,406	1,181	2,587
VANUATU	1,381	1,298	2,679	4,250	4,011	8,261	47,721	46,454	94,175

Note: Excludes those born after 1980 and those for whom LGR of birth and LGR of residence in 1980 are not stated.

First, if one takes all migrant categories together including return migration, which was not captured by the question on LGR of birth, the number of persons who had ever moved from their LGR of birth totals 23,683 which, when related to the total population given in the table, represents 25.1 percent. In other words, one in four persons (ni-Vanuatu) aged 9 and over in 1989 had moved from their LGR of birth, which is significantly higher than the 14.8 percent referred to earlier, and the comparable figure of 20.9 percent for the 9 years and above.

Of the total number of migrants who changed their LGR of residence during 1980-1989, numbering 15,422; 56.5 percent were primary migrants; 17.3 percent were secondary migrants and 26.1 percent were return migrants. Return migrants during 1980-1989 also comprise 26.9 percent of those who were living in a different LGR in 1980 than their LGR of birth. Among the primary and secondary migrants during 1980-1989 78.5 percent and 67.8 percent respectively had moved to Port Vila and Luganville. Also, if one looks at the distribution of migrants to Port Vila and Luganville during 1980-89; nearly all of it is accounted for by primary and secondary migrants, in other words those originating or born in other LGRs. On the contrary, barring a few exceptions like Epi, migration to other LGRs during 1980-1989 is dominated by return migration.

6.8 Migration Rates

While the above discussion has provided some insights into the patterns of migration and the dominance of Port Vila/Efate and Luganville/Santo as the major centres of destination for migrants, it has not provided much clue to the differentials among the LGRs in terms of the impact that the migration has had on their populations. These can be seen from the rates of in and out migration provided in Table 6.10.

For all LGRs except Efate, Santo and Epi, the rates of in-migration (percent in migrants) are lower than rates of out-migration (percent out-migrants). Among all LGRs, Paama and Shepherds are the two that are losing population heavily due to migration. While Paama has lost nearly 60 percent of the population born in it, for the Shepherds 39 percent of the population has migrated out. For all LGRs the proportion of out-migrants constitute 10-20 percent of the population born in them, except for Ambrym for which it is above 22 percent.

Table 6.10: In and Out Migration Rates by LGR, Vanuatu, 1989

LGR	Rate of In-Migration	Rate of Out-Migration
Banks/Torres	7.6	15.0
Santo/Malo	20.4	9.5
Ambae/Maewo	7.4	16.8
Malakula	6.7	10.9
Pentecost	4.7	14.8
Ambrym	5.5	21.6
Paama	15.8	59.5
Epi	15.6	12.0
Shepherds	9.5	38.9
Efate	37	11.3
Tafea	2.3	11.4
Port Vila	46.7	6.6
Luganville	48.1	2.6
Vanuatu	14.8	14.8

Source: Special tabulations, Census of Vanuatu, 1989 and Table 7.5.

Note: In-migration rates are ratios of lifetime in migrants as percent of resident population. Out-migration rates are ratios of lifetime out migrants expressed as percent of those born in the LGR.

Figures shown separately for Port Vila and Luganville show much higher rates of in-migration, 46.7 and 48.1 percent and very low rates of out-migration, 6.6 and 2.6 percent respectively.

In general when the rates are compared with those provided in SPC (1989), for most southern LGRs the in-migration rates are lower and out migration rates are higher indicative of increasing net-losses due to migration.

These figures indicate that migration is predominantly towards Port Vila and Luganville, and further that there is also a fairly significant proportion of return migrants.

6.9 Rural Out-Migrants by Destination

Table 6.11 presents information on lifetime outmigrants from rural areas who moved to urban areas of Port Vila and Luganville. It clearly demonstrates the fact that migration in Vanuatu is towards Port Vila and Luganville. Together they absorbed 78 percent of rural outmigrants. Port Vila alone has received 54 percent of rural outmigrants, or 69 percent of urban ward migrants.

Looking at by LGR of birth it is seen that in all cases, except Epi, the proportion is well over 70 percent. However, the table also gives an indication of the effect of geographic proximity in urbanward migration. Migrants, to Port Vila and Luganville are predominantly from islands or LGRs located closer to it. For example most (84%) of all rural outmigrants from Tafea moved to Port Vila and only 6 percent moved to Luganville. On the other hand, 55 percent of migrants from Banks/Torres moved to Luganville and only 21 percent moved to Port Vila.

Table 6.11: Distribution of Inter LGR Lifetime ni-Vanuatu Out-Migrants of Rural Origin by Urban Destination.

LGR of Birth	Out Migrants	Destination			
		Urban	Percent	Port Vila	Percent
Banks/Torres	982	744	75.8	208	21.2
Santo/Malo(Rural)	1,112	878	79.0	242	21.8
Ambae/Maewo	2,028	1,587	78.3	866	42.7
Pentecost	1,880	1,438	76.5	783	41.6
Malakula	2,146	1,590	74.1	1,039	48.4
Ambrym	1,862	1,383	74.3	833	44.7
Paama	2,168	1,598	73.7	1,064	49.1
Epi	417	271	65.0	207	49.6
Shepherds	2,309	1,682	72.8	1,597	69.2
Efate(Rural)	1,163	999	85.9	964	82.9
Tafea	2,826	2,549	90.2	2,378	84.1
Vanuatu	18,893	14,719	77.9	10,181	53.9

Source: Special tabulations, Census of Vanuatu, 1989.

Note: Rural areas of Efate and Santo are treated separately.

6.10 Rural In-Migrants by Type of Origin

Data provided in Table 6.12 shows that 57.5 percent of the migrants to rural areas were born in other rural areas and the remainder 42.5 percent was born in urban areas.

Looking at it by LGR of residence it is seen that there are significant variations. For instance migrants to Shepherds and Paama (and also Efate rural areas) are predominantly from Port Vila, reflecting possibly the effect of 'baby migration' that Haberkorn (1989) had described analysing the 1979 Census data. Similarly 55.8 percent of migrants to Banks/Torres were born in Luganville.

Table 6.12: Lifetime Rural ni-Vanuatu Immigrants by Origin

LGR of Residence	In Migrants	Origin			
		Port Vila	Percent	Luganville	Percent
Banks/Torres	459	32	7.0	256	55.8
Santo/Malo(Rural)	1,100	74	6.7	312	28.4
Ambae/Maewo	802	150	18.7	200	24.9
Pentecost	536	117	21.8	126	23.5
Malakula	1,291	191	14.8	157	12.2
Ambrym	404	88	21.8	85	21.0
Paama	277	122	44.0	65	23.5
Epi	569	85	14.9	34	6.0
Shepherds	380	245	64.5	4	1.1
Efate(Rural)	912	384	42.1	20	2.2
Tafea	529	311	58.8	17	3.2
Vanuatu	7,259	1,799	24.8	1,276	17.6

Source: Special tabulations, Census of Vanuatu, 1989.

Table 6.13: Place of Birth of ni-Vanuatu In-Migrants to Paama and Shepherds LGRs

LGR	1979				1989			
	Paama	%	Shepherds	%	Paama	%	Shepherds	%
Efate	190	36	694	83	125	45	303	79
Santo	197	37	31	4	29	80	29	8
Other LGRs	141	27	111	13	26	72	48	13
Total	528	100	836	100	277	100	380	100

Source: Special tables, Census of Vanuatu, 1989 and South Pacific Commission, Population of Vanuatu, op cit, 1989.

While the urban to rural migration may reflect the effect of the location of hospitals where many of the babies from neighbouring LGRs are born, comparing the percentage with that provided by Haberkorn (1989) for 1979 shows that its effect on rural-ward migration has not declined significantly as a result of asking the question on mother's place of residence rather than the place of birth (See Table 6.13).

6.11 Migrant Characteristics

Migrants do not constitute a random sample of the population from which they are drawn. This is because the propensity to move varies with age, sex, educational attainment, skill levels or occupation etc.

Information relating to the age-sex composition of the lifetime migrant and non-migrant population is brought together in Table 6.14. As can be seen from the mid-panel of the table, migrants are heavily concentrated in the age group 20-29. While among migrants this age group accounts for 50-53 percent, among non-migrants it accounts for only 35-37 percent. This difference is compensated by the correspondingly smaller percentage of migrants below age 10.

Table 6.15 provides ratios of lifetime migrants to the total population in the corresponding age group. It is seen from the table that the rate of migration is highest in the age group 20-29 followed closely by 30-39, a pattern reflected among both males and females. The lowest rate is observed in the age group 0-9.

Table 6.14: Age-Sex composition of Life-time inter LGR Migrants and Non-migrants, Vanuatu, 1989

Broad Age Group	Migrants		Non-Migrants	
	Males	Females	Males	Females
	Numbers			
0-9	1,799	1,664	21,390	19,481
10-19	2,854	2,628	12,842	12,198
20-29	3,385	3,344	7,827	8,625
30-39	2,191	1,985	5,628	6,009
40-49	1,227	923	4,250	3,939
50+	1,046	753	6,307	5,303
Total	12,502	11,297	58,244	55,555
	Percent			
0-9	14.4	14.7	36.7	35.1
10-19	22.8	23.3	22.0	22.0
20-29	27.1	29.6	13.4	15.5
30-39	17.5	17.6	9.7	10.8
40-49	9.8	8.2	7.3	7.1
50+	8.4	6.7	10.8	9.5
Total	100	100	100	100

	Sex-Ratio	
0-9	108	110
10-19	109	105
20-29	101	91
30-39	110	94
40-49	133	108
50+	139	119
Total	111	105

Source: Special tabulation, Census of Vanuatu, 1989.
Note: As Efate (Rural) Santo (Rural) Port Vila and Luganville are treated separately figures of inter LGR migration differ from other tables.

As for the differential between males and females Table 6.15 shows that rates of migration among females are also high, but are slightly lower than males in all age groups except 0-9. The sex ratio, defined as the number of males per 100 females, is higher among migrants than non-migrants in all age groups (Table 6.14), except 0-9. Among migrants at older ages the ratios are much higher. At the highly migratory ages of 20-39, the sex ratios among non-migrant populations are well below 100.

The age-sex composition differs between lifetime migrants in urban and rural areas, as can be seen from Table 6.16. It should be pointed out that urban in-migrants in this table include inter urban-migrants, and rural migrants include urban-rural and rural-rural migrants. Migrants to urban areas depict greater age selectivity as a significantly higher proportion are in the age range 20-39. Among urban in-migrants, the sex ratios increase as age increases, reflecting excess male migrants to urban areas at older ages. The table also shows that among rural in-migrants females outnumber males in the migratory ages of 20-49.

Table 6.15: Age, Sex Composition of ni-Vanuatu Urban Population by Migration Status, (Percent)

Age Group	Non-Migrants			Migrants		
	Male	Female	Ratio	Male	Female	Ratio
0 - 4	15.7	14.8	106	2.3	2.2	101
5 - 9	9.6	8.8	108	3.2	2.7	119
10-14	7.1	6.9	103	4.3	3.6	120
15-19	5.3	5.1	102	7.1	6.4	111
20-24	3.6	3.7	99	8.5	7.4	114
25-29	2.9	2.6	112	8.1	7.3	110
30-34	1.7	1.7	103	5.8	5.4	108
35-39	1.5	1.4	105	5.3	3.8	139
40-44	1	0.9	110	3.1	2.1	143
45-49	0.8	0.8	102	2.8	1.5	182
50-54	0.6	0.5	111	1.4	0.8	168
55-59	0.4	0.5	84	1.1	0.8	136
60-64	0.4	0.3	129	0.7	0.5	149
65 +	0.8	0.6	133	1	0.8	130
Total (%)	51.4	48.6	106	54.7	45.3	120
Persons	8,339	7,898		9,531	7,934	

Source: Special tabulations, Census of Vanuatu, 1989.
Note: Urban includes urban and peri-urban areas.

Table 6.16: Age-Sex Composition of Life-Time Inter LGR Migrants and Non-Migrants.

Age Group	Urban In-Migrants					Rural In-Migrants				
	Males	%	Females	%	Ratio	Males	%	Females	%	Ratio
0-9	850	9.4	775	10.3	110	949	27.2	889	23.6	107
10-19	1,884	20.9	1,682	22.3	112	970	27.8	946	25.1	103
20-29	2,799	31.1	2,509	33.3	112	586	16.8	835	22.2	70
30-39	1,803	20.0	1,450	19.3	124	388	11.1	535	14.2	73
40-49	976	10.8	626	8.3	156	251	7.2	297	7.9	85
50 +	699	7.8	487	6.5	144	347	9.9	266	7.1	130
Total	9,011	100	7,529	100	120	3,491	100	3,768	100	93

Source: Special Table, 1989 Census and Table 7.15.
Note: Urban-inmigrants include inter-urban migrants. Rural-inmigrants include inmigrants from urban areas.

7 URBANISATION

7.1 Introduction

Urbanisation is the process whereby an increasing proportion of a population is concentrated in a few places called "urban" which have some specified characteristics or acquire them during the process. It occurs through one of the following ways: (i) an increase in the number of such concentrations or in the size of their areas (urban areas); (ii) an increase in the population living in places designated as urban. The latter takes place due to diferences in the rates of natural increase between rural and urban areas and rural to urban migration. In the case of Vanuatu, it is also affected by international migration, mainly of non ni-Vanuatu migrants to Vanuatu, who are concentrated in urban areas. The process of urbanisation and its underlying factors vary over time and from country to country. Understanding the dynamics of urbanisation is essential for formulating policies and programs and hence for achieving balanced and sustainable development.

The trend and patterns of urbanisation in Vanuatu until 1979 have been analysed in detail by Haberkorn (Population Monograph No.2, South Pacific Commission, 1989). This analysis mentions differences in the boundaries of the two urban/peri-urban areas of Port Vila and Luganville betwen censuses of 1962 and 1979. The boundary definitions for Port Vila were changed again for the 1989 Census. Hence, for the following analysis the boundaries of Luganville and Port Vila as defined in the 1989 census have been adopted. Thus, the urban Port Vila encompasses Port Vila centre and Malapoa reserve, and Luganville covers Luganville centre. The population of these two areas constitute the urban population of Vanuatu.

Table 7.1: Indicators of the Level and Trend of Urbanisation, 1967-89

Indicators		1967	1979	1989
Population:	Total	77,988	111,251	142,944
	Urban	7,772	15,784	26,294
Percent:	Urban	10.0	14.2	18.4

Rate of Growth:	1967-79	1979-1989
Total	3.0	2.4
Urban	5.9	4.9

Note: Including visitors to Vanuatu as of the census dates.
Source: National Population Census 1989, Main Report, Pg. 21

7.2 Level and Trends

Table 7.1 provides data which shows the level of urbanisation, and its change during the successive intercensal periods. It is seen that the level of urbanisation is still low in Vanuatu with less than one-fifth (18.39 percent) of the population living in the urban areas of Port Vila and Luganville. Two decades ago (in 1967) urban population constituted only one-tenth of the total.

It is evident that the pace of urbanisation is fast in Vanuatu, although the level still remains relatively low. The fast pace of urbanisation is shown by the growth in urban population during the period 1967-1989 which was far greater than the growth in the total population. While the total population increased 1.8 times, the urban population registered a 3.3 fold increase.

The high rate of urbanisation is also seen by the differentials in the rate of growth of urban and total population given in the same table. While the total population is increasing at a rate between 2.5-3.0 percent, the urban population is increasing at around double this rate, between 5 and 6 percent annually. The growth of the population in urban areas (Table 7.1) shows a decline from 5.9 percent between 1967-79 to 4.9 percent betwen 1979-89. Nevertheless, the rate of urbanisation remains very high. However, there are differences in the growth rates of the two urban areas of Port Vila and Luganville and these are now looked at in more detail.

7.3 Port Vila vs. Luganville

It would be of interest to examine the relative importance in the process of urbanisation of Port Vila (the capital city) and Luganville, the only two urban centres in Vanuatu. Pertinent data are presented in Table 7.2 below.

It is seen that Port Vila accounted for nearly three quarters of the urban population in 1989 and the remaining population lived in Luganville. From 1979 to 1989 the percentage of population living in Port Vila rose significantly from 67 to 73, indicating the growing importance of Port Vila vis-a-vis Luganville. This is also reflected in the slackening of population growth in Luganville, as is seen from the rates of population growth. While for Port Vila the rate has remained constant at around 5.9 percent, that for Luganville declined from 5.9 percent during 1967-79 to 2.9 percent during 1979-89.

Table 7.2: Relative Contribution of Port Vila and Luganville in Urban Growth, 1967-79

Indicators	1967	1979	1989
Urban Population	7,772	15,784	26,294
Port Vila	5,208	10,601	19,311
Luganville	2,564	5,183	6,983
Percent in			
Port Vila	67.0	67.2	73.4
Luganville	33.0	32.8	26.6
Rate of Growth:	1967-79		1979-1989
Port Vila	5.9		5.8
Luganville	5.9		2.9

Source: National Population Census 1989, Main Report

As we are dealing with the population of constant boundaries, the observed difference is due to differentials in natural increase and net-migration. It would be of interest to examine the contribution of these two components to population growth in the two urban areas of Vanuatu.

7.4 Components of Urban Growth

The available data are not adequate to get a precise estimate of the contributions of natural increase and net-migration for Vanuatu, as for most other countries. Such estimates require either accurate data on births and deaths from the civil registration system or data on lifetime migrants for fixed urban boundaries in the successive censuses and an accurate estimate of overall survival ratio(s).

In the absence of these data we would assume that the natural increase for Port Vila and Luganville is the same as the rate of ni-Vanuatu population growth during 1979-89. The resulting estimates of the components of urban growth are shown in Table 7.3.

Table 7.3: Components of Urban Growth, Vanuatu, 1979-89

Indicators	Total Urban	Port Vila	Luganville
Population			
1979	15,784	10,601	5,183
1989	26,294	19,311	6,983
Total Growth	10,510	8,710	1,800
Natural Increase	5,100	3,425	1,675
Net-Migration	5,410	5,285	125
% of Growth:			
Natural Increase	48.5	39.3	93.1
Net-Migration	51.5	60.7	6.9

Source: Computed using data given in Table 8.2 and an assumed natural increase of 2.7%.

The results are not surprising for Vanuatu as a whole. Both natural increase and net-migration have contributed fairly equally to the total growth. However, the situation is quite different for the cities of Vila and Luganville. While for Port Vila over 60 percent of the growth is due to migration, for Luganville the contribution of migration is less than ten percent.

Unless the rate of natural increase differs significantly from the rate of ni-Vanuatu population growth and between the two urban areas, the estimates shown above are likely to be close to reality. However, in examining urban growth and its components, use of constant boundaries might provide not so satisfactory answers, as the boundaries do not remain fixed. Major changes may be taking place in the urban periphery which would be masked by the use of constant boundaries.

Some clue to this can be had from the data given in Table 7.4, which gives a comparison of selected indicators for Vila and Luganville centres, and for the islands of Efate and Santo where they are located.

Table 7.4: Population Growth and its Components, 1979-1989

Indicators	Efate	Port Vila	Santo	Luganville
Population Growth	12,401	8,710	7,397	1,800
Natural Increase	4,996 (5,882)	3,425	5,582 (5,783)	1,675
Net-Migration	7,405 (6,519)	5,285	1,815 (1,614)	125
Percent	100	100	100	100
Natural Increase	40.3 (47.4)	39.3	74.6 (78.1)	93.1
Net-Migration	59.7 (52.6)	60.7	25.4 (21.9)	6.9

There are two sets of figures presented for Efate and Santo. Figures in paranthesis are based on estimates of net-migration to the respective islands from place of birth data, given in Table 7.7 on page 45. Other sets of figures are based on the assumption that the rate of natural increase in Efate and Santo is the same as the rate of growth of the ni-Vanuatu population. Though the two sets of estimates differ, what is significant is the contribution of net-migration. Net-migration for Luganville is significantly higher when the island is used as the unit/area, reflecting the fact that the effect of migration in is more pronounced for areas outside of Luganville than in the town proper. Yet, the contribution of migration to Luganville growth is much less in comparison with that of Port Vila.

7.5 Effect of non ni-Vanuatu Population

It has been noted earlier in the chapter that the movement in and out of Vanuatu of non ni-Vanuatu population has had its effect on the levels and trends of population growth. Its effect is greater for Port Vila and Luganville than for other parts of Vanuatu, as a majority of the non ni-Vanuatu population reside in these two towns and of these the majority are in Port Vila.

Table 7.5: Composition of Resident Population of Port Vila and Luganville by Ethnic Groups, 1989

Category	Port Vila		Luganville	
ni-Vanautu	16,827	87.7	6,659	95.4
Non ni-Vanuatu	2,078	12.3	306	4.6
Total	18,905	100.0	6,965	100.0

For instance, of the 3,469 non ni-Vanuatu enumerated in 1989, 2,384 or 68.7 percent are in Vila and Luganville of which 87.1 percent are in Vila alone.

It was also seen from earlier discussion that during 1979-89 the non ni-Vanuatu population had in fact declined. Comparable data are not available to ascertain the impact of this outward movement on the population growth of Vila and Luganville. Such data, if available, would have facilitated more accurate assessment of the components of urban growth which takes account of the effect of international migration.

7.6 Migrant Origins

Earlier analysis of internal migration has already pointed out the dominance of Vila and Luganville in internal migration of Vanuatu. In this section we shall look at the distribution of lifetime migrants to Port Vila and Luganville by islands of birth using information on the ni-Vanuatu population. Data relating to lifetime in-migration and net-migration to Port Vila and Luganville are shown in Table 7.6.

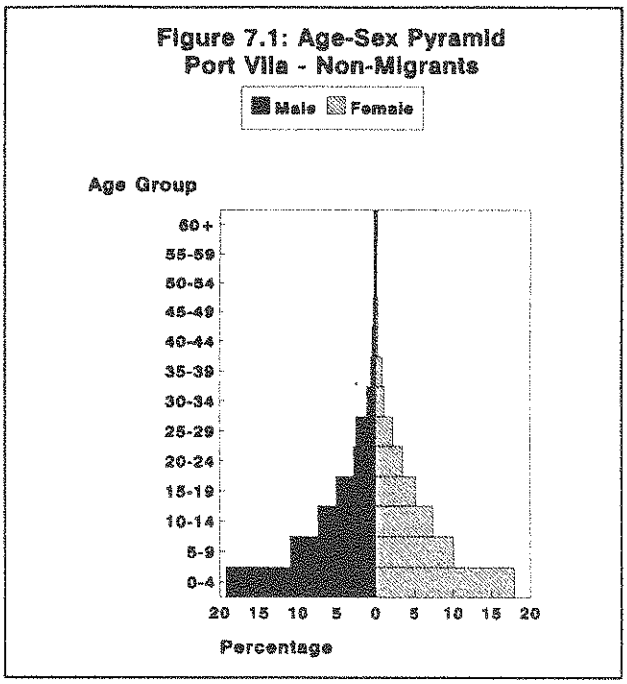
It is clear that islands that are located in the centre part of Vanuatu, viz, Ambae, Malakula, Pentecost, Ambrym, and Paama together have contributed the most significant share of the migrant population, accounting for 46.6 percent of population gains to Port Vila. In the case of Port Vila the remainder is accounted for by migrants from other islands in the southern part of the country, but most importantly Tanna (17.8 percent), and Tongoa (11.3 percent). This shows the attractiveness of Port Vila compared to most islands, including Luganville itself.

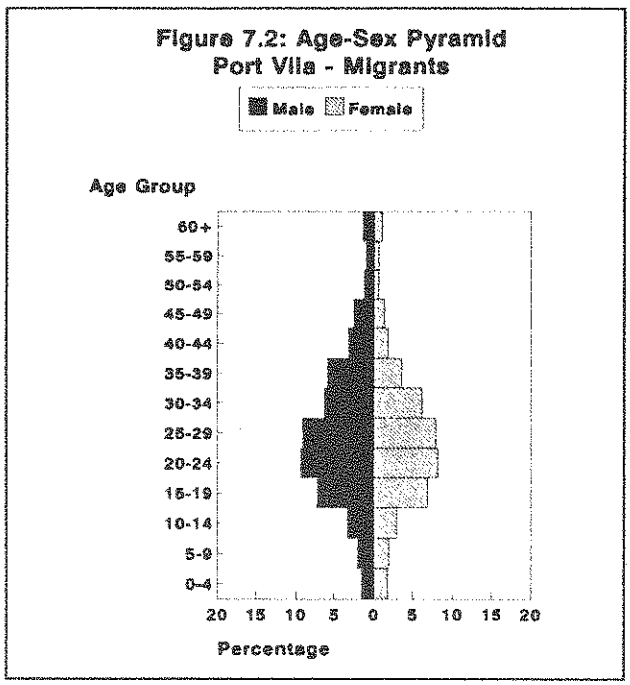
Table 7.6: Lifetime Migrants and Net Migrants to Port Vila and Luganville by Island of Birth, 1989

LGR	Island	In Migrants		Net Migrants	
		Port Vila	Luganville	Port Vila	Luganville
Banks/ Torres	Torres	9	16	-7	11
	Ureparapara	1	10	-1	-7
	Mota Lava	77	103	-61	-99
	Vanua Lava	21	69	-13	10
	Mota	14	12	-14	-6
	Gaua/Santa Maria	7	26	-3	10
	Mere Lava	58	158	-6	-137
Santo/ Malo	Santo	160	293	-81	-60
	Aore	46	57	-29	31
	Malo	81	115	-63	-44
Ambae/ Maewo	Ambae	794	476	-66	-325
	Maewo	34	51	-26	-25
Malakula	Malakula	919	400	-751	-243
Pentecost	Pentecost	714	493	-598	-384
Ambrym	Ambrym	588	382	-505	-326
Paama	Paama	989	372	-872	-312
	Lopevi	7	9	-7	-9
Epi	Epi	181	48	-99	-29
Shepherds	Tongoa	939	56	-826	-53
	Tongariki	129	1	-97	0
	Buninga	44	1	-33	-1
	Emae/Makura	318	7	-252	-7
	Mataso	74	1	-66	-1
Efate	Efate	557	26	-114	41
	Nguna/Pele	346	10	-237	-6
	Emau	243	9	-181	-8
Tafea	Erromango	66	2	-42	-1
	Tanna	1,531	103	-1,298	-95
	Aniwa	26	4	-21	-4
	Futuna	131	5	-113	-5
	Aneityum	51	6	-37	-6
Port Vila		-	293	+7,280	161
Luganville		454	-	-161	+1,929
Vanuatu		9,609	3,614	-	-

Note: Excluding those for whom islands of birth were not stated

Table 7.7: Population of Port Vila and Luganville by Migrant Status, Age and Sex, 1989						
Age Group	Born in (Non Migrant)			Adjusted Population		
	Male	Female	Sex Ratio	Male	Female	Sex Ratio
Port Vila						
0-4	19.2	18.0	103	106	1.8	87
5-9	11.0	10.1	109	2.1	2.0	105
10-14	7.4	7.4	100	3.4	3.0	113
15-19	5.1	5.2	99	7.2	6.9	105
20-24	2.9	3.5	83	9.4	8.2	115
25-29	2.5	2.3	108	9.1	8.0	114
30-34	1.1	1.1	100	6.3	6.2	102
35-39	0.6	0.9	64	5.9	3.6	164
40-44	0.4	0.3	140	3.2	1.9	164
45-49	0.3	0.3	85	2.6	1.4	187
50-54	0.2	0.1	178	1.2	0.7	158
55-59	0.2	0.1	157	1.0	0.7	147
60+	0.2	0.2	122	1.4	1.1	121
TOTAL	51.1	49.5	102	54.4	45.5	119
Luganville						
0-4	20.0	16.7	119	2.6	2.6	100
5-9	12.1	9.9	123	5.0	3.7	135
10-14	7.9	8.1	97	4.3	4.1	105
15-19	4.6	5.8	79	5.3	6.0	88
20-24	3.4	2.7	124	7.3	6.5	111
25-29	1.9	1.9	100	7.1	6.9	103
30-34	1.0	1.1	93	6.2	5.4	115
35-39	0.6	0.4	150	4.6	4.5	101
40-44	0.3	0.2	160	3.1	3.3	136
45-49	0.3	0.2	133	3.0	1.7	173
50-54	0.1	0.1	-	1.7	0.8	213
55-59	-	-	-	1.2	0.9	126
60+	0.3	0.1	-	1.7	1.4	123
TOTAL	52.5	47.2	111	53.1	46.8	113





7.7 Migrant Non-Migrant Differentials

Migrants do differ from non-migrants with respect to the characteristics of the population at origin as well as destination. In this section we shall examine how migrants differ from non-migrants at the place of destination, ie Port Vila and Luganville. Only differentials with respect to age, sex, education and economic activity are considered.

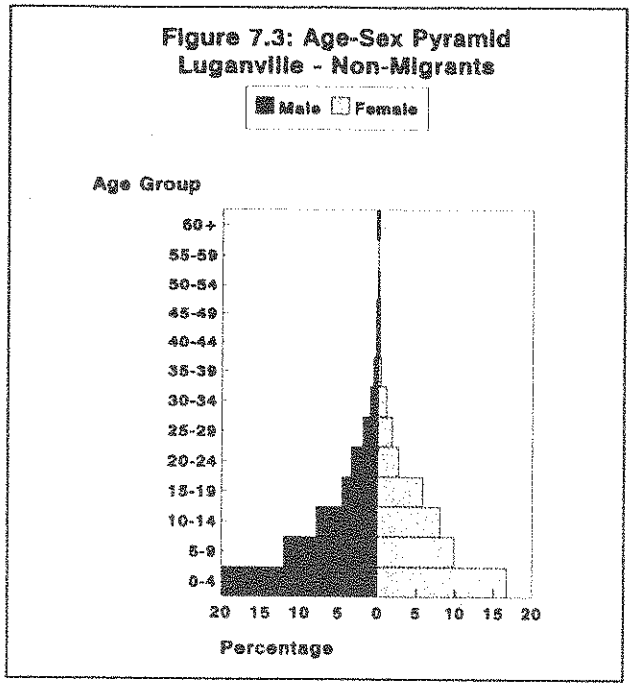
(a) Age-Sex Differentials

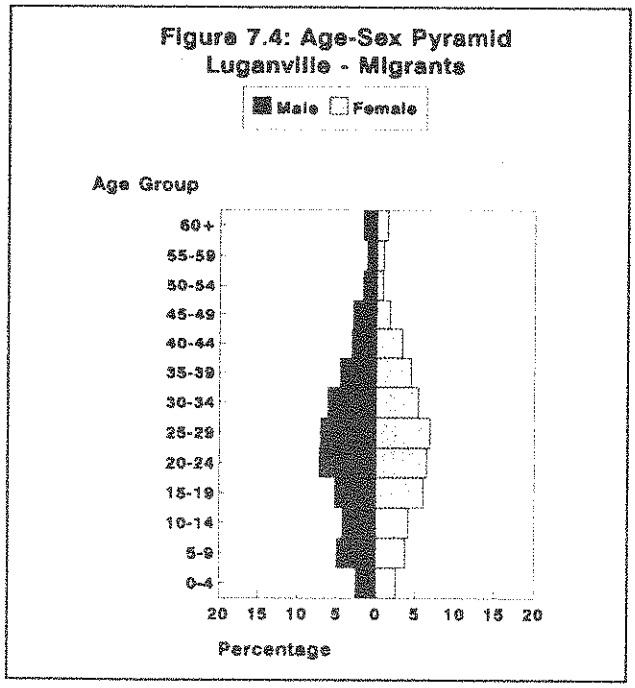
Table 7.7 above provides data on the age-sex composition of the resident ni-Vanuatu population according to their migrant status. The differences are also clearly portrayed in Figures 7.1 and 7.2 above for Port Vila and 7.3 and 7.4 below for Luganville.

It can be seen that the age-structure of migrants and non-migrants differ markedly in both Port Vila and Luganville, which reflect the preponderance of those in the age range 15-35 among the migrants. The extremely high proportion of children, particularly in the age range 0-4, is due to the fact that, as per definition, children born in urban areas to migrants are treated as non-migrants. A comparison of the data presented here with that presented by Haberkorn (Population Monograph No.2, South Pacific Commission, 1989) shows an increase in the proportion below age 10, possibly reflecting indirectly the effect of an increasing trend in migration of young adults and their children born in the cities being counted as non-migrants.

The data also reveal an excess of males over females among migrants to Port Vila as shown by the higher adjusted population sex ratio given in Table 7.7 earlier. No such differential is apparent in the case of Luganville. The excess of males among non-migrants in Luganville, (sex ratio of 111) vis-à vis those in Port Vila (sex ratio: 102) is mainly due to the differences in the age below 10, which is most likely due to differentials in coverage or errors of age reporting or both. The higher sex ratio at older ages in both places could be attributable to higher rates of return migration of females to their home islands at older ages.

In general it can be stated that in Vanuatu, females as well as males migrate to cities, and that there is a slight excess of males in the process. Furthermore, females tend to return to their home islands at older ages as compared to males.





(b) Educational and Economic Activity Differentials

Data pertaining to these differential are given in Table 7.8 below for Port Vila. The analysis can be extended further to include five year age groups, and Luganville but the numbers involved are too small to be meaningful. The general pattern is discernible from the information given in the table.

In general the level of education for Port Vila is low, and female education is even lower. However, within these low levels migrants in general are better educated than non-migrants. In other words a higher percentage of migrants have higher levels of education than non-migrants, both among males and females. The difference may be more marked among more recent migrants and younger cohorts.

Table 7.8: Differentials in Education and Economic Activity Among Port Vila ni-Vanuatu 10 Years Old and Over By Migrant Status, and Sex

Category	Non-Migrants		Migrants	
	Males	Females	Males	Females
	Education			
No School Certificate	37.1	38.4	33.4	41.9
Primary	39.5	47.1	33.4	35.2
Forms 3 & 4	16.5	13.6	20.4	21.7
Higher	6.9	0.9	12.8	1.2
TOTAL	100.0	100.0	100.0	100.0
	Economic Activity			
Economically Active	54.9	52.3	79.3	65.9
Unemployed	2.6	1.7	2.1	0.7
Inactive	42.4	45.9	18.5	33.4
TOTAL	100.0	100.0	100.0	100.0

Also seen in the Table 7.8 is the fact that a significantly higher proportion of migrants are reported to be economically active than non-migrants. Though the data refer to those 10 years and over, the difference may be partly due to a difference in the age structures. A greater concentration of non-migrants between ages 10-19, and a higher proportion of them being in school in comparison with the migrants could partly account for this difference.

7.8 Summary and Policy Implications

The proceeding analysis has indicated that internal migration in Vanuatu has been gaining momentum and that a large part of this movement is toward the urban areas of Port Vila and Luganville; with Port Vila absorbing an overwhelming proportion of urbanward migrants. It is also clear that net out migration from most islands/LGRs has drained part of the natural increase, and in a few it has even exceeded the growth due to natural increase. This has contributed to the declining share of the population in most of the islands, though in absolute terms the population has been increasing in most islands/LGRs except Paama and Shepherds where the population is declining.

Migration in Vanuatu also has been highly selective of young adults in the age range 15-29, with obvious impacts on the age-structure of both sending and receiving areas. Sex selectivity has not been very pronounced as both males and females have been migrating to Port Vila and Luganville in search of better economic opportunities. In general the pattern of population mobility in terms of islands of origin has also remained unchanged.

Continued and unabated movement of people towards Port Vila and Luganville is to be expected in the future and the challenge for planners and policy makers would be to provide employment, education, health and other facilities, and to improve the infrastructure and related services to the growing number of people in the urban areas and at the same time improve the quality of life in the rural and outer islands. Therefore, development policies and programs must take cognisance of this phenomenon, and population policies and programs, while addressing the important issue of high fertility and population growth, must also pay attention to the interrelated issues of internal migration and urbanisation on the one hand and employment and productivity on the other.

8 CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions and Recommendations

This report presents a demographic and migration analysis of the data from the 1989 Vanuatu National Census. Questions on children ever born, children surviving and date of birth of last live birth provided valuable data in estimating fertility and child mortality. Though a high proportion of non-response to these questions introduces an element of uncertainty, the estimates obtained appear reasonable.

A re-look at the 1967 children ever born and children surviving data provides a downwardly revised estimate of child mortality which fits in better with the estimated level in 1985, in terms of a plausible time trend.

Estimates of fertility and child mortality are also provided for the four rural districts as well as for all Local Government Regions. Child mortality as well as fertility had declined significantly during 1967-79 and 1979-89.

The estimate of adult mortality had to be based on the age-sex distributions of the 1979 and 1989 Census data. Given the quality of the age-sex data per se as well as changes in the quality of data between the censuses, adult mortality estimates are not robust. Certain aspects such as a male advantage in mortality reported for the period 1967-79 had to be rejected. The estimates of adult mortality are at best a broad indication of the mortality prevalent during the inter-censal period. Adult mortality had also declined. The net result of declines in child as well as adult mortality is an increase in the expectation of life of around 5 years during 1967-79 and 1979-89.

The population projections provide clear indications that the population of Vanuatu is likely to have doubled by the year 2017. The population would continue to grow from the year 2009 at an annual growth rate of 2-2.5 percent. This increase also means significant growth of sub-populations such as those of school going and working ages. These observations have clear policy implications.

The report on the demographic analysis of the 1967/1979 Census data clearly highlighted the problems in estimating demographic parameters without appropriate and quality data (Booth, 1985). The report strongly recommends that future censuses include questions that would facilitate improved indirect estimates of demographic parameters. The 1989 Census had gone half way by including questions on children ever born, children surviving and date of birth of last child, but had not included any questions needed for indirect estimates of adult mortality.

The registration of vital events in Vanuatu is not sufficient for estimating vital events. There is no doubt that this system should be improved to bring it to the level where such data could be used in estimating rates of vital events. But this is a long term process. Other data sources such as surveys do have a role in providing demographic estimates. However, a constraint exists for countries such as Vanuatu with a small population size. To obtain estimates of Infant Mortality or Age Specific Mortality rates, for example, with acceptable margins of errors require that a very high proportion of the population is sampled. Surveys with even a 20 percent sample will yield estimates with very high margin of errors, as in the case of the Vanuatu Vital Statistics Survey (Government of Vanuatu, 1992). It is then obvious that national censuses will continue to be the primary sources of data for demographic estimates for some time to come. With this in view, the following recommendations are made:

(i) The next census should include specific questions that will permit estimates of adult mortality. Questions on the survival status of mothers and fathers should be considered for inclusion.

(ii) Questions on child mortality should be expanded to ask sex specific questions as well as questions on those living at home and living elsewhere.

(iii) A question on the survival status of mothers should be followed by enquiring and recording the individual person code number of the mother enabling age of mother to be identifiable.

(iv) The codes on relationship should distinguish adopted from own children. A coding scheme that relates persons to the heads of each nuclear unit in a household rather than to one head of household should be considered.

(v) In a census operation, it is frequently difficult to obtain information from the most appropriate person for a set of questions. For example, answers to children ever born and children surviving are best obtained from the mother herself. Efforts should be made to do this as much as possible.

(vi) In general efforts should be made, through intensive training, to assure a better quality of data. In particular, non-response rates should be kept to a minimum.

8.2 Comparison with Other Countries in the Region

Table 8.1 presents the most recent estimates of vital rates for all the Melanesian countries. Among the Melanesian countries, Solomon Islands and Vanuatu appear to have similar mortality profiles. Child mortality is slightly higher in Vanuatu and adult mortality slightly higher in the Solomon Islands. However fertility in the Solomon Islands is higher than that in Vanuatu by about a child. Adult mortality in Vanuatu is comparable also to that of the Indians in Fiji though the sex difference is much more pronounced among Fiji Indians. Broadly speaking, Fiji and New Caledonia enjoy lower levels of mortality and Papua New Guinea experiences relatively high levels, with Vanuatu and Solomon Islands in between. In fertility also Vanuatu occupies the middle position in the region.

Table 8.1: Vital Rates for Melanesian Countries[6]

Country	IMR	TFR	Expectation of Life	
			Male	Female
Fiji: Fijians	30[1]	3.9-4.1	63.1	65.3
Indians(1986)	29[1]	2.6-2.8	59.6	65.1
New Caledonia: Melanesians	23[2]	4.7[4]	66[5]	
Papua New Guinea	72	5.4	48.8	50.7
Solomon Islands	38	6.4	69.9	61.4
Vanuatu	45[3]	5.3	61.5	64.2

1. Obtained by applying a sex ratio at birth of 105 to the sex specific IMR (Trussel Version) provided in Bureau of Statistics, Fiji, 1989. Refers to 1984.
2. 1981-83.
3. 1985
4. 1981
5. 1978
6. Figures obtained from SPC, 1991, Bakker, 1990 and Bureau of Statistics, Fiji, 1989.

ENDNOTES

1 Questions that would permit direct estimates of child mortality were also asked. These were on the date of birth, sex and current living status of the last live birth. A special question was also asked to make sure that only live births are reported. However, data was not collected on the date of death of last child. This means that we do not know whether a reported death occurred before the child reached its first birth day or after. All deaths that occurred among births in the year preceding census of course occurred to infants. But using the births in the one year preceding census and deaths among these children to estimate Infant Mortality Rate (IMR) will result in under estimating IMR as many of these children can still die as infants after the census. The same problem, though to a slightly lesser extent, will persist even in attempts to estimate child mortality under five or three years. However, applying a formula to convert proportion dead to IMR resulted in an implausibly low estimate and is not considered further.

2 However, the sex ratio of births in 1988, for whom month of birth was not reported, is 116.3 indicating that dates of births of baby girls are slightly less likely to be accurately reported. Though this observation could suggest the possibility that female babies are generally less well reported, the indications are that such a failure to report is not significant, given the overall sex ratio at birth of 108.

3 Nearly 98 percent of children under 6 months and over 70 percent of children under two years of age were reported to be breast-fed according to a 1983 National Nutrition Survey. However, bottle feeding was more prevalent in urban areas. (UNICEF, Vanuatu Government, 1991, pp.41)

4 Another estimate of IMR was made using method developed by Palloni and Heligman (Palloni and Heligman, 1986). This method uses information on mean age at maternity calculated from births in a year by age of mother in addition to CEB and CS data. The IMR obtained was 45 per 1000 in 1985 using General Standard of the United Nations Model Life Tables.

5 For the 1989 census we cannot rule out this possibility as we do not have data beyond age 49. Mean parities in both censuses increase up to age 50.

6 The Age Ratio is defined as:

$$\frac{P_x}{\frac{1}{3}(P_{x-1}+P_x+P_{x+1})}$$

where P_x is the population in age group x.

7 Alternative estimates of fertility could have been obtained by using the relationship code for identifying mothers of children of age 15 or less living in the same household and applying 'own children method' (Censuses do ask a specific question that enquires the living status of mothers and identifies who the mother is in cases where she is present in the household. But Vanuatu census did not ask this question). Though this method was applied to the 1979 census data, changes in the relationship code in the 1989 census precludes such application as it is no longer possible to identify own mothers from the way the data is pre-coded.

8 On the other hand, excluding these women, thereby assuming that these women have the same levels of fertility, would result in much higher levels of error and bias the estimates considerably upwards.

9 The Census date was 16 May 1989. It would have been preferable to have considered all births that occurred after 16 May 1988. Women who were interviewed between 8-15 May would be covered for less than a year but this will be compensated on average by women who were enumerated during 16-22 May. The advantage of this approach is that we do not need to discard births that occurred close to the census and thus more accurately reported. But the Main Report of the Census indicates that more interviews per day might have occurred in the latter half of the census enumeration thus invalidating the assumption of interviews being spread evenly across the enumeration period (Statistics Office, Vanuatu, 1991).

10 A decline in the adjustment factor by age would suggest a decline in fertility. The adjustment factor suggests such a decline up to the age 25 and an indication of increase in fertility in the younger ages. For this reason, the adjustment factor for the ages 25-29 was preferred to be applied.

11 Since the child mortality estimate is available for both sexes combined, the method is applied to children of both sexes combined.

12 The comparison of age distribution of Vanuatu with stable age distribution presented in the section on evaluation of data under C. Adult Mortality and Life Table suggests that age data in general for males may be relatively better suited for this analysis than data for females. But the child mortality estimate is available only for both sexes combined. For this reason, proportion under 15 for both sexes was considered preferable.

13 Non-ni-Vanuatu population was 2.1 percent of Vanuatu's total population in 1989. Due to the nature of this population (a substantial percentage being expatriates working in Vanuatu), it is difficult to project the size of this population in future years and hence not attempted. The percentage of population non-ni-Vanuatu had declined from 6.2 percent in 1979 to 2.1 in 1989.

14 This survey is not representative of Vanuatu and the figures from this survey at best can give only a rough indication.

15 There is no proof of this assertion, but discussions with officials involved in the 1989 census seem to point out that this has been the case.

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