Fiji

Report to the Government on the actuarial valuation of the Fiji National Provident Fund evaluated as of 30 June 2002

Pacific Manila



Financial, Actuarial and Statistical Services Branch International Labour Office Geneva ILO Sub-regional Office for South-East Asia and the

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### Acronyms

АТН	Amalgamated Telecom Holdings Limited
FNPF	Fiji National Provident Fund
GDP	Gross Domestic Product
GRA	General Reserve Account
ILO	International Labour Organization
LFPR	Labour Force Participation Rate
NLTB	Native Land Trust Board
SDB	Special Death Benefit
TFR	Total Fertility Rate
VAT	Value Added Tax

**Exchange rate:** US\$ 1 = F\$ 1.93 (July 2003)

# Summary

This actuarial valuation was conducted by the International Labour Organization (ILO) in response to a request of the Fiji National Provident Fund (FNPF).

### 1. Issues in the current scheme

In spite of obvious advantages of the annuity option, there is a recent decrease in the pension take-up rates. The political coups of May 2000 and the growing uncertainty in socio-economic conditions in Fiji raised the demand for immediate cash requirements rather than annuity payments paid over years. The planned reduction of the annuity factor started in 1999 may have contributed to this decline in pension take-up rates.

There is an increasing number of partial withdrawals. In addition to housing, the FNPF has recently extended the grounds for partial withdrawals to cover education, medical and other current needs. In absence of public health insurance or extensive housing and education assistance programmes, the savings in the FNPF accounts are used for the purposes other than old-age income security.

The rates of return on the fund's investment have decreased after the political unrest in 2000 and the global downturn of the stock market in 2001. In 2002, the fund credited a higher rate to members' balances than the actual rate of return.

In consonant with the international trend in extending social security coverage, the FNPF plans to extend compulsory coverage by changing the definition of employers, employees and wages.

In Fiji, there is a clear need for a more efficient and equitable resource allocation of health services. There is a vital need to improve the quality of medical services and equipment, public information and education, primary and preventive care, drug management, and the training of medical doctors. The financing of a health care scheme is a major challenge. Various means of funding should be examined so that the system is affordable and sustainable in the long run. Since 1989 the ILO has conducted several studies and technical consultations on the introduction of health insurance. One option is for the FNPF to start health insurance covering its members and their family members and then extend the coverage to the whole population.

### 2. Key results of the actuarial analysis of the FNPF

The actuarial projections have been made under 29 cases which combine different demographic and economic assumptions and policy scenarios. The projection covers the period 2002-2030.

From the results of the actuarial analysis, the following conclusions will emerge:

• The ultimate rates set in the current annuity factor reduction schedule (15 per cent for single-life pensions and 11 per cent for joint-life pensions) are still too high to ensure the long-term sustainability of the FNPF pensions scheme. A simple calculation implies that for every one dollar converted into annuity, the annuity factors of 25 per cent, 20 per cent and 15 per cent would respectively produce F\$3, F\$2 and F\$1 additional liability to the FNPF. Under the current mortality level, the actuarial annuity factors are estimated as 10 per cent for single-life pensions and 8 per cent for joint-life pensions assuming that the Fund achieves the rate of return at least 7 per cent per annum. These factors will be lower if the Fund cannot ensure a 7 per cent rate of return.

- Under the status quo condition, the Fund would remain fully-funded for the next 30 years under a standard set of assumptions. However, the level of the reserves will decrease from the current level. The General Reserve Account is expected to start declining from 2020 onwards but will not be exhausted by 2030. If the take-up rate for pensions becomes higher, the current annuity factor reduction schedule does not ensure the long-term sustainability of the Fund.
- If the annuity factors were kept at the 2003-level, the General Reserve Account would be exhausted by 2027 and the Fund would shift from a fully-funded to a partially-funded status. Therefore, the annuity factor should be continuously reduced at least in accordance with the schedule stipulated by the current FNPF Act.
- If the annuity factors were further reduced to the actuarial level, the General Reserve Account would not face any decline for the next 30 years. The ILO views that periodical payments (annuities) provide a better old-age protection than one off lump-sum payments. If the FNPF promotes the pension option, then a further reduction in the annuity factor is necessary. Recently the take-up rate for pensions shows a decreasing trend. We have assumed that the take-up rate would increase again to 35 per cent. However, based on our current knowledge, it is difficult to predict the trend of this behaviour with accuracy. Furthermore, our sensitivity analysis shows that, under the assumed take-up rate of 35 per cent, if the FNPF achieves higher yield on investment (8 per cent or more) then the Fund can avoid decrease in the reserves. Taking into account these points, it is suggested that the issue of further reduction of the annuity factor be re-examined at the next valuation in 2007, by which time we will have more known data on the key factors that affect the need for future annuity reduction.
- In general, higher yield on investment improves the financial position of the Fund. Given the limitation of the domestic capital market in Fiji, the FNPF should seek wider possibilities for investment, while maintaining the safety of the overall investment.
- Caution should be taken when considering the option to attribute a higher interest rate on members' balances than the actual rate of return. It should be noted that the allocation of investment income is the only major source of income to the General Reserve Account after the cessation of the deduction of contribution for the Pension Buffer Fund. This policy, if applied in the long run, has negative financial implications to the Fund. It is suggested that such a practice be limited to the case in which actual rate of return is less than the guaranteed minimum rate of 2.5 per cent, and that the FNPF should keep the principle of attributing an equitable rate to the members' balance which reflects the Fund's investment performance.

Furthermore, the following points should be taken into account in considering the future improvement and reinforcement of the FNPF scheme

- There has been a sharp increase in the number of members applying for partial withdrawals on the grounds of housing, education, and medical cares. It is understood that the balance in FNPF is used to meet the needs of housing, health care and education in the absence of extensive programmes in Fiji. However, it should be kept in mind that such a premature withdrawal is not an advantage for the beneficiaries and it consequently weakens their savings for old-age. In this regard, the currently proposed policy to reduce the maximum rate of partial withdrawal from two-thirds to one-half (except for the Housing Assistance Scheme) is therefore supported.
- Given the transitionally high annuity factor and the extended possibility of partial withdrawals, the current FNPF scheme de facto widens the income inequality of the members. This indicates a limitation of provident funds as provident fund schemes do not have any income redistribution function.

- The FNPF's policy to extend the compulsory coverage is supported as an important step towards the achievement of universal coverage of social security in Fiji. The ILO is ready to provide further technical assistance in effectively implementing and administering this policy.
- The FNPF should play an important role in addressing the need for a more efficient and equitable resource allocation to the health services. The FNPF is expected to take a lead in the task force to formulate recommendations on health care coverage and the extension of FNPF coverage to workers in the informal economy.
- In view of its leading experience in the governance of provident funds, the FNPF is expected to play a broader role in social security in the Pacific countries. The areas where the FNPF can provide extended assistance to other provident fund schemes in the Pacific sub-region include: (i) technical advice in governance and organisation, (ii) training in management and administration, (iii) research on the development and extension of coverage, (iv) investment in local and overseas markets.

# Introduction

The Fiji National Provident Fund (FNPF) requested the International Labour Organisation (ILO) to provide technical assistance to conduct an actuarial valuation. The purposes of the actuarial valuation, according to the terms of reference, are as follows:

- Review the last actuarial valuation conducted in 1997 to determine that the parameters, assumptions, forecasts, and trends in the report remain true after five years;
- Identify any new parameters and influencing factors that affect the FNPF pension scheme and determine its impact on previous recommendations and decisions,
- Recommend improvements to the current INPF pension scheme for consideration by the FNPF Board and Executive Management.

The previous actuarial valuation was undertaken by the ILO in 1997 under the project "Reform of the Fiji National Provident Fund Pension Scheme"<sup>1</sup>. The FNPF Board has decided that an actuarial review should be conducted every five years. A new valuation falls due as five years has elapsed since the last valuation. The date of valuation was chosen to be 30 June 2002.

The present actuarial valuation has been carried out by the following experts.

Mr. Kenichi Hirose, Social Protection Specialist, ILO Sub-regional Office for South-East Asia and the Pacific, Manila

- Mr. Aniceto Orbeta, Project Economist
- Mr. Carlo Villacorta, Project Statistical Assistant

Mr Hirose conducted a mission to Suva from 7 to 17 April 2003 to finalise the actuarial valuation. Preliminary results were presented to the FNPF executive management team, which provided an opportunity to discuss the main findings and recommendations of the actuarial valuation.

This report presents the main findings and recommendation of the actuarial valuation. The report is organized as follows. Chapter 1 presents an analysis of the present situation and past performance of the FNPF. Chapter 2 sets out the main demographic and economic assumptions. Chapter 3 analyses the long-term financial evaluation of the FNPF and discusses reform proposals.

The team of experts are thankful to the General Manager of the FNPF, Mr. Olota Rokovunisei, and his staff, in particular, Mr. Winston Chan, Assistant General Manager, Information Technology and Research, and Ms. Olita Talemaibau, Research Officer, for their technical support.

<sup>&</sup>lt;sup>1</sup> ILO, Report to the Government of the Republic of Fiji on the reform of the Fiji National Provident Fund Pension Scheme (ILO/TF/Fiji/R.3), 1997.

# 1. Review of the current scheme

### 1.1. Legislative changes since the last valuation

We summarise major reforms and minor amendments on the FNPF, which have been implemented since the last valuation in 1997. Annex 1 presents a brief description of the FNPF scheme.

### 1.1.1. Reform of the FNPF pension scheme and its implementation

Based on the actuarial recommendations made by the ILO in the previous valuation, amendments to the FNPF Act passed the Parliament in 1998. The objective of the reform is to strengthen the long-term financial position of the FNPF. The following amendments have come into effective since 1 July 1999:

- (i) Gradually reduce the annuity factor for the conversion of balances into pensions. The annuity factor of single-life pension is reduced annually by 1 percentage-point from 25 per cent to 15 per cent over 10 years' transition period from 1999 to 2008. The annuity factor for a joint-life pension will be reduced annually by 0.6 percentage-points from 16.7 per cent to 11 per cent. At the end of the transition period an actuarial valuation is to be carried out, and based on its results the Board will reconsider the further reduction to the actuarial rates of 10 per cent for single-life pensions and 8 per cent for joint-life pensions. (Date of implementation: 1 July 1999);
- (ii) Increase the contribution rate from 14 per cent to 16 per cent. (Date of implementation: 1 July 1999);
- (iii) Cease the 2 per cent deduction for the Pension Buffer Fund and attribute the whole contribution rate (16 per cent) to the members' individual accounts. (Date of implementation: 1 January 2000);
- (iv) Abolish the compulsory entitlement of female workers to withdrawal of their balances on marriage, and allow re-entrants to opt for pensions. (Date of implementation: 1 July 1999);
- (v) Conduct periodical actuarial re-valuation at least every five years;
- (vi) Provide the option of pensions to the re-entered members who have withdrawn on grounds of marriage and migration.

#### 1.1.2. Other amendments

In addition to the above reform of the pension scheme, the FNPF also undertook several other amendments. These measures were implemented based on varying objectives such as enhancing investment opportunities for the FNPF and its members, increasing revenues from contributions, improving benefits for members, and assisting members who lost jobs or suffered pay cuts. The following list provides the amendments implemented from 1995/96 to 2001/02.

#### 1995/96

• FNPF allowed by the Government to invest offshore (worth \$25 million).

#### 1996/97

• Change to accrual accounting system.

• Continued relaxation in Exchange Control policies allowing FNPF to increase its foreign currency holdings.

#### 1997/98

• Special Death Benefit premium was increased from \$12 to \$13.

#### 1998/99

- Special Death Benefit premium was increased from \$13 to \$14.
- Special Death Benefit was increased from \$4,500 to \$4,700.

#### 1999/00

- Changes to the pension scheme were effective as from July 1999.
- Special Death Benefit was increased from \$4,700 to \$4,800.

#### 2000/01

- Establishment of pre-retirement withdrawal scheme in August 2000 to assist members who had lost their jobs or suffered pay cuts due to the political crisis of May 19.
- Revised policies and guidelines of the FNPF housing scheme.

#### 2001/02

- Amendment to FNPF Regulations to allow women who withdrew on grounds of marriage and reentered prior to 1975, to opt for a pension (this amendment thus allows all members of FNPF to qualify for a pension on retirement).
- Special Death Benefit premium was increased from \$14 to \$15.
- Special Death Benefit was increased from \$4,800 to \$5,000.
- Introduction of the Share Investment Scheme.
- Provide expatriate workers the option to join FNPF.

In the recent law amendment, the supervisory responsibility for the FNPF has changed from the Ministry of Finance to the Reserve Bank of Fiji. It is rare that a monetary authority, rather than fiscal authority, takes on a supervisory role of a national provident fund. The Governor of the Reserve Bank expressed his view that the Reserve Bank would focus on the asset side of the FNPF in view of the substantial size of the fund.

### 1.2. Present financial status of the FNPF

We give an overview of the present financial situation of the FNPF. The analysis is based on the statistical and financial data from the annual reports of the FNPF.

As of 30 June 2002, the FNPF covered 281,570 workers, of which 181,597 or 64 per cent are males and 99,973 or 36 per cent were females. The number of pensions in payment was 5,991, of which 3,741 or 62 per cent were single-life pensions and 2,250 or 38 per cent joint-life pensions. The overall average

monthly pension was F\$366. The average single-life pension was F\$399 and the average joint-life pension was F\$310.

The FNPF has changed its accounting system to an accrual accounting system since 1997/98. Prior to that, financial operations of FNPF had been managed by a system with two accounts (the Contribution Account and the General Reserve Account), which is more suitable for the financial analysis. Table 1.1 depicts the structure of the accounting system. Table 1.2 establishes the financial operations on the two accounts system for the fiscal years 1995/96 to 2001/02.

For the purpose of financial analysis, figures which consolidate both accounts by cancelling out the interaccount transfers were constructed (as was done in the previous actuarial valuation). Table 1.3 shows these consolidated figures for the period 1995/96 to 2001/02. Notice that because of the cancellation of inter-account transfers, the income and expenditure of the consolidated account are not equal to the sum of the income and expenditure of both accounts (but the surplus adds up). In this report, the consolidated account is referred to as the Total Fund.

At the beginning of 2001/02, the total asset of the FNPF was F\$2,428 million. During that year, the income of the FNPF was F\$296 million (F\$193 million from contributions and F\$103 million from interest on investments). Expenditure was F\$183 million (F\$27 million for benefit payments, F\$148 million for withdrawals, and F\$8 million for administrative expenses). This produced a surplus of F\$113 million. Consequently, the Fund amounted to F\$2,537 million at the end of that year, which is 13.8 times the annual expenditure.

Annual contribution income has remained at more or less the same level as annual expenditure in the last six years. Thus, income from interest on investments plays a more important role in ensuring sufficient revenues to cover expenditure.

### Table 1.1: Accounting structure of the FNPF

#### CONTRIBUTION ACCOUNT

(CI): INCOME	(CE): EXPENDITURE
ci-1 Contributions	ce-1 Withdrawals
ci-2 Interest credited from General Reserve Account (= ge-3)	ce-2 Transfer to the General Reserve Account
	<i>Of which:</i> ce-21 Special death benefit premium charges ce-22 Purchase of annuities
	(CS): SURPLUS: (CI)-(CE)

#### GENERAL RESERVE ACCOUNT (Pension Buffer Fund)

(GI): INCOME	(GE): EXPENDITURE
gi-1 Interest on investments	ge-1 Administration expenses
gi-2 Transfer from Contribution Account (=ce-2)	ge-2 Benefit payments
Of which:	Of which:
gi-21 Special death benefit premium charges (= ce-21)	ge-21 Special death benefit
gi-22 Purchase of annuities (= ce-22)	ge-22 Annuities
	ge-23 Others
	ge-3 Interest credited to the Contribution Account (= ci-2)
	(GS): SURPLUS: (GI)-(GE)
Inter-account transfer	

ci-2 = ge-3gi-2 = ce-2

#### CONSOLIDATED ACCOUNT (Consolidated: Contribution Account and General Reserve Account)

(A): INCOME	(B): EXPENDITURE		
- Contributions (= ci-1)	- Benefit payments (= ge-2)		
- Interest on investments (= gi-1)	- Withdrawals (ce-1)		
	- Administration expenses (= ge-1)		
	(C): SURPLUS: (A)-(B)		

# Table 1.2.Financial statements of the FNPF, 1996-2002

					(in thousands	of Fiji dollars	)
FISCAL YEAR	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02
CONTRIBUTION ACCOUNT							
(A): INCOME	213,994	222,873	231,172	243,588	265,918	271,574	290,066
- Contribution - Interest credited from the General Reserve Account	127,626 86,368	134,954 87,919	141,949 89,223	149,250 94,338	178,496 87,422	180,978 90,596	193,240 96,826
(B): EXPENDITURE	119,174	129,685	147,368	168,094	159,383	184,522	166,485
- Withdrawals - Transfer to the General Reserve Account	95,511 23,664	102,872 26,813	117,497 29,872	132,690 35,405	131,126 28,258	166,783 17,739	148,443 18,042
Of which: Special death benefit premium charges Purchase of annuities Pension Buffer Fund	2,309 8,007 13,348	2,377 8,346 16,090	2,647 10,452 16,773	2,883 15,589 16,933	2,976 14,369 10,913	3,234 14,505 -	3,321 14,721 -
(C): SURPLUS: (A)-(B)	94,820	93,188	83,804	75,494	106,535	87,052	123,581
Fund at the beginning of the year	1,084,355	1,179,175	1,272,363	1,356,167	1,431,660	1,538,195	1,625,247
Fund at the end of the year	1,179,175	1,272,363	1,356,167	1,431,660	1,538,195	1,625,247	1,748,828
(A): INCOME - Interest on investments Therefore from the Contribution Account	147,861 124,197	191,445 164,632	195,704 165,832	206,650 171,245	172,686 144,428	158,914 141,175	120,605 102,563
Transfer from the Contribution Account Of which: Special death benefit premium charges Purchase of annuities Pension Buffer Fund	23,664 2,309 8,007 13,348	26,813 2,377 8,346 16,090	29,872 2,647 10,452 16,773	2,883 15,589 16,933	28,258 2,976 14,369 10,913	3,234 14,505	3,321 14,721
(B): EXPENDITURE	101,661	107,686	111,267	117,082	115,345	122,685	131,541
- Administrative expenses - Benefit payments Of which:	5,801 9,492	8,013 11,754	7,356 14,688	7,212 15,532	7,881 20,042	7,849 24,240	8,010 26,705
Special death benefit Annuities Others	2,415 7,061 16	2,390 8,832 532	3,103 11,334 251	2,513 12,956 63	2,680 17,190 172	3,341 20,087 812	3,247 22,800 658
- Interest credited to the Contribution Account	86,368	87,919	89,223	94,338	87,422	90,596	96,826
(C): SURPLUS - Net surplus: (A)-(B) - exceptional items	46,259 46,199 59	83,823 83,759 64	84,505 84,437 68	89,636 89,568 68	57,450 57,341 109	36,365 36,229 136	(10,815) (10,936) 121
Fund at the beginning of the year	404,246	450,494	534,317	618,822	708,458	765,908	802,273
Fund at the end of the ye ar	450,494	534,317	618,822	708,458	765,908	802,273	791,458

Source: Based on FNPF Annual Reports.

					(in thousands of Fiji dollars)			
FISCAL YEAR	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	
CONSOLIDATED ACCOUNT								
(A): INCOME	251,823	299,586	307,781	320,495	322,924	322,153	295,803	
- Contribution - Interest on investments	127,626 124,197	134,954 164,632	141,949 165,832	149,250 171,245	178,496 144,428	180,978 141,175	193,240 102,563	
(B): EXPENDITURE	110,804	122,639	139,541	155,434	159,049	198,872	183,158	
- Benefit payments - Withdrawals - Administrative expenses	9,492 95,511 5,801	11,754 102,872 8,013	14,688 117,497 7,356	15,532 132,690 7,212	20,042 131,126 7,881	24,240 166,783 7,849	26,705 148,443 8,010	
(C): SURPLUS	141,079	177,011	168,308	165,129	163,984	123,417	112,766	
- Net surplus: (A)-(B) - Exceptional items	141,020 59	176,947 64	168,240 68	165,061 68	163,875 109	123,281 136	112,645 121	
Fund at the beginning of the year	1,488,601	1,629,670	1,806,681	1,974,989	2,140,118	2,304,103	2,427,520	
Fund at the end of the year	1,629,670	1,806,681	1,974,989	2,140,118	2,304,103	2,427,520	2,540,286	
Rate of increase	9.5%	10.9%	9.3%	8.4%	7.7%	5.4%	4.6%	
Contribution/Expenditure	1.2	1.1	1.0	1.0	1.1	0.9	1.1	
Fund at the end of the year/Expenditure	14.7	14.7	14.2	13.8	14.5	12.2	13.9	

### Table 1.3. Consolidated financial statements of the FNPF, 1996-2002

Source: Based on FNPF Annual Reports

# **1.3.** Comparison of the projection results of the previous valuation against actual performance

As a follow up to the previous valuation, we compare the results of the previous valuation<sup>2</sup> against the actual performance of the FNPF during the inter-valuation years.

### (i) Contributions

Actual contributions closely followed the trend of the projections. From Figure 1.1, the effect of the increase in the contribution rate from 14 per cent to 16 per cent in 1999/00 is obvious, showing a sharp increase in that year. The difference between actual data and projections for the years 2000 to 2002 is ascribed to the loss of employment and reduction in wages as a result of the political crisis in 2000.

 $<sup>^{2}</sup>$  Based on reform option E of the previous actuarial valuation with standard assumptions.





### (ii) Interest on investments

As shown in Figure 1.2, we observe that the steady growth projections for interest on investments do not reflect the fluctuations in actual interest earned. While investment performance was better than projected for the years 1997 to 1999, the situation has been the opposite for the years 2000 to 2002.

Figure 1.2. Projected and actual investment income, 1996-2002



### (iii) Rate of return on investment

Figure 1.3 compares the projected and actual average annual rate of return of FNPF's investments and the interest rate credited to members' balance. Every year the FNPF Board decides the interest rate credited to members' balance. The FNPF Act stipulates that the rate should be at least 2.5 per cent (Figure 1.3 also shows this minimum guaranteed interest rate).

It is understood that the FNPF Board decides the interest credited to members' balance in the light of the actual rate of return on investments. In general, the interest rate credited to members' balance should be at the same level as the rate of return of FNPF's investments. However, past data show that this has not been always the case. It is observed that the rate credited to members' balance was lower than the actual interest rate in 1997. However, in 2002, a rate considerably higher than the actual rate of return was credited to members' balance.



Figure 1.3. Comparison of interest rates, 1996-2002

#### (iv) Total expenditure

The difference between actual and projected expenditure, as depicted in Figure 1.4, is due to the significant disparity with respect to the amount of withdrawals. This is mainly attributed to higher claims of lump sum benefits. The sharp rise in total expenditures for 2001 is brought about by the May 2000 political crisis when the FNPF also had to provide direct financial assistance to members affected by the crisis. In the previous valuation, a take-up rate of 30 per cent has been assumed but the actual rates have never exceeded that level.





#### (v) Surplus

Figure 1.5 compares projected and actual surplus (i.e. total revenue less total expenditure). It clearly shows a growing discrepancy between the projections and actual performance after 2000 as a result of decreased revenues and increased expenditure.



Figure 1.5. Projected and actual surplus, 1996-2002



Figure 1.6 compares the actual and projected increase in the Total fund of the FNPF. As indicated in the above analysis, actual performance since 2000 shows a lower trend than that projected.

Figure 1.6. Projected and actual total fund, 1996-2002



### 1.4. Problems and issues in the current scheme

### 1.4.1. Issues in annuity factor

### (i) Background

One of the most significant changes in the 1999 FNPF reform is to gradually reduce the conversion rate of the member's balance into annuities from 25 per cent to 15 per cent over a ten-year transition period. The rate applicable from July 2003 to June 2004 is 20 per cent. One issue to be ascertained in this valuation is whether the fund can be sustainable with the above reduction schedule or whether the fund should further reduce the rate to the actuarial rate of around 10 per cent. For this purpose, it is crucial to estimate the costs associated with the transitionally high annuity factors by taking into account population dynamics as well as the behavioural pattern of the beneficiaries. Furthermore, there is a view that the

reduction of the conversion rate should be frozen at the current level of 20 per cent for the future. We shall look into this issue in Chapter 3.

### (ii) Implicit actuarial debt under different annuity factors

Figure 1.7 compares the results of a simple model calculation of individual balance under different annuity factors. For this calculation, it is assumed that a worker retires at age 55 with F\$10,000 and he/she converts the full amount into single-life pensions. We examine the development of the balance under the assumed annuity factors of 25 per cent, 20 per cent, 15 per cent and 10 per cent. An interest rate of 6 per cent has been assumed throughout. In the case of the old-law annuity factor of 25 per cent, the balance will be exhausted between ages 59 and 60 and the payment thereafter will have to be financed by the General Reserve Account. By the age 69, equivalent to the life expectancy of Fiji<sup>3</sup>, the implicit debt will be more than F\$30,000. In the case of the 2003-level annuity factor of 20 per cent, the balance will be used up by age 61, and the resulting implicit debt at age 69 is more than F\$20,000. If the annuity factor is 15 per cent, which is the ultimate annuity factor based on the current annuity factor reduction schedule, then the balance will be depleted between ages 63 and 64, and it still produces the implicit debt of more than F\$10,000 by age 69. Only if the annuity factor is reduced to 10 per cent, is the balance spent out with no deficit. To summarise, this simple calculation implies that for every one dollar converted into annuity, the annuity factors of 25 per cent, 20 per cent and 15 per cent would respectively produce F\$3, F\$2 and F\$1 additional liability to the RNPF fund. Therefore, from an actuarial point of view, the annuity factor of 15 per cent is still too high to ensure the long-term sustainability of the FNPF pensions scheme.



Figure 1.7. Implicit actuarial debt under different annuity factors

## (iii) Estimated actuarial annuity factors

Tables 1.4 and 1.5 summarise the results of actuarial annuity factors based on the 1996 Fiji national mortality rates. Under the assumed rate of interest of 7 per cent, the estimated actuarial annuity factor is equal to 10.20 per cent for single-life pensions and 8.02 per cent for joint-life pensions. If the assumed rate of return is 6 per cent, then the actuarial annuity factor is estimated as 9.45 per cent for single-life pensions and 7.33 per cent for joint-life pensions. Thus, the proposed ultimate annuity factors of 10 per cent for single-life pensions and 8 per cent for joint-life pensions approximate the actuarial level if the

 $<sup>^3</sup>$  Technical note: It should be noted that the life expectancy at age 55 was estimated at 16.9 years for males and 19.9 years for females in the 1996 Census. In 2002, it was estimated at 18.7 years for males and 22.5 years for females. These figures are longer than 14 years (i.e. 69 - 55) assumed in the above calculation. However, the above calculation can be justified by taking into account the effects of the compound interest and the survival probability.

Fund achieves a rate of return of at least 7 per cent per annum. Conversely, if the Fund cannot ensure a 7 per cent rate of return (as recent experiences show), the ultimate annuity factors should be set at an even lower level.

Assumed interest rate (%)	Single-life annuity factor (%)	
0	5.28	
1	5.92	
2	6.59	
3	7.27	
4	7.98	
5	8.71	
6	9.45	
7	10.20	
8	10.96	
9	11.73	
10	12.51	

 Table 1.4.
 Single-life annuity factor under different assumed interest rates

Table 1.5.	Joint-life annuity factor under different assumed inter	rest rates
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Assumed interest rate (%)	Joint-life annuity factor for males (%)	Joint-life annuity factor for females (%)	Weighted average (%)
0	3.40	4.12	3.59
1	3.95	4.68	4.14
2	4.54	5.26	4.73
3	5.15	5.87	5.35
4	5.80	6.50	5.99
5	6.46	7.15	6.65
6	7.15	7.81	7.33
7	7.84	8.48	8.02
8	8.55	9.16	8.72
9	9.26	9.84	9.43
10	9.98	10.53	10.14

#### (iv) Recent trend of take-up rates for pensions

A beneficiary can decide whether and how much of the balance he/she converts into annuity. As shown in Figure 1.8, the percentages of those who withdrew and opted for pension remain low. Historically, the take-up rate of annuities was around 78 per cent prior to 1993. In 1994, this dramatically increased to 13.9 per cent, and continued increasing until 1999 when it peaked at 27.6 per cent. However, since 2000 the take-up rate has been decreasing. In 2002, the take-up rate stood at 22.0 per cent.





This recent decrease in the pension take-up rate is accounted for by the political coups of May 2000. Growing uncertainty in socio-economic conditions raised the demand for immediate cash payments rather than periodical annuity payments. Another reason suggested by FNPF staff is that the reduction of the annuity factor which started in 1999 discouraged the retired members to opt for annuity. However, as the current annuity factor is still at a favourable level, a well-informed person would rationally choose the annuity option.

### 1.4.2. Increasing trend of partial withdrawal

There has been a sharp increase in the number of members applying for partial withdrawals since 1998. In addition to housing, the fund extended partial withdrawals on grounds of education, medical and other reasons. The maximum rate of partial withdrawal is set at two-thirds of the balance. In 2002, influenced by the Singaporean system, the fund also introduced a scheme which allows members to invest a certain portion of the balance (up to F\$10,000) in shares of listed companies, including Amalgamated Telecom Holdings Limited (ATH). As of 30 June 2002, 1067 members have utilised the scheme with a total amount of slightly more than F\$ 3 million.

In 2002, out of the total F\$148 million spent for withdrawals, 26 per cent were for partial withdrawals, 23 per cent for migrating Fiji citizens, 23 per cent for members attaining age 55, 17 per cent for the Housing Assistance Scheme, 6 per cent for withdrawals due to the death of a member, and the balance of 4 per cent were for non-citizens leaving Fiji, permanently incapacitated members, and marriage by female members. Partial withdrawals have dramatically increased since 1997 when they accounted for only 7% of total withdrawals. This ratio was 13% in 1998, 10% in 1999 and 16% in 2000; in 2001, it surged to 29%. Consequently, the amount of withdrawals for the three contingencies, i.e. attainment of age 55, permanent incapacity, and death accounts for less and less. In 2002 the amount of these withdrawals represented only 31 per cent of total withdrawals.

In the absence of public health insurance or extensive housing and education assistance programmes in Fiji, savings in the FNPF accounts are used to meet the needs of health care, housing and education. However, it should be kept in mind that such a premature withdrawal is not an advantage for the beneficiaries and consequently weakens the savings for the old-age. In this regard, the currently proposed policy to reduce the maximum rate of partial withdrawal from two-thirds to one-half (except for the Housing Assistance Scheme) is therefore supported.

According to an analysis undertaken by the FNPF, workers with low salaries (and consequently small balances) are more likely to apply for the partial withdrawals and tend to do so more than once. On the other hand, high-income workers (consequently with large balances) tend to opt for annuity and receive favourable pensions by virtue of transitionally high annuity factors. In such circumstances, the FNPF *de* 

*facto* contributes to widen the income inequality of the members. This indicates a limitation of provident funds, as provident fund schemes do not have any income redistribution function.

### 1.4.3. Issues in investment

Yield on investment of the fund has a significant impact on its long-term sustainability. The fund retains F\$ 2.5 billion as a reserve, which is equivalent to 75 per cent of the annual GDP of Fiji. Given the limited capacity of the domestic capital market in Fiji, the fund is facing a problem finding appropriate investment opportunities. In fact, the rates of return on the fund's investment have decreased after the political unrest in 2000 and the global downturn of the stock market in 2001. In 2002, the fund credited a higher rate to members' balances than the actual rate of return. The FNPF management authorities requested that the financial consequences of such policy be evaluated. We shall discuss this issue in Chapter 3.

### 1.4.4. Issues in extension of coverage

The ILO, in pursuit of its overarching goal of securing Decent Work, has adopted as one of its strategic objectives to enhance coverage and the effectiveness of social protection for all. Three dimensions associated with these strategies are (i) extended population coverage, (ii) extension of the range of the risk covered by the protection, and (iii) the improvement of the benefit levels.

The FNPF plans to extend the compulsory coverage by changing the definition of employers, employees and wages. There are two main reasons for this. One is to strengthen compliance by employers. The current legislation defines the compulsorily covered workers as those who work minimum 12 days in a month. Some employers evade paying the FNPF contributions by contracting workers with less than 12 days a month. The FNPF intends to abolish this minimum working day condition. The second reason is to extend the coverage for workers under commission and workers in the informal economy. Workers who will be newly included under the compulsory coverage of this amendment are taxi drivers, hairdressers and agricultural employees such as sugar cane workers. Consultation with employers and workers organisations is currently underway. Experiences in other countries suggest that this is not an easy task. However, the ILO recognises that this is an important step towards the achievement of universal coverage of social security in Fiji and will be ready to provide further technical assistance in effectively implementing and administering this policy.

### 1.4.5. Issues in health care coverage

In Fiji, there is a clear need for a more efficient and equitable resource allocation of health services. Currently, health care services are provided by a tax-financed public health system. However, due to limited government resources allocated to health, the quality of publicly provided health care is far from satisfactory. Only a small proportion of the population can afford private medical insurance policies or cover the cost from their own income or savings to use private hospitals and clinics. There is a vital need to improve the quality of medical services and equipment, public information and education, primary and preventive care, drug management, and the training of medical doctors.

The financing of a health care scheme is a major challenge. Various means of funding should be examined so that the system is affordable and sustainable in the long run. Possible funding avenues include VAT on cigarettes and alcohol, NLTB, and additional contributions from the FNPF members and other organised groups.

Since 1989 the ILO has conducted several studies and technical consultations on the introduction of health insurance. One option is for the FNPF to start health insurance covering its members and their family members and then extend the coverage to the whole population. In the past decade, there has been a gradually emerging private insurance market in Fiji. Therefore, when formulating a health care financing policy, the use of market resource allocation should also be taken into account.

At the brainstorming session held in Suva on 16 April 2003, it was agreed to establish a task force consisting of the Ministries of Labour, Health, National Planning and Finance, employers' and workers' organisations, the FNPF, insurance companies and other stakeholders. The FNPF is expected to take a leading role in this task force to formulate the recommendation on health care coverage and the extension of FNPF coverage to workers in the informal economy.

### 1.4.6. Broader role of the FNPF in the Pacific region

In view of its leading experience in the governance of the provident funds, the FNPF is expected to play a broader role in social security in the Pacific countries. The areas where the FNPF can provide extended assistance to other provident fund schemes in the Pacific sub-region include: (i) technical advice in governance and organisation, (ii) training in management and administration, (iii) research on the development and extension of coverage, (iv) investment in local and overseas markets. In this regard, the FNPF's initiative to organise a CEO forum on the sustainability of provident funds in the Pacific is supported.

# 2. Key demographic and economic assumptions

In this Chapter we discuss the economic and demographic context underlying the present valuation. We present the historical context, the assumptions used for future scenarios, as well as the key features of the resulting scenarios.

### 2.1. Demographic context

### 2.1.1. Historical trends

Table 2.1 summarises key demographic indicators from 1946 to 1996. In the latest Census of 1996, the population of Fiji was estimated at 775,007, growing on average 0.8 per cent per year. This moderate population growth rate is explained by a considerable international out-migration. The 1996 Census Analytical Report noted that the Immigration Department recorded a net out-migration of 64,265 during the decade 1986-1996. This represents about 8 per cent of the 1996 enumerated population. On the other hand, the natural growth rates stand at a relatively high level. From 1986 to 1996 the total fertility rate (TFR) has declined from 3.51 children per woman to 3.26 children per woman, but the current level is still higher than the replacement level In addition, mortality indicators have remained at the same level over the inter-censal period. Infant mortality, for instance, has been steady at 22 per thousand.

With the decline in fertility, the old-age dependency ratio, defined as the population over 65 as a percentage of the population aged 15-64, is also gradually rising from 4.1 per cent in 1976 to 4.9 per cent in 1986 and to 5 per cent in 1996.

Year	1946	1956	1966	1976	1986	1996
Total Population	259,638	345,737	476,727	588,068	715,375	775,077
Annual Growth Rate		2.9%	3.2%	2.1%	2.0%	0.8%
Age structure						
(a) <15	44.3	46.1	46.7	41.2	38.4	35.4
(b) 15-64	52.2	50.7	50.9	56.5	58.7	61.5
(c) 65+	3.5	3.2	2.4	2.3	2.9	3.1
Depedency Ratio (c)/(b)	6.7%	6.3%	4.7%	4.1%	4.9%	5.0%
	1/	2/	3/	4/		
Total Fertility Rate	6.63	6.79	5.00	4.00	3.51	3.26
Life Expectancy at Birth						
Total	52.5	54.6	58.6	62.7	66.9	66.6
Male	50.8	52.8	56.8	60.8	64.8	64.5
Female	55.0	57.0	61.0	65.0	69.0	68.7
Infant Mortality Rate per 1	000					
Total	80	73	59	46	22	22
Male	-	-	-	-	25	22
Female	-	-		-	20	23

#### Table 2.1: Key Demographic Indicators, 1946-1996

Source: 1996 Census Analytical Report

For TFR & Life Expectancy and IMR before 1986, World Population Prospects 2000 Rev

1/	1950-55
2/	1955-60
3/	1965-70

4/ 1975-80

### 2.1.2. Population projection

Population projection provides the general framework for the development of the labour force and the population covered by the FNPF scheme. In the present valuation, a population projection has been undertaken using the ILO population projection model (ILO-POP) and utilizing updated data of the 1996 Census. Note that in the 1997 valuation, we simply used the results of UN population projections for the country. ILO-POP uses the same methodology as the United Nations model. It does, however, estimate population by single age and single year. Furthermore, while it embodies standard UN assumptions, it enables projections to be undertaken using other assumptions different from the standard UN assumptions.

Table 2.2 summarises the underlying assumptions for the population projection. Key assumptions are described as follows.

#### (i) Base population

The base year population for the projection is derived from the 1996 Census.

#### (ii) Mortality

The projection used the United Nations' Far East model life table since it provides the best fit for the Fijian mortality pattern (1996 Census). The medium model of improvement in life expectancy was used. According to the 1996 Census mortality has been at a stand still since 1986. The estimated average life expectancy in 1996 is 64.5 for males and 68.7 for females. This is expected to increase to 73.2 for males and 77.9 for females by 2030.

#### (iii) Fertility

The projection used the TFR of 3.26 for the base year, which is taken from the 1996 census. Age-specific fertility rates are also drawn from the 1996 census. It is assumed that the TFR would gradually decrease to the replacement level by 2020. The sex ratio of the newborn is set at 1.06, which is computed, based on the 1996 census.

#### (iv) Migration

The projection assumed that there is a net international out-migration of 7,000 per year throughout the projection period.

#### Table 2.2. Demographic assumptions, 1996-2030

Year	1996	2002	2005	2010	2015	2020	2025	2030
Total Fertility Rate (children per woman)	3.26	3.09	2.90	2.53	2.22	2.10	2.10	2.10
Life Expectancy								
(III years) Male								
At age 0	64.5	66.8	67.7	69.0	70.2	71.2	72.2	73.2
At age 50	21.6	22.6	23.0	23.6	24.2	24.8	25.4	26.0
At age 55	17.8	18.7	19.0	19.6	20.1	20.6	21.1	21.7
At age 65	11.4	11.9	12.2	12.5	12.9	13.2	13.6	14.0
Females								
At age 0	68.7	71.0	71.9	73.4	74.7	75.9	76.9	77.9
At age 50	25.5	26.6	27.0	27.8	28.5	29.2	29.7	30.4
At age 55	21.5	22.5	22.9	23.6	24.2	24.8	25.3	25.9
At age 65	14.4	15.1	15.4	16.0	16.4	16.8	17.0	17.5

Table 2.3 indicates the projected size of the population in Fiji and its age structure. Figure 2.1 illustrates the sex and age structure of the population for selected years. Table A.1 in Annex 2 provides detailed results of the population projection. The total population in Fiji is expected to rise from 824,733 in 2002 to 923,828 by 2030 with annual population growth slowing down from 1.03 per cent 2002 to 0.9 per cent by 2030. The continuous decline in fertility results in a decline in the share of the population aged less than 15 years from 33 per cent in 1996 to 23 per cent by 2030. It also results in an increase in the share of the population aged 65 years and over from 4 per cent in 1996 to 14 per cent by 2030. Thus, the old-age dependency ratio is projected to increase by almost five times from 4 per cent in 2002 to 19 per cent in 2030.

Year	2002	2005	2010	2015	2020	2025	2030
Total Population	824,733	847,807	879,251	899,512	911,270	919,602	923,828
Annual Growth Rate	1.03%	0.92%	0.73%	0.46%	0.26%	0.18%	0.09%
Age structure							
(a) 15 or less	33%	33%	31%	29%	26%	24%	23%
(b) 15 to 64	63%	63%	63%	64%	66%	65%	64%
(c) 65 and over	4%	4%	5%	7%	8%	10%	12%
Dependency Ratio (c)/(b)	6%	7%	8%	10%	13%	16%	19%

#### Table 2.3. Key results of population projection, 2002-2030

### 2.2. Labour force and covered population by the FNPF

#### 2.2.1. Historical context

Only limited data are available on the labour market in Fiji. In our analysis, data used to capture the labour market patterns are mostly drawn from the 1986 and 1996 Censuses, as summarised in Table 2.4. The labour force was 274,536 in 1986 and 297,770 in 1996. These figures correspond to 62.1 per cent and 59.4 per cent of the working age population respectively. In 1986, 93.4 per cent of labour force were employed and 6.6 per cent unemployed while the corresponding proportions in 1996 are 94.2 per cent and 5.8 per cent respectively. Figure 2.2 shows the labour force participation rates (LFPR) by age group and by sex. As is common in many developing countries, the labour force participation rate of women is lower than that of men. In 1996, the average labour force participation rate of women was 39.4 per cent, which is almost half that of men (79.2 per cent). The unemployment rate is also higher for women. In 1996, the unemployment rate is 7.8 per cent for women and 4.8 per cent for men.



### Figure 2.1. Population pyramids of Fiji, 1996-2030

		1986			1996	
	Population	Labor Force	LFPR	Population	Labor Force	LFPR
D. 1. 6						
Both Sexes			10.0		<b>a</b> ( 100	
15 - 19	73,616	35,756	48.6	83,682	24,438	29.2
20 - 24	73,728	50,114	68.0	66,955	42,413	63.3
25 - 29	63,444	42,881	67.6	61,660	42,462	68.9
30 - 39	92,425	62,934	68.1	116,620	82,879	71.1
40 - 49	63,571	42,788	67.3	81,261	57,203	70.4
50 >	72,765	39,043	53.7	90,735	48,375	53.3
NS	2,363	1,020	43.2	-	-	-
Total	441,912	274,536	62.1	500,913	297,770	59.4
Employed		256,347			280,505	
Employment Rate (%)		93.4			94.2	
Unemployed		18,189			17,265	
Unemployment Rate					<b>5</b> 0	
(%)		6.6			5.8	
Male						
15 - 19	37,070	21,462	57.9	42,829	16,503	38.5
20 - 24	36,731	33,425	91.0	34,444	27,668	80.3
25 - 29	31,988	30,698	96.0	31,283	28,629	91.5
30 - 39	46,372	45,148	97.4	59,252	56,044	94.6
40 - 49	32,021	30,991	96.8	40,823	38,545	94.4
50 >	36,899	27,410	74.3	44,091	32,663	74.1
NS	1,235	795	64.4	-	-	-
Total	222,316	189,929	85.4	252,722	200,052	79.2
Employed		179,595		· · · ·	190,450	
Employment Rate (%)		94.6			95.2	
Unemployed		10,334			9,602	
Unemployment Rate		5.4			4.8	
(%)						
Fomalo						
15 - 19	36 546	14 294	39.1	40.853	7 935	19.4
20 24	36 007	16 680	45 1	32 511	1,955	15.4
20 - 24 25 - 29	31 456	12 183	38.7	30 377	13 833	45.5
30 - 39	46 053	17 786	38.6	57 368	26 835	46.8
40 - 49	31 550	11 797	37.4	40 438	18 658	46.1
50 >	35 866	11,777	32.4	46 644	15,000	33.7
NS	1 128	225	19.9			
Total	219 596	84 607	38 5	248 191	97 718	39 4
Employed	217,570	76 752	50.5	270,171	90.055	57.4
Employee Employment Rate (%)		90.7			92.2	
Unemployed		7 855			7 663	
Unemployee Unemployment Rate		7,000			7,005	
(%)		03			78	
(/*)		2.5			/.0	
	1					

### Table 2.4. Labour supply and employment, Fiji, 1986, 1996

Source: Bureau of Statistics, Report on Fiji Population Census 1986, Vol. 3, Table 1 (Suva 1987) and Bureau of Statistics, 1996 Fiji Census of Population and Housing, General Tables, Table 40.

Source: As compiled from the Fiji Islands Bureau of Statistics, provisional results of 1996 population census, Tables OCC-4, IND-1, IND-1F and IND-1M; Bureau of Statistics, Annual Employment Survey 1996. For 1986, Report on Fiji Population Census 1986, Vol 3, Table 5, p. 230, Table 1, p. 20 and Table 8, p. 258. Appendix Note #1 (re female labor force) (for formal sector employment).



Figure 2.2. LFPR by age-group and by sex, Fiji, 1996

### 2.2.2. Projection of labour force and covered population

Table 2.5 summarises the projected total population, labour force, covered and active population. The proportion of the population in the labour force will rise from 40 per cent in 2002 to 45 per cent in 2030. The percentage of covered workers will increase from 69 per cent in 2002 to 73 per cent by 2030 due mainly to the increased participation of women workers. The proportion of the active population among the covered population is projected at 56 per cent in 2002 rising to 74 per cent by 2030.

Table 2.5.	Summary of pop	ulation, labour force,	covered and active p	opulation, 2002-2030
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	2002	2005	2010	2015	2020	2025	2030
Population	824,733	847,807	879,251	899,512	911,270	919,602	923,828
Labor Force	327,300	340,700	366,200	379,600	392,000	402,600	414,100
as % of Population	39.69	40.19	41.65	42.20	43.02	43.78	44.82
Covered Population	224,600	234,700	253,300	263,100	273,700	287,100	301,500
as % of Labor Force	68.62	68.89	69.17	69.31	69.82	71.31	72.81
Active Population	125,000	136,900	158,000	177,700	195,000	209,800	222,700
as % of Covered Population	55.65	58.33	62.38	67.54	71.25	73.08	73.86

Source: Tables A.1 - A.6

#### (i) Labour force participation

The estimates for labour force participation rate utilized data from the 1996 Census and the 4th edition of the ILO projection on the economically active population. The ILO projection on the economically active population has been made up to 2010. This was extended to 2030 based on our judgments to take into account possible future development. Since the labour force participation rates of men are steady and already quite high, the ILO projection was simply extended using exponential interpolation. The ILO estimate of the labour force participation rates for women in 1995 were found to be low compared with the 1996 census data. Thus, 1996 data was used for 1995 and the ILO estimate for 2010 was retained. Finally, the estimate for 2030 was assumed to be 80 per cent of that assumed for males. The values for the years in between are estimated using exponential interpolation. The resulting age-specific labour force

participation rates and labour force population are found in Tables A.2. in Annex 2. The labour force population was projected by applying age specific assumed labour force participation rates to the projected working age population. Labour force is expected to rise from 327,300 in 2002 to 414,100 by 2030. Table A.3 in Annex 2 shows the resulting projected labour force by sex and age.

#### (ii) Covered and active population

Covered population was estimated by considering the coverage rates to the projected labour force. The coverage rates used are those for the base year of the projection (i.e. 2002). The covered population is estimated to grow from 224,600 in 2002 to 301,500 by 2030. The annual rate of growth starts at 1.5 per cent in 2002 gradually declining to 0.8 per cent by 2030. The active population is estimated to increase in line with the covered population. The active population is expected to increase from 125,000 in 2002 to 222,700 by 2030, or increasing by 3.2 per cent in 2002 gradually declining to 1.1 per cent by 2030. Table A.4 in Annex 2 depicts the projected covered population; and Tables A.5 and A.6 indicate respectively the estimated number and growth rate of covered population and active population.

### 2.2.3. Take-up rates of annuities

As discussed in section 1.4 earlier, the take-up rate for annuity has shown a decreasing trend since 2000. It has been assumed that more workers would opt for annuity as the situation in the country stabilizes. For the purpose of projections, it has been assumed that the take-up rate would start increasing again and reach a level of 35 per cent in 2006 and after.

### 2.3. Economic assumptions

Historical time series data were used as a basis for establishing assumptions for prices, wages and interest rates. The following Table 2.6 summarises the historical trends of major economic indicators.

	Change	Change	Change	Rate of
Year	in CPI	GDP per capita	Wage	return
1990	8.1%	11.4%	-1.1%	9.86%
1991	6.5%	3.0%	19.5%	8.45%
1992	4.9%	10.8%	27.0%	9.19%
1993	5.2%	6.9%	-5.9%	8.30%
1994	0.6%	4.7%	4.5%	7.87%
1995	2.2%	3.5%	3.4%	7.91%
1996	2.8%	5.5%	13.0%	8.20%
1997	3.5%	8.0%	9.4%	9.40%
1998	3.3%	5.9%	-3.0%	7.30%
1999	5.9%	10.5%		6.30%
2000	0.0%	-2.6%		6.14%
2001	3.5%	7.3%		5.63%
2002	2.4%	-		4.22%
Average:				
last 3 years	2.0%	7.4%	6.2%	5.3%
last 5 years	3.0%	5.8%	5.3%	5.9%
last 10 years	2.9%	9.3%	7.0%	7.1%

### Table 2.6.Key macroeconomic indicators, 1990-2002

#### (i) Wage increase

Wage data are only available up to 1998. Wages grew on average 7 per cent per annum over the last 10 years. Growth started to slow down in the early 1990s so for the past 5 years it grew by only 5.3 per cent. A surge in 1996 occurred increasing the average growth for the past 3 years to 6.2 per cent. Given these developments, and in view of the growth rates of GDP per capita (in current prices), we assume that wages will grow at an average of 5 per cent per year. Note that this is one percentage point higher than the assumption made in the 1997 valuation and that the assumed rate is still lower than the realized average growth of wages in recent years.

#### (ii) Inflation

Inflation, on the other hand, has been relatively stable in the last 10 years. In recent years only in 1999 did it exceed 5 per cent. Thus the inflation assumption of 3 per cent used in the 1997 valuation is retained in this valuation. The foregoing scenario implies that the real wage rate will increase by 2 per cent annually (= 5 per cent - 3 per cent).

#### (iii) Interest rate

The average return on investments has been declining. While the average earnings rate for the last 10 years is 7.1 per cent, it is 5.9 per cent for the last 5 years, and 5.3 per cent for the last 3 years. The assumption made in the previous valuation (7 per cent) appears to be higher than actual performance. Therefore in the present valuation, we have assumed a long-term interest rate of 6 per cent as a standard scenario. In view of the sensitivity of the financial projections with respect to the assumed interest rate, two alternative scenarios have been set out. In the high interest scenario the interest rate is assumption about the inflation rate, these scenarios imply that the long-term real interest rate will be 3 per cent (= 6 per cent - 3 per cent) in the standard scenario, 5 per cent (= 8 per cent - 3 per cent) in the high interest scenario.

# 3. Actuarial analysis

In this Chapter, we present the key results of the actuarial projection and their implications on policy. The contributions, investment income, benefit expenditure and the cumulative Fund are projected for the period from 2002 to 2030. The projected figures have been produced by the actuarial model, called ILO-PENS-FNPF, whose first version was constructed in the previous 1997 valuation. For the purpose of this valuation, a second-generation model of ILO-PENS-FNPF has been developed to take into account the changes in the scheme made during the inter-valuation years.

### 3.1. Methods of actuarial valuation

To examine the viability of a social security scheme, two conditions should be ensured – namely, the long-term solvency condition and the short-term liquidity requirement.

Generally, a provident fund scheme, such as the FNPF, is financed on a fully-funded basis. Under this method of financing, the Fund should retain the assets which exceed its liabilities at any point of time. There are several methods of evaluating liabilities in respect of the coverage of periods. In our analysis, we have adopted the accrued-to-date basis – alternatively called the "scheme termination" basis – under which only the past contributions are taken into account. In the case of the FNPF, the liability comprises the cumulative amount in the members' balance and the obligation for the existing pensioners. This liability is compared with the total fund.

The liquidity constraint means that at any point in time the scheme has to ensure that it has the cash income and liquid assets adequate to cover the next payment due. Projections of the fund's operation based on the estimated expenditure and tax base are generally used in order to ascertain this condition.

For the description of the projection results, we define the following three financial indicators.

Firstly, we define the ratio of total fund to the members' balance. The condition that this indicator is greater than 100 per cent means that the Fund has sufficient assets to cover the liability in respect of the members balance. Conversely, if this indicator is less than 100 per cent, then it implies that the Fund is partially-funded. As the total Fund is made up with the members' balance (Contribution Account) and the reserves (General Reserve Account), the condition is equivalent to the fact that the Fund has positive reserves. It should be noted that this indicator does not take into account the liabilities of the existing pensioners. When a retired worker opts for pensions, his/her balance is transferred from Contribution Account to the General Reserve Account and this account is liable for the payment of the annuities for life. Therefore, as long as non-actuarial annuity factors are applied, the General Reserve Account undertakes additional implicit actuarial debt in respect of the pensioners.

Secondly, the fund ratio is defined by the ratio of total Fund to total expenditure. This indicator represents the relative level of the Fund as a multiple of annual expenditure. It shows how many years the fund would be able to pay the current level of expenditure by liquidating assets, on the assumption that the assets were fully liquid.

Thirdly, we define the cash-flow ratio as the ratio of contributions to expenditure (cash-flow is defined as the difference between contributions and total expenditure). To clarify the meaning of this indicator, we note the liquidity of major income available to the fund. While contributions are equivalent to cash, the liquidity of the investment income generally depends on the types of assets in investment. Further, the assets in investment can be sold to cover the expenditure. There is usually a transaction cost for liquidating the assets in investment. Therefore, if the cash-flow ratio is more than 100 per cent, then the Fund has enough liquid income to cover expenditure.

### 3.2. Actuarial projections of the FNPF for the period from 2002 to 2030

By combining alternative economic scenarios and policy assumptions, we have formulated 29 simulation cases. Table 3.1 summarises the characteristics of these cases and the results of key financial indicators. Tables B.0 to B.29 in Annex 2 provide the results of the estimated financial operations of the FNPF fund for these 29 cases.

### Table 3.1. Summary of actuarial projection results

		Assum	ptions				Р	rojection Results	8		
Case	Interest (%)	Interest Credited to Balance (%)	Ultimate Annuity Factors (%)	Take-up Rate for Annuity (%)	First year in which GRA is ir current deficit	Reserves in GRA at end of 2030 (billion F\$)	Total fund / members' balances in 2030 (%)	Total fund at end of 2030 (billion F\$)	Fund ratio in 2030 (Total Fund)	First year in which cash flow becomes negativ	Cash flow ratio in 2030 (Total Fund)
1	6	6	15/11	35	2020	0.7	106%	12.5	11.3	2013	93%
2	4	4	15/11	35	2012	exhausted in 2028	97%	9.6	10.1	-	109%
3	5	5	15/11	35	2016	0.1	101%	10.9	10.7	2021	101%
4	7	7	15/11	35	2027	1.5	112%	14.4	12.0	2010	85%
5	8	8	15/11	35	-	2.7	119%	16.9	12.9	2009	78%
6	6	6	10/8	35	-	1.7	114%	13.5	13.1	2014	100%
7	4	4	10/8	35	2012	0.4	104%	10.3	11.7	-	117%
8	5	5	10/8	35	2023	0.9	109%	11.7	12.4	-	108%
9	7	7	10/8	35	-	2.7	121%	15.6	14.0	2010	92%
10	8	8	10/8	35	-	4.1	129%	18.3	15.0	2009	84%
11	6	6	20/14	35	2014	exhausted in 2027	93%	11.0	9.3	2011	86%
12	5.5	6	15/11	35	2011	exhausted in 2026	92%	10.8	9.8	2013	93%
13	5	6	15/11	35	All years	exhausted in 2020	80%	9.4	8.5	2013	93%
14	4.5	6	15/11	35	All years	exhausted in 2017	69%	8.1	7.3	2013	93%
15	4	6	15/11	35	All years	exhausted in 2015	59%	7.0	6.3	2013	93%
16	5.5	6	10/8	35	2012	0.0	100%	11.8	11.5	2014	100%
17	5	6	10/8	35	All years	exhausted in 2022	88%	10.3	10.1	2014	100%
18	4.5	6	10/8	35	All years	exhausted in 2018	77%	9.0	8.8	2014	100%
19	4	6	10/8	35	All years	exhausted in 2015	67%	7.9	7.7	2014	100%
20	6	6	15/11	100	2015	exhausted in 2026	87%	10.3	7.9	2011	79%
21	6	6	10/8	100	2021	0.9	107%	12.7	11.3	2012	92%
22	4	4	20/14	35	2010	exhausted in 2024	86%	8.5	8.4	2023	101%
23	4	4	20/14	100	2010	exhausted in 2019	51%	5.0	3.9	2012	79%
24	8	8	20/14	35	2020	0.6	104%	14.9	10.5	2008	72%
25	8	8	20/14	100	2014	exhausted in 2023	69%	9.9	5.6	2008	58%
26	4	4	15/11	100	2011	exhausted in 2023	76%	7.6	6.7	2015	91%
27	4	4	10/8	100	2012	exhausted in 2027	95%	9.4	9.7	-	106%
28	8	8	15/11	100	2020	0.4	103%	14.7	9.5	2009	67%
20	8	8	10/8	100	_	37	126%	17.9	13.7	2009	78%

Note: GRA: General Reserve

### 3.2.1. Status quo projections

As a benchmark, we consider the actuarial projection under the status quo condition. The present legislation stipulates that by 2008 the annuity factors will be reduced to 15 per cent for single-life pensions and 11 per cent for joint-life pensions. Concerning the demographic and macroeconomic assumptions, the standard set of assumptions have been chosen: rate of return on investment is 6 per cent, interest rate credited to members' balance is 6 per cent, take-up rate for pensions is 35 per cent. (Case 1)

Under the status quo conditions, the Fund is expected to retain assets in excess of the members' balance throughout the projection period. Consequently, the General Reserve Account is not exhausted until 2030. However, the margin will get smaller from the current 45 per cent to only 6 per cent by 2030. By 2030, the total fund is estimated to be F\$ 12.5 billion, or 11.3 years' annual expenditure; and the reserves in the General Reserve Account are expected to be F\$ 0.7 billion. In addition, the projection results indicate that the General Reserve Account begins to decline from 2020 onwards.

With regard to liquidity, the Fund's cash-flow is expected to turn negative in 2013, which means that the contribution alone will not be enough to cover total expenditure. The cash-flow ratio is estimated to gradually decrease to 93 per cent by 2030. This requires the financial manager to closely observe the level of liquidity of the Fund so that the smooth payment of benefits be ensured.

FISCAL YEAR	2003	2004	2005	2006	2007	2010	2015	2020	2025	2030
CONTRIBUTION ACCOUNT										
(A): INCOME	325,000	348,400	373,000	399,100	426,400	518,100	689,800	910,700	1,220,000	1,653,500
(B): EXPENDITURE	173,100	180,400	199,000	219,600	235,000	293,100	405,900	527,400	693,000	932,000
(C): SURPLUS	151,900	168,100	174,000	179,500	191,500	225,000	283,800	383,300	527,000	721,500
Members balance	1,900,700	2,068,800	2,242,800	2,422,300	2,613,800	3,249,500	4,543,600	6,244,200	8,566,100	11,788,900
Rate of increase of the members balance	8.7%	8.8%	8.4%	8.0%	7.9%	7.4%	6.7%	6.5%	6.6%	6.5%
GENERAL RESERVE ACCOUNT (Pension Buffer Fund)										
(A): INCOME	173,400	188,000	207,800	230,400	246,100	300,400	407,400	528,200	677,500	877,900
(B): EXPENDITURE	154,400	167,700	182,600	199,100	216,300	273,300	387,700	531,800	719,000	969,800
(C): SURPLUS	19,100	20,200	25,200	31,200	29,900	27,100	19,700	-3,600	-41,500	-91,900
Reserves (at the end of the year)	810,900	831,100	856,300	887,500	917,400	1,004,600	1,121,700	1,154,200	1,031,800	669,200
Rate of increase of the reserves	2.4%	2.5%	3.0%	3.6%	3.4%	2.8%	1.8%	-0.3%	-3.9%	-12.1%
Reserves / Members balance	43%	40%	38%	37%	35%	31%	25%	18%	12%	6%
FISCAL YEAR	2003	2004	2005	2006	2007	2010	2015	2020	2025	2030
CONSOLIDATED ACCOUNT			<u>г                                    </u>	Γ '						
(A): INCOME	362,500	387,000	413,200	441,300	470,800	568,100	752,200	985,900	1,303,100	1,734,100
(B): EXPENDITURE	191,500	198,700	214,000	230,500	249,500	316,000	448,600	606,100	817,700	1,104,500
(C): SURPLUS	171,000	188,300	199,200	210,800	221,300	252,100	303,500	379,800	485,400	629,600
(D):SURPLUS (without INTEREST) Cash-flow	18,000	24,900	24,400	24,100	22,100	11,600	-17,600	-40,100	-59,500	-77,700
Fund at the beginning of the year	2,540,600	2,711,600	2,899,900	3,099,100	3,309,800	4,002,000	5,361,800	7,018,600	9,112,500	11,828,400
Fund at the end of the year	2,711,600	2,899,900	3,099,100	3,309,800	3,531,100	4,254,000	5,665,300	7,398,400	9,597,900	12,458,100
Rate of increase	6.7%	6.9%	6.9%	6.8%	6.7%	6.3%	5.7%	5.4%	5.3%	5.3%

#### Table 3.2. Summary of the estimated fund operations of the FNPF, 2002-2030

### 3.2.2. Effects of reduction in the annuity factor

143%

14.2

109

1409

14.

11

1389

14.

111

To evaluate the effects of the reduction of the annuity factors, projections have been undertaken under the following scenarios:

1379

14.4

110

1359

14.

1319

13.

104

1259

12.

1189

12.2

939

112%

11.3

930

106%

11.3

939

- (1) As recommended in the previous valuation, the annuity factor should be further reduced to 10 per cent for single-life pensions and 8 per cent for joint-life pensions,
- (2) Freeze the reduction of annuity factor at the 2003-level, i.e. the annuity factor is fixed at 20 per cent for single-life pensions and 14 per cent for joint-life pensions.

The following Figure 3.1 illustrates the comparison of these schedules with the current schedule for the case of single-life pensions.

und / Members balance

und ratio (Fund at the end of the year/Expenditure)

sh-flow ratio (Contributions/Expenditure)



Figure 3.1. Reduction in annuity factor for single-life pensions

Concerning the economic factors, the same assumptions have been made as the benchmark case: namely, rate of return on investment is 6 per cent, interest rate credited to members' balance is 6 per cent, take-up rate for pensions is 35 per cent.

Table 3.3 compares the actuarial projections. Figure 3.2 illustrates the estimated General Reserve Account for selected cases. The projection results of Case 11 disclose that if the annuity factor were kept at the current level the General Reserve Account would start decreasing 6 years earlier than the status quo case and be exhausted by 2027. This implies that the Fund would switch from a fully-funded to a partially-funded status. The resulting total fund is estimated at a lower level of F\$ 11 billion, or 9.3 years' annual expenditure. The year in which the cash-flow turns negative is expected 2 year earlier and more resources in addition to contributions would be needed to meet the liquidity requirement.

If the annuity factor were further reduced to 10 per cent for single-life pension and 8 per cent for joint-life pension (Case 6), then the General Reserve Account would not envisage any decrease throughout the projection period. The estimated total fund is F\$ 13.5 billion, equivalent to 13.1 years expenditure. It is estimated that the cash-flow turns negative for several years from 2014 but returns to positive by 2030.

In addition, different annuity reduction scenarios have been evaluated under low and high interest rate assumptions. A low interest rate assumption (Cases 22, 2, and 7) brings the General Reserve Account into current deficit much sooner although it keeps a positive cash-flow (except for several years in Case 22). A high interest rate assumption (Cases 24, 5, and 10) prolongs the surplus trend of the General Reserve Account but cash-flow becomes negative by 2010. This can be explained by the fact that a higher interest results in higher balances and thus increases the magnitude of the additional liabilities to the General Reserve Account accordingly.

Table 3.3.	Effects of reduction in the ultimate annuity factors
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		Assum	nptions				F	Projection Resul	ts		
	Interest	Interest	Ultimate	Take-up	First year in	Reserves in GRA	Total fund /	Total fund at end	Fund ratio in	First year in	Cash flow ratio
<b>C</b>	(%)	credited to	Annuity	rate for	which GRA is in	at end of 2030	members'	of 2030 (billion	2030 (Total	which cash flow	in 2030 (Total
Case		Balance	Factors	annuity	current deficit	(billion F\$)	balances in 2030	F\$)	Fund)	becomes negative	Fund)
		(%)	(%)	(%)			(%)				
_ 11	6	6	20/14	35	2014	exhausted in 2027	93%	11.0	9.3	2011	86%
1	6	6	15/11	35	2020	0.7	106%	12.5	11.3	2013	93%
6	6	6	10/8	35	-	1.7	114%	13.5	13.1	2014	100%
22	4	4	20/14	35	2010	exhausted in 2024	86%	8.5	8.4	2023	101%
2	4	4	15/11	35	2012	exhausted in 2028	97%	9.6	10.1	-	109%
7	4	4	10/8	35	2012	0.4	104%	10.3	11.7	-	117%
24	8	8	20/14	35	2020	0.6	104%	14.9	10.5	2008	72%
5	8	8	15/11	35	-	2.7	119%	16.9	12.9	2009	78%
10	8	8	10/8	35	-	4.1	129%	18.3	15.0	2009	84%

Figure 3.2. Effects of reduction in the ultimate annuity factors – General Reserve Account



### 3.2.3. Effects of the take-up rates for pensions

In the analysis of changing the percentage of members opting for pensions, the status quo projection (with 35 per cent take up rate) is compared with the extreme case of full conversion (with a 100 per cent take up rate) (Case 20). The same economic assumptions have been used.

Table 3.4 summarizes the results, and Figure 3.3 shows the estimated General Reserve Account for selected cases. Under the ultimate annuity factors of 15 per cent for single-life pensions and 11 per cent for joint-life pensions, the full take-up rates would entail the faster depletion of the reserves in General Reserve Account and lead to the exhaustion of the General Reserve Account by 2026. In other words, the Fund's liability would exceed its assets; hence the scheme would be only partially funded.

If the annuity factors are further reduced to 10 per cent for single-life pensions and 8 per cent for joint-life pensions (Cases 6 and 21), the Fund could still maintain reserves in General Reserve Account at least up to 2030, although a decline is anticipated in 2021 and after. Under the further annuity reduction schedule, the annuity factor attains its ultimate level (i.e. actuarial rate) in 2013. After that, the annuity conversion does not produce any additional actuarial debt to the Fund. Therefore, once the Fund eliminates unfunded liability relating to the annuity conversion, the fund can remain fully-funded even with the full conversion case.

We observe a trade-off between the welfare of members and the sustainability of the Fund. On one hand, members will certainly benefit from the pension option during the transition period where the still high annuity factors are applied. On the other hand, under the non-actuarial annuity factor, the low take-up rate contributes to contain the actuarial debt to be shouldered by the FNPF. Furthermore, the correlation between the take-up rates and income level of the members should be taken into account. As noted in Section 14.2 earlier, low-income workers tend to apply for partial withdrawals thereby contributing to reduce the actuarial debt, while high-income workers tend to opt for annuities thereby producing the actuarial debt.

Under the low interest rate assumption (Cases 2, 26, 7 and 27) the General Reserve Account is expected to be depleted except for Case 7. Under the high interest rate assumption (Cases 5, 28, 10 and 29), the depletion of the General Reserve Account is avoided but the resulting cash-flow ratios become lower.

	Assumptions				Projection Results								
	Interest	Interest	Ultimate	Take-up	First year in	Reserves in GRA	Total fund /	Total fund at end	Fund ratio in	First year in	Cash flow ratio		
Casa	(%)	credited to	Annuity	rate for	which GRA is in	at end of 2030	members'	of 2030 (billion	2030 (Total	which cash flow	in 2030 (Total		
Case		Balance	Factors	annuity	current deficit	(billion F\$)	balances in 2030	F\$)	Fund)	becomes negative	Fund)		
		(%)	(%)	(%)			(%)						
1	6	6	15/11	35	2020	0.7	106%	12.5	11.3	2013	93%		
20	6	6	15/11	100	2015	exhausted in 2026	87%	10.3	7.9	2011	79%		
6	6	6	10/8	35	-	1.7	114%	13.5	13.1	2014	100%		
21	6	6	10/8	100	2021	0.9	107%	12.7	11.3	2012	92%		
2	4	4	15/11	35	2012	exhausted in 2028	97%	9.6	10.1	-	109%		
26	4	4	15/11	100	2011	exhausted in 2023	76%	7.6	6.7	2015	91%		
7	4	4	10/8	35	2012	0.4	104%	10.3	11.7	-	117%		
27	4	4	10/8	100	2012	exhausted in 2027	95%	9.4	9.7	-	106%		
	-	_				-							
5	8	8	15/11	35	-	2.7	119%	16.9	12.9	2009	78%		
28	8	8	15/11	100	2020	0.4	103%	14.7	9.5	2009	67%		
10	8	8	10/8	35	-	4.1	129%	18.3	15.0	2009	84%		
29	8	8	10/8	100	-	3.7	126%	17.9	13.7	2009	78%		

Figure 3.3. Effects of percentage of members opting for pensions – General Reserve Account



### 3.2.4. Effects on the interest rate

To show the sensitivity of the financial projections with respect to the variance in the interest rate, the projections have been made under different assumptions on interest rates. The standard assumption of 6 per cent is varied by plus and minus 2 per cent-points, namely, 4 per cent, 5 per cent, 6 per cent, 7 per cent and 8 per cent. The remaining economic assumptions have been kept unchanged. It has been assumed here that the rate of credit on members' balance is equal to the rate of return on investment.

Table 3.5 and Figure 34 compare the results. It is generally observed that under both annuity reduction schedules higher interest rates result in a better financial outcome in the long run. According to these results, for every 1 per cent-point increase in the rate of interest, the resulting fund ratio in 2030 would increase 0.6 to 1.0 years' annual expenditure. It should be noted that under the current annuity schedule, a higher interest will accelerate the year in which the cash-flow is negative because, other assumptions being equal, a higher interest rate increases the size of the additional liabilities to the General Reserve Account.

It is observed that under the current annuity schedule, if the FNPF achieves an average rate of return higher than 8 per cent, then the General Reserve Account will not decrease until 2030. On the contrary, if the average rate of return is 4 per cent, then the General Reserve Account will face the risk of exhaustion in 2028.

	Assumptions				Projection Results								
	Interest	Interest	Ultimate	Take-up	First year in	Reserves in GRA	Total fund /	Total fund at end	Fund ratio in	First year in	Cash flow ratio		
Case	(%)	credited to	Annuity	rate for	which GRA is in	at end of 2030	members'	of 2030 (billion	2030 (Total	which cash flow	in 2030 (Total		
Case		Balance	Factors	annuity	current deficit	(billion F\$)	balances in 2030	F\$)	Fund)	becomes negative	Fund)		
		(%)	(%)	(%)			(%)						
2	4	4	15/11	35	2012	exhausted in 2028	97%	9.6	10.1	-	109%		
3	5	5	15/11	35	2016	0.1	101%	10.9	10.7	2021	101%		
1	6	6	15/11	35	2020	0.7	106%	12.5	11.3	2013	93%		
4	7	7	15/11	35	2027	1.5	112%	14.4	12.0	2010	85%		
5	8	8	15/11	35	-	2.7	119%	16.9	12.9	2009	78%		
7	4	4	10/8	35	2012	0.4	104%	10.3	11.7	-	117%		
8	5	5	10/8	35	2023	0.9	109%	11.7	12.4	-	108%		
6	6	6	10/8	35	-	1.7	114%	13.5	13.1	2014	100%		
9	7	7	10/8	35	-	2.7	121%	15.6	14.0	2010	92%		
10	8	8	10/8	35	-	4.1	129%	18.3	15.0	2009	84%		

#### Table 3.5.Effects of the interest rates

Note: Rate of credit on members' balance is the same as the rate of return on investment

#### Figure 3.4. Effects of the interest rates - General Reserve Account



### 3.2.5. Effects of attributing higher interest rates to the members' balance

Prior to 2002, the FNPF Board credited to the members' balance an interest rate that is the same level as the actual return on investment. In 2002, however, the Board credited an interest rate of 6.4 per cent to members' balance while actual investment performance was 4.2 per cent. This implies that the Contribution Account received a higher proportion of investment income than the General Reserve Account.

In this respect, the FNPF management authorities requested to analyse the implication of allocating a higher rate of credit on members' balance than the rate of return on investment. For this purpose, the projections have been made under the following assumptions. The rate of credit to members' balance is fixed at 6 per cent, whereas the rates of return are set at lower rates: 5.5 per cent, 5 per cent, 4.5 per cent and 4 per cent.

Table 3.6 and Figure 3.5 summarize the results of these projections. It is clear that in most cases a constant discrepancy between the rate of credit for members' balance and the rate of return on investment will lead to the exhaustion of the reserves. This is not an unexpected result because the allocation of investment income is the only major source of income to the General Reserve Account after the cessation of the deduction of contribution for the Pension Buffer Fund. Even if the ultimate annuity factors are further reduced to 10 per cent for single-life pensions and 8 per cent for joint-life pensions, the General Reserve Account could be positive only if the difference between the credit rate and rate of return is up to 0.5 per cent-points. Any larger discrepancies will lead to the depletion of the General Reserve Account. It should be noted that this policy option has severe financial implications to the Fund in the long-term.

#### Table 3.6. Effects of attributing higher interest rates of the members' balance

		Assun	ptions		Projection Results									
	Interest	Interest	Ultimate	Take-up	First year in	Reserves in	Total fund /	Total fund at end	Fund ratio in	First year in	Cash flow ratio			
Casa	(%)	credited	Annuity	rate for	which GRA is in	GRA at end of	members'	of 2030 (billion	2030 (Total	which cash flow	in 2030 (Total			
Case		to	Factors	annuity	current deficit	2030 (billion F\$)	balances in 2030	F\$)	Fund)	becomes	Fund)			
		Balance	(%)	(%)			(%)			negative				
		(%)												
1	6	6	15/11	35	2020	0.7	106%	12.5	11.3	2013	93%			
12	5.5	6	15/11	35	2011	exhausted in 2026	92%	10.8	9.8	2013	93%			
13	5	6	15/11	35	All years	exhausted in 2020	80%	9.4	8.5	2013	93%			
14	4.5	6	15/11	35	All years	exhausted in 2017	69%	8.1	7.3	2013	93%			
15	4	6	15/11	35	All years	exhausted in 2015	59%	7.0	6.3	2013	93%			
6	6	6	10/8	35	-	1.7	114%	13.5	13.1	2014	100%			
16	5.5	6	10/8	35	2012	0.0	100%	11.8	11.5	2014	100%			
17	5	6	10/8	35	All years	exhausted in 2022	88%	10.3	10.1	2014	100%			
18	4.5	6	10/8	35	All years	exhausted in 2018	77%	9.0	8.8	2014	100%			
19	4	6	10/8	35	All years	exhausted in 2015	67%	7.9	7.7	2014	100%			



Figure 3.5. Effects of attributing higher interest rates to the members' balance - General Reserve Account

### 3.3. Conclusion

Our actuarial analyses made above lead to the following conclusion.

- The ultimate rates set in the current annuity factor reduction schedule (15 per cent for single-life pensions and 11 per cent for joint-life pensions) are still too high to ensure the long-term sustainability of the FNPF pensions scheme. A simple calculation implies that for every one dollar converted into annuity, the annuity factors of 25 per cent, 20 per cent and 15 per cent would respectively produce F\$3, F\$2 and F\$1 additional liability to the FNPF. Under the current mortality level, the actuarial annuity factors are estimated as 10 per cent for single-life pensions and 8 per cent for joint-life pensions assuming that the Fund achieves the rate of return at least 7 per cent per annum. These factors will be lower if the Fund cannot ensure a 7 per cent rate of return.
- Under the status quo condition, the Fund would remain fully-funded for the next 30 years under a standard set of assumptions. However, the level of the reserves will decrease from the current level. The General Reserve Account is expected to start declining from 2020 onwards but will not be exhausted by 2030. If the take-up rate for pensions becomes higher, the current annuity factor reduction schedule does not ensure the long-term sustainability of the Fund.
- If the annuity factors were kept at the 2003-level, the General Reserve Account would be exhausted by 2027 and the Fund would shift from a fully-funded to a partially-funded status. Therefore, the annuity factor should be continuously reduced at least in accordance with the schedule stipulated by the current FNPF Act.
- If the annuity factors were further reduced to the actuarial level, the General Reserve Account would not face any decline for the next 30 years. The ILO views that periodical payments (annuities) provide a better old-age protection than one off lump-sum payments. If the FNPF promotes the pension option, then a further reduction in the annuity factor is necessary. Recently the take-up rate for pensions shows a decreasing trend. We have assumed that the take-up rate would increase again to 35 per cent. However, based on our current knowledge, it is difficult to predict the trend of this behaviour with accuracy. Furthermore, our sensitivity analysis shows that, under the assumed take-up rate of 35 per cent, if the FNPF achieves higher yield on investment (8 per cent or more) then the Fund can avoid decrease in the reserves. Taking into account these points, it is suggested that the issue of further reduction of the annuity factor be re-examined at the next valuation in 2007, by which time we will have more known data on the key factors that affect the need for future annuity reduction.

- In general, higher yield on investment improves the financial position of the Fund. Given the limitation of the domestic capital market in Fiji, the FNPF should seek wider possibilities for investment, while maintaining the safety of the overall investment.
- Caution should be taken when considering the option to attribute a higher interest rate on members' balances than the actual rate of return. It should be noted that the allocation of investment income is the only major source of income to the General Reserve Account after the cessation of the deduction of contribution for the Pension Buffer Fund. This policy, if applied in the long run, has negative financial implications to the Fund. It is suggested that such a practice be limited to the case in which actual rate of return is less than the guaranteed minimum rate of 2.5 per cent, and that the FNPF should keep the principle of attributing an equitable rate to the members' balance which reflects the Fund's investment performance.

Furthermore, the following points should be taken into account in considering the future improvement and reinforcement of the FNPF scheme

- There has been a sharp increase in the number of members applying for partial withdrawals on the grounds of housing, education, and medical cares. It is understood that the balance in FNPF is used to meet the needs of housing, health care and education in the absence of extensive programmes in Fiji. However, it should be kept in mind that such a premature withdrawal is not an advantage for the beneficiaries and it consequently weakens their savings for old-age. In this regard, the currently proposed policy to reduce the maximum rate of partial withdrawal from two-thirds to one-half (except for the Housing Assistance Scheme) is therefore supported.
- Given the transitionally high annuity factor and the extended possibility of partial withdrawals, the current FNPF scheme de facto widens the income inequality of the members. This indicates a limitation of provident funds as provident fund schemes do not have any income redistribution function.
- The FNPF's policy to extend the compulsory coverage is supported as an important step towards the achievement of universal coverage of social security in Fiji. The ILO is ready to provide further technical assistance in effectively implementing and administering this policy.
- The FNPF should play an important role in addressing the need for a more efficient and equitable resource allocation to the health services. The FNPF is expected to take a lead in the task force to formulate recommendations on health care coverage and the extension of FNPF coverage to workers in the informal economy.
- In view of its leading experience in the governance of provident funds, the FNPF is expected to play a broader role in social security in the Pacific countries. The areas where the FNPF can provide extended assistance to other provident fund schemes in the Pacific sub-region include: (i) technical advice in governance and organisation, (ii) training in management and administration, (iii) research on the development and extension of coverage, (iv) investment in local and overseas markets.

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# Annex 1. Brief description of the FNPF

### 1. Overview

The Fiji National Provident Fund is jointly supported by employees, employers and government. It was set up in 1966 to provide financial security for workers when they retire at the age of 55. It also provides two other main contingencies prior to retirement when the member is incapacitated and is not able to work, and financial support to survivors in the event of death. Over the years the Fund has evolved into a comprehensive scheme that provides a number of pre-retirement withdrawals to members for home ownership, healthcare, and education.

### 2. Coverage

Compulsory coverage is applied to employed workers under the following conditions

- Between 15 and 55 years of age
- Contributions cease to be paid at age 65
- 12 or more days' work for an employer in any month
- Includes expatriate employees and directors who hold 20% shares or less in a company

Compulsory members comprise about 99% of total membership (about 282,000 in 2002)

The FNPF also provides for voluntary contributors: (i) for self-employed workers, and (ii) for the domestic workers of a private employer

### 3. Resources

The main financial resources of the FNPF are contributions from members and interest income on investments.

The contribution rate is set at 16% (employer: 8%, employee: 8%) of the payroll. There is no minimum or maximum threshold on the insurable earnings. The employer may also voluntarily remit excess (of 8%) contributions. The entire 16% is allocated to the individual accounts of members.

Each year, a fixed amount is deducted from each individual balance as a Special Death Benefit premium. The deduction is currently F\$15.

At the end of each fiscal year, interest is credited to the individual balances of members. The interest rate is determined by the FNPF Board. The minimum interest rate is set at 2.5%.

### 4. Withdrawals

Members can withdraw their balance on the following grounds:

#### No. Grounds

- 1 Attainment of Age 55
- 2 Death of Member

- 3 Permanent Physical or Mental Incapacity
- 4 Fiji Citizens Migrating
- 5 Marriage (for females & late approvals only)
- 6 Non-Fiji Citizens Migrating
- 7 Closure of Small Accounts
- 8 Partial Withdrawals
- 9 Housing Assistance Scheme

#### 5. Share Investment Scheme

Additional grounds for withdrawal is for purposes of investing into the FNPF Share Investment Scheme that has been operational since March 2002. This scheme was created to provide FNPF members with an opportunity to voluntarily invest a portion of their savings in shares of companies that have been authorized by the FNPF Board. Being voluntary in nature, the investment risk is borne entirely by the member. As at 30 June 2002, 1067 members have utilized the scheme.

#### 6. Pensions

If a member withdraws his balance due to retirement, death, or incapacity for employment, all or part of his balance can be converted into an annuity. Pensioners have the option of a single-life pension, a joint-life pension or a combination of the two. As per the FNPF reform package, the annuity factor used in calculating pensions shall be reduced as follows:

Period	Single life	Joint life
From July 1998 to June 1999	25.0%	16.7%
From July 1999 to June 2000	24.0%	16.4%
From July 2000 to June 2001	23.0%	15.8%
From July 2001 to June 2002	22.0%	15.2%
From July 2002 to June 2003	21.0%	14.6%
From July 2003 to June 2004	20.0%	14.0%
From July 2004 to June 2005	19.0%	13.4%
From July 2005 to June 2006	18.0%	12.8%
From July 2006 to June 2007	17.0%	12.2%
From July 2007 to June 2008	16.0%	11.6%
From July 2008 and after	15.0%	11.0%

As shown above, the annuity factor used in calculating pensions in 2003/2004 is 20% for single-life pensions and 14% for joint-life pensions. This reduction shall continue until it reaches 15% for single life pensions and 11% for joint life pensions in July 2008, by which time another actuarial valuation review shall be undertaken to decide whether these factors should be further reduced to the actuarially fair rates of 10% and 8% respectively.

The FNPF reform package also adjusted the threshold for the calculation of pensions for voluntary members from \$960 to \$2,400 per annum. Suppose that a voluntary member maintained an FNPF account for 10 years with a balance of F\$30,000, and retires in July 2003, his pension and lump-sum payment will be calculated as follows:

Account balance = F\$30,000

The maximum convertible amount = F\$2,400 x 10 years = F\$24,000

Pension = 20% of F24,000 / 12 = F400 per month (Pension rate for year 2003 = 20%)

Balance as lump sum payment to member = F\$30,000 - F\$24,000 = F\$6,000

### 7. Special Death Benefit

The Special Death Benefit (SDB) is a life insurance that covers all members who have not withdrawn. It is paid in addition to the deceased member's balance. The deceased member's balance with the SDB will be paid to the person or persons nominated by the member. In the event of death, SDB amounting to F\$5,000 is paid to the nominated survivors.

### 8. Historical Data

The table below summarises selected historical data of the Fiji National Provident Fund since its inception in 1966.

	Contribution	Contribution	Special De	ath Benefit		Membership
Year	Rate %				Interest Rate Attributed to Member's Balance%	_
		10 PBF %	Amount F\$	Charges F\$	Weinber's Balance 70	
1966	10	2				
1967	10	2	100			46,000
1968	10	2	100		3.0	56,900
1969	10	2	300		3.5	66,349
1970	10	2	1,000		4.0	77,146
1971	10	2	1,000	5	5.0	83,541
1972	10	2	1,000	5	5.0	87,732
1973	10	2	1,500	5	5.0	94,045
1974	10	2	1,500	5	5.0	99,960
1975	10	2	1,500	5	5.0	98,980
1976	12	2	1,500	5	5.0	102,199
1977	12	2	1,800	5	6.0	106,561
1978	12	2	2,000	5	6.5	109,841
1979	12	2	2,000	5	6.5	114,772
1980	14	2	2,000	5	6.5	120,232
1981	14	2	2,000	5	7.3	125,441
1982	14	2	2,000	5	8.5	129,254
1983	14	2	2,000	5	10.0	132,833
1984	14	2	2,000	5	10.0	137,572
1985	14	2	2,000	5	10.0	140,650
1986	14	2	2,000	5	10.0	143,622
1987	14	2	2,000	5	10.0	146,812
1988	14	2	2,000	5	10.0	147,624
1989	14	2	2,200	7	9.0	149,485
1990	14	2	3,000	7	9.0	157,791
1991	14	2	3,000	7	9.5	169,766
1992	14	2	4,000	7	9.8	171,572
1993	14	2	4,000	10	9.0	177,835
1994	14	2	4,500	10	8.5	183,610
1995	14	2	4,500	12	8.5	188,323
1996	14	2	4,500	12	8.5	193,525
1997	14	2	4,500	12	8.0	198,885
1998	14	2	4,500	13	7.5	203,610
1999	16	0	4,700	14	7.5	205,510
2000	16	0	4,800	14	6.5	212,628
2001	16	0	5,000	15	6.4	213,668
2002	16	0	5,000	15	6.4	224,638

Note: PBF - Pension Buffer Fund

# Annex 2. Statistical tables

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Males								
	1996	2002	2005	2010	2015	2020	2025	2030
15-19	42'829	46'694	44'141	46'219	46'887	46'768	43'827	39'303
20-24	34'444	40'929	43'680	41'106	43'207	43'897	43'800	40'883
25-29	31'283	30'161	33'640	38'864	36'339	38'460	39'172	39'096
30-34	30'727	26'560	25'398	29'642	34'868	32'388	34'525	35'259
35-39	28'525	27'503	25'348	22'893	27'137	32'358	29'925	32'081
40-44	22'341	27'172	26'846	23'820	21'446	25'683	30'888	28'514
45-49	18'482	22'011	24'973	25'700	22'808	20'537	24'754	29'931
50-54	14'286	17'949	19'383	23'856	24'648	21'931	19'793	23'975
55-59	10'857	13'786	15'691	18'197	22'539	23'404	20'911	18'957
60-64	7'605	10'093	11'399	14'248	16'654	20'787	21'713	19'526
Subtotal 15-64	241'379	262'857	270'500	284'546	296'532	306'213	309'309	307'525
0-14	141'209	141'640	143'527	140'974	133'242	122'745	115'091	111'536
65 over	11'343	14'341	16'440	20'779	26'557	33'032	41'479	48'710
TOTAL	393'931	418'838	430'467	446'299	456'331	461'990	465'879	467'771
Females								
	1996	2002	2005	2010	2015	2020	2025	2030
15-19	40'853	43'943	41'285	43'251	43'946	43'815	41'023	36'750
20-24	32'511	38'331	40'617	37'747	39'733	40'441	40'309	37'521
25-29	30'377	27'825	31'057	35'589	32'761	34'762	35'474	35'345
30-34	30'114	25'770	23'775	27'362	31'905	29'111	31'119	31'839
35-39	27'254	27'484	25'312	21'715	25'312	29'854	27'090	29'102
40-44	21'839	26'475	26'913	24'158	20'638	24'235	28'765	26'037
45-49	18'599	21'744	24'437	26'087	23'431	19'999	23'586	28'094
50-54	14'397	18'357	19'611	23'656	25'342	22'804	19'487	23'057
55-59	11'388	14'238	16'389	18'765	22'754	24'475	22'108	18'950
60-64	7'854	10'959	12'163	15'346	17'687	21'586	23'379	21'237
Subtotal 15-69	235'186	255'125	261'559	273'676	283'509	291'082	292'339	287'933
0-14	132'955	133'153	135'022	132'676	125'399	115'550	108'479	105'331
65 over	13'005	17'617	20'758	26'600	34'272	42'647	52'906	62'793
TOTAL	381'146	405'895	417'340	432'951	443'180	449'280	453'723	456'057
Total								
	1996	2002	2005	2010	2015	2020	2025	2030
15-19	83'682	90'636	85'426	89'470	90'833	90'583	84'850	76'053
20-24	66'955	79'259	84'297	78'853	82'940	84'339	84'108	78'404
25-29	61'660	57'986	64'697	74'454	69'099	73'221	74'646	74'441
30-34	60'841	52'330	49'172	57'004	66'773	61'499	65'644	67'098
35-39	55'779	54'987	50'660	44'609	52'449	62'213	57'015	61'183
40-44	44'180	53'648	53'759	47'978	42'084	49'918	59'653	54'552
45-49	37'081	43'755	49'411	51'787	46'239	40'536	48'339	58'025
50-54	28'683	36'306	38'994	47'512	49'990	44'735	39'280	47'032
55-59	22'245	28'024	32'080	36'962	45'293	47'879	43'019	37'908
60-64	15'459	21'052	23'562	29'593	34'341	42'373	45'092	40'763
Subtotal 15-64	476'565	517'983	532'059	558'222	580'041	597'295	601'648	595'458
0-14	274'164	274'793	278'549	273'650	258'641	238'295	223'570	216'868
65 over	24'348	31'957	37'198	47'379	60'829	75'679	94'384	111'502
TOTAL	775'077	824'733	847'807	879'251	899'512	911'270	919'602	923'828

 Table A.1.
 Projected population in Fiji by sex and age group, 2002-2030

IVIAIES							
	2002	2005	2010	2015	2020	2025	2030
15-19	43.9	41.1	37.0	29.9	24.1	19.5	19.5
20-24	85.8	84.7	82.9	79.3	75.9	72.6	69.5
25-29	94.7	94.4	94.0	94.0	94.0	94.0	94.0
30-34	96.9	96.9	96.8	96.8	96.8	96.8	96.8
35-39	97.1	97.1	97.0	97.0	97.0	97.0	97.0
40-44	97.0	96.8	96.6	96.6	96.6	96.6	96.6
45-49	95.0	94.8	94.6	94.6	94.6	94.6	94.6
50-54	89.6	89.1	88.4	88.4	88.4	88.4	88.4
55-59	78.9	78.1	76.7	74.1	71.5	69.1	66.7
60-64	64.8	63.7	61.9	58.5	55.3	52.3	49.4
Total (15-64)	82.7	82.3	80.8	78.6	76.8	76.3	77.2

 Table A.2.
 Projected labour force participation rates in Fiji by sex and age group, 2002-2030

 Males

Females							
	2002	2005	2010	2015	2020	2025	2030
15-19	21.9	22.3	27.1	23.6	20.5	17.9	15.6
20-24	51.3	53.1	61.1	59.7	58.3	56.9	55.6
25-29	51.7	54.3	60.6	63.9	67.5	71.2	75.2
30-34	53.9	56.7	64.3	67.3	70.5	73.9	77.4
35-39	53.4	56.0	62.6	66.1	69.7	73.5	77.6
40-44	50.4	52.4	55.3	60.1	65.4	71.1	77.3
45-49	48.8	50.4	51.0	56.3	62.1	68.5	75.6
50-54	39.7	42.4	48.1	52.9	58.3	64.2	70.7
55-59	29.6	31.9	38.3	41.6	45.2	49.1	53.4
60-64	20.8	22.1	24.4	27.5	31.0	35.0	39.5
Total (15-64)	43.1	45.1	49.8	51.7	53.8	57.0	61.3

Total							
	2002	2005	2010	2015	2020	2025	2030
15-19	33.2	32.1	32.2	26.9	22.4	18.6	17.6
20-24	69.1	69.5	72.5	69.9	67.5	65.0	62.9
25-29	74.2	75.3	77.9	79.7	81.5	83.2	85.2
30-34	75.7	77.5	81.2	82.7	84.2	85.9	87.5
35-39	75.3	76.6	80.3	82.0	83.9	85.8	87.8
40-44	73.8	74.6	75.7	78.7	81.3	84.2	87.4
45-49	72.0	72.9	72.6	75.3	78.4	81.9	85.5
50-54	64.5	65.7	68.4	70.4	73.1	76.4	79.7
55-59	53.9	54.2	57.4	57.8	58.1	58.8	60.1
60-64	41.8	42.4	42.2	42.5	43.0	43.5	44.2
Total (15-69)	63.2	64.0	65.6	65.4	65.6	66.9	69.5
Source: Authors es	timate with inp	out from 1996	Census and 4	4th Edition of	ILO estimates	5.	

Males							
	2002	2005	2010	2015	2020	2025	2030
15-19	20'500	18'200	17'100	14'000	11'300	8'500	7'700
20-24	35'100	37'000	34'100	34'300	33'300	31'800	28'400
25-29	28'600	31'800	36'500	34'200	36'200	36'800	36'800
30-34	25'700	24'600	28'700	33'700	31'300	33'400	34'100
35-39	26'700	24'600	22'200	26'300	31'400	29'000	31'100
40-44	26'300	26'000	23'000	20'700	24'800	29'800	27'600
45-49	20'900	23'700	24'300	21'600	19'400	23'400	28'300
50-54	16'100	17'300	21'100	21'800	19'400	17'500	21'200
55-59	10'900	12'200	14'000	16'700	16'700	14'400	12'700
60-64	6'500	7'300	8'800	9'700	11'500	11'400	9'600
Total (15-64)	217'300	222'700	229'800	233'000	235'300	236'000	237'500
Females							
	2002	2005	2010	2015	2020	2025	2030
15-19	9'600	9'200	11'700	10'400	9'000	7'300	5'700
20-24	19'700	21'600	23'100	23'700	23'600	22'900	20'900
25-29	14'400	16'900	21'500	20'900	23'500	25'300	26'600
30-34	13'900	13'500	17'600	21'500	20'500	23'000	24'600
35-39	14'700	14'200	13'600	16'700	20'800	19'900	22'600
40-44	13'300	14'100	13'300	12'400	15'800	20'400	20'100
45-49	10'600	12'300	13'300	13'200	12'400	16'200	21'300
50-54	7'300	8'300	11'400	13'400	13'300	12'500	16'300
55-59	4'200	5'200	7'200	9'500	11'100	10'900	10'100
60-64	2'300	2'700	3'700	4'900	6'700	8'200	8'400
Total (15-64)	110'000	118'000	136'400	146'600	156'700	166'600	176'600
Total							
	2002	2005	2010	2015	2020	2025	2030
15-19	30'100	27'400	28'800	24'400	20'300	15'800	13'400
20-24	54'800	58'600	57'200	58'000	56'900	54'700	49'300
25-29	43'000	48'700	58'000	55'100	59'700	62'100	63'400
30-34	39'600	38'100	46'300	55'200	51'800	56'400	58'700
35-39	41'400	38'800	35'800	43'000	52'200	48'900	53'700
40-44	39'600	40'100	36'300	33'100	40'600	50'200	47'700
45-49	31'500	36'000	37'600	34'800	31'800	39'600	49'600
50-54	23'400	25'600	32'500	35'200	32'700	30'000	37'500
55-59	15'100	17'400	21'200	26'200	27'800	25'300	22'800
60-64	8'800	10'000	12'500	14'600	18'200	19'600	18'000
Total (15-64)	327'300	340'700	366'200	379'600	392'000	402'600	414'100

 Table A.3.
 Projected labour force population in Fiji by sex and age group, 2002-2030

Males							
	2002	2005	2010	2015	2020	2025	2030
15-19	2'000	1'800	1'600	1'300	1'100	800	800
20-24	17'000	18'000	16'700	16'600	16'200	15'600	14'000
25-29	22'900	25'500	29'500	27'700	29'100	29'700	29'700
30-34	22'500	21'500	25'100	29'500	27'400	29'200	29'800
35-39	23'400	21'600	19'500	23'100	27'500	25'400	27'300
40-44	22'200	21'900	19'400	17'500	20'900	25'200	23'200
45-49	17'700	20'000	20'600	18'300	16'400	19'800	24'000
50-54	13'200	14'200	17'300	17'700	15'700	14'200	17'400
55-59	3'300	3'700	4'200	5'100	4'900	4'200	3'800
60+	2'200	2'400	2'900	3'100	3'600	3'500	3'000
Total	146'500	150'600	156'700	159'800	163'000	167'700	172'900

Table A.4.	Projected covered	population of the FNPF by sex and age group, 2	2002-2030

Females 2002 2005 2010 2015 2020 2025 2030 15-19 1'600 1'500 1'900 1'700 1'500 1'200 1'000 20-24 13'800 15'200 16'400 16'700 16'600 16'200 14'800 25-29 14'800 17'300 22'200 21'600 24'200 26'000 27'400 30-34 12'200 11'900 15'500 18'900 18'000 20'300 21'700 35-39 10'700 16'400 15'700 17'800 11'600 11'200 13'200 40-44 10'300 10'900 10'300 9'500 12'200 15'700 15'500 45-49 7'600 8'900 9'600 9'500 8'900 11'700 15'300 50-54 4'600 5'300 7'200 8'400 8'300 7'800 10'400 55-59 1'100 1'400 1'900 2'500 2'800 2'700 2'500 60+ 700 1'700 2'100 2'100 600 900 1'200 Total 78'200 84'100 96'600 103'200 110'600 119'500 128'600

Total 2002 2005 2010 2015 2020 2025 2030 15-19 3'600 3'400 3'500 3'000 2'600 2'100 1'700 20-24 30'800 33'200 33'100 33'300 32'800 31'800 28'800 25-29 42'800 51'700 49'300 53'300 57'100 37'700 55'800 30-34 34'700 33'400 40'600 48'400 45'400 49'500 51'500 35-39 35'000 32'700 30'200 36'300 44'000 41'100 45'100 40-44 32'800 29'600 27'000 33'100 40'900 38'700 32'500 45-49 25'300 28'900 30'100 27'700 25'400 31'500 39'300 50-54 17'800 19'400 24'500 26'200 24'000 22'100 27'800 55-59 7'500 4'400 5'100 6'100 7'700 6'900 6'300 60+ 2'800 3'100 3'800 4'300 5'300 5'500 5'100 224'600 234'700 253'300 263'100 273'700 287'100 301'500 Total

Year	Numb	per of memb	ers	Growth rate			
	Males	Females	Total	Males	Females	Total	
2002	146'500	78'200	224'600	-	-	-	
2003	147'800	80'100	227'900	0.9%	2.5%	1.5%	
2004	149'200	82'100	231'300	0.9%	2.5%	1.5%	
2005	150'600	84'100	234'700	0.9%	2.5%	1.5%	
2006	152'000	86'800	238'700	0.9%	3.1%	1.7%	
2007	153'300	89'300	242'600	0.9%	2.9%	1.6%	
2008	154'600	91'800	246'300	0.8%	2.8%	1.5%	
2009	155'700	94'200	249'900	0.7%	2.6%	1.4%	
2010	156'700	96'600	253'300	0.7%	2.5%	1.4%	
2011	157'600	98'000	255'500	0.5%	1.5%	0.9%	
2012	158'300	99'300	257'600	0.5%	1.4%	0.8%	
2013	158'900	100'700	259'600	0.4%	1.4%	0.8%	
2014	159'400	102'000	261'400	0.3%	1.3%	0.7%	
2015	159'800	103'200	263'100	0.3%	1.2%	0.7%	
2016	160'300	104'600	264'800	0.3%	1.3%	0.7%	
2017	160'800	106'000	266'800	0.4%	1.4%	0.7%	
2018	161'500	107'500	269'000	0.4%	1.4%	0.8%	
2019	162'200	109'000	271'300	0.5%	1.5%	0.9%	
2020	163'000	110'600	273'700	0.5%	1.5%	0.9%	
2021	163'800	112'400	276'200	0.5%	1.5%	0.9%	
2022	164'700	114'100	278'800	0.5%	1.6%	1.0%	
2023	165'600	115'900	281'500	0.6%	1.5%	1.0%	
2024	166'600	117'700	284'300	0.6%	1.5%	1.0%	
2025	167'700	119'500	287'100	0.6%	1.5%	1.0%	
2026	168'800	121'400	290'200	0.7%	1.6%	1.1%	
2027	169'900	123'300	293'300	0.7%	1.6%	1.1%	
2028	171'000	125'200	296'200	0.6%	1.5%	1.0%	
2029	172'000	126'900	299'000	0.6%	1.4%	0.9%	
2030	172'900	128'600	301'500	0.5%	1.3%	0.8%	

 Table A.5.
 Projected number of covered population of the FNPF, 2002-2030

Year	Number of members			Growth rate			
	Males	Females	Total	Males	Females	Total	
2002	82'400	42'500	125'000	-	-	-	
2003	83'100	43'600	129'000	0.9%	2.5%	3.2%	
2004	83'900	44'600	132'900	0.9%	2.5%	3.1%	
2005	84'700	45'700	136'900	0.9%	2.4%	3.0%	
2006	85'400	47'100	140'900	0.9%	3.1%	2.9%	
2007	86'100	48'500	144'900	0.8%	2.9%	2.8%	
2008	86'700	49'800	149'300	0.7%	2.7%	3.0%	
2009	87'200	51'100	153'600	0.6%	2.5%	2.9%	
2010	87'700	52'400	158'000	0.6%	2.4%	2.8%	
2011	88'100	53'000	162'400	0.5%	1.3%	2.8%	
2012	88'400	53'700	166'800	0.4%	1.2%	2.7%	
2013	88'800	54'300	170'400	0.4%	1.2%	2.2%	
2014	89'000	55'000	174'000	0.3%	1.2%	2.1%	
2015	89'300	55'600	177'700	0.3%	1.2%	2.1%	
2016	89'500	56'300	181'300	0.3%	1.2%	2.0%	
2017	89'900	57'000	185'000	0.3%	1.3%	2.0%	
2018	90'200	57'800	188'300	0.4%	1.3%	1.8%	
2019	90'600	58'500	191'600	0.4%	1.4%	1.8%	
2020	91'000	59'400	195'000	0.5%	1.4%	1.7%	
2021	91'500	60'200	198'300	0.5%	1.5%	1.7%	
2022	91'900	61'100	201'600	0.5%	1.5%	1.7%	
2023	92'400	62'000	204'400	0.5%	1.5%	1.3%	
2024	92'900	62'900	207'100	0.5%	1.4%	1.3%	
2025	93'400	63'800	209'800	0.6%	1.4%	1.3%	
2026	94'000	64'800	212'500	0.6%	1.5%	1.3%	
2027	94'500	65'700	215'200	0.6%	1.4%	1.3%	
2028	95'000	66'600	217'700	0.5%	1.3%	1.2%	
2029	95'400	67'400	220'200	0.4%	1.2%	1.2%	
2030	95'700	68'100	222'700	0.3%	1.1%	1.1%	

 Table A.6.
 Projected number of the active members of the FNPF, 2002-2030

		Assum	ptions	Projection results							
Case	Interest (%)	Interest credited to balance (%)	Ultimate Annuity Factors (%)	Take-up rate for annuity (%)	First year in which GRA is in current deficit	Reserves in GRA at end of 2030 (billion F\$)	Total fund / members' balances in 2030 (%)	Total fund at end of 2030 (billion F\$)	Fund ratio in 2030 (Total Fund)	First year in which cash flow becomes negative	Cash flow ratio in 2030 (Total Fund)
1	6	6	15/11	35	2020	0.7	106%	12.5	11.3	2013	93%
2	4	4	15/11	35	2012	exhausted in 2028	97%	9.6	10.1	-	109%
3	5	5	15/11	35	2016	0.1	101%	10.9	10.7	2021	101%
4	7	7	15/11	35	2027	1.5	112%	14.4	12.0	2010	85%
5	8	8	15/11	35	-	2.7	119%	16.9	12.9	2009	78%
6	6	6	10/8	35	-	1.7	114%	13.5	13.1	2014	100%
7	4	4	10/8	35	2012	0.4	104%	10.3	11.7	-	117%
8	5	5	10/8	35	2023	0.9	109%	11.7	12.4	-	108%
9	7	7	10/8	35	-	2.7	121%	15.6	14.0	2010	92%
10	8	8	10/8	35	-	4.1	129%	18.3	15.0	2009	84%
11	6	6	20/14	35	2014	exhausted in 2027	93%	11.0	9.3	2011	86%
12	5.5	6	15/11	35	2011	exhausted in 2026	92%	10.8	9.8	2013	93%
13	5	6	15/11	35	All years	exhausted in 2020	80%	9.4	8.5	2013	93%
14	4.5	6	15/11	35	All years	exhausted in 2017	69%	8.1	7.3	2013	93%
15	4	6	15/11	35	All years	exhausted in 2015	59%	7.0	6.3	2013	93%
16	5.5	6	10/8	35	2012	0.0	100%	11.8	11.5	2014	100%
17	5	6	10/8	35	All years	exhausted in 2022	88%	10.3	10.1	2014	100%
18	4.5	6	10/8	35	All years	exhausted in 2018	77%	9.0	8.8	2014	100%
19	4	6	10/8	35	All years	exhausted in 2015	67%	7.9	7.7	2014	100%
20	6	6	15/11	100	2015	exhausted in 2026	87%	10.3	7.9	2011	79%
21	6	6	10/8	100	2021	0.9	107%	12.7	11.3	2012	92%
22	4	4	20/14	35	2010	exhausted in 2024	86%	8.5	8.4	2023	101%
23	4	4	20/14	100	2010	exhausted in 2019	51%	5.0	3.9	2012	79%
24	8	8	20/14	35	2020	0.6	104%	14.9	10.5	2008	72%
25	8	8	20/14	100	2014	exhausted in 2023	69%	9.9	5.6	2008	58%
26	4	4	15/11	100	2011	exhausted in 2023	76%	7.6	6.7	2015	91%
27	4	4	10/8	100	2012	exhausted in 2027	95%	9.4	9.7	-	106%
28	8	8	15/11	100	2020	0.4	103%	14.7	9.5	2009	67%
29	8	8	10/8	100	-	3.7	126%	17.9	13.7	2009	78%
Note: GR	A: General	Reserve Ac	count.								

### Table A.7. Summary of actuarial projection results