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PREFACE

As part of their respective work programmes, the Economic and Social Commission for Asia and the Pacific (ESCAP) and the South Pacific Commission (SPC) have undertaken the preparation and publication of a series of monographs on the population situation in each interested country in the South Pacific. Each monograph is prepared in close collaboration with country experts and with the financial support of the United Nations Fund for Population Activities (UNFPA) and SPC. The present monograph on Cook Islands is the third in the series. The first on American Samoa and the second on Papua New Guinea have already been published. Work is in progress on similar studies for Fiji, Solomon Islands and Vanuatu. Monographs for the other Pacific countries will be prepared as resources permit.

The purpose of the monographs is to provide a comprehensive picture of past, current and prospective population trends in the countries concerned as well as a basis for measuring such human needs as education, employment, health and family planning, food and nutrition in terms of size, growth, composition and distribution of the population: Another objective is to encourage the maximum analysis and utilization for planning purposes of data collected through periodic censuses, sample surveys, vital registration etc.

All but one of the eleven constituent chapters and the annex of the present monograph were prepared by Dr. Geoffrey R. Hayes, East-West Population Institute, East-West Center, Honolulu, Hawaii. Chapter X on Status of Women in the Cook Islands was prepared by Ms. Pamela Takiora Ingram Pryor, President, Pacific Planning and Research Corporation, Honolulu. Ms. Vicky Ho, Ms. Judith Thom and Ms. Naomi Higa of the East-West Population Institute assisted in the computation of the life tables and population projections and Mr. Michael Levin of the United States Bureau of the Census in the computation of the age-sex-ratios reported in Annex I. Research support for this study was provided by the Economic and Social Commission for Asia and the Pacific (ESCAP) and the East-West Population Institute, East-West Center, Hawaii.

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CONTENTS

		Page
I.	THE COOK ISLANDS: GEOGRAPHY, ECONOMY AND SOCIETY	1
	A. Location, resources and environment	1
	B. Political-administrative history	3
	C. Contemporary socio-economic organization	5
	D. The structure of the economy	7
	E. Education and health	8
	F. Transport and communications	10
II.	PRECOLONIAL POPULATION HISTORY	11
	A. Settlement	11
	B. Prehistoric population dynamics	13
	C. The population at contact	14
	D. Post-contact population change	16
	E. Conclusion	20
III.	POPULATION CHANGE IN THE TWENTIETH CENTURY: GENERAL TRENDS	22
	A. Introduction	22
	B. Population change: growth and decline	23
	C. Components of change	29
	D. Population composition	32
	E. Population distribution	33
	F. Conclusion	33
IV.	COMPOSITION OF THE POPULATION	35
	A. Age composition	35
	B. Sex composition	48
	C. Marital status	52
	D. Households and families	56
	E. Ethnic composition	57
	F. Religion	57
	G. Education and skills	59
	H. Summary and conclusion	61
V.	TRENDS AND DIFFERENTIALS IN FERTILITY	62
	A. Introduction	62
	B. Crude birth rates	63
	C. Age-sex standardized birth rate	64
	D. The general fertility rate	66
	E. Age-specific fertility rates	69
	F. The total fertility rate	75
	G. Census based measure of fertility	76
	H. Reproductivity	78
	I. The determinants of fertility of fertility decline	81
	J. Conclusion	89

CONTENTS *(continued)*

		Page
VI.	**TRENDS AND DIFFERENTIALS IN MORTALITY**	90
	A. Introduction	90
	B. Crude death rates	90
	C. Age-standardized death rates	91
	D. Age-specific mortality	93
	E. Life expectancy	102
	F. Causes of death	111
	G. Conclusion	114
VII.	**POPULATION DISTRIBUTION AND INTERNAL MIGRATION**	115
	A. Population distribution and social goals	115
	B. Distribution by island	116
	C. Distribution by region	118
	D. Distribution within islands	118
	E. Distribution in Rarotonga	118
	F. Determinants of internal distribution	122
	G. Internal distribution and population structure	128
	H. Conclusion	129
VIII.	**EXTERNAL MIGRATION**	131
	A. Introduction	131
	B. Migration in the early colonial period	131
	C. The Makatea period	132
	D. Patterns of mobility and migration since 1965	132
	E. Ethnic differences in migration patterns	139
	F. Net emigration losses 1966-1981	141
	G. Geographical variations in external migration	142
	H. Age and sex selectivity	146
	I. Determinants of external migration	151
	J. Consequences of external migration	156
	K. The population of Cook Islanders in New Zealand	159
	L. The future of migration	164
	M. Conclusion	168
IX.	**POPULATION AND ECONOMIC ACTIVITIES**	169
	A. Introduction	169
	B. The "working age" population	169
	C. The economically active population	171
	D. Actively engaged by age and sex	173
	E. Occupational status	173
	F. Sectoral distribution of the economically active population	181
	G. Regional variations	184
	H. Distribution by occupation	187
	I. The labour force and socio-economic development	192

CONTENTS *(continued)*

Page

X. THE STATUS OF WOMEN IN THE COOK ISLANDS 194

A. Introduction 194
B. Traditional status and rights of women 194
C. Political and civil rights of women 196
D. Employment, education and maternity 197
E. Conclusion 201

XI. POPULATION PROJECTIONS 202

A. Introduction 202
B. Past projections 202
C. Population projections 1981-2001 205
D. Projection assumptions and rationale 206
E. Projection results 209
F. The labour force 210
G. Conclusions 210

Annex

I. SOURCES AND QUALITY OF DEMOGRAPHIC DATA 212

A. Sources of demographic data 212
B. Accuracy of census data 214

Figures

Page

Chapter III

Figure 1. Cook Islands population change by region, 1901-1981 24
2. Crude rates of birth, death and natural increase, 1902-1981 24

Chapter IV

Figure 3. Population pyramids of total population 1961, 1971 and 1981 38
4. Population pyramids of Rarotonga, 1971 and 1981 43
5. Population pyramids of southern outer islands, 1971 and 1981 44
6. Population pyramids of northern outer islands, 1971 and 1981 45

Chapter V

Figure 7. General fertility rate by region, 1936-1981 67
8. Age-specific fertility rates in the Cook Islands, 1961-1981 70
9. Age-specific fertility rates in Rarotonga, 1961-1981 70
10. Age-specific fertility rates in southern outer islands, 1961-1981 73
11. Age-specific fertility rates in northern outer islands, 1961-1981 74
12. Age-specific fertility rates by region, 1974-1978 74
13. Age-specific fertility rates by region, 1979-1981 74
14. Percentage of mothers unmarried by age group and region, 1976 84
15. Percentage of mothers unmarried by age group, 1961 and 1976, Cook Islands 85

Chapter VI

Figure 16. Infant mortality rates by region, 1928-1981 95
17. Male life expectancy by age, 1974-1978 and 1979-1981 for Rarotonga and the outer islands 109
18. Female life expectancy by age, 1974-1978 and 1979-1981 for Rarotonga and the outer islands 110

Chapter VIII

Figure 19. Net migration of Cook Islands Maori, 1946-1980 134
20. Net migration of Cook Islands Maori by sex and quarter, 1967-1978 136
21. Net emigration of Cook Islands Maori by age group, 1971-1978 147
22. Net migration by age and region, 1971-1976 150
23. Net migration by age and region, 1976-1981 151

Tables

Page

Chapter I

1. Person/land ratios by island and region in 1981 by quality of land 2
2. Gross population density of selected island countries 3
3. Percentage distribution of the gross domestic product by industrial sector, 1970-1978 7

Chapter II

4. Some estimates of the populations of the Cook Islands at the time of European contact 15
5. Estimated northern-group population change, 1850-1877 17
6. Estimated population change in the nineteenth century 19

Chapter III

7. Cook Islands population change by island and region, 1902-1981 26
8. Average annual rates of population change by region, 1902-1981 27
9. Population change, 1971-1976 and 1976-1981 27
10. Crude rates of birth, deaths and natural increase 1902-1981 28
11. Population change in long, medium and short term perspectives by island and geographical region 29

Chapter IV

12. Numerical and percentage distribution of total population by age, 1956-1981 36
13. Percentage distribution of the Cook Islands population by age group and sex, 1956-1981 39
14. Population in three age groups by region and sex, 1956-1981 40
15. Population in young adult age groups, 1966-1981, by region 42
16. Changes in dependency ratios by island and region, 1966-1981 46
17. Child and aged dependency ratios by region and island, 1961-1981 47
18. Sex composition of the Cook Islands population, 1916-1981 48
19. Age-specific sex ratios, 1956-1981 49
20. Sex-ratios by island and region, 1956-1981 50
21. Sex ratios by age-group and region, 1956-1981 51
22. Sex ratios of live births by region 52
23. Marital status by sex, 1956-1981 53

Tables *(continued)*

		Page
24.	Changing proportion of the population never married by age, sex and region, 1956-1981	54
25.	Percentage of the population by relationship to head of the household, 1976	55
26.	Occupants per dwelling by islands, 1966-1981	56
27.	Ethnic composition of Cook Islands population, 1956-1981	58
28.	Religious affiliation of Cook Islands population, 1956-1981	59
29.	High school enrolment by form and year, 1969-1977	60
30.	Population receiving vocational training or other tertiary education, 1966 and 1976	61
Chapter V		
31.	Crude birth rates and age adjusted birth rates by region, 1945-1981	63
32.	Crude birth rates by island and region, 1966-1981	64
33.	General fertility rates by region, 1936-1981	66
34.	Age-adjusted general fertility rate by region, 1961-1981	67
35.	General fertility rates by island, 1966-1981	68
36.	Females by age group in child-bearing age range, 1961-1981	69
37.	Average annual rates of change in the age-adjusted general fertility rate by region, 1966-1981	69
38.	Age-specific fertility rates by region, 1961-1981	71
39.	Percentage change in age-specific fertility rates and total fertility rate, 1966-1971, 1971-1976 and 1976-1981, by region	72
40.	Age-specific fertility rates in the Cook Islands compared with selected Pacific Island countries around 1976	75
41.	Child-woman ratio, 1936-1981	76
42.	Average number of children born alive by age group of the mother and region of the Cook Islands, 1956-1976	77
43.	Distribution of first births by age of mother, 1966-1976	77
44.	Percentage distribution of women by parity and age, 1966 and 1976	78
45.	Crude rates of natural increase, 1966-1981, by region	79
46.	Gross reproduction rates and net reproduction rates by region, 1966-1981	80
47.	Intrinsic growth rate by region, 1966-1981	80
48.	Proportion of females aged 15-44 never married by age group and region, 1966-1981	83
49.	Percentage of mothers unmarried by age group and region, 1976	84

Tables *(continued)*

			Page
	50.	Attendance at gynecology clinic for purposes of family planning (Rarotonga)	86
	51.	Percentage of female population aged 15-44 economically active by age group and region, 1966-1981	88
Chapter VI			
	52.	Crude death rates by region, 1902-1981	92
	53.	Age standardized death rates by region, 1966, 1976, 1981	92
	54.	Trends in infant mortality by region, 1928-1981	94
	55.	Regional trends in infant mortality, 1964-1981 in moving averages	96
	56.	Age-specific mortality rates, total population, 1946-1981	97
	57.	Age-specific mortality rates by region, 1979-1981	98
	58.	Male age-specific mortality rates by region, 1979-1981	99
	59.	Female age-specific mortality rates by region, 1979-1981	100
	60.	Male mortality rates in 10-year age groups in 1971 and 1981 by region	101
	61.	Changes in life expectancy at birth by region, 1945-1981	102
	62.	Abridged life table for Cook Islands total population, 1974-1978	103
	63.	Abridged life table for Rarotonga, 1974-1978	104
	64.	Abridged life table for outer islands, 1974-1978	105
	65.	Abridged life table for Cook Islands total population, 1979-1981	106
	66.	Abridged life table for Rarotonga, 1979-1981	107
	67.	Abridged life table for outer islands, 1979-1981	108
	68.	Principal causes of death in the Cook Islands, 1976-1978, all ages	111
	69.	Principal causes of death in Rarotonga and the outer islands, 1973-1974 and 1977-1978: percentages and death rates per 100,000 by cause	113
	70.	Causes of infant mortality, 1971-1974 and 1975-1978	114
Chapter VII			
	71	Percentage population distribution by island, 1936-1981	116
	72.	Percentage distribution of the population within regions, 1936-1981	117
	73.	Cook Islands population change by census district, 1971-1981	119
	74.	Population of Rarotonga by census district and sex, 1976-1981	121
	75.	Growth of Avarua town area of Rarotonga, 1945-1981	122
	76.	Estimated net migration in Rarotonga, 1902-1981	123

Tables *(continued)*

		Page
77.	Rarotonga's population composition by birthplace, 1906-1976	124
78.	Rarotonga's population by place of birth, 1966-1976	125
79.	Internal lifetime migration in the Cook Islands, 1976	126
80.	Internal migration between outer islands and Rarotonga, 1966-1976	127
81.	Percentage of the population enumerated in their home island or region by island, 1956-1976	128
82.	Regional distribution of three age groups, 1956-1981	129
Chapter VIII		
83.	Net migration of Cook Islands Maori: five-year averages, 1926-1980	133
84.	Net migration and crude net migration rates for Maori and total population, 1966-1981	135
85.	Migration intentions of Cook Islands-born arrivals in New Zealand, 1966-1981	136
86.	Arrivals in the Cook Islands by ethnicity and residential status, 1975-1981	137
87.	Maori migration by intended length of stay and absence by place of usual residence, 1978	138
88.	Maori visitor arrivals and resident departures by purpose of visit, 1978	139
89.	Net intercensal migration of Maori and Non-Maori population	140
90.	Cook Islands net migration by ethnicity, 1966-1980	141
91.	Estimated net intercensal migration, 1966-1981: vital statistics method	142
92.	Intercensal net migration by region and sex, 1966-1981	143
93.	Intercensal net migration by island and sex, 1971-1981	144
94.	Total and average annual net migration and natural increase compared by region and island, 1966-1981	145
95.	Net Maori migration in seven "life stage" age groups, 1971-1978	146
96.	Comparison of net emigration stream with base population by age group and region, 1971-1976	148
97.	Comparison of net emigration stream with base population by age group and region, 1976-1981	149
98.	Net Maori migration by sex and seven "life stage" age group, 1971-1978	152
99.	Sex ratios of 1971-1981 emigration stream by region compared with 1976 population	153
100.	Projected numbers attaining age 17, 1966-1981 assuming no emigration	153
101.	Average hourly wages in New Zealand and the Cook Islands by industry, 1975 and 1980	155

Tables *(continued)*

Page

102. Differences between the expected and achieved rates of population growth, 1966-1981 157

103. Percentage of the expected and enumerated population in 1981 by age group and region 158

104. Cook Islands population distribution in 1981 with and without emigration from 1966 159

105. The destination of Cook Islands Maori migrants: departures from the Cook Islands compared with arrivals in New Zealand, 1972-1981 160

106. Cook Islands-born persons departing New Zealand permanently or long-term in proportion to permanent and long-term arrivals in New Zealand 161

107. The Cook Islands-born population of New Zealand, 1936-1981 161

108. Cook Islanders residing in the Cook Islands and New Zealand, 1936-1981 162

109. Average annual growth rates of four components of the Cook Islands Maori population, 1936-1981 and their proportion of the total 163

Chapter IX

110. The working age population, 1956-1981, by island and region 170

111. The economically active population by region and sex, 1956-1981 172

112. Economic activity rates by age and sex, 1966-1981 (total Cook Islands) 174

113. Economic activity rates by age and sex for Rarotonga, 1966-1981 175

114. Economic activity rates by age and sex for outer islands, 1966-1981 176

115. Economically active by occupational status and region, 1966-1981 177

116. Percentage economically active by occupational status and region, 1966-1981 178

117. Occupational status of the economically active population by sex, 1966-1981 179

118. Percentage distribution of economically active by occupational status and sex, 1966-1981 180

119. Distribution of the actively engaged population by sector, 1966-1981 182

120. Distribution of the actively engaged population by sector and sex, 1966-1981 183

121. Per cent distribution of the actively engaged population by sector and sex, 1966-1981 183

122. Changes in the regional distribution of the economically active population, 1966-1981 184

123. Regional distribution of the labour force by economic sector, 1981 185

124. Distribution of the economically active population by economic sector, region and sex, 1981 186

Tables *(continued)*

Page

125. Distribution of economically active population by major occupational group and sex, 1971-1981 188

126. Distribution of economically active population by major occupational group, region and sex, 1981 189

127. Percentage distribution of economically active population by occupational group, region and sex, 1981 190

128. Changes in major occupational groups, 1966-1981, Rarotonga and outer islands ... 191

129. Private and non-private employment in Rarotonga, 1966-1981 193

Chapter X

130. Employment status by sex, Cook Islands, 1966-1981 197

131. Distribution of economically active population by occupational classification and sex, 1981 198

132. Distribution of economically active population by industrial sector and sex, 1981.. 199

133. Proportion of males and females in selected Rarotonga occupations, 1981 199

Chapter XI

134. Parameter assumptions of Phillips' population projections, 1966 203

135. Population projections from 1966-1981 compared with enumerated population ... 204

136. Assumptions used in population projections, 1981-2001 206

137. Projected populations by region under five separate assumptions, 1981-2001 208

138. Average annual growth rates implied in various population projections, 1981-2001 by region 209

139. Labour force growth 1981-1996 under five assumptions: population age 15-64 showing percentage change from 1981 210

140. Dependency ratios under five projection assumptions in 1996, by region 210

Annex I

141. Census and vital data compared 1976-1981, total population 216

142. Expected and enumerated population under age 1 on 1 December 1981, total population 216

143. Expected and enumerated population under age 1 on 1 December 1981, for Rarotonga 216

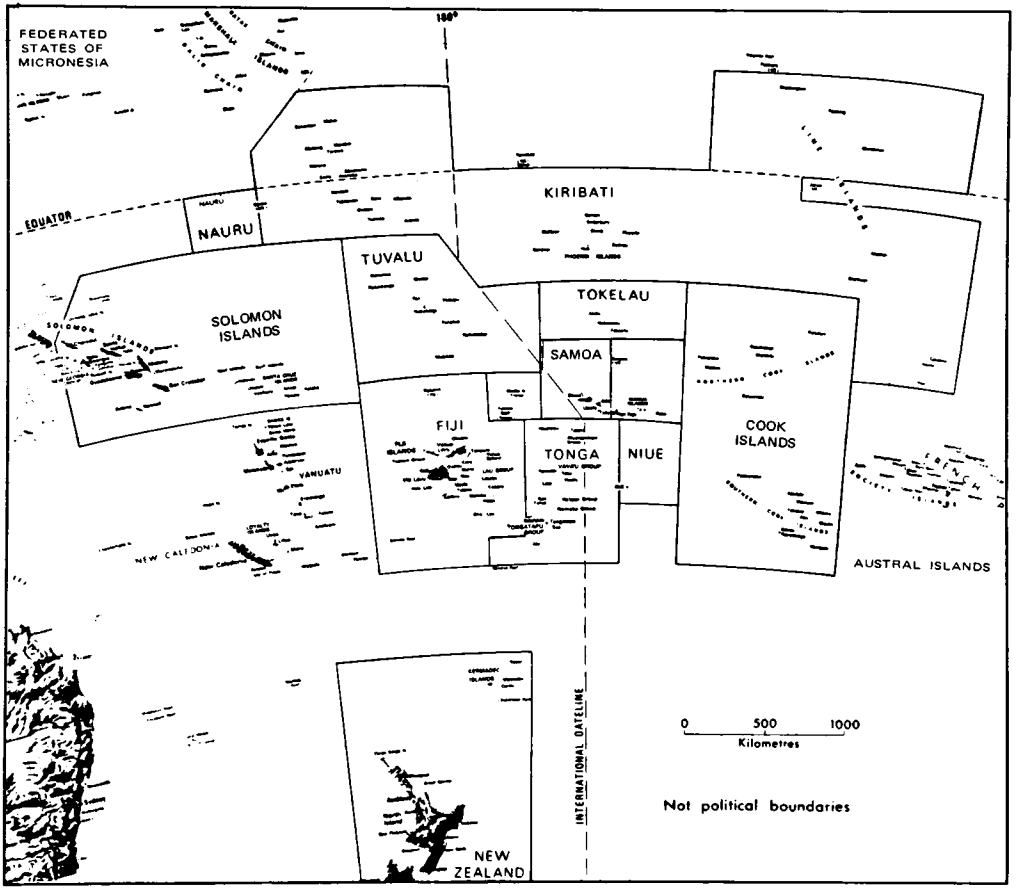
144. Expected and enumerated population under age 1 on 1 December 1981, for outer islands 217

145. Calculation of age-accuracy index, total Cook Islands, 1981 census 218

146. Age-accuracy index by sex and region, 1981 census 219

Tables *(continued)*

		Page
147.	Calculation of United Nations age-sex accuracy index, total Cook Islands, 1981 census	219
148.	United Nations age-sex accuracy index by region, 1981 census	220
149.	Calculation of A. Das Gupta's grouped age-sex accuracy index, total Cook Islands, 1981 census	221
150.	Das Gupta's grouped age-sex accuracy index by region, 1981 census	222
151.	Summary of age-sex accuracy indices, 1966, 1976 and 1981	222
152.	Indexes of age preference by region and sex, 1981 census	222



Map 1. The South Pacific.

Chapter I

THE COOK ISLANDS : GEOGRAPHY, ECONOMY AND SOCIETY

A. LOCATION, RESOURCES AND ENVIRONMENT

The self-governing territory of the Cook Islands consists of 15 islands and atolls spread over a wide area of the South Pacific Ocean approximately mid-way between the Society Islands to the east, American Samoa and Niue to the west. The Cook Islands are bounded to the north by the Line Islands – part of the Republic of Kiribati – and to the southeast by the Austral Islands of French Polynesia (Map 1).

Scattered across an area of more than 2 million sq km of ocean, the Cook Islands has one of the more dispersed populations in the Pacific area.[1] The two most distant islands (Pukapuka and Mangaia) are 1,471 km apart, while the mean distance between the inhabited islands and the administrative centre on the island of Rarotonga is 695 km. Such distances over the sea linking small populations represent a formidable obstacle to the development of efficient transportation and communications.

The islands divide more or less naturally into two geographical groups known locally as the "southern group" (Aitutaki, Atiu, Mangaia, Manuae, Mauke, Mitiaro, Rarotonga and Takutea) and the "northern group" (Manihiki, Nassau, Palmerston, Pukapuka, Rakahanga, Suwarrow and Tongareva[2]). Aside from the sand quay of Takutea and the atoll of Manuae (neither of which are permanently inhabited), all the islands of the southern group are of volcanic formation, part of an undersea mountain chain which originates in the Austral Islands and disappears in the vicinity of Palmerston Atoll. The islands of the northern group are of atoll formation and, with the exception of Palmerston, are located on a raised oceanic shelf known as the "Manihiki Plateau".

Rarotonga, with a total land area of 67.1 sq km (table 1) is the largest, and most populous island and is the administrative centre of government and commerce. The physical configuration of Rarotonga is typical of the larger "high" volcanic islands in the Pacific Ocean. The central core contains several mountains, the largest of which rises to a height of 652 metres. A series of razor-back ridges radiate toward the periphery and between some of these lie fertile valleys up to 3 km deep and about 1 km wide. Between the base of the mountains and the less-fertile coastal plain is a fertile, but in places swampy area in which most food crops are grown. The shallow lagoon reaches a width of about 1 km and is surrounded by a fringing reef. Of Rarotonga's 6,720 hectares, 1,500 or 22 per cent are highly fertile and capable of supporting cash crops or the common domestic food crops. The remaining land is either too mountainous, infertile or rock-strewn to have significant agricultural value, although the coconut palm is ubiquitous.

The southern outer islands of Mangaia, Atiu, Mauke and Mitiaro are similar in topography and geologic structure and contrast markedly with Rarotonga. Although ranging in size from 18.4 km (Mauke) to 51.3 sq km (Mangaia) (table 1), these islands contain a similar sunken volcanic core of swampy and fertile land encircled by a raised plateau of coral known as *makatea*. This area is infertile and supports mainly coconut, ferns and scrub. Below the *makatea*, which in Mangaia reaches a height of 30 m is an area of relatively infertile land which slopes gradually toward a narrow fringing reef. The geologic structure of these islands has made the construction of harbours and boat passages especially difficult. Aitutaki combines features common to both the volcanic "high" islands and the "low" coral atolls. With its relatively high proportion of arable land and its large lagoon, Aitutaki is probably the most liveable of all the Cook Islands. The remaining southern islands of Manuae and Takutea are not permanently inhabited. Manuae is owned by the people of Aitutaki and is visited occasionally by copra-making parties. Takutea is owned by Atiu but rarely visited.

[1] Edward Dommen, "Some distinguishing characteristics of Island States", *World Development*, vol. 8, 1980, pp. 931-943.

[2] Tongareva is also known as Penrhyn. The traditional name of Tongareva is used throughout this document.

Table 1. Person/land ratios by island and region in 1981 by quality of land

Island/region	Population 1981	Total area (km²)	Persons/ km²	Hectares/ capita	Class 1 land[a]		Class 2 land[b]		Total arable	
					ha	ha/ capita	ha	ha/ capita	ha	ha/ capita
Rarotonga	9 530	67.1	141	0.69	1 497	0.16	619	0.07	2 116	0.22
Aitutaki	2 335	18.3	128	0.74	928	0.39	471	0.20	1 399	0.60
Atiu	1 225	26.9	46	2.05	469	0.38	1 370	1.19	1 839	1.50
Mangaia	1 364	51.8	26	3.38	422	0.30	2 129	1.56	2 551	1.87
Manuae	12	6.2	..	..	..	..	622	..	622	..
Mauke	681	18.4	37	2.59	427	0.62	1 159	1.69	1 586	2.31
Mitiaro	256	22.3	11	7.29	110	0.42	913	3.57	1 023	3.99
Takutea	–	1.3	–	–	–	–	130	–	130	–
Southern outer islands	5 873	145.2	41	2.47	2 536	0.43	6 797	1.15	9 333	1.58
Southern group[c]	15 403	212.3	72	1.38	4 033	0.26	7 416	0.48	11 449	0.74
Manihiki	405	5.4	75	2.05	–	–	544	1.34	544	1.34
Pukapuka/Nassau	930	2.6	358	0.29	–	–	260	0.27	260	0.27
Palmerston	51	2.1	24	3.61	–	–	207	4.05	207	4.05
Rakahanga	272	4.1	66	1.46	–	–	414	1.53	414	1.53
Tongareva	608	9.8	62	1.85	–	–	984	1.61	984	1.61
Northern outer islands	2 266	24.5[e]	92	1.08	–	–	2 461	1.08	2 461	1.08
Total Cook Islands	17 754[d]	237.0[e]	75	1.34	4 033	0.23	9 877	0.56	13 910	0.79

Sources: J.P. Fox and L.I. Grange, *Soils of the Lower Cook Group* (Wellington, New Zealand Department of Scientific and Industrial Research, Soil Bureau, Bulletin No. 8, 1953); Cook Islands Statistics Office, *Census of Population and Housing, 1976* (Rarotonga, Statistics Office, 1977), p. 57; *Cook Islands Census of Population and Dwellings, 1981,* CPD8-82, p. 1.

Notes: [a] Suitable for cash and subsistence crops.

[b] Suitable mainly for tree crops.

[c] Southern outer islands and Rarotonga.

[d] Includes 85 persons "at sea".

[e] Includes the unhabited atoll of Suwarrow (0.5 km²).

The population density of the southern group ranges from 11 per sq km in Mitiaro to 141 per sq km in Rarotonga (table 1). On a *per capita* basis the outer islands of the southern group are better supplied with high quality agricultural land than Rarotonga. Based on the population in 1981, the mean number of hectares *per capita* on the five inhabited islands was 0.43 compared with 0.16 on Rarotonga. Rarotonga is also considerably less well-endowed with second class agricultural land than the other southern islands.

The total land area of the northern atolls is 24.5 sq km, most of which is coral rubble capable of supporting only the coconut palm, pandanus tree, and a dry-land variety of taro known as *puraka*. But most of these atolls have a small amount of organic soil (some of which was man-made by the constant mulching of coconut leaves other organic material) in which a small quantity of swamp taro is grown. Overall population density in the northern group is higher than in the southern group and there is also a wider range. In

Table 2. Gross population density of selected island countries[a]

Pacific region	Persons/km²	Other regions	Persons/km²
Tokelau Islands	200	Gibraltar	5 020
Guam	189	Malta	1 051
American Samoa	173	Barbados	590
Tonga	130	Mauritious	444
Kiribati	79	Seychelles	221
Cook Islands	75	Reunion	196
Western Samoa	54	Antigua	164
Fiji	33	Dominica	107
Niue	23	Virgin Islands	78
Vanuatu	7	Bahamas	16

Source: J.C. Caldwell and others, "The demography of microstates", in: R. T. Shand, (ed.) *The Island States of the Pacific and Indian Oceans: Anatomy of Development*, Canberra, Development Studies Centre, Monograph No. 23, (1980) pp. 121-144.

Note: [a] Except for the Cook Islands, data are for 1977. Cook Islands data refer to 1981.

1981, the gross density of the northern group was 92 per sq km and the range was from 24 per sq km on Palmerston to 358 per sq km for Pukapuka and Nassau combined. Pukapuka's gross density, taken separately, was 615 per sq km. While the northern atolls are small in land area, relative to the southern group, they have a greater supply of marine resources on account of their large lagoons. Tongareva's lagoon is 64 km in circumference and richly stocked with fish and pearl shell. Manihiki's lagoon is smaller, but also well supplied with fish and pearl.

The gross population density of the Cook Islands is 75 per sq km, which is unexceptional by Pacific or Caribbean standards (table 2).

The climate of the Cook Islands is tropical with little temperature change throughout the year. The mean daily temperature in Rarotonga is 23.9 degrees celsius compared with 27.9 in Pukapuka.[3] Rainfall is normally spread evenly throughout the year but there is considerable variation from year to year. The northern atolls and some southern outer islands occasionally suffer water shortages for domestic use, and serious droughts are not unknown.[4] The islands lie within the Pacific hurricane belt and severe damage to crops, housing, and harbours can be expected about once or twice each decade. The hurricane season lasts from December to March during which time strong storms of less than hurricane strength may inflict minor damage to the islands.

B. POLITICAL-ADMINISTRATIVE HISTORY

Prior to European contact, each of the islands now included within the boundaries of the Cook Islands were independent socio-political entities.[5] The only exceptions to this were the three islands of Atiu, Mauke and Mitiaro which were dominated by the chiefs of Atiu and carried the collective name of *Nga-pu-toru* ("the three masters"). The large distances between them discouraged any form of unified political rule among the remaining islands. The indigenous political systems of the islands were variations on a generally eastern Polynesian theme, the central feature of which was hereditary chieftainship based on the principle of primogeniture. Chieftainship was most highly developed on Rarotonga, but no single chief was able to assert authority over

[3] Cook Islands Statistics Office, unpublished tables, New Zealand Meteorological Service, nd.

[4] A major drought occurred in 1983.

[5] Nassau was effectively under the control of Pukapuka but not permanently inhabited. Manihiki and Rakahanga were occupied by one population which moved back and forth as food supplies required. Palmerston was not inhabited at the time of European contact.

the whole island. As today, the island was divided into three districts (*vaka*) each of which was associated with a tribal group headed by one or more paramount chiefs (*ariki*). Ranked below the *ariki* were several lesser chiefs whose authority varied from district to district. Chiefs were possessed of spiritual power (*mana*) and sanctity (*tapu*) which varied in strength and purity from the higher to the lesser chiefs and which provided the principal source of social control. All chiefs had responsibilities with respect to the production and re-distribution of food, construction and maintenance of canoes, religious sites and sacred objects; a chief who shirked responsibility, or who failed to maintain the appropriate exchange relationship with his people, could be banished or deposed by force.[6]

Similar forms of chieftainship prevailed on the other southern islands. On Mangaia and Atiu, however, success in warfare tended to overshadow hereditary right as the basis of title-holding. On Mangaia the title of "temporal lord" (*Mangaia*) was given to the chief or warrior able to achieve dominance over all other tribes by violent means.[7]

In the northern atolls, chieftainship was less highly developed than in the south; there were fewer titles and chiefly power was constrained by other social groupings such as councils of elders or village-based authority. This was particularly true of Pukapuka which had a complex political system characterized by a variety of inter-locking groups.[8]

Christian missions were established on each of the larger southern islands between 1821 and 1840 and in the northern group during the late 1850s. The arrival of English missionaries profoundly altered the indigenous socio-political system, but on many islands the principal effect was to increase the power of the *ariki*—at the expense of the minor chiefs and commoners—rather than to reduce it.[9] With the collapse of native religion and ritual, however, spiritual sanctions were no longer capable of maintaining formal social control, although private belief in *mana* and *tapu* remained. With the assistance and encouragement of the missionaries, the chiefs of each island established legal codes covering property, marriage, theft, trespass, etc., to be administered by *ariki*-appointed judges and police. Punishments ranged from fines of money, produce or manual labour to imprisonment or confiscation of land. The beneficiaries of these sanctions were primarily the *ariki* themselves. As formal churches became established, the chiefs' control extended to these as well and the threat of excommunication became a powerful means of obtaining compliance. While both the law and its administration had become secularized in this period, the separation between church and state was far from complete since the definition of what constituted a punishable offense was based largely on missionary-induced conceptions of "sin" [10]

The alliance between the *ariki* and the missionaries was an uneasy one and proved inadequate once other Europeans began to settle in the islands during the 1860s and 1870s. The desire of the European traders and planters to free themselves from the authority of the *ariki*; the *ariki's* fear of possible annexation of the islands by the French; and the desire of the colony of New Zealand for a "British Pacific Ocean", led to the declaration of a British Protectorate over most of the islands in 1888.

The British Government was represented in the Cook Islands by a "Resident" with limited powers. In 1890 he induced the chiefs of Rarotonga to form a General Council made up of the *ariki*, representatives of the lesser chiefs, the district judges and one representative of the European residents. Executive powers remained in the hands of six *ariki*. The following year a Federal Parliament was established with authority over customs duties, finance, shipping, postal services, immigration and other matters relating to the Cook Islands as a whole.[11] A Federal Supreme Court was also formed and one of the *ariki* appointed Judge.

[6] A useful summary sketch of traditional social organization in Rarotonga appears in: R. G. Crocombe, *Land tenure in the Cook Islands* (Melbourne, Oxford University Press, 1964), pp. 25-37.

[7] Te Rangi Hiroa, *Mangaian Society* (Honolulu, Bishop Museum Bulletin No. 122, 1934), p. 122.

[8] Ernest Beaglehole and Pearl Beaglehole, *Ethnology of Pukapuka* (Honolulu, Bishop Museum Bulletin No. 150, 1938).

[9] Richard Gilson, *The Cook Islands 1820-1950* (Wellington, Victoria University Press, 1980), pp. 32-35.

[10] Ernest Beaglehole, *Social Change in the South Pacific* (London, George Allen and Unwin, 1957), p. 57.

[11] Richard Gilson, *op. cit.*, pp. 65-66. At this time the term "Cook Islands" referred to the southern group. Although Pukapuka and Nassau were brought under the protectorate in 1892, the other northern atolls were not included until the Cook Islands were annexed to New Zealand in 1901.

The later attempt by the New Zealand-appointed Resident to replace the Federal Supreme Court with a High Court headed by a European Chief Justice led to widespread protest and eventually to his recall. But after a display of naval power and the mischievious suggestion that Queen Victoria was herself displeased, the second British Resident was able to pursuade the Parliament to establish the High Court and to appoint him the Chief Justice.[12]

While the principal chiefs mistrusted New Zealand, and preferred direct annexation to the United Kingdom of Great Britain and Ireland, in 1900 they agreed to New Zealand's annexation of the Cook Islands (including the northern group) on the condition that New Zealand would provide economic aid while respecting the chiefs' control over land and other powers of "self-government".

During the subsequent decade, a Land Court was established with the Resident Commissioner as Chief Judge; *ariki* courts were abolished on most islands and judicial authority placed in the hands of European Resident Agents; district government was virtually abolished on Rarotonga and the control of finance passed to European officials. By 1912 the Federal Council had become defunct and the Cook Islands Act of 1915, which codified all existing laws, made no mention of any form of federal government.[13] The period from 1915 to 1946 was one of further centralization of power in the Office of Resident Commissioner and the New Zealand Minister of Island Territories. Local powers of self-government were restricted to Island Councils, yet even these played primarily an advisory role.

The first important step towards representative government was taken in 1946 with the passage of the Cook Islands Amendment Act which re-created a council covering all the islands. The Cook Islands Legislative Council consisted of ten members elected by the Island Councils and eleven "official" members appointed by the Resident Commissioner. Because the Commissioner retained the right of veto, however, the elected members remained a minority and the Council's powers were largely advisory.[14] In 1958 the Legislative Council was replaced by a Legislative Assembly consisting of 14 members elected by universal suffrage, seven members elected by Island Councils, one European and five "official" members including the Resident Commissioner.[15]

Under the impetus of a 1960 United Nations resolution concerning non-self-governing territories, to which New Zealand subscribed, movement toward full self-government was rapid after 1962. In 1965 a new constitution was put into effect making the Cook Islands a self-governing territory in "free association" with New Zealand. The constitution called for 22 members of the Legislative Assembly to be elected by universal suffrage and a cabinet of eight elected members. Cook Islanders retained their New Zealand citizenship according them the free right of entry into New Zealand. A High Commissioner appointed by New Zealand would represent the Queen who remained Head of State. New Zealand's responsibilities were limited to foreign affairs and defence.

In recent years the Cook Islands has evolved further toward full sovereign status: foreign affairs are increasingly conducted by Cook Islands officials independently of New Zealand involvement, and an interpretation of New Zealand as an "agent" of the Cook Islands has gained currency. In a series of recent constitutional amendments, the Legislative Assembly has been re-named "Parliament", and the Premier, "Prime Minister", to reflect this changing interpretation. The number of parliamentary seats was recently increased to 24, including one to represent Cook Islanders resident abroad.

C. CONTEMPORARY SOCIO-ECONOMIC ORGANIZATION

In 1976, 96 per cent of the Cook Islands population of 18,127 were reported as full or part-*Maori*,[16], 3.5 per cent were "European" and less than 1 per cent "other races".[17] In 1966, 15.5 per

[12] *Ibid.*, pp. 89-90.

[13] *Ibid.*, pp. 130-131.

[14] Ernest Beaglehole, "Social and political changes in the Cook Islands", *Pacific Affairs*, 1948, vol. 11, pp. 384-398.

[15] S.D. Wilson, "Cook Islands development 1946-65", in Angus Ross (ed.), *New Zealand's Record in the Pacific Islands in the Twentieth Century* (Auckland, Longman Paul, 1969), pp. 60-114.

[16] The term *Maori* refers to the indigenous people and institutions of the Cook Islands. Although there are historical and linguistic links to the New Zealand *Maori*, the two groups should not be confused. The term *Maori* is used in the present report to refer exclusively to Cook Islanders of Polynesian descent.

[17] Cook Islands Statistics Office, *Census of Population and Housing, 1976* (Rarotonga, Government of the Cook Islands, 1977), p. 106.

cent of the population were classified as less than "full-blood" *Maori;* in 1976, only 4.0 per cent were so classified.[18] This change reflects not so much a changing ethnic composition as a loss of precision in the methods of ethnic classification, since it is a virtual certainty that the number of part-*Maori* persons has been increasing since the mid 1960s. According to the 1981 census, 91.2 per cent of the resident population were "Cook Islands Maori", 4.2 per cent were "Cook Islands Maori/other" and 4.6 per cent "other". Again, this form of classification tends to understate the ethnic complexity of the islands.[19] Nevertheless, it is clear that the vast majority of the population is Polynesian in origin and this is reflected in the social and cultural systems of the islands.

Contemporary socio-economic organization in the Cook Islands is based on various combinations of traditional Polynesian elements and post-contact modifications from different sources. These combinations vary in character from region to region and to some extent by island. On Rarotonga, traditional tribal organization has virtually no formal function, though the tribal district (*vaka*) is a locus for personal identity and political affiliation. Similarly, lineage membership has little formal meaning but represents a sentimental attachment which is expressed on ceremonial occasions. Nevertheless, chiefly titles carry considerable social prestige and attain special economic significance where the control of land is concerned.

Traditional elements are more apparent in Mangaia and Pukapuka, particularly in the administration of land. On Mangaia, the district chiefs (*rangatira*) allocate land to households while disputes are settled either by the collectivity of chiefs (*arongo mana*) or by the paramount chief (*ariki*). Unlike Rarotonga, and most other islands, the Land Court does not operate on Mangaia. In Pukapuka, the village is a unit of land-holding as well as food distribution, but here too, maternal and paternal lineages play a role.

On most islands the household is the primary unit of production. If land were distributed equally, Rarotonga's 1,758 households in 1981 would each have 1.2 hectares of arable land.[20] But a significant number of households – particularly those of in-migrants from the outer islands and expatriate Europeans – are landless, and some native Rarotongans do control more land than others. The holding of a typical land-owning family is probably in the range of 2-3 hectares with holdings in excess of 4 hectares being somewhat rare. These are extremely small holdings by any standard and, except for harvesting, the labour required to work them is usually available from within the nuclear family with occasional help from more extended kin networks.

On such southern outer islands as Aitutaki and Atiu, with their relatively greater supply of first class land per household (about double that of Rarotonga), the production unit is sometimes based on a kinship group or extended family. In Atiu and Mangaia, co-operative associations of planters play an important role in the management of pineapple growing.

On Rarotonga, and to a lesser extent on Aitutaki, most adult males follow a pattern of "occupational multiplicity". In 1981, the majority of adult males on Aitutaki was employed for a wage or salary (either part or full-time) in addition to their subsistence and cash-cropping activities.[21] In Rarotonga, very few households are fully dependent on cash-cropping for their livelihood, and the number of persons engaged exclusively in private, commercial agriculture is small.[22] In the northern group and on the smaller southern outer islands there are few opportunities for wage employment outside government administration or services, and dependence on commercial agriculture or pearl shell for a cash income increases accordingly.

[18] Premier's Department, Government of the Cook Islands, *Population Census, 1966* (Rarotonga, Government of the Cook Islands, 1968), p. 29. *Census of Population and Housing, 1976,* p. 106.

[19] Cook Islands Statistics Office, *Cook Islands Census of Population and Dwellings, 1981,* CPD8-82, p. 13.

[20] Cook Islands Statistics Office, *Statistical Abstract* (17/1981), p. 4. But only 70 per cent of this would be prime agricultural land.

[21] *Cook Islands Census of Population and Dwellings, 1981,* unpublished tables. Theodore D. Graves and Nancy B. Graves, "Demographic change in the Cook Islands: perception and reality", *Journal of the Polynesian Society,* 1976, vol. 86, pp. 447-461.

[22] The 1976 population census reported only 42 males self-employed in agriculture on Rarotonga. In 1981 the reported number was 58 compared with 106 in the southern outer islands. See: Cook Islands Statistics Office, *Census of Population and Housing, 1976,* p. 160; *Cook Islands Census of Population and Dwellings, 1981,* unpublished tables.

Table 3. Percentage distribution of the gross domestic product by industrial sector, 1970-1978

Sector	1970	1972	1976	1977	1978
Agriculture, livestock and fisheries	26.4	24.0	16.1	17.5	17.4
Manufacturing	10.9	9.6	5.4	4.5	5.1
Electricity, water and quarrying	2.1	2.2	0.6	0.5	0.5
Construction	9.2	8.1	3.5	3.4	4.3
Wholesale and retail trade, restaurants and hotels	13.7	13.9	29.8	31.8	34.1
Transport, storage and communication	7.2	6.4	8.6	8.6	6.4
Finance and insurance	0.9	1.2	2.1	1.8	2.5
Real estate and ownership of dwellings	2.3	3.3	2.5	2.4	2.6
Public administration, social and personal services	27.3	31.4	31.4	29.4	28.3
Total	100.0	100.0	100.0	100.0	100.0
Total GDP ('000)[a]	8 300.0	8 110.7	13 730.8	16 371.8	17 817.0

Sources: G. Keijzers, *Gross domestic product estimates of the Cook Islands, 1976 and 1977* (Rarotonga, Ministry of Planning and External Affairs, 1978); Cook Islands Department of Development Planning, unpublished tables, nd.

Note: [a] In New Zealand dollars.

D. THE STRUCTURE OF THE ECONOMY

In terms of the quantity of Gross Domestic Product (GDP) generated (table 3), the predominant sector in the Cook Islands as a whole in 1978 (the most recent year for which data are available) was wholesale and retail trading (34.1 per cent) followed by public administration and services (28.3 per cent) with agriculture and fishing (including pearl shell) in third place (17.4 per cent).[23] The sectoral distribution of the labour force in 1981 showed the importance of the services sector (29.3 per cent) in employment, whereas the proportion engaged in wholesale and retail trading (10.0 per cent) is much lower than the proportion of GDP it generates.[24] Agriculture and fishing accounted for 29.2 per cent of the labour force in 1981, although this figure does not reflect informal labour inputs.

The predominance of trade in the generation of GDP in 1978 by comparison with the early 1970s is a reflection of the rapid growth of tourism since the completion of Rarotonga international airport in 1973. While the exact contribution of tourism to GDP across all sectors is unknown, there is little doubt that it is substantial. At the same time, however, the "leakage" of income to external economies may be as high as 50 per cent. Beyond Rarotonga, however, tourism generates little employment or other economic opportunities, and has probably increased regional economic disparities rather than reduced them.

The economy of the outer islands differs considerably from that of Rarotonga. The proportion of the male labour force engaged exclusively in agriculture or fishing in 1981 increased from 14 per cent in Rarotonga to 57.2 per cent in the southern outer islands and to 74.6 per cent in the northern atolls. Conversely, 35.0 per cent of Rarotonga's labour force was engaged in the community, social and personal services sector compared with only 21.0 per cent in the outer islands.[25]

The largest single employer in the Cook Islands is the Government. In 1979, 48 per cent of

[23] Cook Islands Statistics Office, *Statistical Abstract*, (2/1979).

[24] The main reason for this is the high revenues from the sale of stamps and coins with little involvement of local labour.

[25] *Cook Islands Census of Population and Dwellings, 1981*, unpublished tables.

full-time employees in Rarotonga were employed by Government and another 10.1 per cent by quasi-government agencies. This proportion would be higher if the fruit-canning plant, which is now wholly owned by the Cook Islands Government, were included. The major private employers are the trading companies, the two larger clothing factories, and one large hotel. In the outer islands there is little private employment other than in trading stores, bakeries, and growers associations. Most wage or salaried employment is in Government services such as post office, teaching, medical services, etc.

In 1980, the principal exports from the Cook Islands (by value) were clothing (30 per cent), fruit juice (21.6 per cent), copra (12 per cent), banana (10.7 per cent), pearl shell (7.5 per cent) and various fresh fruits and vegetables.[26] The total value of exports was $NZ 4.2 million compared with imports of $NZ 23.6 million. The largest import items were foodstuffs (30.2 per cent), basic manufactures (20 per cent), machinery and transport equipment (18.6 per cent), minerals and fuels.[27] This imbalance of trade is offset to some extent by the inflow of remittances from migrants in New Zealand, tourist expenditure, foreign aid and direct budgetary subsidies from New Zealand. These inflows reflect the considerable dependence of the Cook Islands on external economies for products, personal income and Government revenue. Although detailed statistics are unavailable, there is evidence to indicate that income from remittances (cash and goods) exceeds that from commercial agriculture.[28]

Per capita GDP in 1978 was $NZ 964 ($A 941) which places the Cook Islands above the median among Pacific Island countries and substantially above such Polynesian neighbours as Tokelau ($A 558), Tuvalu ($A504), Tonga ($A395) and Western Samoa ($A304).[29] This relatively high *per capita* GDP is partially a function of the large annual *per capita* inflow of Official Development Assistance (primarily from New Zealand and Australia) which, in 1978 was equivalent to 34 per cent of *per capita* GDP.[30] While this indicates a high degree of external dependency, the Cook Islands are less dependent in this respect than Niue, Tokelau, or the Trust Territory of the Pacific Islands, all of which are highly dependent on external aid.

Nevertheless, dependence in all its manifestations is the principal macro-economic issue in the Cook Islands. Although some forms of dependence are inevitable in a small-scale economy, the long-term consequences of food imports and cash remittances from abroad may be serious insofar as "economic independence" is a stated objective of development planners.

The major internal socio-economic issue is the unequal distribution of employment and other economic opportunities between Rarotonga and the outer islands. This disparity can also be seen in the distribution of amenities and social services. With the possible exception of Aitutaki, none of the outer islands have received much benefit in terms of tourism-related or public administration employment in recent years, and some islands show signs of increasing economic marginalization.

E. EDUCATION AND HEALTH

Schooling in the Cook Islands is provided free by the Government and is compulsory from age 6 to 14. The education system is largely modelled on that of New Zealand with six primary grades and six secondary levels. Primary schools are located on each island or in each village of the larger islands. In 1975 there were 3,844 primary (grades 1-6) pupils enrolled in 25 public and 4 private schools.[31] Census data for 1976 (the latest available) indicate that 90 per cent of the population aged 5-14 attended school.[32] The

[26] Cook Islands Statistics Office, *Quarterly Statistical Bulletin*, December 1981, pp. 6-9.

[27] *Ibid.*, p. 11.

[28] Geoffrey R. Hayes, *Migration, Population Change and Socio-economic Development in the Cook Islands*, unpublished Ph.D. thesis, University of British Columbia, 1982, p. 370. Also see: Alan Bollard, *Agricultural Project Design and Evaluation in an Island Community* (Canberra, Australian National University Press, 1979), Development Studies Centre Monograph No. 15, p. 51. One source gives a figure of $300 *per capita* for remittances in 1978, approximately double the *per capita* value of all exports that year. A.C. Walsh, *Migration, Urbanization and Development in South Pacific Countries* (Economic and Social Commission for Asia and the Pacific, Bangkok, 1982), Comparative study on migration, urbanization and development in the ESCAP region, Country Report No. VI, p. 127.

[29] South Pacific Commission, *South Pacific Economies, 1980; Statistical Summary* (Noumea, New Caledonia, 1982), p.7.

[30] Total ODA in 1980 was $A 520 *per capita*. *Ibid.*, p. 23.

[31] Cook Islands Ministry of Health and Education, *Educational Statistical Bulletin* No. 1, 1975, p. 8.

[32] *Cook Islands Census of Population and Housing, 1976*, p. 111.

language of instruction in the lower primary grades is generally *Maori* with the exception of two schools on Rarotonga which provides unilingual instruction in English.

Secondary schooling up to Form 3 (grade 9) level is available on most islands and up to Form 6 on the larger ones. For Form 7 instruction, however, it is necessary for outer islands students to travel to Rarotonga. In 1975, 2,747 students were enrolled in secondary schools, 202 in private schools operated by the Roman Catholic or Seventh Day Adventist Church.[33] On Rarotonga, 42 per cent of the population aged 15-19 were attending school in 1976. Attendance in this age group dropped to 40 per cent in the southern outer islands and to 27.2 per cent in the northern group.[34] Northern group females had the lowest attendance rate (23.9 per cent).[35]

A number of students also travel privately to New Zealand for secondary schooling where they are supported by relatives. Certification in the Cook Islands is by examination on the New Zealand model. Students may obtain the Cook Islands School Certificate, New Zealand School Certificate, or New Zealand University Entrance Certificate. An apprenticeship training scheme was recently introduced whereby trade certificates will be attainable within the Cook Islands in such fields as auto mechanics and plumbing.

Although temporarily closed, a Teachers Training College is located on Rarotonga and for many years this was the only means of obtaining tertiary education without leaving the islands. A branch campus of the University of the South Pacific is also situated in Rarotonga and offers credit courses toward a degree by correspondence and satellite radio linked to the main campus in Fiji and other campuses throughout the Pacific. Each year a number of students receive scholarships under the New Zealand Training Scheme for university or technical training. In 1975, 53 Cook Islanders were undertaking studies in New Zealand and another 14 were attending educational institutions elsewhere in the Pacific. Many scholarship students elect to remain abroad or emigrate after a period of work in the islands. This produces a serious drain of human resources.

In 1975, an additional 18 public employees were receiving short-term, in-service training under the New Zealand Training Scheme.[36] And in recent years, a number of public employees have received training in Australia and the Netherlands with the support of these countries' foreign aid schemes. A variety of technical training courses are also provided by such United Nations agencies as the World Health Organization, the United Nations Fund for Population Activities, the United Nations Development Programme, as well as the South Pacific Commission.

Health services are provided free of charge to Cook Islands citizens by the Department of Health. In Rarotonga there are two physicians in private practice; in the outer islands all services are supplied by the Government. A general hospital of 106 beds with the capacity to perform general surgery is located on Rarotonga. Aitutaki has a modern, fully-equipped, 40-bed hospital and there are six rural hospitals located on other outer islands. Not all of these are permanently staffed by a physician, however, and the northern group hospitals are often left in the charge of a nurse or "dresser". Patients requiring treatment beyond the capacity of the Cook Islands Department of Health are sent to New Zealand at Government expense. The New Zealand Air Force occasionally airlifts seriously ill patients from the northern group to New Zealand in emergency cases.

The principal infectious diseases in the Cook Islands are influenza, diarrhoea, tuberculosis and gonorrhoea.[37] Diseases of the circulatory system (primarily heart failure), the respiratory system (pneumonia) and senility are the principal causes of death.[38] The life expectancy at birth for both sexes combined was 67.1 years in 1981. This represented an increase of 2.1 years since 1976, mainly as a result of lower mortality among females.

[33] Cook Islands Ministry of Health and Education, *op. cit.*, p. 13.

[34] *Cook Islands Census of Population and Housing, 1976*, p. 114.

[35] A.C. Walsh, *op. cit.*, p. 139.

[36] New Zealand, *Report of the Maori and Island Affairs Department*, Appendix to the Journals of the House of Representative, vol. II, Appendix E13, 1975, pp. 37-38.

[37] World Health Organization, *World Health Statistics Annual, 1980/81* (Geneva, World Health Organization, 1981), vol. 2, p. 68.

[38] Cook Islands Legislative Assembly, *Report of the Health Department, 1974/75* (Rarotonga, Legislative Assembly, nd), pp. 81-84.

F. TRANSPORT AND COMMUNICATIONS

The New Zealand Shipping Corporation operates a twice-monthly service between Auckland and Rarotonga with occasional calls at Aitutaki. Inter-island services are provided by three small ships based in Rarotonga. These call at most southern outer islands three or four times per month and from four to six times per year in the case of the northern atolls. Infrequent service is also provided to Niue, American and Western Samoa.

Rarotonga is linked by air services to New Zealand, Tahiti, Fiji and Samoa. The Cook Islands has little control over international services since landing rights remain under New Zealand authority. The type of aircraft utilized and the frequency of service are determined largely by Air New Zealand. The removal of a direct Honolulu service in 1980 resulted in a substantial drop in the number of North American tourists. All the larger southern outer islands have airstrips and in most cases there is twice-weekly service to Rarotonga. Commercial air services to the northern atolls of Tongareva and Rakahanga have recently commenced and the construction of an airport on Pukapuka is under discussion.

The primary means of internal communication are radio, telegraph and radio-telephone. International communications were much improved in 1980 following the opening of new radio-telephone and telex facilities operated under licence by a British telecommunications company. The Government publishes a daily newspaper, but circulation beyond Rarotonga is limited. There are no private daily newspapers published in the Cook Islands although a private radio station – with limited power – broadcasts from Rarotonga. There is no television service but video cassette players have recently appeared in village stores on Rarotonga.

Chapter II
PRECOLONIAL POPULATION HISTORY

A. SETTLEMENT

Linguistic and archaeological evidence suggests that the ancestors of the people now identified as Polynesians began moving into the Western Pacific from Indonesia about 5,000 years ago; but it was another 1,500-2,000 years before these proto-Polynesians reached Tonga and Samoa and perhaps another 2,400 before all the inhabitable islands of the south-east Pacific were occupied by their descendants.[1]

The Cook Islands were among the last of Polynesia to be permanently settled. Like other Polynesians, the inhabitants of the Cook Islands had no written language. Information on early settlement must, therefore, be sought from ethnohistorical sources such as songs, myths and tribal histories, supplemented, where possible, by the small amount of archaeological data that has so far become available. A number of tribal histories were collected in the late nineteenth and early twentieth century, but not every island is adequately represented and the information is therefore uneven in quality and quantity.

Rarotonga history indicates that a small group of families led by Ata i te Kura came from Iva (probably one of the Marquesas islands) around AD 875. These pioneer settlers were attacked and subdued by later arrivals from the same source while other would-be settlers were driven off.[2] The famed navigator Toi reputedly arrived in AD 1100 and has been credited with the construction of the *ara metua*, an ancient road which encircles the island near the fertile planting lands and the base of the mountains (this is also known as *te ara nui o Toi*, "the great road of Toi").

The principal settlement of Rarotonga is said to have occurred about AD 1250 with the simultaneous arrival of Tangi'ia from Tahiti–accompanied by perhaps as many as 400 followers–and another chief named Karika from Manu'a (Samoa) with a smaller party numbering about 140.[3] These men are honoured today as the founders of the present population of Rarotonga, but the exact details of the relationship between them, the timing and manner of their arrival and their relative importance in the history of Rarotonga remain controversial.

Archaeological evidence indicates that early settlement from both Samoa and Tahiti is plausible. Adzes found in the Takuvaine district have been identified as a distinct Samoan type, while other artifacts, including pearl shell fish hooks, follow a typically Eastern Polynesian pattern.[4] Research on this site establishes clearly that Rarotonga was inhabited at the time suggested by traditional history and in an area said to have been the homesite of Karika.

Nevertheless, these archaeological data do not permit any estimates of prehistoric population levels. If the ethnohistorical sources are reliable, the two tribes headed by Tangi'ia and Karika would have collectively numbered at least 550 around AD 1250. The tribal accounts mention that both chiefs brought women and children with them: Karika made several return voyages to Manu'a and on his final trip brought his wife, children, "serfs" and "people" *(matakeinanga)* back to Rarotonga.[5] Tangi'ia reserved the smaller hull of his double canoe for women and children while the main one contained his warriors.[6] A remnant of the earlier settlers still inhabited the south side of the island when Tangi'ia arrived and, although some sources

[1] P. S. Bellwood, "The peopling of the Pacific", *Scientific American*, 1980, vol. 243, pp. 174-185.

[2] S. P. Smith, "Hawaiki: the whence of the Maori, being an introduction to Rarotonga history" (Part III), *Journal of the Polynesian Society*, 1899, vol. 8, p. 29.

[3] H. Nicholas, "Geneologies and historical notes from Rarotonga", *Journal of the Polynesian Society*, 1892, vol. 1, p. 26.

[4] Peter S. Bellwood, *Archaeological Research in the Cook Islands* (Honolulu, B. P. Bishop Museum, 1978) p. 135.

[5] H. Nicholas, *op. cit.*, p. 71.

[6] S. P. Smith, *op. cit.*, p. 35.

have claimed that all the men were killed, Tangi'ia married two of the women.[7] On this evidence it would appear that a viable reproducing population with the potential for rapid growth was established on Rarotonga by the mid thirteenth century.

The southern outer islands were settled from a variety of sources many of which are now obscure. Most accounts mention "Avaiki" as the place of origin; this most likely refers to Raiatea in the Society group, although Tahiti may also be implied. Te Rangi Hiroa has suggested that the migration which settled these islands occurred between the thirteenth and fourteenth centuries and was precipitated by religious and political conflict in Tahiti.[8] There is also evidence that the population of eastern Polynesia had reached a point of ecological strain during this period and that this also may have precipitated both war and forced migration. One account mentions how emigration was the direct result of conflict over a single breadfruit tree.[9]

The settlement of Aitutaki is associated with Ru'enua who brought with him from "Avaiki" a party of men, women and children numbering at least 200.[10] The date of Ru'enua's arrival is not clear. One archaeological site on Aitutaki contained material dated AD 981 (+/– 83),[11] but there is no evidence to link this site with Ru'enua or any other ancestral figure. To date this is the earliest archaeological evidence of human habitation for any of the Cook Islands. The nearby atoll of Manuae was probably settled from Aitutaki rather than from outside the group. It has also been linked to Atiu and Mangaia.

Atiu was settled from Tahiti and "Avaiki" probably in the thirteenth century. Mauke was visited by Tangi'ia on his way to Rarotonga around AD 1250 and was already inhabited at that time. Mitiaro appears to have been settled from Atiu[12] and up to the modern period was ruled by the chiefs of that island. The small sand quay of Takutea was also controlled by Atiu but was not permanently inhabited.

The mythology of Mangaia has the first settlers already on the island as it rose to the surface from an underworld "Avaiki". A more likely explanation is that they came by way of Rarotonga, Tahiti and, possibly, Tonga.[13] Genealogical evidence suggests that the principal settlers were dissident young chiefs from Rarotonga who arrived about AD 1450. If this date is correct Mangaia was the last island in the Cook group to have been pemanently settled.

Far less information is available on the settlement of the northern outer islands. There is no evidence that any of these atolls were settled before the southern group and many of the traditional accounts of early history mention figures associated with the settlement of the southern islands as well as New Zealand, Tonga and Samoa. Archaeological excavations have been carried out on Tongareva, but no evidence was found to indicate human occupation prior to the era of Karika and Tangi'ia. Tongareva and Rakahanga were probably settled from Rarotonga in the thirteenth century while Pukapuka may have been settled earlier from both western and eastern Polynesia.[14]

There is evidence in the form of unearthed adzes that Palmerston was occupied at some

[7] The term *mana'une* is sometimes used in tribal histories to describe this group, and has been interpreted by some to imply people of small stature; see: Stephen Savage, *A Dictionary of the Maori Language of Rarotonga* (Wellington, Department of Island Territories, 1962) p. 266. One writer has gone so far as to suggest that they were Melanesians; see: Stephen H. Roberts, *Population Problems of the Pacific* (London, Routledge, 1922), p. 11 but there is no supporting evidence for this claim. The term *mana'une* and its cognates elsewhere in Polynesia suggests aboriginal people and it was common for later arrivals to denigrate them to the level of *'iti tangata'* (literally 'small people') with the connotation of low class. See Te Rangi Hiroa, *Mangaian Society* (Honolulu, B. P. Bishop Museum Bulletin No. 122, 1934) p. 76, and Katherine Luomala, *The Menehune of Polynesia and Other Mythical Little People of Oceania* (Honolulu, B. P. Bishop Museum Bulletin No. 203, 1951).

[8] Te Rangi Hiroa, *Mangaian Society*, p. 38.

[9] S. P. Smith, "History and traditions of the Taranaki Coast", *Journal of the Polynesian Society*, 1907, vol. 16, p. 192.

[10] John Pakoti, "The first inhabitants of Aitutaki: the story of Ru", *Journal of the Polynesian Society*, 1895, vol. 66, pp. 65-70. Many of these historical accounts employ the term *"tini tangata"* (literally, "multitudes") which implies at least 200 but could be several times this number.

[11] Peter S. Bellwood, *op. cit.*, p. 135.

[12] Alphons M.J. Kloosterman, *Discoverers of the Cook Islands and the Names They Gave* (Rarotonga, Cook Islands Library and Museum Bulletin No. 1, 1976) p. 27.

[13] Te Rangi Hiroa, *The Arts and Crafts of the Cook Islands* (Honolulu, B.P. Bishop Museum, Bulletin No. 179, 1944) p. 13.

[14] Ernest and Pearl Beaglehole, *Ethnology of Pukapuka* (Honolulu, B.P. Bishop Museum, Bulletin No. 150, 1938).

prehistoric time but the atoll was uninhabited on European contact and no ethnohistorical information has come to light regarding it. The raised atoll of Nassau has always been a satellite of Pukapuka and has supported a small population from time to time. There is no evidence that the atoll of Suwarrow was ever inhabited by Polynesians.

B. PREHISTORIC POPULATION DYNAMICS

Little information has survived regarding prehistoric population dynamics in the Cook Islands. Following a war on Rarotonga in which he killed his close relative Tutapu, the victorious Tangi'ia proclaimed: "let man be sacred; let manslaying cease; the land must be divided out amongst the chiefs, from end to end; let the people increase and fill the land".[15] There are reports that the population did increase rapidly on several islands but the time periods referred to are usually obscure. There is no reason to assume that prehistoric populations were maintained in constant equilibrium with the supply of natural resources; it is more likely that after an initial period of rapid growth population levels fluctuated in the wave-like patterns and occasional bursts of mortality characteristic of most pre-modern populations.[16]

Food shortages resulting from hurricane damage or the deliberate destruction of crops during warfare would have periodically raised mortality rates as would warfare itself.[17] Accidental drowning was probably a factor where ocean voyages were common. Regular travel by canoe between Manihiki and Rakahanga and from Pukapuka to Nassau would also have taken its toll, as would the prediliction of young men to set out on risky voyages of adventure.[18] Deliberate expulsion, as occurred on the Polynesian Outlier of Tikopia,[19] cannot be ruled out, especially on the northern atolls where the population-resource balance was more precarious than on the southern volcanic islands.

Missionary sources disagree on the extent to which infanticide was practiced in the Cook group. John Williams claimed it was not employed on any of the southern islands.[20] Wyatt Gill reported that it was rare on some southern islands but "common" on Rarotonga,[21] while William Gill wrote that "infanticide was committed on a large scale, but was chiefly confined to female children, when two or three were already in the family".[22] Evidence from the west suggests that Polynesians were familiar with a wide range of population-limiting techniques.[23] On Kapingamarangi, a Polynesian Outlier in Melanesia, abortion, delayed marriage and methods to extend child spacing were some of the means resorted to during periods of population strain.[24] Several methods have been reported for Niue, including prescribed periods of sexual abstinence, the procuring of abortions, and a "form of geronticide where the aged and infirm were abandoned in the bush".[25] On Tikopia, contraception was practiced by means of *coitus interruptus* and the option of abortion was available for young unmarried women. Infanticide was resorted to when food was clearly in short supply

[15] S. P. Smith, *op. cit.*, p. 38.

[16] See Peter N.D. Pirie "Polynesian populations: review" *Australian Geographical Studies*, 1968, vol. 6, pp. 175-181; Tim Bayliss-Smith "Constraints on population growth: the case of the Polynesian outlier atolls in the pre-contact period", *Human Ecology*, 1974, vol. 2, pp. 259-295; E. A. Wrigley, *Population in History* (New York, McGraw-Hill, 1969).

[17] The practice of destroying the food supply of one's enemies, or even one's own food in order that the enemy could not benefit from it, is mentioned by several sources. The extent of warfare varied from island to island and through time. The Rarotonga tribes are said to have lived peacefully until about 1450, but after that warfare was common. Mangaia, Tongareva and Atiu suffered from frequent wars although in the case of Atiu and principal victims were the neighbouring islands of Mauke and Mitiaro. Pukapuka had no real battles but violence often erupted over food. See Ernest and Pearl Beaglehole, *op. cit.*, pp. 387-393. Te Rangi Hiroa found no references to warfare in the tribal histories of Manihiki and Rakahanga. Te Rangi Hiroa, *Ethnology of Manihiki-Rakahanga* (Honolulu, B.P. Bishop Museum, Bulletin No. 99, 1932).

[18] For a modern example in which 9 young men drowned attempting to reach Tutuila (Samoa) from Pukapuka, see Ernest and Pearl Beaglehole, *op. cit.*, p. 409.

[19] Raymond Firth, *We the Tikopia* (Boston, Beacon Press, 1963) pp. 373-374.

[20] John Williams, *A Narrative of Missionary Enterprises in the South Sea Islands* (London, John Snow, 1837) p. 146.

[21] W. Wyatt Gill, *The South Pacific and New Guinea Past and Present* (Sydney, Charles Potter, 1892) p. 10.

[22] William Gill, *Gems from the Coral Islands* (London, Ward and Co., 1855) p. 13.

[23] Douglas Oliver, *Ancient Tahitian Society*, (3 vols.) (Honolulu, University Press of Hawaii, 1974) p. 412.

[24] William H. Alkire, *Coral Islanders* (Arlington Heights, Illinois, AHM Publishing Co., 1978) p. 74.

[25] *Ibid.*, p. 82.

and it then became common for junior males in poorer families to marry very late.[26]

The extent to which these methods were employed in the Cook Islands is not known. Traditional means of procuring abortions have been reported in Pukapuka,[27] and knowledge of similar techniques is attributed to some women *ta'unga* ("expert") in the southern islands at the present time. The effects of such practices on prehistoric population levels cannot be known. It can be assumed that resource strain would have been felt earliest on the relatively depauperate northern atolls, however, given the small size of the founding groups it may have been several generations before cultural controls would have been required.

C. THE POPULATION AT CONTACT

The extent to which Pacific Island populations went into decline as a result of contact with representatives of European cultures varied greatly from one group to another and between islands in the same general region.[28] Obviously an assessment of the magnitude of the declines (or increases, which also occurred) will be greatly affected by the accuracy of population estimates made at the time of initial contact. In general, scepticism is an appropriate attitude toward estimates made from the deck of a ship or by persons with a vested bureaucratic interest in under or over-estimation. It is often the case, however, that mariners and missionaries were the first European observers to report population levels; therefore, it is necessary to use their figures or none at all. In the Cook Islands, where land masses are small and populations relatively concentrated, it would be a mistake to discount estimates by some missionaries, especially those who had been in residence long enough to become familiar with settlement patterns and household organization. Unfortunately the very earliest missionary estimates give no indication of how they were obtained and therefore must be used cautiously.

The first contacts with Europeans occurred in the northern atolls. The discovery of Rakahanga and Palmerston has been attributed to Magellan in 1521 but this is probably an error. The sighting of Pukapuka by Alvara de Medana in 1595 is more certain. Although his crew reported seeing canoes, no people were observed. In 1605 the two ships of Pedro de Quiros arrived at Rakahanga and an estimated 500 people were observed assembled on the beach.[29]

According to native informants, Pukapuka had once supported a population of between 1,000 and 2,000. Three hundred and fifty years ago a tidal wave and hurricane reduced this population to 15 families.[30] There are two estimates of the size of this population in 1857 when native missionaries landed: Wyatt Gill gives 750[31] while McArthur gives 600.[32]

A wide variety of estimates have been given for Tongareva. Local informants claimed that the atoll had supported 2,000 inhabitants before Europeans came.[33] When Kotzebue located this atoll in 1815, somewhere between 250 and 470 people came out to his ship in canoes, only a few of whom were women.[34] The captain of a ship wrecked here in 1853 estimated the population then at 2,500.[35] William Gill gives a figure of 1,300 which he apparently obtained from a ship's captain who visited the atoll in 1841.[36]

Prior to the arrival of native missionaries in 1856, the twin atolls of Rakahanga and Manihiki were inhabited by one population which journeyed from one atoll to the other as food supplies dictated. Concerned by the dangers this entailed, the missionaries persuaded the population to divide

[26] Raymond Firth, *op. cit.*, pp. 373-374.

[27] Ernest and Pearl Beaglehole, *op. cit.*, p. 267.

[28] Norma McArthur, *Island Populations of the Pacific* (Canberra, Australian National University Press, 1967).

[29] Alphons M. J. Kloosterman, *op. cit.*, p. 40.

[30] Ernest and Pearl Beaglehole, *op. cit.*, p. 21.

[31] W. Wyatt Gill "Report of a voyage to the outstations of the Hervey group", 1881 [South Seas Journals, Council for World Mission (formerly the London Missionary Society) Archives, School of Oriental and African Studies, University of London, hereafter abbreviated to *SSJ*].

[32] Norma McArthur, *op. cit.*, p. 188.

[33] Te Rangi Hiroa, *Ethnology of Tongareva* (Honolulu, B. P. Bishop Museum, Bulletin No. 92, 1932).

[34] O. Von Kotzebue, *A Voyage of Discovery in the South Seas and to Behrings Straits* (Amsterdam, N. Israel, 1821) p. 217.

[35] R. Gerard Ward, (ed.) *American Activities in the Central Pacific 1790-1870* (5 vols.) (Ridgewood, New Jersey, The Gregg Press, 1966) p. 509.

[36] William Gill, *op. cit.*, p. 277.

into two groups and permanent settlements were established on each island sometime before 1862. Before division took place William Gill estimated this population at 1,200.[37]

These fragments of information referring to quite disparate points in time and collected by no disclosed methodology provide a rather insecure base against which subsequent declines may be measured. As table 4 shows, the total of these estimates for the northern atolls varies by 1,000.

The first population estimates for the southern group were made by Captain Cook who officially discovered the Cook Islands by locating Manuae in 1773. At that time no one was seen on Manuae but, during Cook's third voyage in 1777, several canoes came out to his ship. Cook also located Mangaia, Atiu and Palmerston. The missionary John Williams made several voyages throughout the southern group between 1821 and 1831 and he reported the population of each island he visited. Manuae, Mauke and Mitiaro had all suffered recent wars and their populations were consequently much reduced from their former levels. Mauke had been invaded from Atiu and the "previously considerable" population was "by the dreadful massacre that ensued, reduced to about 300".[38] Mitiaro had also been depopulated by "famine and invasion" and at the time of Williams' visit in 1823 fewer than 100 inhabitants remained.[39] The two islets of Manuae had also been at war with each other and Williams found only 60 inhabitants remaining. In each of these cases Williams implies that the populations had been much larger in the recent past; but he does not suggest how much larger each population was nor how many had died from famine and war.

Captain Cook found Atiu in 1777 and assessed the population to be "at least two thousand",[40] a figure more or less confirmed when native missionaries were landed there in 1823. Williams gives a figure of "about 2,000" for Aitutaki and between two and three thousand for Mangaia.[41]

[37] William Gill, *op. cit.*, p. 273.

[38] John Williams, *A Narrative of Missionary Enterprises in the South Sea Islands* (London, John Snow, 1847) p. 5.

[39] *Loc. cit.*

[40] Norma McArthur, *op. cit.*, p. 181.

[41] John Williams, *op. cit.*, p. 5.

Table 4. Some estimates of the populations of the Cook Islands at the time of European contact

Island	Estimated population
Rarotonga	6 000 - 8 000[a,b,c]
Aitutaki	2 000[a]
Mangaia	2 000 - 3 000[a]
Atiu	2 000[d]
Mauke	300[a]
Mitiaro	100[a]
Manuae	60[a]
Total southern group	12 460 - 15 460
Tongareva	700 - 2 000[e,f,g]
Manihiki-Rakahanga	1 000 - 1 200[g]
Pukapuka	600 - 750[h]
Nassau	...
Suwarrow	...
Total northern group	2 300 - 3 950
Total Cook Islands	14 760-19 410

Sources: [a] John Williams, *A Narrative of Missionary Enterprises in the South Sea Islands* (London, John Snow, 1847) p. 5.

[b] Charles Pitman, Letter to London Missionary Society (27 November 1827) (From South Seas Letters, Council for World Mission Archives, School of African and Oriental Studies, University of London. Hereafter abbreviated to *SSL*).

[c] Charles Pitman, Letter to LMS, 1 January 1852. (*SSL*, London).

[d] Cook, cited in: Norma McArthur, *Island Populations of the Pacific*, (Canberra, Australian National University Press) p. 188.

[e] O. Von Kotzebue, *A Voyage of Discovery in the South Seas and to Behrings Straits* (Amsterdam, N. Israel, 1821) p. 217.

[f] R. Gerard Ward (ed.) *American Activities in the Central Pacific 1790-1870.* (5 vols) (Ridgewood, New Jersey, The Gregg Press, 1966) p. 509.

[g] William Gill, *Gems From the Coral Islands.* (London, Ward & Co., 1855) p. 277.

[h] William Wyatt Gill, "Report of a voyage to the outstations of the Hervey group", Report to LMS, 1881 (*SSJ*, London).

Several figures have been given for Rarotonga's population in the late 1820s. On his arrival in 1827 Williams estimated between 6,000 and 7,000[42] and the lower of these figures was again reported by his companion Charles Pitman, the first resident missionary on the island.[43] In a much later communication to the London Missionary Society, Pitman suggests that the population was between 7,000 and 8,000 in 1827.[44] Aaron Buzacott, who arrived in 1828, claimed that up to 1831 the population averaged 7,000, but this is difficult to reconcile with the reported mortality for 1829 and 1830.[45] It is known that a series of tribal wars occurred on Rarotonga between 1814 and 1821 in which from 700 to 1,300 were killed.[46] If we take the average of these figures (1,000) and accept Pitman's figure of 7,000 in 1827, the implication is that the population of Rarotonga was somewhat closer to 8,000 during the decade immediately preceding the establishment of Christian missions.

As table 4 shows, these estimates imply a total southern group population of between 12,500 and 15,500. On the map of the Pacific contained in the 1847 edition of his book, Williams shows a total population for the seven southern islands of between 16,000 and 18,000 which is greater than the sum of the individual totals given in the text.[47]

D. POST-CONTACT POPULATION CHANGE

The consequences of culture contact for the populations of the Cook Islands varied with the form contact took. The isolation of the northern group and the absence of resident European authorities there attracted the slave ships serving the mining and phosphate contractors in Peru. Also, various labour recruiters sought workers for plantations and European homes in Tahiti, the sugar fields of Hawaii, and the phosphate deposits of various equatorial islands to the north. While disease was certainly a factor in the decline of population in the northern group, the primary cause can be attributed to forced and voluntary emigration. Peruvian slave ships were active in the northern Cooks in 1860s, but the exact number of persons taken cannot be known. By most accounts Tongareva was the hardest hit, but estimates of how many were taken ranged widely from 250 to 3,000.[48] Te Rangi Hiroa accepted the figure of "at least 1,000" which he attributed to S.P. Smith.[49] William Wyatt Gill visited Tongareva in 1863 and was told that 200 had been taken aboard one ship and "more than 50" aboard another; but since the island now only contained "a few old people and some children" he believed that many more had in fact been taken.[50]

In a recent review of the historical evidence, Maude determined that 472 Tongarevans were taken to Peru.[51] This is a plausible number if the lower bound of the estimated initial population of Tongareva (700) presented in table 4 is accepted, along with W. Wyatt Gill's estimate of 300 in 1877.[52] It is known that 130 persons were absent in Tahiti on a two-year labour contract,[53] and that 88 persons remained on the atoll after the slave ships left, giving a total of 690. Gill indicates that the population of 300 in 1877 was one third of the original before the slave ships arrived, implying an

[42] *Loc. cit.*

[43] Charles Pitman, Letter to LMS, 27 November 1827. (*SSL*, London).

[44] Charles Pitman, 1 January 1852 (*SSL*, London).

[45] J. P. Sunderland and A. Buzacott, *Mission Life in the Islands of the Pacific* (London, John Snow, 1866).

[46] A defeated chief indicated that "four score and ten" were killed on the victorious side (586), and "five score" (720) on the defeated side (1306 in all). Norma McArthur, *op. cit.*, pp. 164-165.

[47] Attempts have been made to estimate the "carrying capacity" of some of the Cook Islands based on their potential food production. Lay gives a figure of 7,400 for Rarotonga, quoted in R. G. Crocombe, *Land Tenure in the Cook Islands* (Melbourne, Oxford University Press, 1964) p. 32. A formula proposed in a recent study would yield a population of 6,790 in Rarotonga but could not be applied to other islands. See Stephen Beckerman, "Protein and population in tropical Polynesia", *Journal of the Polynesian Society*, vol. 80, pp. 73-79. Bellwood estimated Rarotonga's capacity at 5,000 and Aitutaki, Mangaia and Atiu at 2,900, 4,100 and 3,100 respectively. Peter S. Bellwood, "Varieties of ecological adaptation in the Southern Cook Islands", *Archaeology and Physical Anthropology in Oceania*, vol. 6, pp. 145-169.

[48] The latter figure was apparently given to a trader named Ellis by local informants. See Frederick Moss, *Through Atolls and Islands of the Great South Sea* (London, Sampson Low and others, 1889) pp. 105-106.

[49] Te Rangi Hiroa, *Ethnology of Tongareva*, p. 7.

[50] W. Wyatt Gill, 18 March 1863 (*SSL*, London).

[51] H. E. Maude, *Slavers in Paradise* (Stanford University Press, 1981) p. 11.

[52] W. Wyatt Gill, "Report of a visit to the outstations of the Hervey group", 1877 (*SSJ*, London).

[53] At least some of these returned according to Frederick Moss, *op. cit.*, p. 105.

initial population closer to 900 and leaving an additional 200 unaccounted for. In 1881 Gill reported 372 inhabitants on Tongareva and Harris found an almost identical number in 1889.[54]

It is also difficult to establish with certainty the numbers taken from Pukapuka. One missionary lamented that "almost the entire adult male population was enticed away"[55] which, assuming a balance of the sexes and about 40 per cent children, would match the figure of 140 given by Wyatt Gill. But Gill's figure does not accord with his statement that this "almost depopulated" the atoll, given his previous statement that there had been 750 people on Pukapuka in 1862.[56] Neither do these figures match with Chalmer's count of 309 in 1875.[57] If the latter figure was correct, the reported population of 430 seven years later would represent an increase of almost 40 per cent. It would appear that either the number removed from Pukapuka in 1863 was understated by Gill or the number given for the population in the late 1850s was overstated.[58]

On Manihiki the chief's control over the population effectively prevented anyone from going aboard the slave ships and all inducements were resisted. About 115 people were taken from Rakahanga.[59]

Depending on which figures are accepted for the initial population of the northern group in the 1850s, the population loss during this period was somewhere between 40 per cent and 57 per cent (table 5). Whichever estimate is accepted as valid, however, the decline is still greater than would be expected given the numbers removed by the slavers (by Maude's account, 729 in all).[60] It appears that additional factors must be introduced to account for the decline. The most likely causes are two: endemic disease and continued labour migration.

Table 5. Estimated northern-group population change, 1850-1877

Island		1850	1877	Change	
				Number	Per cent
Tongareva	high	1 300	300	−1 000	−77.0
	low	500		−200	−40.0
Pukapuka	high	750	309	−441	−58.8
	low	600		−291	−48.5
Rakahanga/ Manihiki		1 200	780	−420	−35.0
Total	high	3 250	1 389	−1 861	−57.3
	low	2 300		−911	−39.6

Sources: W. Wyatt Gill, "Report of a visit to the outstations of the Hervey group" 1877, (*SSJ*, London); W. Wyatt Gill, "Report of a visit to the outstations of the Hervey group." 1881, (*SSJ*, London); Norma McArthur, *Island Populations of the Pacific* (Canberra, Australian National University Press, 1967) pp. 162-231; William Gill, *Gems from the Coral Islands* (London, Ward and Co., 1855) pp. 273-277.

It is curious that only one epidemic was reported for the northern group in the pre-colonial period. This occurred on Tongareva in 1853 following a shipwreck, but the number of deaths is not recorded. Leprosy broke out here also but that was not until 1885. It is likely, however, that other diseases were introduced by ships engaged in labour recruiting and that their effects were insidious rather than dramatic and sudden. Moreover, it is known that a great deal of labour migration occurred right up to the 1890s when the phosphate deposits in the Line Islands were exhausted. McArthur quotes from an 1874 report which describes the great demand in Tahiti for Manihiki women as domestic servants; she suggests that both young men and women took every chance to leave.[61] Frederick Moss said that Manihiki and Tongareva divers were "indispensible" to the pearl shell industry of the Tuamotu archipelago to the east and it is likely that there

[54] G. A. Harris, "Report of deputation to the Hervey Islands and surrounding outstations, 1889" (*SSJ*, London).

[55] J. J. K. Hutchin, "An account of the visit paid by Revd. J. J. K. Hutchin to the outstations of the Hervey group", 1896 (*SSJ*, London).

[56] W. Wyatt Gill, 18 March 1863 (*SSL*, London).

[57] James Chalmers, "Report on a visit to the outstations of the Hervey Islands", 1875 (*SSJ*, London).

[58] H.E. Maude, *op. cit.*, p. 49.

[59] Maude estimates that 145 were taken from Pukapuka from an initial population of 600. Maude, *op. cit.*, pp. 51, 192.

[60] H. E. Maude, *op. cit.*, p. 188.

[61] Norma McArthur, *op. cit.*, p. 187.

was considerable movement between the two areas – no doubt via Tahiti. Not only would this have produced a fluctuating population, it would also have promoted the spread of venereal disease with the ultimate effect of depressing fertility.[62]

From the scattered references in missionary reports it would appear that local health conditions, especially on Tongareva, were poor in the 1870s. Chalmers reported that the people of Tongareva were living chiefly on foreign food and that even coconuts were being imported.[63] Under such circumstances, the pressure to migrate elsewhere to earn a cash income would be strong.

In the southern group the initial cause of population decline was imported disease. The Christian ideology of peaceful relations was effective in reducing the potential for violent death caused by inter-tribal war, cannibalism, infanticide and abortion; but the introduction of foreign diseases, usually from Tahiti and other Pacific ports, against which the population had little natural immunity, resulted in a sharp increase in the death rate which more than compensated for the reduction in deaths from indigenous sources.

If the figures shown in table 6 are taken at face value, the southern group declined from approximately 14,000 in 1827 to 8,700 in 1854, a 38 per cent reduction. However, the pattern of decline was not uniform throughout the group; by far the greatest reduction occurred on Rarotonga which lost more than 5,000 people during this period, a decline of 68 per cent.[64] Of the outer islands, only Atiu registered a substantial decline: Aitutaki and Mangaia remained relatively stable until the 1850s and Mauke and Mitiaro increased somewhat. Manuae dropped to a mere remnant of its former population and this group was later relocated on Aitutaki at the behest of missionaries.

The initial cause of population decline on Rarotonga was a series of epidemics which occurred at various intervals between 1829 and 1854. These usually followed the arrival of missionary or whaling ships, although the damage caused to crops and housing by hurricanes and storms often facilitated the spread of disease through a weakened and vulnerable population. Widespread sickness followed the arrival of English missionaries in 1827[65] but did not reach epidemic proportions until 1829 when an extremely heavy rainstorm was followed by an outbreak of dysentery, a previously unknown disease.[66] Estimates of the number of deaths vary[67] but the most likely figure is about 1,000 within 12 months, or 14 per cent of the population. Although no detailed statistics were given, the death rate among females appears to have been considerably higher than for males.

Hurricanes or violent storms struck the southern group again in 1831 and 1833 destroying houses and crops and adding starvation to the causes of death.[68] In 1843 dysentery was reintroduced to Rarotonga by a whaling ship and the deaths that year numbered over 400.[69] Influenza first appeared in 1847 and again in 1848 in combination with whooping cough.[70] Innoculation of the population of Rarotonga in 1848 prevented an outbreak of smallpox which had already occurred in Tahiti. There is no record of this disease reaching any of the other Cook Islands. In 1850 there was an outbreak of mumps and in 1851 influenza combined with "fever" and "ague".[71] Measles were brought from Tahiti in 1854 and although one report said that it proved "fatal to an extraordinary extent", there is no record of the actual number of deaths.[72]

Because vital statistics were reported sporadically throughout the nineteenth century, it is impossible to document changes in mortality rates for more than a few years at a time. By 1840 the population of Rarotonga had been reduced to about 4,300 and was still in decline. According to statistics given by William Gill, there were 2,290 deaths between 1842 and 1853 and only 1,101

[62] Peter N. D. Pirie, "The effects of treponematosis and gonorrhoea on the populations of the Pacific Islands", *Human Biology in Oceania*, 1971, vol. 1, pp. 187-206.

[63] James Chalmers, *loc. cit.* As early as 1862 W. Wyatt Gill reports visiting Nassau atoll "in the futile hope of finding a permanent location for the then starving Penrhyn Islanders". See W. Wyatt Gill, *Jottings from the Pacific* (London, Religious Tract Society, 1885) p. 31.

[64] The population loss on Rarotonga was probably one of the severest in the Pacific during this period and second only to the Marquesas. Norma McArthur, *op. cit.*, pp. 345-354.

[65] Charles Pitman, 6 November 1827 (*SSL*, London).

[66] J. P. Sunderland and A. Buzacott, *op. cit.*, p. 100.

[67] Norma McArthur, *op. cit.*, p. 165.

[68] William Gill, *op. cit.*, p. 46.

[69] William Gill, *op. cit.*, p. 120.

[70] J. P. Sunderland and A. Buzacott, *op. cit.*, p. 108.

[71] Norma McArthur, *op. cit.*, p. 167.

[72] J. P. Sunderland and A. Buzacott, *loc. cit.*

Table 6. Estimated population change in the nineteenth century

Island	1826-1827[a]	1845	1854-1855	1871-1872	1881	1895	1899	1900	1902	Per cent change 1827-1902
Rarotonga	7 500	3 000	2 374	1 936	2 000	2 454	...	2 207	2 060	−70
Aitutaki	2 000	2 000	1 750	1 450	1 146	...	...	...	1 170	−42[b]
Mangaia	3 000	3 100	2 926	2 266	2 000	...	...	...	1 541	−49[b]
Atiu	2 000	900	1 200	1 100	1 002	826	...	...	918	−55[b]
Mauke	300	250	320	350	487	...	...	...	370	+23[b]
Mitiaro	100	100	120	180	207	...	...	...	165	+65[b]
Manuae	60	10	10	10	10	...	...	...	10	−83[b]
Total southern group	13 960	9 760	8 700	7 292	6 852	7 130[c]	6 932[c]	6 983[c]	6 234	−50
Tongareva	1 350	...	...	300	372	...	417	389	445	−71
Manihiki	...	...	...	407	...	...	590	570	484	...
Rakahanga	1 200	...	...	400	...	...	370	400	400	−21
Pukapuka	750	...	...	340	430	...	409	505	505	−33
Palmerston	...	...	...	...	...	...	115	115	115	...
Suwarrow	...	...	...	...	...	...	30	30	30	...
Total northern group	3 300	2 663[c]	2 577[c]	1 447	1 609	1 859[c]	1 931	2 009	1 979	−40
Total Cook Islands	17 260	12 710	11 650[c]	8 774	8 469	8 989[c]	8 863	8 992	8 213	−52[b]

Sources: William Gill, *Gems from the Coral Islands* (London, Ward and Co., 1855); W. Wyatt Gill, "Report of a visit to the outstations of the Hervey group" 1877 and 1881, (*SSJ*, London); John Williams, *A Narrative of Missionary Enterprises in the South Sea Islands* (London, John Snow, 1847); J.P. Sunderland and A. Buzacott, *Mission Life in the Islands of the Pacific* (London, John Snow, 1866); G.A. Harris, "Report at deputation to the Hervey Islands and surrounding outstations, 1889" (*SSJ*, London); Ernest Beaglehole, *Social Change in the South Pacific* (London, Oxford University Press, 1957); Norma McArthur, *Island Populations of the Pacific* (Canberra, Australian National University Press, 1967); *Annual Report on the Cook Islands*, New Zealand, Appendices to the Journals of the House of Representations, A-3, 1900.

Notes: [a] Based on the best estimated from table 4.

[b] Up to 1902.

[c] Interpolated figure.

births.[73] After 1853 few vital statistics were reported but it appears that deaths continued to exceed births for several decades. By the turn of the century the indigenous population of Rarotonga numbered only 1,509 persons, about 20 per cent of the estimated population seventy years earlier.[74]

The first mission ship to arrive at Mangaia in 1822 introduced an "exceedingly fatal" disease,[75] but the number of deaths is not recorded. The population of Mangaia was relatively stable up to 1854, so it is unlikely that the number of deaths exceeded births except, perhaps, for one or two years. Mangaia does not appear to have been seriously affected by the epidemics of 1831, 1833 and 1841 which occurred on Rarotonga; and,

[73] William Gill, *op. cit.*, p. 120.

[74] P.H. Curson, "Birth, death and migration: elements of population change in Rarotonga 1890-1926", *South Pacific Bulletin*, vol. 29, pp. 103-119.

[75] John Williams, *op. cit.*, p. 22.

although an outbreak of "scarlatina" was recorded in 1847, and measles was introduced from Tahiti in 1894, there is no record of the number of deaths these produced. A hurricane did strike Mangaia in 1846 damaging food crops severely but the reports make no mention of any diseases resulting from this. In 1850 George Gill reported 288 deaths among a population of about 3,000 (a crude rate of 96 per 1,000). In the following year, Gill reported that returning migrants from California brought mumps and ague back with them,[76] but it does not appear that this increased the death rate to epidemic proportions. The drop in Mangaia's population between 1845 and 1855 (about 200) was probably due to negligible natural increase combined with the emigration of young men on whaling ships.

Details of mortality on Aitutaki are scarce until 1839 when an English missionary arrived. Aitutaki was also struck by the 1841 hurricane and crops were severely damaged. Dysentery is reported to have caused 100 deaths in 1843. This island appears to have escaped the various epidemics which raged in Rarotonga in 1847 (influenza), 1848 (whooping cough) and 1851 (mumps), however, there is evidence that whooping cough was present sometime before 1887. The measles epidemic did reach Aitutaki, probably directly from Tahiti, but its effects are not documented.

Of the other southern islands, few references to disease exist. Atiu apparently had an outbreak of dysentery in 1891,[77] but the number of fatalities may have been limited by the fact that most of the population was living inland at some distance from the mission station. Mauke experienced a measles outbreak in 1875 which was brought back from Tahiti.[78]

From the mid 1840s on it is impossible to separate the effects of mortality from the effects of emigration. In spite of attempts by the chiefs of most southern islands to prevent emigration, large numbers of young men left for Tahiti or the "guano" islands on temporary labour contracts or sought adventure in Sydney, Honolulu or California. As early as 1849, 200 young men had left Rarotonga, few of whom returned.[79] In 1873 the English missionary stationed on Aitutaki reported that there was "scarcely a lad left for the work of the land"[80] and in 1871 only 32 adult males remained on Mauke out of a population of 380.[81] In 1885, 200 Atiuans were living in Tahiti on land which they had purchased. By the turn of the century the total number of Cook Islanders in Tahiti had swelled to more than 400.[82] In-migration to Rarotonga also contributed to the decline in the population of the outer islands: by the time of the 1895 census, 282 Mangaians and 140 natives of Nga pu toru were recorded in Rarotonga.

The overall population of the southern group continued to decline beyond the turn of the century as a combined result of emigration and negative natural growth. Vital data are scanty for most islands after 1853, but statistics for Aitutaki between 1886 and 1899 may be indicative of what was taking place elsewhere. The average crude birth rate was 31.5 per 1,000 while the death rate was 37.4 per 1,000.[83] An infant mortality rate of 202 per 1,000 live births contributed to this high death rate. Vital statistics for the southern group as a whole were reported for the period 1892-1896[84] and indicated an excess of 125 births over deaths. However, it is likely that the number of deaths was understated at this time[85] and in the light of later evidence any natural increase was probably a temporary fluctuation which in any case would have been offset by emigration.

E. CONCLUSION

In summary, the dramatic social, political and economic changes which occurred in the Cook Islands between 1830 and 1900 had profound demographic effects, some of which were long-lasting. The nature and magnitude of these changes varied greatly from island to island and between regions. Rapid and severe depopulation occurred primarily on Rarotonga and Tongareva both of which, by the end of the century, had lost between 70 and 80 per cent of their original

[76] George Gill, 30 September 1851, (*SSL*, London).

[77] Norma McArthur, *op. cit.*, p. 181.

[78] James Chalmers, 1875 (*SSJ*, London).

[79] P. H. Curson, *op. cit.*, p. 107.

[80] Henry Royle, 13 December 1873 (*SSL*, London).

[81] J.C. Vivian, April 1871 (*SSL*, London).

[82] Norma McArthur, *op. cit.*, p. 171.

[83] Annual Report on the Cook Islands, New Zealand, Appendices to the Journals of the House of Representatives, A-3, 1900 (hereafter abbreviated to *AJHR*).

[84] *AJHR*, 1901.

[85] Richard Gilson, *The Cook Islands 1820-1950* (Wellington, Victoria University Press, 1980), p. 77.

populations. The other islands of the group were affected to varying degrees by both epidemic and endemic disease as well as emigration, but none to the extent of Tongareva and Rarotonga. Overall, the population decreased by half during the last three quarters of the nineteenth century. Some islands recovered by the 1890s but others did not register a natural increase until the second decade of the twentieth century.[86] In some districts of Rarotonga complete lineages died out, resulting in the redistribution of land, titles and, consequently, political power.

The establishment of missions and the commencement of external trade altered the geographical distribution of the remaining population, especially in the southern group. Prior to contact the population had lived in dispersed hamlets located near the planting lands of each domestic group. Missionaries encouraged the concentration of population near the churches and harbours which probably facilitated the spread of disease, as did European style clothing and housing.

Emigration became a powerful determinant of demographic change during this period. Age and sex-selective emigration affected more than population structure; return migrants from various parts of the Pacific introduced ideas and values which undermined the authority of chiefs as well as missionaries and hastened the end of theological rule.

[86] P. H. Curson, *op. cit.*, p. 103.

Chapter III
POPULATION CHANGE IN THE TWENTIETH CENTURY: GENERAL TRENDS

A. INTRODUCTION

The purpose of this chapter is to give a brief overview of population trends during the twentieth century, to describe the determinants of these trends where possible, to discuss their implications for socio-economic development and to place them in a comparative Pacific context. Some comments will also be made regarding the present population situation and its implications for the future. The chapter represents a summary of the more detailed analyses to be found in subsequent chapters. Readers concerned with technical and methodological issues should refer to the constituent chapters.

The relationship between population change and socio-economic development is theoretically complex and highly controversial.[1] While most theorists would conclude that rapid population growth brings few advantages to a developing country, the theoretical models which postulated a negative relationship between population growth and an increase in *per capita* income (GNP) have been increasingly called into question.[2] In part this is because such models were based essentially on economic growth theories of the 1950s which tended to place capital accumulation at the core of economic development and paid relatively little attention to institutional or sociocultural factors. By the 1970s, however, attention had turned to questions of income distribution, basic needs, rural development, population distribution, international inequality and the quality of human resources.

While controversy continues to surround macro-economic issues, it has become clear that no single, abstract model is applicable to all societies independently of their stage of development, socio-cultural characteristics and historical experience. The focus of population and development research is turning increasingly to the unique problems of specific historical communities.[3]

This approach is particularly appropriate in the Cook Islands case: population-development models designed with the multi-million populations of Asian, African or Latin American countries in mind cannot be applied to micro-populations without modification. And although it shares many geographical features with its Pacific neighbours (limited natural resources, wide dispersion of population, reliance on a small range of export crops, dependence on foreign aid and private remittances, etc.), the Cook Islands has an extremely "open" population and economy because of its unique constitutional link with New Zealand. Unlike Niue and Tokelau, however, which are similarly linked to New Zealand, the Cook Islands has evolved toward quasi nation-state status while always stopping short of complete political independence. This evolution has both demographic and economic implications insofar as such a form of political organization requires an appropriate population base and level of productivity to support it.

While the relationship between population and socio-economic development is context-specific, the dynamics of population change are best understood by reference to the general framework of "demographic transition" theory. In broad terms, this theory envisages three stages through which most populations can be expected to pass. In the first stage both fertility and

[1] Useful discussions of the issues may be found in: Nancy Birdsell, "Analytical approaches to the relationship of population growth and development," *Population and Development Review*, vol. 3, 1977, pp. 63-102; Robert H. Cassen, "Population and development," *World Development*, vol. 4, 1976, pp. 785-830; Geoffrey McNicoll, "Population and development: outlines of a structuralist approach," in: Geoffrey Hawthorn (ed.), *Population and Development* (London, Frank Cass, 1978).

[2] For example, see W. Brian Arthur and Geoffrey McNicoll, "Large scale simulation models in population and development: what use to planners?" *Population and Development Review*, vol. 1, 1975, pp. 251-266; Nancy Birdsell, *loc. cit.*

[3] Geoffrey McNicoll, "Population and Development..."

mortality rates are high leading to low or negative population growth. In the second stage mortality falls rapidly while fertility either remains the same or possibly increases; this produces rapid population growth. In the third stage, after a lag of variable duration, fertility declines to a similar level as mortality resulting in either low or zero population growth.[4] Thus, rapid population growth can be seen as a result of the lag between the decline in mortality and the subsequent decline in fertility.

A major theoretical limitation of the model as originally formulated was the absence of a migration component. In recent years various attempts have been made to incorporate migration to produce a more dynamic theory. Thus Zelinsky has suggested that societies passing through the mortality and fertility transitions may simultaneously or subsequently experience a "mobility transition."[5] Kingsley Davis has argued that emigration can be seen as one of the possible demographic responses to the high rates of population growth to be expected in the second stage of the demographic transition.[6] This is particularly suggestive in the case of the Cook Islands since it implies that as fertility declines, net emigration is likely to decline as well. Of course there are economic and cultural forces which will tend to perpetuate emigration independently of demographic factors, but demographic theory helps to identify when these factors become especially relevant.

The rest of this chapter will place the broad population trends in the Cook Islands within this general theoretical framework.

B. POPULATION CHANGE: GROWTH AND DECLINE

1. Total population

The demographic history of the Cook Islands in the twentieth century can be divided approximately into three periods: (a) a period of gradual recovery from the decline of the nineteenth century lasting until the late 1920s; (b) a period of slow but increasing growth leading to a population peak for the century in 1971; (c) a period of rapid, but decelerating decline from 1971 up to the most recent census in 1981 (see table 7 and figure 1) and continuing at the time of writing.

The average annual rate of change over the century (1902-1981) has been a modest 0.98 per cent growth (assuming geometric change), although it is clear that there has been considerable intercensal fluctuation. Growth was particularly slow during the first 16 years of the century and it was not until the 1926-1936 period that the rate of increase rose above 2 per cent (table 8). The sharpest contrast on an intercensal basis was between the intercensal periods 1966-1971 and 1971-1976. During the first of these the population grew at an average annual rate of 2.15 per cent; in the latter period the rate of growth completely reversed and the population declined at an average annual rate of 3.02 per cent. The growth patterns of the last two intercensal periods are compared in table 9. Clearly the rate of decrease in the 1976-1981 period has dropped to a fraction of the 1971-1976 period (2.1 per cent compared with 15.0 per cent). Nevertheless, the mid-year population estimate for 1982 (16,900) suggests a decline of 2.9 per cent over mid-year 1981, and this may be a sign that the rate of decrease is accelerating again. The 1982 population is approximately the same as in the mid 1950s although there are major differences in the way the 1981 population was distributed.

Although the patterns of change have been less volatile than in the nineteenth century, the twentieth century can also be characterized as a period of considerable demographic instability. This instability is a function of a gradually evolving transition in fertility and mortality rates, accompanied by erratic fluctuations in the rate of external migration.

The long-term trends in fertility and mortality (as measured by crude rates) are plotted in figure 2 and reveal a pattern of change similar in general outline to that supported by the theory of "demographic transition" previously discussed[7] (actual rates are given in table 10). Although the registration data are of poor quality during the first

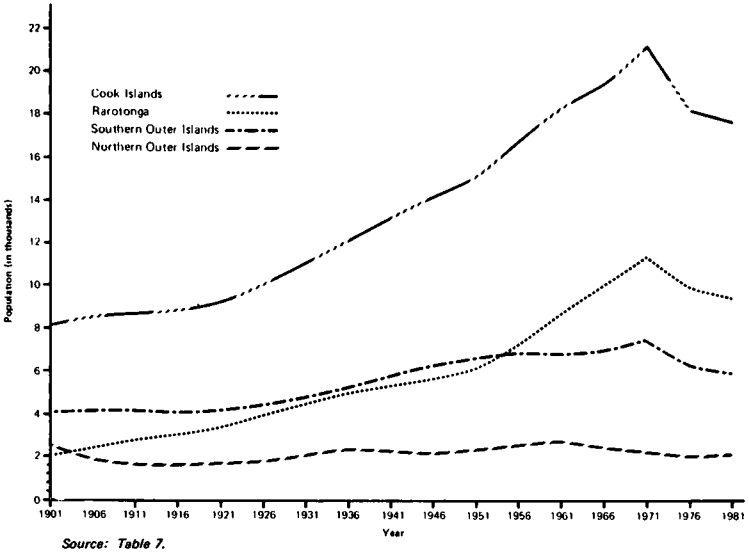
[4] This theory was first proposed by: Warren S. Thompson, "Population," *American Journal of Sociology*, vol. 34, 1929, pp. 959-975.

[5] Wilbur Zelinsky, "The demographic transition: changing patterns of migration," in *Population Science in the Service of Mankind* (Liege, Belgium, International Union for the Scientific Study of Population, 1979), pp. 165-188.

[6] Kingsley Davis, "The theory of change and response in modern demographic history", *Population Index*, vol. 29, 1963, pp. 345-356.

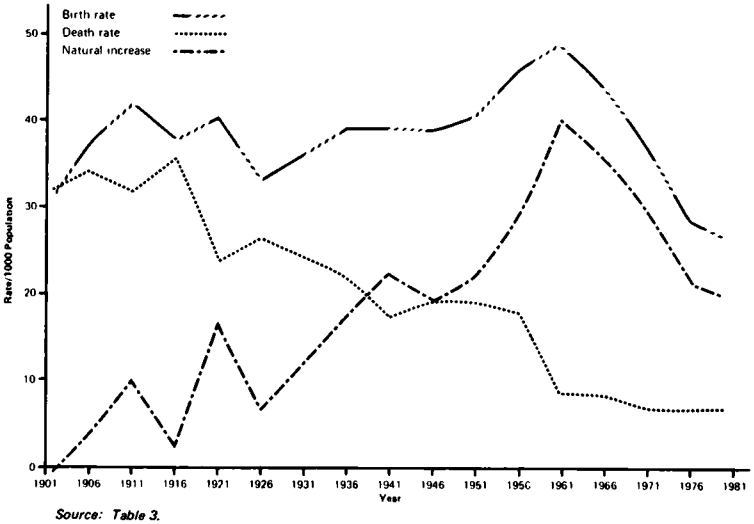
[7] The increase in both the birth and death rate between 1901 and 1916 probably indicates more complete recording of vital events.

Figure 1. Cook Islands population change by region, 1901-1981



Source: Table 7.

Figure 2. Crude rates of birth, death, and natural increase, 1902-1981



Source: Table 3.

20 years of the century, the available evidence suggests that fertility and mortality were at similar levels during the closing years of the nineteenth century and the first decade of the twentieth,[8] resulting in a low or negative natural increase. After 1916, however, mortality falls below fertility and after 1926 shows a fairly steady pattern of decline before levelling off around 1971. Fertility, on the other hand, increases steadily from 1926 onwards reaching a peak in 1961 before declining quite rapidly over the subsequent 20 years. Insofar as natural growth is concerned, the Cook Islands experienced fluctuating, but positive, growth during the first 26 years of the century. This was followed by 35 years (1926-1961) in which the rate of natural growth climbed steadily upwards, reaching a peak of 40 per 1,000 in 1961. This in turn was followed by 20 years of decreasing rates of natural growth to a level of about 21 per 1,000 in 1981.

The exact level of external migration in the early part of the century cannot be determined with much accuracy. Up until the 1951-1961 intercensal period, it is impossible to reconcile reported net migration with the census counts and continuous records,[9] and certain discrepancies in the migration records also have been found in the 1966-1971 period.[10] While the under-registration of deaths has contributed to these discrepancies, particularly prior to 1956, the primary cause was unrecorded emigration.

These statistical discrepancies aside, it is clear that emigration has played a major role in determining the actual level of population in the Cook Islands. While migration has never been insignificant, its importance has grown immensely since 1945. Given the stabilization of mortality in the 1970s and steadily declining fertility since 1961, external migration has become the primary determinant of short-term changes in population levels.

[8] P.H. Curson, "Birth, death and migration: elements of population change in Rarotonga 1890-1926," *New Zealand Geographer*, vol. 29, 1973, p. 111. Curson's analysis of Rarotonga census data for the period 1902-1911 indicated a crude birth rate of 43.6 per 1,000 and an almost identical crude death rate of 43.4 per 1,000.

[9] Norma McArthur, *Island Population of the Pacific* (Canberra, Australian National University Press, 1967), pp. 198-199.

[10] Geoffrey R. Hayes, *Report on Project to Evaluate Cook Islands Vital Statistics, 1965-77*, South Pacific Commission, 1980 (unpublished).

2. Regional and inter-island variations in population change

It is apparent from tables 7 and 8 and figure 1 that population change has occurred unevenly across regions and individual islands. Rarotonga's growth has been steady and relatively high (sometimes exceeding 4 per cent per annum) and, unlike other regions, Rarotonga did not experience negative growth until the 1971-1976 period. The outer islands, in contrast, have had lower and somewhat more irregular rates of change since the beginning of the century, and periods of actual population decline have been more frequent. These regional patterns are, of course, interrelated; Rarotonga has been receiving migrants from the outer islands since the 1860s and this out-flow has contributed to the lower rates of growth in the islands of out-migration while also increasing the rate of growth on Rarotonga.

The average annual rate of increase for the outer islands over the period 1902-1981 (table 8) was only 0.35 per cent compared to Rarotonga's 1.96 per cent and 0.98 per cent for the Cook Islands as a whole. In the northern group, the rate of growth was only 0.17 per cent per annum over the 1902-1981 period – less than one tenth of Rarotonga's rate. The northern group population in 1981 (2,264), while reflecting an increase over 1976, is still relatively close to the mean population over the century (2,109) and is no higher than the level reached in the late 1940s. The southern outer islands have had a higher average rate of growth overall (0.44 per cent) but, unlike the northern atolls, have continued to decline since 1976, and their 1981 population of 5,873 is approximately the same as that recorded in 1939.

These regional trends tend to conceal the variable population history of each island taken as an individual entity. Some indication of the variable growth history of each island can be obtained from table 11 which shows changing rates of growth from three time-depth perspectives. Each island can be placed in one of four classes depending on its pattern of growth: (a) those experiencing long-term population decline since the turn of the century; (b) islands which have been declining since the end of the Second World War; (c) islands which have only decreased in numbers since 1971; (d) islands which have increased in population. The islands of Mangaia, Palmerston and Rakahanga show consistent (and accelerating) rates of decline from all three time perspectives and therefore fall in the first category; Mauke, Manihiki and Tongareva fall in the second

Table 7. Cook Islands population change by island and region, 1902-1981

Island/region	1902	1906	1911	1916	1921	1926	1936	1945	1951	1956	1961	1966	1971	1976	1981
Rarotonga	2 060	2 441	2 759	3 064	3 503	3 936	5 054	5 573	6 048	7 212	8 676	9 971	11 478	9 802	9 530
Aitutaki	1 170	1 162	1 237	1 302	1 373	1 431	1 719	2 356	2 396	2 565	2 582	2 579	2 855	2 423	2 335
Atiu	918	918	812	759	837	933	1 086	1 114	1 270	1 307	1 266	1 327	1 455	1 312	1 225
Mangaia	1 541	1 531	1 471	1 245	1 230	1 249	1 459	1 845	1 830	1 970	1 877	2 002	2 081	1 530	1 364
Manuae	10	–	29	23	–	23	8	28	20	32	18	15	2	–	12
Mauke	370	446	457	490	578	511	652	804	836	815	785	671	763	710	681
Mitiaro	165	210	199	237	207	238	265	229	305	275	307	293	331	305	256
Total southern outer islands	4 174	4 267	4 205	4 056	4 255	4 385	5 189	6 376	6 657	6 964	6 835	6 887	7 487	6 280	5 873
Manihiki	484	521	444	493	432	416	487	435	816	661	1 006	584	452	266	405
Nassau	–	–	–	–	–	–	18	–	124	110	109	167	160	123	134
Palmerston	115	82	107	90	83	97	90	65	87	77	86	86	62	56	51
Pukapuka	505	435	490	474	530	526	651	662	559	638	718	684	732	785	797
Rakahanga	400	352	315	295	310	327	290	318	261	341	319	323	339	283	269
Suwarrow	30	–	–	7	–	–	–	5	–	58	1	–	–	–	–
Tongareva	445	420	335	326	376	395	467	654	527	619	628	545	612	531	608
Total northern outer islands	1 979	1 810	1 691	1 685	1 731	1 788	2 007	2 139	2 374	2 504	2 864	2 389	2 358	2 046	2 266
Total outer islands	6 153	6 007	5 896	5 741	5 986	6 173	7 196	8 515	9 031	9 468	9 699	9 276	9 845	8 326	8 139
Total Cook Islands	8 213	8 518	8 655	8 805	9 459	10 082	12 246	14 088	15 079	16 680	18 378	19 247	21 323	18 128	17 754[a]

Source: Cook Islands Statistics Office, *Census of Population and Housing, 1976*, p. 55, table 1.

Note: [a] Includes 85 persons "at sea".

Table 8. Average annual rates of population change by region, 1902-1981[a]

Period	Rarotonga	Southern outer islands	Northern outer islands	Total outer islands	Total Cook Islands
1902-1906	4.62	−0.56	−2.13	−0.59	0.92
1906-1911	2.60	−0.29	−1.31	−0.37	0.32
1911-1916	2.21	−0.71	−0.07	−0.53	0.35
1916-1921	2.86	0.83	0.55	0.85	1.48
1921-1926	2.48	0.76	0.35	0.62	1.32
1926-1936	2.84	1.83	1.37	1.66	2.15
1936-1945	1.28	2.54	0.75	2.04	1.67
1945-1951	1.42	0.73	1.83	1.21	1.17
1951-1956	3.85	0.92	1.09	0.96	2.12
1956-1961	4.06	−0.37	2.90	0.48	2.03
1961-1966	2.98	0.15	−3.22	−0.87	0.94
1966-1971	3.02	1.74	−0.27	1.22	2.15
1971-1976	−2.92	−3.24	−2.64	−3.08	−3.02
1976-1981	−0.55	−1.21	2.31	−0.42	−0.41
1902-1981[b]	1.96	0.44	0.17	0.35	0.98

Sources: Calculated from Cook Islands Statistics Office, *Census of Population and Housing, 1976,* p. 55; Cook Islands Statistics Office, *Quarterly Statistical Bulletin,* December 1981, p. ii.

Notes: [a] Mean rate of change based on the population at the beginning of each period.

[b] Assuming geometric growth

Table 9. Population change, 1971-1976 and 1976-1981

	1971-1976		1976-1981	
	Number	Per cent	Number	Per cent
Rarotonga	−1 676	−14.6	−272	−2.8
Aitutaki	−432	−15.1	−88	−3.6
Atiu	−143	−9.8	−87	−6.6
Mangaia	−551	−26.5	−166	−10.8
Mauke	−53	−6.9	−29	−4.1
Mitiaro	−26	−7.9	−49	−16.1
Total southern outer islands[a]	−1 207	−16.1	−407	−6.5
Manihiki	−186	−41.2	+139	+52.3
Nassau	−37	−23.1	+11	+8.9
Palmerston	−6	−9.7	−5	−8.9
Pukapuka	+53	+7.2	+12	+1.5
Rakahanga	−56	−16.5	+77	+14.5
Total northern outer islands	−312	−13.2	+220	+10.8
Total outer islands	−1 519	−15.4	−187	−2.2
Total Cook Islands	−3 195	−15.0	−374	−2.1

Source: Table 7.

Note: [a] Includes Manuae.

Table 10. Crude rates[a] of births, deaths and natural increase, 1902-1981

Year	Crude birth rate	Crude death rate	Crude natural increase
1902[b]	31.34	31.74	−0.45
1906[c]	37.67	33.93	3.74
1911[d]	41.74	31.72	10.01
1916[e]	37.76	35.53	2.23
1921[f]	40.14	23.80	16.33
1926[g]	33.00	26.40	6.60
1936	39.23	17.43	21.80
1941	39.20	17.23	21.97
1946	38.60	19.30	19.30
1951	40.34	18.77	21.56
1956	46.00	17.58	28.42
1961	48.59	8.51	40.08
1966	44.12	8.52	35.60
1971	36.83	6.80	30.03
1976	28.15	6.81	21.34
1981[h]	26.84	6.21	20.63

Sources: New Zealand, Department of Island Territories, *Annual Report on the Cook Islands*, (Wellington, Government Printer, 1902-1928); Cook Islands Statistics Office, unpublished tables of vital rates (refer to period 1936-1963); Geoffrey R. Hayes, *op. cit.* (Appendix) (covers period 1964-1977); Cook Islands Statistics Office, *Quarterly Statistical Bulletin*, December 1980.

Notes: [a] Crude rate = vital events per 1,000 population.

[b] Estimated on the basis of returns for five islands only.

[c] Estimated on basis of returns for eight islands.

[d] Returns from six islands (returns for 1911, 1912, 1913 were averaged). (1912; 1913; 1914).

[e] Returns from six islands (returns for 1915, 1916, 1918 were averaged).

[f] Returns from six islands (vital statistics refer to year-ending 31 March 1923).

[g] Returns from six islands (1927 data only).

[h] Vital statistics for 1980-1981 were averaged.

category; Rarotonga, Aitutaki and Mitiaro fall in the third, and only the island of Pukapuka (along with its satellite island of Nassau) falls in the fourth category.

Many of these trends have continued into the most recent intercensal period. Mangaia and Palmerston continue their long-term decline although at a slower rate than previously. Rarotonga and Aitutaki are continuing their downward trend which began in 1971, although, again, the pace of decline is much slower than during the 1971-1976 period. On the other hand, the increases in Manihiki and Tongareva represent a reversal of their long-term decline, and this is also true of the northern group as a whole.

Table 11. Population change in long, medium and short term perspectives by island and geographical region

(rates of change assuming geometric increase or decrease)

Island/region	Long-term 1902-1981	Medium-term 1945-1981	Short-term 1971-1981
Rarotonga	1.95	1.48	−1.89
Aitutaki	0.90	–	−1.94
Atiu	0.37	0.26	−1.71
Mangaia	−0.15	−0.84	−4.14
Mauke	0.78	−0.45	−1.09
Mitiaro	0.55	0.31	−2.54
Total southern outer islands[a]	0.44	0.22	−2.37
Manihiki	0.23	−0.19	−1.09
Palmerston	−1.02	−0.67	−1.93
Pukapuka	0.58	0.52	0.58
Rakahanga	−0.50	−0.46	−2.29
Tongareva	0.39	−0.20	−0.07
Total northern outer islands[b]	0.17	0.15	−0.41
Total Cook Islands	0.98	0.63	−1.84

Source: Calculated from table 7.

Notes: [a] Includes Manuae.

[b] Includes Nassau.

C. COMPONENTS OF CHANGE

1. Mortality[11]

The transition from high to low mortality began in earnest in the early 1920s. The crude death rate (CDR) fell by more than half from about 35 per 1,000 in 1916 to around 16 per 1,000 in 1956. It took only another five years for the CDR to fall a further 50 per cent to 8.6 per 1,000 in 1961. Twenty years later the rate stood at 6.3 indicating that the rate of decline fell rapidly during the last two decades.

Thus, the mortality transition in the Cook Islands was essentially completed by the early 1960s. It was brought about by the gradual development of immunity to those foreign diseases which had so reduced the population in the nineteenth century and the eradication of such infectious and parasitic diseases as tuberculosis and gastroenteritis through public health measures. The reduction of infant mortality from about 170 per 1,000 live births in the late 1920s to 44 by the early 1960s had much to do with the decline in the crude death rate. For the population as a whole then, the mortality transition took approximately 40 years to occur with some variation in timing among the regions.

Present mortality levels in the Cook Islands are comparable with other Polynesian populations with similar economies and style of life. The CDR of 6.3 per 1,000 in 1981 is within the range represented by American Samoa (5 per 1,000) and Wallis and Futuna Islands (6 per 1,000) on the low side, and Tokelau (7 per 1,000) and French Polynesia (7 per 1,000) on the slightly higher side.[12] At these low levels of mortality, however, the

[11] Unless otherwise indicated, the statistical information in this section is taken from chapter VI.

[12] South Pacific Commission, *South Pacific Economies 1980: Statistical Summary*, Edition No. 6, August 1982, p. 33.

crude death rate begins to reflect not only actual mortality conditions but also the age structure of the population. A precise comparison of mortality across the Pacific would require that the effects of different age structures be controlled by means of a standardized death rate. Even then, however, variations in the quality of reporting may result in different rates even when actual mortality conditions are similar.

Infant mortality in 1979-1981 was 28.5 per 1,000 live births for the population as a whole and about 3 points higher in the northern atolls. Comparative figures for other Pacific countries with dates in parentheses are: American Samoa, 19 (1980); Trust Territory of the Pacific Islands, 29 (1979); Tonga, 45 (1977-1979); New Caledonia, 27 (1980); Tuvalu, 42 (1979).[13] American Samoa's low rate is no doubt a function of the health care efficiencies which come with a population concentrated mainly on one island combined with high *per capita* incomes. The Cook Islands rate is similar to that of the Trust Territory which has a lower *per capita* income but similar health care delivery problems to the Cook Islands.

Life expectancy in the Cook Islands increased rapidly from the 1940s to mid 1960s after which the rate of improvement declined. Life expectancy at birth in 1981 was 64 for males and 70 for females. Averaging these gives an approximate figure of 67 for both sexes. While comparative data are lacking for 1981, Cook Islands life expectancy at birth in 1976 (65 years) was above that reported for Fiji (62), Niue (62) and Tonga (58),[14] and it is more than likely that this advantage has been maintained in subsequent years. One possible explanation for this is the low ratio of persons per medical doctor in the Cook Islands by comparison with other Pacific island countries (especially Tonga and Western Samoa).

It should be noted that male life expectancy at birth has decreased in the outer islands during the 1976-1981 intercensal period by about 3 years, whereas it increased by 4 years on Rarotonga. Until the cause of death data become available for the 1979-1981 period, no explanation can be given for this, but it is noteworthy that death rates among northern group males have increased since 1971 across most age groups except the 0-9. The spread between male and female life expectancy at birth has been widening since 1971 and now stands at six years. This can be explained by the worsening mortality situation among outer islands males and steadily improving mortality among females throughout all regions. Diseases of the circulatory system are the single most important cause of death in the Cook Islands and these tend to affect men in particular.

Even with improvements in mortality, the crude death rate in the Cook Islands is unlikely to fall in the next two decades. This would only occur if emigration stopped and the population became progressively younger. As it is, the population is aging because of the twin effects of declining fertility and emigration and the most likely prospect for the future is for the proportion of the population aged 65 and above to increase steadily over the next two decades resulting in a slightly higher crude death rate than at present.

2. Fertility[15]

While the crude death rate dropped steadily for 40 years after 1920, the crude birth rate (CBR) increased throughout the same period. Herein lies the explanation for the high rates of natural increase since the 1920s and especially the 1940s. As figure 2 (above) demonstrated, the CBR did not peak until 1961 when it reached about 49 per 1,000. Even adjusting for the changing age composition of the population, the birth rate was still an exceptionally high 48 per 1,000 in 1961. The period 1961-1966 thus exhibited the widest spread between the birth and death rates in the Cook Islands this century resulting in natural increase of 4.0 per cent annually. This rate implies that the population was doubling (or would have doubled without emigration) every 17.5 years.

After 1966, the birth rate declined dramatically, particularly in Rarotonga. The present CBR of 26.3 per 1,000 is among the lowest in the Pacific with only Tuvalu (24 per 1,000), Tokelau (20), Palau (19.8) and New Caledonia (26) reporting lower rates around 1980.[16]

Given the rapidly changing age composition of the Cook Islands' population, however, the crude birth rate is becoming less useful as an indicator of comparative fertility levels. Age-adjusted birth rates suggest that fertility remains

[13] *Ibid.*

[14] *Ibid.*

[15] Unless otherwise indicated, statistical data in this section are taken from chapter V.

[16] South Pacific Commission, *South Pacific Economies 1980: Statistical Summary*, Edition No. 6, August 1982, p. 33.

substantially higher in the outer islands than on Rarotonga. This is also reflected in the age-adjusted general fertility rate, which, in 1981, varied from 111 in Rarotonga to 180 and 181 in the southern and northern outer islands respectively.

Although susceptible to variations in age structure, the unadjusted general fertility rate indicates that the two northern atolls of Tongareva and Pukapuka and the small southern island of Mauke presently have the highest fertility levels. This can probably be explained by the lower educational attainment, less formal labour force experience, more recent or no exposure to family planning concepts and materials among northern group women. A certain cultural conservatism by comparison with other islands may be a contributing factor. At the present time, the average outer islands woman is giving birth to 5.6 children in her lifetime compared with 3.3 for Rarotongan women. For the Cook Islands as a whole, the total fertility rate is 4.1.

The key question is how long it will take for the fertility transition to complete its course. If it is assumed that it will take at least as long as the mortality transition, then the Cook Islands would not see birth rates matching death rates until approximately the turn of the century. Because fertility reduction encounters more socio-cultural resistance than mortality reduction, however, this scenario may be too optimistic. The population projections reported in chapter XI make the assumption that fertility in the outer islands will fall at a similar rate as in Rarotonga but with a delay of about one decade. Furthermore, it is assumed that fertility will always remain somewhat higher in the outer islands for cultural and economic reasons. If these assumptions are valid, then the fertility transition would require more than 50 years to run its course. In other words, making reasonable assumptions about the rate at which fertility will decline, the Cook Islands can expect to have a positive rate of natural increase until the second decade of the next century.

3. Migration[17]

We have seen that mortality and fertility have followed the general course outlined by transition theory. The principal demographic function of emigration has been to maintain a growth rate well below the potential represented by natural increase. From the 1920s to the mid-1960s, the average rate of net external migration was about 8.5 per 1,000 compared with natural increase of 23 per 1,000; consequently the population grew rapidly. By the 1971-1975 period, however, net emigration reached an average annual rate of 49.6 per 1,000, almost double the rate of natural increase. This resulted in a sharp drop in total population after 1971 (see figure 1 above).

From 1966 through to 1981, the annual rate of emigration has tended to fluctuate erratically. In 1968 and 1977 there was a net inflow of 0.8 and 6.0 per 1,000 respectively; in 1974 the net emigration rate increased to 96.2 per 1,000 and to 104.6 per 1,000 for the Maori population taken separately. The average rate throughout this period was 28.4 per 1,000 which is equivalent to a net outflow of 552 migrants annually. Among the Maori population, the average annual outflow was almost 600 persons, representing a crude rate of 32 per 1,000. The total estimated number of emigrants during the intercensal period 1966-1981 was between 9,000 and 9,500 in the total population, depending on the estimation method used.

If we take the 1966-1981 period as a whole, it is clear that the average rate of emigration has also varied quite widely from island to island. Three islands stand out in particular as having extremely high rates: Mangaia (50 per 1,000), Palmerston (64.5) and Manihiki (64.2). The lowest rates, on the other hand, were recorded by the northern atolls of Pukapuka/Nassau (21.2) and Tongareva (22.6). The remaining islands fell within the range represented by Rakahanga (35.8) and Mauke (29.2).

Two points can be made about these rates. First, there is no island on which emigration is a negligible factor in reducing the rate of population growth. Second, while the southern outer islands as a group had the highest rate of the three regions (36.6 per 1,000 compared with 30.0 for Rarotonga and 33.4 for the northern group), high and low emigration islands are distributed throughout the outer islands. Thus, there is no simple correlation between geographical location and the rate of emigration. Similarly, there is no correlation between the rate of emigration and population density. Indeed, the highest density island (Pukapuka) had one of the lowest emigration rates.

The most important effect of emigration is the reduction of population growth from a potential 2.7 per cent per annum during the

[17] Statistical data in this section are from chapter VIII unless otherwise indicated.

1966-1981 period to a negative rate of 0.5 per cent. In other words, for the population as a whole, emigration has reduced growth by approximately 120 per cent. Only on Tongareva and Pukapuka/Nassau was emigration below natural increase while in the case of Mauke the two rates were identical.

The second major effect is the depletion of the young adult population because of the age-selective nature of emigration. Net emigration in recent years has been particularly selective of those aged 15 to 29, and within this range those aged 15 to 24 make up a large proportion of the total emigration stream. During the 1971-1978 period, almost 80 per cent of the total emigration stream was under the age of 25. Of course, the Cook Islands population is also young because of high fertility in the past; but the emigration stream tends to be even younger than the total population. Rarotonga and some of the southern outer islands suffer less from this problem than the northern atolls. For example, the number of males aged 25-29 in the northern group declined from 117 in 1956 to 40 in 1981, and the number aged 30-34 has dropped from 113 in 1961 to only 21 in 1981.

Because emigration tends to fluctuate widely from year to year, it is difficult to identify clear trends from annual figures. On an intercensal basis, however, emigration is obviously declining: the net migration loss in the 1976-1981 period was 2,251 compared with 5,739 in the 1971-1976 period – a decline of about 40 per cent. The decrease has been most marked in the northern group which actually registered a migration gain in the male population during the 1976-1981 period.

The complexity of migration by comparison with mortality and fertility makes it extremely difficult to predict future patterns. Those social-demographic approaches which employ some version of "transition" theory (discussed more fully in chapter VIII) envisage declining net emigration as the fertility transition proceeds, perhaps accompanied by an increase in circulation. Those theories which focus mainly on the economic discrepancies between the Cook Islands and New Zealand predict continuing high levels of emigration unless these discrepancies can be reduced. There is evidence to support both views. On a long-term basis, emigration is following the downward trend that transition theory would predict; on the other hand, emigration has a tendency to increase suddenly with cumulative effects throughout the economy and society.

D. POPULATION COMPOSITION

1. Age composition

Up until the early 1970s, the proportion of the population under 15 years of age increased steadily while the population 15 years of age and over tended to decrease.[18] This was a consequence of two processes: on the one hand, high fertility increased the under 15 group; on the other hand, high rates of emigration reduced the 15 and over group.

Since 1971, and increasingly since 1976, these processes have reversed. Rapid fertility decline has substantially reduced the 0-14 population and especially the 0-4 age group. In 1966 the latter group was 20.6 per cent of the total; by 1981 it had fallen to 12.5 per cent. On the other hand, the 15-64 age group increased from 44.7 per cent to 52.9 per cent during the same period.

The 15-19 age group has shown strong growth since 1966, in spite of high emigration, and this has tended to increase the labour force. But the 25-39 age group has tended to decline in absolute numbers while remaining virtually static in proportion to the total.

The population aged 65 and over is also increasing both absolutely and proportionately.

These general trends in age composition are occurring throughout the Cook Islands but the increase in the 15-19 age group is particularly noticeable in the outer islands. In the northern atolls, this age group increased by a remarkable 83 per cent (from 162 to 297) between 1976 and 1981. This is probably a reflection of the difficulty school leavers have in obtaining employment either in Rarotanga or New Zealand.

As a result of these general trends, the dependency ratio[19] declined from 121 in 1971 to 89 in 1981. On some of the outer islands, the dependency ratio decreased dramatically during the 1976-1981 period: on Rakahanga, for example, it went from 198 in 1976 to 102 in 1981, an improvement of almost 50 per cent in just five years. From a socio-economic point of view these are positive changes. A lower dependency burden

[18] See chapter IV for statistical sources for this section.

[19] The dependency ratio is obtained by the formula P (0 – 14 + 65 and over)/15 – 64 x 100.

implies a greater net reward from production for the producers themselves which may lead to higher consumption, capital investment and encourage further increases in productivity.

2. Sex composition

Since at least the 1916 census there has been a consistent excess of males in the Cook Islands' population. Although there have been intercensal fluctuations, the general trend in the sex ratio was downward to 1966 after which it has tended to rise again. In 1981 the ratio was 106.9 males per 100 females compared with 102.2 in 1966. The principal reason for this is the high rate of emigration among females – especially in the older age groups. The sex ratio is particularly high above 45 years of age and in the 15-19 age group.

By Pacific Islands standards, the sex ratio in the Cook Islands is unexceptional: Tonga and Western Samoa have similar ratios while somewhat higher ones are reported among some Melanesian populations to the West.[20]

E. POPULATION DISTRIBUTION

The proportion of the population located on Rarotonga has been increasing steadily since the Second World War while the proportion on the outer islands has declined. The peak period for this population shift was between 1956 and 1966 when Rarotonga's share increased from 43.2 per cent of the total to 51.8 per cent.[21]

There has been little change in the proportional distribution of the population since 1971, but the southern outer islands continue to decline relative to Rarotonga and the northern group. Return migration to some northern atolls, and a general slow-down of out-migration from others, has increased the proportion of the total population in the northern group from 11.0 per cent in 1971 to 12.8 per cent in 1981.

Because emigration tends to be more age-selective in the outer islands, there is a long-term tendency for the under 15 and over 65 population to become concentrated in the outer islands while the "working age" (15-64) population is more concentrated on Rarotonga. This is no doubt a consequence of the unequal distribution of employment opportunities in the Cook Islands.

Nevertheless, the proportion of the population in the urban centre of Avarua has been declining steadily since 1966, and this trend has continued during the 1976-1981 intercensal period. Avarua had 20.6 per cent of the Cook Islands total in 1981 compared with 26.8 per cent in 1966. Similarly, the Avarua area contained 38.4 per cent of Rarotonga's population in 1981 compared with 51.7 per cent in 1966.

Census data do not provide an explanation for these changes but three processes are likely. Some families with the means to purchase private transport have relocated to other parts of the island from which they can commute to their employment in Avarua. Second, emigration rates out of Avarua have been higher than from other districts. Third, in-migrants from the outer islands, who traditionally settled in the Avarua area, are now migrating directly to New Zealand where the chances of employment are better.

F. CONCLUSION

With mortality at relatively low levels, population trends in the Cook Islands are determined almost entirely by fertility and emigration. The effects of fertility decline since the mid-1960s can be seen in the changing age composition throughout all regions: the proportion of the population under 15 years of age has declined by 18 per cent since 1966 while the proportion between 15 and 64 has increased by a similar percentage. These changes are reflected in significantly lower dependency ratios in all islands.

The effects of emigration on population structure are apparent mainly in the northern group where the young adult population has been experiencing continuous attrition over several decades. In-migration during the 1976-1981 intercensal period has helped re-populate some age groups, but a serious deficit still remains.

From the point of view of socio-economic development, the trends in the age structure are positive, and other factors being equal should result in a higher level of social welfare than in the past. Unfortunately, these positive changes are accompanied by a declining overall population brought about by a rate of emigration in excess of natural increase. The consequences and socio-economic significance of a declining population are more difficult to evaluate. There is little doubt that population decline has psychological effects

[20] For example: Vanuatu (133), Solomon Islands (109), Papua New Guinea (108). See: South Pacific Commission, *South Pacific Economies 1980: Statistical Summary*, Edition No. 6, August 1982, p. 29.

[21] See chapter VII for statistical sources.

such as malaise and low morale among those who are attempting to promote development. More concretely, commercial interests are likely to be concerned about declining markets for trade goods, and employers normally prefer a labour surplus to keep wages low. As chapters VII and VIII discuss in more detail, however, there are also economic advantages to a smaller population, providing that capital is available to replace labour and there are no institutional barriers to the redistribution of productive wealth among the population which remains. Such barriers do exist in the Cook Islands and it is by no means obvious that the declining population is easily translated into a higher level of living for the resident population.

The Cook Islands is thus caught in a population dilemma: fertility still remains high enough that labour force absorption would be a major problem in the absence of the "safety valve" of emigration; on the other hand, emigration tends to exceed the level necessary to keep the increase in the labour force to manageable proportions. The direct control of emigration is probably outside the range of social policy, and indirect measures are extremely difficult to formulate because of the large number of variables involved. Nevertheless, a possible first step might be the identification of specific target age groups and islands with the highest propensity to emigrate. Potential policy measures which focus specifically on these target groups could then be considered.

Chapter IV
COMPOSITION OF THE POPULATION

A. AGE COMPOSITION

1. Total population

A complete classification by age was not available for all of the Cook Islands combined until the 1916 census, but only the "native and half caste" population were included. Since this accounted for 97 per cent of the population, however, little information is lost by using these data. Although the accuracy of the age distribution is open to doubt, it appears that the proportion of the population under the age of 15 was already quite high given that the rate of growth since the turn of the century had been low. Of the total native population, 37.2 per cent were under 15 years of age and 60.2 per cent were between 15 and 65! These proportions represent a dependency ratio of 66.0, which is more favourable than has been achieved since and about 26 per cent below the 1981 ratio of 89.1.

In the 1921, 1926 and 1936 censuses part of the population was classified as "under 45 years" or "over 45 years", which reduced the usefulness of the distribution somewhat, but the proportion under 15 appeared to have increased to 39.5 per cent in 1921 and to 41.0 and 43.4 per cent in 1926 and 1936 respectively.[2]

In 1945 a complete distribution of the native population was again available and by this date the populace had become sufficiently birth-date conscious that the age data were considered generally reliable, particularly in the young ages.[3] The under 15 age group increased again to 45.9 per cent of the native population in 1945 (table 12) and the dependency ratio rose to 95.

From 1956 onwards the total population inclusive of all ethnic groups has been classified by 5-year age groups and the distinction between "native" and "non-native" no longer employed.

The general trend in the age composition of the Cook Islands is what would be expected in a population undergoing a transition in vital rates accompanied by large-scale emigration. The proportion of the population under 15 years of age, an approximate indicator of fertility levels, increased to a maximum of 51.9 per cent in 1966 then declined to 42.7 per cent in 1981 – the lowest since the 1926 census. Similarly, the 15-64 age group decreased proportionately to a low of 44.7 per cent in 1966, but increased again to 52.9 per cent in 1981 as fertility rates declined. By most standards these are favourable changes; after 20 years in which the dependent population (0-14 and 65+) was a majority, the productive (15-64) population again become the majority in 1981, although it has some distance to go before reaching the 60.2 per cent recorded in 1916.

By comparison with other age groups, the 65 and over category changed little up to 1971, but since then there has been a distinct upward trend in both numbers and percentage of the total population. As chapter VIII indicates, this is not the result of immigration by the elderly and can therefore be attributed to natural growth and increased longevity.

A distinctive feature of the Cook Islands age structure is the tendency, evident since 1956, of the young adult population to decline in absolute numbers and in proportion to the total, in spite of very large increases in the size of younger cohorts. For example, between 1956 and 1976, the 20-24 age group declined by 350 from 1,392 to 1,042 (a drop of 25.2 per cent) and from 8.3 per cent to 5.7 per cent of the total population. This occurred in spite of the large potential for growth represented by the 0-4 age group, which, as table 12 shows, numbered 2,979 in 1956.

[1] Dominion of New Zealand, *Results of a Census, October 1916*, Appendix B "Population of Cook and other annexed Pacific Islands", Wellington, 1918, p. xv.

[2] Dominion of New Zealand, *Results of a Census, April 17, 1921*, Appendix B "Population of Cook and other annexed Pacific Islands", Wellington, 1921, p. 9; Dominion of New Zealand, *Population Census, 1926*, vol II, "Census of New Zealand's dependencies", Wellington, 1927, p. 3; Dominion of New Zealand, *Population Census, 1936*, vol II, "Dependencies", Wellington, 1937, p.5.

[3] Norma McArthur, *Island Populations of the Pacific* (Canberra, Australian National University Press, 1968), p. 201.

Table 12. Numerical and percentage distribution of total population by age, 1956-1981

	Population							Percentage						
	1945[a]	1956	1961	1966	1971	1976	1981	1945[a]	1956	1961	1966	1971	1976	1981
0 - 4	2 259	2 979	3 738	3 961	3 928	2 837	2 216	16.6	17.9	20.3	20.6	18.4	15.6	12.5
5 - 9	2 168	2 544	2 920	3 436	3 843	3 098	2 558	16.0	15.3	15.9	17.9	18.0	17.0	14.4
10 - 14	1 812	2 075	2 410	2 586	3 225	3 087	2 812	13.3	12.4	13.1	13.4	15.1	17.0	15.8
15 - 19	1 422	1 908	1 804	1 874	2 202	2 085	2 434	10.5	11.4	9.8	9.7	10.3	11.5	13.7
20 - 24	1 115	1 392	1 370	1 274	1 449	1 042	1 401	8.2	8.3	7.5	6.6	6.8	5.7	7.9
25 - 29	939	1 110	1 160	1 068	1 149	879	893	6.9	6.7	6.3	5.5	5.4	4.8	5.0
30 - 34	795	890	958	898	999	802	829	5.9	5.3	5.2	4.7	4.7	4.4	4.7
35 - 39	617	834	829	858	886	807	814	5.5	5.0	4.5	4.5	4.2	4.5	4.6
40 - 44	535	718	723	721	781	731	788	3.9	4.3	3.9	3.7	3.7	4.0	4.4
45 - 49	482	558	631	626	709	625	703	3.6	3.3	3.4	3.3	3.3	3.4	4.0
50 - 54	453	485	523	576	573	580	621	3.3	2.9	2.8	3.0	2.7	3.2	3.5
55 - 59	318	376	403	398	502	464	528	2.3	2.3	2.2	2.1	2.4	2.6	3.0
60 - 64	284	284	343	322	385	374	380	2.1	1.7	1.9	1.7	1.8	2.1	2.1
65 - 69	163	234	240	310	317	292	321	1.2	1.4	1.3	1.6	1.5	1.6	1.8
70 +	212	391	326	339	375	424	456	1.6	1.8	1.8	1.8	1.8	2.3	2.6
All ages	13 574	16 680	18 378	19 247	21 323	18 127	17 754	100.0	100.0	100.0	100.0	100.0	100.0	100.0
0 - 14	6 239	7 598	9 068	9 983	10 996	9 022	7 586	45.9	45.6	49.3	51.9	51.5	49.6	42.7
15 - 64	6 960	8 457	8 744	8 615	9 635	8 389	9 391	51.3	51.2	47.6	44.7	45.2	46.5	52.9
65 +	375	625	566	649	692	716	777	2.8	3.2	3.1	3.4	3.3	3.9	4.4

Sources: Dominion of New Zealand, *Population Census, 1945,* vol. II, Island Territories (Wellington, Census and Statistics Dept., 1947) p. 5; *Cook Islands Census of Population and Housing, 1976,* p. 58; *Cook Islands Census of Population and Dwelling, 1981,* unpublished tables.

Note: [a] Native population only.

Since only 1,042 remained by 1976, 65 per cent of this group (1,937 persons) either died or emigrated during the intervening 20 years. Mortality would have reduced this cohort by approximately 355 over this period which leaves 1,582 who must have emigrated. Given an expected size of 2,624 for this cohort in 1976, discounted for mortality, 1,232 persons would have had to emigrate in order for the 20-24 age group to be the same size in 1976 as it was in 1956 (1,392). Since actual emigration was 1,582 according to the above estimate, we can say that the difference between the two figures (350) represents "surplus" emigration; that is, emigration over and above what was required to maintain this age group at its 1956 level. By implication, 22 per cent of the emigration (350/1,582 x 100) was surplus by this standard.

By this same reasoning, the 20-39 age group had "excess" emigration through to 1976, and the 25-39 group had excess emigration up to 1981. Between 1976 and 1981, the 20-24 group recovered its 1956 numbers, if not quite its proportion of the population, and although the 25-39 group (and all other age groups above 39) increased in size relative to 1976, it did not reach its 1956 level. Above the age 39, however, a general increase was noticeable, and there were more people aged 40 and above absolutely and proportionately in 1981 than at any point since the Second World War.

The increasing size of the 40 and over group reflects two long-term processes: (a) fertility increase extending backwards in time to the early decades of the century; (b) transition to low mortality which occurred during the 1930s to 1950s and which enabled a larger proportion of ever-larger birth cohorts to survive. Of course emigration has not been entirely absent from the 40 and over population, but the rate has generally been low and the numbers insufficient to reduce the absolute or relative size of the older age groups.

The younger age groups are affected by more recent changes. After increasing from 2,259 in 1945 to 3,961 in 1966, the 0-4 age group has fallen to 2,216 in 1981, just below its 1945 level (table 12). This is a clear indication of the fertility transition through which the Cook Islands have been passing during the last 20 years, a process which is also apparent in the 5-9 and 10-14 age groups. Emigration is also a crucial determinant of the ultimate size of these age groups, and while the net emigration losses below the age of 15 have been substantial in the past, the reproductive capacity of the population has been even greater and the 5-9 and 10-14 age groups have increased relative to 1956. By 1981, however, the 5-9 group was about even with its 1956 numbers, and while the 10-14 group was well above its 1956 level, a reduction over 1976 was apparent.

On the other hand, the 1976-1981 period witnessed a substantial increase in the 15-19 group (up 17 per cent over 1976). This can be attributed to two factors: first, the 0-4 cohort of 1966 (which would reach the age 15-19 in 1981) was the largest in the post-1945 period (probably the largest in Cook Islands history); second, there was a slow-down in the rate of emigration during the 1976-1981 intercensal period. Along with the increases in the 20 and over population already discussed, this means that the "working age" (15-64) population has begun to increase again after declining in absolute numbers (but not proportionately) between 1971 and 1976. This age group is now just 3 per cent below its 1971 level.

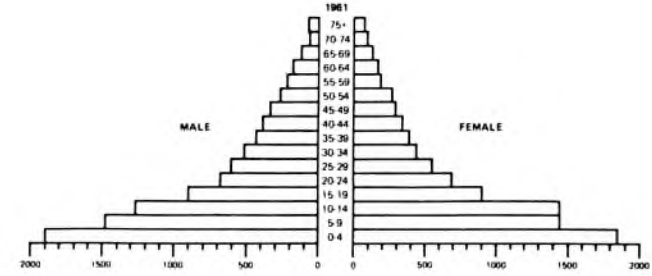
The broad changes in the age structure of the Cook Islands population since 1961 are illustrated by the series of age pyramids in figure 3. The 1961 and 1971 pyramids are typical of populations experiencing rapid fertility increase: each age group is successively smaller than the one preceeding it, and the pyramid is extremely wide at the base. This shape was maintained for a longer period than would otherwise have been the case by high rates of emigration, which prevented the young adult and teenage population from increasing in accordance with the growth potential present in the 0-4 and 5-9 age groups.

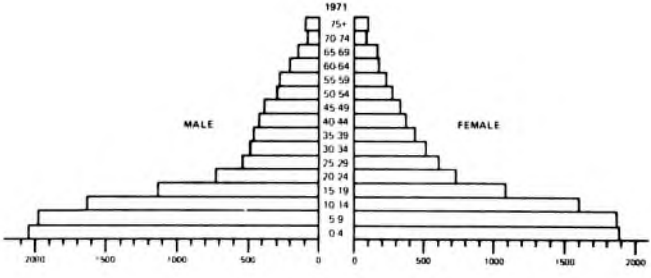
The 1981 pyramid reflects the dramatic effects of both declining fertility and emigration: the pyramid has contracted sharply at the base with large shrinkages apparent in the 0-4 and 5-9 age groups; on the other hand, the 15-19 group has expanded as emigration has decreased, and the 20-24 age group remained virtually static for the same reason. While the sex composition of the population will be discussed below, it is worth nothing here that there is little difference in the age composition of the two sexes when taken separately (table 13).

2. Regional variations

Regional changes in three broad age categories are shown by sex in table 14. The pattern of change in the 0-14 age group is similar in all regions, with minor variations between the sexes: there is a general rise up to 1971 followed by a decline

Figure 3. Population pyramids of total population 1961, 1971 and 1981





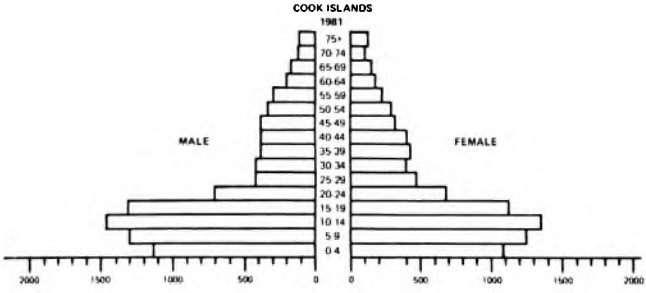


Table 13. Percentage distribution of the Cook Islands population by age-group and sex, 1956-1981

Age group	Males						Females					
	1956	1961	1966	1971	1976	1981	1956	1961	1966	1971	1976	1981
0 - 4	17.2	19.9	20.8	18.8	15.5	12.3	18.6	20.9	20.3	18.1	15.8	12.7
5 - 9	15.0	15.1	17.7	18.1	17.4	14.3	15.5	15.9	18.0	17.9	16.8	14.6
10 - 14	12.1	12.9	13.3	15.0	17.5	15.9	12.9	12.4	13.5	15.3	16.5	15.7
15 - 19	11.7	9.4	9.9	10.3	11.5	14.3	11.1	10.2	9.5	10.3	11.5	13.1
20 - 24	8.7	8.0	5.7	6.6	5.3	7.7	8.0	8.0	7.5	7.0	6.2	8.0
25 - 29	6.8	5.7	5.5	4.9	4.7	4.7	6.5	6.1	5.6	5.9	5.1	5.3
30 - 34	5.6	5.7	4.7	4.5	4.1	4.7	5.1	5.0	4.7	4.9	4.8	4.6
35 - 39	5.1	4.7	4.6	4.2	4.4	4.2	4.9	4.4	4.3	4.1	4.5	5.0
40 - 44	4.5	4.1	3.9	3.8	3.9	4.3	4.2	4.0	3.6	3.5	4.2	4.6
45 - 49	3.5	3.8	3.3	3.5	3.6	4.2	3.2	3.1	3.2	3.1	3.4	3.7
50 - 54	2.9	2.8	3.2	2.7	3.4	3.6	2.9	2.8	2.8	2.6	3.0	3.4
55 - 59	2.1	2.3	2.3	2.5	2.8	3.2	2.4	2.2	1.8	2.2	2.3	2.8
60 - 64	1.8	1.7	1.8	1.9	2.1	2.2	1.7	1.7	1.5	1.7	2.0	2.1
65 - 69	1.4	1.2	1.6	1.4	1.7	1.9	1.5	1.1	1.6	1.6	1.5	1.7
70 +	1.7	1.8	1.6	1.7	2.3	2.5	1.8	1.9	1.9	1.8	2.4	2.6
0 - 14	44.3	47.9	51.8	51.9	50.4	42.5	47.0	49.2	51.8	51.3	49.1	43.0
15 - 44	42.5	37.6	34.3	34.3	33.9	39.9	39.8	37.7	35.2	35.7	36.3	40.6
45 - 64	52.7	48.2	44.9	44.9	45.8	53.1	50.0	47.5	44.5	45.3	47.0	52.7
65 +	3.1	3.0	3.2	3.1	4.0	4.4	3.3	3.0	3.5	3.4	3.9	4.3

Sources: *Cook Islands Census of Population and Housing, 1976,* pp. 58-62; *Cook Islands Census of Population and Dwellings, 1982,* CPD2-82, CPD3-82, and unpublished tables.

Table 14. Population in three age groups by region and sex, 1956-1981

Region		Males			Females			Total		
		0 - 14	15 - 64	65 +	0 - 14	15 - 64	65 +	0 - 14	15 - 64	65 +
Rarotonga	1956	1 543	2 143	119	1 536	1 769	102	3 079	3 912	221
	1961	1 948	2 395	127	1 956	2 130	120	3 904	4 525	247
	1966	2 374	2 513	160	2 425	2 343	156	4 799	4 856	316
	1971	2 807	2 961	149	2 741	2 677	143	5 548	5 638	292
	1976	2 320	2 591	161	2 143	2 434	145	4 463	5 025	306
	1981	1 909	2 851	173	1 775	2 651	171	3 684	5 502	344
Southern outer islands	1956	1 765	1 767	90	1 681	1 569	92	3 446	3 336	182
	1961	1 971	1 432	92	1 815	1 525	102	3 786	2 957	194
	1966	2 021	1 333	94	1 916	1 410	113	3 937	2 743	207
	1971	2 184	1 463	131	2 026	1 541	142	4 210	3 004	273
	1976	1 791	1 265	137	1 678	1 284	126	3 469	2 549	263
	1981	1 427	1 422	151	1 390	1 344	139	2 817	2 766	290
Northern outer islands	1956	541	667	60	532	640	64	1 073	1 307	124
	1961	716	713	60	662	651	65	1 378	1 364	125
	1966	666	526	62	581	490	64	1 247	1 016	126
	1971	667	481	67	571	502	70	1 238	983	137
	1976	575	374	71	515	433	76	1 090	807	147
	1981	557	540	75	517	510	67	1 074	1 050	142
Cook Islands	1956	3 849	4 577	269	3 749	3 978	258	7 598	8 555	527
	1961	4 635	4 540	279	4 433	4 204	287	9 068	8 744	566
	1966	5 061	4 372	316	4 9 22	4 243	333	9 938	8 615	649
	1971	5 658	4 915	337	5 338	4 720	355	10 996	9 635	692
	1976	4 686	4 238	369	4 336	4 151	347	9 022	8 389	716
	1981	3 899	4 873	400	3 687	4 518	377	7 586	9 391	777

Sources: *Cook Islands Census of Population and Housing, 1976,* pp. 58-61; *Cook Islands Census of Population and Dwellings, 1981,* CPD2-82, pp. 1-2; and unpublished tables.

over the next decade. The northern outer islands are distinctive insofar as the under 15 age group peaked in 1961, a decade earlier than the other regions. Furthermore, the size of this age group in 1981 is not very different from 1956, whereas this group has increased substantially in Rarotonga, relative to 1956, and declined in the southern outer islands. In the later case, however, the decline in the 0-14 group to below the level of 1956 occurred in the most recent intercensal period.

A similar contrast can be seen in the 15-64 age group: in Rarotonga, both sexes increase to a peak in 1971, but then level-out to a point substantially above 1956 (708 above in the case of males and 882 for females); in the outer islands this group fluctuates in size from census to census, but the trend is downwards with 1981 numbers falling, on average, about 20 per cent below 1956 levels. Apparently, however, 1976 represents a low-point since 1956, and some large increases occurred between 1976 and 1981. Foremost among these was the male 15-64 population of the northern group which increased by 166 (44.4 per cent); smaller increases also occurred among northern group females (17.8 per cent) and southern group males (12.4 per cent), while the female 15-64 group in the southern islands, which had relatively high rates of emigration during this period, increased by only 4.7 per cent.

These changes illustrate the substantial impact that relatively short-term changes in the rate and direction of emigration, and its age-sex composition, can have on the size of some age groups. For example, the increase in the male 15-64 age group in the northern outer islands resulted in part from in-migration after 1976, and in part from a slow-down in emigration from those islands which are still experiencing net emigration losses. On the other hand, the female 15-64 population of the southern outer islands increased very little because emigration continued at a high rate throughout the 1976-1981 period.

While there has been some intercensal fluctuation in the size of the 65 and over population, there is an upward trend in all regions. This is particularly apparent in Rarotonga and the southern outer islands where the increases since 1956 were 55.7 and 59.3 per cent respectively. The increase in the northern group was much smaller (14.5 per cent) and the female population 65 and over has hardly deviated from a mean of 68. It is worth nothing that at least since 1956 the majority of the 65 and over population have resided on the outer islands.

Given the peculiar importance of emigration in the Cook Islands, and its concentration in younger age groups, the patterns of change in the young adult population have particular relevance. The 15-19 age group has tended to fluctuate since 1956, but apart from a dip in the 1971-1976 period, the long-term trend has been upwards (table 15). Most of the recent increase in this group has occurred in the outer islands; in Rarotonga, the 15-19 population has changed little since 1976 while increases of 32.3 and 83.3 per cent occurred in the southern and northern outer islands respectively.

Other young adult age groups show a tendency to increase in Rarotonga over the long-term (1956-1981), and a marked tendency to decline in the outer islands. The declining trend appears to be weakest in the 20-24 group and strongest in the 30-34. The latter group declined by 58.6 per cent in the northern atolls between 1956 and 1981 and among males the decrease was 70.4 per cent. Obviously these changes are much too large to attribute to mortality, and it is clear that emigration is responsible for the high rate of attrition in these cohorts over the past two decades.

The contrast between the age structures of the various regions is apparent from the age pyramids in figures 4 to 6. Rarotonga's pyramid is similar in shape to the total population and appears to be approaching the "barrel" shape characteristic of populations which have passed through the demographic transition. The southern and northern outer islands, like Rarotonga, are contracting at the base as fertility declines, but these pyramids have acquired distinctly sculptured sides which contrast with Rarotonga's more balanced structure. The almost vertical sides of the northern group's pyramid above the age of 25 is a vivid illustration of the distortions which result from age-selective emigration.

3. The dependency ratio

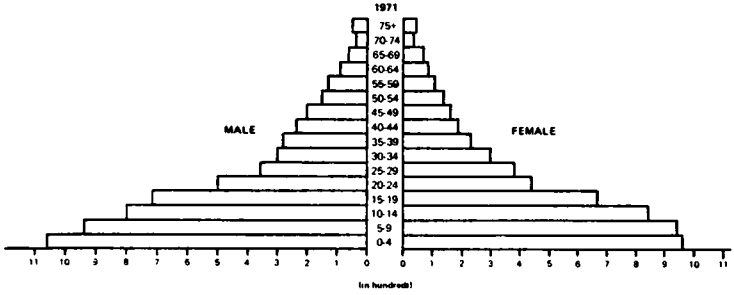
The dependency ratio is an attempt to measure the degree of economic hardship inherent in a given age structure. Insofar as it assumes that certain age groups are exclusively "producers" or "consumers", the dependency ratio must be seen as an approximate index only. In a primarily peasant economy, such as the Cook Islands, where a large proportion of agricultural production takes place within the household, most age groups

Table 15. Population in young adult age groups, 1966-1981, by region

		Males				Females				Total			
		15 - 19	20 - 24	25 - 29	30 - 34	15 - 19	20 - 24	25 - 29	30 - 34	15 - 19	20 - 24	25 - 29	30 - 34
Rarotonga	1956	532	410	250	212	431	285	211	156	963	695	461	368
	1961	535	434	339	241	544	369	276	204	1 079	803	615	445
	1966	599	366	336	282	565	457	298	235	1 164	823	634	517
	1971	717	497	359	301	658	440	381	302	1 375	937	740	603
	1976	665	336	295	247	636	362	280	259	1 301	698	575	506
	1981	683	481	289	304	625	452	294	263	1 308	933	583	567
Southern outer islands	1956	392	245	226	202	339	240	206	180	731	485	432	382
	1961	275	152	181	162	266	220	181	146	541	372	362	308
	1966	320	128	144	108	274	203	170	131	594	331	314	239
	1971	326	177	140	141	317	213	173	160	643	390	313	301
	1976	327	118	108	91	295	121	121	117	622	239	229	208
	1981	447	153	98	100	376	156	108	93	823	309	206	193
Northern outer islands	1956	96	98	117	71	118	114	100	69	214	212	217	140
	1961	90	96	88	113	94	99	95	92	184	195	183	205
	1966	50	65	54	64	66	55	66	78	116	120	120	142
	1971	85	50	40	43	99	72	56	52	184	122	96	95
	1976	74	39	30	39	88	66	45	49	162	105	75	88
	1981	174	70	40	21	123	78	52	37	297	148	92	58
Cook Islands	1956	1 020	753	593	485	888	639	517	405	1 908	1 392	1 110	890
	1961	900	682	608	516	904	688	552	442	1 804	1 370	1 160	958
	1966	969	559	534	454	905	715	534	444	1 874	1 274	1 068	898
	1971	1 128	724	539	485	1 074	725	610	514	2 202	1 449	1 149	999
	1976	1 066	493	433	377	1 019	549	446	425	2 085	1 042	879	802
	1981	1 310	710	435	434	1 124	691	458	395	2 434	1 401	893	829

Sources: *Cook Islands Census of Population and Housing, 1976*, pp. 59-61; *Cook Islands Census of Population and Housing, 1981*, CPD2-82, p. 1, CPD3-82, p. 2; and unpublished tables.

Figure 4. Population pyramids of Rarotonga, 1971 and 1981



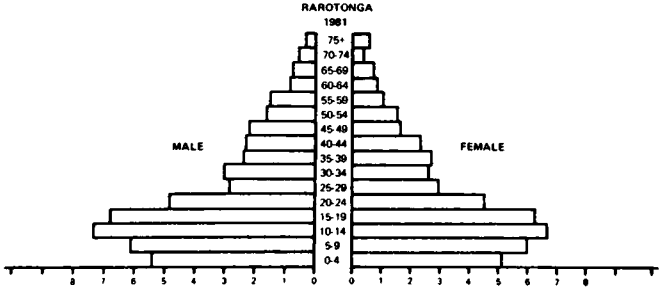
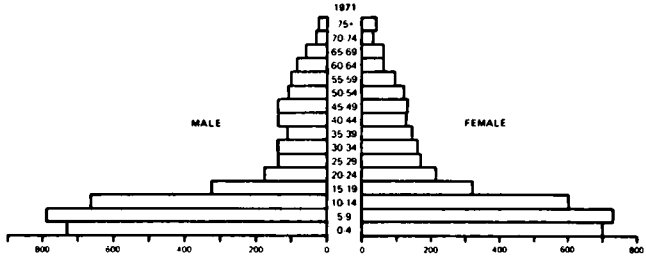


Figure 5. Population pyramids of southern outer islands, 1971 and 1981



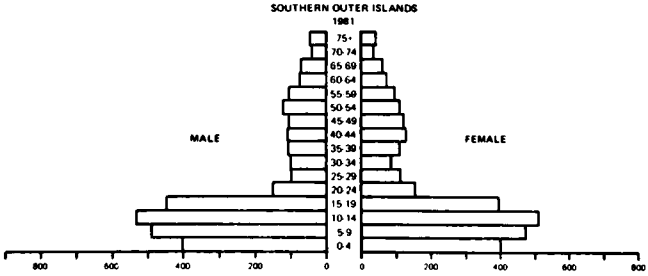
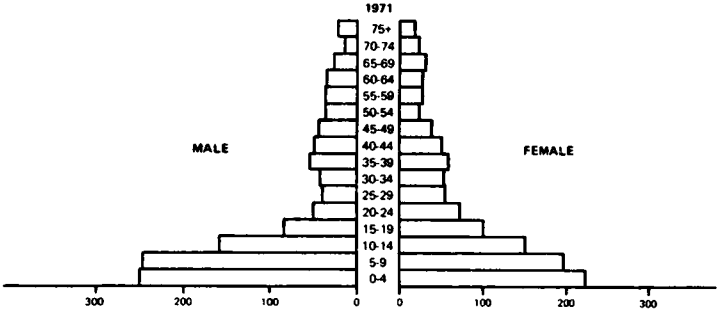


Figure 6. Population pyramids of northern outer islands, 1971 and 1981



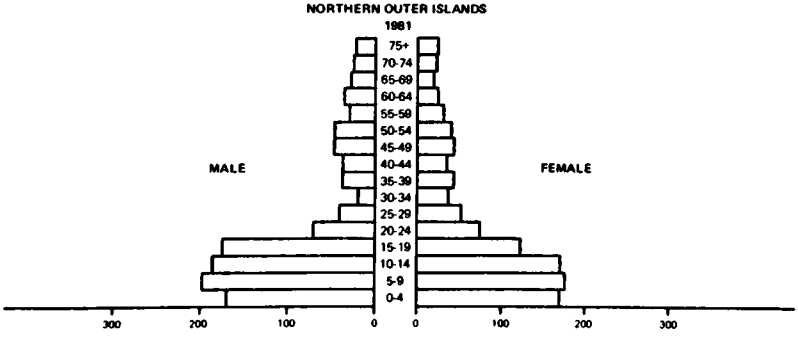


Table 16. Changes in dependency ratios[a] by island and region, 1966-1981

Islands/region	1956	1961	1966	1971	1976	1981
Rarotonga	84.4	91.8	105.3	103.6	94.5	73.2
Aitutaki	...	...	140.6	132.1	132.4	103.4
Mangaia	...	...	156.3	157.2	148.4	108.6
Atiu	...	...	153.2	164.1	155.9	123.1
Mauke	...	...	142.2	153.5	156.3	138.9
Mitiaro	...	...	190.1	173.6	202.0	113.3
Southern outer islands	108.8	139.4	151.1	148.4	146.4	112.3[b]
Palmerston	...	...	126.3	121.4	112.0	121.7
Pukapuka	...	...	130.3	133.1	137.5	128.7
Nassau	...	...	111.4	150.0	105.5	79.5
Manihiki	...	...	139.3	144.3	157.8	101.5
Rakahanga	...	...	139.3	149.3	197.9	101.5
Tongareva	...	...	144.4	139.1	159.0	127.7
Northern outer islands	91.6	110.2	135.1	139.8	153.3	115.8
Total Cook Islands	95.0	110.0	123.4	121.2	115.6	89.1

Source: Cook Islands Census of Population and Housing, 1976, p. 58-61.

Note: [a] Dependency ratio: (0-14 + 65 and over)/(15-64) x 100.

[b] Includes Manuae.

other than the very young and very old do make a contribution to production. But the actual labour input of various age groups can only be determined by special surveys designed for this purpose.

Like other population indicators, the dependency ratio in the Cook Islands has been passing through a phase of transition. As mentioned in the opening section, the dependency ratio of the native population in 1916 was 66.0 and this rose to 95.0 by 1945. As table 16 shows, this increasing trend continued until 1966 when the ratio reached a peak of 123.4 before declining to 89.1 in 1981. The trend follows the rise and fall of fertility, although, as already discussed, emigration has played a secondary role.

The trend in the dependency ratio of the southern outer islands follows the timing of Rarotonga and the total population, but at a substantially higher level. The islands of Nga pu toru (Atiu, Mauke and Mitiaro) have consistently had the highest dependency ratios in the southern group, primarily because of their high birth rates. As in other respects, the trend in the northern group lags behind the other islands: its dependency ratio reached 153.3 in 1976 as fertility peaked and an unusually high rate of out-migration reduced the size of the adult population, but fell rapidly to 115.8 in 1981 as both fertility and emigration declined.

The islands of Mauke, Pukapuka and Tongareva had the highest dependency ratios in 1981. It should be noted that these high ratios are not a direct consequence of out-migration: Mangaia has had higher rates of emigration in the past than any of these islands, yet its dependency ratio is lower. Similarly, Rakahanga and Manihiki had identical dependency ratios in 1981, but the former island had net out-migration in the 1976-1981 period while the latter had net in-migration. But Pukapuka's high ratio results in part from the

Table 17. Child and aged dependency ratios by region and island, 1961-1981

Islands/region	Child dependency[a]					Aged dependency[b]				
	1961	1966	1971	1976	1981	1961	1966	1971	1976	1981
Rarotonga	86	99	98	89	67	5	6	5	6	6
Aitutaki	...	140	125	124	94	...	6	7	9	10
Atiu	...	146	156	145	114	...	7	9	9	10
Mangaia	...	146	147	136	98	...	10	10	12	11
Mauke	...	135	142	146	125	...	7	12	12	14
Mitiaro	...	179	162	193	102	...	9	11	13	12
Southern outer islands	133	144	140	136	102	7	8	9	10	10
Manihiki	...	127	133	139	91	...	11	11	17	11
Palmerston	...	118	111	112	119	...	8	11	12	14
Pukapuka/Nassau	...	114	121	122	104	...	13	15	17	16
Rakahanga	...	124	132	173	86	...	15	17	25	15
Tongareva	...	131	126	138	113	...	17	13	18	11
Northern outer islands	101	122	126	135	102	9	12	14	18	14
Total Cook Islands	104	116	114	108	81	6	8	7	9	8

Source: Calculated from *Cook Islands Censuses, 1961-1981.*

Notes: [a] $P_{0-14/15-64} \times 100$.

[b] $P_{65+/15-64} \times 100$.

fact that many working-age persons are on Nassau, and when the two populations are combined (see table 17) the rates drops considerably.

The substantially improved dependency ratios in 1981 compared with 1976 are a function of declining rates of both fertility and emigration. Declining fertility means a contraction in the number of dependents (as was apparent in figures 3-6), while a reduction in the emigration of young people aged 10-14 has expanded the population of young working age (15-19) in 1981. Of course it remains to be seen whether this expansion will continue into the 20-24 age group during the next five years, but further decreases in the dependency ratio can be expected as fertility continues its decline in the outer islands.

The impact of fertility decline on the age structure is apparent from table 17 which shows the child dependency ratio falling by 30.0 per cent in the total population from 116 in 1966 to 81 in 1981. Since 1976 the fall has been exceptionally rapid – 25 per cent in the population as a whole and by similar amounts in the three regions. Some islands had a spectacular decrease: Rakahanga's ratio declined by 50.3 per cent, from 173 to 86, and in Manihiki and Mangaia the ratio declined by 34.5 and 28.0 per cent respectively. In Manihiki's case, return migration of working-age adults contributed to this improvement; in Mangaia reduced out-migration and a decline in fertility were responsible.

By comparison, the aged dependency ratio is relatively stable, but a slight upward trend is visible in the outer islands. In the northern group the aged ratio jumped to 18 in 1976 as a consequence of unusually high out-migration in 1971-1976; with return migration to some islands, and a slow-down in net out-migration from others, the ratio has fallen back to 14 in 1981.

Table 18. Sex composition of the Cook Islands population, 1916-1981

Census year	Males (1)	Females (2)	Total (3)	Percentage male[a] (4)	Sex ratio[b] (5)	Excess males[c] (6)	Percentage excess males[d] (7)
1916	4 724	4 193	8 917	53.0	112.7	531	6.0
1921	4 956	4 503	9 459	52.4	110.1	453	4.8
1926	5 259	4 809	10 068	52.2	109.4	450	4.5
1936	6 376	5 870	12 246	52.1	108.6	506	4.1
1945	7 185	6 903	14 088	51.0	104.1	282	2.0
1951	7 997	7 401	15 398	51.9	108.1	593	3.9
1956	8 695	7 985	16 680	52.1	108.9	710	4.3
1961	9 454	8 924	18 378	51.4	105.9	530	2.9
1966	9 749	9 498	19 246	50.7	102.6	251	1.3
1971	10 910	10 413	21 323	51.2	104.8	497	2.3
1976	9 294	8 834	18 128	51.0	105.7	460	2.5
1981	9 172	8 582	17 754	51.7	106.9	590	3.3

Sources: New Zealand Census and Statistics Office, *Population Census, 1916,* Appendix B, "Population of Cook and other annexed Pacific Islands" (Wellington, 1918), p. xiv; *Population Census, 1921,* Appendix B, "Population of Cook and other annexed Pacific Islands" (Wellington, 1921), p. 8; *Population Census, 1926,* vol. II, "Census of New Zealand's dependencies" (Wellington, 1927), p. 1: *Cook Islands Census of Population and Housing, 1976,* p. 56; *Cook Islands Quarterly Statistical Bulletin,* December 1981, p. ii; *Cook Islands Census of Population and Dwellings, 1982,* CPD1-82, CPD2-82, CPD3-82; unpublished census tables.

Notes: [a] (1) / (3) x 100.
[b] (1) / (2) x 100.
[c] (1) - (2).
[d] (6) / (3) x 100.

B. SEX COMPOSITION

A long-term characteristic of the Cook Islands population throughout this century has been its masculinity. Since 1916, the percentage of the population which is male has deviated very little from a mean of 51.7 (table 18). The only discernible trend is that the proportion of males in the population has not risen to 52 per cent since 1956, whereas this was a frequent occurrence before this date. But the 1981 figure of 51.7 comes close to this and is actually identical to the long-term mean.

The sex ratio has only once fallen below 103 (in 1966), and the mean ratio of 107.3 is only just above the 1981 figure of 106.9. As table 18 also shows, there has been a consistent, and substantial, excess of males since 1916, and although there have been dips in 1945 and 1966, the fact that there were 590 excess males in 1981 indicates that the forces favouring masculinity are still functioning at the present time.

When sex ratios are calculated by age group, however, some historical trends are apparent (table 19). Using 1956 as a starting point, it is clear that the sex ratios of the age groups 20-24 through 40-44 are declining through time. It should be noted that these groups had extremely high ratios in 1956 and an upward trend could hardly be expected. Nevertheless, if the sex ratios of the 0-4, 5-9 and 10-14 cohorts in 1956 are traced through successive censuses, the general trend is one of decreasing masculinity as each group ages. This is not always true for age groups from 40-44 and above, and it is not until the 65

Table 19. Age-specific sex ratios, 1956-1981[a]

Age group	1956	1961	1966	1971	1976	1981
0 - 4	100.7	102.4	105.3	108.7	103.4	103.9
5 - 9	105.5	104.9	101.3	105.9	109.0	104.6
10 - 14	102.2	110.6	101.1	102.8	111.6	108.3
15 - 19	114.9	99.6	107.1	105.0	104.6	116.5
20 - 24	117.8	99.1	78.2	99.9	89.8	103.2
25 - 29	114.7	109.1	100.0	88.4	97.1	94.9
30 - 34	119.8	116.7	102.3	94.2	88.7	109.9
35 - 39	113.8	113.1	108.3	105.5	101.8	90.2
40 - 44	116.9	110.8	109.0	115.7	99.2	98.0
45 - 49	118.8	119.8	108.7	116.8	111.9	119.7
50 - 54	110.9	104.3	114.9	108.4	116.4	102.1
55 - 59	96.9	117.8	127.4	120.2	126.3	122.8
60 - 64	115.2	117.1	122.1	121.3	111.3	111.1
65 +	104.3	97.2	94.9	94.9	106.3	94.3
Total population	108.9	105.9	102.6	104.7	105.2	106.9

Sources: *Cook Islands Census of Population and Housing, 1976,* p. 58; *Cook Islands Census of Population and Dwellings,* 1982, CPD1-82, CPD2-82, CPD3-82; unpublished tables.

Note: [a] The sex ratio is the number of males per 100 females (m/f x 100).

and over age group that females once again become the majority.

One hypothesis which might account for the excess of males is the immigration of single men associated originally with the New Zealand Administration and more recently with economic development and foreign aid programmes. But this would not explain the high sex ratios at young ages, nor does it explain the declining sex ratio of the 20-24 age group and the consistently high sex ratios of the 45-64 age group. Furthermore, if this explanation were valid, Rarotonga would have a higher sex ratio than the outer islands, since few foreigners reside outside Rarotonga. Table 20 indicates that Rarotonga's sex ratio has generally been higher than the southern islands, but not consistently higher than the northern group where very few non-Maori reside.

The trend of decreasing masculinity is apparent across all three regions of the Cook Islands, but is particularly severe in some age groups in the northern atolls. For example, the age groups 20-24, 25-29 and 30-34 had sex ratios in 1981 of 93.3, 76.9 and 56.8 respectively (table 21).

Certain islands also tend to have higher sex ratios than others (tables 20). Most of the northern atolls, with the exception of Pukapuka and Rakahanga, have ratios well above the Cook Islands average, as does Mitiaro in the southern group; but Mangaia, Mauke, Pukapuka and Rakahanga, which otherwise have little in common, tend to have lower ratios than either their region or the Cook Islands as a whole.

Only three factors can account for high sex ratios: (a) the sex ratio at birth; (b) sex differences in mortality; (c) sex-selective migration. In the Cook Islands case it is difficult to obtain long-term data on the sex ratio at birth, so this factor cannot be fully explored here; but

Table 20. Sex ratios by island and region, 1956-1981

Island/region	1956	1961	1966	1971	1976	1981
Rarotonga	111.7	104.8	102.5	106.4	110.2	107.3
Aitutaki	106.2	...	97.5	102.1	101.2	107.6
Atiu	110.3	...	111.6	109.4	114.0	107.3
Mangaia	109.6	...	96.5	98.7	100.5	97.7
Mauke	102.5	...	98.5	93.2	92.2	96.8
Mitiaro	103.7	...	96.6	108.2	116.3	118.8
Southern outer islands	108.8	104.6	100.3	101.9	103.4	104.4[a]
Manihiki	92.2	...	116.3	112.2	100.0	117.7
Nassau	103.6	...	145.5	135.3	123.6	122.0
Pukapuka	100.0	...	107.9	97.8	91.9	98.0
Palmerston	71.0	...	86.9	72.0	93.0	131.8
Rakahanga	94.8	...	99.4	95.9	100.7	98.5
Tongareva	110.5	...	109.6	116.3	106.6	113.3
Northern outer islands	107.0	108.1	110.5	106.3	99.6	107.4
Total Cook Islands	108.9	105.9	102.6	104.7	105.2	106.9

Sources: Cook Islands Population Census, 1956 (Wellington, Department of Statistics), typescript, p. 1.; *Cook Islands Census of Population and Dwellings, 1976,* pp. 58-67; *Cook Islands Census of Population and Dwellings, 1981,* CPD2-82, pp. 1-2,CPD3-82, pp. 1-2; unpublished census tables.

Note: [a] Includes Manuae.

table 22, which presents a regional breakdown for the 1964-1981 period, suggests that only the northern group could be said to have unusually high ratios.

As chapter VI shows, mortality rates are generally higher for males than for females; consequently, if mortality is the only factor affecting the sex ratio, it is to be expected that masculinity would decrease as each cohort ages. It was clear from table 19 that this is the long-term pattern, but there is a tendency for most cohorts to pass through a period of increasing masculinity before becoming ultimately more feminine between the ages of 20 and 44. This is not what would be expected from the action of mortality alone, and this also applies to the pattern of high masculinity from age 45 and above. Furthermore, the degree of femininity in the 20-39 age group of the northern atolls in recent years (table 21) is much greater than could be accounted for by differential mortality, especially since until recently there was little difference between male and female death rates in the north.

It follows that sex-selective emigration must be the principal factor affecting the sex ratio. The patterns of change in age-specific sex ratios through time, both in the total population and in the outer islands specifically, suggest that emigration is female dominant below the age of 20 and over 40, and male-dominant from age 20 through 39. This pattern is partly confirmed by the migration data presented in chapter VIII; emigration is generally female dominant, and especially so in the older age groups. Female dominance is also apparent below the age of 10, but only in Rarotonga is there evidence of male dominance in the 20-29 group, at least in the 1971-1981 period. More detailed analysis by cohort and region would be required for a fuller explanation.

Table 21. Sex ratios by age-group and region, 1956-1981

Age group	1956	1961	1966	1971	1976	1981
			Rarotonga			
0 - 4	96.4	95.1	102.6	111.3	103.7	107.5
5 - 9	105.7	97.4	94.7	100.2	113.1	103.7
10 - 14	99.7	109.7	105.3	94.8	107.7	110.0
15 - 19	124.0	96.5	103.8	109.0	104.6	109.3
20 - 24	143.9	117.6	83.1	113.0	92.8	106.4
25 - 29	118.5	144.5	112.8	94.2	105.4	98.3
30 - 34	135.4	118.1	120.0	99.7	95.4	115.6
35 - 39	100.0	147.7	114.1	124.9	113.1	86.8
40 +	111.4	110.8	115.8	117.3	117.9	112.6
All ages	111.7	104.8	102.5	106.4	110.2	107.3
			Southern outer islands			
0 - 4	104.8	107.2	101.7	104.0	102.9	100.0
5 - 9	105.0	107.3	109.3	108.2	103.1	103.3
10 - 14	105.2	112.3	106.0	111.7	114.2	104.1
15 - 19	115.6	112.3	116.8	102.8	110.8	118.9
20 - 24	102.1	69.1	63.1	83.1	97.5	98.1
25 - 29	109.7	100.0	84.7	80.9	89.3	90.7
30 - 34	112.2	111.0	82.4	88.1	77.7	107.5
35 - 39	107.9	102.0	99.3	79.9	81.3	95.5
40 +	115.6	107.0	97.1	102.8	104.3	104.7
All ages	108.4	104.6	100.3	101.9	103.4	104.4
			Northern outer islands			
0 - 4	99.2	111.7	128.8	112.6	103.6	101.2
5 - 9	106.2	103.2	102.3	124.7	112.4	111.8
10 - 14	100.0	108.8	110.0	112.7	121.1	110.8
15 - 19	81.4	95.7	75.8	85.9	84.1	141.5
20 - 24	86.0	97.0	118.2	69.4	59.1	93.3
25 - 29	117.0	92.6	81.8	71.4	66.6	76.9
30 - 34	102.9	122.8	82.1	82.7	79.6	56.8
35 - 39	182.0	109.6	110.9	93.1	103.3	86.4
40 +	100.4	116.3	126.2	117.4	100.4	111.9
All ages	107.0	108.1	110.5	106.3	99.6	107.4

Sources: Cook Islands Census of Population and Housing, 1976, pp. 58-61; *Cook Islands Census of Population and Dwellings, 1981,* CPD2-82, pp. 1-2; CPD3-82, pp. 1-2; unpublished census tables.

Table 22. Sex ratios of live births by region

Region	1964-1968	1969-1973	1974-1978	1979-1981
Rarotonga	100.1	110.3	101.0	97.1
Southern outer islands	101.5	101.8	100.4	109.1
Northern outer islands	113.6	110.1	117.9	99.0
Cook Islands	102.4	107.3	102.9	101.2

Sources: Geoffrey R. Hayes, *Report on Project to Evaluate Cook Islands Vital Statistics, 1965-1977*, South Pacific Commission, 1980, Appendix A (unpublished); Cook Islands Statistics Office, unpublished vital statistics, 1979-1981.

C. MARITAL STATUS

The proportion of a population which marries, and at what age, are not only important indicators of socio-cultural patterns, but also have consequences for fertility levels. Everything else being equal, late marriage usually results in lower fertility levels than early marriage and a smaller total number of births per woman. The definition of marriage used in pre-1956 censuses are no longer known, but from 1956 onwards "marriage" includes couples living together as man and wife irrespective of whether a civil or religious ceremony has been performed or not.

Table 23 suggests that marital patterns in the Cook Islands have remained remarkably stable over the twenty-year period 1956-1976, especially for males, but some important changes are apparent since 1976. The proportion of married males rose slightly from 51.5 per cent in 1956 to 52.6 per cent in 1976, an increase of only 2.1 per cent, and the number has decreased from 2,496 to 2,422, a decline of 3.0 per cent. While the number of married males changed little during the 1976-1981 period, the proportion dropped to 47.2 per cent and the proportion unmarried climbed to 46.0 per cent compared with 41.3 per cent in 1976. The proportion of females never married has also increased sharply since 1976. The total number of married couples in the Cook Islands increased to a peak of about 3,000 in 1971, dropped to about 2,500 in 1976 (approximately the same number as in 1956), and decreased again to 2,380 in 1981.

While the increase in the proportion of the population unmarried is a long-term trend, the increase in the number of persons separated and divorced is quite recent. The number of males and females in this category has increased by 126 and 140 per cent respectively since 1976.

In Rarotonga both the number and proportion of the population over 15 years of age which is married had declined in the 1976-1981 period, females more so than males, and there was an increase in the number of persons separated or divorced. In the southern outer islands the number of married females dropped by 9.0 per cent, and the proportion married declined from 58.6 per cent to 51.3 per cent. A considerable jump in the number and percentage of divorced or separated persons is also apparent in the southern outer islands, but the incidence is still quite low.

Is both Rarotonga and the southern outer islands there has been a reduction in the degree of imbalance between the number of married males compared to females during the 1976-1981 period. Since emigration was female dominant during the period, it is possible that relatively more married females have emigrated than males.

When the proportion unmarried is broken down by age and region, however, a less stable picture emerges. For males 20-24 there is an upward trend in the proportion unmarried (table 24). This is noticable both in Rarotonga and the outer islands. The same trend is apparent among females, and appears to be consistent throughout all regions. Between 1971 and 1976 there was a noticable increase in the proportion of northern group females aged 25-34 who were unmarried, but this trend did not continue through to 1981. Since the 1971-1976 period was one of exceptional emigration, it is likely that there was some selectivity in favour of married women, many of whom may have returned in subsequent years.

Table 23. Marital status[a] by sex, 1956-1981

	Males		Females	
	Number	Per cent	Number	Per cent
Never married				
1956	2 013	41.5	1 272	30.0
1961	2 022	42.0	1 496	33.2
1966	1 939	41.4	1 527	33.4
1971	2 006	38.2	1 580	31.1
1976	1 904	41.3	1 627	36.2
1981[a]	2 316	46.0	1 850	39.4
Married				
1956	2 496	51.5	2 524	59.6
1961	2 417	50.2	2 572	57.3
1966	2 389	51.0	2 611	57.1
1971	2 908	55.4	3 059	60.3
1976	2 422	52.6	2 506	55.7
1981[a]	2 378	47.2	2 389	50.9
Widowed				
1956	293	6.0	395	9.3
1961	311	6.5	388	8.6
1966	277	5.9	364	8.0
1971	261	5.0	385	7.6
1976	219	4.8	318	7.1
1981[a]	200	4.0	344	7.3
Separated or divorced				
1956	44	0.9	45	1.1
1961	69	1.4	46	1.0
1966	67	1.4	57	1.2
1971	76	1.4	51	1.0
1976	62	1.3	47	1.0
1981[b]	140	2.8	113	2.4

Sources: *Cook Islands Population Censuses, 1956-1981.*

Notes: [a] Population 15 years of age and over.

[b] Refers to "resident" population only.

Table 24. Changing proportion of the population never married by age, sex and region, 1956-1981

Age group	Rarotonga				Southern outer islands				Northern outer islands				Cook Islands				
	1966	1971	1976	1981	1966	1971	1976	1981	1966	1971	1976	1981	1956	1966	1971	1976	1981
Males																	
15 - 19	99.7	95.7	98.5	99.6	96.9	93.6	100.0	97.7	100.0	94.1	100.0	94.8	97.6	98.8	94.9	99.1	98.3
20 - 24	69.4	65.8	73.5	82.1	62.5	49.2	67.7	80.7	69.2	42.0	41.0	59.7	62.9	67.8	61.0	69.6	79.6
25 - 29	45.5	30.4	38.3	45.0	36.8	16.4	28.7	43.3	29.6	15.0	36.7	35.9	36.2	41.6	26.0	35.8	44.1
30 - 34	23.8	18.3	18.2	23.0	22.2	11.3	15.4	14.4	18.8	2.3	20.5	22.2	18.8	22.7	15.3	17.8	21.6
35 - 39	24.8	15.7	13.9	11.2	17.4	8.7	16.5	11.9	14.1	14.8	12.9	2.6	16.7	20.6	14.0	14.5	14.3
40 - 44	16.7	17.7	12.5	11.5	16.6	6.5	10.1	13.0	13.2	8.0	5.1	12.8	11.9	16.2	13.1	11.0	12.8
45 - 59	11.7	12.1	16.5	13.0	10.9	10.5	13.6	8.5	11.0	17.9	13.1	9.9	9.5	11.3	12.3	15.1	11.0
60 - 74	5.3	7.3	6.9	11.0	5.0	7.8	12.7	11.7	5.4	3.8	9.3	8.0	7.6	5.2	6.9	9.7	10.7
75 +	17.2	2.0	2.1	–	4.3	–	–	4.5	–	4.3	10.5	–	7.5	8.2	2.0	3.0	1.8
15 and over	45.9	42.9	44.2	47.9	38.8	23.3	39.1	44.4	27.0	26.6	30.8	40.9	41.5	41.4	38.0	41.3	46.0
Females																	
15 - 19	96.3	91.2	97.0	97.9	92.7	89.0	99.0	96.2	92.4	84.8	96.6	91.0	88.1	94.9	90.3	97.5	96.6
20 - 24	55.4	51.6	61.0	71.9	54.7	42.3	57.0	72.3	54.5	48.6	56.0	70.1	45.5	55.1	49.0	59.6	71.5
25 - 29	23.5	16.0	27.5	30.6	23.5	20.8	26.4	35.6	16.7	17.9	28.9	27.5	16.4	22.6	17.9	27.4	31.4
30 - 34	14.0	12.3	10.8	16.9	16.8	10.0	15.4	12.0	7.7	5.8	22.4	28.6	10.4	13.7	11.0	13.4	16.7
35 - 39	7.6	7.4	13.1	7.8	13.3	5.6	8.2	14.5	–	6.9	3.3	7.0	5.9	6.1	6.7	10.8	9.5
40 - 44	8.8	3.2	6.6	6.6	1.6	3.2	3.9	5.7	8.5	6.1	4.8	2.9	5.1	6.1	3.6	5.4	6.0
45 - 59	5.8	4.5	5.2	6.3	3.0	1.0	5.4	2.0	5.9	6.7	10.9	6.9	3.3	4.8	3.7	6.0	4.8
60 - 74	2.2	5.9	5.3	3.4	2.2	0.6	3.1	4.2	4.2	3.8	2.6	4.5	2.5	2.6	3.5	4.0	3.9
75 +	–	–	2.6	3.7	–	2.4	–	–	–	5.9	–	–	2.9	–	2.1	1.0	1.6
15 and over	38.2	34.6	39.4	41.1	30.3	26.4	31.8	37.9	21.7	26.0	31.6	35.7	30.0	33.4	31.1	36.2	39.4

Sources: Cook Islands Population Censuses, 1956-1981.

For the population as a whole, and in the southern group in particular, there has been little change in the surplus of unmarried males relative to females. With the single exception of the 15-34 age group of the northern atolls, which was mentioned above, more males are unmarried in proportion to their numbers than females. The gap is widest in Rarotonga, probably because of the in-migration and immigration of single males seeking work, but in 1981 it was almost as wide in the southern outer islands (table 24). As already mentioned, most age groups in the Cook Islands have an excess of males which means that some males must remain unmarried or marry outside the Cook Islands; but there does not appear to be a direct and simple association between a high sex ratio and an excess of unmarried males, since even some age groups which have a surplus of females overall also have an excess of unmarried males. The selective emigration of single females is probably a contributing factor in these cases. This is supported by the fact the discrepancy between the proportion of males and females unmarried is much smaller in the northern group where emigration has tended to be male dominant, and fewer single females have been able to emigrate.

In summary, the general trends in the Cook Islands indicate that marriage is taking place at older ages than was the case in the mid-1960s, and this is particularly clear in Rarotonga and the southern outer islands and for females rather than males. The difference in the magnitude of this change for males and females suggests that there may also be changes in the relationship between the age of husbands and wives, with wives tending to be closer in age to their husbands than was formerly the case. This cannot be confirmed with the presently available census tabulations, however, and the only other method would be a systematic and time-consuming study of the marriage register.

Table 25. Percentage of the population by relationship to head of the household, 1976[a]

Relationship	Rarotonga	Southern	Northern	Total
Head	18.0	16.9	18.6	17.7
Spouse	17.3	10.7	10.8	14.2
Son or daughter	36.8	42.7	42.2	39.6
Son or daughter in-law	2.1	1.1	0.9	1.6
"feeding child"[b]	0.4	0.6	0.4	0.4
Grandchild	11.9	19.4	14.9	14.9
Parent and parent-in-law	0.9	0.6	1.4	0.9
Grandparent	0.3	0.1	0.4	0.2
Brother or sister[c]	2.7	1.3	1.9	2.1
Uncle or aunt	0.4	0.2	0.5	0.4
Nephew or niece	8.0	5.8	4.0	7.1
Other relative	1.0	0.5	1.1	0.9
Housegirl or family helper	0.1	–	–	0.1
Flat-mate	0.1	–	–	0.1
Total	100.0	100.0	100.0	100.0

Source: Cook Islands Census of Population and Housing, 1976, pp. 89-92.

Notes: [a] Guests and visitors have been excluded.

[b] "Feeding child" refers to an informal adoption arrangement usually within the extended family.

[c] Includes in-laws.

D. HOUSEHOLDS AND FAMILIES

Because of a shortage of data, it is not possible to analyse the trends in family and household composition in detail. Before 1976, census data on households were not published. In 1976, the published tables do not use the household as the unit of analysis, but rather the relationship of each individual to the household head (table 25). Thus, it was possible to say that in 1976 there were 2,558 persons (14.9 per cent of the population) who lived in households headed by their grandparent, but this indicates neither how many households contained grandchildren, nor the exact number of households headed by a grandparent. On an average basis there was less than one grandchild per household, but this is not a very useful figure.

Tabulated in this manner, however, the data do produce some interesting results. For example, 1,209 persons were living in households headed by an uncle or aunt, and 213 in households headed by a brother or sister. Very few persons were living in households in which their own son or daughter was the head, and these were mostly widows and widowers. It would appear that the more common pattern is for younger married people to live in a household headed by their parents rather than vice versa. The wide range of relationships to the household head in 1976 suggests that family patterns are complex but the number of households containing only one nuclear family in contrast to the joint family household, cannot be determined.

Whatever their actual composition, the average density of households in the Cook Islands is generally decreasing, although there is some variation from island to island (table 26). The number of households on Rarotonga has increased by 330 between 1966 and 1981, and the mean number of occupants has declined from 7.0 to 5.2. In spite of a drop in population, the rate of increase in the number of households on Rarotonga has accelerated in the 1976-1981 period when it reached over 27 per year.

Table 26. Occupants per dwelling by islands, 1966-1981

Island	1966		1976		1981	
	Dwellings	Mean occupants	Dwellings	Mean occupants	Dwellings	Mean occupants
Rarotonga	1 428	7.0	1 622	6.0	1 758	5.2
Aitutaki	389	6.6	402	6.0	419	5.5
Mangaia	315	6.4	260	5.9	230	5.9
Atiu	214	6.2	192	6.8	198	6.2
Mauke	125	5.4	128	5.5	118	5.8
Mitiaro	44	6.7	55	5.5	53	4.8
Palmerston	13	6.6	10	5.6	10	5.1
Pukapuka	128	5.3	139	5.6	124	6.4
Nassau	28	6.0	17	7.2	21	6.4
Manihiki	109	5.4	66	4.0	71	5.7
Rakahanga	56	5.8	50	5.7	46	5.9
Tongareva	98	5.6	92	5.7	103	5.9
Cook Islands	2 948	6.5	3 033	6.0	3 153[a]	5.5

Sources: *Cook Islands Census of Population, 1966*, p. 67; *Cook Islands Census of Population and Housing, 1976*, p. 232; *Cook Islands Census of Population and Dwellings, 1981*, CPD1-82, p. 3; CPD2-82, p. 3; CPD6-82, p. 3.

Note: Includes Manuae.

Aitutaki and Mitiaro also had more households and a smaller average number of occupants in 1981 compared to 1966, but the number of households on Mangaia and Mauke has decreased, and on Mauke there has been an increase in the household density. The number of households on Mangaia has dropped by an astonishing 27.0 per cent, from 315 to 230 – an average of almost six households per year presumably being dissolved as a result of out-migration. This statistic signals a community in the process of contraction and underdevelopment.

Aside from Tongareva, all northern atolls had fewer households in 1981 than in 1966. Since Pukapuka's population has been growing throughout this period, the reduction in the number of households has resulted in greater household density (6.4 compared to 5.3), but even on those islands which are declining in population (e.g., Manihiki) household density has tended to increase. Only Palmerston shows a decrease in density since 1966.

For the population as a whole, however, the average number of occupants per household has dropped by one since 1966. Rarotonga, Mitiaro and Palmerston are all below the mean of 5.5, while most other islands are above it. In 1981, Pukapuka and Nassau had the highest densities.

E. ETHNIC COMPOSITION

The degree to which census data can reflect the complex racial and ethnic make-up of the present Cook Islands population is limited. Responses to census questions reflect respondent's own understanding and knowledge of his or her family background, and can hardly be expected to give a precise picture of the biological inheritance of the population. Suffice it to say that the originally Polynesian population of the islands has been incorporating genetic elements from other Polynesian populations, other non-Polynesian Pacific populations, and non-Pacific populations throughout the 160 years which have elapsed since first European contact.

The concept of "full" Maori which has been used in table 27 should not be taken literally to mean that the biological heritage of the individuals so classified is exclusively Cook Islands Maori, or for that matter exclusively Polynesian. Up to 1971 the census attempted to determine the degree of mixture between Cook Islands Maori and other populations by asking specific questions about each respondent's parentage. But in 1976 and 1981 this procedure was not followed: in 1976, five categories were employed, namely, Cook Islands Maori, Cook Islands Maori/European, Cook Islands Maori/French Polynesian, European, and other; in 1981 this was further reduced to "Cook Islands Maori", "Cook Islands Maori/other", "other ethnic origin". Thus we can see a gradual delimitation of the range of categories employed in the census questionnaire, with the result that the population appears successively more homogeneous than is justified on the basis of historical knowledge.

The changes illustrated by table 27 appear to be in large part an artifact of the way questions concerning ethnicity were asked. For example, the part Maori part French Polynesian population appears to have increased by over 600 per cent between 1956 and 1966 and then decreased by a similar proportion by 1976. This is not a plausible pattern. Similarly, the part Maori-Caucasian population dropped from 1,467 in 1971 to 563 in 1976, a decline of 61.6 per cent in only five years. Furthermore, the population of French Polynesians and those Maori whose heritage includes non-Polynesian and non-Caucasians ("Maori/other") disappeared altogether in 1976. These changes do not seem to be realistic. If the data are taken at face value, however, the part Maori population has declined steadily from 1966 to 1981 and the non-Maori population has remained more or less stable since 1971. The former trend would be plausible if part Maori had a higher propensity to emigrate than "full" Maori. This is a reasonable assumption, but there are no independent data to confirm it.

F. RELIGION

The formal religious affiliation of the Cook Islands population has remained overwhelmingly Christian since the late nineteenth century. In 1921, 94 per cent of the population declared themselves supporters of the congregationalist Cook Islands Christian Church (CICC) which was established by the London Missionary Society in the mid-nineteenth century. Since then support for the CICC has steadily weakened and the Christian population has become increasingly fragmented into a variety of denominations and sects (table 28). The largest non-congressionalist group is the Roman Catholic which has been active in the islands since the 1880s. In 1981, 15.0 per cent of the population were Roman Catholic, a slight increase over 1976. The Seventh Day Adventists have also increased slightly since 1966

Table 27. Ethnic composition of Cook Islands population, 1956-1981

	1956		1966		1971		1976		1981[a]	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Full Maori	14 887	89.3	15 640	81.3	18 297	85.8	16 596	91.6	15 710	96.3
Maori/French Polynesian	146	0.9	1 101	5.7	482	2.3	163	0.9	...	...
Maori/Caucasian	1 107	6.6	1 490	7.7	1 467	6.9	563	3.0	...	...
Maori/other	117	0.7	386	2.0	267	1.3	...	...	725	4.2
Total part Maori[b]	1 370	8.2	2 977	15.4	2 216	10.5	726	3.9	725	4.2
French Polynesian	65	0.4	73	0.4	46	0.2	...	...	...	...
Caucasian[c]	307	1.8	456	2.4	630	3.0	632	3.4	...	...
Other	51	0.3	101	0.5	133	0.6	173	1.0	792	4.6
Total non-Maori	423	2.5	630	3.3	809	3.8	805	4.4	792	4.6
Total	16 680	100.0	19 247	100.0	21 323	100.0	18 128	100.0	17 227	100.0

Sources: Cook Islands Population Censuses, 1956-1981.

Notes: [a] Resident population only.

[b] Detailed tables indicating the degree of Maori descent were published in 1966 and 1971, but not in other years. This table has been simplified to permit comparison.

[c] Census tables use the term "European" for this group. The majority are of New Zealand or Australian origin.

Table 28. Religious affiliation of Cook Islands populations, 1956-1981

Religion or section	1956		1966		1976		1981	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Cook Islands Christian Church	13 358	80.1	14 059	73.0	13 204	72.8	11 890	69.0
Roman Catholic	1 854	11.1	2 260	11.7	2 544	14.0	2 590	15.0
Seventh Day Adventists	910	5.4	1 121	5.8	1 157	6.4	1 223	7.1
Latter Day Saints	194	1.2	573	3.0	412	2.3	529	3.0
Other Christian[a]	191	1.1	369	1.9	519	2.9	632	3.7
Other Religion	52	0.2	27	0.1	285	1.6	98	0.6
None, not stated or refuse to state	127	0.8	838	4.3	11	0.1	265	1.5
Total	16 880	100.0	19 247	100.0	18 127	100.0	17 227	100.0

Source: Cook Islands Census of Population, 1956-1981.

Note: [a] Includes Anglican, Presbyterian, Methodist, "Free Church", Bahai, Assembly of God.

while the population of Mormons has dropped slightly in number while retaining their representation at the same level as 1966. The various other Christian groups have increased steadily in number since 1956, and this no doubt accounts for the declining population which is affiliated with the CICC. The latter represented 80.1 per cent of the population in 1956, but only 69.0 per cent in 1981.

As a consequence of these changes, the CICC is less able to serve the integrating function which was formerly of great importance to the Cook Islands social system following the decline of the indigenous religious and political system.

It is impossible to determine the degree of secularization in the Cook Islands from census data alone. The number of people who express no religious affiliation, or who object to the question, has fluctuated widely since 1956, perhaps indicating some variation in the way the question was posed.

G. EDUCATION AND SKILLS

The supply of educational statistics in the Cook Islands is inadequate either for an analysis of trends in educational attainment or for an assessment of the present level of educational achievement in the population as a whole. The 1966 population census reported the number of years of schooling which the population aged 15 and over had completed; but the 1976 population census only tabulated the last level of education attended for the population under 20 years of age. Consequently, the two data sets cannot be compared, and it is impossible to determine the degree to which the average level of educational achievement in the population has been improving.

Similarly, the latest enrolment figures to be published are already outdated, insofar as they refer to the year 1977, and since the school population is not reported by age, it is impossible to indicate what proportion of each age group is actually attending school. The 1977 data do indicate that 36 government and private schools were in operation that year, 14 of which were giving instruction to junior high school level, two of which were exclusively senior high schools (both on Rarotonga), and the remainder of which were primary schools only. Senior high school instruction up to Form 5 (grade 11 in United States classification) was available on all the southern islands with the exception of Mitiaro (which had classes up to Form 3 (grade 9) only) and on Pukapuka in the northern group. For

Table 29. High school enrolment by form and year, 1969-1977

Form	1969	1970	1971	1972	1973	1974	1975	1976	1977
				(A) Numbers in each form					
1	500	632	691	*721*	664	854	666	576	634
2	657	573	659	701	*764*	600	765	652	596
3	468	549	439	474	518	*547*	575	687	562
4	335	358	458	350	359	326	*440*	481	531
5	140	146	196	196	191	241	246	*342*	448
6	13	17	15	23	11	14	15	18	*26*
Total	2 113	2 275	2 458	2 465	2 507	2 582	2 707	2 756	2 797
				(B) Proportion of form 1 class remaining in subsequent forms					
1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2		114.6	104.2	101.4	106.0	90.4	89.5	97.9	96.6
3			87.8	75.0	75.0	76.0	86.6	80.4	84.4
4				70.0	56.8	47.0	61.0	72.4	62.2
5					38.2	38.1	35.6	47.4	67.5
6						2.8	2.3	2.6	3.6

Source: Cook Islands Statistics Office, *Quarterly Statistical Bulletin*, July - December 1977, p. 110.

instruction at sixth Form (grade 12) level, outer islands students must travel to Rarotonga and attend either the public high school or one operated by the Roman Catholic Church. In 1980 one additional public high school began sixth Form instruction on Rarotonga, but enrolment figures are not presently available. Because of the social and economic difficulties some outer islands' children face in Rarotonga, it is common for those families who can afford the expense to send their children to New Zealand for high school education. The numbers involved in this type of educational migration are not known. This practise is also common for Rarotongan families, so the enrolment statistics in Cook Islands high schools give an imperfect picture of the number of Cook Islanders receiving secondary education.

Table 29 gives an indication of the number and proportion of pupils entering Form 1 who continued through subsequent levels during the period 1969-1977. For most of these years, more than 80 per cent of pupils reached Form 3, and on average 62 per cent completed Form 4. Although the series is too short to indicate a trend, the proportion of pupils continuing through to Form 5 appears to be increasing in the late 1970s, but only a very small number enter Form 6. As already mentioned, however, these attrition rates will be affected by emigration, and should not be taken as an accurate indication of the drop-out rate.

Although 1966 and 1976 census data on vocational and specialized education are not completely comparable, an approximate indication of the trends can be obtained from table 30. In broad terms the picture is not a positive one, especially in view of the large expenditures in education and training undertaken by the Cook Islands government and various foreign aid agencies. The most favourable interpretation is that the supply of persons with some vocational or higher education was static over this period, but there are also signs that some categories of skilled persons were declining (e.g., public service trainees, female

Table 30. Population receiving vocational training or other tertiary education, 1966 and 1976

Type of education	1966			1976		
	Males	Females	Total	Males	Females	Total
Teacher's training college	184	223	407	231	190	421
Nursing, medical and dental	1	44	45	7	36	43
Public service	21	7	28	9	3	12
University	73	14	87	...	...	...
Engineering	...	...	...	23	–	23
Surveying	...	...	...	5	–	5
Trades	...	...	...	22	–	22
Typing	...	...	...	1	13	14
Other professional and vocational education	78	18	96	63	23	86
Other education	27	12	39	38	11	49
Not stated	13	8	21	1	2	3
Total	397	326	723	400	278	678

Sources: *Cook Islands Population Census, 1966*, p. 66; *Cook Islands Census of Population and Housing, 1976*, pp. 126-127.

teachers). The principal reason for this situation is emigration. Although there is a constant turnover of skilled persons between the Cook Islands and New Zealand, the net result during the 1966-1976 period was a net loss of skills to the Cook Islands, especially of teachers are tradesmen.[4]

H. SUMMARY AND CONCLUSION

Significant changes in the age composition of all islands have occurred during the 1976-1981 intercensal period. The under 15 population has declined substantially and the simultaneous increase in the 15-64 age group has reduced the youth dependency ratio on every island. Declining fertility and emigration are responsible for these changes. But the age structure of the outer islands – particularly the northern group – remains highly distorted because of previous out-migration by young adults. There is an acute deficiency of adults aged 30-34 in the northern group.

Conversely, the 65 and over age group is increasing – especially on the outer islands – and this means that the aged dependency ratio either remains high or is also increasing.

In 1981 the proportion of males in the population was at its highest since 1956. This appears to be a function of female-dominated emigration, but other factors may also be at work. The sex ratio tends to be lowest in the 35-44 age group.

There also appear to be significant changes in the marital composition of the population with fewer persons married in 1981 than in previous years. Later marriage and a larger young adult population probably accounts for part of this change but the number and proportion of separated or divorced persons is also growing.

The ethnic composition of the Cook Islands appears to have changed little since 1976. Although there are some problems of classification, it appears that the part-Maori and non-Maori populations have remained stable. Similarly, only minor changes are apparent in the religious affiliation of Cook Islanders, although the processes of fragmentation into smaller sects continues.

[4] Geoffrey R. Hayes, *Migration, Population Change and Socio-economic Development in the Cook Islands*, unpublished Ph.D. thesis, University of British Columbia, 1982.

Chapter V
TRENDS AND DIFFERENTIALS IN FERTILITY

A. INTRODUCTION

While emigration has played a substantial role in reducing the actual growth of the Cook Islands population during the past twenty years, the extremely high level of fertility which prevailed throughout the 1950s and 1960s was an important driving force behind the large out-flow of people which occurred during these decades and into the 1970s. And so long as emigration continues to remove large numbers of people, the relationship between fertility and other characteristics of the population will tend to be obscured. The high dependency ratios of most islands in the 1970s, for example, are often attributed to emigration; yet emigration is only a contributory cause of this phenomenon. Emigration is partly a response to high fertility levels, but it also tends to exacerbate the very conditions for which high fertility is responsible. Without emigration, dependency ratios in the Cook Islands would remain exceptionally high because of high fertility; but age-selective emigration does result in dependency ratios a little higher still than they otherwise would have been.

Looked at from this perspective, the timing and rate of transition from high to low fertility is the single most important demographic issue in the Cook Islands. High fertility rates ensure a continual, and increasing, supply of potential emigrants; yet emigration sets up social and economic forces which tend to perpetuate the emigration stream leading to "over-adjustment" and a declining population. The future of population growth in the Cook Islands will largely depend on whether fertility can fall far and fast enough that the social and economic forces set in motion by emigration are prevented from becoming overwhelming.

Just as the 1950s were a period of rapid mortality transition, the 1970s and 1980s represent a period of fertility transition. The purposes of this chapter, therefore, are as follows: (a) to describe and analyse this fertility transition up to 1981; (b) to indicate the significant variations across regions and islands; (c) to suggest the probable determinants of the transition; and (d) to discuss both the present consequences of past fertility and the likely course of fertility change in the near future. For the purpose of understanding fertility trends since the turn of the century, this chapter primarily employs vital data from the civil registers maintained by the Cook Islands Department of Justice. Because the official registration of births and deaths did not become effective until 1917, considerable under-registration must be assumed during the first two decades of this century. Indeed, it was not until the late 1920s that it became possible to compile vital data for the Cook Islands as a whole. The degree of under-registration and incomplete coverage since then has no doubt varied from island to island according to local conditions, but owing to the nature of the land tenure system, the incentive to register a birth has generally been strong.[1] By the end of the Second World War both the completeness and coverage of the vital registration system had improved to the point where reasonably accurate regional and inter-island comparisons could be made.

It is only recently, however, that any attempts have been made to estimate the accuracy of vital data by technical methods;[2] and even then the techniques employed have been somewhat rudimentary. Based on a comparison of registered births and hospital records, the under-registration of births in Rarotonga was estimated to be somewhere between 2.9 and 4.1 per cent in 1979. In other words, registration in that year was between 95.9 and 97.1 per cent complete. The small size of the populations on the outer islands has advantages and disadvantages in this respect. In such small communities, births are less likely to go unnoticed by the Administrative Officer than would be true in larger anonymous communities; but given the small number of births in any one

[1] Norma McArthur, *Island Populations of the Pacific* (Canberra, Australian National University Press, 1967), p. 211.

[2] Geoffrey R. Hayes, *Report on Project to Evaluate Cook Islands Vital Statistics, 1965-77*, South Pacific Commission, 1980, p. 21, (unpublished).

Table 31. Crude birth rates and age adjusted birth rates by region, 1945-1981

(births per 1,000 population)

Census year	New Zealand	Rarotonga		Southern outer islands		Northern outer islands		Total Cook Islands	
		CBR	AABR[a]	CBR	AABR	CBR	AABR	CBR	AABR
1945[1]	...	40.6	...	44.8	...	31.8	...	38.2	35.3
1951[1]	...	39.8	...	44.2	...	39.4	...	40.8	37.5
1956[1]	...	41.2	39.1	46.2	46.5	53.1	44.4	46.6	45.3
1961[1]	...	47.1	42.5	51.2	56.1	51.2	48.2	49.0	47.9
1966[2]	22.5	45.8	41.7	42.2	49.3	41.8	51.0	44.4	45.0
1971[2]	22.6	36.6	34.2	35.0	45.7	44.9	50.3	37.0	39.9
1976[2]	17.8	27.4	27.6	27.1	42.5	34.6	45.7	28.3	33.5
1981[3]	16.3[b]	25.8	21.7	25.8	35.3	29.0	35.6	26.3	26.5

Sources: [1] James Phillips, *A Demographic Profile of the Cook Islands*, Unpublished Msc. Thesis, University of Hawaii, 1972, p. 53.

[2] Geoffrey R. Hayes, *op. cit.*

[3] Cook Islands Statistics Office. *Quarterly Statistical Bulletin*, December 1980; unpublished Statistics, 1981.

Notes: 'For the years 1945 through 1961, three years of vital data centred on the census year were used to calculate rates. In 1966 through 1976, five years of vital data were used. For 1981, vital data for 1979-81 were averaged since 1982 data were not available.'

[a] Age adjusted birth rate, standardized on 1966 New Zealand population.

[b] 1980 rate.

year, even one or two missed births could have a substantial effect on the resulting birth rates.[3] Nevertheless, the quite small "error of closure" found in a reconciliation of census and registration data for the period 1971-1976 suggests that even outer islands vital data are reasonably accurate for most analytical purposes.[4] For this reason, the measures reported in this chapter are based entirely on unadjusted data.

B. CRUDE BIRTH RATES

Data compiled by missionaries and chiefs suggest that between 1902 and 1926 the crude birth rate (CBR) on that sub-set of islands from which statistics were available[5] fluctuated from a low of 31 per 1,000 population to a high of 41.7 per 1,000. Curson estimated the CBR in Rarotonga during the period 1902-1911 to be 43.6 per 1,000, and commented that this was a substantial increase over the last decade of the nineteenth century.[6]

According to registration data, the CBR for the Cook Islands as a whole increased from 38.2 per 1,000 in 1945 to 49.0 in 1961, and then declined to 26.3 in 1981 (see table 31). This general pattern of change – a rising trend up to 1961 followed by a steady decline – occurred in all regions, but the southern outer islands had the highest CBR in 1945 (44.8 per 1,000) and dropped to the same level as Rarotonga (25.8 per 1,000) by 1981.

In 1981 (that is, 1979-1981 vital data), the northern group had the highest crude birth

[3] In 1981, 7 of 11 outer islands had fewer than 20 births and 5 had 10 or less each.

[4] See Annex I.

[5] For details on the number of islands see chapter III, table 10.

[6] P.H. Curson, "Birth, death and migration: elements of population change in Rarotonga 1890-1926", *New Zealand Geographer*, vol. 29, 1973, pp. 103-119.

Table 32. Crude birth rates by island and region, 1966-1981

	1966	1971	1976	1981
Rarotonga	45.9	36.5	27.5	25.8
Aitutaki	43.1	32.5	27.1	29.4
Atiu	45.1	39.4	31.0	20.1
Mangaia	39.0	29.6	22.7	26.1
Mauke	40.2	44.1	35.7	26.4
Mitiaro	47.8	41.3	36.1	16.9
Southern outer islands	41.9	35.3	27.3	25.8[a]
Manihiki	42.8	50.9	58.9	23.9
Palmerston	31.4	32.3	23.8	25.6
Pukapuka/Nassau	45.4	44.8	28.6	32.3
Rakahanga	40.3	38.3	37.7	22.1
Tongareva	38.5	45.8	32.3	32.3
Northern outer islands	41.4	45.9	34.9	29.0
Total Cook Islands	43.7	37.0	28.3	26.3[a]

Source: Same as table 31.

Note: 'In this table, three years of vital data centred on the census year were used in the calculations. This accounts for the small discrepancy between some of the regional rates shown here and those shown in table 31 in which five years of vital data were used.'

[a] Includes Manuae.

rate (29.0 per 1,000) as it has since 1971. But this does not mean that every northern atoll had a higher CBR than every southern island: Manihiki, Nassau, Rakahanga and Palmerston all had a lower CBR than either Aitutaki or Mangaia; but no southern island had a rate as high as Pukapuka or Tongareva, the two northern atolls with the largest populations.[7]

The CBR has increased on Aitutaki, Mangaia, Palmerston and Pukapuka/Nassau between 1976 and 1981 (table 32). In the case of the first two islands this is undoubtedly a function of their changing age composition and not a sign of increasing fertility. In Palmerston and Pukapuka/Nassau, however, more refined indicators to be discussed below suggest that fertility has increased slightly since 1976.

The exceptionally high crude rates recorded on Manihiki in 1971 and 1976 are partly a function of the circulation of population which artificially increases and decreases the denominator used to calculate such rates. This was apparent at the time of the 1976 census when approximately 50 Manihikians en route to New Zealand were enumerated in Rarotonga. If this group were added back into Manihiki's population, the CBR would be reduced to 49.6 per 1,000 from 58.9. Return migration prior to the 1981 census may partly account for the large drop in the CBR that year, but a real decline in fertility is also implied.

The lowest crude birth rates in 1981 were recorded in Mitiaro (16.9) and Atiu (20.1). Since there were only an average of 35 women of child-bearing age on Mitiaro during the 1976-1981 period, random fluctuation in the number of births may have contributed to this low rate, but it is unlikely that this is a complete explanation for a fall of such magnitude and a decline in fertility is also probable.

C. AGE-SEX STANDARDIZED BIRTH RATE

Because the crude birth rate is affected by changes in the age composition of the population, it is necessary to standardize the age structure before attempting detailed comparisons across regions and through time. Table 31 shows birth rates which have been standardized on the 1966 age and sex distribution of New Zealand.[8] The age-adjusted birth rate indicates what the birth rate of each region would be if the age and sex composition of their populations was identical to this "standard" population.

Up until 1976, the effects of standardization are quite dramatic. In 1966, Rarotonga had the

[7] Small differences between the rates for individual islands should be interpreted with caution because of the chance of random fluctuation in the number of births.

[8] The age adjusted birth rates for 1945, 1951, 1956 and 1961 were taken from James F. Phillips, *op. cit.*, pp. 51-53. Phillips does not indicate whether the direct or indirect method was used nor what population was used as the standard. But since it is clear that he used the 1966 population of New Zealand as his 1966 standard, this has been retained here for subsequent years. The "direct" method of standardization has been used; that is, age-specific fertility rates for each region have been applied to the New Zealand age distribution. For details of standardization methods see: Henry S. Shryock, Jacob S. Siegel and Associates, *The Methods and Materials of Demography* (Washington, United States Census Bureau, 1975), pp. 481-483.

highest CBR (45.8 per 1,000) whereas the northern group had the lowest (41.8 per 1,000). According to the age-adjusted birth rate, however, Rarotonga's rate of 41.7 per 1,000 was the lowest of all the regions, and the northern group's 50.3 was the highest. Given Rarotonga's higher level of urbanization, larger foreign population and greater affluence, it is to be expected that the birth rate would be lower there than in the northern atolls. The age-adjusted birth rate shows that this is indeed the case, whereas the crude birth rate tends to conceal it. The large difference between the northern group's crude birth rate and age adjusted birth rate is an indication of how different its age structure is from New Zealand's.

Differences in the rates of change exhibited by the crude birth rate and the age adjusted birth rate are an indication of the extent to which the changing age composition of the population is affecting the crude birth rate. For the total population, the CBR dropped from 44.4 per 1,000 in 1966 to 28.3 in 1976, a decline of 16.1 points or 36.6 per cent. The age-adjusted rate, on the other hand, dropped from 45 per 1,000 to 33.5 per 1,000, a decline of only 25.5 per cent. This suggests that about one third of the decrease in the crude birth rate between 1966 and 1976 can be attributed to changes in the age structure.

From 1976 to 1981, however, the age-adjusted birth rate dropped even faster than the crude birth rate – the former declining by 21.0 per cent, the latter by only 7.1 per cent. This indicates not only that fertility is declining but also that the age structure is undergoing a different type of change than was the case between 1966 and 1976.

The differences between the CBR and the age-adjusted birth rate are largest in the outer islands where high levels of out-migration have produced populations deficient in the young adult age groups. This is particularly apparent in the southern outer islands where about 55 per cent of the decline in the crude birth rate between 1966 and 1976 can be attributed to changes in the age composition of the population. In the northern group, about 40 per cent of the decline in the CBR resulted from changes in the age structure.

But even in the outer islands the situation changed after 1976. In both the north and the south the age-adjusted rate decreased more than the crude birth rate, signifying not only that fertility has declined but also that changes in the age structure tend to disguise the true magnitude of the decline. Whereas prior to 1976 the crude rate tended to understate the decline in fertility, the trend since 1976 is toward an age structure in which the crude birth rate tends to overstate the degree of fertility decline. As yet this is only a tendency in the outer islands since their age-adjusted birth rates remain substantially higher than their crude birth rates; but in Rarotonga the 1981 crude birth rate of 25.8 per 1,000 is 16 per cent higher than the age-adjusted rate of 21.7 per 1,000.

In the total population, as already mentioned, the crude birth rate and the age-adjusted birth rate are now virtually identical. This can be explained by the fact that Rarotonga's lower age-adjusted birth rate is compensated by the outer islands' higher age-adjusted rate, producing the combined result shown in table 31. As fertility continues its decline in the outer islands, it can be expected that the difference between the crude and age-adjusted rates will widen, with the age-adjusted rate falling below the crude rate – as is presently the case in Rarotonga.

The principal factor behind the changing relationship between the crude and age-adjusted birth rates is the declining proportion of the population under the age of 15. This proportion had been increasing through the 1960s as fertility increased – reaching a peak of 51.9 per cent of the population in 1966 – but is now decreasing. The trend has gone much further in Rarotonga where the population under 15 years of age has dropped to 38.7 per cent of the total compared to 48.3 per cent in 1971, but it is apparent in the outer islands as well.

Measured according to the age-adjusted birth rate, fertility in the Cook Islands reached a post-War peak around 1961– except in the northern atolls where the peak came 5 years later. During the subsequent 20 years, the age-adjusted birth rate has declined by 44.7 per cent in the total population, 48.9 per cent in Rarotonga, 37.1 per cent in the southern outer islands and 26.1 per cent in the northern group. In general, the rate of decline in the age-adjusted rate has accelerated in each intercensal period since 1961: the rate of decline in the 1976-1981 period (20.9 per cent) is almost four times that of the 1961-1966 period (5.8 per cent). Up until 1976, the rate of decline in the northern group lagged substantially behind the rest of the country; during the 1976-1981 period, however, the northern group had the highest rate of decline of any of the regions – either at present or in their past history.

Table 33. General fertility rates by region, 1936-1981

Region	1936[a]	1945[a]	1951[a]	1956[a]	1961[b]	1966[c]	1971[c]	1976[c]	1981[d]
Rarotonga	188	210	207	217	239	241	188	142	115
Southern outer islands	217	220	226	254	305	277	237	198	157
Northern outer islands	...	159	189	266	287	274	254	219	180
Total Cook Islands	...	203	212	239	268	256	210	166	133

Sources: [a] Norma McArthur, *Island Populations of the Pacific* (Canberra, Australia National University Press, 1967) p. 220.

[b] James Phillips, *op. cit.*, p. 54.

[c] Calculated from vital statistics in: Geoffrey R. Hayes, *op. cit.*, (Appendix).

[d] Calculated from unpublished vital statistics provided by Cook Islands Statistics Office (mean births 1979-1981).

Note: The general fertility rate is the number of births per 1,000 females aged 15-44. A small number of births to females aged 10-14 and 45-49 have been placed in the age groups 15-19 and 40-44 respectively.

D. THE GENERAL FERTILITY RATE

A more precise measure of regional differences in fertility levels may be obtained from the general fertility rate (GFR) which is less susceptible to changes in the age composition of the population than the crude birth rate. Under conditions of rapid population growth, or where there are wide variations in the fertility levels of different age groups within the child-bearing age range, however, the GFR may also be affected by compositional change. It is therefore advisable to adjust the GFR to a standard population as well.[9]

Table 33 shows the GFR by region from 1936 through 1981, while the age-adjusted GFR from 1966 is shown in table 34. According to the unadjusted GFR, fertility in the Cook Islands as a whole rose steadily from 1945 to 1961, reaching a peak of 268 births per 1,000 women aged 15-44 in the latter year. After 1961 the GFR declined to 133 in 1981, a 50.4 per cent decline in 20 years. As to be expected, this rate of decline is similar to that indicated by the age-adjusted birth rate.

Although each region has a different level of fertility in any given period, the general pattern of change through time has been similar. According to the GFR, both the southern outer islands and the northern group reached peak fertility in 1961, although the southern outer islands peaked at a slightly higher level. In Rarotonga the GFR also appears to have peaked and leveled-off somewhere around 1961-1966. Similarly, the GFR declined in all regions after 1966, but to a much lesser degree in the northern group than in the other regions. These changes are illustrated by figure 7.

Since the GFR is already a partially age-sex adjusted rate, it is unlikely that further standardization would have a large effect on the rates themselves or on the direction of change. As a comparison of tables 33 and 34 will show, this is the case here: standardizing the rates makes only a small difference to the comparative level of fertility across the regions, and no difference to the direction of change within each. In the outer islands, however, the magnitude of change over the 1961-1981 period is affected by standardization. The decline in the age-sex adjusted general fertility rate since 1961 is about 20 per cent lower than the decline in the unadjusted GFR, indicating that the changing age composition of the female population within the child-bearing age range has contributed to the declining general fertility rate in the outer islands. In the total population the difference between the rate of decline in the two measures is only about 5 per cent, and in Rarotonga there is virtually no difference between them.

[9] The age-sex adjusted GFR is obtained in the same manner as the age-adjusted birth rate except that the divisor is the female standard population aged 15-44 rather than the total standard population.

Table 34. Age-adjusted general fertility rate by region, 1961-1981

	1961[a]	1966[b]	1971[b]	1976[b]	1981[b]
Rarotonga	230	228	174	139	111
Southern outer islands	291	273	230	215	180
Northern outer islands	257	262	256	232	181
Total Cook Islands	257	245	203	169	134

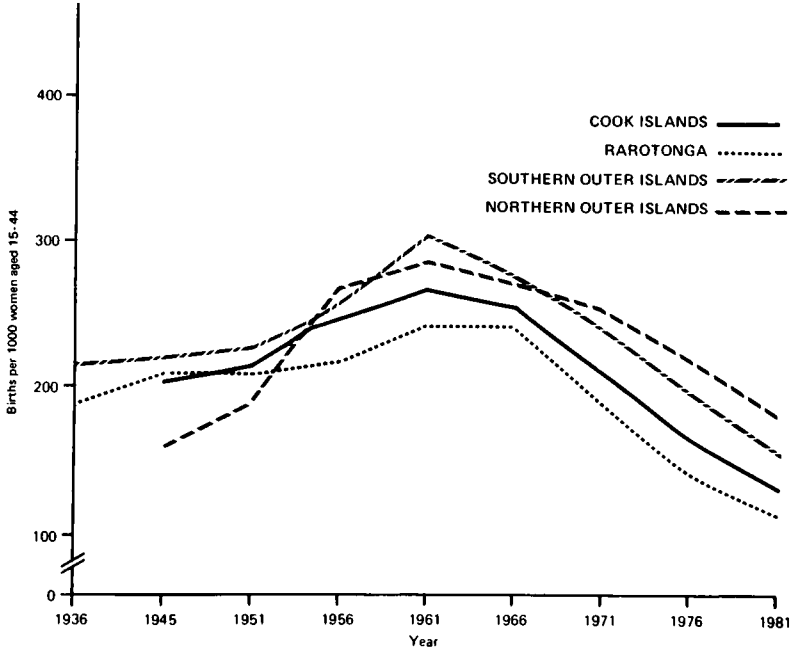
Sources: [a] Calculated from age-specific fertility rates in: James Phillips, *op. cit.*, p. 57.

[b] Calculated from age-specific fertility rates in Geoffrey R. Hayes, *Migration, Population Change and Socio-economic Development in the Cook Islands*, unpublished Ph.D. thesis, University of British Columbia, 1982, Appendix D.

[c] Calculated from unpublished vital statistics. Cook Islands Statistics Office (mean births by age 1979-1981).

Note: The age-sex adjusted general fertility rate was obtained by applying age-specific fertility rates to a standard population (New Zealand, 1966).

Figure 7. General fertility rate by region, 1936-1981



Source: Table 33.

Table 35. General fertility rates by island, 1966-1981

	1966[a]	1971[a]	1976[a]	1981[b]
Rarotonga	241	188	142	115
Aitutaki	270	220	173	170
Atiu	308	284	233	126
Mangaia	247	208	175	143
Mauke	256	346	192	198
Mitiaro	354	289	303	120
Palmerston	133	200	91	114
Pukapuka/Nassau	283	237	153	196
Manihiki	296	350	394	152
Rakahanga	288	232	257	109
Tongareva	264	259	244	237

Sources: [a] Calculated from Geoffrey R. Hayes, *op. cit.* (five years of vital data averaged).

[b] Unpublished Vital Statistics, Cook Islands Statistics Office (mean births 1979-1981).

Note: Manuae omitted.

As in the case of the CBR, the GFR varies widely between islands and within regions (table 35). By this measure, Tongareva has the highest fertility of any island, followed by Mauke and Pukapuka/Nassau, while Rakahanga has the lowest. The GFR dropped sharply on several islands between 1976 and 1981 but there appears to be little regional consistency. The smaller islands show a greater tendency to decrease while the larger ones have either increased or remained virtually steady.

The effects of age standardization indicate that changes in the age composition of the population caused by out-migration and emigration have contributed to the declining general fertility rate in the outer islands. But these age-structure effects are not a simple matter of a steady decline in the size of certain age groups. As table 36 shows, the size of the female population in the child-bearing ages has tended to fluctuate with the level of emigration. For the Cook Islands as a whole, this group numbered 3,491 in 1981, which is only 5.2 per cent above the 1961 figure of 3,318. But the 20-34 age group declined by 15.6 per cent, and, as will be shown in the following section, it is this age group that has particularly high fertility rates.

Both the southern outer islands and the northern group exhibit a declining trend in the 15-44 age group, but some intercensal fluctuation is also apparent. In the southern outer islands, the female population aged 15-44 declined in the 1961-1966 and 1971-1976 intercensal periods when out-migration was high, and increased in the 1966-1971 and 1976-1981 periods when out-migration was relatively lighter. But some groups experienced a continuous decline: the 30-34 age group, for example, declined by 36.6 per cent between 1961 and 1981, and the 25-29 group declined by 40.3 per cent.

To the extent that the age composition of the female population at risk of child-bearing has changed in the Cook Islands total population since 1961, this can be attributed almost entirely to changes taking place in the outer islands. These changes are the result of emigration and out-migration. In Rarotonga, on the other hand, the 15-44 age group has increased by 25 per cent since 1961, and this is because net emigration has been relatively lighter and the emigration of Maori women has been slightly offset to some degree by the immigration of non-Maori women.[10]

Taking the age-sex adjusted general fertility rate as the most precise indicator of over-all fertility employed so far in this chapter, fertility in the Cook Islands as a whole has declined by 47.9 per cent between 1961 and 1981. In Rarotonga the decline was 51.7 per cent, in the southern outer islands 38.1 per cent, and in the northern atolls 29.6 per cent. These rates of change are somewhat higher than indicated by the age standardized birth rate, but moderately so. The pace of decline in the age-sex adjusted GFR is similar to that of the age-sex adjusted birth rate. And in the case of the total population the rate of decline has tended to accelerate through time (table 37). The only exception to this was the 1971-1976 period when the rate decreased slightly. Rarotonga experienced its fastest decline in the 1966-1971 intercensal period but has had a fairly steady rate since then. In the northern group the age-sex adjusted GFR has been declining at the fast rate of 4.4 per cent annually during the 1976-1981 intercensal period.

[10] These are mostly married women accompanying their husbands in connection with various development assistance programmes.

Table 36. Females by age group in child-bearing age range, 1961-1981

Age group	Rarotonga					Southern outer islands				
	1961	1966	1971	1976	1981	1961	1966	1971	1976	1981
15 - 19	544	565	658	636	625	266	274	317	295	376
20 - 24	369	457	440	362	452	220	203	213	121	156
25 - 29	276	298	381	280	294	181	170	173	121	108
30 - 34	204	235	302	259	263	146	131	160	117	93
35 - 39	164	198	229	236	273	152	150	144	134	111
40 - 44	161	170	187	198	241	138	128	126	128	122
15 - 44	1 718	1 923	2 197	1 971	2 148	1 103	1 056	1 133	917	966

Age group	Northern outer islands					Cook Islands				
	1961	1966	1971	1976	1981	1961	1966	1971	1976	1981[a]
15 - 19	94	66	99	88	123	904	905	1 074	1 019	1 124
20 - 24	99	55	72	66	75	688	715	725	550	688
25 - 29	95	66	56	45	52	552	534	610	447	458
30 - 34	92	78	52	49	37	442	444	514	423	395
35 - 39	73	64	58	30	44	389	412	431	400	428
40 - 44	44	47	49	41	35	343	345	362	367	398
15 - 44	497	376	386	319	366	3 318	3 355	3 716	3 206	3 491

Source: *Cook Islands Census of Population and Housing, 1976,* pp. 58-61, *Cook Islands Census of Population and Dwellings, 1981,* CPD1-82, CPD2-82, CPD3-82, and unpublished tables.

Note: [a] The total for the Cook Islands is greater than the sum of the regions since persons "at sea" are included.

Table 37. Average annual rates of change in the age-adjusted general fertility rate by region, 1966-1981

	1961-1966	1966-1971	1971-1976	1976-1981
Rarotonga	−0.2	−4.7	−4.0	−4.0
Southern outer islands	−1.2	−3.2	−1.5	−3.3
Northern outer islands	−0.4	−0.4	−1.9	−4.4
Total Cook Islands	−0.9	−3.4	−3.3	−4.1

Source: Table 34.

E. AGE-SPECIFIC FERTILITY RATES

Age-specific fertility rates are less affected by changes in the age composition of the population than either the CBR or GFR and provide the most detailed basis on which to compare changes in fertility across time and space. In the Cook Islands context, however, the extremely small size of some age groups, and the likelihood of random variation in the number of births in any one year means that small differences between regions or through time must be interpreted with caution. This problem is most serious in the northern group where there may be fewer than 40 females in some age groups and as few as 3 births per year. Under such circumstances, only quite large percentage

changes attain statistical significance.[11] When the unit of analysis is the total population, however, this problem is less critical.

1. Total population

Age-specific fertility rates from 1961 onwards are presented by region in table 38. With respect to the total population, most age groups exhibit a steady pattern of decline since 1961, but the fertility rate of the 15-19 group was still increasing up to 1966. In 1961, the 25-29 age group had the highest rate (404 per 1,000); by 1981 peak fertility had shifted to the 20-24 age group (213 per 1,000), but as in 1961 the difference between the 20-24 and 25-29 groups was small when compared to the difference between these and other age groups. The general pattern of change is illustrated by figure 8, which shows that the fertility curve has not only moved substantially down the scale, it has also changed its shape becaue of the different rates of change in each age group.

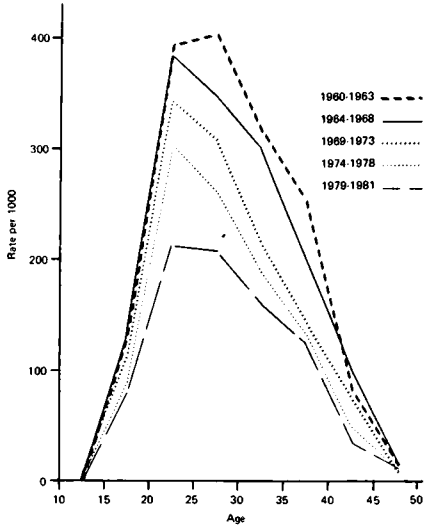
As table 39 indicates, the downward trend is accelerating in some groups (e.g., 20-24 and 25-29), slowing down in others (e.g., 15-19 and 30-34) and is somewhat erratic in others. In the total population fertility is presently declining most rapidly in the 20-29 age group.

2. Regional variations

One of the reasons for the erratic changes in the rates of change in some age groups in the total population is that each of the regions of the Cook Islands are at different stages of their fertility transitions. And since economic, social and cultural conditions vary greatly between regions–and sometimes between individual islands within regions–the transition does not follow exactly the same course in each region with a predictable time-lag. Because fertility began to decline first in Rarotonga, and in particular in the 35 and above age group, it is not surprising that the rate of decline in this group has begun to fall-off since 1971. The single exception to this appears to be the 40-44 group which had a 60.0 per cent decline in fertility in the 1976-1981 period. The decline in the 30-34 age group has leveled-not since 1976, and whereas the decline has slowed down in the 25-29 group, it is apparently accelerating among women aged 20-24. The

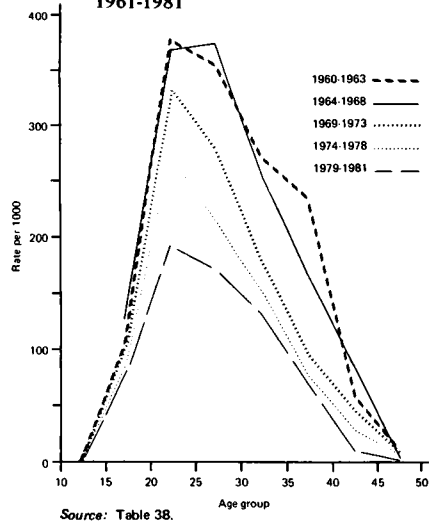
[11] The question of statistical significance in cases where rates are based on a complete enumeration, rather than a sample, is a controversial one. See: Norma McArthur, *Introducing Population Statistics* (Melbourne, Oxford University Press, 1961), pp. 39-41.

Figure 8. Age-specific fertility rates in the Cook Islands, 1961-1981



Source: Table 38.

Figure 9. Age-specific fertility rates in Rarotonga, 1961-1981



Source: Table 38.

Table 38. Age-specific fertility rates by region, 1961-1981

(per 1,000 population)

Age group	Rarotonga					Southern outer islands				
	1961	1966	1971	1976	1981	1961	1966	1971	1976	1981
10 - 14	1	–	1	1	–	2	4	3	–	–
15 - 19	107	127	108	85	82	164	128	129	102	73
20 - 24	378	370	334	276	193	406	408	403	380	259
25 - 29	355	376	281	214	171	495	429	341	332	280
30 - 34	271	255	179	151	131	378	405	238	239	226
35 - 39	238	172	96	81	71	274	213	201	194	179
40 - 44	59	88	48	30	12	97	109	87	78	72
45 - 49	10	1	6	6	2	22	16	15	11	32
TFR[a]	7 098	7 014	5 266	4 222	3 312	9 203	8 565	7 070	6 631	5 608

Age group	Northern outer islands					Cook Islands				
	1961	1966	1971	1976	1981	1961	1966	1971	1976	1981
10 - 14	–	–	–	–	–	1	2	1	1	–
15 - 19	136	137	101	91	119	126	128	115	89	83
20 - 24	395	418	417	318	253	392	385	363	302	213
25 - 29	390	410	393	400	273	404	349	308	262	207
30 - 34	301	269	327	265	224	315	300	216	189	161
35 - 39	237	267	207	300	141	252	199	144	135	106
40 - 44	105	106	143	73	89	81	99	77	52	37
45 - 49	18	29	–	–	7	16	17	9	10	13
TFR[a]	7 910	8 171	7 936	7 238	5 528	7 936	7 635	6 165	5 195	4 100

Sources: 1961: James Phillips, *op. cit.*, p. 57.

1966-1976: Geoffrey R. Hayes, *Migration, Population Change and Socioeconomic Development in the Cook Islands*, Appendix D.

1981: Calculated from unpublished vital statistics, Cook Islands Statistics Office, 1979-1981.

Note: [a] The total fertility rate is the sum of the age specific fertility rates. In effect this indicates the total number of births a cohort of 1,000 women would have in their lifetime if they experienced the age-specific fertility rates prevailing in the stated period.

Table 39. Percentage change in age-specific fertility rates and total fertility rate 1966-1971, 1971-1976 and 1976-1981, by region

Age group	Rarotonga			Southern outer islands			Northern outer islands			Cook Islands		
	1966-1971	1971-1976	1976-1981	1966-1971	1971-1976	1976-1981	1966-1971	1971-1976	1976-1981	1966-1971	1971-1976	1976-1981
15-19	−15.0	−19.0	−3.5	−0.8	−20.9	−28.4	−26.2	−9.9	−30.8	−10.1	−22.6	−6.7
20-24	−9.7	−17.3	−30.1	−1.2	−5.7	−31.8	−0.2	−23.7	−20.4	−5.7	−16.8	−29.4
25-29	−25.3	−23.8	−20.1	−20.5	−2.6	−15.7	−4.1	1.8	−31.8	−11.7	−14.9	−32.8
30-34	−29.8	−15.6	−13.2	−41.2	−0.4	−5.4	−21.6	−19.0	−15.5	−28.0	−12.5	−14.8
35-39	−44.2	−15.6	−12.3	−5.6	−3.5	−7.7	−22.5	−44.9	−53.0	−27.6	−6.2	−21.5
40-44	−45.5	−37.5	−60.0	−20.2	−10.3	−7.7	−34.9	−49.0	−21.9	−22.2	−32.5	−28.8
45-49	500.0	–	−66.7	−6.5	−26.6	190.0	−100.0	–	–	−47.1	+11.1	+30.0
TFR[a]	−24.9	−19.8	−21.6	28.0	−7.6	−15.4	−2.9	−8.8	−23.6	−19.3	−15.7	−21.1

Source: Table 38.

Notes: [a] Total fertility rate.

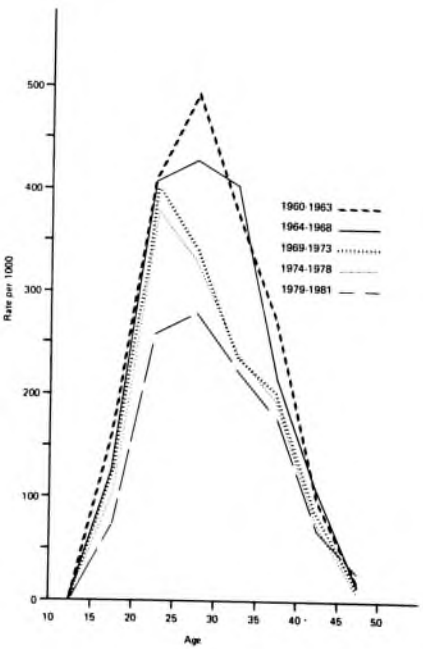
decline in the fertility of the 15-19 age group has virtually stopped in Rarotonga, and this might account for the growing perception there that teenage pregnancy is on the increase.[12]

The pattern of change in Rarotonga is illustrated by figure 9. It will be seen that in spite of a substantial decline in the fertility of all age groups, Rarotonga's fertility remains an "early peak" type, with the highest fertility occurring in the 20-24 age group. This is in contrast to the fertility curve for the total population (figure 8) which is moving toward a "broad peak" type in which fertility reaches a peak in the 20-29 age group.[13]

The general trend in the outer islands is one of accelerating fertility decline in the 15-29 age group while the other age groups are either declining at a slower pace than before or following an erratic pattern. In both outer islands regions the trend among women aged 15-24 is sharply downwards, particularly during the latest inter-censal period (see table 39), and a similar pattern of rapid decline is apparent in the 25-29 group in the northern atolls. In the 30-34 age group, on the other hand, the rate of decrease in the southern outer islands has slowed down considerably since the 1966-1976 period. For women above the age of 24 there is a substantial difference in the rate of decline in the southern outer islands and the northern group during the latest intercensal period; but this reflects largely a difference in timing, not a difference in fertility rates. As inspection of table 38 will show, the actual fertility rates in these age groups are now similar in both regions, and as will be discussed below, it appears that the age-specific fertility patterns of the two outer islands regions are beginning to converge.

The changing patterns of age-specific fertility through time are illustrated for the southern outer islands and the northern group in figures 10 and 11 repectively. It is noteworthy that in both regions fertility peaks in the 24-29 age group rather than in the 20-24 group as is the case in Rarotonga. In the south the fertility curve changed from a late peak type in 1961 and 1966 to an early peak type in 1971 and 1976 and then back again to a late peak type in 1981—Although at a much lower level than previously. In the northern group the shift from an early to a late peak curve took place after 1971.

Figure 10. Age-specific fertility rates in southern outer islands, 1961-1981

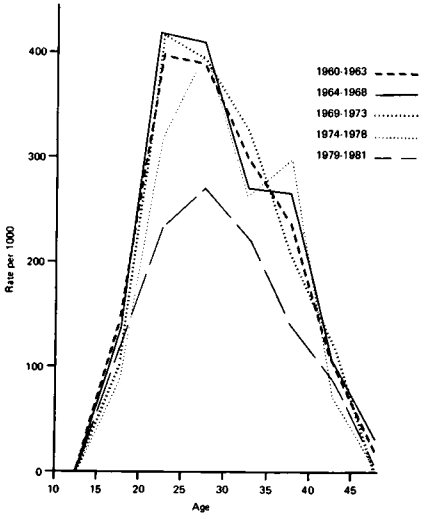


Source: Table 38.

[12] Sun Young Kim, *Report on a Field Visit to the Cook Islands*, World Health Organization, Manila, 1980, pp. 5-9. Clearly the fertility rate of teenagers aged 15 to 19 is decreasing, not increasing, but it is possible that more young teenagers (15-17) still attending school are becoming pregnant, and this may account for the public perception that teenage pregnancy is on the increase. This cannot be substantiated since the age of mothers is not published by single year.

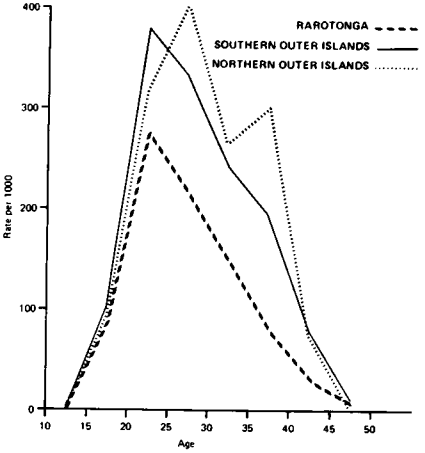
[13] This pattern of change has also been observed on Niue. See: M.L. Bakker, "Fertility", in: *Niue, 1976, Census of Population and Housing*, vol. 2, Analysis of Demographic Data (Niue, Department of Justice, 1980), p. 91.

Figure 11. Age-specific fertility rates in the northern outer islands, 1961-1981



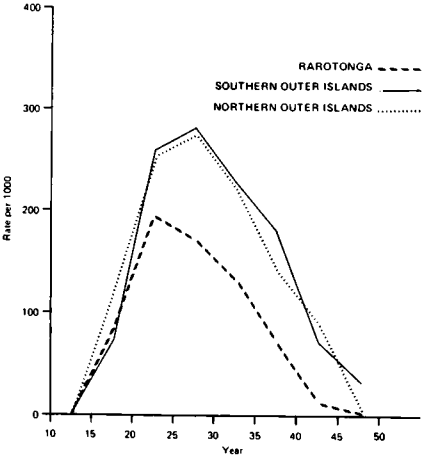
Source: Table 38.

Figure 12. Age-specific fertility rates by region, 1974-1978



Source: Table 38.

Figure 13. Age-specific fertility rates by region, 1979-1981



Source: Table 38.

Regional variations in age-specific fertility in 1976 and 1981 are shown graphically in figures 12 and 13. The most notable change between the two periods is the apparent convergence of age-specific rates in the outer islands in 1981. The erratic pattern of the northern group in 1976 has been replaced by a much more even curve with virtually the same shape as the southern outer islands. While substantial differences between urban (Rarotonga) and rural (outer islands) fertility remain, the trend is for the fertility curve to assume a similar shape in all regions.

Comparative data from other Pacific countries are not yet available for 1981, but up to 1976 age-specific fertility in the Cook Islands as a whole appears to be generally lower than in Western Samoa, but higher than in either the Fijian population of Fiji or the total population of Niue (table 40). The single exception was the 15-19 age group whose fertility rate was higher than in any of the countries shown in table 40.

Table 40. Age-specific fertility rates in the Cook Islands compared with selected Pacific countries around 1976

Age group	Niue[a] 1972-1976	Fiji[b] 1976	Western Samoa[c] 1972-1976	Cook Islands[d] 1974-1978
15 - 19	82.0	42.4	58.2	89.0
20 - 24	259.0	237.3	318.6	301.8
25 - 29	225.0	257.1	362.7	261.7
30 - 34	188.0	174.2	285.0	189.1
35 - 39	72.0	99.3	204.9	135.0
40 - 44	26.0	36.9	78.4	51.8
45 - 49	3.0	4.2	28.3	9.8
Total fertility rate	4.3	4.3	6.7	5.2

Sources: [a] M.L. Bakker, "Fertility", in *Niue, 1976 Census of Population and Housing Report,* vol. II, Analysis of Demographic Data, p. 87. Note that these rates are based on register data; census-based estimates for Niue show higher rates than the Cook Islands except for age groups 35 and over, and the TFR is 5.3, one point higher than register data indicate.

[b] Parliament of Fiji, *Report on the Census of the Population, 1976,* Parliamentary Paper No. 43, 1979, vol. II, Demographic Characteristics, pp. 122-129. Note: These data refer to the native Fijian population only.

[c] Department of Statistics, Government of Western Samoa, *Census of Population and Housing, 1976,* Analytical Report, vol. 2, Apia, Government of Western Samoa, 1979, p. 203.

[d] Table 38.

F. THE TOTAL FERTILITY RATE

The total fertility rate (TFR) indicates the average number of children a cohort of 1,000 women would have during their lifetime if they experienced the current schedule of age-specific fertility (with no allowance for mortality). The TFR for the Cook Islands since 1961 was shown by region in table 38 (in the following discussion, the TFR is expressed per woman rather than per 1,000 women as a matter of convenience).

It will be seen that the TFR for the total Cook Islands decreased from 7.9 (7,936 per 1,000) in 1961, to 4.1 (4,100 per 1,000) in 1981. This represents a decline of 48.1 per cent in 20 years, a similar rate of decline as was indicated by the age-sex standardized general fertility rate.

As is to be expected, the decline was greater in Rarotonga (53.3 per cent) than in either the southern outer islands (39.0 per cent) or the northern group (30.0 per cent). The current TFR of 4.1 (1981) suggests that a woman passing through her child-bearing years at present age-specific rates would have 4.1 children compared to almost 8 for a woman entering her child-bearing period in 1961.[14]

The TFR is a useful summary index of comparative fertility between regions. Thus it will be seen that in Rarotonga the average woman at 1981 age-specific rates could expect to have 3.3 children compared to 5.6 in the southern outer islands and 5.5 in the northern group. In other words, the average outer islands woman would give birth to an additional 2 children beyond the average Rarotongan woman. In the case of the southern outer islands, this gap has not changed since 1961, but at that time southern women could

[14] The rate of decline in the Cook Islands TFR is similar to that observed in Niue. M.L. Bakker, *op. cit.*, p.89.

expect to have an average of 9.2 children–an exceptionally high TFR–compared to 7.1 for Rarotongan women.

It is noteworthy that the TFR in the northern group fell to about the same level as the southern outer islands in 1981, whereas five years earlier it had been almost 10 per cent above the southern outer islands rate. The present rate of decline in the northern group's TFR is extremely fast, but similar to what was observed in Rarotonga between 1966 and 1971, and can therefore be expected to slow down in the near future.

conditions; for example, the tendency of young women to leave their young children temporarily with their parents or grandparents while they sojourn abroad will tend to increase the ratio of children to women of child-bearing age, and any large variations in this practice through time may distort the rate of change.

The general trend in the child-woman ratio in the Cook Islands (table 41) follows that of other fertility measures; but, with the exception of the northern group, the rate of decline during the 1961-1981 period is about 10 per cent below that

Table 41. Child-woman ratio,[a] 1936-1981

	1936	1945	1951	1956	1961	1966	1971	1976	1981
Rarotonga	753	819	848	823	951	1 010	930	699	426
Southern outer islands	854	900	952	1 067	1 342	1 421	1 262	1 165	841
Northern outer islands	808	688	769	948	1 134	1 375	1 227	1 232	929
Cook Islands	804	837	881	940	1 111	1 181	1 057	885	635

Sources: *Cook Islands Population Censuses, 1936-1981.*

Note: [a] Number of children aged 0-4 per 1,000 women aged 15-44.

G. CENSUS BASED MEASURE OF FERTILITY

In addition to providing the population denominators from which vital rates are calculated, the census is also an independent source of information regarding fertility which can usefully supplement the results obtained from vital statistics. The census is also a rich potential source of data on the socio-economic characteristics of women and families at various fertility levels, but in the Cook Islands case these data are not usually tabulated.

The simplest census-based measure is the child-woman ratio.[15] This ratio is susceptible to the effects of out-migration under certain

[15] The number of children aged 0-4 divided by the number of females aged 15-44, multiplied by 1,000.

indicated by the age-adjusted fertility rate, and slightly below the rate indicated by the total fertility rate. This is consistent with increasing emigration throughout this decade which was highly concentrated in the young age groups and generally female dominant. Furthermore, improved survival in the 0-4 age group, which also occurred over the period, will affect the rate in the same direction. In the northern group the child-woman ratio has fluctuated up and down since 1961, and it is only during the most recent intercensal period that a clear downward trend became apparent.

The average number of children ever-born alive, another census-based measure of fertility, gives a further indication of changing patterns of fertility among various age groups. Of particular relevance is the average number of children born to women who have completed their fertility cycle. Unfortunately, this measure is also subject to bias

Table 42. Average number of children born alive by age group of the mother and region of the Cook Islands, 1956-1976

Age group	Rarotonga			Southern outer islands		Northern outer islands		Cook Islands		
	1956	1966	1976	1956	1976	1956	1976	1956	1966	1976
15 - 19	0.12	0.20	0.12	0.13	0.13	0.19	0.10	0.13	0.19	0.12
20 - 24	1.08	1.56	1.22	1.39	1.95	1.28	1.78	1.23	1.61	1.44
25 - 29	2.88	3.51	2.73	3.31	3.51	3.36	3.96	3.14	3.73	3.06
30 - 34	4.67	4.78	4.16	5.05	4.82	4.67	5.38	4.84	4.97	4.49
35 - 39	6.03	6.31	4.88	6.63	5.97	4.74	6.80	6.11	6.53	5.45
40 - 44	5.41	7.14	5.39	7.15	6.77	4.11	5.53	5.91	7.78	5.90
45 - 59	6.60	6.67	6.00	7.57	7.25	5.81	6.30	6.85	6.81	6.52
60 - 74	6.17	6.20	5.49	6.84	5.52	5.01	4.69	6.14	6.29	5.44
75 +	5.52	8.00	4.65	5.62	5.62	6.75	6.28	5.91	7.28	5.39

Sources: Norma McArthur, *Island Populations of the Pacific*, p. 223; *Cook Islands Census of Population, 1966*, p. 23; *Cook Islands Census of Population and Housing, 1976*, pp. 167-170.

if emigration is selective of women at specific parity (number of children) levels. In the case of older cohorts, this measure is also compromised by failures of memory and the probable lower survivorship of women who have had large numbers of children.

In the Cook Islands context, it is highly probable that childless or low-parity women have a greater tendency to emigrate, in spite of the fact that some are able to leave their children in the care of a relative.[16] And generally speaking the rate of decline in the average number of children ever-born alive is much smaller than would be expected given the changes in fertility previously discussed. For example, the average number of children born to women aged 40-44 has remained virtually static in Rarotonga and in the total population during the twenty-year period 1956-1976 (table 42). Nevertheless, there

[16] Norma McArthur, *op. cit.*, p. 221.

Table 43. Distribution of first births by age of mother, 1966-1976

(per cent of females aged 10 years and over)

Age group	Rarotonga		Outer islands		Cook Islands	
	1966	1976	1966	1976	1966	1976
Under 15	0.5	0.8	0.5	0.5	0.5	0.7
15-19	41.3	39.5	44.7	44.9	43.0	41.9
20-24	44.5	46.1	42.0	44.6	43.3	45.4
25-29	7.8	10.6	7.1	7.2	7.5	9.1
30-34	1.8	1.9	1.4	2.1	1.6	2.0
35 and over	1.1	1.0	0.8	0.6	1.0	0.8
Not stated	2.9	–	3.5	–	3.1	–

Sources: Cook Islands Population Census, 1966, p. 25; *Cook Islands Census of Population and Housing, 1976*, pp. 196-198.

Table 44. Percentage distribution of women by parity and age, 1966 and 1976

Age group		Number of births									
		0	1	2	3	4	5	6	7	8-9	10+
15 - 24	1966	61.5	16.2	10.1	6.3	3.8	1.7	0.4	–	–	–
	1976	69.6	16.3	9.0	3.3	1.3	0.2	0.2	–	–	–
25 - 29	1966	10.5	8.3	10.1	12.1	12.1	12.3	11.9	10.5	8.8	3.4
	1976	11.5	9.8	17.1	17.8	15.0	9.8	8.3	4.6	4.8	0.9
35 - 44	1966	8.5	5.2	5.2	5.2	5.5	5.9	6.5	8.9	17.0	32.2
	1976	9.0	4.0	11.2	9.7	9.0	8.1	12.4	10.8	14.3	10.1
45 - 54	1966	13.4	6.3	4.9	5.5	5.3	4.4	6.2	5.5	12.5	36.1
	1976	14.2	3.8	6.2	5.9	8.3	5.2	5.9	9.3	15.9	25.3

Source: Cook Islands Population Census, 1966, p. 23; *Cook Islands Census of Population and Housing, 1976,* p. 168.

is evidence of a reduction in the average number of children ever-born since 1966, particularly in the 30-44 group.

On the other hand, there has been little change in the ages at which Cook Islands women bear their first child (table 43). There is a trend toward later child-bearing, which is consistent with "late-peak" fertility, but it is quite small.

It is evident, however, that the proportion of high parity women has been declining. In 1966, 32.2 per cent of women in the age group 35-44 reported having had ten or more children (table 44); by 1976 this proportion had dropped to 10.1 per cent. The general trend is an increasing proportion of women aged 24 and over having from 2 to 4 children and a corresponding decline in the proportion having eight or more. An indication of the extremely high level of fertility in the past can be obtained from the fact that almost 50 per cent of females aged 35-44 in 1966 had given birth to eight or more children.

H. REPRODUCTIVITY

"The study of reproductivity is concerned with the extent to which a group is replacing its own numbers by natural processes."[17] While the population of the Cook Islands has been declining during the past decade, this is not because Cook Islanders are unable to replace their numbers by natural processes but because of large scale emigration. The reproductive capacity of the Cook Islands population has been substantial in the past and remains considerable at the present time, in spite of the rapid declines in various fertility measures discussed above.

The simplest measure of reproductivity is the crude rate of natural increase (CNI) which is the crude birth rate minus the crude death rate. These are reported by region in table 45, which shows that the CNI decreased from 35.8 per 1,000 in 1966 to 20.6 per 1,000 in 1981, a decline of 42.5 per cent. The general trend appears to be one of convergence toward a rate of 21 per 1,000 across all regions by 1981. Like all crude rates, however, the CNI is affected by changes in the age structure; a younger population will usually have more births and fewer deaths than an older population. If, as in the Cook Islands case, the age structure is changing due to emigration and declining fertility, and if migration patterns differ sharply by region, then the crude rate of natural increase will distort regional comparisons.

As already demonstrated, this problem can be overcome by the use of an age-adjusted rate. The two most commonly used rates are the gross reproduction rate (GRR) and the net

[17] Henry S. Shryock and Jacob S. Siegel and Associates, *op. cit.*, p. 523.

Table 45. Crude rates of natural increase, 1966-1981, by region

(rates per 1,000 population)

	1966			1971			1976			1981		
	CBR[a]	CDR[b]	CNI[c]	CBR[a]	CDR[b]	CNI[c]	CBR[a]	CDR[b]	CNI[c]	CBR[a]	CDR[b]	CNI[c]
Rarotonga	45.8	8.8	37.0	36.6	7.1	29.5	27.4	6.8	20.6	26.4	5.8	20.6
Southern outer islands	42.2	7.7	34.5	35.0	6.0	29.0	27.1	6.5	20.6	26.2	6.1	20.1
Northern outer islands	41.8	9.6	32.2	44.9	7.6	37.3	34.6	9.3	25.3	32.2	8.6	23.3
Cook Islands	44.4	8.6	35.8	37.0	6.8	30.2	28.3	7.2	21.1	26.8	6.2	20.6

Sources: *Vital Statistics Register and Censuses, 1966-1981.*

Notes: [a] Crude birth rate.

[b] Crude death rate.

[c] Crude natural increase.

reproduction rate (NRR). The gross reproduction rate is a version of the total fertility rate previously discussed. "Whereas the total fertility rate measures the total number of children a cohort of women will have, the gross reproduction rate measures the number of daughters it will have."[18] The net reproduction rate is identical except that the mortality of females prior to, and during, the reproductive cycle has been taken into account. Some females will die before reaching the age of reproduction, others will die before the end of their reproductive period, while others will live to complete their child-bearing years. A net reproduction rate of 1 implies that the population is exactly reproducing itself from one generation to the other; a rate below 1 indicates that the current generation is not replacing itself.

The GRR for the Cook Islands as a whole was 3.76 in 1966 and fell to 2.17 in 1981, a 42.3 per cent decline (table 45). In other words, given the fertility rates around 1981, the average woman would have 2.17 daughters. When allowance is made for mortality (also at current age-specific mortality rates), this number drops to 1.83. The net reproduction rate in 1976 was exactly one point below 1966; thus, one less daughter was being produced, on average, in 1976 than had been the case 10 years earlier.

As was found with other fertility measures, the levels and rates of change in the reproduction rates vary widely by region. Rarotonga's NRR fell to 1.5 in 1981, a drop of 52.2 per cent since 1966 when the rate stood at 3.14. Both the southern outer islands and the northern atolls had net reproduction rates around 3 in 1976 (3.10 and 2.98 respectively), representing a drop of 19.1 per cent in the south and only 11.0 per cent in the north since 1966. But the rate of decline increased quite rapidly in the 1971-1981 decade (see table 46), particularly in the northern group.

The "intrinsic rate of natural increase" is another way of expressing a population's reproductive capacity. This is the rate of growth which would eventually be achieved if the observed age-specific fertility and mortality schedules were to continue indefinitely. While the changes in these rates (table 47) are similar to those observed in other rates, they indicate greater intrinsic reproductive capacity than, for example, the crude rate of natural increase. Thus, the intrinsic rate of natural increase for the total population in 1981 was 2.3 per cent compared to a crude rate of 2.06 per cent. The differences are larger in the outer islands, however, and especially in the northern group whose intrinsic rate of growth in 1981 was 3.4 per cent compared with a crude rate of natural increase of 2.3 per cent. Again, the reason for the difference between the two rates is to be found in the changing age composition of the population.

[18] *Ibid.*, p. 524.

Table 46. Gross reproduction rates and net reproduction rates by region, 1966-1981

	Gross reproduction rates[1]				Net reproduction rate[2]				Per cent change			
									1966-1976		1971-1981	
	1966	1971[a]	1976[a]	1981[b]	1966	1971	1976	1981	GRR	NRR	GRR	NRR
Rarotonga	3.50	2.51	2.09	1.68	3.14	2.28	1.94	1.50	−40.3	−44.6	−33.1	−34.2
Southern outer islands	4.25	3.50	3.30	2.68	3.83	3.21	3.10	2.35	−22.4	−19.1	−23.4	−26.8
Northern outer islands	3.81	3.64	3.31	2.78	3.35	3.34	2.98	2.49	−15.1	−11.0	−23.6	−32.5
Total Cook Islands	3.76	2.97	2.55	2.17	3.37	2.71	2.37	1.83	−32.2	−29.7	−26.9	−32.5

Sources: [a] Geoffrey R. Hayes, *Migration, Population Change and Socio-economic Development in the Cook Islands*, Appendix D.

[b] Calculated from unpublished vital statistics, 1979-1981, Cook Islands Statistic Office.

Notes: [1] The number of daughters the average female would have at current fertility rates in the absence of mortality.

[2] The number of daughters the average female would have at current fertility rate assuming a fixed set of mortality rates.

Table 47. Intrinsic growth rate by region, 1966-1981

(per cent)

	Intrinsic growth rate				Per cent change		
	1966	1971	1976	1981	1966-1971	1971-1976	1976-1981
Rarotonga	4.183	3.098	2.486	1.708	−25.9	−19.8	−31.3
Southern outer islands	4.839	4.263	4.081	3.172	−11.9	− 4.3	−22.3
Northern outer islands	4.346	4.285	3.810	3.420	− 1.4	−11.1	−10.2
Cook Islands	4.397	3.658	3.131	2.315	−16.8	−14.4	−26.1

Source: Geoffrey R. Hayes, *loc. cit;* and calculated by author.

I. THE DETERMINANTS OF FERTILITY AND FERTILITY DECLINE

The determinants of fertility can be divided into two classes: (a) indirect determinants; (b) direct or "proximate" determinants.[19] The first category consists of social, economic, cultural and environmental conditions; the second category consists of those "intermediate variables" through which the first group would have to act if they were to have any effect on fertility. Theoretical controversy regarding the causes of fertility decline revolves principally around the nature and effect of the "indirect" variables. Nevertheless, some remarks regarding the proximate determinants of fertility are required before we explore the possible effects of socio-economic and socio-cultural conditions on Cook Islands fertility.

Bongaarts,[20] following earlier work by Davis and Blake,[21] identifies eight intermediate fertility variables and groups them into three broad classes:

I Exposure factors
  1. Proportion married

II Deliberate marital fertility factors
  2. Contraception
  3. Induced abortion

III Natural marital fertility factors
  4. Lactational infecundability
  5. Frequence of intercourse
  6. Sterility
  7. Spontaneous intrauterine mortality
  8. Duration of the fertile period

Category III contains those variables which determine the level of "natural fertility" in a population. Unless this level is known, the degree to which births are deliberately controlled cannot be known either. The difficulty here is that there is no standard level of natural fertility in all populations and one study has proposed a typology of 280 logically possible types.[22] Whether or not social controls are necessary, given a certain desired family size, will depend on the type of natural fertility found in the population in question. For example, permanent sterility can range from 2.5 per cent of the population aged 20-24 to 38.2 per cent, depending on various biological factors.[23] Some comments on possible changes in these variables in the Cook Islands follow.

The principal determinant of lactational infecundability (the inability to conceive) is the intensity and duration of lactation.[24] In the Cook Islands, as elsewhere in the Pacific, the practice of bottle-feeding using infant formula rather than breast-feeding was on the increase during the 1970s, but some officials believe that it has since declined. Without detailed studies, however, the effects of these changes cannot be measured. All islands are affected, however, including the remote northern atolls. This will tend to increase fertility by shortening the infecund period thereby offsetting other changes which are depressing fertility.

Nothing is known regarding the frequency of intercourse on these islands, but recent studies have concluded that coital frequency has little to do with variations in fertility levels.[25] The exception is when husbands and wives are separated for long periods. This does occur in the Cook Islands when husbands emigrate ahead of their wives who join them perhaps as long as one year later. This was the typical pattern in the mid-1960s,[26] but the incidence of this is probably on the decline in recent years and it is highly doubtful that it has had much to do with the observed changes in fertility.

The remaining factors are physiological, about which little is known in the Cook Islands case or generally. Various hypotheses have been advanced regarding the effects of nutrition on age of menarche, the likelihood of spontaneous

[19] John Bongaarts, "A framework for analyzing the proximate determinants of fertility", *Population and Development Review*, vol. 4, 1978, pp. 105-132.

[20] John Bongaarts, *Loc. cit.*

[21] Kingsley Davis and Judith Blake, "Social structure and fertility: an analytical framework", *Economic Development and Cultural Change*, vol. IV, 1956, pp. 211-235.

[22] Bourgeois-Pichat, cited in Geoffrey Hawthorn, *The Sociology of Fertility* (London, MacMillan, 1970), p. 12.

[23] Geoffrey Hawthorn, *loc. cit.*

[24] John Bongaarts, *op. cit.*, p. 107.

[25] *Ibid.*, p. 118.

[26] P.H. Curson, "The migration of Cook Islanders to New Zealand", *South Pacific Bulletin*, vol. 23, pp. 15-25.

abortion, the length of post-partum infecundity, etc., but no secure evidence is available to suggest that these will have a substantial effect on fertility levels.[27] The one exception to this concerns the effects of venereal disease: untreated or inadequately treated, gonorrhea may eventually produce sterility. Because statistics on gonorrhea usually tend to underestimate the true incidence in a population, especially among women, the high reported rates in Rarotonga during the early 1970s are extremely noteworthy. In 1971, 10 per cent of the female population aged 15-19 were treated for this disease and five cases in females aged 13-14 were reported.[28] Nevertheless, the incidence of gonorrhea in the 15-19 age group appears to have declined in subsequent years to around 2 per cent. In any case, it is extremely unlikely that increasing sterility caused by venereal disease has played a role in fertility decline.

While it cannot be ruled out that changes in natural fertility have occurred in the Cook Islands, the effects of any such changes would probably be small; and the most likely change – the reduction in the post-partum infecund period because of formula feeding – will tend to increase rather than decrease fertility. Thus, it is necessary to look for the social, economic and cultural changes which lie behind the drop in fertility.

Earlier in this chapter is has been implied that fertility was exceptionally "high" in the Cook Islands before its recent declines, and remains "high" in the outer islands. The question arises: "high" relative to what standard? Recent statistical studies suggest that a population with a crude birth rate around 50 per 1,000, and a total fertility rate around 7, is experiencing "natural fertility" with no deliberate control over the number of births.[29] Referring back to tables 31 and 38, we can see that this description fits the total Cook Islands and all its sub-regions in 1966, the southern outer islands up to 1971, and the northern group up to 1976. The implication here is that the deliberate limitation of births began to be reflected in the births statistics after 1966 in Rarotonga, after 1971 in the southern outer islands, and in the northern atolls after 1976. Obviously, however, it must be assumed that the deliberate limitation of births, or some other socio-cultural factor, explains not only why the total fertility rate falls below 7, but also why it falls from a level above 7, as is the case in the Cook Islands (note that the TFR in 1961 was 9.2 in the southern outer islands and 7.9 in the north).

This returns us to the two other categories of "intermediate fertility variables": exposure to intercourse, and deliberate fertility factors (contraception and induced abortion). Unfortunately, neither of these variables is easily measurable by means of census data and more specialized surveys are normally required. An approximate measure of exposure to sexual intercourse, however, is the proportion of women of reproductive age which has ever been married.[30]

In the Cook Islands the proportion of women who have never been married has increased in most age groups between 1966 and 1981, but particularly in the 20-29 age group (table 48). The pattern is much the same across all regions, but the largest percentage changes occurred in the northern atolls. Indeed, the proportion of females aged 15-44 in the northern group which had never married increased from 29.8 per cent in 1966 to 53.2 per cent in 1981. In Rarotonga the proportion of never-married women aged 15-44 has increased from 48.4 per cent in 1966 to 52.3 per cent in 1981, and among the 20-24 age group it has risen by 30 per cent from 55.4 to 71.9 per cent. Even larger increases are apparent in the southern outer islands (table 48) where the proportion of never-married in the 20-24 age group has climbed to 56.9 per cent in 1981 compared to 41.6 per cent in 1966.

But clearly the relationship between the proportion of women married and the fertility rate is not a direct one. In Rarotonga the largest declines in fertility between 1966 and 1976 occurred in the 25 and over age groups where the proportion married has changed only slightly. On the other hand, in the northern group there

[27] William P. Butz and Jean-Pierre Habicht, "The effects of nutrition and health on fertility: hypotheses, evidence and interventions", in Ronald G. Ridker (ed.) *Population and Development* (Baltimore, Johns Hopkins University Press, 1976), pp. 210-238.

[28] Legislative Assembly of the Cook Islands, *Report of the Department of Health*, Legislative Assembly Paper No. 7, 1971, P. 33.

[29] John Bongaarts, "Why high birth rates are so low", *Population and Development Review*, vol. 1, 1975, pp. 289-296.

[30] The definition of marriage employed in Cook Islands censuses since 1956 includes couples living together as man and wife but not formally married.

Table 48. Proportion of females aged 15-44 never married by age group and region, 1966-1981

	Rarotonga			Southern outer islands			Northern outer islands			Cook Islands		
	1966	1976	1981[a]	1966	1976	1981[a]	1966	1976	1981[a]	1966	1976	1981[a]
15 - 19	96.3	97.0	97.9	92.7	98.9	96.3	92.4	96.6	91.0	94.9	97.5	96.6
20 - 24	55.4	61.0	71.9	54.7	57.0	72.3	54.5	56.1	70.1	55.1	59.6	71.5
25 - 29	23.5	27.5	30.6	23.5	26.4	35.6	16.2	28.9	27.4	22.6	27.4	31.4
30 - 34	14.0	10.8	16.9	16.8	15.4	12.0	7.7	22.4	28.6	13.7	13.4	16.7
35 - 39	7.6	13.1	7.8	16.7	8.2	14.5	–	3.3	7.0	6.1	10.8	9.5
40 - 44	8.8	6.6	6.6	1.6	3.9	5.7	8.5	4.8	2.9	6.1	5.4	6.0
15 - 44	48.4	50.0	52.3	41.6	46.6	56.9	29.8	46.7	53.2	44.1	48.8	53.6

Sources: Cook Islands Population Censuses, 1966-1981.

Note: [a] Resident population only.

was virtually no change in the fertility of the 25-34 age group between 1961 and 1976, yet the proportion of women in this age group who had never married increased substantially during the same period.

It would appear that significant changes in marriage patterns have taken place during the past 15 years, and it is highly likely that these changes have contributed to the decline in fertility. But an analysis of the data shows that while there is a relationship between the declining marriage rate and decreasing fertility, it does not hold across all age groups. In other words, an increase in the proportion of never-married women is neither a sufficient nor a necessary condition for fertility decline. Fertility has declined markedly in some age groups even though the proportion never-married has remained stationary (e.g., the 40-44 age group of Rarotonga) or has decreased (the 15-19 and 30-34 age groups of the southern outer islands). In the absence of detailed studies, however, changing marriage patterns cannot be ruled-out as a significant factor in the declining age-specific fertility rates of the Cook Islands, but it is clear that this is an insufficient explanation in itself.

One reason why the proportion of women married has only a moderate effect on fertility levels in the Cook Islands is that exposure to intercourse is apparently not dependent on marriage. Table 49 shows that 71.4 per cent of all mothers aged 15-19 were unmarried in 1976. Furthermore, there is little variation in this pattern across the regions (figure 14), even though fertility levels vary widely. These patterns of "illegitimacy" also appear to be quite stable through time, although, as figure 15 indicates, there has been a moderate increase since 1961.

This phenomenon was investigated on Rarotonga in some detail for the 1965-1966 period by Curson who found that, according to registration data, 77 per cent of all women aged 15-19 who gave birth in a 12 month period were "unmarried" and that 36.8 per cent of all births were to unmarried mothers.[31] Furthermore, approximately 21 per cent of the married women who gave birth during this period had previously borne children before undergoing a formal marriage.

Curson explained this situation as the result of the continuation of a traditional practice in which "illegitimate" children were accepted into the household with "identical rights to the legitimate offspring".[32] The majority of unmarried mothers eventually do marry (although not necessarily to the father of their previous children) and such

[31] Peter Curson, "Birth and illegitimacy in Rarotonga", *Journal of the Polynesian Society*, vol. 78, 1969, pp. 112-122.

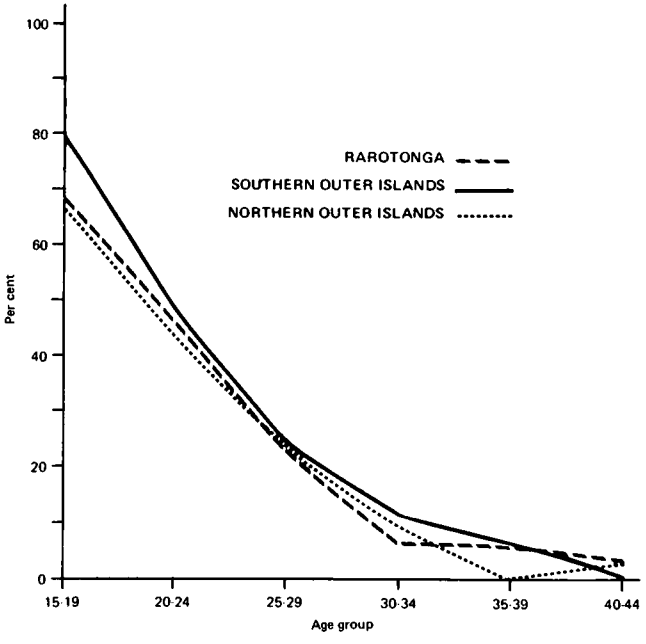
[32] *Ibid.*, p. 121.

Table 49. Percentage of mothers unmarried by age group and region, 1976

	Rarotonga	Southern outer islands	Northern outer islands	Total
15 - 19	68.2	80.0	66.7	71.4
20 - 24	46.4	48.4	43.8	46.5
25 - 29	22.6	24.1	23.8	23.2
30 - 34	6.8	11.4	9.3	8.4
35 - 39	6.0	6.5	–	5.7
40 - 44	3.5	0.9	2.9	2.8
15 - 44	20.9	20.2	20.6	20.7

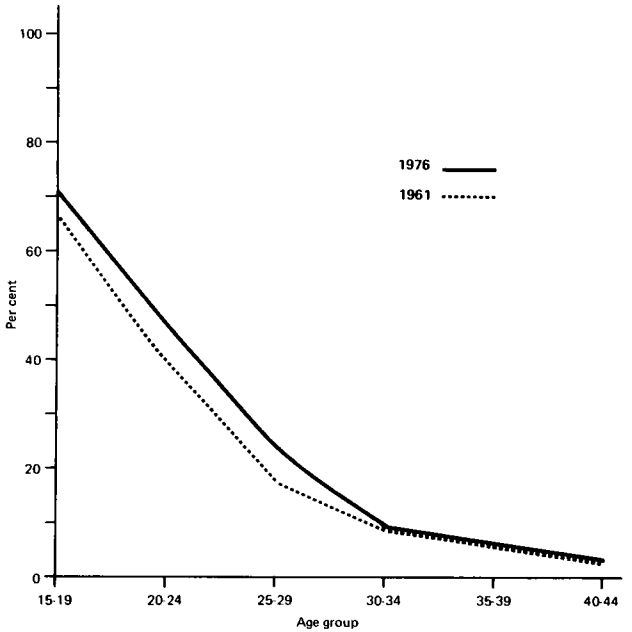
Source: Cook Islands Census of Population and Housing, 1976, pp. 167-213.

Figure 14. Percentage of mothers unmarried by age group and region, 1976



Source: Table 49.

Figure 15. Percentage of mothers unmarried by age group, 1961 and 1976, Cook Islands



Sources: Cook Islands Population Census, 1961, unpublished tables; table 49.

children are ultimately informally adopted by the husband. In Rarotonga there was some evidence to indicate that in-migrant women were more likely to give birth to "illegitimate" children than native Rarotongan women. Curson suggests that this can be explained by the weakness of social control in the in-migrant community and the level of "personal disorganization" which results. While this may account for some illegitimate births in Rarotonga, it is important to note that in 1976 the outer islands (particularly in the south) had higher illegitimacy rates than Rarotonga (inclusive of in-migrants). It is more likely, however, that this cultural pattern is common to most islands and did not need to be acquired in Rarotonga. In 1981, Sun Young Kim found that 41.3 per cent of the pregnant women registered in Aitutaki's prenatal clinic were unmarried, while the equivalent figure in the Rarotonga clinic was 29.6 per cent.[33] These percentages refer to women in a "stable union", a term which probably covers a wide variety of relationships containing varying degrees of commitment.

Since this and other evidence suggests that the proportion of women in the Cook Islands who are married is not a strong determinant of exposure to intercourse, the explanation for fertility decline, by a process of elimination, must lie in the deliberate control of both marital and non-marital births. As previously mentioned, this implies two possibilities: (a) induced abortion; (b) contraception.

[33] Sun Young Kim, *op. cit.*, p. 5.

There is little information on the first of these for the contemporary Cook Islands. Prior to European contact, various methods for inducing abortions were known (see chapter 2), and some women are believed to have knowledge of such techniques today, but the extent of their use cannot even be guessed. Between 1969 and 1973, 154 women were admitted to Rarotonga hospital for "abortion".[34] After 1973, however, the category of abortion disappears from the statistical record. The 1979 Department of Health Report indicated that 74 "D & C" were performed during the three year period 1976-1978,[35] but no such statistics were published for 1974 and 1975. As New Zealand citizens, Cook Islanders can obtain medical services in New Zealand – presumably including abortions – but the number of women who have done this is, of course, unknown, and in any case is likely to be limited to the small number who could afford to pay the expenses and withstand family pressures against abortion.[36]

Modern means of contraception were introduced to Rarotonga in 1964. Referring to the 1965-1966 period, Curson noted that "contraceptives, although readily available, are expensive, little comprehended and rarely used, except in the case of the expatriate European community."[37] There is no doubt whatsoever that this situation changed during the 1970s. Birth control supplies are provided free of charge by the United Nations Fund for Population Activities, and while delivery systems are still in the process of formation in the outer islands, there are few material limitations on family planning. As table 50 shows, the number of attendances at family planning clinics has increased from 260 in 1972, to 1302 in 1978. The 1975 Department of Health report indicated 362 women taking oral contraceptives, 198 with an interuterine device, 121 receiving injectibles, and 49 who had a tubal ligation.[38] These women

Table 50. Attendance at gynecology clinic for purposes of family planning (Rarotonga)

Year	Number
1972	260
1973	645
1974	678
1975	548 (847)
1976	861 (915)
1977	931
1978	1 302

Sources: Annual Reports of the Department of Health, 1973-1979.

Note: Figures in brackets refer to alternative numbers cited elsewhere in the text of the reports.

constituted approximately 21 per cent of the female population aged 15-44. Another source has indicated that 28 per cent of women of child-bearing age in the Cook Islands are practicing contraception;[39] but not all women registered as using contraceptives actually do so consistently; and since some women may obtain birth control supplies from a private physician, and therefore be missed from official statistics, it is impossible to give a precise number of contraceptors. Nevertheless, the number involved in deliberate family planning is considerable and apparently growing rapidly.

Since birth control services in Rarotonga were initially provided to married women who already had two children, it is not surprising that the largest decline in fertility occurred in the 25 and over age group. The evidence suggests that the primary impact of contraception has been to reduce the incidence of high parity births. As contraceptive techniques became more widely available, and more broadly accepted in the community, younger and unmarried women were also able to control their conception, and this is apparent in the declining fertility in 15-24 age groups.

There is presently no information on the degree to which birth control is practiced on the

[34] Legislative Assembly of the Cook Islands, *Report of the Department of Health*, Legislative Assembly Paper No. 7, 1971-1973. The report does not indicate if the data refer to spontaneous or induced abortions.

[35] Legislative Assembly of the Cook Islands, *Report of the Department of Health, 1979.*

[36] Most families would object to abortion and would likely seek to place the child within the extended family.

[37] Peter Curson, *op. cit.*, p. 121.

[38] Legislative Assembly of the Cook Islands, *Report of the Department of Health, 1974-75*, Legislative Assembly Paper No. 7, p. 74.

[39] David Lucas and Helen Ware, "Fertility and family planning in the South Pacific", *Studies in Family Planning*, vol. 12, 1981, p. 309.

outer islands, but services are available from the pre-natal clinics attached to the hospitals of the larger islands and from the public health nurses or Medical Officer on the smaller islands. Recent reports of the Department of Health indicate a growing awareness of, and interest in, family planning on the outer islands, including the northern atolls, and there is little doubt that this is a major factor in the decline in fertility since 1976.

The exact socio-economic and cultural conditions which provide the motivation and means to limit family size, and hence bring about the transition from high to low fertility, are complex and theoretically controversial. Until recently the principal emphasis has been placed on the large-scale macroscopic changes which occur in a "developing" economy and society: industrialization, economic growth, urbanization, literacy, and the declining importance of the nuclear family and local institutions.[40] Subsequent theories have focussed more narrowly on the micro-economics of household fertility behaviour, employing a basically utilitarian framework.[41] With the expansion of education and the employment of women outside the household, etc., the costs of raising children (and the "opportunity" costs of a mother's time) increased and their contributions to family production and income declined. Consequently, the choice to have fewer children is the rational result of a cost-benefit calculus by parents.[42]

A significant variant of the "economic" approach to fertility decline focusses on the historically decisive shift from a family-based mode of production to one based on capitalist social relations and impersonal markets for labour and commodities. As noted by Caldwell:

> It is not factories and steel mills that count in the reduction of fertility; it is the replacement of a system in which material advantage acruing from production and reproduction flows to people who can control or influence reproduction by a system in which those with economic power either gain no advantage from reproduction or cannot control it. This usually occurs only with the collapse of familial production, although it can follow fundamental changes in the balance of material advantage and decision-making within the family.[43]

The emphasis here is on power relations within the family itself rather than on the demographic behaviour of a household as a unit. Such relations are based in the system of production, but the education of women and the western conception of equality between the sexes can play an independent role in shifting demographic decision-making toward women.

While none of these theories can be rejected outright, the empirical data on fertility decline during the 1965-1977 period which are now emerging suggest that fertility has decreased across an extremely wide range of cultural and economic circumstances, and no single explanation appears to adequately match the complexities involved.[44] For example, fertility decline has been observed in a number of countries in which no major changes in economic organization or performance have occurred, and the association between urbanization and fertility does not appear to be as direct as was once believed.[45]

Some studies have suggested that cultural change, either accompanied by socio-economic change, or independent of it, has much to do with fertility decline in the developing world. For example, the idea of family limitation may have had an independent causal effect on fertility. This effect will be strengthened where communications and transportation are well-developed, and where the content of such communications stresses both family limitation and associated ideas such as the nuclear family and greater freedom for women.[46]

In Rarotonga, the formation of a local "middle class" committed to a "metropolitan"

[40] Ronald Freedman, "Theories of fertility decline: a reappraisal", in Phillip M. Hauser (ed.), *World Population and Development* (Syracuse, Syracuse University Press, 1979), pp. 63-79.

[41] Geoffrey Hawthorn, *The Sociology of Fertility* (London, MacMillan, 1970) pp. 58-65.

[42] Richard A. Easterlin, "An economic framework for fertility analysis", *Studies in family Planning*, vol. 6, 1975, pp. 54-63.

[43] John C. Caldwell, "A theory of fertility: from high plateau to destabilization", *Population and Development Review*, vol. 4, No. 4, p. 568.

[44] Ronald Freedman, *op. cit.*, p. 66. Nick Eberstadt, "Recent declines in fertility in less developed countries and what population planners may learn from them", in N. Eberstadt (ed.) *Fertility Decline in the Less Developed Countries* (New York, Praeger, 1981), pp. 29-71.

[45] Nick Eberstadt, *op. cit.*, p. 48.

[46] Ronald Freedman, *op. cit.*, p. 72.

Table 51. Percentage of female population aged 15-44 economically active by age group and region, 1966-1981

	15 - 19			20 - 24			25 - 34			35 - 44			15 - 44		
	1966	1976	1981	1966	1976	1981	1966	1976	1981	1966	1976	1981	1966	1976	1981
Rarotonga	46.5	45.6	33.2	56.7	59.1	65.7	40.2	59.2	58.8	37.2	52.8	57.7	45.4	53.4	52.2
Southern outer islands	23.4	22.4	18.7	38.9	25.6	31.6	24.6	25.6	26.4	21.6	18.7	33.2	26.2	22.6	25.9
Northern outer islands	47.0	61.4	45.9	63.6	19.7	66.2	41.0	24.5	59.3	36.9	18.3	61.5	44.1	32.3	56.7
Outer Islands	28.8	31.3	25.4	44.1	23.5	43.1	29.9	25.3	36.6	26.0	18.6	40.3	31.1	25.1	34.4
Cook Islands	39.9	40.2	29.7	52.2	47.0	57.4	35.5	46.2	50.5	31.4	37.9	50.8	39.3	42.5	45.3

Sources: Cook Islands Population Census, 1966; Cook Islands Statistical Abstract, No. 3, 1979; unpublished tables, 1981 census.

life style and pattern of consumption has no doubt contributed to the acceptance of the concept of family limitation. This has given legitimacy to the idea and facilitated its acceptance by other socio-economic groups. The availability of modern means of birth control at no monetary cost to the public, and their association with maternal and child health programmes, has made their adoption by lower income groups possible. The concept of family limitation, but as yet not the full range of means, has spread by diffusion to the southern outer islands and, more recently, to the northern group. This "diffusion of innovations" has probably been facilitated in part by the circulation of population between the outer islands, Rarotonga and New Zealand. Migration has therefore played an indirect role in the reduction of fertility through its cultural impact, quite aside from its effects on the age structure and subsequently on the crude birth rate.

At the same time, changes in the economic foundation of family life in Rarotonga and some outer islands (e.g., Aitutaki) may now give material advantages to a smaller family. As table 51 shows, the proportion of Rarotongan women aged 25 and over who were economically active in 1976 has increased substantially over 1966. It is impossible to know if this involvement in the labour force increased the demand for birth control or if the availability of birth control made a higher level of participation possible, but most likely both processes have been occurring simultaneously. While the "family farm" remains important to agricultural production and national exports, a larger proportion of all families is becoming independent of cash-crop production; thus the need for a large labour force within the family has decreased. In the outer islands, however, the degree and manner of women's participation in the labour force is less clear than in Rarotonga. For example, the participation rate of northern group females aged 15-44 declined from 44.1 per cent in 1966 to 32.3 per cent in 1976 and increased again to 56.7 per cent in 1981. In the southern outer islands the participation rate of the 15-19 and 20-24 age groups has been declining since 1966, and the rate for the 15-44 group as a whole has remained virtually static up to 1981.

But the important factor in the outer islands, and particularly in the south, is not so much the proportion of women who are economically active, but the type of activity pursued; and in this respect there have been substantial changes since 1966. For example, 41 per cent of economically active women in the southern outer islands were classified as agricultural workers in 1966, whereas only 7 per cent were so classified in 1981.[47] The involvement of women in various categories of "white collar" work has increased proportionately.

This occupational shift implies a number of changes in women's social and economic roles, including higher education, increased monetary contribution to the household and a greater involvement in household decision-making. These changes will tend to reduce the desired number of children and increase the likelihood that contraceptive means will be sought out and used. The expansion and increased effectiveness of maternal and child health programmes with a family planning component thus plays an important contributory role in fertility decline, and even where socio-economic changes are few, such programmes probably have a strong demonstration effect.

J. CONCLUSION

The evidence reviewed in this chapter shows clearly that a fertility transition is well underway in the Cook Islands. It is most advanced in Rarotonga where the rate of decline in the total fertility rate is itself beginning to fall. In the outer islands, the decline in the TFR lags about ten years behind Rarotonga but is presently falling rapidly, particularly in the northern group. There is little doubt that the 24 per cent drop in the TFR of the northern group is the most significant change to occur in Cook Islands' fertility patterns during the 1976-1981 intercensal period.

The important question for the future is this: how far will fertility fall? That is, at what point will fertility level-out and stabilize? It is extremely unlikely that the TFR would drop below 2 in a Polynesian culture context in which a high proportion of the population eventually marries and where the family is valued almost above all other institutions. If fertility were to level-out around at TFR of 2 (which, of course, implies a desired family size somewhat above 2), then Rarotonga was already two-thirds through its transition phase, and at current rates of decline could expect to complete it in about ten years. Similarly, the outer islands would be about halfway through their transition but would not complete it until the turn of the century.

[47] See chapter IX.

Chapter VI
TRENDS AND DIFFERENTIALS IN MORTALITY

A. INTRODUCTION

During the missionary and early colonial periods, the recording of deaths in the Cook Islands was carried out by missionaries and the district or village chiefs. Registration was not compulsory, however, and since a small fee was normally required, it is understandable that the statistics were incomplete. While death statistics for individual islands were published in the annual reports of the Administration during the late nineteenth and early twentieth century, it was seldom possible to compile data for the Cook Islands as a whole. Although the civil registration of vital statistics was provided for in the Cook Islands Act of 1915, registration did not commence until 1 April 1917.[1] Consequently, death statistics for the first two decades of this century are incomplete and unreliable, and for many years after the registration system was established it cannot be assumed that the date of registration coincides with the date of occurrence.

In 1967 McArthur noted that deaths were more likely to escape detection in the Cook Islands than births owing to the nature of the regulations governing the inheritance of land; but she also expressed the informed belief that almost all the deaths which occurred on the larger islands were being registered by that time.[2] Tests of completeness carried out for the 1966-1976 and 1976-1981 intercensal periods suggest that registration was near to complete, assuming that the data on external migration were accurate.[3]

Few detailed statistics regarding the principal causes of death are available for the early decades of this century. The general causes of death were known from surveys conducted by various Medical Officers, but the systematic and routine notification of the cause of death was not established on Rarotonga until 1947, and not until the 1960s in the outer islands.[4]

B. CRUDE DEATH RATES

Such information as is available for the first two decades of this century suggest that the crude death rate (CDR) probably fluctuated at quite high levels. Estimates for Rarotonga based on the 1902 census[5] indicated a CDR of 41.9 per 1,000 population – slightly higher than the estimated crude birth rate of 39.4 per 1,000. Between 1902 and 1912 the total number of deaths was equivalent to 99 per cent of births, resulting in a negligible rate of natural increase. Combining the statistics for those islands for which data are available (which varied from year to year), the CDR for the census years 1902, 1906, and 1911 was 31.7, 33.9, and 31.7 per 1,000 respectively.[6]

From the information given in the annual reports of the Administration, it would appear that the general mortality conditions which prevailed in the last few decades of the nineteenth century continued into the first two decades of the twentieth, albeit with lessened force. The most common cause of death was most likely tuberculosis, followed by dysentery and other infectious diseases which particularly affected infants. Leprosy, filariasis, gonorrhea, yaws, and infectious parasites were present in the population,[7] but these diseases, while debilitating, would have had little effect on mortality. What is clear is that malnutrition, poor standards of infant care, inadequate medical services, and sub-standard housing were important contributing factors up to the 1950s.

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[1] Norma McArthur, *Island Populations of the Pacific* (Canberra, Australian National University Press, 1967), p. 211.

[2] *Ibid.*, p. 214.

[3] See Annex I for test results.

[4] Norma McArthur, *op. cit.*, p. 214.

[5] P. H. Curson, "Birth, death and migration: elements of population change in Rarotonga 1890-1926", *New Zealand Geographer*, vol. 27, 1973, pp. 103-119.

[6] See chapter III, table 10 for details.

[7] Richard Gilson, *The Cook Islands 1820-1950* (Wellington, Victoria University Press, 1980), p. 178.

During the second decade of the century, the New Zealand Administration improved hospital services in the Islands and this most likely accounts for the decline in the crude death rate during the 1920s. Although statistics are not available for all islands, those which are available suggest that the CDR had declined to about 26 per 1,000 by 1927. By this time the population had most likely acquired a high degree of immunity to the more common communicable diseases which had been prevalent in the Pacific throughout the nineteenth century.[8] Nevertheless, it is evident that the CDR continued to fluctuate quite widely from year to year: crude rates of 20 and above were reported in the 1930s and 1940s, and in spite of under-reporting (which must be assumed), the rate of 30.1 per 1,000 was recorded as late as 1948.[9] The principal reason for this was the extremely high rates of infant mortality which prevailed throughout the 1930s and 1940s. It was not until 1958 that a sustained decline in infant mortality was evident, after which it decreased rapidly.[10]

Public expenditure on medical facilities increased gradually during the second decade of the century and programmes were begun to improve sanitation, eliminate mosquito breeding grounds, improve personal hygiene and the welfare of children. The training of local doctors and nurses commenced and victims of leprosy were transferred to a central hospital in Fiji. Because of poor transportation and communications, many of these improvements were slow to reach the outer islands; but in the 1940s hospitals were constructed on some of the larger ones, and judging from a medical survey conducted on Pukapuka in 1951, many of the public health measures instituted in the outer islands during the 1940s were reasonably effective.[11] Nevertheless, some evidence suggests that the diet deteriorated on some islands during the 1950s, and that "the people had become lax in their care and feeding of infants."[12] This may account for the exceptionally high infant mortality rates recorded during the early 1950s.

As table 52 indicates, the crude death rate for the total population declined almost by half between 1956 and 1961. Since 1961 it has tended to fluctuate from one census period to another around a mean of 7.2 per 1,000 population, but the general trend is downwards.

For each census period since 1966 the northern group has had a higher CDR than either Rarotonga or the southern outer islands, principally because of its higher infant mortality. From 1966 to 1981 the southern outer islands had the lowest CDR of all regions, but in 1981 Rarotonga's rate fell to an extremely low 5.8 per 1,000 while the southern outer islands remained at 6.3, the same rate as for the Cook Islands as a whole.

The difficulty with comparisons based on crude rates is that, as in the case of fertility, changes in the age composition of the population are not taken into account. Under the fertility conditions of the Cook Islands in past decades, the population has been growing progressively younger and therefore generally less susceptible to death. As the previous chapter indicated, the population has now begun to age as fertility decreases, and this will tend to increase the crude death rate even if age-specific death rates remain constant. Consequently, it is necessary to employ "age-standardized" death rates to remove the influence of the changing age structure.

C. AGE-STANDARDIZED DEATH RATES

The age-standardized death rates reported in table 53 were produced by the "direct" method. That is, age-specific death rates for each of the regions were applied to a "standard" population (in this case the 1976 population of New Zealand) divided into five-year age groups. The total number of deaths thus produced is used to calculate a crude death rate which, in effect, indicates what the death rate of each region would be if its age structure were identical to that of the standard population. This permits valid comparisons across regions and through time since the age structure is held constant.

The conclusion which can be drawn from the standardized death rates is that, with the

[8] P. H. Curson, *op. cit.*, p. 117.

[9] F. Van Os, *Tentative Analysis of Selected Sectors of the Cook Islands Economy* (Rarotonga, Ministry of Planning and Foreign Affairs, 1977), Annex IX, Vital Statistics 1936-1967.

[10] James Phillips, *A Demographic Profile of the Cook Islands* (Unpublished Msc. Thesis, University of Hawaii, 1972), p. 36.

[11] G. N. Davies and others, *Survey of Medical and Environmental Conditions of Inhabitants of a South Sea Atoll, Pukapuka, 1951* (Wellington, New Zealand Department of Health, n.d.).

[12] Richard Gilson, *op. cit.*, p. 215.

Table 52. Crude death rates by region, 1902-1981

(registered deaths per 1,000 population)

Census year	Rarotonga	Southern outer islands	Northern outer islands	Total Cook Islands
1902[a]	...	...	...	31.7
1906[a]	...	...	...	33.9
1911[a]	...	...	...	31.7
1916[a]	...	...	...	35.5
1921[a]	...	...	...	23.8
1926[a]	...	...	...	26.4
1936[a]	...	...	...	39.2
1941[a]	...	...	...	17.2
1945[b]	...	...	...	20.9
1951[b]	...	...	...	20.1
1956[b]	...	...	...	16.2
1961[b]	...	...	...	8.6
1966[c]	8.8	7.7	9.6	8.6
1971[c]	7.1	6.0	7.6	6.8
1976[c]	6.8	6.5	9.3	7.2
1981[d]	5.8	6.3	8.8	6.3

Sources: [a] Table 10 chapter III.

[b] James Phillips, *A Demographic Profile of the Cook Islands,* pp. 157-181.

[c] Geoffrey R. Hayes, *Report on Project to Evaluate the Vital Statistics of the Cook Islands,1965-77,* South Pacific Commission, 1980 (Appendix B).

[d] Unpublished vital statistics summaries, Cook Islands Statistics Office.

Table 53. Age standardized death rates by region, 1966, 1976, 1981

(per 1,000 population)

Region	Crude death rate			Age standardized death rate[a]		
	1966	1976	1981	1966	1976	1981
Rarotonga	8.8	6.8	5.8	13.9	14.5	13.1
Southern outer islands	7.7	6.8	6.3	14.1	11.0	9.4
Northern outer islands	9.6	9.3	8.8	11.3	11.0	12.7
Cook Islands	8.6	7.2	6.3	13.6	12.0	11.9

Source: See table 52.

Notes: [a] These rates are based on the "direct" standardization method in which the age-specific death rates for each region are applied to the New Zealand population in 1976. The rates indicate what the death rate would be if each region had the same age distribution as the New Zealand population. For methods see Henry S. Shryock, Jacob S. Siegel and Associates, *The Methods and Materials of Demography* (Washington, United States Bureau of the Census, United States Government Printing Office, 1975), pp. 419-422.

exception of the southern outer islands, a substantial part of the decline in the crude death rate since 1966 can be attributed to changes in the age composition of the population. For example, while Rarotonga's crude death rate declined by 34 per cent between 1966 and 1981 (from 8.8 to 5.8 per 1,000), the age-standardized death rate decreased by only 5.8 per cent (from 13.9 to 13.1 per 1,000), indicating virtually no change in the overall level of mortality. In the case of the northern group, the standardized death rate indicates a 12.4 per cent increase in mortality (from 11.3 per 1,000 to 12.7) while the crude death rate shows a 9.1 per cent decline. But given the likelihood of random variation these changes may not be statistically significant. Only in the southern outer islands is it evident that a genuine decline in overall mortality has occurred since 1966: the age-standardized death rate has fallen from 14.1 per 1,000 in 1966 (the highest of all regions) to 9.4 per 1,000 in 1981 – the lowest rate of all regions. This represents a decline of 33.3 per cent since 1966 or about twice the rate of decline in the CDR over the same period.

It is noteworthy that in 1976 and again in 1981, Rarotonga's age-adjusted death rate was higher than that of the two outer islands regions. The contrast between Rarotonga and the southern outer islands is particularly remarkable given that Rarotonga's medical facilities have long been superior to those of any other island and that a higher proportion of Rarotonga's population has access to the "urban" lifestyle usually associated with low mortality. While the population of Rarotonga is aging more rapidly than in the outer islands (because fertility has been falling faster and for a longer period), most of the effects of an aging population should be removed by standardization.

Phillips has suggested that the number of deaths occurring on Rarotonga might be inflated by the in-flow of seriously ill patients from the outer islands whose subsequent deaths are recorded as deaths of Rarotonga residents.[13] This would tend to increase Rarotonga's crude death rate while simultaneously decreasing that of the outer islands. While such events do occur, their incidence is most likely too small to account for the observed differences between the regions.[14]

[13] James Phillips, *op. cit.*, p. 47.

[14] This was the opinion of Health Department officials in 1980, but the proposition has not been thoroughly tested.

A number of observers have suggested that the relatively higher levels of mortality in Rarotonga can be attributed to differences in diet, level of physical exercise, and general lifestyle of Rarotongans in comparison to Outer Islanders.[15] This hypothesis is certainly plausible, but its present validity is best examined in the light of differences in age-specific mortality rates.

D. AGE-SPECIFIC MORTALITY

1. Infant and child mortality

Table 54 presents the general trends in infant mortality since the late 1920s expressed in triennial moving averages. The infant mortality rate of 168.8 per 1,000 live births, recorded in 1928-1930, is most likely an understatement, since complete registration cannot be assumed for this period.[16] Until the late 1950s the infant mortality rate for the total population remained substantially above 100 per 1,000 live births before declining dramatically by about two thirds in the 1960-1962 triennium (see figure 16). This rapid decline would appear to be a product of increasing expenditures on public health in the middle to late 1950s. Since 1960, the infant mortality rate has exhibited considerable fluctuation – even when smoothed by moving averages. While the rate dropped to a low of 28.5 per 1,000 in the 1979-1981 triennium, rates well above 40 per 1,000 were not uncommon throughout the 1960s and 1970s.

Regional trends in infant mortality generally follow national ones although there are some sharp contrasts in magnitude. In broad terms, the southern outer islands tend to have had lower rates than either Rarotonga or the northern group, but the pattern is not always consistent from year to year. The fact that the southern outer islands achieved the low rate of 25.8 per 1,000 in 1979-1981 leads to the suspicion that some late registrations may yet occur; but it should be

[15] See James Phillips, *op. cit.*, p. 50; P. H. Curson, *Population of the Cook Islands*, unpublished manuscript, MacQuarrie University, 1973, p. 55. These views are based on epidemiology research reported in: I. A. M. Pryor and others, *The Health of Two Groups of Cook Islands Maoris* (Wellington, Medical Research Council of New Zealand, 1966).

[16] G. N. Davies and others, p. 11. A rate of 223 per 1,000 live births was reported on Pukapuka between 1941 and 1950 by a medical team. General malnutrition and a dietary deficiency of vitamin K were believed to be the primary causes of this high rate.

Table 54. Trends in infant mortality by region, 1928-1981

(three-year averages)

Period	Rarotonga	Southern outer islands	Northern outer islands	Total Cook Islands
1928-1930[a]	142.2	...	...	168.8
1944-1946[b]	...	...	...	121.4
1950-1952[b]	...	...	...	151.9
1955-1957[b]	...	...	...	112.9
1960-1962[b]	...	...	...	43.7
1964-1966	55.1	50.3	63.1	54.4
1965-1967	48.1	43.7	59.8	48.0
1966-1968	51.6	46.1	53.3	50.0
1967-1969	45.2	49.4	55.0	47.7
1968-1970	43.4	45.9	57.8	46.0
1969-1971	40.5	47.5	67.8	46.2
1970-1972	47.6	36.8	40.8	43.1
1971-1973	43.8	32.2	44.9	39.9
1972-1974	45.3	29.4	52.3	40.8
1973-1975	43.8	35.2	85.7	46.3
1974-1976	34.6	36.1	84.1	41.8
1975-1977	32.7	28.2	84.1	38.2
1976-1978	36.0	27.6	65.7	37.0
1977-1979	41.6	31.7	63.2	41.2
1978-1980	35.8	27.4	40.6	33.7
1979-1981	27.4	25.8	32.9	28.5

Sources: [a] P.H. Curson, *op. cit.*, p. 59.

[b] James Phillips, *op. cit.*, pp. 163-181.

1964 to 1978 rates are based on vital data reported in Geoffrey R. Hayes, *op. cit.*, (Appendices A and B).

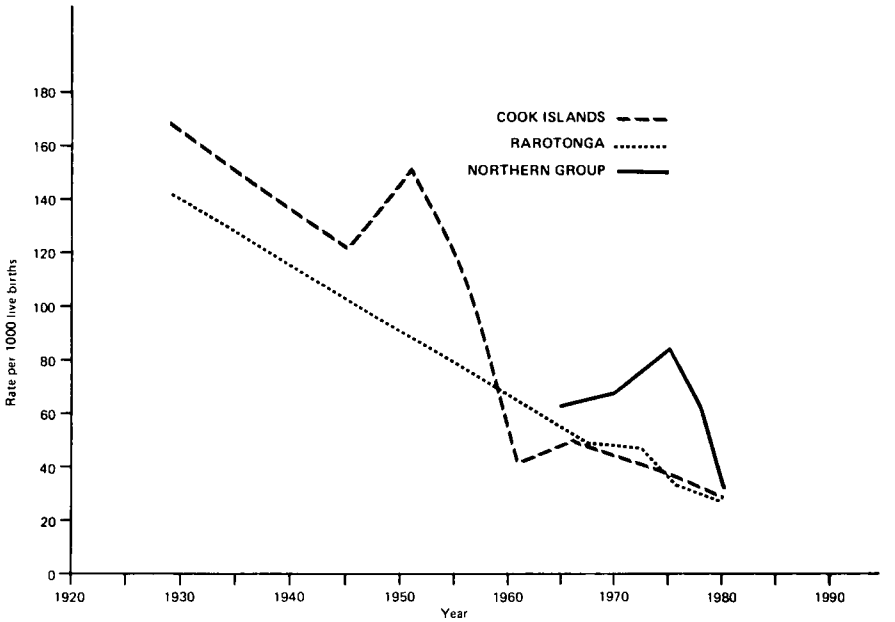
1979-1981 rates based on unpublished vital statistics summaries provided by the Cook Islands Statistics Office.

noted that the trend in the southern outer islands has been consistently downwards during the 1970s, with much less fluctuation than in the northern group. Of course, random fluctuation may help to explain the northern group pattern.

Rarotonga's infant mortality rate shows a tendency to jump above 40 per 1,000 occasionally, even though the general trend has been downward since the mid-1960s. The 1979-1981 rate of 27.4 per 1,000 is most likely the lowest recorded in Rarotonga since civil registration began, but it is still above the southern outer islands rate of 25.8.

It is evident that the previously wide gap between infant mortality rates in the northern and southern outer islands has narrowed considerably in the last few years. Assuming that no late registrations are received, the northern group's infant mortality rate has declined by 61.0 per cent in just five years. This suggests that major improvements in child care and health practices have taken place in recent years. With populations as small as these, random variation cannot be ruled out completely, and some increase may occur in future; but there appears to have been a major decline.

Figure 16. Infant mortality rates by region, 1928-1981



Source: Table 54.

When infant mortality rates are calculated for males and females separately, males tend to have higher rates than females (table 55). This pattern, which is typical of most populations, holds for the southern group (Rarotonga included), but in the northern atolls female infant mortality has exceeded male as often as the reverse. Again, random variation cannot be ruled out entirely, and without further analysis of the circumstances surrounding these deaths it would be unjustified to conclude that female infants receive less care and attention than male – even though this is not uncommon in patriarchal societies.

While Rarotonga's infant mortality rate is higher in the 1979-1981 triennium than the southern outer islands rate, the difference is certainly too small to account for the contrasting age-adjusted death rate in the two regions.[17] The reason must therefore lie in differential mortality rates at older ages.

While there are regional variations in the mortality rates of children (age 1-4), the differences are also too small to account for Rarotonga's higher age-standardized death rate. In the total population, the mortality of children has declined substantially since 1956 particularly among females. The male rate dropped from 10.6 per 1,000 in 1956 to 2.7 per 1,000 in 1981, while the female rate declined from 17.3 to 1.6 over the same period (table 56).

[17] The differences in infant mortality account for only 0.1 per 1,000 in the age-adjusted death rate.

Table 55. Regional trends in infant mortality, 1964-1981, in moving averages

(registered deaths per 1,000 live births)

Three-year period	Males				Females			
	Rarotonga	Southern outer islands	Northern outer islands	Total Cook Islands	Rarotonga	Southern outer islands	Northern outer islands	Total Cook Islands
1964-1966	58.8	52.2	59.5	56.6	51.8	47.8	68.5	52.5
1965-1967	57.9	53.1	71.2	58.1	38.0	34.4	48.9	38.1
1966-1968	57.9	47.4	64.4	55.4	45.3	44.8	43.2	44.9
1967-1969	53.4	48.4	88.3	55.6	36.2	50.6	22.0	39.7
1968-1970	43.8	46.4	72.5	47.7	44.3	45.1	45.2	44.4
1969-1971	36.5	58.0	78.1	48.6	46.3	35.8	58.9	43.9
1970-1972	38.9	43.5	44.3	39.7	57.6	28.5	56.8	46.7
1971-1973	41.5	30.7	45.9	38.6	46.9	31.3	49.2	41.4
1972-1974	47.8	24.6	59.3	41.7	42.7	35.9	54.7	41.6
1973-1975	46.6	36.0	89.6	49.1	40.4	36.0	83.5	44.0
1974-1976	36.9	40.1	78.6	44.2	31.2	31.2	90.2	38.4
1975-1977	39.4	37.1	78.6	44.4	25.3	19.1	90.9	31.7
1976-1978	43.6	27.5	48.3	39.3	28.2	27.4	84.2	35.4
1977-1979	52.2	32.4	53.1	45.7	38.5	35.5	74.2	42.4
1978-1980	30.8	20.8	30.0	27.4	41.0	34.1	51.3	36.6
1979-1981	22.5	25.9	31.3	26.2	32.0	25.7	34.7	30.8

Source: Calculated from Geoffrey R. Hayes, *op. cit.*, (Appendices A and B); Cook Islands Statistics Office, unpublished summaries of vital statistics, 1979-1981.

Table 56. Age-specific mortality rates, total population, 1946-1981

(registered deaths per 1,000 population in age group)

	Males					Females				
	1946	1956	1966	1976	1981	1946	1956	1966	1976	1981
0[a]	138.1	123.7	58.1	44.0	26.2	100.0	114.4	46.0	32.2	30.8
1 - 4	...	10.6	6.9	2.1	2.7	...	17.3	4.2	2.7	1.6
5 - 9	2.8	4.3	1.1	0.8	0.8	4.4	2.7	1.3	0.2	0.3
10 - 14	3.5	2.9	1.8	0.5	0.9	4.8	3.3	0.5	0.7	0.4
15 - 19	12.9	2.6	2.3	2.5	2.1	13.3	6.0	0.7	1.0	1.3
19 - 24	8.7	6.2	3.6	3.4	1.9	13.4	6.3	2.2	1.2	1.5
25 - 29	8.7	4.5	1.5	3.8	4.8	12.4	9.0	1.5	1.9	1.5
30 - 34	13.7	12.4	4.9	1.1	1.6	10.2	7.4	5.5	1.5	1.7
35 - 39	10.7	6.8	4.5	1.5	5.2	12.8	9.4	2.9	3.3	3.0
40 - 44	33.3	10.3	7.0	6.9	7.4	16.7	8.1	8.2	1.7	4.6
45 - 49	26.6	11.0	9.9	8.3	3.6	24.4	15.7	8.1	4.2	3.1
50 - 54	30.2	17.0	11.8	10.8	12.5	30.2	37.7	13.6	8.9	5.2
55 - 59	34.0	23.4	22.8	21.2	19.8	25.8	20.9	15.0	15.8	17.6
60 - 64	51.3	74.6	33.1	38.4	28.6	70.5	45.4	27.8	25.7	8.3
65 - 69	73.7	50.9	27.1	42.2	53.9	37.5	37.4	30.3	32.9	36.1
70 - 74	...	95.2	81.0	70.7	74.4	...	91.3	88.6	59.4	43.5
70 +	162.9	...	...	...	...	221.1	...	...	...	...
75 +	...	134.3	160.4	137.7	136.6	...	91.8	106.6	137.7	122.4
75 - 79	...	...	111.5	99.1	107.7	...	...	53.4	102.2	41.5
80 - 84	...	...	257.8	198.0	101.6	...	...	72.2	130.8	164.1
85 +	...	...	140.0	98.9	319.2	...	...	260.1	234.9	456.4
All ages	20.8	15.8	9.5	7.8	7.8	20.1	16.6	7.7	6.5	5.6

Sources: Norma McArthur, *Island Populations of the Pacific* (Canberra, Australian National University Press, 1968), p. 215 (for 1946 and 1956); 1966 and 1976 from life tables in Geoffrey R. Hayes, *Population, Migration, and Socioeconomic Development*, unpublished Ph.D. dissertation, University of British Columbia, 1982, Appendix E; 1981 calculated from unpublished vital statistics, Cook Islands Statistics Office.

Note: [a] Infant mortality: registered deaths per 1,000 live births.

Table 57. Age-specific mortality rates by region, 1979-1981

(per 1,000 population)

Age group	Rarotonga	Southern outer islands	Northern outer islands	Cook Islands
0	27.40	25.82	32.90	28.50
1 - 4	2.41	1.24	3.74	2.20
5 - 9	0.45	0.43	1.86	0.57
10 - 14	0.38	0.50	2.80	0.65
15 - 19	1.78	0.97	3.36	1.69
20 - 24	1.79	–	2.34	1.70
25 - 29	1.13	3.73	10.86	3.12
30 - 34	0.97	5.44	–	1.66
35 - 39	3.27	–	12.19	4.03
40 - 44	4.21	11.68	4.59	5.96
45 - 49	3.50	4.66	–	3.37
50 - 54	11.50	3.12	15.58	9.13
55 - 59	20.73	10.04	17.04	8.78
60 - 64	17.64	25.97	5.57	18.97
65 - 69	52.21	22.69	89.56	45.60
70 +	108.21	70.13	97.18	91.77
70 - 74	71.36	57.73	43.54	60.04
75 - 79	93.62	46.13	83.94	71.16
80 - 84	100.00	114.21	242.00	130.68
85 +	461.53	271.25	410.00	393.07

Source: Calculated from unpublished vital statistics, Cook Islands Statistics Office.

Since high childhood mortality is usually associated with somewhat different health and welfare conditions than high infant mortality[18] these changes suggest that the improvements which occurred in the Cook Islands since the mid-1950s covered a wide range of health-related conditions.

When both sexes are combined, the northern group had the highest child mortality rate in 1979-1981 (table 57), but this is mainly attributable to the northern group's high male rate which was more than double that of the other regions (table 58). It should be noted, however, that we are speaking here of a very small number of deaths: the male death rate of 5.03 per 1,000 in the 1-4 age group is based on an average of just under one death per year. It would be quite inappropriate to draw any broad conclusions regarding comparative health conditions in the Cook Islands based on this statistic alone; much more would have to be known about the physical causes of these deaths and the general circumstances surrounding them. In the three year period 1979-1981 there were only four child deaths per year throughout the Cook Islands. Conclusions regarding health conditions would be more firmly based if these specific deaths were studied in detail than if inferences were drawn from the fact that they occurred with different frequency in different regions.

[18] Morris D. Morris, *Measuring the Condition of the World's Poor* (New York, Pergamon Press, 1979), p. 35.

2. Adult mortality

Referring back to table 56, it will be seen that the mortality rates of all age groups between the age of 15 and 49 have fallen substantially since 1946 and have reached quite low levels in the 1979-1981 period. No age group has a death rate approaching one per cent (10 per 1,000), and most age groups, whether male or female, are well below half of one per cent. These low adult death rates are characteristic of "modern" populations in which most of the serious infectious and parasitic diseases which affect the broad majority of the population have been eradicated or highly controlled. The transition to a "modern" mortality pattern is perhaps incomplete in the northern group where mortality between the ages of 15 and 49 is about double the national rate. Again, however, the relatively higher death rate in the northern group is almost entirely a function of the high rates for males (see table 58) since the female death rates in this age range is extremely small (table 59), and most female age groups had no deaths at all.

Above the age of 50 the mortality picture becomes more complex. The downward trends evident in the younger age groups are evident in some older ones, but others show little change over a long period. Among males aged 50-54, for example, the mortality rate has remained unchanged since 1966, and for females aged 65-69 there has been little change since 1946 (table 56). The death rate for males aged 65-69 appears to

Table 58. Male age-specific mortality rates by region, 1979-1981

(per 1,000 population)

Age group	Rarotonga	Southern outer islands	Northern outer islands	Cook Islands
0	22.50	25.94	31.25	26.19
1 - 4	2.28	2.33	5.03	2.71
5 - 9	0.53	0.06	3.50	0.80
10 - 14	0.44	0.06	5.34	0.93
15 - 19	2.43	0.06	5.74	2.05
20 - 24	2.07	–	–	1.92
25 - 29	1.14	7.85	25.00	4.83
30 - 34	1.09	3.70	–	1.61
35 - 39	4.22	–	26.31	5.18
40 - 44	4.27	17.24	–	7.38
45 - 49	4.57	3.39	–	3.57
50 - 54	18.29	1.42	21.73	12.48
55 - 59	19.86	19.33	24.13	19.75
60 - 64	26.17	45.06	–	28.55
65 - 69	62.26	31.30	88.89	53.98
70 +	108.21	70.13	97.18	91.77
70 - 74	74.07	86.84	56.00	74.35
75 - 79	152.50	81.72	93.33	107.68
80 - 84	127.69	36.66	175.00	101.61
85 +	285.71	273.33	505.00	319.16

Source: Calculated from unpublished vital statistics, Cook Islands Statistics Office.

Table 59. Female age-specific mortality rates by region, 1979-1981

(per 1,000 population)

Age group	Rarotonga	Southern outer islands	Northern outer islands	Cook Islands
0	32.00	25.69	34.66	30.76
1 - 4	2.57	0.15	2.44	1.61
5 - 9	0.37	0.82	–	0.31
10 - 14	0.32	0.96	–	0.36
15 - 19	1.07	2.04	–	1.28
20 - 24	1.48	–	4.53	1.46
25 - 29	1.12	–	–	1.50
30 - 34	0.84	7.30	–	1.72
35 - 39	2.45	–	–	2.99
40 - 44	4.14	6.72	9.71	4.57
45 - 49	2.04	5.88	–	3.13
50 - 54	4.32	5.32	8.50	5.22
55 - 59	21.98	–	10.62	17.59
60 - 64	8.27	6.62	13.60	8.33
65 - 69	42.02	12.28	90.53	36.13
70 +	108.21	70.13	97.18	91.77
70 - 74	67.80	27.83	30.00	43.46
75 +	100.90	56.10	93.13	82.55
75 - 79	52.05	14.84	76.11	41.52
80 - 84	78.82	247.14	342.50	164.10
85 +	666.67	270.00	346.67	456.42

Source: Calculated from unpublished vital statistics, Cook Islands Statistics Office.

have increased since 1956 after an initial drop between 1946 and 1956. On the other hand, all female groups with the exception of the 75 and over show evidence of declining mortality.

In 1979-1981, differences in adult mortality rates do not follow a simple regional pattern. For example, when both sexes are combined (table 57), Rarotonga has the highest rate in the 55-59 age group, whereas the southern outer islands has the highest rate in the 60-64 group and the northern outer islands in the 65-69 group. Above the age of 70, however, Rarotonga again has the highest rate (108.2 per 1,000) followed by the northern group and the southern outer islands.

These variations generally hold for both sexes treated independently, but the male rates show more consistency across the regions than the female rates (compare tables 58 and 59). The death rate among females aged 70 and over is much higher in Rarotonga (100.9 per 1,000) than in the southern outer islands (56.1 per 1,000), and although a spread is also apparent among males, it is not as wide as for females. On the other hand, there is little differences between the mortality rates of Rarotonga and the northern outer islands in the over 70 population, whether male or female, and if the lifestyle and diet of the northern atolls was responsible for the lower risk of death there in the 1960s and early 1970s, this

advantage seems to have disappeared by the late 1970s. At present, the population of the southern outer islands, appears to be subject to the lowest risk of death in the Cook Islands, particularly southern females.

In summary, the southern outer islands' relatively low death rates across all age groups, and particularly its lower mortality among females aged 15-44 and 55 and above, appears to account for its low age-adjusted death rate in comparison with either the northern group or Rarotonga.

If we use 1971 as a reference point, the evidence suggests that while female mortality has declined substantially in the southern outer islands, and has remained more or less static in the northern group, male mortality has increased in both outer islands regions. In the south, the crude death rate for males increased by 15 per cent during the 1971-1981 decade, and the northern group rate more than doubled (table 60). This is in sharp contrast to Rarotonga where the male death rate declined by 12.3 per cent.

The rising crude death rate among outer islands males appears to be a function of increasing deaths across a wide range of age groups with the exception of the 0-9 and 70 plus. Increases are particularly apparent in the 10-19 and 20-29 age groups of the northern atolls, both of which had no deaths at all in 1971. The death rate among northern group males aged 50-59 doubled over the decade and more than trebled among those aged 60-69. In the southern outer islands, death rates increased across the 10-69 age range, but these increases were generally smaller than in the northern group. The contrast between Rarotonga and the outer islands is clear from table 60: Rarotonga shows a downward trend in all groups with the exception of the 10-19, whereas there is an upward trend in most outer islands age groups other than 0-9 and the 10-19 and 70 plus groups in the southern outer islands.

Some of the possible explanations for these trends will be discussed below. First it is useful to examine the effects of these mortality patterns on life expectancy.

Table 60. Male mortality rate in 10-year age groups in 1971 and 1981 by region

Age group	Rarotonga		Southern outer islands		Northern outer islands		Cook Islands	
	1971	1981	1971	1981	1971	1981	1971	1981
0 - 9	6.6	3.5	6.0	3.2	8.2	6.5	6.6	4.2
10 - 19	0.9	1.4	0.8	0.1	–	5.5	1.8	1.5
20 - 29	3.8	1.6	1.9	3.1	–	9.1	2.2	3.4
30 - 39	5.2	2.6	1.6	1.8	1.7	16.9	3.7	3.4
40 - 49	8.7	4.4	4.5	10.3	1.5	–	6.5	5.5
50 - 59	19.8	19.0	9.4	9.9	11.3	22.7	16.1	16.0
60 - 69	58.6	42.3	30.9	38.5	10.7	38.1	38.6	40.0
70 +	106.2	81.1	102.8	84.5	100.8	101.3	98.7	108.0
CDR[a]	8.1	7.1	6.1	7.0	7.4	15.4	7.3	7.8

Source: 1971 data from life table (M_x column) in Geoffrey R. Hayes, *Population, Migration, and Socioeconomic Development in the Cook Islands*, Appendix E. (five years of vital data centred on census year) 1981 data from unpublished vital statistics, Cook Islands Statistics Office (three years of vital data).

Note: [a] Crude death rate.

E. LIFE EXPECTANCY

Life expectancy at birth is a convenient summary index of the total mortality experience of population.

During the 36 years which elapsed between 1945 and 1981, life expectancy at birth (table 61) (for life tables see tables 62-67) increased from 41 to 64 years for males, an increase of 23 years, and from 48 to 70 years for females, an increase of 27 years.

But this has not been a smooth process. A large improvement occurred between 1956 and 1961 when life expectancy at birth jumped from 49 to 61 years for males, and from 48 to 63 years for females, representing increases of 25.5 and 31.3 per cent respectively. In fact, among males there was some regression between 1961 and 1966, and female life expectancy at birth appeared to stall at 63 years. Since 1971, male life expectancy at birth has increased by only one year (from 63 to 64 years) while the female index has continued to climb, reaching 70 years in 1981. Consequently, the gap between male and female life expectancy at birth, which was two years in 1945, increased to six years by 1981.

The growing gap between male and female life expectancy at birth is largely a reflection of the age-specific mortality patterns of outer islands males which have already been discussed. The trends in the outer islands are apparent from table 61. Between 1971 and 1976, male life expectancy at birth declined by one year in the northern group and by two years in the south. The same trend continued through to 1981: life expectancy in the outer islands as a whole decreased from 65 in 1976 to 62 in 1981. This is in marked contrast to Rarotonga which had an improvement of four years during the same period. Thus the improvement of one year in the total male population can be attributed entirely to changes in Rarotonga, and the fact that this was such a small change can be attributed to increasing male mortality in the outer islands.

Table 61. Changes in life expectancy at birth by region, 1945-1981

	1945[a]	1951[a]	1956[a]	1961[a]	1966[b]	1971[b]	1976[b]	1981[c]
					Males			
Rarotonga	...	...	...	...	57	60	61	65
Southern outer islands	...	...	...	...	61	67	65	...
Northern outer islands	...	...	...	...	65	69	68	...
Total outer islands	...	...	...	...	...	...	65	62
Cook Islands	41	42	49	61	60	63	63	64
					Females			
Rarotonga	...	...	...	...	62	65	66	69
Southern outer islands	...	...	...	...	68	69	69	...
Northern outer islands	...	...	...	...	63	69	65	...
Total outer islands	...	...	...	...	...	...	68	70
Cook Islands	43	44	48	63	63	67	67	70

Sources: [a] James Phillips, *op. cit.*, pp. 163-184.

[b] Geoffrey R. Hayes, *op. cit.*, pp. 495-531.

[c] Tables 65, 66 and 67.

Table 62. Abridged life table for Cook Islands total population, 1974-1978

Age interval	Proportion dying	Of 100,000 born alive		Stationary population		Average remaining lifetime
Period of life between two exact ages stated in years (1) x to x+n	Proportion of persons alive at beginning of age interval dying (2) $_nq_x$	Number living at beginning of age interval (3) l_x	Number dying during age interval (4) $_nd_x$	In the age interval (5) $_nL_x$	In this and all subsequent age intervals (6) T_x	Average number of years of life remaining at beginning of age interval (7) e^o_x
			Males			
0	0.046364	100 000	4 636	96 068	6 317 318	63.173
1	0.008505	95 364	811	379 427	6 221 250	65.237
5	0.003885	94 553	367	471 844	5 841 824	61.784
10	0.002613	94 185	246	470 485	5 369 980	57.015
15	0.012846	93 939	1 207	466 954	4 899 495	52.156
20	0.016924	92 732	1 569	459 850	4 432 541	47.799
25	0.019126	91 163	1 744	451 231	3 972 692	43.578
30	0.005510	89 419	493	445 644	3 521 461	39.381
35	0.007709	88 927	686	443 444	3 075 817	34.588
40	0.034117	88 241	3 011	434 256	2 632 374	29.832
45	0.040516	85 231	3 453	417 788	2 198 119	25.790
50	0.052557	81 777	4 298	399 051	1 780 332	21.770
55	0.100910	77 479	7 818	369 504	1 381 281	17.828
60	0.175600	69 661	12 232	318 383	1 011 778	14.524
65	0.191261	57 428	10 984	260 046	693 395	12.074
70	0.300908	46 445	13 976	197 678	433 349	9.330
75	0.396466	32 469	12 873	129 905	235 672	7.258
80	0.649876	19 596	12 735	64 315	105 767	5.397
85	1.000000	6 861	6 861	41 452	41 452	6.042
			Females			
0	0.040856	100 000	4 086	96 494	6 708 911	67.089
1	0.010905	95 914	1 046	381 043	6 612 417	68.941
5	0.001449	94 869	138	473 999	6 231 375	65.684
10	0.003706	94 731	351	472 851	5 757 377	60.776
15	0.005221	94 380	493	470 710	5 284 526	55.992
20	0.005895	93 887	554	468 137	4 813 817	51.272
25	0.009631	93 334	899	464 453	4 345 681	46.561
30	0.007643	92 435	706	460 527	3 881 229	41.989
35	0.016066	91 728	1 474	454 975	3 420 702	37.292
40	0.008793	90 255	794	449 377	2 965 727	32.860
45	0.021199	89 461	1 897	443 197	2 516 350	28.128
50	0.043752	87 565	3 831	429 186	2 073 154	23.676
55	0.076581	83 733	6 412	403 788	1 643 969	19.633
60	0.121069	77 321	9 361	364 030	1 240 181	16.039
65	0.152821	67 960	10 386	315 004	876 151	12.892
70	0.260073	57 574	14 973	251 878	561 147	9.747
75	0.406086	42 601	17 300	169 205	309 270	7.260
80	0.487576	25 301	12 336	94 301	140 065	5.536
85	1.000000	12 965	12 965	45 764	45 764	3.530

Table 63. Abridged life table for Rarotonga, 1974-1978

Age interval	Proportion dying	Of 100,000 born alive		Stationary population		Average remaining lifetime
Period of life between two exact ages stated in years (1) x to x+n	Proportion of persons alive at beginning of age interval dying (2) $_nq_x$	Number living at beginning of age interval (3) l_x	Number dying during age interval (4) $_nd_x$	In the age interval (5) $_nL_x$	In this and all subsequent age intervals (6) T_x	Average number of years of life remaining at beginning of age interval (7) e^o_x
			Males			
0	0.046506	100 000	4 651	96 058	6 146 978	61.470
1	0.008649	95 349	825	379 336	6 050 921	63.461
5	0.002517	94 525	238	472 029	5 671 586	60.001
10	0.003884	94 287	366	470 804	5 199 558	55.146
15	0.017108	93 921	1 607	465 976	4 728 755	50.348
20	0.024258	92 314	2 239	455 894	4 262 779	46.177
25	0.013739	90 074	1 238	446 965	3 806 886	42.264
30	0.008300	88 837	737	442 296	3 359 921	37.821
35	0.011576	88 100	1 020	438 563	2 917 626	33.117
40	0.042384	87 080	3 691	426 822	2 479 063	28.469
45	0.049706	83 389	4 145	406 496	2 052 241	24.610
50	0.041337	79 244	3 276	388 964	1 645 746	20.768
55	0.113577	75 968	8 628	360 816	1 256 782	16.544
60	0.230093	67 340	15 494	298 558	895 966	13.305
65	0.221475	51 846	11 483	229 760	597 408	11.523
70	0.293382	40 363	11 842	172 272	367 648	9.109
75	0.412930	28 521	11 777	113 328	195 376	6.850
80	0.754411	16 744	12 632	50 133	82 048	4.900
85	1.000000	4 112	4 112	31 915	31 915	7.761
			Females			
0	0.032908	1 00 000	3 291	97 129	6 645 975	66.460
1	0.009512	96 709	920	384 537	6 548 846	67.717
5	0.002930	95 789	281	478 245	6 164 310	64.353
10	0.004269	95 509	408	476 597	5 686 066	59.535
15	0.006684	95 101	636	474 003	5 209 469	54.778
20	0.008786	94 465	830	470 339	4 735 467	50.129
25	0.011328	93 635	1 061	465 586	4 265 128	45.550
30	0.012186	92 575	1 128	459 916	3 799 542	41.043
35	0.004467	91 446	409	456 181	3 339 626	36.520
40	0.010835	91 038	986	453 257	2 883 446	31.673
45	0.032994	90 052	2 971	443 649	2 430 189	26.987
50	0.056508	87 080	4 921	424 000	1 986 540	22.813
55	0.088748	82 160	7 292	393 451	1 562 540	19.018
60	0.122235	74 868	9 152	352 176	1 169 090	15.615
65	0.163130	65 717	10 720	303 082	816 914	12.431
70	0.279876	54 996	15 392	237 909	513 832	9.343
75	0.441303	39 604	17 477	153 884	275 924	6.967
80	0.599415	22 127	13 263	75 031	122 040	5.516
85	1.000000	8 864	8 864	47 009	47 009	5.304

Table 64. Abridged life table for outer islands, 1974-1978

Age interval	Proportion dying	Of 100,000 born alive		Stationary population		Average remaining lifetime
Period of life between two exact ages stated in years (1) x to x+n	Proportion of persons alive at beginning of age interval dying (2) $_nq_x$	Number living at beginning of age interval (3) l_x	Number dying during age interval (4) $_nd_x$	In the age interval (5) $_nL_x$	In this and all subsequent age intervals (6) T_x	Average number of years of life remaining at beginning of age interval (7) e^o_x
			Males			
0	0.046357	100 000	4 636	96 069	6 531 624	65.316
1	0.008401	95 364	801	379 454	6 435 555	67.484
5	0.005346	94 563	506	471 552	6 056 101	64.043
10	0.002564	94 058	241	469 684	5 584 549	59.374
15	0.005314	93 817	499	467 788	5 114 866	54.520
20	0.000125	93 318	12	467 052	4 647 078	49.798
25	0.030610	93 306	2 856	459 388	4 180 027	44.799
30	0.000020	90 450	1	451 660	3 720 639	41.135
35	0.000001	90 452	0	452 665	3 268 979	36.140
40	0.021475	90 452	1 942	447 930	2 816 315	31.136
45	0.028549	88 510	2 527	437 019	2 368 386	26.759
50	0.066630	85 983	5 729	416 538	1 931 367	22.462
55	0.088110	80 254	7 071	384 362	1 514 830	18.876
60	0.128892	73 183	9 433	343 110	1 130 469	15.447
65	0.169583	63 750	10 811	293 163	787 360	12.351
70	0.308826	52 939	16 349	224 493	494 197	9.335
75	0.383436	36 590	14 030	146 916	269 704	7.371
80	0.520469	22 560	11 742	82 332	122 788	5.443
85	1.000000	10 818	10 818	40 456	40 456	3.740
			Females			
0	0.050769	100 000	5 077	95 736	6 794 073	67.941
1	0.011575	94 923	1 099	376 946	6 698 337	70.566
5	0.000000	93 824	0	469 122	6 321 392	67.375
10	0.003096	93 824	291	468 451	5 852 270	62.375
15	0.002839	93 534	266	466 945	5 383 819	57.560
20	0.000003	93 268	0	466 414	4 916 874	52.717
25	0.006605	93 268	616	464 801	4 450 460	47.717
30	0.000019	92 652	2	463 638	3 985 660	43.017
35	0.026446	92 650	2 450	457 246	3 522 023	38.014
40	0.006418	90 200	579	449 195	3 064 777	33.978
45	0.008191	89 621	734	446 729	2 615 582	29.185
50	0.031300	88 887	2 782	438 518	2 168 853	24.400
55	0.066409	86 105	5 718	417 662	1 730 336	20.096
60	0.120175	80 387	9 661	378 693	1 312 675	16.329
65	0.142643	70 726	10 089	329 567	933 982	13.206
70	0.250989	60 638	15 219	266 710	604 415	9.968
75	0.388083	45 418	17 626	182 248	337 706	7.435
80	0.413243	27 792	11 485	109 780	155 458	5.594
85	1.000000	16 307	16 307	45 678	45 678	2.801

Table 65. Abridged life table for Cook Islands total population, 1979-1981

Age interval	Proportion dying	Of 100,000 born alive		Stationary population		Average remaining lifetime
Period of life between two exact ages stated in years (1) x to x+n	Proportion of persons alive at beginning of age interval dying (2) $_nq_x$	Number living at beginning of age interval (3) l_x	Number dying during age interval (4) $_nd_x$	In the age interval (5) $_nL_x$	In this and all subsequent age intervals (6) T_x	Average number of years of life remaining at beginning of age interval (7) e^o_x
			Males			
0	0.02574	100 000	2 574	98 275	6 434 993	64.35
1	0.01077	97 426	1 049	386 926	6 336 718	65.04
5	0.00404	96 377	390	480 813	5 949 792	61.73
10	0.00464	95 987	445	478 867	5 468 980	56.98
15	0.01022	95 542	976	475 366	4 990 113	52.23
20	0.00960	94 566	908	470 648	4 514 747	47.74
25	0.02386	93 657	2 235	462 924	4 044 099	43.18
30	0.00803	91 423	734	455 351	9 581 175	39.17
35	0.02559	90 688	2 321	447 872	3 125 824	34.47
40	0.03628	88 368	3 206	434 144	2 677 953	30.30
45	0.01773	85 162	1 510	422 184	2 243 809	26.35
50	0.06061	83 651	5 070	406 089	1 821 625	21.78
55	0.09432	78 581	7 412	375 118	1 415 536	18.01
60	0.13360	71 169	9 508	333 028	1 040 418	14.62
65	0.23870	61 661	14 719	272 982	707 390	11.47
70	0.31549	46 943	14 810	199 169	434 408	9.25
75	0.42784	32 133	13 748	127 669	235 239	7.32
80	0.40514	18 385	7 449	73 304	107 570	5.85
85	1.00000	10 936	10 936	34 266	34 266	3.13
			Females			
0	0.03014	100 000	3 014	97 981	6 985 064	69.85
1	0.00642	96 986	622	386 297	6 887 084	71.01
5	0.00156	96 364	150	481 407	6 500 786	67.46
10	0.00181	96 214	174	480 650	6 019 379	62.56
15	0.00639	96 039	613	478 725	5 538 729	57.67
20	0.00731	95 426	698	475 455	5 060 004	53.03
25	0.00751	94 728	711	471 934	4 584 549	48.40
30	0.00857	94 017	806	468 151	4 112 615	43.74
35	0.01485	93 211	1 384	462 734	3 644 464	39.10
40	0.02262	91 827	2 077	454 152	3 181 729	34.65
45	0.01551	89 750	1 392	445 412	2 727 577	30.39
50	0.02581	88 359	2 280	436 320	2 282 165	25.83
55	0.08441	86 078	7 266	412 953	1 845 845	21.44
60	0.04085	78 812	3 219	386 335	1 432 893	18.18
65	0.16625	75 593	12 567	347 803	1 046 558	13.84
70	0.19680	63 026	12 403	285 360	698 755	11.09
75	0.18883	50 622	9 559	230 170	413 395	8.17
80	0.58175	41 063	23 889	145 596	183 225	4.46
85	1.00000	17 175	17 175	37 629	37 629	2.19

Table 66. Abridged life table for Rarotonga, 1979-1981

Age interval	Proportion dying	Of 100,000 born alive		Stationary population		Average remaining lifetime
Period of life between two exact ages stated in years (1) x to x+n	Proportion of persons alive at beginning of age interval dying (2) $_nq_x$	Number living at beginning of age interval (3) l_x	Number dying during age interval (4) $_nd_x$	In the age interval (5) $_nL_x$	In this and all subsequent age intervals (6) T_x	Average number of years of life remaining at beginning of age interval (7) e^0_x
			Males			
0	0.02221	100 000	2 221	98 512	6 502 017	65.02
1	0.00908	97 779	888	388 767	6 403 505	65.49
5	0.00267	96 892	259	483 747	6 014 738	62.08
10	0.00222	96 633	214	482 651	5 530 991	57.24
15	0.01208	96 419	1 165	479 299	5 048 340	52.36
20	0.01034	95 254	985	473 905	4 569 042	47.97
25	0.00569	94 269	537	470 055	4 095 136	43.44
30	0.00541	93 732	507	467 442	3 625 081	38.67
35	0.02089	93 225	1 947	461 450	3 157 639	33.87
40	0.02115	91 278	1 931	451 754	2 696 189	29.54
45	0.02258	89 347	2 018	441 892	2 244 434	25.12
50	0.08762	87 329	7 652	418 282	1 802 542	20.64
55	0.09482	79 678	7 555	380 257	1 384 260	17.37
60	0.12316	72 123	8 883	339 296	1 004 003	13.92
65	0.27086	63 240	17 129	275 091	664 707	10.51
70	0.31447	46 111	14 500	195 755	389 616	8.45
75	0.55820	31 611	17 645	115 706	193 861	6.13
80	0.48397	13 966	6 759	52 931	78 155	5.60
85	1.00000	7 207	7 207	25 224	25 224	3.50
			Females			
0	0.03133	100 000	3 133	97 901	6 908 653	69.09
1	0.01021	96 867	989	384 849	6 810 752	70.31
5	0.00185	95 878	177	478 902	6 425 903	67.02
10	0.00164	95 701	157	478 127	5 947 001	62.14
15	0.00535	95 544	511	476 493	5 468 874	57.24
20	0.00739	95 033	702	473 480	4 992 381	52.53
25	0.00560	94 331	528	470 388	4 518 901	47.90
30	0.00417	93 803	392	468 076	4 048 512	43.16
35	0.01220	93 412	1 140	464 323	3 580 436	38.33
40	0.02054	92 272	1 895	456 811	3 116 113	33.77
45	0.01020	90 377	922	449 671	2 659 302	29.42
50	0.02139	89 455	1 914	442 682	2 209 631	24.70
55	0.10440	87 541	9 139	415 773	1 766 949	20.18
60	0.04055	78 402	3 179	384 380	1 351 177	17.23
65	0.19088	75 223	14 359	341 653	966 796	12.85
70	0.29158	60 864	17 746	261 729	625 143	10.27
75	0.23138	43 118	9 977	191 644	363 414	8.43
80	0.32924	33 141	10 911	138 426	171 771	5.18
85	1.00000	22 230	22 230	33 344	33 344	1.50

Table 67. Abridged life table for outer islands, 1979-1981

Age interval	Proportion dying	Of 100,000 born alive		Stationary population		Average remaining lifetime
Period of life between two exact ages stated in years (1) x to x+n	Proportion of persons alive at beginning of age interval dying (2) $_nq_x$	Number living at beginning of age interval (3) L_x	Number dying during age interval (4) $_nd_x$	In the age interval (5) $_nL_x$	In this and all subsequent age intervals (6) T_x	Average number of years of life remaining at beginning of age interval (7) e^o_x
			Males			
0	0.02772	100 000	2 772	98 143	6 226 494	62.26
1	0.01243	97 228	1 209	385 712	6 128 351	63.03
5	0.00528	96 019	507	478 702	5 742 639	59.81
10	0.00715	95 512	683	475 923	5 263 936	55.11
15	0.00826	94 830	783	472 268	4 788 014	50.49
20	0.00826	94 046	777	468 366	4 315 746	45.89
25	0.06222	93 269	5 803	452 419	3 847 380	41.25
30	0.01518	87 466	1 328	434 145	3 394 961	38.81
35	0.03415	86 139	2 942	423 633	2 960 816	34.37
40	0.06204	83 197	5 162	403 596	2 537 183	30.50
45	0.01179	78 035	920	387 968	2 133 586	27.34
50	0.03486	77 115	2 688	379 123	1 745 619	22.64
55	0.09710	74 427	7 227	354 788	1 366 495	18.36
60	0.14188	67 200	9 534	313 115	1 011 707	15.06
65	0.21320	57 665	12 294	258 820	698 592	12.11
70	0.31637	45 371	14 354	192 406	439 772	9.69
75	0.35534	31 017	11 022	128 633	247 366	7.98
80	0.34292	19 995	6 857	82 835	118 733	5.94
85	1.00000	13 139	13 139	35 898	35 898	2.73
			Females			
0	0.02754	100 000	2 754	98 155	7 014 561	70.15
1	0.00327	97 246	318	388 142	6 916 407	71.12
5	0.00299	96 928	289	483 844	6 528 265	67.35
10	0.00360	96 639	348	482 358	6 044 421	62.55
15	0.00769	96 291	740	479 678	5 562 063	57.76
20	0.00733	95 551	701	476 072	5 082 385	53.19
25	0.01119	94 850	1 061	471 703	4 606 313	48.56
30	0.02583	93 789	2 423	463 129	4 134 610	44.08
35	0.01949	91 366	1 781	452 556	3 671 480	40.18
40	0.02563	89 585	2 296	442 415	3 218 924	35.93
45	0.02099	87 289	1 832	432 048	2 776 508	31.81
50	0.03097	85 457	2 647	420 933	2 344 460	27.43
55	0.01300	82 810	1 076	411 468	1 923 528	23.23
60	0.04109	81 734	3 359	400 610	1 512 059	18.50
65	0.14791	78 375	11 592	364 056	1 111 450	14.18
70	0.13411	66 783	8 956	312 421	747 394	11.19
75	0.16768	57 827	9 696	265 864	434 973	7.52
80	0.82667	48 131	39 788	141 184	169 109	3.51
85	1.00000	8 343	8 343	27 925	27 925	3.35

Figure 17. Male life expectancy by age, 1974-1978 and 1979-1981 for Rarotonga and the outer islands

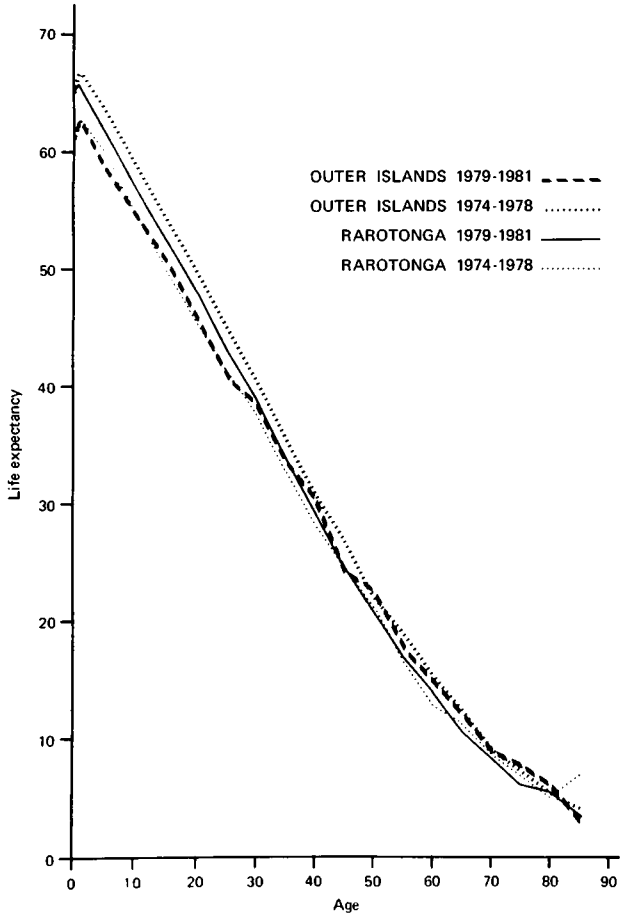
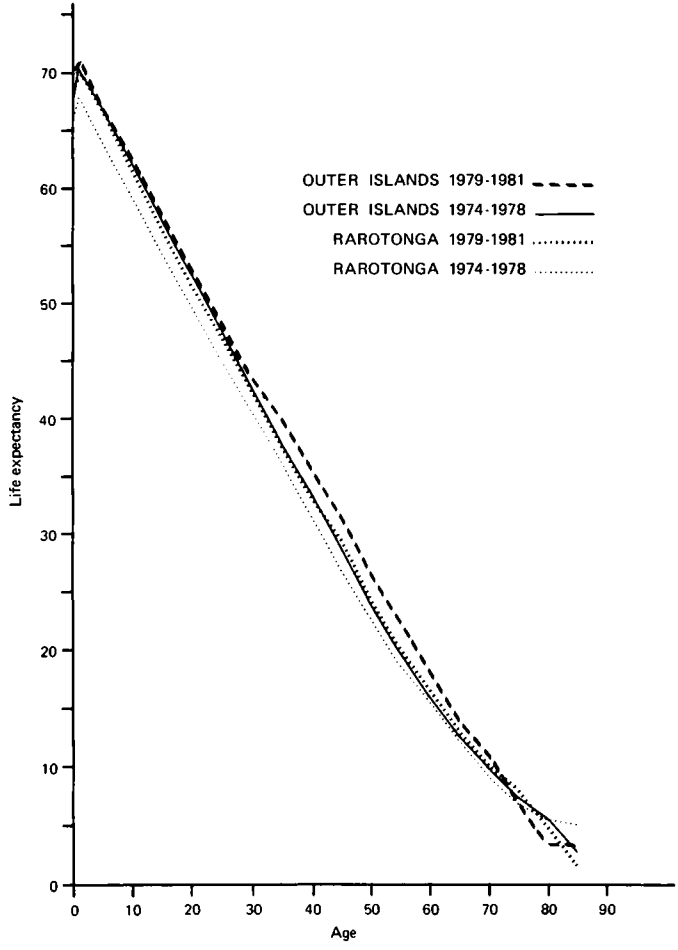


Figure 18. Female life expectancy by age, 1974-1978 and 1979-1981 for Rarotonga and the outer islands



A similar deterioration is also apparent in the female population of the northern group between 1971 and 1976, but this trend probably did not continue since the figure for the total outer islands combined rose to 70 years in 1981, higher than Rarotonga's 69 years.

In summary, the risk of death is highest, according to this measure, among outer islands males, particularly those living in the northern group, and is lowest among outer islands females whether living in the north or south. Rural (outer islands) and urban (Rarotonga) differences are small in the case of females with life expectancy at birth in the outer islands just one year above Rarotonga. For males, the difference is larger and in the other direction: Rarotonga's life expectancy at birth of 65 years is three years above the outer islands, and this is also a reversal of the situation in 1976.

Figure 17, which plots male life expectancy by age in both Rarotonga and the outer islands in 1976 and 1981, suggests that the deterioration in the mortality experience of outer islands males since 1976 has occurred primarily in the under 50 age group. Above this age the difference between these years is small. The widest gap is in the under 30 population, which suggests that causes other than degenerative diseases may be responsible.

In the case of females however, no such deterioration was apparent (figure 18), and life expectancy in the outer islands has risen at all ages except 75 and over where the sample size is very small.

F. CAUSES OF DEATH

Because there is a delay of several years before statistics pertaining to the cause of death are published, it is impossible to explain the most recent changes in mortality patterns by reference to the changing incidence of specific diseases or other causes. The latest available data show clearly that diseases of the circulatory system (particularly heart failure and cardiovascular disease) are the major cause of death in the Cook Islands, accounting for 30.7 per cent of all deaths in the 1976-1978 period (table 68).

Table 68. Principal causes of death in the Cook Islands, 1976-1978, all ages

Cause	Number	Per cent
Diseases of the circulatory system	109	30.7
Diseases of the respiratory system	61	17.2
Perinatal diseases	33	9.3
Senility and ill-defined causes	30	8.5
Other infective and parasitic diseases	30	8.5
Injuries	27	7.6
Malignant neoplasms[a]	21	5.9
Other causes	19	5.3
Other endocrine and metabolic diseases	15	4.2
Diseases of the digestive system	10	2.8
Total	355	100.0

Source: Legislative Assembly of the Cook Islands, *Reports of the Department of Health*, Legislative Assembly paper No. 7, Rarotonga, 1977-1979.

Note: [a] Excludes non-resident deaths.

As already mentioned, epidemiological studies have suggested that the "westernization" of the diet and lifestyle of Rarotongans is responsible for their high cholesterol levels, salt intake, increasing hypertension, obesity, and tendency to diabetes, and that these factors in turn explain the high incidence of circulatory problems in Rarotonga by comparison with the northern atolls.[19] Conversely, the relatively lower consumption of imported foods and the more active lifestyle of such northern atolls as Pukapuka provides protection against heart disease and other maladies of "modernization." Nevertheless, a recent follow-up study was unable to find a statistical association between high blood pressure or cholesterol levels and death in either Pukapuka or Rarotonga.[20]

Since the latter study was not based on the actual cause of death, but simply on the dead or alive status of the sample population ten years after the initial survey, the results cannot be taken as conclusive. It is instructive to note, however, that when the causes of death are broken down by region (table 69), the relatively less "westernized" outer islands have a similar incidence of circulatory problems as Rarotonga (a cause-specific death rate of 334.8 per 100,000 population compared with Rarotonga's 333.1). In so far as the proportion of all deaths in Rarotonga attributable to circulatory diseases increased between 1973-1974 and 1977-1978 from 28.1 per cent to 32.3 per cent, and the rate from 333.1 to 409.4 per 100,000, it appears that the trend is worsening. This may also be true of the outer islands, however, where the death rate from circulatory disease increased slightly during the same period.

Respiratory diseases such as pneumonia and emphysema are the second most important causes of death in the Cook Islands, followed by various perinatal causes (table 68). It is important to note that deaths from infective and parasitic diseases have fallen to low levels. In the 1950s, tuberculosis and gastroenteritis were major causes of death; these diseases have been substantially reduced by innoculation programmes and other public health measures.

Infectious diseases constitute a larger proportion of all deaths on the outer islands than in Rarotonga (table 69), as does senility, but the death rate from accidents and injuries tend to be highest in Rarotonga. Deaths from cancer appear to have increased in Rarotonga since the mid-1960s,[21] but the problems with the most recent data (see footnote to table 69) make it difficult to determine if the rate has increased through the late 1970s. Deaths from cancer do appear to be on the increase in the outer islands, however.

That infant mortality made a significant contribution of the total number of deaths in 1976-1978 can be seen from the fact that 9.3 per cent of all deaths were due to perinatal diseases and these were the third most important cause of death. Actually, this statistic understates the impact of infant mortality since some infant deaths are not attributable to perinatal causes as such, and infant mortality from all causes in the 1976-1978 period accounted for 13.8 per cent of all deaths.

Some indication of the trends in infant mortality by cause during the 1970s can be gained from table 70. There is a notable decline in the proportion of infant deaths attributable to bacterial diseases (e.g., gastroenteritis), respiratory diseases, etc., and a rather large increase in the number and proportion of infant deaths caused by perinatal factors. The decline in the importance of bacterial and respiratory diseases can be explained by improvements in general public health conditions such as water supply, sanitation, and housing, as well as various innoculation programmes; the absolute and proportional increase in deaths caused by perinatal factors cannot be explained without further details regarding the specific nature of these factors.

As mentioned, it is not yet possible to determine the reasons for the apparently increasing male death rate in the outer islands. It should be noted, however, that in the case of the northern group, about one third of the increase over the 1974-1978 period can be attributed to a jump in the number of deaths in the 5-39 age group, and that almost all of these deaths occurred on Tongareva. It is highly unlikely that degenerative diseases can account for these deaths and an increase in accidental deaths may be indicated. The other two thirds of the increase in male deaths occurred above the age of 54 and on the two larger islands of Pukapuka and Tongareva. The rising incidence of circulatory diseases in the outer islands may account for this

[19] I. A. M. Pryor and others, *op. cit.*

[20] Robert Beaglehole and others, "Death in the South Pacific", *New Zealand Medical Journal*, vol. 91, 1980.

[21] No deaths from malignant neoplasms were recorded in 1965. See P. H. Curson, *Population of the Cook Islands*, p. 65.

Table 69. Principal causes of death in Rarotonga and the outer islands, 1973-1974 and 1977-1978: percentages and death rates per 100,000 by cause

Cause of death (general category)	1973-1974				1977-1978			
	Rarotonga		Outer islands		Rarotonga		Outer islands	
	Per cent	Rate[a]	Per cent	Rate	Per cent	Rate	Per cent	Rate
Diseases of circulatory system	28.1	333.1	28.4	334.8	32.3	409.4	26.2	386.6
Diseases of repiratory system	12.5	147.2	15.6	183.6	18.9	239.6	19.0	281.2
Malignant neoplasms	14.1	165.7	3.7	43.2	7.8[b]	99.9[b]	6.3	93.7
Causes of perinatal morbidity and mortality	11.7	131.1	5.5	64.8	9.4	119.8	7.9	117.2
Accidents and injuries	7.0	82.8	0.9	10.8	8.7	109.8	6.3	93.7
Senility and ill-defined symptoms	5.5	64.4	17.4	205.2	3.9	49.9	11.1	164.0
Diseases of the nervous system	4.7	55.2	6.4	75.6	4.7	59.9	3.2	46.9
Other infectious diseases	–	–	3.7	43.2	4.7	59.9	11.1	164.0
Other endocrine and metabolic diseases	3.1	36.8	3.7	43.2	6.3	79.9	4.0	58.6
Diseases of the digestive system	2.3	27.6	0.9	10.8	2.4	30.0	3.2	46.9
Other causes	10.9	128.9	13.8	162.0	0.8	10.0	1.6	23.4
Total	100.0		100.0		100.0		100.0	
Number	128		109		127		126	

Sources: The Legislative Assembly of the Cook Islands, *Report of the Department of Health,* Legislative Assembly Paper No. 7(A), (Annual reports 1973-1974, 1977-1978).

Notes: [a] Deaths per 100,000 population

[b] The deaths of non-residents receiving treatment for cancer in Rarotonga were apparently reported with resident deaths in 1977. Thus, the 1978 figure has been used here for 1977. This may actually understate resident deaths from cancer in Rarotonga.

Table 70. Causes of infant mortality, 1971-1974 and 1975-1978

Disease group	1971-1974		1975-1978	
	Number	Per cent	Number	Per cent
Bacterial diseases	31	29.5	14	15.9
Metabolic diseases	2	1.9	1	1.1
Diseases of the nervous system	7	6.7	8	9.1
Diseases of the circulatory system	1	1.0	1	1.1
Diseases of the repiratory system	22	20.9	12	13.6
Perinatal morbidity and mortality	31	29.5	52	59.1
Other undefined causes	11	10.5	–	–
Total	105	100.0	88	100.0

Sources: The Legislative Assembly of the Cook Islands, *Report of the Department of Health,* Legislative Assembly Paper No. 7(A), (Annual reports 1971-1979).

increase, but a detailed examination of the data on a case by case basis would be required to confirm this.

G. CONCLUSION

The Cook Islands largely completed its mortality transition in the early 1960s by which time most of the serious infectious diseases which affect general mortality levels were either eliminated or brought under a large measure of control. Since then the crude death rate has dropped to an extremely low level. Nevertheless, some of this improvement can be attributed to changes in the age structure resulting from the high fertility rates of the late 1950s and the 1960s, and the mortality picture as revealed by the age-standardized death rate or life expectancy at birth leaves a much less favourable impression. An increase of only three years in male life expectancy at birth over the 20-year period 1961-1981 is hardly a spectacular performance when compared with some other developing countries, or with the seven-year improvement for Cook Islands females.

There would appear to be considerable scope for improvement in male mortality levels in the future. As already indicated, some of the increase in the male death rate in recent years may have resulted from unique circumstances rather than preventable ones; but some of the evidence reviewed in this chapter also points to an increasing incidence of diseases related to consumption patterns and general lifestyle.

As the fertility transition progresses in the Cook Islands, the population will become older. For this reason the crude death rate is more likely to increase in the coming years rather than decrease. In the longer term, the aging of the population implies that degenerative diseases will play a larger role in overall mortality than heretofore. As in all other dimensions of the Cook Islands population, however, much depends on the rate of emigration in various age groups. If emigration continues at the same level and age distribution as in the 1976-1981 intercensal period, those age groups most susceptible to degenerative diseases will tend to increase slowly during the next 15 years.

Chapter VII
POPULATION DISTRIBUTION AND INTERNAL MIGRATION

A. POPULATION DISTRIBUTION AND SOCIAL GOALS

The distribution of population within a country or region usually has important consequences for the level of economic development, the cost and supply of social services and human welfare, the relative efficiency of infrastructure investment, and the over-all productivity of the population. Among many developing countries, distribution is now seen as the major population problem, in some cases overshadowing even natural growth.[1] By 1976, a majority of the less-developed nations had adopted explicit policies designed to redistribute population in accordance with developmental goals.[2]

Nevertheless, the specification of an optimal population for a specific region, town, city – or even a nation as a whole – is extremely difficult with present knowledge. What is certain, however, is that distribution goals are intrinsically linked to other social, economic and cultural objectives. As Conroy states:

> ...the optimal location of the population to pursue the collective goals of the individual members of that population cannot be considered in isolation. It must be related to, or derived from, the full interplay of social goals, technical possibilities, and the forms of institutional organization which have been developed to mediate the tension between possibilities and goals.[3]

Among the concrete objectives to which a distribution policy might be linked are the following: (a) economic growth; (b) equitable levels of living, income and welfare; (c) full and efficient utilization of natural resources; (d) integration of all the components of the population into national life and urban culture; (e) the maintenance of a specific ecological system; (f) administrative efficiency.[4]

It is apparent that what is optimum in the light of one of these objectives, or any sub-set of them, may not necessarily be optimum with respect to others. For example:

> ...if there are agglomeration economies in production, the optimal degree of population concentration would be greater under profit maximization than, say, under income equalization.[5]

Insofar as economic growth is concerned, the fundamental starting point in relation to population distribution is the almost inevitable circumstance that productive resources are unevenly distributed in space. In its spatial aspect, economic-demographic theory is concerned with the manner in which the factors of production (primarily physical capital and human resources) become concentrated in certain locations and the consequences of this concentration. For example, under what conditions does (or should) capital "migrate" to a supply of labour and vice versa?[6]

These issues are relevant and important in the Cook Islands case. But they are complicated by the fact that the Cook Islands are closely integrated with the economy, population and social system of New Zealand. To a much greater degree than in most developing countries, including

[1] George J. Demko and Roland J. Fuchs, "introduction", *Population Distribution Policies in Development Planning*, United Nations, Department of International Economic and Social Affairs, Population Studies No. 75 (New York, United Nations, 1981), p. 1.

[2] Demko and Fuchs note that "... as of 1976, nearly 80 per cent of governments had adopted policies to alter migration trends, 69 per cent had policies to bring about an adjustment of rural population configuration... and 46 per cent had policies to adjust urban configurations, either alone or together with rural configurations." *Ibid.*, p.2.

[3] M. E. Conroy, "The role of large cities in third world development: a putative reappraisal", quoted in Harry W. Richardson, "Defining urban population distribution goals in development planning", in George W. Demko and Roland J. Fuchs, *op. cit.*, p. 7.

[4] Harry W. Richardson, *Ibid.*, pp. 7-18. Akin Mabogunjie, "Objectives and rationales for regional population redistribution in developing countries", in George W. Demko and Roland J. Fuchs, *op. cit.*, pp. 19-29.

[5] Harry W. Richardson, *op. cit.*, p. 8.

[6] Samir Amin, *Modern Migration in West Africa* (London, Oxford University Press, 1974), pp. 85-104.

neighbouring Pacific ones, the relative internal distribution of the Cook Islands population is determined as much by differential emigration as by internal movement or by regional variations in the rate of natural growth.

Thus, the issue of internal distribution in the Cook Islands cannot be separated from the broader question of external migration to New Zealand and its many consequences.

The necessary assumption of this chapter, then, is that public policy with respect to distribution is concerned primarily with the present residential collectivity of the Cook Islands, not the total population of Cook Islanders. More abstractly, it is assumed that population distribution should reflect cultural as well as economic goals; that is, that the maintenance and welfare of each island community has higher priority, *ceteris paribus,* than the maximization of individual cash income insofar as the latter might imply the acceleration of emigration and the eventual demise of community life in its present form.

There are three general distribution issues which arise in the Cook Islands' case: (a) the distribution of population among individual islands; (b) the distribution among the three broad regions (Rarotonga, the southern and northern outer islands); (c) the distribution within islands and in particular the process of "urban" concentration in the Avarua area of Rarotonga. The role of emigration in effecting change in each of these areas will be discussed here as well as in chapter VIII.

B. DISTRIBUTION BY ISLAND

Throughout this century, the general trend has been for Rarotonga to increase its proportion of the population at the expense of all other islands. It should be recalled, however, that

Table 71. Percentage population distribution by island, 1936-1981

	1936	1945	1951	1956	1961	1966	1971	1976	1981
Rarotonga	41.2	39.6	40.1	43.2	47.2	51.8	53.8	54.1	53.6
Aitutaki	14.0	16.7	15.9	15.4	14.0	13.4	13.4	13.4	13.3
Atiu	8.9	7.9	8.4	7.8	6.9	6.9	6.8	7.2	6.9
Mangaia	11.9	13.1	12.1	11.8	10.2	10.4	9.8	8.4	7.7
Manuae	0.1	0.2	0.1	0.2	0.1	0.1	–	–	0.1
Mauke	5.3	5.7	5.5	4.9	4.2	3.5	3.6	3.9	3.9
Mitiaro	2.2	1.6	2.0	1.6	1.7	1.5	1.6	1.7	1.4
Total southern outer islands	42.4	45.3	44.1	41.8	37.2	35.8	35.1	34.6	33.2
Manihiki	4.0	3.1	5.4	4.0	5.5	3.0	2.1	1.5	2.3
Nassau	0.1	–	0.8	0.5	0.6	0.9	0.8	0.7	0.8
Palmerston	0.7	0.5	0.6	0.5	0.5	0.4	0.3	0.3	0.3
Pukapuka	5.3	4.7	3.7	3.8	3.9	3.6	3.4	4.3	4.5
Rakahanga	2.4	2.3	1.7	2.0	1.7	1.7	1.6	1.6	1.5
Tongareva	3.8	4.6	3.5	3.7	3.4	2.8	2.9	2.9	3.4
Total northern outer islands[a]	16.4	15.2	15.7	15.0	15.6	12.4	11.0	11.2	12.8
Total outer islands	58.8	60.4	59.9	56.8	52.8	48.2	46.2	45.9	46.4
Total Cook Islands	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Table 7.

Note: [a] Includes Suwarrow.

Rarotonga's population had been seriously reduced by epidemics in the nineteenth century, and much of its twentieth century growth can be seen as a restoration of its precontact dominance. Nevertheless, the process of concentration has continued well beyond the point of recovery, and as table 71 shows, Rarotonga has gained proportionately at each census count since 1936, with the single exception of the 1976-1981 period, while the share of virtually every other island has declined. Distinctive among the latter are Manihiki in the northern group and Mangaia in the south. In 1936, Mangaia contained almost 12 per cent of the total population, but by 1981 its share had dropped to just under 8 per cent. Manihiki was 4 per cent of the total in 1936 and dropped to just 1.5 per cent in 1976; but return migration between 1976 and 1981 has raised its proportion to 2.3 per cent. Most other islands have remained relatively stable in proportional terms, although the long-term trend is one of moderate decline in such islands as Atiu, Mauke and Mitiaro (Nga pu toru) in the south and Rakahanga in the north. Pukapuka and Nassau are a special case since there is regular movement between them. When the two populations are combined, their collective share of the total population has remained unchanged since 1936.

When distribution within regions is considered, it is apparent that Mangaia and Manihiki have declined proportionately within their respective regions while Aitutaki in the south, Pukapuka/Nassau and Tongareva in the north have increased (table 72). In 1981, Pukapukans (including those living on Nassau) constituted 41.4 per cent of the northern group's population compared with 33.3 per cent in 1936.

Table 72. Percentage distribution of the population within regions, 1936-1981

	1936	1945	1956	1961	1966	1971	1976	1981
Southern outer islands								
Aitutaki	33.1	37.0	36.2	37.8	37.4	38.1	38.7	39.9
Atiu	20.9	17.5	18.8	18.5	19.3	19.4	20.9	20.8
Mangaia	28.1	28.9	28.3	27.5	29.0	27.8	24.4	23.2
Manuae	0.2	0.4	0.5	0.3	0.2	–	–	0.2
Mauke	12.6	12.6	11.7	11.5	9.7	10.2	11.3	11.6
Mitiaro	5.1	3.6	3.9	4.5	4.3	4.4	4.9	4.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Northern outer islands								
Manihiki	24.2	20.3	26.4	35.1	24.4	19.2	13.0	17.9
Palmerston	4.5	3.0	3.0	3.0	3.6	2.6	2.7	2.3
Pukapuka	32.4	30.9	25.5	25.1	28.6	31.0	38.4	35.2
Rakahanga	14.4	14.5	13.6	11.1	13.5	14.4	13.8	11.9
Tongareva	23.2	30.5	24.7	21.9	22.8	26.0	26.0	26.9
Nassau	0.9	–	0.9	3.8	6.9	6.7	6.0	5.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Table 7.

And the concentration of the northern group's population on the two atolls of Pukapuka and Tongareva has continued throughout this period: in 1981, 62.1 per cent of the northern group's population were living on these two atolls compared with 55.6 per cent in 1936. This concentration reached a peak in 1976 when 64.4 per cent of the northern group were enumerated on Pukapuka and Tongareva, but return migration to Manihiki in recent years, and the continuation of emigration from both Pukapuka and Tongareva, has reduced the relative concentration on the latter atolls.

C. DISTRIBUTION BY REGION

Rarotonga's proportional increase has necessarily been accompanied by proportional decreases in the populations of the outer islands. Since the late 1930s, the southern outer islands has declined from 42.4 per cent of the Cook Islands total to 33.2 per cent (table 71). Until 1961, the northern group's share of the total population showed only minor changes; since then, however, there has been a moderate decline with 1971 representing the low-point and 1981 showing an increase. The latter is attributable to the virtual cessation of net emigration from the northern group during the 1976-1981 intercensal period accompanied by continued emigration from Rarotonga and the southern outer islands.

D. DISTRIBUTION WITHIN ISLANDS

The smallest unit into which the Cook Islands population can be divided is the census district of which there were 39 in 1971 and 42 in 1981. Some islands have such small populations that they comprise only one census district (Palmerston, Nassau and Manuae). In 1981, census districts ranged in population from 12 on Manuae island (a work-party from Aitutaki) to 1,486 in Muri Enua Arorangi on Rarotonga. On some islands a census district may reasonably coincide with a "village" grouping (for example, on Pukapuka, Mangaia and Atiu), while on others the census district represents one or more traditional land divisions (known on Rarotonga as *tapere*) occupied by a residential group, usually a minor lineage. On Rarotonga some of these combinations of *tapere* reflect the location of mission stations established in the nineteenth century rather than meaningful statistical or social categories. For example, the tribal district of Takitumu contains the census districts of Matavera, Ngatangiia and Titikaveka–locations of early missionary churches. Until the 1981 census, Arorangi was treated as one census district even though it is similar in area to Takitumu which contained three census districts. This is most likely due to the fact that Arorangi was sparsely populated during the missionary era and therefore warranted only one mission station. In 1981, however, Arorangi has been divided into two census districts somewhat more comparable with those of Takitumu.

As table 73 indicates, there is considerable variation in the direction and magnitude of change by census district. On Aitutaki, for example, Amuri-Araunga increased by 76.8 per cent between 1976 and 1981, while Arutanga-Taravao declined by 33.3 per cent. While five of Mangaia's six census districts lost population in this period, one (Te Makatea) shows an increase of 65.1 per cent.

E. DISTRIBUTION IN RAROTONGA

The concentration of population in the Avarua area of Rarotonga dates from the early missionary period. It was in the area adjacent to the Avarua harbour that the first mission station was established and attempts were made to bring converted Christians from all parts of the islands to live in one settlement.[7] This arrangement proved politically unworkable, but Avarua became the centre of trading activities with the whaling fleet and eventually the administrative and commercial centre of the entire Cook Islands.

The "town" of Avarua consists of five adjacent census districts (table 74) spreading from Avatiu harbour eastward to the Pue-Kiikii area. The central business district is more narrowly concentrated along the main roadway from Tupapa to Avatiu, ranging inland only a distance of a few hundred yards.

The process of "urbanization" is implied not only in the growth of Avarua township in both relative and absolute terms, but also in the growing concentration of the population on Rarotonga as a whole.[8] The two processes have existed side by

[7] John Williams, *A Narrative of Missionary Enterprise in the South Seas* (London, John Snow, 1837).

[8] As Walsh has suggested, the whole island of Rarotonga can be treated as an "urban" area relative to the rest of the Cook Islands. A. C. Walsh, *Migration, Urbanization and Development in South Pacific Countries*, Comparative Study on Migration, Urbanization and Development in the ESCAP Region, Country Report No.VI, pp. 127-147.

Table 73. Cook Islands population change by census district, 1971-1981

	1971	1976	1981	Change			
				1971-1976		1976-1981	
				Number	Per cent	Number	Per cent
Rarotonga	11 478	9 802	9 530	−1 676	−14.6	−272	−2.8
Pue-Matavera	709	736	610	27	3.8	−126	−17.1
Tupapa-Maraerenga	950	764	802	−186	−19.6	38	5.0
Takuvaine-Parekura	1 127	866	805	−261	−23.2	−61	−7.0
Tutakimoa-Teotue	787	698	552	−89	−11.3	−146	−20.9
Avatiu-Rvatonga	1 947	1 469	895	−478	−24.6	−574	−39.0
Total "urban" Rarotonga	5 520	4 533	3 664	−987	−18.0	−869	−19.2
Nikao	916	801	1 111	−115	−12.5	310	38.7
Arorangi (total)	2 484	2 244	2 552	−240	−9.7	308	13.7
Ruau Arorangi	...	...	1 066	...	...	...	...
Muri enua Arorangi	...	...	1 486	...	...	...	...
Titikaveka	1 125	1 058	1 030	−67	−6.0	−28	−2.6
Ngatangiia-Muri	777	649	629	−128	−16.5	−20	−3.1
Matavera	656	517	544	−139	−21.2	27	5.2
Total "suburban" Rarotonga	5 958	5 269	866	−689	−11.6	597	11.3
Aitutaki	2 855	2 423	2 335	−432	−15.1	−88	−3.6
Amuri-Araunga	505	413	730	−92	−18.2	317	76.8
Arutanga-Turavao	1 341	1 067	712	−274	−20.4	−355	−33.3
Vaipae-Avanui	675	641	601	−34	−5.0	−40	−6.2
Tautu	334	302	292	−32	−9.6	−10	−3.3
Mangaia	2 081	1 530	1 364	−551	−26.5	−166	−10.8
Tavaenga	626	410	260	−216	−34.5	−150	−36.6
Kavmata	175	133	86	−42	−24.0	−47	−35.3
Te Makatea	329	250	418	−79	−24.0	168	65.1
Tamarua	391	268	231	−123	−31.5	−37	−13.8
Ivirua	346	290	231	−56	−16.2	−59	−20.3
Karanga	214	179	138	−35	−16.4	41	−22.9
Atiu	1 455	1 312	1 225	−143	- 9.8	87	- 6.6
Mapumai	171	161	177	−10	−5.8	16	9.9
Areora	397	366	363	−31	−7.8	−3	−0.8
Tengatangi	276	278	233	2	0.7	−45	−16.2
Ngatiarua	174	110	98	−64	−36.8	−12	−10.9
Teenui	437	397	354	−40	−9.5	−43	−10.8

Table 73. *(Continued)*

	1971	1976	1981	Change			
				1971-1976		1976-1981	
				Number	Per cent	Number	Per cent
Mauke	763	711	681	−52	6.8	−30	−4.2
Kimiangatau	368	425	320	102	31.6	−105	−24.7
Areora-Makatea	...	...	189	...	...	...	...
Ngatiarvua	...	...	172	...	...	...	...
Oiretumu	395	286	361	−62	−17.8	75	26.2
Mitiaro	331	305	256	−26	−7.9	−49	−16.0
Takua-Mangarei	...	...	103	...	...	...	...
Atai-Auta	...	...	153	...	...	...	...
Manuae	2	–	12	−2	−100.0	12	–
Manihiki	452	266	405	−186	−41.2	139	52.3
Tauhunu	289	151	265	−138	−47.8	114	75.5
Tukao	163	115	140	−48	−29.4	25	21.7
Palmerston	62	56	51	−6	−9.7	−5	−8.9
Pukapuka	732	785	796	53	7.2	11	1.4
Ngake	206	219	250	13	6.3	31	14.1
Roto	276	274	266	−2	−0.7	−8	−2.9
Yato	250	292	280	42	16.8	−12	−4.1
Nassau	160	123	134	−37	−23.1	11	8.9
Rakahanga	339	283	269	−56	−16.5	−14	−4.9
Tongareva	612	531	608	−81	−13.2	77	14.5
Te Tautua	168	185	192	17	10.1	7	3.8
Omoka	444	346	416	−98	−22.0	70	20.2
Cook Islands	21 322	18 127	17 754	−3 195	−15.0	−373	−2.1

Source: Cook Islands Population Censuses, 1976, 1981.

Table 74. Population of Rarotonga by census district and sex, 1976-1981

	1976		1981		Change 1976-1981			
					Males		Females	
	Males	Females	Males	Females	Number	Per cent	Number	Per cent
Pue-Matavera	376	360	318	292	−58	−15.4	−68	−18.9
Tupapa-Maraerenga	402	362	440	362	38	9.5	–	–
Takuvaine-Parekura	446	420	408	397	−38	−8.5	−23	−5.4
Tutakimoa-Teotue	341	357	298	254	−43	−12.6	−103	−28.9
Avatiu-Ruatonga	773	696	457	438	−316	−40.9	−258	−37.1
Total "urban"	2 338	2 195	1 921	1 743	−417	−17.8	−452	−20.6
Nikao-Panama	399	402	543	568	144	36.1	166	41.3
Ruau Arorangi Muri enua Arorangi	1 198	1 046	1 346	1 206	148	12.4	160	15.3
Titikaveka	533	525	506	524	−27	−5.1	−1	−0.2
Ngatangiia-Muri	358	291	341	288	−17	−4.7	−3	−1.0
Matavera	254	263	276	268	22	8.7	5	1.9
Total "suburban"	2 742	2 527	3 012	2 854	270	9.8	327	12.9
Total Rarotonga	5 080	4 722	4 933	4 597	−147	−2.9	−125	−2.6

Source: Cook Islands Population Censuses, 1976 and *1981.*

side, but neither has been continuous. Table 75 shows that Avarua's growth rate has fluctuated more erratically since Second World War than has Rarotonga's, but both show a similar trend of growth up to 1971 followed by a rapid decline to 1976 and a slower decline from 1976 to 1981.

Avarua's importance in Rarotonga appears to have peaked in 1966 when it comprised 51.7 per cent of the island's population and almost 27 per cent of the total Cook Islands population was resident there. In 1981 these figures were 38.4 and 20.6 per cent respectively. While the concentration of population in Avarua has declined since 1966, the present proportions indicate a high degree of urban "primacy" in the Cook Islands; that is, an excessive concentration of the nation's urban population into one city or town.[9]

At the peak of this concentration from 1966 to 1971, a number of problems often associated with rapid urbanization were apparent in Avarua: makeshift housing constructed from scrap materials and located on land to which occupants had no formal title; poor water and sanitation, inadequate income of squatters leading to malnutrition and petty crime.[10] By 1981, however, Avarua's population had dropped by 1856 (33.6 per cent) and there is little doubt that this has relieved the pressure on housing and other facilities in the town.

As table 74 showed, the largest drop in population within the Avarua area occurred in the Avatiu-Ruatonga census district which declined by 54.0 per cent during the 1971-1981 decade. Indeed, 57.0 per cent of the decline in Avarua's population is accounted for by Avatiu-Ruatonga with the remainder spread over the four

[9] The "primacy" of Avarua is comparable to that of Bangkok in relation to the rest of Thailand or Soeul in relation to South Korea. See Harry W. Richardson, *op. cit.*, p. 9.

[10] Peter H. Curson, "Avarua Cook Islands", *South Pacific Bulletin*, vol. 18, 1968, pp. 41-45.

Table 75. Growth of Avarua town area of Rarotonga, 1945-1981

Avarua census districts[c]	1945	1956	1961	1966	1971	1976	1981
Maraerenga-Tupapa	519	664	835	985	950	764	802
Pue-Matavera	194[a]	436	536	723	709	736	610
Takuvaine-Parekura	624	751	925	1 184	1 127	866	805
Tutakimoa-Ruatonga[b]	452	1 042	1 133	...	...	...	...
Tutakimoa-Teotue	(245)	...	...	763	787	698	552
Avatiu-Ruatonga	(515)	...	...	1 499	1 947	1 469	895
Avatiu[b]	270	427	573	...	...	...	...
Total	2 059	3 320	4 002	5 154	5 520	4 533	3 664
Increase from previous census		1 315	682	1 152	366	-987	-869
Percentage increase (average annual)		5.8	4.1	5.7	1.4	-3.6	-3.8
Percentage increase in "rural" Rarotonga		0.8	4.0	0.6	4.7	-2.3	2.3
Percentage increase in total Rarotonga		3.8	4.1	3.0	3.0	-2.9	-0.7
Avarua as per cent of total Rarotonga	36.9	46.0	46.1	51.7	48.1	46.2	38.4
Avarua as per cent of Cook Islands	14.6	19.9	21.8	26.8	25.9	25.0	20.6

Sources: Cook Islands Population Censuses, 1945-1981.

Notes: [a] This figure may be understated since census boundaries do not match exactly with later ones.

[b] Note change of census district after 1945.

[c] Census districts usually consist of two or more adjacent traditional land divisions *(tapere)* hence the hyphenated names.

other districts. The only census district to show any appreciable increase in population during the 1971-1981 decade is Nikao-Panama. Since this is the area in which residences of expatriate seconded personnel are located, either this group has increased in size or these residences are being occupied by internal migrants from other parts of the island.

The large census districts which make up the Arorangi tribal district (Ruau Arorangi and Muri Enua Arorangi) appear to have maintained their numbers since 1971; however, it should be borne in mind that a number of hotels and motels are located here and while few visitors would have been included in the 1971 census, 178 persons enumerated in 1981 in Arorangi were non-residents, and these comprised 41.2 per cent of all non-residents in Rarotonga.[11]

[11] *Cook Islands Census of Population and Dwellings, 1981*, CPD3-82.

F. DETERMINANTS OF INTERNAL DISTRIBUTION

The relative distribution of population is a function of regional differences in the rate of births, deaths and net migration. But it is difficult to document these variations in detail since the necessary historical details are not readily available.

Rarotonga's growth patterns are better known than those of the other regions, but even here there are limitations in the degree to which indirect estimates can reveal the exact contribution of each component of change. Although Rarotonga's share of the total population has increased from 47.2 per cent in 1961 to 53.6 per cent in 1981, the island has experienced a net migration loss during the same period (table 76). This implies that Rarotonga's proportional increase during the past twenty years is in part the result of high levels of direct emigration from the outer islands which has produced declining absolute numbers there.

Table 76. Estimated net migration in Rarotonga, 1902-1981

Period	Natural increase	Actual increase	Net migration	Average annual migration	Average crude rate (per cent)
1902-1906	−2	381	+383	+77	34.2
1906-1911	14	318	+304	+61	23.5
1911-1916	198	305	+107	+21	7.2
1916-1921	236	439	+203	+41	12.5
1921-1926	295	433	+138	+28	7.5
1926-1936	914	1 118	+204	+20	4.4
1936-1945	1 014	519	−495	−55	−10.4
1945-1951	578	475	−103	−21	−3.6
1951-1956	733	1 164	+431	+86	−13.0
1956-1961	1 441	1 464	+23	+5	−0.6
1961-1966	1 740	1 295	−445	−89	−9.5
1966-1971	1 913	1 507	−406	−81	−7.6
1971-1976	1 312	−1 676	−2 988	−598	−56.2
1976-1981	1 013	−325	−1 338	−268	−27.8

Source: P.H. Curson, *The population of the Cook Islands*, p. 19 (1902-1966). 1966-1981 from Population Censuses and Vital Statistics Register.

The extent of lifetime in-migration from the outer islands is illustrated by the place of birth method in table 77. The proportion of Rarotonga's population which was born in the outer islands has ranged throughout this century from a low 21.9 per cent in 1945 to a high of 33.0 per cent in 1961. For in-migrants born in the southern outer islands, the peak year was 1961 when they comprised 26.6 per cent of Rarotonga's population. For northern group in-migrants, the peak year was 1966 when they made up 9.5 per cent of Rarotonga's total. These data suggest a definite slow-down in the extent of in-migration to Rarotonga from the outer islands since the mid-1960s. This decrease in in-migration does not appear to be concentrated in any one island of origin, but the proportion of Mangaia-born in Rarotonga's population has declined to a greater extent than that of any other group. Manihikians were the only group to be increasing in Rarotonga between 1971 and 1976, but their representation most likely dropped in 1981 because of return migration or onward emigration to New Zealand.[12] Although 1981 data were unavailable at the time of writing, it is unlikely – given the further decline of Rarotonga's population – that in-migration has increased since 1976.

On the other hand, there was a 63.5 per cent increase in the number of foreign-born in Rarotonga during the 1976-1981 period (table 78). Of the total additional foreign-born (504), 82 per cent were born in New Zealand and 59 per cent were male. Since there has been no increase in the non-Maori population during the period, the indication is that these are Cook Islands Maori, presumably the New Zealand-born children of return migrants.

Migration from Rarotonga to the outer islands plays a relatively small role in the internal

[12] The presence in Rarotonga of a *tere* party (entertainment group) from Manihiki on the day of the 1976 census no doubt inflated the number of actual residents.

Table 77. Rarotonga's population composition by birthplace, 1906-1976

(per cent)

Place of birth	1906	1911	1916	1921	1926	1936	1945	1951	1956	1961	1966	1971	1976
Rarotonga	64.6	62.7	56.3	59.1	62.6	66.5	71.8	68.5	63.9	60.5	60.3	59.6	60.8
Aitutaki	3.3	3.3	3.1	4.1	4.5	4.8	4.0	6.0	6.2	6.8	5.7	5.3	4.7
Atiu	2.7	3.2	4.8	3.7	3.2	3.1	2.8	3.1	4.5	5.9	5.5	5.2	4.2
Mangaia	12.3	11.1	14.0	11.7	10.9	8.0	6.0	6.2	6.6	8.4	6.0	5.4	4.5
Manuae	–	–	–	–	–	0.1	0.2	0.1	0.2	0.3	0.2	0.1	0.1
Mauke	1.1	0.6	1.1	1.5	1.6	1.6	1.7	2.3	3.1	3.4	3.2	2.6	2.7
Mitiaro	0.6	0.4	0.4	0.5	1.1	1.0	1.3	1.4	2.1	1.8	1.7	1.8	1.7
Southern outer islands	20.0	18.6	23.4	21.5	21.3	18.6	16.0	19.1	22.7	26.6	22.3	20.4	17.9
Manihiki	1.0	2.1	1.8	1.8	2.7	2.1	2.3	1.8	1.7	1.7	3.1	3.3	3.4
Palmerston	–	0.2	0.2	0.3	0.3	0.8	0.9	0.8	0.8	0.7	0.7	0.6	0.5
Pukapuka/Nassau	0.5	0.5	1.6	0.5	0.8	0.4	1.2	1.3	1.0	0.9	1.5	1.3	1.1
Rakahanga	0.6	0.4	0.2	0.3	0.1	0.7	0.9	0.9	1.0	1.5	1.8	1.7	1.4
Tongareva	0.3	1.8	0.5	0.8	0.8	1.0	0.6	0.6	1.2	1.6	2.4	2.0	1.8
Northern outer islands	2.4	5.0	4.3	3.7	4.7	5.0	5.9	5.4	5.7	6.4	9.5	8.9	8.2
Total outer islands	22.4	23.6	27.7	25.2	26.0	23.6	21.9	24.5	28.4	33.0	31.8	29.3	26.1
Cook Islands	87.0	86.3	84.0	84.3	88.6	90.1	93.7	93.0	94.0	93.5	92.1	88.9	86.9
French Polynesia	5.5	6.7	7.2	7.7	4.9	4.5	3.0	1.6	1.7	1.3	1.0	0.7	1.1
Other Pacific[a]	...	...	...	...	...	...	...	...	0.8	0.8	0.7	0.9	0.8
Metropolitan	4.4	5.0	5.3	5.7	4.8	4.3	3.3	4.1	3.5	4.4	5.9	8.4	11.0
Other	3.1	2.0	3.5	2.3	1.7	1.1	–	1.3	–	–	0.2	2.7	0.2
Non Cook Islands	13.0	13.7	16.0	15.7	11.4	9.9	6.3	7.0	6.0	6.5	7.8	12.7	13.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	2 441	2 759	3 064	3 503	3 936	5 054	5 573	6 048	7 212	8 676	9 971	11 478	9 802

Source: 1906-1951: P.H. Curson, *The Population of the Cook Islands; 1956-1976: Cook Islands Population Censuses, 1961-1976.*

[a] Included in "other," 1906-1951.

Table 78. Rarotonga's population by place of birth, 1966-1976

Birthplace	1966			1971			1976			Change 1966-1976					
										Number			Per cent		
	Males	Females	Total	Males	Females	Total	Males	Females	Total	Males	Females	Total	Males	Females	Total
Southern outer islands	1 030	1 095	2 125	1 181	1 155	2 336	935	805	1 740	−95	−290	−385	−9.2	−26.5	−18.1
Northern outer islands	465	477	942	522	491	1 013	417	385	802	−48	−92	−140	−10.3	−19.3	−14.9
Total outer islands	1 495	1 572	3 067	1 703	1 646	3 349	1 352	1 190	2 542	−143	−382	−525	−9.6	−24.3	−17.1
Rarotonga	2 997	3 013	6 010	3 469	3 374	6 843	2 975	2 986	5 961	−22	−27	−49	−0.7	−0.9	−0.8
Total Cook Islands	4 492	4 585	9 077	5 172	5 020	10 192	4 327	4 176	8 503	−165	−409	−574	−3.7	−8.9	−6.3
New Zealand	269	218	487	462	342	804	496	403	899	227	185	412	84.4	84.9	85.6
Elsewhere	186	121	307	283	199	482	256	143	399	70	22	92	37.6	18.2	30.0
Total foreign-born	455	339	794	745	541	1 286	752	546	1 298	297	207	504	65.3	61.1	63.5
Total population	5 047	4 924	9 971	5 971	5 561	11 478	5 080	4 722	9 802	33	−202	−169	0.7	−4.1	−1.7

Source: Cook Islands Population Censuses, 1966-1976.

Table 79. Internal lifetime migration in the Cook Islands, 1976

Place of birth	Place of Residence														Total Cook Islands
	Rarotonga	Southern outer islands						Northern outer islands							
		Aitutaki	Atiu	Mangaia	Mauke	Mitiaro	Total	Manihiki	Nassau	Palmerston	Pukapuka	Rakahanga	Tongareva	Total	
Rarotonga	5 961	2 58	150	145	94	43	690	41	9	8	66	35	34	193	6 844
Aitutaki	453	1 834	21	9	2	–	1 866	5	–	–	11	4	7	27	2 349
Atiu	408	33	1 076	9	31	6	1 155	5	–	1	2	1	3	12	1 565
Mangaia	438	41	17	1 263	8	7	1 336	3	–	1	4	1	–	9	1 783
Mauke	265	14	8	11	534	2	569	2	–	–	5	2	2	11	845
Mitiaro	164	4	7	–	16	244	271	–	3	–	–	1	–	4	439
Southern outer islands	1 737	1 926	1 129	1 292	591	259	5 197	15	3	3	22	9	12	63	6 997
Manihiki	335	30	5	3	5	1	44	189	1	–	–	13	13	216	595
Nassau	6	–	–	–	1	–	1	–	34	–	27	1	–	62	69
Palmerston	45	1	–	1	–	–	2	3	–	41	–	1	12	57	104
Pukapuka	98	8	–	5	–	–	1	2	76	–	659	3	2	742	841
Rakahanga	139	12	–	2	–	1	14	6	–	–	–	215	3	224	377
Tongareva	178	14	–	8	–	–	22	2	–	–	–	–	433	435	635
Northern outer islands	801	65	5	19	6	2	97	202	111	41	686	233	463	1 736	2 634
Total outer islands	2 538	1 991	1 134	1 311	597	261	5 294	217	114	43	708	242	475	1 799	9 631
Total Cook Islands born	8 504	2 254	1 284	1 456	681	304	5 979	258	123	52	774	276	512	1 995	16 478
Total population	9 802	2 423	1 312	1 530	711	305	6 281	266	123	56	785	283	531	2 046	18 128

Source: Cook Islands Census of Population and Dwellings, 1976, pp. 104-105.

distribution of population, but movement between outer islands is even less significant (table 79). There is some movement from Manihiki and Mangaia to Aitutaki and from Atiu to Mauke. Some movement from Manihiki and Mangaia to Aitutaki and from Atiu to Mauke is indicated in the census data, but little "lifetime" migration between other outer islands is evident. Since Nassau is essentially a satellite of Pukapuka there is constant reciprocal movement between the two, and although census data do not show it, a certain amount of circulation also takes place between Manihiki and Rakahanga.

In 1976, 11.0 per cent of the southern and 9.4 per cent of the northern outer islands' population was born on Rarotonga. In proportion to their 1976 numbers, Manihiki and Rakahanga in the north and Mauke and Mitiaro in the south had the most Rarotonga-born, but the largest absolute numbers were on Aitutaki and Pukapuka. Some of this movement reflects the return migration of parents who had children while temporarily in Rarotonga. Another category of movers would be government staff (teachers and administrators) and church ministers.

Table 80 suggests that the movement of Rarotongans to the outer islands has been small relative to the reverse. Only Pukapuka, Atiu and Aitutaki had an appreciable in-flow—mostly males—while Mangaia and Manihiki had a net loss.

It would appear that the smaller outer islands have the highest rates of internal mobility. In 1976, only 31.8 per cent of the Manihikian-born population were enumerated on their home island compared with 86.3 per cent for Pukapukans and 87.1 for Rarotongans (table 81). These data also suggest that the internal mobility

Table 80. Internal migration between outer islands and Rarotonga, 1966-1976

Island/region	Outer-islands born in Rarotonga[a]			Rarotonga born in outer-islands[b]		
	Males	Females	Total	Males	Females	Total
Aitutaki	−35	−35	−70	+29	+7	+36
Mangaia	−29	−92	−121	–	−12	−12
Atiu	−34	−68	−102	+21	+14	+35
Mauke	−3	−31	−34	–	+6	+6
Mitiaro	−5	+12	+7	+2	+8	+10
Southern outer islands	−106	−214	−320	+52	+23	+75
Palmerston	−5	−17	−22	−3	−3	−6
Pukapuka/Nassau	−14	−21	−35	+17	+10	+27
Manihiki	+38	+10	+48	−20	−11	−31
Rakahanga	−15	−11	−26	+5	−4	+1
Tongareva	−16	−25	−41	+7	+5	+12
Northern outer islands	−12	−64	−76	+6	−3	+3
Total outer islands	−118	−278	−396	+58	+20	+78

Source: *Cook Islands Population Census, 1966*, p. 25; *Cook Islands Census of Population and Housing, 1976*, p. 104.

Notes: [a] Adjusted for mortality.

[b] No adjustment for mortality.

Table 81. Percentage of the population enumerated in their home island or region by island, 1956-1976

	1956	1961	1966	1971	1976
Rarotonga	86.9	86.4	88.0	86.6	87.1
Aitutaki	78.2	73.8	75.5	75.9	78.0
Atiu	72.2	64.1	63.5	62.4	68.8
Mangaia	75.7	66.3	71.7	70.8	70.8
Mauke	71.1	62.7	56.8	60.9	63.2
Mitiaro	52.4	54.9	51.6	51.0	55.9
Southern outer islands[a]	...	71.1	72.0	72.2	74.3
Palmerston	44.5	43.7	41.0	31.5	40.4
Pukapuka/Nassau	...	84.7	79.2	79.9	86.3
Manihiki	63.6	70.0	49.3	39.8	31.8
Rakahanga	62.1	50.0	48.5	48.0	56.9
Tongareva	72.5	63.5	59.6	64.2	68.2
Northern outer islands[b]	...	77.7	65.0	63.5	65.9

Sources: Cook Islands Censuses, 1956-1976.

Notes: [a] Proportion of southern outer islands born enumerated in the southern outer islands, not necessarily on their natal island.

[b] Proportion of northern outer islands born enumerated in the northern group, not necessarily on their natal island.

of southern outer islanders has been relatively stable since the 1950s whereas northern outer islanders have tended to become more mobile through time.

G. INTERNAL DISTRIBUTION AND POPULATION STRUCTURE

The age-selectivity of emigration and out-migration from the outer islands has produced unfavourable age structures by comparison with Rarotonga. This is apparent in the extremely high dependency ratios of the outer islands which were discussed in chapter IV, and can also be seen in the uneven regional distribution of the dependent and "working-age" (15-64) populations. While the proportion of the total population concentrated in Rarotonga has been increasing steadily since the 1950s, the concentration of the "working-age" population is even greater; conversely, the "dependent" population has become more highly concentrated in the outer islands. In 1981, the southern outer islands had 33.2 per cent of the total population but 37.1 per cent of the under 15 age group and 37.3 per cent of the 65 and over (table 82). The northern group's share of the 0-14 age group is approximately proportional to its total population, but its share of the 65 and over group is disproportionately high.

Conversely, Rarotonga, with 53.6 per cent of the total population in 1981 had 58.6 per cent of the "working age" population and only 44.3 per cent of the 65 and over age group.

As chapter IV discussed in more detail, dependency ratios in the outer islands have declined substantially since 1976, but this was primarily due to lower youth dependency ratios; the aged dependency ratio has remained stable in Rarotonga but has been increasing in the outer islands – particularly in the northern group.

Table 82. Regional distribution of three age groups, 1956-1981

	1956	1961	1966	1971	1976	1981
0-14 years						
Rarotonga	40.5	43.1	48.3	50.5	49.5	48.6
Southern	45.4	41.8	39.6	38.3	38.5	37.1
Northern	14.1	15.2	12.5	11.3	12.1	14.2
Total	100.0	100.0	100.0	100.0	100.0	100.0
15-64 years						
Rarotonga	54.7	51.7	56.4	58.5	59.9	58.6
Southern	39.0	33.8	31.8	31.2	30.4	29.5
Northern	15.3	15.6	11.8	10.2	9.6	11.2
Total	100.0	100.0	100.0	100.0	100.0	100.0
65 years and over						
Rarotonga	41.9	43.6	48.7	42.2	42.7	44.3
Southern	34.5	34.3	31.9	39.5	36.7	37.3
Northern	23.5	22.1	19.4	19.8	20.5	18.3
Total	100.0	100.0	100.0	100.0	100.0	100.0
Total Population						
Rarotonga	43.2	47.2	51.8	53.8	54.1	53.6
Southern	41.8	37.2	35.8	35.1	34.6	33.2
Northern	15.0	15.6	12.4	11.0	11.2	12.8
Total	100.0	100.0	100.0	100.0	100.0	100.0[a]

Source: Table 14, chapter IV.

Notes [a] Includes 85 persons "at sea" (0.5 per cent).

H. CONCLUSION

As indicated at the outset of this chapter, an evaluation of a particular pattern of population distribution must be firmly based on explicitly stated social goals. In "developing" countries such goals are usually stated in a "development plan". While the Cook Islands Development Plan for 1982-1986 has yet to be officially approved, the following broad guidelines for development have been established:

1. To raise the prosperity of the people of the Cook Islands and to encourage them to remain within their home islands.

2. To attain a large measure of economic independence at the national, community and *kainga* (family) levels.

3. To ensure that economic development proceeds in a manner compatible with the valued aspects of the Cook Islands way of life.

4. To ensure that the benefits of development are widely shared among all islands and all sectors of the population.

5. To increase the level of participation of Cook Islanders in the development process.

6. To utilize the natural resources and environment so as to ensure their conservation for future generations.

7. To strengthen the sense of national identity.

8. To further co-operate with Pacific Island neighbours in economic affairs and other matters of mutual independence.

Unfortunately, most of these principles are too broad to serve as explicit criteria for the evaluation of a concrete pattern of distribution. Nevertheless, what seems to be implicit in the first four of these statements is the belief that Cook Islanders should not have to emigrate (or in-migrate) in order to benefit from "development". Historically, however, the concept of "development" has implied high levels of rural-urban migration accompanied by the growth of capital intensive agriculture and a very small proportion of the labour force in agriculture. Insofar as economic growth is pursued by means of commercial agriculture, the declining populations of the southern outer islands could well have positive consequences. A smaller population lowers the person/land ratio, encourages capital investment in labour-saving machinery and raises the efficiency of the remaining workers. Larger units of land-holding and land-working provide economies of scale leading to greater efficiency, lower production costs and higher incomes.

For these economic benefits to be realized, however, institutional changes and infrastructure improvements would be necessary.[13] Where land-holding institutions inhibit the creation of efficient production units, the advantages of a smaller population cannot be realized and total production simply declines (as it has done since the early 1970s).[14]

Without emigration, the labour force of the southern outer islands would increase by some 2,062 persons by 1996 and the supply of first class land per adult would decrease from its present level of 0.92 hectares to 0.53 hectares. Unless major efficiencies in agricultural production can be achieved, it is difficult to see how this change would facilitate higher cash incomes. If the labour force is to remain close to its present level, however, continued emigration (or in-migration to Rarotonga) would be essential.[15] With fertility declining, this implies a smaller total population and perhaps a greater concentration of population on Rarotonga. If *per capita* income from agriculture is to be increased, the labour force in agriculture will have to decline and capital investment increase (or the remaining labour be made more efficient). If the labour force and the total population are permitted to increase, locally-produced income will continue to fall unless other forms of employment are made available.

If the population is to remain on their "home islands", while simultaneously raising their "prosperity", some form of economic diversification appears to be essential. It is doubtful that this could be accomplished by the expansion of government services unless the amount of budgetary assistance from abroad were increased. While this may be possible in the short term, such an increase would surely be contrary to the values of economic self-sufficiency stated in the guidelines of the Development Plan.

[13] Michael Lipton, "Migration from rural areas of poor countries: the impact on rural productivity and income distribution", *World Development*, vol. 8, 1980, pp. 1-24.

[14] Some evidence from the northern group suggests that migrants continue to press claims to land in spite of prolonged absence in Rarotonga or New Zealand. See: Trevor Matheson, "A confused state of mind: absentee land rights on Rakahanga", unpublished paper, Department of Human Geography-Australian National University, 1982.

[15] A reduction in fertility would not affect the size of the labour force for 15 years.

Chapter VIII
EXTERNAL MIGRATION

A. INTRODUCTION

The Cook Islands have always been "migration oriented" communities to a degree. Nevertheless, the nature of their migration patterns has changed with historical conditions. It is possible to discern five broad phases of migration in Cook Islands history: (a) the pre-European period prior to the 1820s; (b) the missionary period, 1821-1888; (c) the early colonial period, 1888-1941[1]; (d) the late colonial "Makatea" period from 1942 to 1955; and (e) the period of mass migration to New Zealand from about 1956 to the present.

The first two of these periods were discussed in chapter II. This chapter will discuss the third and fourth periods briefly, but the principal focus will be on the final period, particularly the 15 years from 1966 to 1981.

B. MIGRATION IN THE EARLY COLONIAL PERIOD

Subsequent to the Cook Islands becoming a Protectorate of Great Britain, external migration took two general forms: on the one hand, the practice of formal labour recruitment, which began in the 1860s, reached high levels as Cook Islanders were recruited for plantation labour in eastern Polynesia and on various "guano" islands to the east and north; on the other hand, the newly-established shipping links with New Zealand facilitated the drift of Cook Islanders there to find employment.

The emigration of young men on labour contracts received the approval of the British Resident, but the chiefs were less enthusiastic about the loss of manpower. In 1900, the Resident approved an Australian company's request to recruit Cook Islands labour to work on the phosphate island of Malden on the grounds that this would remove "the surplus population of young men who would otherwise have fallen into lazy and disreputable habits".[2] But an act was later drawn-up to regulate labour recruitment and each island was assigned a quota specifying the maximum number of men who could be absent at any one time.[3] The 1906 census indicated 196 known absentees working "in ships or at the guano islands", but this was almost certainly an understatement since more than 200 Cook Islanders were on the island of Malden alone at this time,[4] and in 1904 at least 400 were living in Tahiti.[5]

While the exact numbers involved in labour circulation at this time are unknown, the available figures suggest that a considerable proportion of the adult male population was involved. By 1915, however, most of the nearby phosphate deposits were worked-out and along with the shortage of shipping caused by the First World War, this reduced the demand for Cook Islands labour. Aside from the 112 Cook Islanders who left to serve in the New Zealand army during the First World War, the period between 1915 and 1942 was one of negligible external migration. Between 1924 and 1941, only three years had net emigration and the period as a whole showed a net inflow of 443 Cook Islands *Maori*. By 1936 there were still only 103 Cook Islands Maori living in New Zealand.[6]

[1] In some respects the second and third phases overlap since labour recruiting began in the 1860s. (See chapter II)

[2] Colonel Gudgeon to Governor of New Zealand, New Zealand Parliament, *Annual Report on the Cook Islands*, Appendices to the Journals of the House of Representatives, A-3, 1900. The idea of "surplus" contradicted Gudgeon's view that the population was dying-out.

[3] R. P. Gilson, *Administration of the Cook Islands (Rarotonga)*, unpublished M.Sc. thesis (London University, 1952), p. 219.

[4] A. M. Quanchi, "Life on Malden, where the workers had numbers instead of names", *Pacific Islands Monthly*, May 1978, pp. 51-62.

[5] Norma MacArthur, *Island Populations of the Pacific* (Canberra, Australian National University Press, 1967), p. 173.

[6] New Zealand Department of Statistics, *New Zealand Population Census, 1936*, vol. IX, Race, pp. 16-17

C. THE MAKATEA PERIOD

The next important phase in external migration was the Makatea labour indenture scheme. This entailed an agreement between the British and French owned *Compagnie Francaise des Phosphates de L'Oceanie,* and the Government of New Zealand in which Cook Islanders between the ages of 18 and 30 were recruited on one-year renewable contracts at wages approximately triple those prevailing in the Cook Islands.[7] Because of the considerable circulation between the Cook Islands and Makatea, it is difficult to know how many Maori were involved in the scheme in a given year, but at their peak they probably numbered around 500,[8] some of whom were women and children.[9] It has been estimated that 2,900 Cook Islanders had been involved in the Makatea indenture scheme before it ceased in 1956.[10]

The Makatea scheme was significant for a number of reasons: it introduced a large number of men to non-agricultural wage labour and the 40 hour week; it removed a great many young men from chiefly authority for the first time; it exposed Cook Islanders to labour unions and organization activities; and it provided a pool of capital by means of which subsequent emigration to New Zealand was financed.

One important characteristic of the Makatea scheme was its regulation by authorities in the sending communities. For example, married men were required to remit a proportion of their wages to their families at home, and on some islands a quota was established such that each village was able to send men only in proportion to its total numbers.[11] In other words, the magnitude of the migration, and the characteristics of the migrants, were regulated with the interests of the sending communities at least partly in mind.

[7] P. H. Curson, "The migration of Cook Islanders to New Zealand", *South Pacific Bulletin,* vol. 23, 1973, pp. 15-25.

[8] Richard Gilson, *The Cook Islands, 1820-1950* (Wellington, Victoria University Press, 1980), p. 192.

[9] Anthony Hooper, "The migration of Cook Islanders to New Zealand", *Journal of the Polynesian Society,* vol. 70, 1961, pp. 11-17.

[10] P. H. Curson, *loc, cit.*

[11] B. J. Allen, "Markets, migration and the Mangaians", in I. G. Bassett (ed.) *Pacific Peasantry* (Palmerston North, New Zealand Geographical Society, 1969), pp. 67-85.

Emigration to New Zealand gained momentum during the Second World War when there was a demand for domestics and factory workers, and between 300 and 400 Maori had moved there by the end of the war.[12] Migrant labourers returning from Makatea found village conditions constraining and few opportunities for wage-work were available – especially on the smaller outer islands. Several researchers have noted the role of Makatea savings in facilitating migration to New Zealand during the 1950s. Hooper suggested that a large number of men who migrated to New Zealand in the late 1950s earned their fares in Makatea,[13] and Allen noted that emigrants from those villages in Mangaia, which had few wage-labour opportunities, used their Makatea savings to finance migration to Rarotonga or New Zealand.[14] A survey conducted by Curson in 1965 found that 25 per cent of household heads who had in-migrated to Rarotonga from the southern outer islands attributed their migration to the fact that they had earned money at Makatea, and 35 per cent of migrant households had at least one member who had been to Makatea.[15]

The principal impediment to external migration in the 1950s would appear to have been transportation rather than motivation, demand for labour in New Zealand or migrant capital. Shipping calls had hardly increased from their low war-time levels and the available passenger space was usually booked many months ahead. After 1960, however, both shipping and air services improved and this facilitated higher levels of emigration out of the group. Internal transportation – especially to the northern atolls – remained infrequent, but it was still sufficient to remove a considerable portion of the population during the early 1960s.

D. PATTERNS OF MOBILITY AND MIGRATION SINCE 1965

Table 83 illustrates the mobility patterns of the Maori component of the population since 1926 in five-year averages. Although the gross movement (column 4) was higher during the first five years of self-government (1966-1970) than during any previous five-year period since 1926, it was still only marginally higher than the 1946-1950 period (1609 compared to 1547). The large

[12] Richard Gilson, *op. cit.,* p. 192.

[13] Anthony Hooper, *loc. cit.*

[14] B. J. Allen, *loc. cit.*

[15] P. H. Curson, *loc. cit.*

Table 83. Net migration of Cook Islands Maori: five-year averages, 1926-1980

Period	Arrivals (1)	Departures (2)	Net balance (1) – (2) (3)	Gross movement (1) + (2) (4)	Total Maori population[a] (mid-period) (5)	Crude net rate[b] (6)	Efficiency per cent[c] (7)
1926 - 1930	93	80	+13	173	10 326	+1.3	7.5
1931 - 1935	71	56	+15	127	11 404	+1.3	11.8
1936 - 1940	52	42	+10	94	12 344	+.8	44.7
1941 - 1945	165	270	−105	435	13 162	−7.8	38.9
1946 - 1950	740	807	−67	1 547	14 152	−4.7	4.3
1951 - 1955	551	681	−130	1 232	15 507	−8.4	10.6
1956 - 1960	264	493	−229	757	17 055	−13.4	30.3
1961 - 1965	320	847	−527	1 167	18 235	−28.8	45.2
1966 - 1970	642	967	−325	1 609	19 565	−16.6	20.2
1971 - 1975	2 320	3 259	−939	5 579	18 915	−49.6	16.8
1976 - 1980	5 044	5 557	−525	10 601	17 767	−29.4	4.9

Sources: P.H. Curson, "The population of the Cook Islands", unpublished typescript (MacQuarrie University, 1973): Cook Islands Statistics office, *Quarterly Statistical Bulletin*, 1974-1980.

Notes: [a] Estimated.

[b] Using formula (1) - (2)/(5) x 1,000.

[c] Net migration as per cent of total mobility. i.e., (3)/(4) x 100.

increase in total mobility after 1971, however, is striking. The average annual gross movement between 1971 and 1975 (5,579) was two and a half times that of the previous five years.

The net migration pattern is somewhat different. Compared to the 1961-1965 period, net emigration during the first five years of self-government dropped by 38 per cent from an average of 527 net departures annually to 325. During the subsequent five years, however, net emigration increased three-fold, rising to an average of 939 persons annually. An equally sudden drop occurred after 1975 when emigration returned to approximately the level of the 1961-1965 period.

The wide fluctuation in both net migration and crude migration rates is indicated in table 84. Net migration in the Maori population ranged from -58 in 1968, to -1,911 in 1974, representing crude rates of 3.0 and 104.5 per 1,000 respectively. The extremely large increase in emigration between 1972 and 1974 is also clear (see figure 19). The crude rate increased by almost a factor of 10 between 1971 and 1974. The latter year coincides with the expansion of air services following the completion of Rarotonga's international airport, and as one observer has noted,[16] the large increase between 1972 and 1974 most likely represents "delayed" migration from earlier years. The total net loss to the Maori population for these three years was 4,120 persons or about 21 per cent of the total.

The average annual migration loss for the 16 years 1966-1981 was 596, representing an average annual crude rate of 32.0 per 1,000 or 3.2 per cent of the Maori population (table 84). The difference between the Maori component and the total population is a function of the in-flow of non-Maori (primarily Caucasians) in the same period, which reduces the average annual emigration rate in the total population to 28.4 per 1,000 (ethnic differences are discussed more fully below).

[16] F. Van Os, *A Tentative Analysis of Selected Sectors of the Cook Islands Economy* (Rarotonga, Planning Office, 1977), pp. 52-80.

Figure 19. Net migration of Cook Islands Maori, 1946-1980



Source: P.H. Curson, *op. cit.*, Appendix; Cook Islands Statistics Office, *Quarterly Statistical Bulletin*, 1974-1980.

Insofar as the population of the Cook Islands has been growing throughout the century, the absolute number of migrants is a misleading indicator of comparative migration levels. But as table 83 also showed (column 6), the crude rate of net migration has been growing faster than the population itself, going from 16.6 per 1,000 during the 1966-1970 period to 49.6 per 1,000 in the 1971-1975 period. While the rate has dropped by 41 per cent over the 1976-1980 period to 29.4 per 1000, this is still a high rate by historical standards.

Although net migration has increased through the 1970s by comparison with the previous decade, there has also been a major change in the relationship between net migration and total mobility. The "efficiency" of migration (the proportion of moves in both directions which results in net emigration) dropped from 45.2 per cent in the 1961-1965 period to 16.8 per cent in the 1971-1975 period and declined again to 4.9 per cent in 1976-1980 (see table 83 column 7). This implies that the proportion of emigrants among all classes of movers (visitors, vacationers, sojourners, permanent and semi-permanent migrants, etc.) has declined markedly, even though the absolute number of emigrants has increased. The scale of this new mobility can be seen from the increase in gross movement between 1961-1965 and 1976-1980 from 1,167 to 10,601 moves annually (table 83 column 4). Even allowing for multiple journeys by government officials and private business personnel, it is clear that the tempo of spatial mobility in the Maori population has stepped-up dramatically during the 1970s.

One important dimension of the new mobility pattern which has evolved since 1974 is seasonal "visiting". This is illustrated by figure 20, which shows net migration by quarterly periods. The high net inflow in the final quarter of each year, beginning in 1974, is a reflection of the degree to which New Zealand-resident Cook

Table 84. Net migration and crude net migration rates for Maori and total population, 1966-1981

Year[b]	Mid year population[a]		Net migration		Rate/1,000 population	
	Total	Maori	Total	Maori	Total	Maori
1966	19 220	18 620	−253	−363	13.2	19.5
1967	19 570	18 930	−311	−334	15.9	17.6
1968	19 990	19 310	+16	−58	(+) 0.8	3.0
1969	20 400	19 680	−363	−530	17.8	26.9
1970	20 810	20 050	−212	−483	10.2	24.1
1971	21 230	20 420	−108	−237	5.1	11.6
1972	21 370	20 570	−999	−839	46.7	40.8
1973	20 790	19 990	−1 133	−1 311	54.5	65.6
1974	19 640	18 840	−1 872	−1 970	96.2	104.6
1975	18 370	17 570	−237	−308	12.9	17.5
1976	18 600	17 800	−507	−378	27.3	21.2
1977	18 620	17 820	+112	−200	(+) 6.0	11.2
1978	18 480	17 480	−639	−537	34.6	30.7
1979	18 200	17 300	−535	−523	29.4	30.2
1980	18 000	17 000	−1 025	−982	56.9	57.8
1981	17 500	16 900	−799	−472	45.7	27.9
1982	16 900	16 000	−802	−1 002	47.5	62.6
Mean 1966-1982	19 276	18 487	−569	−619	30.6	33.7

Sources: *Cook Islands Quarterly Statistical Bulletin*, 1974-1981; and Geoffrey R. Hayes, *Report on Project to Evaluate Cook Islands Vital Statistics, 1965-1977*, Noumea, South Pacific Commission, 1980. (Appendix A). *Cook Islands Census of Population and Housing, 1976.*

Notes: [a] Estimated.

[b] Calendar year.

Islanders return to the Islands during the December-January vacation period – a pattern largely facilitated by the expansion of international air services in 1974.

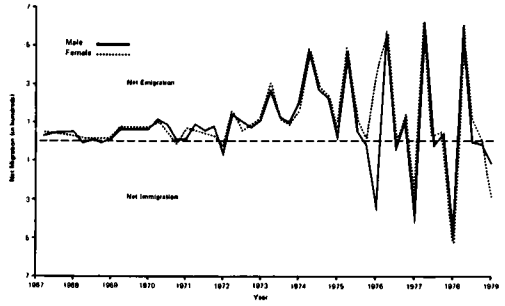
The pace of circulation by Cook Islanders predominantly resident in the Cook Islands has also increased with the improvement in air transport. Between 1971 and 1976, the number of trips to New Zealand for private and official business and for "arts, sports and entertainment" have tripled.[17] And although there was considerable fluctuation in the number of Cook Islanders entering New Zealand for the purposes of "temporary work" during this period, there was a substantial increase in this category as well, even though temporary workers represent less than 10 per cent of all arrivals.[18] As table 85 suggests, permanent and long-term migrants are a decreasing proportion of the total mobility stream to New Zealand.

Table 86 shows that 50.4 per cent of all Maori arrivals in the Cook Islands during the period

[17] Estimated from New Zealand Department of Statistics, *Population and Migration: Part B, Migration.* Tables 31 and 32 (1970-1971), tables 18 and 19 (1972-1973 to 1976-1977).

[18] *Ibid.*

Figure 20. Net migration of Cook Islands Maori by sex and quarter, 1967-1978



Sources: Data for 1967-1970 were estimated from unpublished migration summaries, Cook Islands Statistics Office; 1971-1978 data were taken from Cook Islands Statistics Office, *Statistical Bulletin: Overseas Migration,* 1971-1978.

Table 85. Migration intentions of Cook Islands-born[a] arrivals in New Zealand, 1966-1981

Year	Permanent[b] immigrants		Long-term[c] stayers		Permanent and long-term		Visitors[d]		Total Number
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	
1966 - 1967	602	57.7	...	...	602	57.7	441	42.3	1 043
1967 - 1968	385	47.0	...	...	385	47.0	443	53.0	828
1968 - 1969	230	28.4	...	...	230	28.4	580	71.6	810
1969 - 1970	484	35.1	...	...	484	35.1	894	64.9	1 378
1970 - 1971	626	51.3	...	...	626	51.3	594	48.7	1 220
1971 - 1972	231	24.4	369	39.0	600	63.4	347	36.6	947
1972 - 1973	447	29.5	664	43.9	1 091	73.4	423	26.6	1 514
1973 - 1974	559	23.0	1 044	43.0	1 603	66.1	864	33.9	2 426
1974 - 1975	744	21.2	1 099	31.3	1 843	52.5	1 668	47.5	3 511
1975 - 1976	396	15.8	510	20.4	906	36.2	1 600	63.8	2 506
1976 - 1977	286	14.9	368	19.2	654	34.1	1 264	65.9	1 918
1977 - 1978	344	17.0	268	13.2	612	30.2	1 416	69.8	2 028
1978 - 1979	212	9.7	372	17.1	584	26.8	1 592	73.2	2 176
1979 - 1980	172	7.4	405	17.5	57	24.9	1 740	75.0	2 317
1980 - 1981	148	6.4	328	14.2	476	20.6	1 830	79.4	2 306

Sources: New Zealand Department of Statistics, *Population and Migration,* Part B – Migration (1966-1981, annual publications).

Notes: [a] Excludes residents of New Zealand returning after short-term or longterm absence.

[b] Intending to remain permanently in New Zealand.

[c] Intending to stay more than 12 months but not permanently.

[d] Less than 12 months.

Table 86. Arrivals in the Cook Islands by ethnicity and residential status, 1975-1981

Year	Maori						Non-maori						Total
	Visitors		Residents		Total		Visitors		Residents		Total		
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	
1975	2 021	41.8	2 570	58.2	4 591	100.0	7 239	95.2	361	4.8	7 600	100.0	12 191
1976	2 147	47.6	2 069	52.4	4 216	100.0	7 751	96.1	315	3.9	8 066	100.0	12 282
1977	2 629	63.4	1 864	36.6	4 493	100.0	11 955	97.0	375	3.0	12 330	100.0	16 823
1978	3 880[a]	58.6	2 242	41.4	6 122	100.0	14 033	95.2	710	4.8	14 743	100.0	20 865
1979	2 614	50.9	2 878	49.1	5 492	100.0	17 056	96.6	606	3.4	17 662	100.0	23 154
1980	2 025	44.7	2 821	55.3	4 846	100.0	19 026	96.7	643	3.3	19 669	100.0	24 515
1981	2 041	43.9	2 607	56.1	4 648	100.0	16 457	95.4	789	4.6	17 246	100.0	21 354
1975-1981	17 357	50.4	17 051	49.6	34 408	100.0	93 517	96.1	3 799	3.9	97 316	100.0	131 184

Source: Cook Islands Statistics Office, *Quarterly Statistical Bulletin*, January 1977; April 1979; December 1981.

Note: [a] Includes "fly-in voters" who stayed less than one day.

Table 87. Maori migration by intended length of stay and absence by place of usual residence, 1978[a]

Length of stay or absence	Maori visitor[b] arrivals			Maori resident[c] departures		
	Number	Per cent	Accumulated per cent	Number	Per cent	Accumulated per cent
1 week or less	178	6.0	6.0	191	6.8	6.8
up to 2 weeks	411	13.9	19.9	561	20.0	26.8
" " 3 "	1 050	35.4	55.3	461	16.5	43.5
" " 4 "	701	23.6	78.9	423	15.1	58.4
1 month or less	2 340		78.9	1 636		58.4
up to 2 months	179	6.0	84.9	279	10.0	68.4
" " 3 "	184	6.2	91.1	187	6.7	75.1
" " 6 "	75	2.5	93.6	223	8.0	83.1
1 year and over	187	6.4	100.0	475	17.0	100.0
More than 1 month	625	21.1		1 164	41.7	
Total	2 695	100.0		2 800	100.0	

Source: Cook Islands Statistics Office, *Statistical Bulletin: Overseas Migration,* January - December 1978.

Notes: [a] Short-term "fly-in voters" have been excluded.

[b] Usually resident outside the Cook Islands. (predominantly New Zealand). A "visitor" is defined officially as someone who intends to leave the Cook Islands within 31 days of their arrival. See Cook Islands Statistics Office, *Statistical Bulletin, Overseas Migration,* January 1978, p. i. It is clear from the tables from which the above data were compiled that place of usual residence is the determining factor used to distinguish visitors from non-visitors.

[c] Usually resident in the Cook Islands.

1975-1981, inclusive, were by non-residents. Since the base population of the non-resident group was larger than the resident by about 26 per cent during the period, the degree of mobility among resident Maori would appear to be greater than among non-resident Maori. The nature of mobility also appears to be different in the two groups. New Zealand-resident Maori tend to make trips of less than one month in duration, whereas a much larger proportion of Cook Islands-resident Maori remain (or intend to remain) absent for more than one month (see table 87).[19] Similarly, a much higher proportion of New Zealand-resident Cook Islanders return to the islands for vacations or to visit relatives than is the case for Cook Islands residents travelling to New Zealand. The relatively greater importance of business, employment and education in the out-going stream – as opposed to the incoming one – is apparent from table 88.

[19] Note that the data apply to 1978, the latest year for which information is available. The "fly-in" voters who stayed in Rarotonga for less than one day in March, 1978 are excluded from the table.

Table 88. Maori visitor arrivals and resident departures by purpose of visit, 1978[a]

Purpose of visit or absence	Maori visitor[b] arrivals		Maori resident[c] departures	
	Number	Per cent	Number	Per cent
Vacation	614	20.7	621	22.3
Visit friends and relatives	2 080	70.2	1 165	41.8
Vacation and visiting	2 694	90.9	1 786	64.1
Business and vacation	30	1.0	166	5.9
Business	13	0.4	61	2.2
Employment	16	0.5	103	3.7
Education	31	1.0	326	11.7
Conference, etc.	18	0.6	75	2.7
Other	160	5.4	273	9.8
Total	2 965	100.0	2 790	100.0

Source: Same as table 87.

Notes: [a] Short-term "fly-in voters" have been excluded.

[b] Usually resident outside the Cook Islands (predominantly New Zealand).

[c] Usually resident in the Cook Islands.

E. ETHNIC DIFFERENCES IN MIGRATION PATTERNS

Assessing the migration patterns of the non-Maori[20] population raises some methodological difficulties. According to "frontier" statistics, there was a net migration gain of 570 persons non-Maori during the intercensal period 1966-1976, and a further gain of 39 from 1976 to 1981 (table 89). Calculated on a calendar year basis using frontier statistics, the increase was 962 up to the end of 1975, and 988 to the end of 1980 (table 90). These gains are not consistent with census-based information, however, which suggests that the increase in the non-Maori population during the 1966-1976 intercensal period was only 248.[21] On the assumption that the vital statistics for the period are reasonably accurate, it appears that frontier data seriously understate the number of non-Maori departures between 1966 and 1971, thus overstating immigration. There is little doubt that a migration gain has occurred, but it is probably closer to 250-300 than the 570 indicated in table 89 or the 962 suggested in table 90. Part of the discrepancy between the two sets of figures may have to do with the different definition of "Maori" employed in the census and on the

[20] The term "non-Maori" refers primarily to Caucasians of Australian, New Zealand or British origin. A small number of Pacific Islanders and other ethnic groups will also be included.

[21] It is difficult to know the exact number of non-Maori "residents" at any one time. The 1976 census indicated 381 "contract workers" (employees of New Zealand agencies or supplied to the Cook Islands by foreign aid programmes) and another 240 "residents" who live permanently in the Cook Islands at the pleasure of the Minister of Immigration, for a total of 621 (*Census of Population and Housing, 1976*, p. 133). The total non-Maori population based on "racial origin", however, was 805. (*Ibid.*, p. 106.) The 1966 census (p. 29) indicated 557 persons of non-Maori background, resulting in an increase of 248 over the decade.

Table 89. Net intercensal migration of Maori and Non-Maori population

Year	Total population (1)			Maori (2)			Non-Maori (1) – (2) (3)		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
1966[a]	−24	−60	−84	−50	−70	−120	+26	+10	+36
1967	−23	−288	−311	−184	−150	−334	+161	−138	+23
1968	+35	−19	+16	+2	−60	−58	+33	+41	+74
1969	−142	−221	−363	−238	−292	−530	+96	+71	+167
1970	−130	−82	−212	−239	−244	−483	+109	+162	+271
1971	−52	−56	−108	−144	−93	−237	+92	+37	+129
1972	−609	−390	−999	−415	−424	−839	−194	+34	−160
1973	−600	−533	−1 133	−675	−636	−1 311	+75	+103	+178
1974	−899	−973	−1 872	−974	−996	−1 970	+75	+23	+98
1975	−90	−147	−237	−82	−226	−308	−8	+79	+71
1976[b]	−725	−832	−1 557	−635	−605	−1 240	−90	−227	−317
1966-1976	−3 259	−3 601	−6 860	−3 634	−3 796	−7 430	+375	+195	+570
1976[c]	...	...	+1 050	...	...	+862	...	...	+188
1977	...	...	+112	...	...	−200	...	...	+312
1978	...	...	−639	...	...	−531	...	...	−108
1979	...	...	−532	...	...	−523	...	...	−9
1980	...	...	−1 025	...	...	−982	...	...	−43
1981[d]	...	...	−1 391	...	...	−882	...	...	−301
1976-1981	...	...	−2 425	...	...	−2 256	...	...	+39

Source: Cook Islands Statistics Office, Statistical Bulletin: *Overseas Migration*, 1972-1976; Quarterly Statistical Bulletin, June 1979 and June 1982.

Notes: [a] From census date 1 September 1966.

[b] Up to census date 1 December 1976.

[c] 1 December to 31 December.

[d] Up to census date 1 December 1981 (estimated).

migration cards (the latter being self-defining). The non-Maori population as defined by migration statistics had net migration losses from 1978 to 1981, but there was an inflow of 200 in 1982. Some of this fluctuation may represent the ebb and flow of visitors rather than a genuine migratory movement.

Some idea of the mobility of the non-Maori component can be gained by referring back to table 86 which shows that arrivals doubled between 1975 and 1980. The figure of 643 "resident" arrivals in 1980 is considerable in view of the fact that the total non-Maori population was probably in the order of 800 during the 1976-1980

Table 90. Cook Islands net migration by ethnicity, 1966-1980

Year	Arrivals			Departures			Net difference		
	Maori	Non-Maori	Total	Maori	Non-Maori	Total	Maori	Non-Maori	Total
1966	536	625	1 161	899	515	1 414	−363	+110	−253
1967	588	583	1 171	922	559	1 481	−334	+23	−310
1968	628	702	1 330	686	628	1 314	−58	+74	+16
1969	571	985	1 556	1 101	818	1 919	−530	+167	−363
1970	738	1 062	1 800	1 222	790	2 012	−484	+272	−212
1971	987	1 156	2 143	1 224	1 027	2 251	−237	+129	−108
1972	1 033	1 203	2 236	1 872	1 363	3 235	−839	−160	−999
1973	1 273	1 609	2 882	2 584	1 431	4 015	−1 311	+178	−1 133
1974	3 724	5 129	8 853	5 680	5 045	10 725	−1 970	+98	−1 872
1975	4 645	7 600	12 245	4 953	7 529	12 482	−308	+71	−237
1966-1975 inclusive							−6 433	+962	−5 472
1976	4 216	8 066	12 282	4 594	8 195	12 789	−378	−129	−507
1977	4 493	12 330	16 823	4 693	12 018	16 711	−200	+312	+112
1978	6 122	14 743	20 865	6 659	14 845	21 504	−537	−102	−639
1979	5 544	17 662	23 206	6 067	17 674	23 741	−523	−12	−535
1980	4 842	19 669	24 511	5 824	19 712	25 536	−982	−43	−1 025
1966-1980 inclusive							−9 053	+988	−8 066

Sources: Cook Islands Statistics Office, *Statistical Bulletin: Overseas Migration,* April 1978, (table 1 corrected); Cook Islands Statistics Office, *Quarterly Statistical Bulletin,* January 1981, p. 24; Unpublished migration tables, Cook Islands Statistics Office, nd.

period.[22] The other category of non-Maori arrivals to show a dramatic increase are "visitors", primarily tourists who increased from 7,239 in 1975 to 19,026 in 1980. This reflects the establishment of international tourism following the expansion of air services in 1973 and the construction of several hotels.

F. NET EMIGRATION LOSSES 1966-1981

While external mobility patterns have become increasingly complex during the decade and a half since self-government was achieved, the net result of all forms of population movement has been a substantial population loss to the Cook Islands. The total indicated loss for the intercensal period 1966-1981 by the vital statistics method (table 91) was 9,322 (4,446 male, 4,876 female). Because the non-Maori population probably remained static between 1976 and 1981, and since the net migration gain for this group between 1966 and 1976 was in the range 200-300, the implied net loss in the *Maori* population up to 1981 is in the range 9,522-9,622.

The 1971-1976 period stands out as one of exceptional population loss: net emigration was equivalent to 29.1 per cent of the mean population over the same period. During the subsequent five years (1976-1981), the net loss fell to 2,139 or about 40 per cent of the previous period. It seems unlikely that the specific set of conditions which

[22] Based on the 1976 census count of 805 cited in previous footnote.

Table 91. Estimated net intercensal migration 1966-1981: vital statistics method

	1966-1971			1971-1976			1976-1981		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
(1) Population, first census	9 749	9 498	19 247	10 910	10 413	21 323	9 294	8 834	18 128
(2) Population, second census	10 910	10 413	21 323	9 293	8 834	18 127	9 172	8 582	17 751
(3) Increase (2) – (1)	1 161	915	2 076	–1 617	–1 579	–3 196	–122	–252	–374
(4) Births	2 252	2 129	4 381	1 609	1 572	3 181	1 207	1 179	2 386
(5) Deaths	486	367	853	346	300	646	367	256	623
(6) Natural increase (4) – (5)	1 766	1 762	3 528	1 263	1 272	2 535	840	923	1 763
Estimated net migration									
(7) Residual Estimate (3) – (6)	–605	–847	–1 452	–2 880	–2 851	–5 731	–962	–1 175	–2 137
(8) Direct count (frontier data)	–385	–772	–1 157	–2 874	–2 829	–5 703	...	...	–2 217
(9) Difference between (7) and (8)	220	75	295	6	22	28	...	...	80

Sources: Population data from Cook Islands Statistics Office, *Cook Islands Census of Population and Dwellings, 1976;* vital data from Geoffrey R. Hayes, *Report on Project to Evaluate Cook Islands Vital Statistics, 1965-1977,* Noumea, South Pacific Commission,1980, (Appendix); Cook Islands Statistics Office, unpublished vital statistics 1979-1981.

produced the high emigration levels of the 1971-1976 period will be repeated in the near future, but the fact that net migration in 1981 and 1982 was-799 and-802 respectively shows that the possibility of increased emigration in the 1981-1986 intercensal period cannot be ruled out.

G. GEOGRAPHICAL VARIATIONS IN EXTERNAL MIGRATION

1. Regional differences

The measurement of regional differences in migration patterns presents a number of methodological difficulties. Because frontier statistics report neither the island of last residence, nor the island of intended residence, it is impossible to disaggregate the various categories of arrivals and departures into their regional or island components. Consequently, estimation methods which combine census data with life table survival rates must be used. Of necessity, these estimates measure only the net result of all movement between two exact census dates; they reveal nothing about short-term fluctuations. Moreover, the method cannot distinguish between internal migration to other islands and external migration out of the territory. Nevertheless, it is possible to make an approximate estimate of internal migration using place of birth statistics (see chapter VII).

In the 1966-1971 period, the majority of emigrants were from the outer islands (1,111 of 1,519 or 73.1 per cent). This is partly attributable to the low level of male emigration from Rarotonga which was less than 15 per cent of male emigration from the outer islands and only a quarter of female emigration from Rarotonga. This relatively low level of male emigration can be explained by the demand for labour in Rarotonga in the early 1970s caused by airport reconstruction and expansion of the Civil Service.

In the 1971-1976 period this sex imbalance disappeared, and even though Rarotonga's emigration remained female-dominant, it was much less so than during the previous five years. It is noteworthy that the emigrant stream from the southern outer islands was also female-dominant (53.8 per cent) while the northern group stream was male-dominant (55.6 per cent).

Table 92. Intercensal net migration by region and sex, 1966-1981

Region	1966-1971			1971-1976			1976-1981		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
Rarotonga	-81	-327	-408	-1 475	-1 546	-3 021	-598	-612	-1 210
Southern outer islands	-285	-394	-679	-1 008	-1 028	-2 036	-458	-544	-1 002
Northern outer islands	-256	-176	-432	-379	-303	-682	+19	-58	-39
Total outer islands	-541	-570	-1 111	-1 387	-1 331	-2 718	-439	-602	-1 041
Cook Islands	-622	-897	-1 519	-2 862	-2 877	-5 739	-1 037	-1 214	-2 251

Source: Calculated by "survival rate" method as described in Henry S. Shryock, Jacob S. Siegel and Associates, *The Methods and Materials of Demography* (Washington, United States Bureau of the Census, United States Government Printing Office, 1975), pp. 594-596.

The 1971-1976 emigration stream was broadly representative of all regions with little sign of regional selectivity. Rarotonga's net emigration of 3,021 represented 52.6 per cent of the Cook Islands total, while 53.9 per cent of the mean population over the same period resided in Rarotonga. The equivalent figures for the southern group were 35.5 per cent and 34.9 per cent respectively, and for the northern group 11.9 per cent and 11.1 per cent. When males and females are compared, however, there is some selectivity in favour of northern group males, who appear to have been over-represented in the emigration stream whereas northern group females were under-represented.

Much stronger regional selectivity is apparent in the 1976-1981 period, however, with disproportionately high emigration from the southern outer islands, and disproportionately low emigration from the northern group (1.7 per cent of the total compared with 12.0 per cent of the population). But Rarotonga's contribution to total emigration remained proportionate to its population.

It would appear from the data shown in table 92 that net migration in the northern group fell to a low level in the 1976-1981 period. A small net out-flow of females was offset by a net in-flow of males, producing a net out-flow of only 39.[23]

[23] When the "vital statistics" method was applied to northern group migration rather than the "survival ratio" method, the in-flow of males balances exactly the out-flow of females.

2. Inter-island differences

As indicated in chapter III, certain islands have been particularly prone to out-migration and emigration in the past and have contributed a disproportionate number of migrants to the regional streams. Since 1971, the outstanding islands have been Mangaia in the southern group and Manihiki in the north. Mangaia's out-migration rate of 76.3 per 1,000 in the 1971-1976 period was substantially higher than any other southern island, and well above the 59.1 per 1,000 for the southern outer islands as a whole (table 93). Similarly, Manihiki's rate of 121.0 per 1,000 was unmatched by any other northern atoll, and almost double the northern group rate of 62.1. Manihiki contributed 38 per cent of the northern group's out-migration stream in this period, and about 33 per cent of the southern outer islands total out-migration originated from Mangaia. Although no islands could be said to have low out-migration rates, Mauke in the south and Pukapuka/Nassau in the north had the lowest rates in the 1971-1976 period, with Pukapuka/Nassau having the lowest rate (29.7 per 1,000) of any island.

Manihiki is again outstanding in the 1976-1981 period, but this time for its high in-migration rate. While out-migration declined in all the northern atolls, it is only in Manihiki that a substantial migration gain occurred; and this is the principal reason why the northern group as a whole had little net change from migration during the period.

In contrast, no southern island shows any sign of net in-migration. Although out-migration

Table 93. Intercensal net migration by island and sex, 1971-1981

Island	1971-1976						1976-1981					
	Number			Rate[a]			Number			Rate[a]		
	Males	Females	Total	Males	Females	Total	Males	Females	Total	Males	Females	Total
Rarotonga	−1 475	−1 546	−3 021	53.6	60.1	56.8	−598	−612	−1 210	23.9	26.3	25.0
Aitutaki	−381	−381	−762	57.3	58.2	57.7	−116	−217	−333	19.0	37.2	27.9
Atiu	−169	−160	−329	46.6	48.4	47.3	−109	−78	−187	32.5	26.0	29.5
Mangaia	−335	−354	−689	74.3	78.3	76.3	−153	−130	−283	42.4	35.8	39.1
Mauke	−87	−86	−173	49.0	44.9	46.9	−46	−61	−107	27.1	34.0	30.7
Mitiaro	−36	−47	−83	45.6	61.0	53.2	−34	−58	−92	44.7	89.9	65.5
Southern outer islands	−1 008	−1 028	−2 036	58.0	60.3	59.1	−458	−544	−1 002	29.5	36.5	32.9
Manihiki	−147	−112	−259	158.1	92.6	121.0	+66	+35	+101	+75.0	+43.8	+60.1
Palmerston	−2	−13	−15	14.8	78.8	50.0	–	−9	−9	–	62.1	33.3
Pukapuka & Nassau	−82	−51	−133	36.9	22.6	29.7	−39	−54	−93	17.1	23.3	20.2
Rakahanga	−45	−58	−103	58.4	73.9	66.2	−10	−21	−31	14.5	30.2	22.4
Tongareva	−103	−69	−172	68.2	51.1	60.1	+2	−9	−7	+1.3	6.7	2.5
Northern outer islands	−379	−303	−682	68.0	55.9	62.1	+19	−58	−39	+3.5	11.0	3.6
Cook Islands	−2 862	−2 877	−5 739	56.7	59.8	58.2	−1 037	−1 214	−2 251	22.5	27.9	25.1

Source: Estimated using "survival rate" methods.

Note: [a] Average annual net migration rate per 1,000 population according to the formula $(n/y) / [(p^1+p^2)/2] \times 1{,}000$, where n refers to intercensal migration, y represents length of intercensal period in years, p^1 the population at the first census and p^2 the population at the second census.

rates have dropped by as much as 52 per cent (e.g., in Aitutaki), all southern islands continue to show net migration losses, and in the case of the small island of Mitiaro the out-migration rate has risen by 23 per cent over 1971-1976. But the importance of Mangaia as the predominant source area has diminished in the 1976-1981 period. After Mitiaro it does have the highest out-migration rate of the southern group (39.1 per 1,000), and following Aitutaki it contributed the second-largest number of migrants of any outer island, but compared with the 1971-1976 period, the wide gap between Mangaia's out-migration rate and those of the other southern islands has narrowed considerably.

As these data suggest, inter-island variations in out-migration cannot be explained by geographical factors alone. Some northern atolls have relatively high rates while others have low ones, or, as in the case of Manihiki in the 1976-1981 intercensal period, net in-migration. Similarly, the range of out-migration rates in the south does not appear to follow any clear spatial or ecological pattern. Because short-term fluctuations may tend to conceal long-term variations between islands, however, it is important to look at historical patterns to see if the contrast between islands can be either heightened or reduced.

In table 94, average annual out-migration rates for the 1966-1981 period are compared with natural increase over the same period. It will be seen from the migration rates that Minihiki, Palmerston and Mangaia stand out above all other islands. Mangaia's rate of 50.0 per 1,000 is well

Table 94. Total and average annual net migration and natural increase compared by region and island, 1966-1981

Island/region	Net migration			Natural increase			Difference	
	Total	Average annual		Total	Average annual		Average annual	
		Number	Rate[a]		Number	Rate[a]	Number	Rate[a]
Rarotonga	−4 647	−310	−30.0	4 170	278	26.9	−32	−3.1
Aitutaki	−1 310	−87	−33.7	1 058	71	27.3	−16	−6.4
Atiu	−657	−44	−32.6	540	36	26.7	−8	−5.9
Mangaia	−1 252	−83	−50.0	650	43	24.5	−40	−25.5
Mauke	−318	−21	−29.2	317	21	29.2	–	–
Mitiaro	−167	−11	−36.4	128	9	28.2	−2	−8.2
Southern outer islands	−3 704	−246	−36.6	2 685	179	26.7	−67	−9.9
Palmerston	−60	−4	−64.5	23	2	24.7	−2	−39.8
Pukapuka/Nassau	−288	−19	−21.2	365	24	27.2	5	6.0
Manihiki	−395	−26	−64.2	193	13	31.8	−13	−32.4
Rakahanga	−171	−11	−35.8	121	8	26.3	−3	−9.5
Tongareva	−200	−13	−22.6	266	18	31.0	5	8.4
Northern outer islands	−1 114	−75	−33.4	963	64	28.6	−11	−4.8
Cook Islands	−9 465	−631	−32.7	7 818	521	27.4	−110	−5.3

Source: Calculated by "survival ratio" methods.

Note: [a] Per 1,000 population.

above the southern group average, and the rates for Manihiki and Palmerston are double the northern group average.

Insofar as population decline is identified as the principal problem associated with out-migration and emigration, the important issue is the degree to which migration is out-pacing natural increase. On the basis of the data in table 94, it is possible to identify three groups of islands: (a) those in which out-migration is substantially above natural increase and in which no imaginable rise in natural increase could completely replace the lost population (Mangaia, Manihiki, Palmerston); (b) islands in which out-migration is greater than natural increase by a margin of less than one per cent per year (Rarotonga, Aitutaki, Atiu, Mitiaro, Rakahanga) and in which a higher rate of natural increase could, theoretically, replace the losses from migration; (c) islands in which the rate of out-migration is either equal to or below the rate of natural increase (Mauke, Pukapuka, Nassau, Tongareva).

H. AGE AND SEX SELECTIVITY

1. Age selectivity

There is little doubt that the total emigration stream from the Cook Islands is an extremely youthful one. During the last period for which disaggregated "frontier" data are published (1971-1978), almost 80 per cent of all emigrants were under the age of 25 at the time of their emigration (table 95 and figure 21). But the youthfulness of the emigration stream must be seen in the light of the age structure of the population from which emigrants are drawn. Thus, while 35.2 per cent of the emigrants were under the age of 15, 51.5 per cent of the 1971 population was also in this age category, indicating that this group was actually under-represented in the emigration stream. In contrast, the 15-24 group was 17.1 per cent of the population but 44.0 per cent of the emigration stream, indicating strong selectivity in this age group.

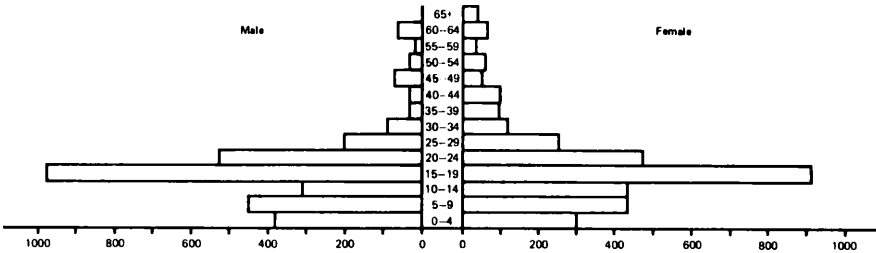
Table 95. Net Maori migration in seven "life stage" age groups, 1971-1978

Year ending 31 March	Age group							
	0 - 4	5 - 14	15 - 24	25 - 29	30 - 44	45 - 59	60 +	Total
1971	−27	−83	−185	−19	−5	−29	−8	−354
1972	−7	−66	−234	−44	−30	−38	12	−382
1973	−127	−255	−391	−79	−124	−57	−43	−1 076
1974	−201	−375	−692	−146	−159	−96	−46	−1 715
1975	−253	−600	−651	−114	−129	−135	−54	−1 936
1976	−31	−63	−346	−18	−43	35	−32	−498
1977	−28	−130	−245	−19	−27	−12	−14	−475
1978	−7	−67	−161	−17	43	34	20	−155
Total 1971-1978	−681	−1 640	−2 905	−456	−474	−272	−165	−6 591
Per cent	10.3	24.9	44.0	6.9	7.2	4.1	2.5	100.0
Accumulated per cent	10.3	35.2	79.2	86.1	93.3	97.4	100.0	
Population[a] per cent	18.4	33.1	17.1	5.4	12.5	8.4	5.0	100.0
Accumulated per cent	18.4	51.5	68.6	74.0	86.5	94.9	100.0	

Source: Cook Islands Statistics Office, *Statistical Bulletin: Overseas Migration.* (compiled from monthly migration bulletins, 1970-1978).

Note: [a] 1971 population.

Figure 21. Net emigration of Cook Islands Maori by age group, 1971-1978[a]



Note: [a] Year ending 31 March.

There is also selectivity in the 25-29 age group, but the numbers drop sharply by comparison with the 15-24 group. While by no means insignificant numerically, the 30 and over age category is underrepresented in the emigration stream by comparison with its proportion of the population.

In terms of life stages, therefore, we can say that half of all emigrants leave the islands during early adulthood when a high proportion are either unmarried or have few children. The child-woman ratio for the sample of emigrants in table 95 was 347 compared to 885 for the Cook Islands population in 1976 (table 41, chapter V), suggesting that emigrants do have fewer children than non-emigrants (or take fewer with them).

While this is only a rough estimate, the age data suggest that the equivalent of approximately 600 established households-families emigrated over the eight-year period 1971-1978 – an average of 75 families per year. In addition to these, the emigration of young single people aged 15-24, who would be forming households within the next 5-10 years, was equivalent to another 1,400 potential households which in the event would be formed in New Zealand or elsewhere.[24]

As has been mentioned, it is impossible to break down frontier data into regional or island sub-streams. For this purpose, therefore, estimation techniques must be used. The results obtained are not fully compatible with those obtained by frontier data, however, since frontier data measure the age at which migration occurred, while estimation techniques indicate the effects of net migration on a specific age group during a specific intercensal period. Thus, estimation techniques can indicate what proportion of, say, the 10-14 age group emigrated during a ten-year period before reaching the age 20-24, but they cannot say when the act of migration occurred (other than the logical requirement that it took place sometime within the ten-year period).[25] Tables 96 and 97 show the results of estimation techniques for the intercensal periods 1971-1976 and 1976-1981 respectively by region and 10 year age groups. Referring first of all to the total population, age selectivity is apparent in the 10-19 and 20-29 age groups, particularly the former. In the 1971-1976 period, 40.8 per cent of total net emigration was in the 10-19 age group whereas only 25.5 per cent of the 1971 population were in this group (table 96). For the 20-29 group the equivalent percentage were 16.1 and 12.2 respectively, indicating a smaller degree of selectivity than

[24] In the absence of detailed knowledge regarding household formation in the Cook Islands, these figures should be treated as broad approximations only. Furthermore, they are gross numbers and do not take account of the dissolution of existing households as a result of the death or infirmity of elderly householders.

[25] When applied to the outer islands, estimation methods do not distinguish between internal and external migration. For the period 1971-1976, however, there is no indication from place of birth statistics that there has been any net in-migration to Rarotonga from the outer islands and it is therefore reasonable to treat all net out-migration from the outer islands as emigration. Of course some Outer Islanders may be in-migrating to Rarotonga, but they are offset by others who are emigrating from Rarotonga. Place of birth data for Rarotonga are not yet available from the 1981 census but it seems unlikely that the pattern of direct emigration from the outer islands has changed.

Table 96. Comparison of net emigration stream with base population by age group and region, 1971-1976

Age group	Rarotonga			Southern			Northern			Total				
	Emigration		Population[a]	Emigration		Population[a]	Emigration		Population[a]	Emigration		Population[a]	Base population	Per cent emigration
	Number	Per cent	Per cent	Number	Per cent	Per cent	Number	Per cent	Per cent	Number	Per cent	Per cent		
0 - 9	787	51.3	50.2	530	34.6	37.9	216	14.1	11.9	1 533	27.5	36.4	7 771	19.7
10 - 19	1 005	44.0	55.6	1 038	45.5	35.1	236	10.4	9.3	2 279	40.8	25.5	5 427	42.0
20 - 29	582	64.7	64.5	262	29.1	27.1	55	6.1	8.4	899	16.1	12.2	2 598	34.6
30 - 39	185	55.9	59.3	80	24.1	29.7	66	19.3	11.0	331	5.9	8.8	1 885	17.6
40 - 49	112	45.9	52.2	88	36.0	35.5	44	18.0	12.3	244	4.4	7.4	1 490	16.4
50 - 59	91	49.5	47.9	72	39.1	40.2	21	11.4	11.9	184	3.3	5.0	1 075	17.1
60 +	39	34.2	43.4	64	56.1	38.1	11	9.6	18.5	114	2.0	5.1	1 007	10.6
Total	2 801	50.2	53.8	2 134	38.2	35.1	649	11.6	11.1	5 584	100.0	100.0	21 323	26.2

Source: Calculated by survival ratio method.

Note: [a] Base population refers to enumerated population at the beginning of the period (1971). Differences in total migration between these and other tables are due to the exclusion here of those born during the intercensal period, that is, only those alive at the beginning of the interval are included.

Table 97. Comparison of net emigration stream with base population by age group and region, 1976-1981

Age group	Rarotonga			Southern			Northern			Total				
	Emigration		Base population[a]	Emigration		Base population[a]	Emigration		Base population[a]	Emigration		Base population[a]	Base population	Per cent emigration
	Number	Per cent	Per cent	Number	Per cent	Per cent	Number	Per cent	Per cent	Number	Per cent	Per cent		
0 - 9	268	53.9	54.2	218	43.9	38.1	11	2.2	12.7	497	23.5	32.7	5 935	8.4
10 - 19	583	44.9	55.0	685	51.9	35.3	53	13.5	9.5	1 321	62.5	28.5	5 172	25.5
20 - 29	108	54.0	66.0	65	32.5	24.4	27	3.2	9.3	200	9.5	10.6	1 921	10.4
30 - 39	7	100.0	62.7	+4	..	28.0	+9	..	9.3	+6	..	8.8	1 609	..
40 - 49	32	100.0	55.8	+6	..	32.5	+20	..	11.7	6	0.3	7.5	1 356	0.4
50 - 59	59	70.2	50.2	25	29.8	39.1	+17	..	10.7	67	3.2	5.8	1 044	6.4
60 +	11	28.2	43.7	28	71.8	38.7	+12	..	17.6	27	1.3	6.0	1 090	2.5
Total	1 068	50.6	54.0	1 011	47.9	34.6	33	1.6	11.2	2 112	100.0	100.0	18 127	11.7

Source: *Cook Islands Census of Population and Housing, 1976;* survival ratio estimates 1976-1981.

Note: [a] Base population refers to enumerated population at the beginning of the period (1976).

in the 10-19 group. All other groups were under-represented in the emigration stream. These results are similar to those obtained from frontier data.

It is also useful to compare the proportion of each age group which has emigrated during the intercensal period. Here again the 10-19 and 20-29 age groups are outstanding: in the former case, 42.0 per cent of the original 1971 cohort had emigrated before attaining the age 15-24, and 34.6 per cent of the 20-29 age group emigrated before reaching the age 25-34. These two groups lost a larger proportion of their 1971 numbers than any other age group, and more than the population as a whole (26.2 per cent).

As already indicated by frontier data, emigration slowed down considerably in the 1976-1981 period, and table 97 suggests that the pattern of age-selectivity has also changed. Only the 10-19 age group is over-represented, but the magnitude of this over-representation is remarkable: 62.5 per cent of the total net emigration stream was in this age group compared with only 28.5 per cent of the base (1976) population. All age groups above 30 have low emigration rates by comparison with their base populations. While the total stream has become more concentrated in the 10-19 age group, the proportion of this and all other age groups which emigrated over the period has declined severely. Whereas 42 per cent of the 10-19 group emigrated in the 1971-1976 period, only 25.5 per cent did so in the 1976-1981 period, and in the case of the 20-29 age group the decline was from 34.6 per cent to 10.4 per cent.

As mentioned, there was little evidence of regional selectivity in total emigration in the 1971-1976 period. This is confirmed by the row totals of table 97 which shows that each region contributed to the total emigration stream in approximately the same proportion as their population, although the southern outer islands were slightly over-represented.

But the picture changes somewhat when each age group is considered separately. Thus, the outer islands as a whole contribute relatively more persons aged 10-19 than Rarotonga, and the southern outer islands contributes more 60 and over than either Rarotonga or the northern group. In 1971, 55.6 per cent of all persons aged 10-19 were residing in Rarotonga, but only 44.0 per cent of the 1971-1976 emigration stream emigrated from there. Thus Rarotonga appears to retain a higher proportion of its population of this age than do the outer islands.

This general pattern of age-selectivity continued into the 1976-1981 period and in the case of the southern outer islands became even more pronounced. The fall-off in out-migration from the northern atolls is partly a function of net in-migration above the age of 29, and continued out-migration between the ages of 0 and 29. Only in the 10-19 age group, however, are there more northern group emigrants than would be expected on the basis of the 1976 population. In the southern outer islands selectivity is apparent in the 0-9, 10-19, 20-29 and 60 plus age groups. Rarotonga supplies relatively more migrants aged 35-59, but the numbers are not large compared to the previous intercensal period.

The contribution of each age group and region to the emigration streams in 1971-1976 and 1976-1981 are illustrated by figures 22 and 23 respectively. Figure 23 shows clearly the degree to which emigration in the 1976-1981 period became concentrated in the 10-19 age group as well as the large contribution the southern outer islands made to emigration in this age group.

Figure 22. Net migration by age and region, 1971-1976

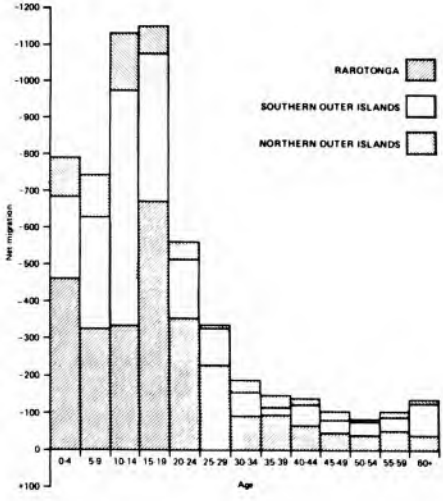
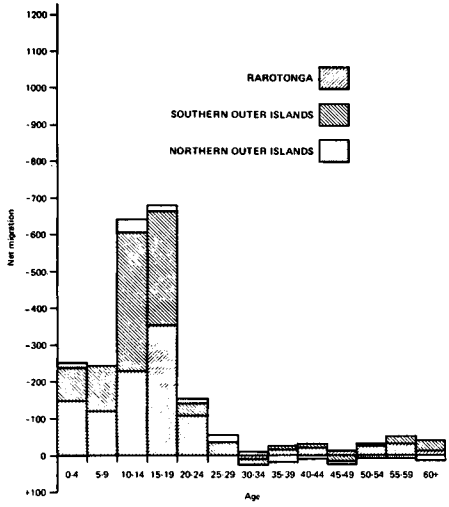


Figure 23. Net migration by age and region, 1976-1981



2. Selectivity by sex

In spite of a substantial surplus of males in the Cook Islands population, more females emigrated over the 1966-1981 period than males. Estimated by the "vital statistics" method, 52.3 per cent of the total emigration stream of 9,322 were female, producing a sex ratio of 91.2 males per 100 females. As indicated by frontier data, 51.4 per cent of Maori emigrants during the 1971-1978 period were female, but, as table 98 shows, the sex ratio varies by age. It tends to be low in the 5-14 and 25 plus age groups, and relatively high in the 0-4 and 15-24 groups. The 30-44 and 60 plus age groups are extremely female-dominant, even though the base populations in these age groups have high sex ratios. From age 25 to 29, however, the sex ratio of the emigration stream is close to that of the base population indicating little selectivity by sex. Why the sex ratio of the 0-4 emigrant age group should be so high is not clear; possibly young parents are more likely to take their male children with them when they migrate, leaving relatively more females with kin.

The female bias in Cook Islands emigration also holds up from a longer-term perspective and when survival ratio estimates are used instead of frontier data. But while this bias is less apparent in the total population, it is much accentuated in certain age groups. In table 99 the sex ratio of the 1971-1981 emigration stream is compared to the mid-period population of each region and age group. In all cases the sex ratio is higher in the population than in the emigration stream, but this is particularly pronounced above the age of 50. Even in those age groups which have a female bias in the population (20-29, 30-39), emigration is even more strongly female-dominant. This is most noticeable in the 20-29, 30-39 and 40-49 age groups of the southern outer islands, all of which already have low sex ratios indicating a relative surplus of females. With the exception of the 30-39 age group, out-migration from the northern group is heavier among males, but the 30-39 group is extremely female-dominant and this helps to account for the relatively balanced sex ratio overall.

I. DETERMINANTS OF EXTERNAL MIGRATION

In broad terms, migration patterns are a function of four general classes of determinants: (a) factors associated with the area of origin; (b) factors associated with the area of destination; (c) intervening obstacles; (d) personality factors. Since little is known about the personality characteristics of Cook Islands migrants, the following section will concentrate on items (a) to (c).

A major factor behind the large numerical increases in migration during the past decade and a half was the extremely rapid rate of natural growth. As chapter V showed, the intrinsic rate of increase climbed rapidly from about 1956 onwards and reached a peak during the 1961-1965 period. From 1971 on, therefore, the number of young persons entering the labour force climbed at a much faster rate than the number retiring from it. Thus, without the relief of emigration, the working-age population would have increased by almost 5,300 persons between 1966 and 1976. Taking age 17 as the average age of entry into the labour force, the number of new entrants per year between 1966 and 1971 would have been 434, and this number would have increased to 566 during the subsequent 5 years and to 777 between

Table 98. Net Maori migration by sex and seven "life stage" age group, 1971-1978

Year ending 31 March	Age group															
	0 - 4		5 - 14		15 - 24		25 - 29		30 - 44		45 - 59		60 +		Total	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
1971	−5	−22	−49	−34	−98	−87	−14	−3	3	−8	−20	−9	−3	−5	−186	−168
1972	−1	−6	−34	−33	−128	−106	−22	−22	−16	−14	−2	−36	9	3	−194	−188
1973	−74	−53	−117	−138	−186	−205	−39	−40	−64	−60	−32	−25	−10	−33	−522	−544
1974	−118	−83	−174	−201	−371	−321	−79	−67	−78	−81	−52	−44	−21	−25	−893	−822
1975	−141	−112	−296	−304	−316	−335	−44	−70	−15	−114	−77	−58	−34	−20	−923	−1 013
1976	−24	−7	−26	−37	−177	−169	1	−19	−20	−23	33	2	−15	−17	−204	−294
1977	−5	−23	−48	−82	−135	−110	3	−22	−20	−7	−10	−2	−7	−7	−222	−253
1978	−13	6	−24	−43	−96	−65	−10	−7	28	15	37	−3	17	3	−61	−94
Total	−381	−300	−768	−872	−1 507	−1 398	−204	−250	−157	−317	−123	−149	−64	−101	−3 205	−3 386
Per cent	11.9	8.9	23.9	25.8	47.0	41.3	6.4	7.4	4.9	9.4	3.8	4.4	2.0	3.0	100.0	100.0
Accumulated	11.9	8.9	35.8	34.7	82.8	76.0	89.2	83.4	94.1	92.8	97.9	97.2	100.0	100.0		
Population	18.8	18.1	33.1	33.2	17.0	17.3	4.9	5.9	12.5	12.6	8.7	8.0	5.0	5.1	100.0	100.0
Accumulated	18.8	18.1	51.9	51.3	68.9	68.6	73.8	74.5	86.3	87.1	95.0	95.1	100.0	100.0		
Sex ratio:																
Migrants	127		88		108		87		50		82		63		95	
Population	109		105		103		88		104		115		104		105	

Source: Cook Islands Statistics Office, *Statistical Bulletin: Overseas Migration.* (compiled from Monthly Bulletins, 1970-1978).

Table 99. Sex ratios[a] of 1971-1981 emigration stream by region compared with 1976 population

Age group	Rarotonga		Southern		Northern		Total	
	Migration	Population	Migration	Population	Migration	Population	Migration	Population
0 - 9	94	109	95	103	106	108	95	106
10 - 19	98	106	114	113	117	108	106	109
20 - 29	109	98	60	93	64	62	88	94
30 - 39	97	104	63	80	33	89	78	95
40 - 49	118	111	58	99	142	95	97	105
50 - 59	119	137	59	103	500	120	91	121
60 +	67	110	71	112	300	96	67	108
Total	99	108	94	103	99	100	97	105

Source: *Cook Islands Census of Population and Housing, 1976;* migration data calculated from survival ratio estimates.
Note: [a] Sex ratio is the number of males per 100 females.

1976 and 1981 (table 100). These figures demonstrate the tremendous pressure of population growth on the absorptive capacity of the Cook Islands economy and society during the 1960s and 1970s.

Table 100. Projected numbers attaining age 17, 1966-1981 assuming no emigration

Period	Males	Females	Total	Annual average
1966-1971	1 126	1 042	2 168	434
1971-1976	1 404	1 424	2 828	566
1976-1981	2 022	1 865	3 887	777

Source: Based on the population in 1966 by single year. *Cook Islands Census of Population, 1966,* p. 19.

The sharp rise in emigration during the mid-1970s which followed the peak in natural increase by approximately 12-15 years, and the subsequent decline of emigration in the 1976-1981 intercensal period, suggests that high levels of emigration are related to the "demographic transition" through which the Cook Islands has been moving for the past several decades. If this were the case, the absolute number of emigrants per year could be expected to fall during the eighties, but the migration figures for 1981 and 1982 do not confirm this expectation.[26] While population growth increases the stock of potential emigrants, however, it is neither a necessary nor a sufficient condition for emigration to occur. In the Cook Islands case, a wide variety of institutional factors combine with population growth to produce the observed rates. The institutions involved vary by region and island and their importance depends partly on the specific age group in question. In very broad terms, the mode of land tenure and the basically small-scale peasant mode of production must be considered primary. Population growth is translated into emigration because the peasant mode of production constrains the speed at which new household-production units are able to form. During the early 1960s, for example, the average woman was bearing more than 7 children during her lifetime. With infant mortality decreasing at the same time, most of these children would eventually survive into adulthood, and under this demographic regime the probability of a young man acquiring a plot

[26] See Section L (below) for a fuller discussion.

of land equivalent in size to his father's was diminishing rapidly. Furthermore, with the increased longevity of parents, brought about by improved health conditions during the previous 40 years, there was a substantial delay before the effective control over land and other productive property could be transferred to sons or daughters.[27] In the meantime, young people must contribute their labour to the parental household at a lower rate of compensation than the foreign (or even the local) labour market offers. Moreover, their labour is supervised by elders having a lower level of formal education than themselves, and this supervision is felt to be particularly burdensome. Furthermore, without the transfer of property, particularly land, young people must either delay marriage, marry but form a joint household and submit to parental authority, or find an independent economic foundation for their own household. Local wage or salaried work is such a foundation and is the most common means of escaping dependence on the parental generation; but by itself, such employment is an insufficient basis for household formation, except at the highest income levels. For most families, land for food production is essential to maintain the desired standard of living, and land can only be acquired through the extended family or lineage. These institutional conditions particularly affect the 15-29 age group which, as noted above, from the majority of emigrants.

The expansion of formal secondary schooling in the 1960s, and the adoption of a curriculum oriented to the industrialized economy of New Zealand, act as a further "push" insofar as the 15-29 age group is concerned. The occupational aspirations which this educational system produces in Cook Islands youth (particularly in Rarotonga), exceed the realistic capacity of the Cook Islands economy now and in the foreseeable future. Higher education does not compel emigration in itself,[28] since most youth are able to adjust their sights downwards to a degree, but the inability to create an economic niche combining a wage or salaried occupation with a reasonable plot of land for food and cash-crop production is a crucial factor.

Another important "push" factor, which particularly affects mature householders in the outer islands, is the low profitability and general instability of cash crop production. While crop prices have risen, they have trailed behind the rate of inflation. With some loss of labour from emigration, cash-cropping has become more dependent on purchased inputs such as weed-killing chemicals, fuels and fertilizers, all of which have increased rapidly in price.[29] On the outer islands, where there are few wage and salary jobs, the difficulties of cash-cropping are severe enough to impel many to emigrate.

The shortage of medical and senior educational facilities on some of the outer islands – particularly in the northern group – provide another impetus to migration which may be felt across all age groups. The elderly are especially affected by the lack of specialized medical services. Few dentists ever visit the northern atolls, for example. In a survey of departures from Pukapuka during a 12 month period in 1978-1979, the largest single motivating factor (34.0 per cent of all departures to New Zealand) was to obtain medical treatment.[30]

A wide variety of social and political factors are also associated with emigration. The formation of political parties following the achievement of self-government provided a potent new vehicle for social division and conflict in the Cook Islands, and this ultimately had an effect on the level of emigration. A number of dismissed government workers emigrated after the 1972 election.[31]

Party politics are also implicated in the new mobility patterns which link the Cook Islands and New Zealand. As it has increased in size and affluence, the New Zealand-based community of Cook Islanders has become an important source of campaign funds and political support. During election years there is a steady ebb and flow of organizers, candidates and supporters between the two regions. And the high levels of emigration

[27] This phenomenon was observed in Germany during the nineteenth century. See: Rudolph Heberle, "The causes of rural-urban migration: a survey of German theories", *American Journal of Sociology*, vol. 43, 1938, pp. 932-950.

[28] See the results of a survey of Rarotonga high school students in: Geoffrey R. Hayes, *Migration, Population Change and Socio-economic Development in the Cook Islands*, unpublished Ph.D. dissertation, UBC, 1982, pp.109-114.

[29] Nick Taylor, "Attitudes to change in Cook Islands agriculture", Paper presented at fortyninth ANZAAS Congress, Auckland, 1979.

[30] Geoffrey R. Hayes, *op. cit.*, p. 104.

[31] Anthony Utanga, "Politics in the public service", in: *Cook Islands Politics* (Auckland, Polynesian Press, 1979), pp. 86-107.

Table 101. Average hourly wages[a] in New Zealand and the Cook Islands by industry, 1975 and 1980

($NZ)

Industry	1975			1980		
	New Zealand (1)	Cook Islands[b] (2)	Ratio (1) / (2)	New Zealand (3)	Cook Islands[c] (4)	Ratio (3) / (4)
Agriculture	...	0.47	...	...	0.93	...
Mining & quarrying	2.87	0.42	6.8	5.37	1.23	4.4
Manufacturing	2.49	0.49	5.1	4.90	1.07	4.6
Electricity	2.72	0.47	5.8	5.12	0.91	5.6
Construction	2.50	0.64	3.9	4.64	1.50	3.1
Trade	2.29	0.76	3.0	4.25	1.27	3.3
Transport	2.66	0.65	4.1	4.99	1.06	4.7
Finance	2.80	1.06	2.6	4.98	1.25	4.0
Services	2.75	0.81	3.4	4.99	1.27	3.9
All sectors	2.56	0.66	3.9	4.82	1.21	4.0

Source: Cook Islands Statistics Office, unpublished Employment Surveys, 1975 and 1980; New Zealand Department of Statistics, *New Zealand Yearbook*, 1976 and 1981.

Notes: [a] Ordinary time only.

[b] Maori wage earners, full-time and part-time workers (Rarotonga only).

[c] Maori and permanent residents, full-time and part-time workers (Rarotonga).

during the election years of 1972 and 1974 are attributed locally to the departure of disappointed opposition supporters. Although this association is difficult to substantiate, emigration did double in 1978 – another election year – by comparison with the previous three years.

Some Outer Islanders believe themselves to be the object of social as well as political discrimination. Because the ownership or control of land is virtually the foundation for social membership, particularly among the more tradition-minded, landless in-migrants to Rarotonga have considerably less social prestige than land-owning Rarotongans, and this provides a strong incentive for them to continue their migration on to New Zealand.[32]

[32] Norman George, "Organizing the exiles", in *Cook Islands Politics* (Auckland, Polynesian Press, 1979), p. 67.

In concert with these many "push" factors, which act with different force on various age groups and social strata, are a number of "pull" factors, without which emigration would not reach current levels. The most fundamental of these is New Zealand's extension of citizenship to include Cook Islanders. This is not in itself a "pull" force, but without it most pull factors would be ineffective. Secondly, there is the strong demand for Cook Islands labour in New Zealand and at wage rates four or more times those prevailing in the Cook Islands in similar occupations (table 101).

Perhaps the primary "pull factor, however, is the process of chain migration whereby jobs, accommodation, passage-money, housing and psychological support are provided by kin who have previously emigrated. This process greatly reduces the risk of unemployment, alienation or

financial insecurity for new migrants, and it often absolves them of the need to accumulate money to pay their own migration expenses.[33] Thus, the restraint of low rural incomes, which normally applies, even when the motivation to leave is strong, is much weaker than would otherwise be the case. The existance of migration chains is one reason why even a weakening of labour demand in New Zealand may have little effect on the emigration rate. Also, as New Zealand citizens, Cook Islanders actually benefit from New Zealand's immigration policies which are designed to protect jobs from other Pacific Islands immigrants such as Samoans, Tongans and Fijians, all of whose entry to New Zealand is currently restricted.[34]

The final category of conditions, "obstacles", is more difficult to document than the other two. Until 1973, when Rarotonga's international airport was completed, transportation was no doubt a limiting factor. The construction work itself provided a large number of jobs which, like the Makatea scheme in the 1950s, supplied much of the capital to emigrate to New Zealand, and the improved air services meant that transportation was cheap and virtually unlimited.[35] The fact that Pukapuka has the lowest rate of emigration for any island suggests that cultural conservatism, a high degree of social integration, as well as low cash incomes, can restrain emigration, though not eliminate it. It is also likely that some of the smaller southern outer islands have not had the cash incomes to finance emigration, but as their migrant communities become more established in New Zealand this constraint will tend to weaken.

J. CONSEQUENCES OF EXTERNAL MIGRATION

Emigration has two types of effects – demographic and non-demographic. The principal demographic effects are population growth, the age and sex composition of the population and its geographical distribution. These topics will be discussed here while the non-demographic consequences will be covered in chapter XII and elsewhere in this monograph.

1. Emigration and population growth

The primary effect of emigration during the past 15 years has been to dramatically reduce the rate of population growth and to reduce the size of the resident population. Between 1966 and 1971, when the rate of emigration was relatively low, population growth was reduced from an expected 4.07 per cent annually to 1.92 per cent, a 47.2 per cent reduction (table 102). In the 1971-1976 period, emigration effectively reduced growth by 186.5 per cent, or almost reversing the expected rate of growth. During the 1976-1981 period, the effect of emigration was substantially reduced, but the rate of growth was still equivalent to 114.9 per cent below what would have been expected without emigration.

In the northern group, migration had no effect on growth in the 1976-1981 period and the entire intercensal increase of 218 (annual growth rate of 2 per cent) can be attributed entirely to natural increase. But this was possible only because the migration losses from Pukapuka and Tongareva were made up by migration gains to Manihiki, and about one third of the losses in the female population were made up by the net in-migration of males.

The effects of migration on growth are presently strongest in the southern outer islands, and of these Mangaia and Mitiaro are the most affected. The long-term implications for population growth, should emigration continue at 1976-1981 rates, are discussed in detail in chapter XI; but one point can be made here. At present rates of natural increase, most emigrants will be replaced, but a small short-fall is likely, leading to a continued population decline of around 0.5 per cent per annum.

2. Effects of emigration on the age structure

If emigrants were drawn proportionately from all age groups in the population, no changes in the age structure would occur. As the previous discussion has shown however, emigration has been disproportionately concentrated in the 15-29 age group. This has two potential consequences: (a) the rate of growth in this age group will be reduced; (b) if the rate of emigration exceeds

[33] For a systems theory approach to chain migration in the Cook Islands see: Peter H. Curson, "Cook Islanders in town: a study of Cook Islands urbanization", unpublished Ph.D. dissertation, University of Tasmania, 1972.

[34] Richard Bedford, "Polynesian migration to New Zealand 1971-81: review and prospect", paper presented at SPC/ILO Conference of Migration, Employment and Development in the South Pacific, Noumea, February 1982.

[35] The real cost of transportation out of the Cook Islands has declined steadily since the 1960s (see Geoffrey R. Hayes, *op. cit.*, p. 361), but has probably risen again in the early 1980s.

Table 102. Differences between the expected and achieved rates of population growth, 1966-1981

Intercensal period	Expected rate[a] of growth (per cent)	Achieved rate[a] of growth (per cent)	Differences	Per cent
1966-1971	4.07	2.15	1.92	47.2
1971-1976	3.49	−3.02	6.51	186.5
1976-1981	2.74	−0.41	3.15	114.9

Sources: Expected rates of growth based on population projections for each intercensal period assuming observed fertility and mortality at the beginning of each period. Produced by computer programme "PROJECT", see Nathan Keyfitz and William Flieger, *Population: Facts and Methods of Demography* (San Francisco, W.H. Freeman), pp. 158-159. Achieved rates of growth are from table 8.

Note: [a] Average annual.

the rate of natural growth, the absolute numbers in this age group will decline.

Whether or not there has been an absolute decline in the size of specific age groups depends partly on which census is used as a comparative reference. If 1981 is compared with 1966,[36] an absolute decline is apparent in five age 0-4, 5-9, 25-29 and 65-69 age groups have decreased relative to 1966, but in the outer islands a broad range of age groups have experienced an absolute decline in numbers since 1966.

But the changing structure of a population is a function of the relative size of all age groups, and to observe the total effects of emigration it is necessary to refer once again to the population which would be expected in the absence of emigration and to compare this with the population which was actually enumerated. The percentages of each age group in these two populations is shown in table 103. Insofar as the total Cook Islands population is concerned, the two distributions are remarkably similar, but the effects of emigration are noticeable in the 0-4, 20-24, 25-29 and 30-34 age groups. The population aged 15-64 is slightly larger in the enumerated than in the expected population, and this is reflected in a slightly lower dependency ratio. This is also apparent in Rarotonga where it appears that the relative drop in the 0-9 age group, and the increase in the 15-19 group, has produced a lower dependency ratio than would have been the case without any emigration at all.

It is in the outer islands that the impact of emigration is clearly unfavourable to a balanced age structure. The dependent age groups (0-14 and 65+) are proportionately larger in the enumerated population than would be expected without emigration, and the 20-24, 25-29 and 30-34 age groups are all proportionately smaller. Consequently, while the dependency ratios of the outer islands have improved since 1966, they are worse than they would have been without emigration.

3. The sex ratio

The female bias in total net emigration has produced a more masculine population in 1981 than would have been the case without emigration. The expected sex ratio in 1981, assuming no emigration since 1966, would have been 100.4 compared to the observed ratio of 106.9. In Rarotonga the difference was even greater – 99.0 for the expected population compared with 107.3 for the observed. In the northern group, however, emigration actually improved the sex ratio from an expected 110.1 to an actual ratio of 107.4, while in the southern outer islands the reverse was the case (98.8 expected, 104.4 observed).

[36] The use of 1966 as a comparative reference does not imply that the age distribution in that year was an optimal one, it is used here only as a benchmark.

Table 103. Percentage of the expected and enumerated population in 1981 by age group and region

Age group	Rarotonga		Southern		Northern		Cook Islands	
	Expected	Enumerated	Expected	Enumerated	Expected	Enumerated	Expected	Enumerated
0 - 4	15.0	11.1	21.2	13.8	17.1	15.0	17.6	12.5
5 - 9	14.5	12.7	14.0	16.4	13.1	16.6	14.1	14.4
10 - 14	13.8	14.8	11.7	17.7	12.9	15.7	12.9	15.8
0 - 14	43.3	38.6	46.9	47.9	43.1	47.3	44.6	42.7
15 - 19	11.8	13.7	12.2	14.0	12.9	13.1	12.1	13.7
20 - 24	9.6	9.8	11.7	5.3	10.5	6.4	10.5	7.8
25 - 29	8.1	6.1	8.7	3.5	6.5	4.0	8.1	5.0
30 - 34	6.7	5.9	5.0	3.3	3.5	2.6	5.7	4.7
35 - 39	5.2	5.4	2.6	3.7	2.5	3.6	3.9	4.6
40 - 44	4.0	5.0	2.0	3.9	2.9	3.3	3.1	4.4
45 - 49	3.1	4.0	2.1	3.8	3.4	4.0	2.8	4.0
50 - 54	2.6	3.3	2.1	3.6	3.2	3.8	2.5	3.5
55 - 59	2.1	2.7	1.9	3.5	2.5	2.7	2.1	3.0
60 - 64	1.5	1.8	1.7	2.5	2.0	2.7	1.7	2.1
15 - 64	54.7	57.8	50.0	47.2	49.1	46.5	52.4	53.0
65 - 69	1.0	1.6	1.3	2.1	1.7	2.0	1.2	1.8
70 - 74	0.5	1.0	0.9	1.3	1.5	2.1	0.8	1.2
75 +	0.5	1.0	0.9	1.5	4.6	2.1	1.0	1.3
65 +	2.0	3.6	3.1	4.9	7.8	6.2	3.0	4.3
Dependency ratio	82.8	73.2	101.2	112.3	104.7	116.2	90.8	89.1

Source: Expected: population projections prepared by author; Actual: unpublished tables, *1981 Census of Population and Dwellings.*

4. Population Distribution

There are two aspects to population distribution in the Cook Islands' case: (a) the internal distribution between islands and regions; (b) the relative distribution of Cook Islanders between the Cook Islands and New Zealand. Both of these processes are affected by external migration, although the first of these is also affected by internal movement (see chapter VII). (The distribution of Cook Islanders between New Zealand and the Cook Islands is discussed in the next section.)

External emigration has an effect on internal distribution to the extent that emigrants are drawn selectively from a specific region or islands. As already discussed above, the degree of regional selectivity in Cook Islands emigration has tended to fluctuate during the past 15 years, but the southern outer islands has generally contributed proportionately more emigrants than their share of the total population would warrant. As table 104 shows, the principal effect of emigration during the 1966-1981 period was to reduce the southern outer islands' share of total population from 37.6 per cent to 33.0 per cent and to increase

Table 104. Cook Islands population distribution in 1981 with and without emigration from 1966

Region	Expected population, 1981		Observed population, 1981	
	Number	Per cent	Number	Per cent
Rarotonga	16 167	49.7	9 530	53.7
Southern outer islands	12 242	37.6	5 873	33.0
Northern outer islands	4 118	12.7	2 266	13.2
Total	32 527	100.0	17 754	100.0

Source: Expected population without emigration estimated by author; 1981 observed population from *Cook Islands Census of Population and Dwellings, 1981,* CPD8-82.

Rarotonga's share from 49.7 to 53.7 per cent. Emigration has little effect on the northern group's share of the total.

K. THE POPULATION OF COOK ISLANDERS IN NEW ZEALAND

The significance of a growing population of Cook Islands Maori in New Zealand – both Cook Islands-born and New Zealand-born – goes well beyond demographic issues or those questions of assimilation, integration or employment which are of particular concern to the New Zealand government and general public. As the population of Cook Islanders residing predominantly outside the geographical boundaries of the Cook Islands increases, so too does the potential impact of this group on the economy, politics and culture of the Cook Islands as a geographical entity. The economic dimension of this impact is evident in the flow of cash, goods, services and skills between the two poles of Cook Islands Maori society. Cash remittances from migrants produce more income *per capita* than commercial agriculture,[37] and any major change in the magnitude of remittance flows would have a substantial effect on the level of living in the Cook Islands.

Up until 1976, the vast majority of emigrants from the Cook Islands went to New Zealand. It has been estimated that 95.0 per cent of net departures by Cook Islands Maori between 1966 and 1976 were matched by net arrivals in New Zealand.[38] Increasing numbers of Cook Islanders were moving to distinations other than New Zealand in the late 1970s (table 105). When net departures from the Cook Islands are compared with net arrivals in New Zealand, every year since 1974 shows a negative balance indicating substantial movement to other countries. During the ten years 1972-1981 inclusive, according to these data, 1830 Cook Islands Maori (net) departed the Cook Islands but did not enter New Zealand. This number represents 23.0 per cent of net departures from the Cook Islands during the period.

There is some evidence that Australia has become the principal destination for Cook Islanders not going to New Zealand, and one source has suggested that between 4,000 and 5,000 Cook Islands Maori are resident there.[39] Assuming that few Cook Islanders were living in Australia in the early 1970s, this estimate is much too high. Even if all those Maori not going to New Zealand did settle in Australia, the number of Cook Islanders there (including children born

[37] It is difficult to estimate the total value of remittances since there is a myriad of ways that money can enter the Cook Islands. Some estimates suggest that in 1976, remittances of cash and goods *per capita* were six times *per capita* income from commercial agriculture. See: Geoffrey R. Hayes, *op. cit.*, p. 373.

[38] *Ibid.*, pp. 133-134.

[39] P. MacDonnell, cited in John Connell, Migration, Employment and Development in the Cook Islands, Country Roport (draft), SPC/ILO, Noumea, 1982, p. 23.

Table 105. The destination of Cook Islands Maori migrants: departures from the Cook Islands compared with arrivals in New Zealand, 1972-1981

Year ending 31 March	Net departures from the Cook Islands			Net arrivals in New Zealand			Balance = gain from or loss to other countries		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
1972	−194	−188	−382	+263	+223	+486	+69	+35	+104
1973	−522	−544	−1 076	+591	+552	+1 143	+69	−2	+67
1974	−893	−822	−1 715	+908	+730	+1 638	+15	−92	−77
1975	−923	−1 013	−1 936	+771	+846	+1 617	−152	−167	−319
1976	−204	−294	−498	+262	+204	+466	+58	−90	−32
1977	−222	−253	−475	−46	−62	−108	−268	−315	−583
1978	−61	−94	−155	−4	−120	−124	−65	−214	−279
1979	...	...	−599	+68	+316	+384	...	...	−215
1980	...	...	−724	+225	+490	+715	...	...	−9
1981	...	...	−417	−32	−38	−70	...	...	−487
Total	...	...	−7 977	3 006	3 141	6 147	...	...	−1 830

Sources: New Zealand Department of Statistics, *Population and Migration,* Part B, Migration, 1980-1981, p. 13; Cook Islands Statistics Office, *Statistical Bulletin: Overseas Migration,* 1972-1978 (adjusted to 31 March year); *Quarterly Statistical Bulletin,* December 1981; March 1982.

there) would be less than 2,000, and a figure in the region of 1,500-1,600 seems more realistic.[40]

There is no doubt that the number of Cook Islanders departing New Zealand has been growing apace during the 1971-1981 decade. As table 106 indicates, the ratio of permanent and long-term departures to the previous year's arrivals has increased from 16.7 per cent in 1972-1973 to 73.8 per cent in 1980-1981. For the period as a whole, the return ratio was 33.0 per cent of all arrivals, a total of 3,268 persons. The majority of these are, of course, returning to the Cook Islands, but there is clearly considerable potential for movement elsewhere. Unfortunately, it is impossible to determine the total extent of return migration using Cook Islands census or frontier data (see below).

The Cook Islands-born population of New Zealand has been increasing at a rapid rate since 1936 and reached 13,851 in 1981 (table 107). But the rate of increase has slowed down considerably during the 1976-1981 intercensal period as would be expected given the decrease in emigration from the Cook Islands and the rate of onward movement to Australia. It is interesting to note that since 1971 the female population of Cook Islands-born in New Zealand has increased at a faster rate than the male population. This is consistent with the female-dominant emigration stream from the Cook Islands.

Of course, the Cook Islands Maori population in New Zealand is increased not only by the immigration of those born in the Cook Islands, but also by births to Cook Islands Maori parents in New Zealand, both immigrants and those who are themselves New Zealand-born (less deaths to ethnic Cook Islanders). The total

[40] For four years from 1972 to 1975, the New Zealand Statistics Office bulletin *Population and Migration* (Part B, Migration) published country of next permanent residence by "race". A total of 403 Cook Islands Maori were reported destined for Australia from New Zealand. The series ceased in the 1974-1975 year, but an increasing trend was apparent. If the 1974-1975 rate of movement from New Zealand to Australia continued, approximately 1400 Cook Islanders would now be living there (not counting the Australian-born). As Hambeuchen has reported, however, direct movement from the Cook Islands to Australia is also occurring. See: W. H. Hambuechen, "Pukapukans at home in Wollongong", *Pacific Islands Monthly.* May 1981, p. 25.

Table 106. Cook Islands-born[a] persons departing New Zealand permanently or long-term in proportion to permanent and long-term arrivals in New Zealand

Year ending 31 March	(1) Departures from New Zealand			(2) Arrivals in New Zealand			(1) as percentage of (2) of previous year		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
1971-1972	64	76	140	334	294	628	..	..	..
1972-1973	47	58	105	603	547	1 150	14.1	19.7	16.7
1973-1974	77	73	150	883	774	1 657	12.8	13.3	13.0
1974-1975	138	140	278	926	976	1 902	15.6	18.1	16.8
1975-1976	212	186	398	496	486	982	22.9	19.1	20.9
1976-1977	184	176	360	394	334	728	37.1	36.2	36.7
1977-1978	224	148	372	356	312	668	56.8	44.3	51.1
1978-1979	268	264	532	344	412	756	75.3	84.6	79.6
1979-1980	206	209	415	364	338	702	59.9	50.7	54.9
1980-1981	280	238	518	294	305	599	76.9	70.4	73.8
1972-1981	1 700	1 568	3 268	4 994	4 778	9 772	34.0	32.8	33.0[b]

Source: New Zealand Department of Statistics, *Population and Migration*, Part B, Migration, 1971-1972 to 1980-1981.

Notes: [a] A small number of non-Maori will be included.

[b] Total of column (1) as percentage of total of column (2).

Table 107. The Cook Islands-born population of New Zealand, 1936-1981

	1936	1945	1956	1961	1966	1971	1976	1981[a]
Population								
Males	87	165	936	1 719	3 105	3 808	6 243	6 966
Females	70	228	1 029	1 665	2 773	3 581	5 980	6 885
Total	157	393	1 992	3 374	5 838	7 389	12 223	13 851
Intercensal increase								
Males	..	78	771	783	1 386	703	2 436	723
Females	..	158	801	636	1 068	848	2 399	902
Total	..	262	1 599	1 382	2 464	1 551	4 834	1 628
Average annual increase								
Males	..	7.7	12.7	11.8	11.5	4.1	9.7	2.2
Females	..	11.8	11.6	9.4	9.7	5.4	10.0	2.8
Total	..	10.6	12.2	10.3	10.7	4.7	9.8	2.5

Source: New Zealand Department of Statistics, *New Zealand Census of Population*, 1936-1981.

Note: [a] Refers to "usually resident" population only.

Table 108. Cook Islanders[a] residing in the Cook Islands and New Zealand, 1936-1981

	Cook Islands residents			New Zealand residents						Total Cook Islands Maori		
				Total			New Zealand born					
	Males	Females	Total	Males	Females	Total	Males	Females	Total	Males	Females	Total
1936	6 214	5 729	11 943	57	36	93	12	11	23	6 271	5 765	12 036
1945	6 906	6 668	13 754	148	205	353	31	59	90	7 054	6 873	13 927
1951	7 618	7 139	14 757	683	676	1 359	170	190	360[b]	8 301	7 815	16 116
1956	8 845	7 814	16 259	1 144	1 176	2 320	341	378	719	9 989	8 990	18 579
1961	9 144	8 720	17 864	2 305	2 194	4 499	869	888	1 757	11 449	10 914	22 363
1966	9 373	9 244	18 617	4 526	4 137	8 663	1 758	1 775	3 533	13 899	13 381	27 280
1971	10 841	10 097	20 938	7 052	6 720	13 772	3 316	3 196	6 512	17 893	16 817	34 710
1976	8 803	8 519	17 322	9 538	9 072	18 610[e]	3 628	3 415	7 043[e]	18 341	17 591	35 932
1981	8 421	8 014	16 435[c]	12 060	11 820	23 880[d]	...	...	10 293	20 481	19 834	40 315

Sources: *New Zealand Population Census, 1936-1981; Cook Islands Census of Population, 1936-1981.*

Notes: [a] Includes both "full" and "part" Maori.

[b] Includes Niueans.

[c] Resident Maori only.

[d] Usually resident population only. Note that the New Zealand Census is conducted in March while the Cook Islands census is held in December. Some Cook Islanders will have been counted in both places if they moved from New Zealand to the Cook Islands in the interim and treated both locations as their usual residence. Conversely, those who moved to New Zealand between census dates may not have been counted in either location.

[e] Beginning in 1976 only those of one half or more Cook Islands Maori descent were classified as Maori in the New Zealand Census. This change in definition tends to understate both the number of Cook Islands Maori usually resident and born in New Zealand and, consequently the total number of Maori in the two locations.

Table 109. Average annual growth rates of four components of the Cook Islands Maori population, 1936-1981 and their proportions of the total

Intercensal period	Cook Islands Maori populations of the Cook Islands		Cook Islands Maori population of New Zealand		Cook Islands Maori population in New Zealand and born in New Zealand		Total Cook Islands Maori in Cook Islands and New Zealand	
	Growth rate	Proportion	Growth rate	Proportion	Growth rate	Proportion	Growth rate	Proportion
1936-1945	1.6	97.5	13.0	2.5	13.2	0.6	1.6	100.0
1945-1951	1.2	91.6	19.6	8.4	20.0	2.2	2.4	100.0
1951-1956	1.9	87.6	10.4	12.4	13.3	3.9	2.8	100.0
1956-1961	1.9	79.9	12.8	20.1	16.8	7.8	3.7	100.0
1961-1966	0.8	68.2	12.7	31.8	13.4	13.0	4.0	100.0
1966-1971	2.3	60.5	9.1	39.5	11.9	18.8	4.8	100.0
1971-1976	−3.8	48.2	6.0	51.8	1.6	19.6	0.7	100.0
1976-1981	−1.0	40.8	5.0	59.2	7.5	25.5	2.3	100.0

Source: Table 108.

Note: [a] At the end of the stated period. Total refers only to Cook Islands Maori in New Zealand and the Cook Islands. Those living in Australia or elsewhere are not included.

population of Cook Islands Maori by ethnicity resident in New Zealand has increased from just 93 in 1936 to 23,880 in 1982 (table 108). Since the latter figure excludes those of one quarter Maori descent or less it represents an understatement of the total Maori population.[41]

The figure of 40,315 total Cook Islands Maori should also be viewed as an understatement. First, Cook Islanders living elsewhere in the world are excluded; second, Cook Islanders of one quarter descent or less are also excluded.

Nevertheless, these figures indicate clearly that Cook Islanders living within the Cook Islands are now a minority of all Cook Islands Maori. The proportions of each component of the total Maori population are shown in table 109. Excluding those in Australia and elsewhere, New Zealand resident Cook Islanders now comprise almost 60 per cent of the total. If it is assumed that about 2,500 Maori live outside New Zealand and the Cook Islands, the share of the Cook Islands resident component drops to only 38.4 per cent.

The fastest-growing component of the Maori population at the present time is the New Zealand-born group. Although this figure too will be an understatement, 25.5 per cent of the total Cook Islands Maori population in 1981 were both born in and residing in New Zealand. This figure understates the total number of New Zealand-born Cook Islanders since those who have emigrated to the Cook Islands (mostly children of temporary migrants) are not separated in the table.

While it is difficult to determine the number of return migrants in the population of the Cook Islands, the number of persons born in New Zealand has increased from 1,155 (6.4 per cent) in 1976 to 1,606 (9.0 per cent) in 1981, about half of whom were under 15 years of age.

The Cook Islands Maori population in New Zealand is relatively young (38.2 per cent is under age 15), but in general has a more balanced age structure than the population of the Cook Islands. The dependency ratio in 1981 was 65.8, compared with 89.1 for the Cook Islands, and this reflects the larger proportion of working age persons in the New Zealand-resident population (60.3 per cent compared with 52.9 per cent in the Cook Islands).

[41] The Cook Islands census appears to use a more inclusive definition of ethnicity.

L. THE FUTURE OF MIGRATION

With fertility decreasing rapidly in the Cook Islands, emigration has become the primary determinant of population size. At the present time, however, there is no general social science model which would enable future emigration rates to be predicted exactly. Nevertheless, there are a number of partial theories whose relevance to the Cook Islands case can be usefully explored. In combination with knowledge of the migration trends in the Cook Islands, such theories should permit some indication of the conditions under which migration can be expected to increase or decrease in the near future. Once these conditions have been identified it would be possible to consider the extent to which they could be influenced by public policy.

The selection of an appropriate model or theory of Cook Islands migration is hampered by two conditions: in the first place, of the many studies of Cook Islands migration, none have attempted to systematically test a specific explanatory model or models;[42] secondly, most migration models are designed either for mature industrialized ("developed") societies, or for "Third World" developing societies, rarely for both. The first condition means that the available data on the determinants of migration have been collected on an *ad hoc* basis and are not suitable for the retrospective testing of theory; the second condition is problematic mainly because the Cook Islands does not fit neatly into the class of "developed" or "underdeveloped" societies. Being citizens of New Zealand (and not just nationals) Cook Islanders participate freely in the labour market and consumption patterns of a "developed," industrial economy. This reality gives Cook Islands migration some of the characteristics of internal movement within New Zealand. On the other hand, Cook Islands migration

[42] Most studies of Cook Islands' migration have employed *ad hoc* hypotheses with an emphasis on "economic" conditions. An important exception, and the most sophisticated treatment to date, is Curson's application of systems theory. See footnote 33.

patterns exhibit many of the characteristics of "Third World" societies: migrants are generally young and recent entrants to the labour force; a growing proportion of total movement is made up of circular moves between a rural home base and an urban wage job; social contact with the household of origin is not lost through migration but is maintained through the flow of remittances, goods, information; and there is an extremely large differential between potential earnings in the sending and receiving societies.

The Cook Islands thus represent a unique mixed type of migration system in which levels and rates are extremely difficult to predict.

In broad terms we can identify four general classess of migration theory: (a) "gravity" models; (b) labour force adjustment models; (c) "human capital" models; (d) "transition" or "stage" models.[43] In addition to these are various "micro" models which attempt to explain the process by which individual decisions to migrate are made. While in reality there is a continuum between "micro" and "macro" levels of analysis, their integration in the Cook Islands case is made difficult by the shortage of data concerning the reasoning Cook Islanders follow in reaching a decision to migrate. For example, we do not know the extent to which this decision is made exclusively by an individual rather than by the household head with or without negotiation.[44] Given this limitation, the following discussion focuses primarily on "macroscopic" models.

A "gravity" model suggests that migration is directly related to the population size of the sending and receiving areas and inversely related to the distance between them.[45] Applied to the Cook Islands case, this model, which focuses largely on the potential information flow between the two regions, would predict continued high rates of emigration from the Cook Islands to New Zealand. As the population of Cook Islanders in New Zealand increases and that of the Cook Islands decreases, the amount of information received by the latter about the former will increase (absolutely and relative to the reverse) and migration will increase. Insofar as Cook Islanders are now migrating to Australia, a substantially larger population than New Zealand, this model would predict an increasing out-flow of migrants in that direction. The additional distance to Australia would act as a restraining factor, however.

Within the general class of "gravity" models can be placed those theories which emphasize the social momentum which may be built up as a migration system becomes established.[46] This is implicit in Curson's research,[47] although the possibility of "equilibrium" is also explored. At a certain point in the development of a migration system, migration becomes "semiautomatic" behaviour rather than a consciously chosen act based on an assessment of the relative costs and benefits to the individual. Migration is thus linked to previous migration and therefore becomes self-perpetuating.

The labour force adjustment approach argues that migration represents the means by which labour demand and supply, as well as wage rates, becomes equilibrated in space.[48] Everything else being equal, migration from a low-wage to a high-wage area will continue until both wage rates and unemployment levels are the same in both areas. The volume of migration will be directly related to the size of the wage differential between the sending and receiving areas.

As already indicated in this chapter, there is a wide discrepancy between wage rates in the Cook Islands and New Zealand, and the evidence suggests that the gap has not diminished since 1975. This model would therefore predict continuing emigration. The theory assumes that all migration has the character of "labour" migration and that individuals respond directly to wage rates. While this may describe those emigrants with some occupational training and work experience who are able to compare the wages offered in the Cook Islands and New Zealand for similar work, it does

[43] Lawrence A. Brown and Rickie L. Sanders, "Toward a development paradigm of migration, with particular reference to third world settings", in Gordon F. De Jong and Robert W. Gardner, (eds.) *Migration Decision Making* (New York, Pergamon Press, 1981), pp. 149-185.

[44] Bollard has observed that on Atiu a young man asks the permission of elder relatives before emigrating and that such permission may be denied if he is the last adult male in the household. Allan Bollard, *Agricultural Project Design and Evaluation in an Island Community* (Canberra, Australian National University Press, 1979) Development Studies Centre Monograph No. 15, p. 29.

[45] Lawrence A. Brown and Rickie L. Sanders, *op. cit.*, p. 157.

[46] For example, William Peterson, *Population* (New York, MacMillan, 1975), p. 315.

[47] Peter H. Curson, "Cook Islanders in town. . .".

[48] Lawrence A. Brown and Rickie L. Sanders, *op. cit.*, p. 157-158.

not account for those new labour force entrants who have no experience and whose options are to work within the family productive unit for intermittent cash income or to seek more formal employment in New Zealand. Thus, the theory does not take into account the differences in the institutional framework of production in the two areas. Nor does this theory explain migration undertaken for education or social reasons. The model cannot be completely rejected in the Cook Islands case, however; in the absence of more detailed survey data than are currently available, the most that can be said is that an unknown proportion of migrants are influenced by differential wage rates, but this differential in itself cannot provide the basis on which future levels of emigration can be predicted.

The "human capital" approach to migration is similar to the labour allocation model except that it is not the present discrepancy between wage levels which produces migration but, rather, the expected present value of future earnings in the destination economy compared with the economy of origin. That is, migrants are assumed to estimate their total lifetime earnings in the two locations and to move to the one which offers the highest returns.[49] This is a useful refinement of the labour allocation model insofar as it helps to explain why a reduction in the current demand for labour in the receiving society may have little effect on migration levels (as appears to have been the case in Cook Islands emigration vis-a-vis the New Zealand economy). Potential emigrants consider their total lifetime earnings discounted by their estimate of the period they may have to spend unemployed and looking for work.

The "human capital" approach also provides the link between education and the propensity to emigrate. Education, particularly that which is oriented specifically to an urban culture and the acquisition of urban occupational skills, increases the capital value of the potential migrant, hence his potential productivity. The capital value of an urban-oriented education received by a rural resident cannot be exploited, however, as long as he remains in the rural area. Thus, a further "investment" in migration is required for the individual to receive the benefits of the capital already embodied in him by education. This theory partly explains why migration tends to be concentrated in young, new labour force entrants: the longer the period between initial emigration and the end of the individual's working life, the greater the total net benefits he will receive over his lifetime, and the longer the period in which the costs of emigrating can be amortized. Conversely, this explains why emigration is lower among older age groups: on the one hand, by staying in the rural area they have accumulated a certain amount of "location specific" capital (land, a home, obligations from kin, etc.); on the other hand, they have a considerably shorter period in which to re-coup their investment in migration, even though the present discrepancy in earnings between the two areas may be wide.

This model would also predict continued emigration from the Cook Islands so long as the educational system is oriented to the urban industrial economy of New Zealand; that is, so long as the Cook Islands' investment in human capital realizes a higher return in New Zealand than the Cook Islands. Since migration is partly a function of age, however, the model also implies that as the population ages (because of fertility decline) there will be fewer young labour force entrants who will seek to emigrate and the number of emigrants will therefore tend to fall.

Transition or "stage" models include both socio-demographic and macro-economic variants. The socio-demographic approach is exemplified by the work of Kingsley Davis[50] and Wilbur Zelinsky.[51] Davis suggests that during the period of rapid natural growth which has characterized most nations undergoing industrialization, "...families tended to use every demographic means possible to maximize their new opportunities and to avoid relative loss of status."[52] These demographic means include emigration, birth control, abortion, late marriage, and so on. Thus, the responses to unprecedented natural increase are "multiphasic," that is, they cover the entire range of possible actions. Emigration is one response among others and is especially likely to occur in an agrarian economy where productive resources are inherited through the family.

[49] Michael P. Todaro, "A model of labor migration and urban unemployment in less developed countries", *American Economic Review*, vol. 59, pp. 138-148.

[50] Kingsley Davis, "The theory of change and response in modern demographic history", *Population Index*, vol. 29, 1963, pp. 345-356.

[51] Wilbur Zelinsky, "Demographic transition: changing patterns of migration", in *Population Science in the Service of Mankind*, (Liege, Belgium, International Union for the Scientific Study of Population, 1979), pp. 165-188.

[52] Kingsley Davis, *op. cit.*, p. 356.

This model, then, links migration to the stages of the "demographic transition"; specifically it occurs when natural increase reaches such a level that additional family members cannot be absorbed into the rural economy without a reduction in the average standard of living. The logical implication of this model is that once the fertility transition has occurred, such drastic responses as high rates of emigration will no longer be required. Late marriage, contraception and family planning will have become institutionalized by this time, thus reducing both the number of potential migrants as well as the economic pressures which previously impelled many to emigrate.

Applied to the Cook Islands case, this model would predict a decline in the absolute number of emigrants as the fertility transition proceeds and natural growth declines. There is some evidence which suggests that this may be the case. When plotted against natural increase (with a time-lag of 12-15 years) net migration in absolute numbers and triennial averages) from the Cook Islands follows a similar trend, although the migration peak in 1972-1974 was much higher than could be predicted from the model. As Davis also points out in the case of Japan and other countries, rural out-migration did not suddenly stop when the "surplus" natural growth had been removed; rather, a substantial portion of the base population of rural areas was removed as well. Thus, the strain toward equilibrium, which may be occurring over several decades, can be expected to produce feedback effects which substantially change the original circumstances to which emigration was intended to be a response.

A variant of this approach which focuses explicitly on migration and other forms of population mobility has been advanced by Zelinsky in the form of a "mobility transition" hypothesis. As the "vital transition" in mortality and fertility proceeds, population mobility also passes through a number of stages which are interdependent with the vital transition. Particularly important in this context are the "early" and "late" transitional periods. As discussed in previous chapters, the vital transition is well underway in the Cook Islands. In Zelinsky's terms, Rarotonga is in the "late" stage of the vital transition while the outer islands are in the "early" stage. Insofar as the mobility patterns in this schema apply to peripheral societies such as the Cook Islands, high rates of rural-urban migration are to be expected along with the immigration of skilled workers and professionals and the growth of circulation. This does describe Rarotonga in the early 1970s,[53] and with the exception of the immigration of skilled workers and professionals could also be said to fit the outer islands (particularly the southern group) during the late 1970s. Assuming that the Cook Islands were able to enter "phase III" of the mobility transition, emigration could be expected to slow down while circulation would increase. Evidence presented in this chapter suggest that circulation – as opposed to permanent emigration – has been increasing throughout the 1970s, but the net balance of movement remains negative at the present time.

The socio-economic version of the "stages" approach to migration suggests that societies undergoing industrial development pass through two stages. In the early stage economic growth tends to occur in the modern sector represented by one or more "core" cities which draw population from the "periphery" whose economy remains "traditional" in nature. In this stage the periphery is drained of its resources and polarization effects increase the disparity between the two regions. At a later stage, "spread" or "trickle-down" effects tend to reverse this process as both migration and economic growth spread from core cities to the periphery and the discrepancy in living standards between core and periphery is reduced.[54]

A major difficulty with this theory is that it is based on broad historical processes which give little indication of short-term trends. A second problem is its applicability to the Cook Islands case. Insofar as the Cook Islands is treated as a nation-state, these polarization effects may be expected to occur within its own boundaries; that is, between Rarotonga as the developing "core" and the outer islands as "periphery." Treated more realistically as a hinterland territory of New Zealand, however, Rarotonga would be seen as a periphery of Auckland and the other islands as the periphery of the periphery. In such a case then, the process of polarization reversal, and its timing, depend on the maturation of the New Zealand economy and the effects of public policy in the Cook Islands would be minimal.

In summary, then, we can see that those theories which focus on the absolute magnitude of

[53] There was some inflow of skilled expatriates, but a net outflow of skilled Cook Islanders.

[54] Lawrence A. Brown and Rickie L. Saunders, *op. cit.*, pp. 172-174.

discrepancies between the Cook Islands and New Zealand (or Australia), such as population size, current wages, total lifetime earnings (and, by extension, general living standards), forecast continued emigration. On the other hand, those theories which emphasize evolutionary change (either demographic or socio-economic) envision a decrease in emigration, possibly accompanied by an increase in circulation.

The first view has been strongly argued recently by Connell[55] on the grounds that the prospects for real economic growth and the expansion of employment opportunities in the Cook Islands are poor. The Cook Islands can never expect to achieve parity with New Zealand or Australia in the level of material rewards, especially in the outer islands, and even the maintenance of present standards of living depends upon the continued supply of foreign aid. The cycle of cumulative causation whereby low incomes and productivity leads to emigration which further reduces national productivity, and so on, is unlikely to be broken in the short-term, according to this view.

The continuation of high emigration from the southern outer islands at just above the long-term (1966-1981) rate for the Cook Islands as a whole supports this pessimistic outlook, but the return migration of males to the northern group, and the continued (relatively) low rates of emigration from Pukapuka and Rakahanga cannot be explained within this framework.

It appears obvious that none of the models discussed in this section can account for the uniqueness of the Cook Islands' polity-economy nor the complexity of its migration patterns. As shown in section I, migration can be motivated by political, social status and cultural considerations quite independently of the socio-economic conditions most migration theories focus upon. The fact that Cook Islands' migration patterns are determined by a multiplicity of "factors" which vary from region to region makes it extremely difficult for one theory to fully explain or predict them.

[55] John Connell, *op. cit.*

M. CONCLUSION

Migration remains the most powerful and volatile factor affecting the size of the Cook Islands population. While the net outflow of Cook Islands Maori dropped by 52 per cent between 1980 and 1981, it increased again by almost 50 per. cent in 1982, and the crude emigration rate remains substantially above the rate of natural increase. Thus the population continues to decline.

Net emigration during the 1976-1981 intercensal period has decreased by 61.0 per cent in comparison with the 1971-1976 period, and net migration from the northern group virtually ceased as some islands experienced a net in-flow and others a net out-flow. Rarotonga continues to contribute to the nex emigration stream in proportion to its population size, but the southern outer islands contribute relatively more emigrants than their populations warrant. And net emigration from the southern group is more evenly distributed across all islands than was the case in the 1971-1976 period.

Net emigration has also become more concentrated in the 10-19 age group than was previously the case. This suggests that high school education and first jobs are the primary motives for emigration. It also appears that more females are emigrating than males, particularly from the outer islands. This may be related to the higher levels of education received by women and the shortage of commensurate employment opportunities in the outer islands.

The principal demographic effects of emigration are a reduction in the growth rate and the distortion of the age structure. The latter effects are concentrated in the outer islands, however, and the emigration of children from Rarotonga in recent years appears to be improving the dependency ratio.

The future of emigration in the Cook Islands is uncertain and cannot be predicted from present theory. A cautious assessment must conclude that a sharp break with the past is unlikely and that migration losses will continue to occur for some years to come.

Chapter IX
POPULATION AND ECONOMIC ACTIVITIES

A. INTRODUCTION

Economic activities in the sense used here are those which have to do with the production, distribution and exchange of commodities, goods and services. Censuses are, of course, an imperfect source of detailed information regarding the full range of economic activities that an individual may be engaged in over the course of a period such as a year. This is particularly the case in economies such as those of the outer Cook Islands where the degree of occupational specialization is low and the average adult is engaged in a multiplicity of activities. And even in Rarotonga, where the vast majority of the labour force is engaged in some form of paid employment, many householders are simultaneously involved in such informal activities as subsistence and cash-crop production or petty trading. But an in-depth analysis of such occupational patterns requires special time-budget surveys designed for the purpose.

Nevertheless, the problem of occupational multiplicity has not been ignored in the Cook Islands census. Information on "primary" an "secondary" activities has been collected in each census since 1966. Unfortunately that was the last year for which such data were published, although some unpublished data from 1971 are available.

Censuses measure economic activities in terms of either (a) the "gainful worker" concept referring to a person's "usual" activity, or (b) the "labour force" method which measures a person's activity during a specific reference period – usually the week of the census.[1] The nature of a person's involvement in the economy may be different depending on the definition employed. As far as can be determined, the 1956 Cook Islands census used the "gainful worker" concept while subsequent censuses have used the "labour force" approach.[2] In 1966 and 1971, the reference period was apparently the day of the census, whereas subsequent censuses have referred to the week preceding the census date. Where the distribution of the currently unemployed by industrial sector is concerned, however, the person's usual or last activity is reported.

The "economically active" population refers to all persons 15 years of age and over who were either engaged in economic activities as previously defined or were able and willing to be so engaged. Even though presently inactive, the unemployed are included since they represent part of the total supply of labour power present in the economy. A portion of the economically active population which is not classified as unemployed may nevertheless be "underemployed," that is, they may currently be working fewer hours than they would normally be willing and able to work. Unfortunately, it is impossible to measure the degree of underemployment directly using Cook Islands census data, but some indirect indicators will be discussed below.

B. THE "WORKING AGE" POPULATION

The potential supply of human resources in an economy is determined in the first instance by demographic factors. Although both the young and old contribute labour to the economy, the principal contribution normally comes from the 15-65 age group. This is true in the Cook Islands case although there is little doubt that occasional involvement of both the young teenage population and elderly in productive activities (e.g., harvesting and maintaining cash crops, subsistence production on weekends, etc.) is far from negligible, especially in the outer islands. Nevertheless, school attendance is compulsory up to age 14, and 65 is the official age of retirement,[3] so there is some justification in referring to this group as the principal supplier of labour power.

[1] Henry S. Shryock and Jacob S. Siegel, *Methods and Materials of Demography* (Washington, United States Bureau of the Census, 1975), p. 337.

[2] No labour force statistics were published from the 1961 census.

[3] Persons also become eligible for an old-age pension at age 65.

Table 110. The working age population, 1956-1981, by island and region

Island/region	Males						Females						Total					
	1956	1961	1966	1971	1976	1981	1956	1961	1966	1971	1976	1981	1956	1961	1966	1971	1976	1981
Rarotonga	2 163	2 395	2 513	2 961	2 559	2 851	1 829	2 130	2 343	2 677	2 434	2 651	3 992	4 524	4 856	5 638	5 033	5 502
Aitutaki	634	...	487	604	502	600	583	...	558	626	537	548	1 217	...	1 045	1 230	1 039	1 148
Atiu	327	...	267	280	264	283	273	...	257	271	252	266	600	...	524	551	516	549
Mangaia	528	...	371	386	311	323	461	...	410	423	307	331	989	...	781	809	618	654
Mauke	202	...	143	143	137	141	190	...	134	158	139	144	392	...	277	301	276	285
Mitiaro	62	...	47	58	51	68	55	...	51	63	47	52	117	...	102	121	98	120
Southern outer islands[a]	1 767	1 432	1 333	1 473	1 265	1 422	1 562	1 423	1 410	1 541	1 284	1 344	3 329	2 855	2 743	3 014	2 549	2 766
Manihiki	157	...	134	97	53	110	182	...	113	88	48	91	339	...	247	185	101	201
Palmerston	16	...	17	10	10	10	16	...	21	18	15	11	32	...	38	28	25	21
Pukapuka/Nassau	209	...	190	178	174	210	212	...	186	200	205	211	421	...	376	378	379	421
Rakahanga	80	...	74	62	36	61	82	...	61	74	59	75	162	...	135	136	95	136
Tongareva	160	...	114	134	101	147	146	...	109	122	106	120	306	...	223	256	207	267
Northern outer islands	670	713	529	481	374	538	642	651	490	502	433	508	1 312	1 364	1 019	983	807	1 046
Total Cook Islands	4 600	4 540	4 372	4 915	4 238	4 873[b]	4 033	4 204	4 243	4 720	4 151	4 518[b]	8 633	8 744	8 615	9 635	8 389	9 391[b]

Source: Cook Islands Statistics Office, *Cook Islands Census of Population and Housing, 1976* (Rarotonga, Cook Islands Statistics Office, 1977), pp. 58-67.

Notes: [a] Includes Manuae.

[b] Includes "at sea"

The main determinants of potential labour power are fertility and migration. Given the high rates of emigration from the Cook Islands since the 1950s, the question of a depleting labour force has often arisen. Since the early 1960s, a number of observers have pointed to labour force depletion as the principal danger in continual out-migration.[4] Less attention has been paid to the "supply side" of the labour force, however, which is natural growth.

In spite of persistent net migration losses, the "working age" population of the Cook Islands has not decreased since 1956, but has increased by 8.8 per cent from 8,633 in that year to 9,391 in 1981 (table 110). What is clear, however, is that the increase in the labour supply has not occurred evenly across all islands but has been concentrated almost entirely in Rarotonga (27.4 per cent increase). With the exception of Pukapuka/Nassau, and perhaps Mitiaro, all the outer islands have lost population from this age group over the past 25 years. In some cases, however, the losses are relatively small – 5.7 per cent from Aitutaki, 8.5 per cent from Atiu, and 12.7 per cent from Tongareva. But rather more severe losses are apparent from Mangaia (33.9 per cent) and Manihiki (40.7 per cent), and as chapter VIII indicated these are the islands with the highest rates of out-migration.

It is important to note, however, that with the single exception of Palmerston, the 15-64 age group has increased on every island during the 1976-1981 intercensal period. While some of these increases are modest (3.3 per cent of Mauke and 6.4 per cent on Mangaia), Manihiki's working age population doubled and Rakahanga's increased by 30.1 per cent.

From a long-term perspective, then, 1976 appears to represent a low-point in the size of the working age population, primarily because of high rates of emigration during the previous five years. As emigration slowed down after 1976, a definite recovery has occurred; and although few islands other than Rarotonga have increased their working age population relative to 1956 (Pukapuka/Nassau's is identical), most have returned to approximately their 1971 levels (the single exception being Mangaia).

As already discussed in chapter IV, changes in the age composition of the population have led to much lower dependency ratios than was the case in 1976 and previous years. The total dependency ratio fell from 115.6 in 1976 to 89.1 in 1981 – a 23 per cent reduction. In other words, more workers were supporting fewer dependents in 1981 than since the 1950s, and these changes have occurred throughout all regions of the country. As indicated in chapters IV and V, the main reason for the improved dependency ratios is declining fertility. That is, the ratio of children to workers has decreased; but the ratio of the elderly to workers has not. And where the size of the working age population has increased, it is mainly because the slow-down in emigration has increased the number of young workers aged 15-24, and not the number of "mature" workers.

C. THE ECONOMICALLY ACTIVE POPULATION

The demographic definition of the labour force refers, of course, to potential labour power, not that which is actually utilized. Some persons may be disabled while others are attending high school or university or are simply inactive (recipients of rent or remittances). The proportion of the Cook Islands population above the age of 15 which was engaged in economic activities at various census dates is shown in table 111. It would appear that the "gainful worker" approach used in 1956 resulted in an extremely low rate of female participation by comparison with subsequent censuses, and the jump in the rate in 1966 almost certainly has to do with this shift in definition. For comparative purposes, then, it is best to begin from a 1966 base, bearing in mind that minor definitional changes may also be involved in subsequent years.

The total number of economically active persons has changed little since 1966 – a decline of 112 males being offset by an increase of 139 females. The overall participation rate has tended to fall somewhat through time, except for females, presumably because of the expansion of education facilities (but other factors also may be involved). This is particularly apparent in the southern outer islands where the participation rate for both sexes combined was only 49.6 per cent in 1981 compared with 68.9 per cent in the northern group and 63.6 per cent in Rarotonga. The main reason

[4] G.W. Jones and Gerard Ward, "Rural labour shortages in Southeast Asia and the Pacific: a review of the evidence," in G.W. Jones and H.V. Richter, (eds.) *Population Mobility and Development: Southeast Asia and the Pacific* (Canberra, Australian National University Press, Development Studies Centre Monograph No. 27, 1981); Norma McArthur, "Contemporary Polynesian emigration from Samoa and the Cook Islands", *Journal of the Polynesian Society*, vol. 70, 1961, pp. 1-10.

Table 111. The economically active population by region and sex, 1956-1981

		Males		Females		Total	
		Number	Rate	Number	Rate	Number	Rate
Rarotonga	1956	2 133	93.4	376	19.5	2 509	59.5
	1966	2 380	89.0	1 032	41.3	3 416	66.0
	1971	2 652	85.3	1 197	42.4	3 849	64.9
	1976	2 314	83.8	1 190	46.1	3 504	65.6
	1981	2 289	80.6	1 198	45.2	3 487	63.6
Southern	1956	1 804	97.2	88	5.3	1 892	53.8
	1966	1 235	86.5	357	23.4	1 592	61.5
	1971	1 354	84.9	411	24.4	1 765	53.9
	1976	1 172	83.6	227	16.1	1 399	49.8
	1981	1 198	77.3	296	20.2	1 494	49.6
Northern	1956	662	97.2	26	3.7	688	49.6
	1966	548	93.2	231	41.7	779	68.2
	1971	500	91.2	155	27.1	655	58.5
	1976	364	81.8	117	23.0	481	50.4
	1981	528	87.0	258	45.2	786	66.7
Cook Islands	1956	4 694	95.4	490	11.4	5 139	56.0
	1966	4 163	88.8	1 620	35.4	5 783	62.4
	1971	4 506	85.8	1 763	34.7	6 269	60.7
	1976	3 850	83.5	1 534	34.1	5 384	58.9
	1981	4 051	80.5	1 759	37.5	5 810	59.7

Sources: Cook Islands Statistical Abstract, 3-1979; Population Censuses, 1956-1981.

for these differences is the lower female participation rate in the southern outer islands.

The high female participation rate in the northern group in 1981 would appear to be a consequence of a change in the definition of economic activities. The effects of the change were particularly noticeable in Pukapuka. Since women above the age of 15 were estimated by the Statistics Office to spend an average of 10 hours per week maintaining taro plots, they have been classified as "subsistence" workers and included in the economically active population.[5] In previous censuses, however, such activities were apparently treated as an extension of the "homemaker" role resulting in a smaller labour force.[6] It would appear that the 1981 classification system was similar to what was used in 1966.

The number of economically active males in the northern group has increased by 164 since 1976 – a jump of 45 per cent – and the participation

[5] Personal communication with Cook Islands Statistics Office.

[6] As a result of this mode of classification, only 5 females (all of them about 54 years of age) were considered "homemakers," whereas 50 women on Manihiki were so classified. There remains some doubt whether Manihiki women are less economically engaged than Pukapukan.

rate has also increased. These changes may be related to male in-migration during the 1976-1981 period as well as to changes in definition. While the number of economically active males in the southern outer islands has remained virtually static since 1976, there has been a drop in the participation rate from 83.6 to 77.3 per cent, and a similar trend is apparent in Rarotonga.

In spite of fairly high rates of female emigration from the southern outer islands, both the number of economically active women and their participation rate have increased since 1976 and this has contributed to the larger total labour force in 1981. But both the female labour force and the participation rate are still substantially below 1966 and 1971 levels.

In summary, the number of economically active persons in the Cook Islands has increased by 426 (7.9 per cent) since 1976. Half of this increase can be attributed to the increase in the male labour force of the northern group; about 40 per cent can be attributed to the female labour force of the northern group (largely, but not entirely, because of a change in definition); and the balance is due to increases in the southern outer islands – particularly among females. Rarotonga has not contributed to the increase and both the male and female labour force there seem to have remained static since 1976.

From a long-term perspective, the labour force appears to be quite unstable, rising and falling from census to census, and it is difficult to detect a definite trend. But most of this instability is in the male labour force, and if we ignore 1971 as an exceptional year (because of the high demand for labour on the construction of Rarotonga's airport), the general trend since 1956 has been downwards (the male labour force in 1981 was 14 per cent below 1956). By contrast, the female labour force is much more stable, especially if some of the changes in the outer islands can be attributed to changes in definition.

The 1976-1981 period appears to have been one of stabilization in the labour force, but this may well have been short-lived. If emigration among the working-age population continues at the 1981-1982 rate, a further decline in the labour force may well occur. This would not be inevitable, however, if the emigration-related losses could be made up from the ranks of the unemployed and underemployed; but this would be unlikely to happen unless the latter group possessed the necessary skills.

D. ACTIVELY ENGAGED BY AGE AND SEX

In broad terms, labour force participation rates are declining among the young (15-24) and elderly (55 and above) population and are either static or increasing in other age groups (table 112). These trends are not always consistent, but the general direction is fairly clear.

These changes cannot be explained fully from census information. An increase in enrolment in the higher grades at secondary school is most likely implied in the case of the 15-19 age group. The establishment of a pension scheme for persons over the age of 65, and the receipt of remittances from emigrants in New Zealand, has probably facilitated the partial withdrawal of this age group from active involvement in the economy.

In Rarotonga (table 113), the general trends are similar. The participation rate of females between 35 and 54 appears to be increasing while from 55 and above it is decreasing. Participation rates for males above 60 years of age also appear to be declining. This is much less apparent in the outer islands, however. Although the figures do indicate a decline, random variation will have an effect on these older age groups which tend to be small in size.

Female participation rates in the outer islands, on the other hand, have increased in all age groups other than the 15-19 (table 114). As already discussed, definitional changes will be partially responsible for this, but the data may well reflect socio-economic changes in the southern outer islands.

E. OCCUPATIONAL STATUS

A better picture of structural changes in the Cook Islands economy is provided by data on the manner in which the active population is actually engaged. Several significant changes have occurred in recent years. First, the number of persons employing labour has increased from only 56 in 1976 to 148 in 1981 – a jump of 164 per cent (table 115). Although these data have yet to be cross-tabulated by sector, preliminary classification by occupation suggests that transportation, sales and services are the principal categories in which the number of employers has grown.

Table 112. Economic activity rates by age and sex, 1966-1981 (total Cook Islands)

(per cent economically active in age group)

Age group	Males				Females				Total			
	1966	1971	1976	1981	1966	1971	1976	1981	1966	1971	1976	1981
15 - 19	66.4	59.7	57.9	60.3	39.9	52.8	40.2	29.4	53.5	56.3	49.3	46.1
20 - 24	98.4	98.1	96.6	91.6	52.1	52.6	47.0	57.2	72.4	75.3	70.4	74.7
25 - 29	...	...	98.4	94.9	...	...	45.3	50.4	...	...	71.4	71.9
30 - 34	...	...	99.5	97.7	...	...	47.3	50.7	...	...	71.8	75.3
25 - 34	96.6	99.0	98.9	96.3	35.4	40.6	46.6	50.5	67.7	68.4	71.6	73.5
35 - 39	...	...	99.3	96.9	...	...	41.3	53.4	...	...	70.5	73.7
40 - 44	...	...	99.7	98.6	...	...	43.3	48.0	...	...	66.9	72.8
35 - 44	98.9	99.0	99.5	97.8	31.4	28.4	37.9	50.8	66.6	65.4	68.8	73.3
45 - 49	...	...	99.4	98.6	...	...	28.5	37.4	...	...	65.9	70.7
50 - 54	...	...	96.5	95.3	...	...	17.1	29.4	...	...	59.8	64.6
45 - 54	98.1	97.1	98.0	97.1	31.9	15.1	23.1	33.6	66.8	58.6	63.0	67.8
55 - 59	...	...	94.2	92.8	...	...	8.8	14.3	...	...	56.5	57.1
60 - 64	...	...	94.9	63.7	...	...	9.0	8.8	...	...	50.0	38.0
55 - 64	95.0	87.2	98.5	80.9	26.6	8.7	8.0	12.0	64.7	51.6	53.6	49.1
65 +	50.6	47.7	39.3	33.2	9.0	2.3	2.3	3.3	29.3	24.4	21.4	18.7
Total	88.8	85.8	83.6	80.5	35.4	34.7	34.0	37.5	62.4	60.7	59.1	59.7
Number	4 163	4 506	3 850	4 051	1 620	1 763	1 534	1 759	5 783	6 269	5 384	5 810

Sources: Cook Islands Population Census, 1966, p. 54; *Cook Islands Statistical Abstract, 3-1979; Cook Islands Census of Population and Dwellings, 1981*, unpublished tables.

Table 113. Economic activity rates by age and sex for Rarotonga, 1966-1981

Age group	Males				Females				Total			
	1966	1971	1976	1981	1966	1971	1976	1981	1966	1971	1976	1981
15 - 19	67.6	57.2	55.2	54.8	46.5	49.1	45.6	33.2	57.4	53.3	50.5	45.6
20 - 24	98.6	95.6	95.2	90.0	56.6	62.3	59.1	65.7	75.5	79.9	76.5	78.4
25 - 29	...	...	98.6	94.5	...	...	60.0	58.9	...	...	79.8	68.0
30 - 34	...	...	98.8	...	...	...	58.3	58.6	...	...	78.1	79.4
25 - 34	99.5	97.6	98.7	95.9	40.2	45.8	59.2	58.8	75.6	71.3	79.0	77.8
35 - 39	...	...	98.9	97.1	...	...	54.2	58.4	...	...	77.9	75.6
40 - 44	...	...	100.0	96.3	...	...	51.0	56.6	...	...	76.6	76.8
35 - 44	98.9	97.3	99.4	97.0	37.2	43.0	52.8	57.6	70.6	73.1	77.5	76.2
45 - 49	...	...	98.9	99.0	...	...	43.1	46.9	...	...	72.8	77.3
50 - 54	...	...	95.9	94.8	...	...	26.4	33.8	...	...	66.1	64.7
45 - 54	97.5	93.9	97.5	97.2	37.7	22.9	35.6	40.3	69.8	61.4	69.7	71.4
55 - 59	...	...	91.6	91.5	...	...	16.3	14.9	...	...	60.5	59.5
60 - 64	...	...	86.3	58.3	...	...	17.0	4.2	...	...	52.9	33.3
55 - 64	94.4	84.4	89.5	79.1	28.6	14.4	16.7	10.4	64.7	52.4	57.3	49.2
65 +	53.1	42.3	44.1	31.4	6.4	2.8	4.1	4.3	30.1	26.4	25.2	17.8
Total	89.0	83.9	83.8	80.6	41.2	42.1	46.1	45.2	65.9	64.0	65.6	63.6
Number	2 380	2 609	2 314	2 289	1 032	1 187	1 190	1 198	3 412	3 796	3 504	3 487

Sources: *Cook Islands Population Census, 1966*, p. 54; *Cook Islands Statistical Abstract, 3-1979; Cook Islands Census of Population and Dwellings, 1981*, CPD3-82, CPD4-82; and unpublished tables.

Table 114. Economic activity rates by age and sex for outer islands, 1966-1981

Age group	Males				Females				Total			
	1966	1971	1976	1981	1966	1971	1976	1981	1966	1971	1976	1981
15 - 19	64.3	64.0	62.3	66.0	28.8	58.7	31.3	24.7	47.3	61.3	47.2	47.6
20 - 24	97.4	100.0[a]	99.4	94.9	44.4	37.5	23.5	41.8	67.0	66.8	58.1	67.5
25 - 29	...	...	97.8	95.6	...	...	20.5	34.9	...	...	55.6	63.5
30 - 34	...	...	98.5	99.1	...	...	30.1	36.2	...	...	68.0	66.1
25 - 34	99.7	98.4	98.2	97.2	29.9	34.4	25.3	35.5	72.0	63.7	61.4	64.7
35 - 39	...	...	100.0	97.8	...	...	22.5	45.1	...	...	58.2	70.2
40 - 44	...	...	99.3	100.0	...	...	14.8	35.7	...	...	54.3	66.8
35 - 44	99.0	100.0[a]	99.6	99.0	26.0	12.2	18.6	40.3	61.6	56.6	56.2	68.5
45 - 49	...	...	100.0	98.0	...	...	11.1	28.0	...	...	57.6	62.5
50 - 54	...	...	97.1	95.8	...	...	8.6	24.4	...	...	53.0	64.2
45 - 54	98.7	100.0[a]	98.6	96.8	26.4	7.7	9.9	26.4	64.9	55.7	55.3	63.3
55 - 59	...	...	96.9	94.0	...	...	2.7	13.2	...	...	52.7	54.4
60 - 64	...	...	87.2	67.9	...	...	2.1	12.2	...	...	47.5	41.5
55 - 64	95.9	89.7	92.5	83.0	24.9	3.7	2.4	12.8	64.5	50.9	50.3	48.7
65 +	48.1	52.1	35.6	34.7	11.3	1.9	1.0	2.5	28.5	25.5	18.5	19.3
Total	88.7	88.6	83.0	80.0	28.3	25.5	17.9	27.2	57.9	56.2	50.3	54.4
Number	1 783	1 897	1 536	1 726	588	576	344	554	2 371	2 473	1 880	2 280

Source: Same as table 113.

Note: [a] In these cases the participation rate was actually above 100 per cent indicating some problems in the census tabulation.

Table 115. Economically active by occupational status and region, 1966-1981

Occupational status	Rarotonga				Southern outer islands[a]			Northern outer islands[a]			Total Cook Islands			
	1966	1971	1976	1981	1966	1976	1981	1966	1976	1981	1966	1971	1976	1981
Employer	43	50	53	135	5	3	8	4	–	3	52	63	56	148
Self-employed:														
(a) cash	299	118	114	128	416	125	139	342	185	225	1 057	800	424	493
(b) subsistence	94	120	128	147	213	277	400	64	43	311	371	371	448	867
Wage or salary, full and part time	2 629	2 952	2 812	2 848	700	694	785	341	121	154	3 737	4 140	3 627	3 817
Unpaid family worker	74	163	200	41	83	171	82	6	10	93	163	508	381	216
Unemployed	206	191	100	188	175	67	80	22	1	–	403	387	168	269
Unknown	–	–	97[b]	–	–	62[b]	–	–	121[b]	–	–	–	280[b]	–
Total	3 412	3 796	3 504	3 487	1 592	1 399	1 486	779	481	786	5 783	6 269	5 384	5 810

Sources: *Cook Islands Census of Population, 1966,* p. 58; *Cook Islands Census of Population and Housing, 1976,* pp. 159-166; *Cook Islands Statistical Abstract, 3-1979; Cook Islands census of Population and Dwellings, 1981,* CPD9-82, p. 2; unpublished tables, *1971 Population Census.*

Notes: [a] 1971 data not available.

[b] The 1976 statistics on the economically active population were revised in 1979 resulting in an increase in the economically active population by comparison with the figures published in the 1976 census report. Since the occupational status of the revised economically active population was not tabulated, the additional numbers have been included here as 'unknown'.

Table. 116. Percentage economically active by occupational status and region, 1966-1981

Occupational status	Rarotonga				Southern outer islands[a]			Northern outer islands[a]			Total Cook Islands			
	1966	1971	1976	1981	1966	1976	1981	1966	1976	1981	1966	1971	1976	1981
Employer	1.3	1.3	1.5	3.9	0.3	0.2	0.5	0.5	–	0.5	0.9	1.0	1.0	2.6
Self-employed:														
(a) cash	8.8	3.1	3.3	3.7	26.0	8.9	9.3	43.9	38.5	28.5	18.3	12.8	7.9	8.5
(b) subsistence	2.8	3.2	3.7	4.2	13.4	19.8	26.7	8.2	8.9	39.8	6.4	5.9	8.3	15.0
Wage or salary employment	78.9	77.8	80.3	81.7	44.0	49.6	52.5	43.8	25.2	19.2	64.6	66.0	67.4	65.5
Unpaid family worker	2.2	4.3	5.7	1.2	5.2	12.2	5.5	0.8	2.0	11.5	2.8	8.1	7.1	3.7
Unemployed	6.0	5.0	2.9	5.4	11.0	4.8	5.4	2.8	0.2	0.5	7.0	6.2	3.1	4.7
Other	–	–	–	2.8	–	4.4	–	–	25.2	–	–	–	5.2	–
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Table 115.

Note: [a] 1971 data not available.

It would appear, then, that a small class of entrepreneurs has developed in the Cook Islands during the 1976-1981 period. Given that 91.2 per cent of employers are located on Rarotonga, the most likely cause of this phenomenon is the growth of commercial tourism. Hoteliers and restauranteurs are prominent among this group, and most of them appear to be managing proprietors. Transport managers-employers also appear to have increased in number, suggesting such tourist-related activities as taxis, buses and car rentals. The substantial number (32) of "working managers" in sales occupations is probably a reflection of the very large increase in the number of village grocery stores on Rarotonga in recent years which has been fueled by the increasing importation of food and the monetization of the local food sector.

While the number of self-employed (or "own account") workers involved in the cash economy has steadily decreased since 1966, the data indicate an increase in the number of "subsistence" workers. This pattern is most obvious in the outer islands and particularly in the northern group where the number increased from 64 in 1966 to 311 in 1981. Of this increase, approximately 100 can be explained by the inclusion of almost all Pukapukan women above the age of 15 among the economically active (table 117 shows that female subsistence workers increased from 86 to 180 between 1966 and 1981). The rest of the increase can be accounted for by male in-migration to the northern group and an increase in subsistence activities in the southern outer islands.

Table 117. Occupational status of the economically active population by sex, 1966-1981

Occupational status	Males				Females			
	1966	1971	1976	1981	1966	1971	1976	1981
Employer	44	52	45	116	8	11	11	32
Self-employed:								
(a) mainly cash	810	730	352	417	247	70	72	76
(b) mainly subsistence	285	364	441	687	86	7	7	180
Total	1 094	1 094	793	1 104	333	77	79	256
Wage and salary:								
(a) full time/permanent	1 813	2 777	...	2 385	859	1 116	...	1 183
(b) part time or casual	835	182	...	147	230	65	...	102
Total	2 648	2 959	2 462	2 532	1 089	1 181	1 165	1 285
Unpaid family worker	144	184	316	156	19	324	159	60
Unemployed	232	217	106	143	171	170	62	126
Other	–	–	128	–	–	–	58	–
Total	4 163	4 506	3 850	4 051	1 620	1 763	1 534	1 759

Sources: *Cook Islands Population Census, 1966*, p. 53; *Cook Islands Statistical Abstract, 3-1979*; unpublished tables, 1971 Census, *Cook Islands Census of Population Dwellings, 1981*, CPD9-82.

The proportion and number of persons employed for a wage in the Cook Islands has tended to fluctuate since 1966, but 1981 showed an increase of 190 over 1976. The bulk of this increase occurred in the outer islands and not in Rarotonga which showed only a small change since 1976. In the southern outer islands, 52.5 per cent of the labour force is now working for a wage (table 116) compared with 44.0 per cent in 1966. Of the total Cook Islands labour force, 65.5 per cent had some wage employment in 1981. While this figure suggests little change since 1966, it must be noted that a much larger proportion of the employed population had full-time work in 1981 than in 1966 (tables 117 and 118). The proportion of the male labour force performing part-time work declined from 20.1 per cent in 1966 to only 3.6 per cent in 1981. (The equivalent figures for females are 14.1 and 5.8 per cent respectively).

The number and proportion of unpaid family workers has declined overall, most dramatically in Rarotonga, but has increased in the northern group. The latter change may reflect the definitional changes previously discussed rather than a structural change in the economy. In Rarotonga, however, two processes have probably occurred. On the one hand, emigration has removed some unpaid family workers who were most likely underemployed; on the other hand, unemployment has increased suggesting that some of those who were previously satisfied to be family workers were seeking formal employment in 1981.

The unemployment rate in 1981 (4.7 per cent) represents an increase since 1976, but is below the level of 1966 and 1971. If we consider the sum of the unemployed and unpaid family workers as representing the underutilized labour force, then a smaller proportion was underutilized

Table 118. Percentage distribution of economically active by occupational status and sex, 1966-1981

Occupational status	Males				Females			
	1966	1971	1976	1981	1966	1971	1976	1981
Employer	1.1	1.2	1.2	2.9	0.5	0.6	0.7	1.8
Self-employed:								
(a) mainly cash	19.5	16.2	9.2	10.3	15.2	4.0	4.7	4.3
(b) mainly subsistence	6.8	8.1	11.5	17.0	5.3	0.4	0.5	10.2
Total	26.3	24.3	20.7	27.3	20.5	4.4	5.2	14.5
Wage and salary:								
(a) full time/permanent	43.6	61.6	...	58.9	52.7	63.3	...	67.3
(b) part time or casual	20.1	4.0	...	3.6	14.1	3.7	...	5.8
Total	63.7	65.6	63.9	62.5	66.8	67.0	75.9	73.1
Unpaid family worker	3.5	4.1	8.2	3.9	1.2	18.4	10.4	3.4
Unemployed	5.6	4.8	2.8	3.5	10.5	9.6	4.0	7.2
Other	...	...	3.3	...	...	...	3.8	...
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Table 117.

in 1981 (8.4 per cent) than in 1971 (14.3 per cent) or in 1966 (9.8 per cent). Unemployment in 1981 is higher among females (7.2 per cent) than among males (3.5 per cent) and the total underutilization of labour is greater for females than for males (table 118). This was also typical of previous years, but 1981 represents a distinct improvement over 1971 and 1976.

F. SECTORAL DISTRIBUTION OF THE ECONOMICALLY ACTIVE POPULATION

The broad trend in the sectoral distribution of the Cook Islands labour force is a decline in the primary and secondary sectors and a corresponding increase in the tertiary sector (table 119). In 1966, 37.1 per cent of the labour force were engaged in agriculture and fishing; by 1981 this proportion had fallen to 29.2 per cent. However, this decline has not been a smooth process: primary sector engagement dropped to a low of 21.8 per cent in 1976 before increasing again in 1981. These changes must be interpreted cautiously. As table 120 makes clear, the number and proportion of women included in the primary sector has fluctuated erratically from census to census: in 1966, 397 women (18.5 per cent of all primary sector) were included; in 1976 only 22 (1.9 per cent of the sector) were included. It is highly unlikely that these figures accurately represent reality; rather, they reflect different definitions of women's productive role in the economy.

A better indication of the significance of the primary sector is the activity of males. Here the trend is downward from 1966 to 1976, and upward from 1976 to 1981. During the latter period, the male primary sector increased by 23.7 per cent from 1,153 to 1,426, and from 29.9 per cent of the male labour force to 35.2 per cent (table 121).

It should be noted immediately that this does not automatically imply that the commercial agricultural sector is generating more employment than previously. The number of male "own-account" agricultural workers has increased since 1976, but so has the number of "mainly subsistence" workers. Indeed, the latter have increased by 246 over 1976 or 55.8 per cent.[7] Furthermore, 211 males are classified as fishermen, almost all of whom fish for household, not commercial, production.[8]

The secondary sector has shown a steady decline, especially since 1971. Since employment in construction was inflated by the Rarotonga airport project in that year, not much should be made of this. But if 1971 is ignored, the secondary sector has still dropped from 893 in 1966 to 722 in 1981 and from 15.4 per cent of the labour force to 12.4 per cent – a 20 per cent decline. Perhaps more important is the 34.1 per cent decline in manufacturing – from 602 in 1966 to 397 in 1981. The decrease in manufacturing employment is particularly important in the case of females: in 1976, 20.1 per cent of the female labour force were so engaged; five years later this had dropped by half to 11.2 per cent (table 121).

Employment in the tertiary sector, on the other hand, has grown steadily since 1966 and reached 54.0 per cent of the labour force in 1981. The principal reason for this is the expansion of the wholesale and retail trade sub-sector, which grew from 7.2 per cent of the labour force in 1966 to 12.3 per cent in 1981 and from 416 to 757 workers (table 119). Since 1976, female employment in this sub-sector has increased by 51 per cent and male employment by 38.3 per cent. There is little doubt that these changes show the effects of commercial tourism, although other changes which have facilitated a more fully monetized food sector are also involved.

The community, social and personal services sub-sector has levelled-off after growing to 33.5 per cent of the labour force in 1976 and to a peak of 2,031 persons in 1971. Employment in this sub-sector has fallen by 326 persons since 1971 – a 16.1 per cent drop, partly because of government measures to decrease the size of the Public Service, and partly because the primary and secondary sectors have declined in size and require less support services than previously. It is mainly the female labour force in services which has fallen, however. As table 121 shows, 52.6 per cent of the female labour force was engaged in the services sector in 1971 and this dropped to 37.8 per cent in 1981. While the number of males in services has declined slightly, there is virtually no change in the proportion of the male labour force so engaged.

[7] According to table 117, there were 441 "mainly subsistence" male workers in 1976 and 687 in 1981, an increase of 246.

[8] The large jump in the number of fishermen compared with previous years is probably due to the definitional changes already discussed.

Table 119. Distribution of the actively engaged population by sector, 1966-1981

Sector	1966		1971		1976		1981	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Agriculture and fishing	2 146	37.1	1 421	22.7	1 175	21.8	1 697	29.2
"Primary" sector	2 146	37.1	1 421	22.7	1 175	21.8	1 697	29.2
Manufacturing	602	10.4	555	8.8	514	9.5	397	6.8
Construction and quarrying	291	5.0	766	12.1	292	5.4	325	5.6
"Secondary" sector	893	15.4	1 321	20.9	806	14.9	722	12.4
Electricity and water	60	1.0	76	1.2	81	1.5	137	2.4
Transport and communications	472	8.2	566	9.0	437	8.1	581	10.0
Wholesale and retail trade	416	7.2	468	7.5	495	9.2	717	12.3
Community, social and personal services[a]	1 276	22.1	2 031	32.4	1 804	33.5	1 705	29.3
"Tertiary" sector	2 224	38.5	3 141	50.1	2 817	52.3	3 140	54.0
Not classifiable by sector[b]	520	9.0	386	6.1	586	10.9	252	4.3
Total	5 783	100.0	6 269	100.0	5 384	100.0	5 810	100.0

Sources: Geoffrey R. Hayes, *Employment and Occupation Trends in the Cook Islands*, 1966-1976. Cook Islands Statistics Office, Occasional Paper No. 2: *Cook Islands Statistical Abstract*, 3-1979; unpublished tables, 1981 census.

Notes: [a] Includes finance, business and insurance services.

[b] Includes "new workers" awaiting first employment, unemployed, or persons without a normal occupation or industry.

Table 120. Distribution of the actively engaged population by sector and sex, 1966-1981

Sector	Males				Females			
	1966	1971	1976	1981	1966	1971	1976	1981
Agriculture	1 732	1 361	1 153	1 215	397	37	22	263
Fishing	17	23	...	211	–	–	...	5
"Primary" sector	1 749	1 384	1 153	1 426	397	37	22	268
Manufacturing	301	239	206	198	301	316	308	199
Construction	289	757	277	320	2	9	15	5
"Secondary" sector	590	996	483	518	303	325	323	204
Electricity and water	58	76	76	125	2	–	5	12
Transport and communications	458	526	393	494	14	40	44	86
Wholesale and retail trade	241	205	230	318	175	263	265	399
Community, social and personal services	737	1 104	1 186	1 034	539	927	618	671
"Tertiary" sector	1 494	1 911	1 885	1 971	730	1 230	932	1 168
Total	3 958	4 506	3 850	4 051	1 468	1 763	1 534	1 759

Source: Cook Islands Population Censuses, 1966-1981.

Table 121. Per cent distribution of the actively engaged population by sector and sex, 1966-1981

Sector	Males				Females			
	1966	1971	1976	1981	1966	1971	1976	1981
Agriculture	43.8	30.2	29.9	30.0	27.0	2.1	1.4	15.0
Fishing	0.4	0.5	...	5.2	–	–	...	0.3
"Primary" sector	44.2	30.7	29.9	35.2	27.0	2.1	1.4	15.3
Manufacturing	7.6	5.3	5.4	4.9	20.5	17.9	20.1	11.2
Construction	7.3	16.8	7.2	7.9	0.1	0.5	1.0	0.3
"Secondary" sector	14.9	22.1	12.6	12.8	20.6	18.4	21.1	11.5
Electricity and water	1.5	1.7	2.0	3.1	0.1	–	0.3	0.7
Transport and communications	11.6	11.7	10.2	12.2	1.0	2.3	2.9	4.8
Wholesale and retail trade	6.1	4.5	6.0	7.8	11.9	14.9	17.3	22.5
Community, social and personal services	18.5	24.5	30.8	25.5	36.7	52.6	40.3	37.8
"Tertiary" sector	37.7	42.4	49.0	48.7	49.7	69.8	60.8	65.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Table 120.

G. REGIONAL VARIATIONS

The distribution of the labour force across the regions is determined by a number of factors. Differential migration – both internal and external – will result in a redistribution of the labour force, but migration may itself be determined by the changing demand for labour in various regions. In percentage terms, however, the regional distribution of the Cook Islands labour force has changed little since 1966 (table 122). The concentration of the labour force in Rarotonga (60.0 per cent) is greater than the concentration of the total population (54 per cent), which is commensurate with Rarotonga's role in the total economy.

The proportion of the Cook Islands labour force in the northern group has returned to about 14 per cent after dropping to 9 per cent in 1976. This is partly a result of the redefinition of women's economic activities on Pukapuka, and had this redefinition not occurred, Rarotonga's share of the labour force would have risen to approximately the same level as in 1976.

Regional differences in the type of economic activities in which the labour force is engaged are indicated in table 123. Less than 20 per cent of primary sector employment occurs in Rarotonga, whereas 82.8 per cent of secondary and 75.8 per cent of tertiary employment is on this island alone. Conversely, 80 per cent of the agricultural labour force is located on the outer islands and only 16.5 and 23.5 per cent of the secondary and tertiary sectors respectively.

The relative importance of primary sector activities in each region is also indicated by the proportion of each region's labour force so engaged. Only 14.0 per cent of Rarotonga's economically active male population is engaged in agriculture or fishing compared with 57.2 per cent in the southern islands and 78.8 per cent in the north. Among females, the contrast is even greater: less than one per cent of Rarotonga females are engaged in the agriculture and fishing sector compared with 82 per cent of economically active northern group women.

There is little doubt that these data understate the informal labour input of both women and men in Rarotonga's agricultural sector, but at the same time it is unlikely that the average labour input of a Rarotongan woman is equivalent to northern group women – especially on those islands where copra is made year-round.

Table 122. Changes in the regional distribution of the economically active population, 1966-1981

Region	1966		1971		1976		1981[a]	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Rarotonga	3 412	59.0	3 796	60.6	3 504	65.1	3 487	60.0
Southern outer islands	1 592	27.5	1 765	28.2	1 399	26.0	1 486	25.6
Northern outer islands	797	13.8	655	10.4	481	8.9	786	13.5
Total outer islands	2 389	41.3	2 420	38.6	1 880	34.9	2 272	39.1
Total Cook Islands	5 783	100.0	6 269	100.0	5 384	100.0	5 810[b]	100.0

Source: Table 111.

Notes: [a] Resident population.

[b] Includes persons at sea.

Table 123. Regional distribution of the labour force by economic sector, 1981

Sector	Rarotonga		Southern		Northern		Cook Islands	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Agriculture and fishing	328	19.3	727	42.8	628	37.0	1 697	100.0
"Primary" sector	328	19.3	727	42.8	628	37.0	1 697	100.0
Manufacturing	351	88.4	37	9.3	7	1.8	397	100.0
Construction and quarrying	247	76.0	64	19.7	11	3.4	325	100.0
"Secondary" sector	598	82.8	101	14.0	18	2.5	722	100.0
Electricity and water	101	73.7	36	26.3	–	–	137	100.0
Transport and communications	458	78.8	89	15.3	24	4.1	581	100.0
Wholesale and retail trade	604	84.2	91	12.7	22	3.1	717	100.0
Community, social and personal services	1 217	71.4	379	22.2	94	5.7	1 704	100.0
"Tertiary" sector	2 380	75.8	595	19.0	140	4.5	3 139	100.0
Not classifiable by occupation	181	71.8	71	28.2	–	–	252	100.0
Total	3 487	60.0	1 494	25.7	786	13.5	5 810	100.0

Source: Cook Islands Census of Population and Dwellings, 1981, unpublished tables.

Table 124. Distribution of the economically active population by economic sector, region and sex, 1981

	Rarotonga				Southern				Northern				Total			
	Males		Females		Males		Females		Males		Females		Males		Females	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Agriculture and fishing	320	14.0	8	0.7	685	57.2	42	14.2	416	78.8	212	82.2	1 429	35.3	268	15.2
Manufacturing	171	7.5	180	15.0	25	2.1	12	4.1	–	–	7	2.7	198	4.9	199	11.3
Construction and quarrying	242	10.6	5	0.4	64	5.3	–	–	11	2.1	–	–	320	7.9	5	0.3
Electricity and water	90	3.9	11	0.9	35	2.9	1	0.3	–	–	–	–	125	3.1	12	0.7
Transport and communications	381	16.6	77	6.4	82	6.8	7	2.4	22	4.2	2	0.8	495	12.2	86	4.9
Wholesale and retail trade	261	11.4	343	28.6	45	3.8	46	15.5	12	2.3	10	3.9	318	7.8	399	22.7
Community, social and personal services	722	31.5	495	41.3	231	19.3	148	50.0	67	12.7	27	10.5	1 033	25.5	671	38.1
Not classifiable by sector	102	4.5	79	6.6	31	2.6	40	13.5	–	–	–	–	133	3.3	119	6.8
Total	2 289	100.0	1 198	100.0	1 198	100.0	296	100.0	528	100.0	258	100.0	4 051	100.0	1 759	100.0

Source: Cook Islands Census of Population and Dwellings, 1981, unpublished tables.

H. DISTRIBUTION BY OCCUPATION

The type of occupations pursued by the labour force is a further indication of the nature of the economy and the changes occurring within it. The trends since 1971 can be seen in table 125. The most visible one is the decline (especially in the female labour force) of production, transport and related occupations. This is no doubt due to the drop in female employment in the manufacturing sector, which consists almost entirely of the fruit canning plant, clothing factories and bakeries in Rarotonga. There has also been a 50 per cent decline in the number of female service workers since 1971 (from 502 to 248).

On the other hand, the number of clerical and related workers has increased by almost 40 per cent since 1971 (from 462 to 669) and female clerical workers have more than doubled, almost compensating for the decline in service workers.

Agricultural workers and fishermen formed the largest single occupational group in 1981, but these numbers have been affected by the changes in the definition of economic activities discussed previously. Between 1971 and 1981, the relative proportion of agricultural and production and related workers appears to have reversed, the latter sub-group declined from 30.6 to 23.8 per cent of the labour force over this period. The small decline in the number of professional and technical workers has been more than compensated by a rise in the number of administrative and managerial workers.

As would be expected, given the sectoral distribution of the labour force across regions, "white collar" occupational groups tend to be concentrated in Rarotonga (table 126) whereas agricultural workers are concentrated in the outer islands. Concentration is particularly extreme in clerical and related occupations and service occupations, 86.7 and 81.6 per cent of which, respectively, were located on Rarotonga. But professional and technical workers are relatively evenly distributed by comparison with the distribution of the labour force as a whole.

It is apparent that there are very few white collar occupations in the northern group (less than 20 per cent of the total), especially for females (table 126 and 127). This is much less the case in the southern outer islands than in the north: 35.1 per cent of the female labour force were in professional, technical and related occupations in 1981 compared with only 8.1 per cent in the northern group. Similarly, 81.8 per cent of economically active northern women were in agricultural or fishing (e.g., pearl sorting) occupations compared with only 6.8 per cent of southern females.

Although the long-term trends are not always constant, the general direction of change in the occupational structure of Rarotonga is a decrease in the number and proportion of the labour force engaged in agriculture and fishing, production and related occupations and an increase in both the number and proportion in administrative, clerical and service occupations (table 128).[9]

In some occupational groups, however, there have been few major changes in recent years. Although the numbers have fluctuated, there is relative stability in the proportion of the labour force in professional, technical and related occupations. Similarly, there have been only minor changes in the number of sales workers since 1971. Although there was a sharp drop in the number of agricultural workers and fishermen after 1966, the proportion of the labour force in this category has remained stable since 1971.

The labour force of the outer islands exhibits some of the same changes as Rarotonga's. Professional and technical workers have increased by 23 per cent since 1966 compared with a 17.5 per cent increase in Rarotonga. The number of administrative and managerial workers has increased about one and a half times and clerical workers have more than doubled since 1966. Smaller increases are apparent in the sales and services categories, however.

Up to 1976, the number and proportion of agricultural workers and fishermen in the outer islands was falling steadily. In 1981 there was a 49 per cent increase in this category and the proportion of the labour force it represents increased from 44.6 per cent to 54.8 per cent. As already discussed, part of this increase can be attributed to definitional changes, but this does not account for the total and there is reason to believe that there has been a real increase in this occupational group.

As already discussed, the distribution of primary occupations tends to understate total

[9] Such employment patterns tend to occur in micro-economies. See John C. Caldwell, Graham E. Harrison and Pat Quiggin, "The demography of micro-states," *World Development*, vol. 8, No. 12, pp. 953-967.

Table 125. Distribution of economically active population by major occupational group and sex, 1971-1981

	Males				Females				Both sexes			
	1971		1981		1971		1981		1971		1981	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Professional technical and related workers	521	11.6	512	12.6	375	21.3	372	21.1	896	14.3	884	15.2
Administrative, executive, and managerial workers	79	1.8	168	4.1	7	0.4	15	0.9	86	1.4	183	3.1
Clerical and related workers	288	6.4	296	7.3	174	9.9	373	21.2	462	7.4	669	11.5
Sales workers	126	2.8	129	3.2	188	10.7	189	10.7	314	5.0	318	5.5
Service workers	376	8.3	328	8.1	502	28.5	248	14.1	878	14.0	576	9.9
Agricultural workers and fishermen	1 328	29.5	1 303	32.2	37	2.1	240	13.6	1 365	21.8	1 543	26.6
Production, transport and related	1 611	35.8	1 181	29.2	309	17.5	201	11.4	1 920	30.6	1 382	23.8
Workers not classified by occupation	214	4.7	134	3.3	171	9.7	121	6.9	385	6.1	255	4.4
Total	4 506	100.0	4 051	100.0	1 763	100.0	1 759	100.0	6 269	100.0	5 810	100.0

Source: *Cook Islands Population Census, 1971*, unpublished tables; *Cook Islands Census of Population and Dwellings, 1981*, unpublished tables.

Table 126. Distribution of economically active population by major occupational group, region, and sex, 1981

Occupational group	Rarotonga			Southern outer islands			Northern outer islands			Cook Islands		
	Males	Females	Both sexes	Males	Females	Both sexes	Males	Females	Both sexes	Males	Females	Both sexes
Professional	303	246	549	139	104	243	58	21	79	512	372	884
Administrative	133	12	145	26	2	28	5	1	6	168	15	183
Clerical and related	242	338	580	43	30	73	10	5	15	296	373	669
Sales workers	89	141	230	26	38	64	13	10	23	129	189	318
Service workers	256	214	470	58	31	89	12	3	15	328	248	576
Agriculture	279	3	282	617	20	637	401	211	612	1 303	240	1 543
Production	885	163	1 048	257	31	288	29	7	36	1 181	201	1 382
Workers not classified	102	81	183	32	40	72	–	–	–	134	121	255
Total	2 289	1 198	3 487	1 198	296	1 494	528	258	786	4 051	1 759	5 810

Source: Cook Islands Census of Population and Dwelling, 1981, unpublished tables.

Table 127. Percentage distribution of economically active population by occupational group, region and sex, 1981

Occupational group	Rarotonga			Southern outer islands			Northern outer islands			Cook Islands		
	Males	Females	Both sexes	Males	Females	Both sexes	Males	Females	Both sexes	Males	Females	Both sexes
Professional	13.2	20.5	15.7	11.6	35.1	16.3	11.0	8.1	10.1	12.6	21.1	15.2
Administrative	5.8	1.0	4.2	2.2	0.7	1.9	0.9	0.4	0.8	4.1	0.9	3.1
Clerical and related	10.6	28.2	16.6	3.6	10.1	4.9	1.9	1.9	1.9	7.3	21.2	11.5
Sales workers	3.9	11.8	6.6	2.2	12.8	4.3	2.5	3.9	2.9	3.2	10.7	5.5
Service workers	11.2	17.9	13.5	4.8	10.5	6.0	2.3	1.2	1.9	8.1	14.1	9.9
Agriculture	12.2	0.3	8.1	51.5	6.8	42.6	75.9	81.8	77.9	32.2	13.6	26.6
Production	38.7	13.6	30.1	21.5	10.5	19.3	5.5	2.7	4.6	29.2	11.4	23.8
Workers not classified	4.5	6.8	5.2	2.7	13.5	4.8	–	–	–	3.3	6.9	4.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Table 126.

Table 128. Changes in major occupational groups, 1966-1981, Rarotonga and outer islands

Occupation, major group	Rarotonga				Outer islands			
	1966	1971	1976	1981	1966	1971	1976	1981
Professional, technical and related	459	569	604	549	274	327	278	322
Administrative, executive and managerial	57	72	163	145	14	14	24	34
Clerical and related	246	377	442	580	40	85	69	88
Sales workers	179	231	224	230	63	83	55	87
Service workers	216	446[a]	330	470	60	432[a]	80	104
Agricultural workers and fishermen	668	310	279	282	1 394	1 018	838	1 249
Production, transport and related workers	1 368	1 604	1 168	1 048	277	316	257	324
Not classifiable by occupation	116	187	294	183	130	198	276	72
Total	3 309	3 796	3 504	3 487	2 252	2 146	1 880	2 280

Source: Cook Islands Population Censuses, 1966-1981.

Note: [a] The number of service workers was inflated in 1971 because many "family workers" performing essentially domestic tasks were included in the labour force.

labour input to the agricultural sector. At least as far as males are concerned, the extent and distribution of secondary occupations gives some idea of the magnitude of this understatement.

In 1966, 8.5 per cent of the total labour force practiced a secondary occupation, and 85 per cent of these were in the agricultural sector.[10] Professional, administrative, sales and production workers were most likely to have secondary occupations in agriculture, whereas service and clerical workers were least likely. This is probably a reflection of the higher proportion of females in the latter occupations. More Rarotongans had secondary occupations than outer islanders (9.2 per cent compared with 7.4 per cent).[11]

By 1971, however, this pattern changed. The proportion of the outer islands labour force with a secondary occupation increased to 11.1 per cent while in Rarotonga it dropped to 5.1 per cent.[12] Put another way, in 1966, 64.6 per cent of all secondary occupations were performed on Rarotonga; by 1971, only 29.2 per cent were on Rarotonga and 70.8 per cent on the outer islands. The main reason for the change on Rarotonga appears to be a withdrawal from secondary agricultural activities by those whose primary involvement was in production, transport and related occupations and agriculture. Furthermore, of those who did have a secondary occupation, fewer were in agriculture than was the case in 1966.

In the outer islands, the proportion of all occupational groups with a secondary occupation

[10] *Cook Islands Population Census, 1966*, p. 52.

[11] While these proportions may seem quite low, the proportion of household heads with secondary occupations would be much higher.

[12] *1971 Population Census*, unpublished tables.

increased markedly from 7.4 per cent in 1966 to 21.7 per cent in 1971, and even larger increases occurred among those whose primary occupation was in production, transport and related activities. And about 90 per cent of all secondary occupations were in the agricultural sector.

The probable explanation for these changes lies in the expansion of the public sector after self-government was achieved in 1965. This made it possible for more Rarotongans to abandon agriculture completely – even as a secondary activity – and for more outer islanders to relegate agriculture to a part-time activity.

I. THE LABOUR FORCE AND SOCIO-ECONOMIC DEVELOPMENT

Because of high rates of emigration in the 1971-1976 period, the quantity of labour in the Cook Islands in 1976 was at its lowest level since the early 1950s. As emigration slowed down in the 1976-1981 period, the labour supply recovered, and even though it has not reached the level of 1971 (when labour demand was high), a healthy 11.0 per cent increase has occurred. In demographic terms, the supply of human resources was greater in 1981 than during the early to mid-1960s.

At the same time, the dependency ratio has fallen substantially in every islands. Thus, although the working age population is smaller than in 1971 (by some 321), the number of dependents each workers has to support has declined. This too is a positive development.

From the point of view of the growth of total domestic product, it is also encouraging that the economically active population has grown back to approximately where it was in 1966, even though the participation rate is lower. This indicates, of course, that continued emigration of the young adult population is not inevitable, and may be following a cyclical rather than a continuous trend.

The way in which the labour force is engaged is, of course, as important as the fact that they are. The large increase in the number of employers of labour in Rarotonga, for example, is consistent with the growth of an entrepreneurial class, and there is little doubt that this economic stratum has formed as a result of tourism and the broader monetization of the economy. Insofar as the creation of such a stratum was one of the ends to which tourism was seen as a means by past governments, then the policy of encouraging tourism has achieved at least one of its aims.

During the 1966-1976 period, the number of wage and salaried persons on the outer islands actually declined (especially in the north). This trend reversed after 1976 and increases are apparent in both outer island groups suggesting that some of the benefits of recent economic changes are at last spreading to the outer islands after a long period of stagnation.

In Rarotonga the total number of wage and salaried employees has remained virtually static since 1976 and has yet to reach the level achieved in 1971. Of course the nature of employment has changed, with many more people in essentially "white collar" occupations. And as table 129 showed, the proportion of wage and salaried employees working full-time rather than part-time has increased from 77.1 to 92.7 per cent. In the 1960s, many of these part-time workers were lightermen and other cargo handlers who received work only on boat days. Since the airport was completed, alternative and more regular employment has become available and mechanization has reduced the demand for labour on the waterfront.

Judging from the data presented above, it would appear that recent government policy aimed at reducing the size of the public sector has been effective. "Non-private" employment in Rarotonga peaked at 1,854 in 1979 (58.3 per cent of all employment), but this dropped to 1,651 by 1981.

The decline in the number of independent planters ("self-employed", cash earners) has clearly levelled off and 1981 shows a healthy (16.2 per cent) increase over 1976. Since agricultural exports are a crucial component of the economy, an increase in the number of producers is a significant and positive change.

The absolute and proportional increase in the category "subsistence" workers in the outer islands suggests that not all of the recent increase in the labour force has been fully absorbed in the economy. It is highly doubtful that subsistence activities require a full working week throughout the year, at least not insofar as food production is concerned, and the implication here is that some surplus labour now exists, especially in the southern outer islands. Of the 400 "subsistence" workers in the southern group, however, 46.8 per cent were aged 15-24, and 95.5 per cent were male. It is this group of young males which is particularly prone to emigration in the absence of cash earning opportunities, and it is highly likely that this group

Table 129. Private and non-private employment in Rarotonga, 1966-1981

Year	Private			Non-private			Total		
	Full-time	Part-time	Total	Full-time	Part-time	Total	Full-time	Part-time	Total
1966[a]	843	393	1 236	1 240	225	1 464	2 083	618	2 701
Per cent	31.2	14.6	45.8	45.9	8.3	54.2	77.1	22.9	100.0
1975[b]	757	152	909	1 371	87	1 458	2 128	239	2 367
Per cent	32.0	6.4	38.4	57.9	3.7	61.6	89.9	10.1	100.0
1976[c]	–	–	1 168	–	–	1 652	–	–	2 820
Per cent	–	–	41.4	–	–	58.6	–	–	100.0
1979[d]	1 195	130	1 325	1 748	106	1 854	2 943	236	3 179
Per cent	37.6	4.1	41.7	55.0	3.3	58.3	92.6	7.4	100.0
1980[d]	1 218	137	1 355	1 536	84	1 620	2 754	221	2 975
Per cent	40.9	4.6	45.5	51.6	2.8	54.5	92.6	7.4	100.0
1981[d]	1 215	138	1 353	1 570	81	1 651	2 785	219	3 004
Per cent	40.4	4.6	45.0	52.3	2.7	55.0	92.7	7.3	100.0

Sources: [a] *Cook Islands Population Census, 1966*, p. 53; and New Zealand Department of Island Territories, *Annual Report on Cook Islands*, 1965, p. 13. (note that the figure of 1240 "non-private" employees refers to the Cook Islands administration only; employees of the New Zealand Government and other public agencies are included in "private" employment because it is not possible to isolate them.)

[b] Unpublished employment survey by Cook Islands Statistics Office, 1975. Note that this was not a complete enumeration, therefore the numbers should not be compared with previous and subsequent years. Percentages may be compared, but a degree of error should be assumed.

[c] *Cook Islands Census of Population and Housing, 1976*, unpublished census data produced by Geoffrey R. Hayes using re-analyzed materials.

[d] *Cook Islands Statistical Abstract*, 21/1981. Note that churches were placed in the non-private category in 1979 and 1980, and in the private category in 1981. These data derive from the annual 'Survey at Employment and Wages'. Own-account workers who do not pay themselves a wage, onpaid family workers and subsistence workers are excluded.

has contributed to the upsurge in emigration in 1981-1982.

Recent changes in the sectoral distribution of the labour force are both favourable and unfavourable. The increase in primary sector engagement is positive insofar as agriculture is the essential foundation of the economy. But the decline in manufacturing employment and the accompanying absolute and relative increase in the tertiary sector suggests some loss of diversity in recent years. While manufacturing is not a major component of the Cook Islands economy (5.1 per cent of GDP in 1978), it has provided a significant amount of employment in the past (especially for women), and the loss of such employment, if permanent, may be damaging to the total economy.

Of course, wholesale and retail trade has more than compensated for the decline in manufacturing employment, and this type of work is undoubtedly more satisfactory for the individuals involved than factory work. But this structural change is symptomatic of a tourism – and bureaucracy-oriented economy and also reflects a growing dependency on imported food. This dependency would appear to be more highly concentrated on Rarotonga than elsewhere.

Chapter X
THE STATUS OF WOMEN IN THE COOK ISLANDS*

A. INTRODUCTION

Women have always been a powerful force in the Cook Islands, both in the family and at the community level. They not only take primary responsibility for raising the children and managing the household, but also provide support for men in their political and economic endeavours. Although they now enjoy equal political and civil rights, they have not always exercised these rights fully. While women vote in general elections, only a few have ever run as candidates for political office. Of the total population of 17,754 in 1981, 48.3 per cent were female, but women's voices are not being heard. Yet the full participation of women in the development process is essential if the total human resources of the Cook Islands are to be fully utilized.

In order to understand the term "status of women", it is useful to look at some definitions. According to Webster's, "status" is "the condition of a person or thing in the eyes of the law."[1] Law dictionaries define it as "the rights, duties, capacities and incapacities which determine a person to a given class."[2] The United Nations Commission on the Status of Women noted that:

> When we speak of the 'status of women', then, we are speaking of the conjunction of positions a woman occupies at any one point in time, as a worker, student, wife, mother, church member, political worker, or whatever, and the rights and duties she is expected to exercise in her active role as occupants of these positions. It is more generally accepted that women are discriminated against and that men have more prestige, power and privileges in almost all societies. But the direct measurement of status is a difficult and complex problem which hinders investigation of the causes and consequences of this particular form of stratification.[3]

Women have been serving their communities for many years as health and education officers, mediators of social change, communicators of traditional knowledge, skills and culture. These are acceptable roles for them in the Cook Islands and they continue to perform these vital functions. The contributions of women to national development are recognized by men in the community, government and international agencies, and women are encouraged to do more. In employment, higher education, and politics, however, women are lagging behind.

The reasons for the lack of women in top leadership positions and the underutilization of their capabilities are complex. An understanding of these reasons requires an analysis of the status and role of women in traditional society, a review of women's political and civil rights, and a look at the issues of employment, education and child-bearing.

B. TRADITIONAL STATUS AND RIGHTS OF WOMEN

Although the rights of women in the Cook Islands were not well documented by early explorers and missionaries, some accounts enable us to at least partially reconstruct the position of women in pre-contact society.

At the time of missionary contact in Rarotonga in 1823, the status of women was secondary to that of men. Women were not able to hold rank titles and therefore had no rights to land. Titles were usually transmitted from father to first-born son, although there were exceptions. The extent of matrilineal descent has been understated in genealogical records because of the

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* Contributed by Pamela Takiova Ingram Prior, Pacific Research Associates, Honolulu, Hawaii.

[1] Websters New Collegiate Dictionary, 1980 Edition, p. 1128.

[2] Blacks Law Dictionary.

[3] Quoted in: Economic and Social Commission for Asia and The Pacific, *Population of the Philippines*, Country Monograph Series Number 5, Bangkok, Thailand, p. 313.

strong tendency to rationalize the line according to the patrilineal ideal.[4] Women normally married outside their lineage and lived patrilocally on the land of their husband's lineage. In the case of a favoured daughter of a high-ranking chief, however, a piece of land known as a "marriage portion" *(enua taoanga rima)* may be set aside for her in her natal lineage on which she or her children could plant food or otherwise control.[5] But most women would not retain such use rights.

In general terms, a woman's privileges and prestige were dependent on the position of her husband. But the first-born female of a high-ranking chief often had prestige in her own right and may receive the honorary title of *tepaeru.* Before passing through the rites associated with adulthood, such women may be secluded and fed special foods to enhance their beauty and marriageability.

There is little doubt that women were ritually inferior to men. There are no recorded instances of women priests, mainly because priests also held chiefly titles, and women were not permitted on the sacred enclosures *(marae)* during menstruation. In broad terms women were considered *noa* (profane) and a threat to men's spirituality *(mana).* As a general rule women were not permitted in ocean-going canoes, but this restriction was lifted during voyages of exploration or settlement. Women ate their meals with the children after the men had eaten, and certain foods were forbidden to them.[6] Men usually had considerable power over women. According to one report, men enforced conjugal fidelity and a husband might "put away" his wife for adultery.[7]

The missionary John Williams wrote that:

> In one respect, the treatment of females at this island (Rarotonga) was materially worse than that which obtained in the Tahitian and Society groups; for, whilst in the latter females had a share of their father's possessions, at Rarotonga these went to the male branches of the family, and seldom, if ever to the daughters, on the ground, as they alleged, that their person was their portion.[8]

As a result of missionary influence, the status of women improved. In 1845, a woman acquired the *Makea Ariki,* one of the highest titles on Rarotonga. Makea Te Vaerua was the sister of the deceased chief (who had no children), and she was the wife of a Tahitian mission teacher who lived at mission headquarters.[9] As she was highly regarded by the missionaries, it can be assumed that they played an important role in this change of tradition.

With this precedent established, women on Rarotonga began to acquire titles and to exercise the land rights which came with them. This change was not documented or ratified by legislation; rather, it evolved and became custom. Women held the highest titles *(ariki)* more frequently than the lesser ones, but in Mangaia and the other Cook Islands title-holding rights were still reserved for men only. Even though some women held titles on Rarotonga, the preferred pattern was for the title to pass to the eldest resident son.

During the missionary era, women became spiritual equals with men and received the same instruction in scripture. The separation of men and women at mealtimes was abolished, but the husband was expected to be the spiritual leader of the household. Under missionary influence, however, women were still punished severely for adultery. Punishments might include being placed in stocks, suspended down a well by ropes, or paraded through the village with a shaven head.

In July 1902, the Land Court was established in the Cook Islands to investigate titles to land, determine successors, impose limits on land alienation, reserve land for public purposes and other matters.[10] When the Court made awards based on principles not consistent with pre-contact custom, it justified its actions on the grounds that the relevant custom had changed since contact. One of these fundamental changes was the right of women to own land. By recognizing the ability of women to hold titles (and thereby land) the Court assumed that untitled women were also

[4] R. G. Crocombe, *Land Tenure in the Cook Islands* (Melbourne, Oxford University Press, 1964), p. 26.

[5] *Ibid.*, p. 54.

[6] On Tongareva, for example, women were prohibited from eating turtle meat.

[7] Richard Gilson, *The Cook Islands, 1820-1950* (Wellington, Victoria University Press, 1980), p. 9.

[8] John Williams, *A Narrative of Missionary Enterprises in the South Seas Islands* (London, John Snow, 1837), p. 214.

[9] R. G. Crocombe, *op. cit.*, pp. 89-90.

[10] *Ibid.*, p. 102.

allowed to own land and, accordingly, it granted them rights of succession.

Since then, women have been able to succeed to traditional titles and land on a more or less equal basis with men. In Rarotonga, today, three of the six *ariki* title-holders and many of the *mataiapo* (chiefs of major lineages) are women. However, their political power is limited by the Cook Islands Constitution. The Constitution established the "House of Ariki" to accommodate the traditional leaders while setting up a Legislative Assembly (now called "Parliament") to make laws "...for the peace, order and good government of the Cook Islands."[11] The functions of the House of Ariki are to

> ...consider such matters relative to the welfare of the people of the Cook Islands as may be submitted to it by the Legislative Assembly for its consideration, and it shall express its opinion and make recommendations thereon to the Legislative Assembly.[12]

The political power of titled women is therefore limited to an advisory nature, mostly on matters of custom and tradition.

C. POLITICAL AND CIVIL RIGHTS OF WOMEN

The "political rights" of women in this context means the rights of women in relation to the state. They include the rights of suffrage, to run for election and hold public office, to express views on public issues, to form associations, to assemble peaceably and the right to petition the government for redress of grievances. The Cook Islands Constitution and subsequent legislation govern the exercise of these rights and provide for equal rights for women in all these areas. However, the constitution itself refers to persons in masculine terms. The habitual assumption that men will fill political offices gives rise to the exclusive use of the masculine pronouns "he" and "his", inplicitly excluding the female half of the population. Even recent, major amendments to the Constitution continue to use masculine pronouns.

Suffrage under the Constitution may be exercised by citizens not otherwise disqualified by law who are 18 years of age or over who have resided in the Cook Islands for at least three months immediately prior to the election. A survey of registered voters conducted by the author in two constituencies in the 1983 election showed that only one third of registered voters were women. There appears to be a need to create greater political awareness among women.

Since an elected national government was established in the Cook Islands, only three women have been elected to membership in the governing body. Two were elected to the Assembly in 1961, but it was another 22 years before women were again represented in the Legislature. Over the last three elections, only six women have run for political office, and only one has been successful. In the 1983 election, a woman was elected to represent the newly-created Overseas Constituency made up of voters living outside the Cook Islands (mostly in New Zealand). This woman is also the first to be appointed to the cabinet (as Minister of Internal Affairs).

While many women are employed in the Public Service as teachers, health and clerical workers, stenographers, etc., men occupy the higher positions in the government bureacracy.[13] No woman holds the top administrative position (Secretary) of any Ministry, and only a handful of women hold second-level positions. The latter are in Health, Justice and Labour and Employment, the Women's Development Officer, the Library and satellite communications.

The Cook Islands National Development Plan states that:

> From the base of a successfully operating Women's Development Centre, the Government aims to support women's organizations throughout the Cook Islands. The Centre will promote income generating schemes for women, and organise workshops and similar activities at the village level designed to develop the capacity of women to participate fully in the productive and community life of the country.[14]

It should be noted, however, that there is no statement to encourage the participation of women in decision-making and political leadership.

[11] Government of the Cook Islands, *Cook Islands Constitution* (Wellington, New Zealand Government Printer, Reprinted, 1967), p. 30.

[12] *Ibid.*, p. 19.

[13] A breakdown of Public Service workers by sex was not available at the time of writing.

[14] *Cook Islands Development Plan, Summary* (Rarotonga, 1983).

The Women's Development Centre in Rarotonga is run by the Women's Development Officer and an assistant and is primarily engaged in promoting the sale of handicrafts. This has become an important outlet for the fine baskets, mats, shellwork and hats that women produce – especially in the outer islands. The Centre has provided a convenient location where tourists can purchase traditional Cook Islands handicrafts and it has generated much-needed income for women. There are also approximately ten women's organizations on Rarotonga, including religious groups, charity and political organizations, and other community-oriented groups.

D. EMPLOYMENT, EDUCATION AND MATERNITY

1. Employment

Of the total economically-active population in 1981, 30.3 per cent were women (table 130). This represents only a small increase since 1966.

However, the proportion of women employers has increased from 15.4 per cent in 1966 to 21.6 per cent in 1981, indicating that more women are becoming entrepreneurs, most of them in Rarotonga. Women make up a considerable

Table 130. Employment status by sex, Cook Islands, 1966-1981

Employment status	Males				Females			
	1966	1971	1976	1981	1966	1971	1976	1981
Employer	84.6	82.5	80.4	78.4	15.4	17.5	19.6	21.6
Self-employed								
(a) mainly cash income	76.6	91.3	83.0	84.6	23.4	8.8	17.0	15.4
(b) mainly subsistence	76.8	98.1	98.4	79.2	23.2	1.9	1.6	20.8
Total	76.6	93.4	90.9	81.2	23.4	6.6	9.1	18.8
Wage and salary								
(a) full-time/permanent	67.9	71.3	...	66.8	32.1	28.7	...	33.2
(b) part-time/casual	78.4	73.7	...	59.0	21.6	26.3	...	41.0
Total	70.9	71.5	67.9	66.3	29.1	28.5	32.1	37.7
Unpaid family worker	88.3	36.2	66.5	72.2	11.7	63.8	33.5	27.8
Unemployed	57.6	56.1	63.1	53.2	42.4	44.2	36.9	46.8
Other	–	–	68.8	–	–	–	31.2	–
Total	72.0	71.9	71.5	69.7	28.0	28.1	28.5	30.3
Number	4 163	4 506	3 850	4 051	1 620	1 763	1 534	1 759

Source: Table 117, chapter IX.

Table 131. Distribution of economically active population by occupational classification and sex, 1981

Occupational group	Males		Females		Total	
	Number	Per cent	Number	Per cent	Number	Per cent
Professional, technical and related	512	58.0	372	42.0	885	100.0
Administrative and managerial	168	91.8	15	8.2	183	100.0
Clerical and related	296	44.2	373	55.8	669	100.0
Sales workers	129	40.6	189	59.4	318	100.0
Service workers	328	56.9	248	43.0	576	100.0
Agricultural workers and fishermen	1 303	84.4	240	15.6	1 543	100.0
Production and related, transport operators and labourers	1 181	85.4	201	14.6	1 382	100.0
Workers not classifiable by occupation	134	51.7	121	48.3	255	100.0
Total	4 051	69.7	1 759	30.3	5 810	100.0

Source: Table 126, chapter IX.

Note: There is a small difference between this table and table 130 in the total female labour force. The data used here were taken from unpublished tables.

proportion of part-time workers (41.0 per cent in 1981) and the unemployed (46.8 per cent). Women form the majority of sales workers, and clerical and related workers (59.4 and 55.8 per cent respectively), and they provide a considerable proportion of professional and technical (42.1 per cent) and service workers (43.1 per cent); but they are grossly underrepresented in administrative and managerial occupations (table 131).

Classified by industrial sector (table 132), women workers make up 55.6 per cent of the labour force in wholesale and retail trade, and 50.1 per cent of the manufacturing labour force (mainly in the clothing factories and fruit-juice processing plant). Women are less represented in agriculture, construction and transport and communications, but constitute 39.4 per cent of the 1981 labour force in community, social and personal services.

The distribution of the female labour force by sector is different from the male distribution: 65.8 per cent of the female labour force was in services in 1981 compared to 48.7 per cent of the male labour force.[15] In 1976, 21.1 per cent of the female labour force was in manufacturing, but this dropped to 11.5 per cent in 1981.[16] It appears that a number of female jobs have been lost in recent years.

Of course, the distribution of the female labour force varies by region. In Rarotonga, about 75 per cent was in the tertiary sector (mostly in services and trade) in 1981. In the southern outer islands a high proportion (66 per cent) was also in services and trade, but in the northern group 82 per cent was in agriculture and fishing – a higher proportion than in the male labour force.[17]

As already mentioned, there are few women in the higher positions in the Public Service. Table 133 gives a breakdown of selected occupations in Rarotonga by sex. Out of a total of 20

[15] See table 121, chapter IX.

[16] *Ibid.*

[17] See table 124, chapter IX.

Table 132. Distribution of economically active population by industrial sector and sex, 1981

Industrial sector	Males		Females		Total	
	Number	Per cent	Number	Per cent	Number	Per cent
Agriculture and fishing	1 429	83.6	268	16.4	1 697	100.0
Manufacturing	198	49.9	199	50.1	397	100.0
Construction and quarrying	320	98.5	5	1.5	325	100.0
Electricity and water	125	91.2	12	8.8	137	100.0
Transport and communications	495	85.2	86	14.8	581	100.0
Wholesale and retail trade	318	44.4	399	55.6	717	100.0
Community, social and personal services	1 033	60.6	671	39.4	1 704	100.0
Not classifiable by sector	133	52.5	119	47.5	252	100.0
Total	4 051	69.5	1 759	30.5	5 810	100.0

Source: Table 124, chapter IX.

Table 133. Proportion of males and females in selected Rarotonga occupations, 1981

Selected occupation	Males		Females		Total	
	Number	Per cent	Number	Per cent	Number	Per cent
Members of legislative assembly	20	100.0	–	–	20	100.0
Permanents heads of public service	14	100.0	–	–	14	100.0
Government administrators	32	97.0	1	3.0	33	100.0
Government executive officials	19	95.0	1	5.0	20	100.0
Production managers	15	68.2	7	31.8	22	100.0
Physicians and surgeons	9	90.0	1	10.0	10	100.0
Accountants and auditors	16	88.9	2	11.1	18	100.0
Lawyers and attorneys	8	88.9	1	11.1	9	100.0
Secondary teachers	42	67.7	20	32.3	62	100.0
Primary teachers	29	25.7	84	74.3	113	100.0

Source: Census of Population and Dwellings, 1981, unpublished tables.

government executive officials, only one is female and only one female is a government administrator out of a total of 33. Similarly, there is only one lawyer (out of 9), one physical (total of 10) and two accountants/auditors (total of 18). In education, 33.3 per cent of secondary school teachers are women while 74.3 per cent of primary school teachers are women. Thus men tend to dominate the higher paid teaching positions and women the lower paid ones.

Before 1981, census data tend to underestimate the participation of women in the economy. Women who stay at home but who are active in subsistence agriculture, handicraft production copra-making or other home-related occupations were partially omitted from earlier figures. In 1981, however, women on Pukapuka who spent 10 hours or more per week making copra were included in the labour force, and this raised the participation rate of women to 85.5 per cent.[18] It is possible that a closer look at the activities of women on other islands would result in an upward adjustment of the labour force participation rate of women. The multiple activities of women as farmers, handicraft manufacturers, storekeepers, as well as wives and mothers makes it dificult for census categories to accurately reflect women's economic roles.

Furthermore, the treatment of women in quantitative techniques for national planning is inadequate, with such terminology as "manpower" used to describe the supply of human resources and "head of household" to describe the decision-maker.[19] In developing countries such as the Cook Islands, the "man of the house" may not be the main decision-maker. The distortions involved in research and data collection on which development planning is based, and the relegation of women to "special projects" (such as Women's Development Centres) is often the result of the requirements of international agencies. By paying special attention of "women's issues", little attention is paid to the integration of women into national development at all levels.

2. Education

One of the most important limiting factors in the full participation of women in national development and decision-making has been the lack of educational opportunities. Although women have more equal access to education today, this was not the case in the past. Before the mid-1950s, there were no secondary schools on Rarotonga, and the best students received government scholarships to go to New Zealand (and Fiji medical school) for further education. However, women who demonstrated the ability to receive higher education were not permitted to go abroad. Consequently, most women of that era did not receive secondary or other higher education, and therefore lacked the necessary training and skills to fill the higher-paying Public Service positions, and were unable to participate equally in national development.

Since the 1960s, this situation has changed. Of the 25 students presently attending the University of the South Pacific in Fiji, 8 are women, and the number of women who have completed university degrees has increased considerably in recent years. There are now 4 Cook Islands women holding Masters degrees, one woman lawyer and one dentist.

Access to higher education is still somewhat restricted in the outer islands, however. Enrollment in the higher grades in high school tend to be lower for outer islands females than for males – especially in the northern group.

3. Maternity

Another factor which limits the ability of women to participate fully in national development, in education, and to develop themselves as individuals, is motherhood. Traditionally, mothers had the sole responsibility for child-care. However, maternity and child-care is a social function and should no longer be the burden of women alone. This burden can be shared by society as a whole, whose aims should include the protection of the family and the safeguard of the demographic development of the country.

For example, the attitude of the Government and Public Service Association toward maternity leave needs to be revised. At the present time, Public Service policy requires the dismissal of an unmarried woman attending Teachers Training College who becomes pregnant. Maternity leave presently includes six paid weeks, but should be increased to four weeks before birth and eight weeks afterwards. Other provisions should be included such as the exemption of pregnant women from dangerous work; that pregnant women cannot be fired; that either parent can take a leave of absence without pay with no risk

[18] Unpublished tables, *1981 Population Census.*

[19] In 1976, 17 per cent of all households in the Cook Islands were headed by a woman. *Cook Islands Census of Population and Housing, 1976,* p. 89.

of losing seniority; and that training be provided to women who have left the labour force to raise a family and want to re-enter the job market.

E. CONCLUSION

If greater efforts are made to remove the impediments to women's participation in work, education and political life, women in the Cook Islands can look forward to a period of development and personal growth in the coming decades. With more women graduating with higher educational qualifications, and increasing their participation in employment, the nature of the decision-making elite will undoubtedly undergo fundamental changes.

Equally important, women in the Cook Islands have been the agents of transfer of traditional knowledge, skills and culture, and will continue to be the most important links between generations. Women are mainly responsible for passing on the native language, for explaining important ceremonies and customs, teaching gardening, weaving and other skills such as food preparation and certain forms of fishing, as well as song and dance.

Although women have been culturally-conditioned in the past to believe that they should not aspire to leadership positions in the community, through education and exposure, different attitudes toward leadership and economic opportunity are emerging. Some of these attitudes are in direct conflict with traditional values and one of the most important tasks of women in the future will be to learn to deal with these conflicts. This has already happened to a great extent: women have become mediators of social change, managing to maintain their important traditional roles while adapting to new ones. They have become bi-cultural or even multi-cultural, successfully adapting to twentieth century challenges.

But there is much more to be done to encourage women to exercise their rights and to take the opportunities that are available to them. By doing this the human resources available to the whole community will be significantly expanded.

Chapter XI
POPULATION PROJECTIONS

A. INTRODUCTION

From a social and economic planning perspective, population projections have a wide range of uses. The demand for health, educational and welfare services, the need for housing, roads and other facilities, the likely size of the labour force and the population dependent on it, all these are determined to some degree by the size of the total population and various subgroups within it.

A population projection is not a prediction, however. Most demographers make a series of projections employing various assumptions about the likely patterns of change in fertility, mortality, and migration. These assumptions are usually based on a knowledge of past trends in the subject population, on observed trends in similar populations elsewhere, and on socio-demographic theory; but since they are determined by a wide range of circumstances not yet fully understood, population trends are not predictable from demographic information alone. Social, economic, and cultural changes can alter population parameters dramatically, as (to a lesser extent) can government policy designed for that purpose.

The demographer's task is to choose a sufficiently wide range of assumptions so that planners and other officials can see the effects of different assumptions and can make their own assessment of which ones are most realistic.[1]

Because of the unstable nature of the Cook Islands population, which has been evident throughout the preceding chapters, population projections far into the future are unlikely to be useful or reliable. The principal purpose of making projections for periods of 20-25 years is to throw light on the ultimate consequences of present patterns and to assist planners to decide if anything should be done to alter them.

[1] For a discussion of the demographer's responsibilities see: Donald J. Bogue, *Techniques for Making Population Projections* (Chicago, Community and Family Study Center, University of Chicago, 1974), Family Planning Research and Evaluation Manual No. 12, pp. 52-54.

B. PAST PROJECTIONS

A number of population projections have been performed on the Cook Islands population during the past two decades.[2] Using mathematical methods,[3] Williams[4] postulated three alternative growth patterns from a 1961 base population: (a) assuming the same levels of natural growth and net migration as observed in the 1945-1956 period, the total population would reach 38,607 in 1981; (b) assuming that these same parameters would follow the pattern of 1951-1961, the 1981 population would be 26,140; (c) assuming that 1956-1961 patterns would continue (a period in which emigration was increasing rapidly), the population would decline to 16,880 by 1981.

The latter projections, based on continued high emigration, turned out to be within 5 per cent of the observed population in 1981, even though such high levels of emigration were not considered likely at the time the projection was made.[5]

Another projection using mathematical methods is contained in the analytical section of the 1976 census report.[6] Two projections were made. Both assumed that the rate of natural increase observed in 1976 (1.91 per cent) would continue, but different levels of net migration were employed. Assuming no emigration at all, the total

[2] Not considered here is McArthur's projection cited by Crocombe (R. G. Crocombe, *Land Tenure in the Cook Islands,* Melbourne, Oxford University Press, 1964), p. 151 because no method was indicated.

[3] A "mathematical" projection involves the application of a formula directly to the total population as based on a census enumeration.

[4] Joseph Williams, "Population Trends and Projections of the Cook Islands," Appendix III of *Report of Cook Islands Health Survey,* typescript, Hamilton Library, University of Hawaii, 1969.

[5] Joseph Williams, *op. cit.,* p. 4.

[6] Cook Islands Statistics Office, *Census of Population and Housing, 1976* (Rarotonga, Government of the Cook Islands, 1977), pp. 18-19.

Table 134. Parameter assumptions of Phillips' population projections, 1966

Projection	Mortality	Fertility	Migration
I	Constant at 1962-1970 rates based on model life tables	Constant at 1965-1967 age-specific rates	Zero
II	Same as I	Same as I	Constant at observed 1961-1966 age-specific rates
III	Same as I	Same as I	Changes in accordance with difference between 1961-1966 and 1966-1971 migration
IV	Same as I	Declines by 1 per cent annually to GFR of 102	Same as II
V	Same as I	Same as IV	Declines from 1961-1966 level by 1 per cent per year, eventually to zero

population projected from a 1976 base would reach 19,926 in 1981. This was considered the likely upper bound of the possible range. Assuming continued emigration equivalent to the annual average of the 1967-1976 period, but excluding the exceptionally high emigration years 1972-1974, the population would be 18,970 in 1981. This was considered the lower bound.

As the 1981 enumeration shows, even the lowest estimate was too high. Emigration during the 1976-1980 period was more than double the annual figure of 246 assumed in the projection. In retrospect, it was unrealistic to exclude the 1972-1974 period completely from the estimate of future trends. The actual level of emigration through the total 1966-1976 period inclusive would have provided a better estimate.[7]

Mathematical projections which take no account of the age structure of the population or its geographical distribution are of limited utility for planning or general sociological purposes. More detailed projections employing cohort component methods applied separately to each region of the population were performed by Phillips[8] using the 1966 population as a base. A review of the results in the light of subsequent population changes may be useful in demonstrating the difficulties inherent in all projections.

The assumptions employed in Phillips' projections are summarized in table 134. Mortality was held constant in each projection, but the actual level varied from region to region. The principal variables then were fertility and migration. Projection I indicated the consequences of zero net migration and is best seen as an illustration of the inherent natural growth potential in the population around 1966. The other projections demonstrated the results of various combinations of fertility and migration rates.

Table 135 indicates the results of each projection for 1981 compared with the enumerated population for that year. With the exception of the northern group Projection II, IV and V, all of these projections turned out to be too high. It may be useful to examine why.

[7] Although emigration was exceptionally high between 1972-1974, it is likely that this reflected delayed migration from the 1966-71 period when transportation was limited. Average annual emigration from 1966-1976 inclusive was 545, while the annual average for 1977-1981 was 577.

[8] James Phillips, *A Demographic Profile of the Cook Islands*, unpublished M.Sc. thesis, University of Hawaii, 1972, pp. 85-99.

Table 135. Population projections from 1966-1981 compared with enumerated population

Projection	Rarotonga	Southern outer islands	Northern outer islands	Cook Islands
I	17 695	12 652	3 986	34 603
II	16 316	6 667	1 242	24 266
III	14 065	10 692	2 687	27 444
IV	15 450	6 288	1 179	22 917
V	17 331	8 426	1 580	27 337
1981 enumerated population	9 530	5 873	2 246	17 754

Sources: Projections from James Phillips, *op. cit.*; 1981 population data from table 7.

While the assumption of constant mortality at 1962-1970 rates was not a realistic one in the light of a moderate decline in mortality during the 1970s, this would have tended to produce smaller populations that would have been projected had a mortality decline been assumed. Thus the mortality assumption is not responsible for the difference between the projected and observed populations.

In the case of Rarotonga, projection III produced the population closest what was enumerated, but even this figure was 48 per cent above the actual 1981 population. This projection assumed constant fertility and mortality and an increasing rate of emigration. While the emigration assumption was realistic, fertility actually dropped sharply over the 1966-1981 period. Projection IV did assume a 1 per cent annual decline in fertility, but this turned out to be less than what actually occurred. It also kept emigration constant at 1961-1966 levels which were too low. As chapter VIII showed, in-migration to Rarotonga from the outer islands, which was an important feature of the 1961-1965 period, virtually ceased in favour of direct emigration to New Zealand. Thus Rarotonga's net emigration rates were substantially above those projected. Projection V was unrealistic for the same reason: migration did not decline but rather increased in the 1971-1976 period before falling in the 1976-1981 period.

In the southern outer islands, only projection IV was close to being realized. Here the one per cent annual decline in fertility was closer to what actually occurred, but again, emigration was significantly higher than was assumed in any of the five projections.

The assumption of constant fertility and mortality schedules and a gradually declining rate of emigration (Projection III) appears to have been the most realistic in the case of the northern group, even though the resulting figure was still about 18 per cent too high. Emigration was somewhat higher than projected and there was a small decline in fertility. Projection II set emigration too high while projections IV and V assumed a more rapid decline in fertility than actually occurred.

Although the difference is still substantial, Projection IV produced a total population in 1981 closer to that which was enumerated than any of the other projections. The assumption of declining fertility was valid, but the actual decline on Rarotonga (which has a major impact on the total) was much faster than could have been anticipated in the late 1960s. The same applies to emigration. While most observers expected the level of emigration to decline as the pace of economic development accelerated in the 1970s,[9] emigration

[9] Joseph Williams, *op. cit.*, p. 4.

actually soared during the 1971-1976 period and has remained high up to 1982.

The experience of these projections suggests that any assumptions regarding changing fertility or migration patterns must be made independently for each region of the Cook Islands. A constant rate of decline in fertility across all regions, for example, cannot be assumed, since each region is at a different stage in the fertility transition. Furthermore, the 1976-1981 emigration data indicate that emigration can vary widely across the regions and between individual islands.

The principal shortcoming of each of the projections reviewed so far is their failure to allow for the possibility of increasing levels and rates of emigration.

C. POPULATION PROJECTIONS 1981-2001

The population projections discussed in this section were performed by computer using the methods and computer programme developed by Frederic Shorter and David Pasta.[10] The programme employs a modified cohort-component method using separate five-year projection cycles and 16 age/sex groups ranging from 0-4 to 75+. In all the projections reported here the enumerated population on 1 December 1981 was used as the base population. No attempt was made to shift the projections to a mid-year date, therefore the projected populations will also refer to 1 December of the stated year. Although the computer programme projects the population ahead 35 years to 2016, the principal concern here is the 20 year period 1981-2001. It is unlikely that a projection period beyond 20 years is meaningful in the Cook Islands with its considerable demographic instability.

While the 1981 census reported the age-sex distribution of the "resident" (or *de jure*) as well as the total (*de facto*) population, only the latter has been used in the projections. The two populations differ by approximately 3 per cent, but Rarotonga is the only island which would be affected by the presence of non-residents.

Because each region has different rates of mortality, fertility, and migration, separate projections were performed for each and the results summed to produce a total for the Cook Islands.

The basic methodology of population projections is to apply a five-year survival rate to the population of each age group at the beginning of each five-year period. Since the risk of death is substantially higher in the first year of life, and especially in the first few weeks, the 0-4 age group is disaggregated into two groups: (a) below one year of age; (b) 1-4 years, as is the case in life table construction. Separate survival ratios are then applied to each group and the results summed to provide the 0-4 population at the beginning of the next projection period.

The survival ratios employed in the projections were obtained from two sources. The initial survival ratios were obtained from the life tables reported in chapter V (tables 65 through 70) using the formula L_{x+n}/L_x. With the exception of Projection I, which assumes that all components remain constant throughout the projection period, it is assumed that mortality conditions improve at a constant rate such that life expectancy at birth reaches 70.1 years for males and 72.5 years for females by the year 2001. The survival ratios commensurate with the latter values were obtained from the model life tables produced by Coale and Demeny.[11] In all projections except Projection I, it is assumed that mortality patterns in all three regions will converge at level "West" 22.6 for males and level "West" 22 for females by the year 2001. In the case of male mortality, this assumption is not based on the extrapolation of a trend, but on the expectation that public health measures in the outer islands will bring down the male death rate in the coming years.

The number at births which occur in each projection period is determined by the application of age-specific fertility rates to the female population aged 15-49. For the initial projection period, the age-specific fertility rates for 1979-1981 reported in chapter V were employed. These were then permitted to change as described below.

Similarly, age-specific annual net migration rates were obtained from the same "survival ratio" estimates used to produce the migration rates reported in chapter VIII. The projection programme assumes that migration occurs evenly throughout the five-year projection period and

[10] Frederic S. Shorter and David Pasta, *Computational Methods for Population Projections: With Particular Reference to Development Planning* (New York, The Population Council, 1974).

[11] Ansley J. Coale and Paul Demeny, *Regional Model Life Tables and Stable Populations* (Princeton University Press, 1966).

that migrants are subject to the same risk of death throughout the period. Migration rates may be positive (in-migration) or negative (out-migration) or zero in each five-year age group. Naturally, separate migration rates are entered for males and females and for each region.

It is a matter of judgement how many separate projections it is considered appropriate to perform for a given population. In some instances it may be useful to make enough projections such that the separate effects of each component of change can be determined. This approach has not been followed here. Since migration has such a powerful effect on the size and structure of the Cook Islands population, it was felt that it was more useful to make the most realistic assumptions possible about fertility and mortality and to hold these constant while altering the level of migration. If these fertility and mortality assumptions were to be invalidated by subsequent events then the projections would be incorrect even if the migration rates were the correct ones.

D. PROJECTION ASSUMPTIONS AND RATIONALE

The assumptions employed in the following projections are outlined in table 136. Projection I is intended to illustrate the effects of current rates in all three components and is not meant to be a realistic prognostication of likely trends. It is highly improbable that any of the population components will remain constant in the future, but this projection shows what would happen were this to occur.

The remaining projections employ dynamic rather than static assumptions. Projections II through V use identical fertility and mortality assumptions while varying the rate of net migration. Mortality is expected to decline in all regions at a constant rate beginning at 1979-1981 levels and reaching life expectancy at birth of 70.1 years for males and 72.5 years for females by the 1996-2001 period. These levels are derived from the "West" model life tables level 22.6 and 22.0 respectively.

Table 136. Assumptions used in population projections, 1981-2001

Projection number	Mortality	Fertility	Migration
I	Constant at 1979-1981 mortality rates from life tables	Constant at 1979-1981 age-specific fertility rates from vital register	Constant at average annual net migration rates 1976-1981 as estimated by "survival ratio" methods.
II	Mortality declines at a constant rate in all regions reaching life expectancy at age 0 of 70.1 years for males and 72.5 years for females by 2001.	Total fertility rate falls to 2.0 in Rarotonga, 2.6 in the southern group, and 3.0 in the northern group by the year 2001.	Zero net migration
III	Same as II	Same as II	Same as I
IV	Same as II	Same as II	Constant at average annual rates of 1966-1981 period.
V	Same as II	Same as II	In Rarotonga and the southern islands, migration begins at 1976-1981 rates then falls to 50 per cent of these rates by 1991-1996 period. Northern group migration fluctuates.

These rates of change imply that male life expectancy at birth [Em_0] will improve by 5.75 years from its present 64.35 years and female [Ef_0] by 2.65 years from 69.85 years by the 1996-2001 period. In the case of the outer islands, however, male E_0 would increase from its present 62.26 years to 70.1 years, an improvement of 7.84 years over a twenty-year period. The relatively larger increase in male life expectancy is based on the assumption that more rapid improvement in mortality levels is to be expected at lower mortality levels than at higher. As was discussed in chapter VI, there is a possibility that the decline in male E_0 in the outer islands between 1974-1978 and 1979-1981 is due to chance fluctuations in the number of deaths or to some unusual circumstance. In this case a more rapid improvement may be expected.[12]

Since female life expectancy at birth is already quite high for such socio-economic circumstances, a slower rate of improvement has been assumed and Ef_0 is made to level off at 72.5 years and to follow the age specific pattern of the "West" family of life tables.

In Projections II to V, fertility is assumed to fall in all regions but at different rates. In Rarotonga, the total fertility rate was 3.3 in 1979-1981 and it is assumed that this will fall to 2.0 by the year 2001 and remain constant after that. Total fertility is assumed to fall from 5.6 to 2.6 in the southern outer islands and from 5.5 to 3.5 in the northern group over the same period, and is held constant thereafter. In the case of Rarotonga it is assumed that the age distribution of fertility also changes as the TFR declines so that by 1991-1996 the mean age at child bearing has increased to 29.6 years of age from 27.2 years in 1979-1981. The mean age at childbearing in the outer islands was already high in 1979-1981 (29.9 years in the south and 29.0 years in the north) so that 1979-1981 age distribution of fertility was retained for all projections.

The levels of total fertility which each region is assumed to reach by 2001 were selected on the basis of recent trends as well as on the belief that substantial differences in the socio-economic and cultural conditions of the three regions will persist into the foreseeable future. For example, it seems unlikely that the desired family size in the northern group will drop to the same level as Rarotonga given the importance of kinship groups in the organization of production on these atolls. In the southern islands, some scope for larger production units and capital-intensive methods exists, but not all islands are equally placed and a certain cultural conservation may also tend to maintain total fertility above the level of Rarotonga.

The most difficult, and crucial, assumption to make in the Cook Islands case concerns levels and trends of external migration. In Projection I, the average annual net migration rates at the 1976-1981 intercensal period have been input to the projection. It is important to note that not all age-sex groups, nor all regions, have a net outflow. Net immigration was apparent among males aged 25-34 and 40-49 in the total population and in the northern group the general inflow of males virtually offset the net outflow of females.

In Projection II, net migration is zero in all regions and age-sex groups. Since Projection III holds mortality and fertility constant while assuming 1976-1981 average migration rates, a comparison of Projections II and III will indicate the effects of migration. Similarly, a comparison of Projection II with IV and V will show the degree to which a higher or lower level of migration affects population growth and structure. While the exceptionally high emigration rates of the 1971-1976 period are unlikely to be repeated in the future,[13] somewhat higher rates than the 1976-1981 period are plausible. One possibility is that the decline in net emigration in the 1976-1981 period is only temporary and that the long-term average will resume in subsequent census periods. Projection IV shows the implications of this by using the long-term average migration rates from the 1966-1981 period. For the overall population this means that the net migration rate would increase from the -25.0 per 1,000 rate implied in Projection III, to approximately -33.0 per 1,000.

As was discussed in chapter VIII, it is also possible that the Cook Islands will pass through a "mobility transition" analagous to the mortality transition through which it has already passed and the fertility transition through which it is presently passing. In this interpretation, the decline in net intercensal emigration since 1976 can be seen as the beginning of a definite downward trend which can be expected to continue. Projection V is intended to show the effects of such a transition in net migration.

[12] The probability of chance fluctuation affecting mortality levels is greatest in the northern group and would increase should the population decline.

[13] See chapter VIII for a discussion of this point.

In Projection V, migration begins at the average rates of the 1976-1981 period and is assumed to decline at the constant rate of 2.5 per cent per year (i.e. a 50 per cent decline in 20 years). The only exception to this pattern is in the northern group. In the case of these remote atolls, a constant decline in net migration is unlikely. First, natural increase will remain higher for longer than in the south, and given the pressure on resources that this implies, net emigration will tend to continue. Secondly, migration in the northern group has tended to fluctuate in the past depending upon such factors as the pearl fishery. For these reasons, Projection V assumes fluctuating migration. In the first five years, 1976-1981 rates are assumed to apply; subsequently migration increases to 1971-1981 levels for five years and then decreases again to the average level at the 1976-1981 and 1971-1981 periods.

Table 137. Projected populations by region under five separate assumptions, 1981-2001

	1981	1986	1991	1996	2001
Projection I					
Rarotonga[a]	9 615	9 613	9 743	9 867	9 861
Southern	5 873	5 412	5 205	5 126	5 033
Northern	2 266	2 480	2 722	2 976	3 242
Total	17 754	17 504	17 670	17 969	18 136
Projection II					
Rarotonga[a]	9 615	10 694	11897	12 988	13 929
Southern	5 873	6 561	7 496	8 582	9 625
Northern	2 266	2 554	2 922	3 346	3 778
Total	17 754	19 809	22 315	24 916	27 332
Projection III					
Rarotonga[a]	9 615	9 613	9 653	9 615	9 427
Southern	5 873	5 412	5 107	4 849	4 532
Northern	2 266	2 480	2 683	2 851	2 990
Total	17 754	17 505	17 443	17 315	16 949
Projection IV					
Rarotonga[a]	9 615	9 273	8 907	8 453	7 901
Southern	5 873	5249	4 810	4 417	3 980
Northern	2 266	2 153	2 065	1 972	1 844
Total	17 754	16 675	15 782	14 842	13 725
Projection V					
Rarotonga[a]	9 615	9 536	9 747	10 072	10 227
Southern	5 873	5 443	5 400	5 571	5 655
Northern	2 266	2 471	2 317	2 345	2 354
Total	17 754	17 450	17 464	17 988	18 236

Note: [a] Rarotonga's population in 1981 is slightly higher in these projections than in previous tables because the "at sea" population was added to ensure that the sum of the three regions would correctly equal the total population.

E. PROJECTION RESULTS

The results of these projections are presented by region in table 137 with the rates of growth shown in table 138. If the rates of fertility, mortality and migration of the 1976-1981 period were to continue for the next 20 years, (Projection I) the total population would grow at the extremely low annual rate of 0.1 per cent (table 138), and by the year 2001 would only have reached 18,136 or 2.2 per cent above the 1981 population. This suggests that, at 1976-1981 rates, net migration more or less offsets natural increase. Of course this does not hold for every region. At present rates, the southern outer islands will continue to decline at an average annual rate of 0.8 per cent, the northern group will increase at 1.8 per cent and Rarotonga by 0.1 per cent.

Table 138. Average annual growth rates implied in various population projections, 1981-2001 by region

Region	Projection				
	I	II	III	IV	V
Rarotonga	0.1	1.9	−0.1	−1.0	0.3
Southern	−0.8	2.5	−1.3	−1.9	−0.2
Northern	1.8	2.6	1.4	−1.0	0.2
Total	0.1	2.1	−0.2	−1.3	0.1

Source: Table 137.

In the case of the nothern group at least, this scenerio is somewhat unrealistic. Since in-migration is presently male biased whereas out-migration is female biased, the sex ratio would increase continually until it reached 129 in 2001. It seems unlikely that this sex inbalance would be permitted to occur and some corrective could be expected.

The effects of emigration on population growth, even with reduced levels of fertility and mortality, are apparent from the results of Projection II which shows the total population reaching 27,332 in 2001, an average annual growth rate of 2.1 per cent. By 2001, the total population would be 54 per cent above 1981. The outer islands would increase at the fast rate of 2.5-2.6 per cent annually, but even Rarotonga would experience a healthy growth rate of 1.9 per cent.

The complete cessation of emigration is, of course, an unlikely prospect: complex kinship links between the New Zealand-based Maori population and the Cook Islands and the difficulties of labour absorption in the Cook Islands economy will continue to encourage emigration. The main difficulty here is predicting the level emigration is likely to reach.

If emigration were to continue at 1976-1981 rates while fertility and mortality continued to decline, (Projection III) the result would be a continuous, but extremely gradual, decline in total population. But the northern group would increase because of net in-migration in certain age groups (table 137). Because Projection I and Projection III employ the same migration assumption, the difference between them shows the effects of declining fertility and mortality. These effects tend to be greater in the outer islands than in Rarotonga since the latter has passed through its period of most rapid decline in fertility. The population decline engendered by 1976-1981 migration rates would largely be concentrated in the southern outer islands with negligible effects in Rarotonga – at least up to 1996.

Were emigration to return to the historical levels of the 1966-1981 period as a whole (Projection IV), all regions would experience steadily declining populations, and the total population would fall by 23 per cent to 13,725 by 2001. Again, the rate of decline would be highest in the southern outer islands (−1.9 per cent annual rate) while Rarotonga and the northern group would decline at about half this rate. Insofar as a declining total population is considered inimical to the achievement of development goals, Projection IV represents the worst scenerio for the Cook Islands.[14]

The assumption that migration will pass through a "transition" analogous to those of fertility and mortality (Projection V) presents a more positive future. In this case, Rarotonga would increase moderately, the southern outer islands would decrease initially but gradually recover while the northern group would remain

[14] The second quarter population estimates for 1982 indicate a total population of 16,900 – a 2.9 per cent decline over the second quarter 1981. This suggests a net emigration rate well above the "worst case" scenario presented in Projection IV.

Table 139. Labour force growth 1981-1996 under five assumptions: population age 15-64 showing percentage change from 1981

Region	1981	Projection I		II		III		IV		V	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Rarotonga	5 575	6 225	11.7	8 220	47.4	6 259	12.3	5 361	−3.8	6 482	16.3
Southern	2 767	2 591	−6.4	4 829	74.5	2 621	−5.3	2 303	−16.8	3 030	11.3
Northern	1 050	1 577	50.2	1 845	75.7	1 594	51.9	1 018	−3.0	1 274	21.3
Total	9 392	10 393	10.7	14 894	58.6	10 474	11.5	8 682	−7.6	10 836	15.4

Source: Table 137.

more or less stable for 20 years. Although the total population would decline slightly for ten years, by 2001 it would return to about the same level as 1976.

F. THE LABOUR FORCE

From an economic point of view, the size of the working age population – both absolutely and relative to the dependent age groups – is at least as important as the size of the total population. The labour force (defined here as the population aged 15-64) shows a tendency to grow in all population projections except IV (which assumes increasing emigration). Without migration (Projection II) the total labour force would grow by 58.6 per cent overall by 1996 and by 75 per cent in the outer islands (table 139). Projection I, on the other hand, suggests a relatively small labour force increase of 10.7 per cent, more or less the same as Projection III. The higher migration rates of Projection IV result in a 7.6 per cent decline in the labour force overall, and a 16.8 per cent drop in the southern outer islands.

Interestingly, none of the projections predict an increase in the dependency ratio and the differences between the projections are relatively small (table 140). Projection III, which assumes 1976-1981 migration rates and declining fertility gives the lowest dependency rates overall, but the outer islands would have lower ratios without migration.

Table 140. Dependency ratios under five projection assumptions in 1996, by region

	1981	Projection I	II	III	IV	V
Rarotonga	72.5	58.5	58.0	53.6	57.7	55.4
Southern	112.1	97.8	77.7	85.0	91.8	80.9
Northern	115.8	88.7	81.4	78.9	93.7	84.1
Total	89.1	68.7	67.2	65.3	70.9	65.9

G. CONCLUSIONS

It is clear from the results of Projection II that despite recent declines in fertility rates, considerable growth potential remains in the population. In the absence of emigration, it would only take 10 years from 1981 for the total population to increase to above 22,000 (just over the level reached in 1971). The natural resources of the Cook Islands are certainly sufficient to support the projected numbers up to 1991, but without an increase in productivity –especially in the agricultural sector – this growth would most

likely result in lower *per capita* incomes. Furthermore, migrant remittances tend to fall-off with time, thus this larger population would not be able to substitute remittance income for agricultural income to the same extent as the present population.

After 1991, however, population levels in all regions would reach unprecedented levels. Again there is little doubt that the Cook Islands, in spite of its limited land area, could support a projected population of 27,332 by 2001: the question is whether this could be done simultaneously with an expansion of commercial agriculture and increasing *per capita* incomes. At this level of population, competition between subsistence and cash-crop production over the utilization of land may become severe.

In the case of the outer islands, much would depend on how the population were distributed among the islands. The larger islands of Mangaia and Aitutaki are probably in a better position to absorb population increases than Mauke or Mitiaro.

It seems more likely, however, that the Cook Islands will experience continued net emigration for the foreseeable future. The main question is whether the relatively moderate rates of the 1976-1981 period will continue or whether migration will increase. The continuation of 1976-1981 rates would not present overwhelming socio-economic problems. Labour force growth in Rarotonga would be negligible as would labour force decline in the southern outer islands. This would provide some scope for more capital-intensive horticulture and perhaps lead to higher *per capita* incomes. The continued in-flow of males to the northern group is unlikely to continue, but some labour force growth is to be expected there. The economic consequences of this will depend on distribution. Pukapuka and Nassau are densely populated already whereas Tongareva is not and has a richer resource base.

Insofar as population policy is concerned, the point of departure must be the most preferable population profile. Total population size is only one consideration, the age structure is also an important aspect of economic and social welfare. Assuming that resources were fully redistributed among the remaining population, smaller populations would increase *per capita* income, but the extra public costs of providing social services to small outer islands populations may well offset this private advantage. Further subsidies from the central government would be required to support schools and health services, but the declining total population would mean a shrinking tax base necessitating increased financial aid from New Zealand or elsewhere.

Assuming that fertility continues to fall at the rate indicated in Projections II through V, a significantly reduced rate of emigration would not increase the dependency ratio. Thus, a policy aimed at reducing emigration would probably have no negative demographic consequences. In this case, however, labour force absorption could become a major problem – depending on the extent to which migration was reduced. In the short-run (15 years) no reduction in fertility can ease labour absorption problems since the future labour force already exists. If long term (20-30 years) labour absorption problems are to be avoided, however, present fertility levels would have to be reduced if emigration were to be cut-back substantially.

The main point here is that any attempt to increase the presently declining population by relaxing downward pressure on fertility (for example, by discouraging family planning) would result in higher dependency ratios in the future. On the other hand, discouraging emigration may lead to problems of labour absorption in the future.

A joint policy of downward pressure on fertility – especially in the outer islands – accompanied by a reduction in net emigration would result in a population in 1996 somewhere between the 17,998 of Projection V and the 24,916 of Projection II. Such a population (approximately 21,500) has been experienced before (in 1971), but in this case dependency would be much lower than in 1971 and *per capita* welfare should therefore be higher. Nevertheless, if this population level were accepted as a target for 1996, fertility would have to decline rapidly (or emigration permitted to rise again) if further growth beyond this was to be prevented.

Annex I

SOURCES AND QUALITY OF DEMOGRAPHIC DATA

A. SOURCES OF DEMOGRAPHIC DATA

1. Population Censuses

The first official census of population in the Cook Islands was taken on Rarotonga in 1895. The information gathered included country and island of birth, ages in six categories ("under 5, 5 to 10, 10 to 20, 20 to 50, over 50, doubtful"), literacy and district of residence.[1] No breakdown by sex was provided.

A second census covering Rarotonga and Mangaia was taken in 1901. In the case of Mangaia only the total population by sex was reported;[2] in Rarotonga a breakdown by three age groups (1-16, 16-40, 40+), sex and place of birth was given.

There is some doubt as to when the first complete enumeration of all islands took place. The 1907 Annual Report[3] included population totals for each island as of 1902, yet McArthur has indicated that Mangaia, Mauke, Mitiaro, Manua and Pukapuka were omitted from the census count that year.[4] In any case, only population totals were reported, with no breakdowns by age and sex.

A complete census was taken in 1906 and breakdowns by age (under 16 years and over 16 years), sex, number of "whites" and "half-castes" and the birth-places of the population were reported. In 1916 a much more ambitious census collected data pertaining to the distribution of population by five year age groups, ethnicity, place of birth, religion, school attendance and literacy.[5] From 1916 through 1945, the results of the census were appended to the New Zealand census results.

Since 1916, the scope of the census has gradually been enlarged to cover the standard range of demographic and socioeconomic questions.[6] Several changes of definition have occurred, however, to correct various anomalies in the distinction between the "native" and "non-native" population.[7]

In 1926, the occupations of the "non-native" population were reported, but not those of the "native" population, and data for Niue were conflated with those from the Cook Islands. More detail regarding race/ethnic composition, literacy and duration of residence was provided in 1936, but occupational data were not reported. By 1945, however, the occupations of both "native" and "non-native" groups were reported with a breakdown by sex.

The 1951, 1956 and 1961 censuses were not published with the New Zealand census reports as previously, but detailed tables were made available by the New Zealand Department of Statistics on request. The 1951 tables included information on the marital status of the population (by island) for the first time, as well as the number of children by the age of parents ("other than indigenous inhabitants"). It would appear that literacy was of particular concern during this period since detailed

[1] New Zealand House of Representatives, Appendices to the Journals, vol. 1, A-3, 1896, p. 12.

[2] *Ibid.*, 1902, p. 16.

[3] *Ibid.*, 1907, p. 2.

[4] Norma McArthur, *Island Populations of the Pacific* (Canberra, Australian National University Press, 1968), p. 191.

[5] New Zealand, *Results of a Census Taken in the Dominion of New Zealand. October, 1916*, Appendix B, Population of Cook and other Annexed Pacific Islands.

[6] The 1916 census attempted to collect data on the number of livestock and coconut trees but suspicion of a taxation scheme rendered the results inaccurate. Census and Statistics Office, *New Zealand Census, 1916*, Section XVI, Census of Cook and other Annexed Pacific Islands, Wellington, Govt. Printer, 1920, p. 183. For details regarding census methods and procedures from 1906 to 1961 see Norma McArthur, *op. cit.*, pp. 191-197.

[7] From 1906 to 1916, "native" women married to Europeans and "half-castes living as whites" were included in the same category, whereas "half-castes living as natives" were included with the "native" population. The category "whites living as natives" was not employed. Although the treatment of "native" women married to "whites" changed in 1926, the distinction between "native" and "non-native" was retained, and it was not until 1956 that the ethnic term Maori was employed.

breakdowns of the degree of literacy by individual island were provided. Marital status by age, sex and island was tabulated in 1956, and this is the first year in which occupational data and the number of children born to women by age and marital status were provided by island.

Except for summary tables by island, which appeared in the annual reports of the Administration, the results of the 1961 census do not appear to have been published. Some scholars have obtained a limited number of tables from the New Zealand Department of Statistics, but even these are no longer available.[8] Ten tables are on file at the South Pacific Commission and various Pacific libraries.[9] These include age of females at birth of first child and the labour force by industrial sector (neither of which were previously tabulated).

The 1966 census represents a milestone in the history of census-taking in the Cook Islands. Not only was the standard range of demographic questions asked but also a number of questions relating to primary and secondary incomes, educational qualifications, housing materials and household facilities, tenure of dwellings and the number of livestock. An attempt was made to conform to standard international census practice with respect to industry and occupation.

In 1971 the census was again expanded to include questions on land tenure, but questions regarding income were dropped since the validity of the results was considered questionable. Because of long delays in the data processing stage, the 1971 census was never published as an independent report, but a large number of tables was generated by the New Zealand State Services Commission. Some of these data were incorporated in the 1976 census report, but a great deal of material remains unpublished. Because of the delay in processing and publishing the 1971 census results, "quick counts" were conducted in December 1973 and again in February 1975. While the results of these enumerations were never published as separate reports, a number of tables, including age and sex by island and region, industrial sector by age and island from the 1973 count were published in the Quarterly Statistical Bulletin.[10] Apparently the latter set of data was adjusted in the belief that Rarotonga's population was underenumerated. Unadjusted data were published in a development study by the Planning Office, along with a more limited set of data from the 1975 "quick count".[11]

In contrast to 1971, the results of the 1976 census were available within 12 months of the census date, mainly because of the use of labour-intensive hand sorting processing methods. The main shortcoming of the 1976 report was the lack of detailed tables on occupation and industry by island, age and employment status and the lack of comparability of educational attainment data with previous censuses.

The 1981 census, which is being processed by an Altos micro-computer in the Cook Islands Statistics Office, contains a number of innovations over previous years. First, the results were published in a series of separate bulletins pertaining to various regions and subjects; this has facilitated more rapid release of the results. Secondly, a distinction was made between "total" and "resident" population. The "resident" population excludes those visitors to the Cook Islands who "will not have worked between his or her date of arrival and date of departure."[12] Thus defined, the "resident" population is not a true *de jure* one (since usually resident persons temporarily abroad are not counted), but insofar as such temporary visitors as tourists are excluded, a more accurate indication of the permanently-resident population is provided. Tables pertaining to socio-economic characteristics employ the "resident" population resulting in a minor loss of comparability with previous years.

2. Vital Registration

As indicated in previous chapters, the registration of births and deaths became a civic responsibility following the passage of the Cook Islands Act of 1915, but registration did not commence until 1917 and was probably not effective for several years thereafter. The registration of vital events is presently governed by the "Births and Deaths Registration Act 1973" which is administered by the Department of Justice. In the outer islands, each Chief Administration Officer is *ex-officio* a Deputy Registrar with the responsibility to administer the act, while on

[8] Personal Communication, New Zealand Department of Statistics.

[9] For example, The Pacific Collection, Hamilton Library, University of Hawaii.

[10] Cook Islands Statistics Office, *Quarterly Statistical Bulletin*. April-July, 1975, pp. 14-43.

[11] F. Van Os, *Tentative Analysis of Selected Sectors of The Cook Islands Economy*, Rarotonga, Planning Office, 1977.

[12] From the census questionnaire.

Rarotonga a full-time Deputy Registrar-General is appointed. Registration is centralized in Rarotonga but duplicates are retained in the outer islands.

The standards of registration in the Cook Islands are generally high. Most outer islands are small enough that few vital events escape public notice and on the whole administrators are conscientious. The major sources of error in registration, according to a recent assessment, were in the actual compilation of annual totals from the register, the neglect of late registrations and the occasional inclusion of an event which occurred on another island.[13] Because of its greater anonymity and administrative complexity, Rarotonga may well have a higher incidence of underregistration than the outer islands, but no field studies have been conducted to confirm this. An attempt to match register data with Health Department records for 1979 produced an estimate of 4.1 per cent underregistration in Rarotonga, but it is impossible to know how representative this figure is for previous or subsequent years or for other islands.[14] The general indication from the numerical tests reported below is that the level of underregistration has been relatively low since the mid 1960s.

3. Migration

Until 1965, the principal sources of migration data (aside from indirect census-based estimates) were the annual reports by the Cook Islands Administration published by the New Zealand House of Representatives. After 1965, records maintained by the Customs, Justice and Premier's Departments in Rarotonga became the main source and these were the basis of a statistical series going back to 1924 which was compiled by Curson.[15] This series included total arrivals and departures, excess of departures and a breakdown of total departures by the categories "adult male", "adult female" and "child."

When the Cook Islands Statistical Bulletin was inaugurated in the early 1970s, more detailed demographic information on migration was published going back to 1966. From 1971 through 1978, the Statistics Office published a monthly migration bulletin containing detailed statistics of arrivals, departures and net departures by five-year age groups, sex and ethnicity. This highly useful series is no longer published and the present series of monthly bulletins places primary emphasis on visitor statistics with little demographic information provided. The present arrival and departure cards are designed primarily for the needs of the tourist industry, and although demographic information is collected, no detailed statistics are currently being published.

A second important source of migration data is the New Zealand Department of Statistics annual bulletin Population and Migration. Up until the early 1970s, probably 95 per cent of all Cook Islanders who left the Cook Islands went to New Zealand; thus, New Zealand arrival statistics could be treated as virtually equivalent to departures from the Cook Islands. As more Cook Islanders settle in Australia and elsewhere, this equivalence cannot be assumed, but New Zealand data are still an important supplement to Cook Islands sources, and this is still the best source of information on the socio-economic characteristics of migrants.

B. ACCURACY OF CENSUS DATA

There are two main areas of concern with respect to census accuracy. The first is whether all persons eligible to be included are actually enumerated: this refers to the completeness of coverage. The second concerns the validity of the responses given to such census questions as age, socio-economic status, ethnicity, number of children, etc. The sources of error in census data are many and varied, ranging from the complete loss of questionnaire schedules to memory lapse or lack of age consciousness in individual respondents. These and other errors will tend to be higher if a population is illiterate, suspicious of census takers, lacks appreciation of the purpose of censuses or is apathetic or uncooperative with census takers. Problems of distance and transportation as well as inadequate training of enumerators and supervisors also increase the probability of errors in coverage and detail.

The Cook Islands has obvious advantages in these respects.[16] There is a long history of

[13] Geoffrey R. Hayes, *Report on Project to Evaluate Cook Islands Vital Statistics, 1965-1977,* South Pacific Commission, 1980 (unpublished).

[14] *Ibid.*

[15] P.H. Curson, *Population of the Cook Islands,* unpublished manuscript, MacQuarrie University, 1973.

[16] George W. Roberts "Some issues in the study of small populations", in Leszek A. Kosinski and John W. Webb (eds.) *Population at Microscale,* New Zealand Geographical Society, 1976, pp. 37-46.

census-taking in the islands and the literacy rate is high (probably above 95 per cent). Also, there is a strong appreciation in most segments of the population of the need for census information, and although suspicion of the central government is far from absent, it is unlikely that this would affect the accuracy of responses to demographic and related questions. The standards of training are also reasonably high and considerable expertise in census taking has developed during the past 15 years.

1. Completeness of Enumeration

Of the many possible technical methods for evaluating census coverage,[17] comparison with other sources of population data is the only one so far applied in the Cook Islands. McArthur checked the 1956 census results against those expected on the basis of the 1951 census and the continuous records of births, deaths and net migration during the intercensal period, and concluded that "... the agreement between the numbers expected and enumerated in 1956 is as close as one can expect when one juggles populations as at the end of September and annual statistics relating to the year ended 31 March."[18]

Using the same methods, McArthur found a 5 per cent undercount of the "native" population in 1945, and a 2.5 per cent undercount in 1951. The general indication is that both census and continuous records have gradually improved in quality since then.

Similar tests have been conducted on the 1971 and 1976 censuses. The "error of closure" in 1971 was 1.4 per cent for the total population, but the understatement of male emigration in the 1966-1971 period almost certainly contributed to this. In 1976 the total error according to this method was only 0.15 per cent,[19] suggesting, perhaps unrealistically, a high level of accuracy.

The results of the same method applied to the 1981 census are shown in table 141. For reasons mentioned above, it is no longer possible to obtain a breakdown of net migration by month; thus it was necessary in the case of 1981 to estimate net migration for that part of the final quarter of the year which preceded the census date (October-November). Given this, the result of 0.46 per cent error of closure is a reasonable one. In the absence of independent measures of net migration for individual islands, however, it is impossible to check the accuracy of census counts for regional sub-groups.

Since underenumeration is more likely at young ages, it is useful to compare the enumerated population of infants under one year of age with what would be expected on the basis of continuous records. Providing it is assumed that the registration of births and deaths was 100 per cent complete, and that migration does not occur under one year of age, the underenumeration of infants in the 1966 census was 5.4 per cent. It is reasonable to conclude, however, that both the underregistration of deaths and the underenumeration of infants in the census contributed to this discrepancy rather than only one or the other.[20]

In 1976 the discrepancy between the expected and enumerated population below one year of age was less than 1 per cent for the total population.[21] Assuming that the vital data are accurate, this suggests a high quality of enumeration in the 1976 census.

Table 142 shows the same method applied to the 1981 census (total population). The total error of closure was only 2 or 0.44 per cent of the enumerated population. A comparison of Rarotonga (table 143) and the outer islands (table 144) presents a different picture, however, with opposite errors in the two regions virtually cancelling each other out. In the outer islands, there was either overenumeration of infants or underregistration of births during the previous year. If the latter were the case then 7 per cent of all births during the 12 months prior to the census were unregistered, which seems unduly high. Another possibility is that there was some out-migration of infants from Rarotonga to the outer islands. This would also account for the error in Rarotonga.

[17] Seven general approaches are discussed by Shryock and Siegel: Re-enumeration; comparison of successive censuses; internal consistency within a census; check against independent aggregates; matching against individual records; post-enumeration sample surveys; some combination of these. *The Methods and Materials of Demography* (Washington, United States Bureau of the Census, 1975), p. 105.

[18] Norma McArthur, *op. cit.*, p. 199.

[19] Geoffrey R. Hayes, *op. cit.*, p. 19.

[20] *Ibid.*, p. 15.

[21] *Ibid.*, pp. 16-17.

Table 141. Census and vital data compared 1976-1981, total population

	Males	Females	Total
Enumerated population 1 December 1976	9 293	8 834	18 127
Natural increase 1 December 1976 - 30 November 1981	840	923	1 763
Net migration (frontier data)[a]	...	...	−2 425
Expected population 1 December 1981	...	...	17 465
Enumerated population	9 172	8 582	17 754
Error of closure	...	...	289
Per cent error	...	...	0.16

Note: [a] Breakdown by sex not available.

Table 142. Expected and enumerated population under age 1 on 1 December 1981, total Cook Islands

	Males	Females	Total
(1) Births	228	235	463
(2) Deaths	4	5	9
(3) Expected population (1) - (2)	224	230	454
(4) Enumerated population 1 December 1981	222	230	452
(5) Error of closure (4) - (3)	2	–	2
(6) Per cent error	0.9	–	0.44

Table 143. Expected and enumerated population under age 1 on 1 December 1981, for Rarotonga

	Males	Females	Total
(1) Births	119	137	256
(2) Deaths	3	4	7
(3) Expected population (1) - (2)	116	133	249
(4) Enumerated population	110	121	231
(5) Error of closure (4) - (3)	−6	−12	−18
(6) Per cent error	−5.45	−9.92	−7.79

Table 144. Expected and enumerated population under age 1 on 1 December 1981, for outer islands

	Males	Females	Total
(1) Births	109	98	207
(2) Deaths	1	1	2
(3) Expected population (1) - (2)	108	97	205
(4) Enumerated population	112	109	221
(5) Error of closure (4) - (3)	4	12	16
(6) Per cent error	3.57	11.01	7.24

2. Age-sex Accuracy

Various statistical methods have been devised to estimate the accuracy of age reporting in population censuses. Table 145 shows the age ratio method of Shryock and Siegel applied to the 1981 Cook Islands census.[22] The results suggest that female age reporting (index 6.44) was less accurate than for males (index 6.12). Insofar as this index can be affected by age-selective migration, however, the overall index of 6.28 may be taken as an indication of reasonable accuracy.[23]

Table 146 shows the results of applying the age-ratio method to the three regions. In general, the index increases as the size of the population decreases, with the northern group having the highest score (11.08) indicating the least accuracy. This is in part a function of age-selective migration producing irregularities in the numbers in adjacent age groups – a phenomenon which is exaggerated in a small population. But the northern group index for females is similar to that obtained for Rarotonga females in spite of a much smaller population. By this measure, age-reporting is most inaccurate in the male population of the northern group.

An alternative method proposed by the United Nations is demonstrated in table 147.[24] The United Nations age-sex accuracy index "combines... the sum of (a) the mean deviation of the age ratios for males from 100.0, (b) the mean deviation of the age ratios for females from 100.0 and (c) three times the mean of the age-to-age difference in reported sex ratios."[25] Again, the age-ratio for the female population is higher than for males indicating less accuracy in female age-reporting.

According to United Nations standards, however, the joint index of 51.62 suggests "highly inaccurate" age reporting. A regional comparison of the United Nations index (table 148) suggests that Rarotonga and the northern group had less-accurate age-reporting than the southern outer islands or the population as a whole. Again, this is not entirely a function of population size since the population of the southern group is only two thirds that of Rarotonga.

[22] Henry S. Shryock and Jacob S. Siegel, *op. cit.*, p. 220. The age ratio is obtained by the formula: 300.*P(A)/[P(A-5)+P(A)+P(A+5)]. The age accuracy index is the sum of the average deviations from 100 across all age groups.

[23] Shryock and Siegel (*op. cit.*, p. 219) give examples from previous censuses US (1960): 2.3; Sweden (1963): 3.3; Taiwan 1964): 4.7; Greece (1961): 6.5; Philippines (1960): 7.0; Turkey (1960): 9.7.

[24] *Ibid.*, p. 222.

[25] The age-ratio by the United Nations method is obtained by the formula: 200.*p(A)/[p(A−5)+p(A+5)]. The age-sex accuracy index is three times the mean sex ratio difference plus the mean age ratio deviations from 100.

Table 145. Calculation of age-accuracy index, total Cook Islands, 1981 census

Age group	Population		Analysis of age ratios			
			Males		Females	
	Males	Females	Ratio	Deviation from 100	Ratio	Deviation from 100
0 - 4	1 129	1 087	–	–	–	–
5 - 9	1 308	1 250	100.64	0.64	101.71	1.71
10 - 14	1 462	1 350	107.50	7.50	108.95	8.75
15 - 19	1 310	1 124	112.87	12.87	106.54	6.54
20 - 24	710	691	86.76	–13.24	91.20	–8.80
25 - 29	435	458	82.65	–17.35	88.99	–11.01
30 - 34	434	395	103.75	3.75	92.51	7.49
35 - 39	386	428	95.70	–4.30	105.16	5.16
40 - 44	390	398	100.95	0.95	104.19	4.19
45 - 49	383	320	103.79	3.79	95.52	–4.48
50 - 54	334	287	99.40	–0.60	102.01	2.01
55 - 59	291	237	105.82	5.82	100.99	0.99
60 - 64	200	180	90.63	–9.37	95.24	–4.76
65 - 69	171	150	105.12	5.12	104.41	4.41
70 - 74	117	101	98.60	–1.40	90.45	–9.55
75 - 79	68	84	94.88	–5.12	116.67	16.67
80 - 84	30	31	–	–	–	–
85 and over	14	11	–	–	–	–
Total (absolute value)	–	–	–	91.81	–	96.53
Mean	–	–	–	6.12	–	6.44

Note: Overall age accuracy index = 6.28.

Table 146. Age-accuracy index[a] by sex and region, 1981 census

	Males	Females	Total
Rarotonga	8.74	8.37	8.56
Southern	9.98	9.88	9.93
Northern	13.76	8.40	11.08
Cook Islands	6.12	6.44	6.28

Note: [a] Age-ratio method.

Table 147. Calculation of United Nations age-sex accuracy index, total Cook Islands, 1981 census

Age group	Population		Analysis of sex-ratios		Analysis of age ratios			
					Males		Females	
	Males	Females	Ratio	Successive differences	Ratio	Deviation from 100	Ratio	Deviation from 100
0 - 4	1 129	1 087	103.86	–	–	–	–	–
5 - 9	1 308	1 250	104.64	0.78	100.96	0.96	102.59	2.59
10 - 14	1 462	1 350	108.30	3.66	111.69	11.69	113.73	13.73
15 - 19	1 310	1 124	116.55	8.25	120.63	20.63	110.14	10.14
20 - 24	710	691	102.75	–13.80	81.38	–18.62	87.36	–12.64
25 - 29	435	458	94.98	–7.77	76.05	–23.95	84.35	–15.65
30 - 34	434	395	109.87	14.90	105.72	5.72	89.16	–10.84
35 - 39	386	428	90.19	–19.69	93.69	–6.31	107.94	7.94
40 - 44	390	398	97.99	7.80	101.43	1.43	106.42	6.42
45 - 49	383	320	119.69	21.70	105.80	5.80	93.43	–6.57
50 - 54	334	287	116.38	–3.31	99.11	–0.89	103.05	3.05
55 - 59	291	237	122.78	6.41	108.99	8.99	101.50	1.50
60 - 64	200	180	111.11	–11.67	86.58	–13.42	93.02	–6.98
65 - 69	171	150	114.00	2.89	107.89	7.89	106.76	6.76
70 - 74	117	101	115.84	1.84	97.91	–2.09	86.32	–13.68
75 - 79	68	84	80.95	–34.89	92.52	–7.48	127.27	27.27
80 - 84	30	31	96.77	15.82	–	–	–	–
85 and over	14	11	127.27	–	–	–	–	–
Total (absolute value)	–	–	–	175.17	–	135.88	–	145.76
Mean				10.95	–	9.06	–	9.72

Note: Accuracy index = Three times mean sex-ratio difference plus mean age ratio differences = 51.62.

Table 148. United Nations age-sex accuracy index by region, 1981 census

	Males age-ratio	Females age-ratio	Joint score
Rarotonga	12.82	12.52	87.07
Southern	14.60	14.99	83.29
Northern	20.28	12.61	99.51
Cook Islands	9.06	9.72	51.62

A method of age-sex evaluation which avoids some of the reputed shortcomings of the UN age-sex accuracy index has been proposed by Das Gupta[26] and is illustrated for the total population in table 149. The results suggest "inaccurate" reporting whereas each region taken separately (table 150) would have to be characterized as "highly inaccurate" by this method. Again it should be noted that age-selective migration and random variation in a small population will have an effect on these indices.

A summary of various age-sex accuracy indices is presented for three censuses in table 151. Based on the United Nations "joint score", age-reporting was more accurate in 1966 than in either 1976 or 1981, and the 1981 census was the least accurate of the three.

[26] Ajit Das Gupta, "Accuracy index of census age distributions", *Proceedings of the World Population Conference, 1954,* United Nations, vol. IV, 1955, pp. 63-74.

The accuracy of the age information obtained from the census may also be affected by the preference for, or avoidance of, certain ages. The specific numbers avoided or preferred vary from culture to culture, but preference for digits ending in 0 or 5 is widespread, particularly where education levels are low. Such preferences are typically measured by "Whipple's index". A score of 100.0 indicates no preference for ages ending in 0 to 5 while a score of 500 would indicate that only ages ending in 0 or 5 was reported. A score below 100.0 indicates the degree to which 0 and 5 are avoided.

As table 152 shows, Whipple's Index varies considerably by region and sex. Preference for 0's and 5's is clearly greater in the northern group than elsewhere probably because of the greater need to estimate ages in this region. In the total population, there is no 0 or 5 preference among females, but some avoidance among males. The latter is particularly apparent in Rarotonga.

Myer's index is a summary measure of the preference for *any* terminal digit. In effect, it indicates the "minimum proportion of persons in the population for whom an age with an incorrect final digit is reported."[27] Since the closer the score is to 0 the more accurate the age reporting, we can see from table 151 that the 1981 census is more accurate in this respect than either 1976 or 1966. But age-heaping is more apparent in the outer islands (table 152) than in Rarotonga, particularly in the northern group. This would be expected on both cultural and statistical grounds – the latter because of the small size of each age group.

[27] Henry S. Shryock and Jacob S. Siegel, *op. cit.,* p. 207.

Table 149. Calculation of A. Das Gupta's grouped age-sex accuracy index, total Cook Islands, 1981 census

Age group	Population		Analysis of sex-ratios		Analysis of age-ratios					
					Males			Females		
	Males	Females	Ratio	Successive differences	Paired age group total	Ratio	Deviation from 100	Paired age group total	Ratio	Deviation from 100
0 - 4	1 129	1 087	103.86	–	–	–	–	–	–	–
5 - 9	1 308	1 250	104.64	0.78	2 437	107.35	7.35	2 337	106.97	6.97
10 - 14	1 462	1 350	108.30	3.66	2 770	105.56	5.56	2 600	103.85	3.85
15 - 19	1 310	1 124	116.55	8.25	2 772	94.52	5.48	2 474	90.86	–9.14
20 - 24	710	691	102.75	–13.80	2 020	70.30	–29.70	1 815	76.14	–23.86
25 - 29	435	458	94.98	–7.77	1 145	75.98	–24.02	1 149	79.72	–20.28
30 - 34	434	395	109.87	14.90	869	99.88	–0.12	853	92.61	–7.39
35 - 39	386	428	90.19	–19.69	820	94.15	–5.85	823	104.01	4.01
40 - 44	390	398	97.99	7.80	776	100.52	0.52	826	96.37	–3.63
45 - 49	383	320	119.69	21.70	773	99.09	–0.91	718	89.14	–10.86
50 - 54	334	287	116.38	–3.31	717	93.17	–6.83	607	94.56	–5.44
55 - 59	291	237	122.78	6.41	625	93.12	–6.88	524	90.46	–9.54
60 - 64	200	180	111.11	–11.67	491	81.47	–18.53	417	86.33	–13.67
65 - 69	171	150	114.00	2.89	371	92.18	–7.82	330	90.91	–9.09
70 - 74	117	101	115.84	–	–	–	–	–	–	–
75 - 79	68	84	80.95	–	–	–	–	–	–	–
80 - 84	30	31	96.77	–	–	–	–	–	–	–
85 and over	14	11	127.27	–	–	–	–	–	–	–
Total absolute value	9 172	8 582	–	–	–	–	119.56	–	–	127.72

Note: Census data are described as accurate, 'accurate', 'inaccurate', or 'highly inaccurate' depending on whether the index is under 5, 5 to 15, or over 15.

Ratios : RI = 104.28 = Initial paired sex-ratio
RT = 112.42 = Terminal paired sex-ratio
RHM = 119.98 = Largest age group to final pair (male)
RFM = 14.03 = Final age group to final pair (male)
RHF = 115.53 = Largest age group to final pair (female)
RFF = 12.84 = Final age group to final pair (female)

Indices : I = 8.81 = Sex-ratio index
= 1/13 x sum of differences minus ABS (RI-RT)
IIM = 0.95 = Age-ratio index (male)
= Sum of deviations devided by (RHM-100.1RHM-RFM)
IIF = 1.08 = Age-ratio index (female)
= Sum of deviations devided by (RHF-100.1RHF-RFF)

Grouped accuracy index = I + IIM + IIF = 9.03

Table 150. Das Gupta's grouped age-sex accuracy index by region, 1981 census

Region	Index
Rarotonga	15.99
Southern	16.85
Northern	60.62
Total	9.03

Table 151. Summary of age-sex accuracy indices, 1966, 1976 and 1981

	1966[a]	1976[a]	1981[b]
United Nations sex-age accuracy index:			
Sex-ratio score	8.23	9.69	10.95
Male age-ratio score	5.76	5.41	9.06
Female age-ratio score	5.75	5.14	9.72
Joint score	36.20	39.62	51.62
Das Gupta's grouped index	...	...	9.03
Whipple's index	104.06	99.81	96.13
Myer's summary index	2.56	3.54	1.83

Sources: [a] U Thang Muang, *Report on Mission to Cook Islands,* United Nations, Bangkok, 1978, p. 5.
[b] 1981 Census.

Table 152. Indexes of age preference by region and sex, 1981 census

Index	Rarotonga			Southern			Northern			Cook Islands		
	Males	Females	Total	Males	Females	Total	Males	Females	Total	Males	Females	Total
Myer's index	3.1	2.6	2.1	3.3	4.6	3.7	6.2	7.2	5.1	2.2	2.3	1.8
Whipple's index	89.8	95.3	92.4	92.3	106.2	99.2	106.4	113.9	110.3	92.1	100.4	96.1

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