

A SIMULATION MODEL FOR
LONG-TERM POLICY FORMATION IN
PAPUA NEW GUINEA

by

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VOLUME II

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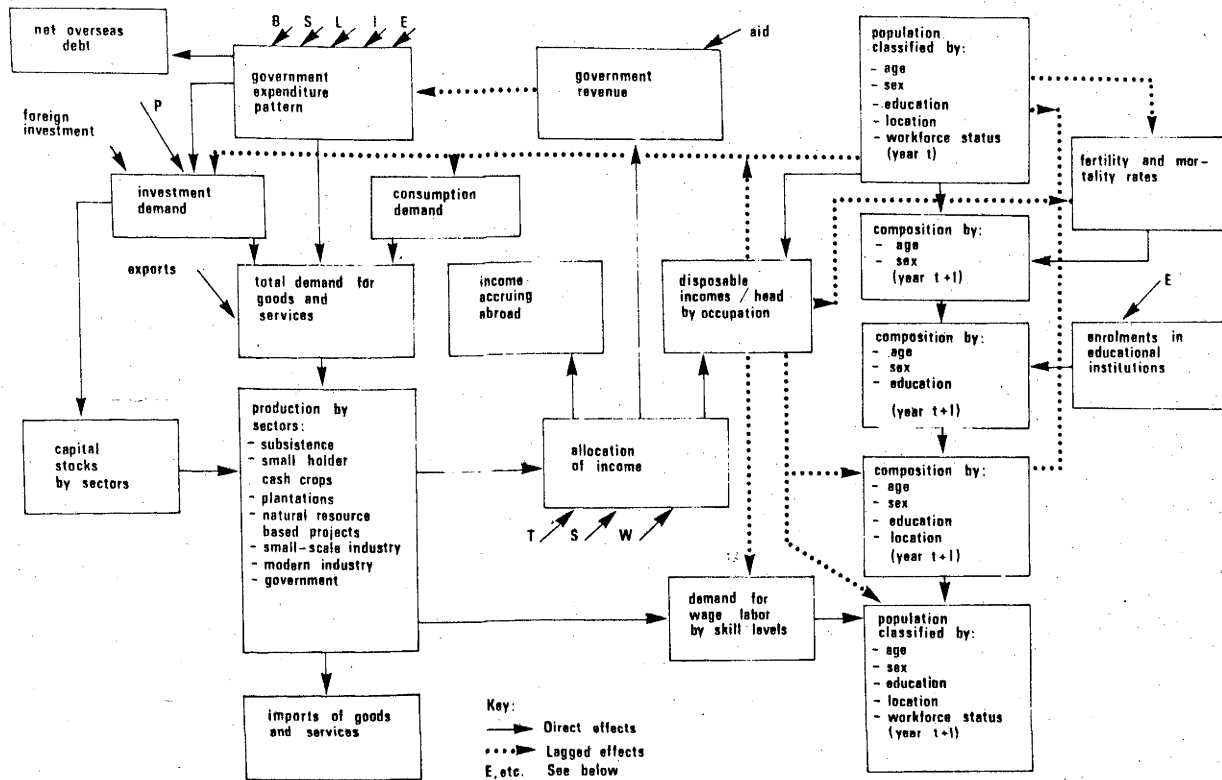
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Diagram 11.1: Structure of the simulation model



Government strategies.

B = government borrowing from abroad
 E = expansion of the education system
 I = expenditure on the provision of infrastructure
 L = lending to finance investment by rural smallholders

P = timing and scale of future natural resource based projects
 S = policy on government ownership in modern sectors of the economy
 T = determination of tax rates on profits and wages
 W = determination of wage rates by skill level

Table 11.1: Basic projection - value added by sectors
 units: \$'m (1968/69 prices); figures in brackets are percentage of total

Sector	1966	1971	1976	1981	1986	1991	1996	2001	2006	Average annual rate of growth 1966-2006
Smallholder agriculture:										
food crops	4.8 (1.7)	6.1 (1.4)	7.8 (1.3)	10.8 (1.5)	16.9 (1.7)	26.9 (2.5)	42.4 (3.3)	67.7 (4.5)	110.5 (5.8)	8.2
export crops	20.6 (7.4)	26.3 (6.2)	33.3 (5.7)	44.3 (6.2)	60.0 (6.2)	81.5 (7.6)	112.4 (8.7)	158.1 (10.5)	231.9 (12.1)	6.2
Plantations	30.0 (10.8)	38.3 (9.0)	40.5 (6.9)	31.2 (4.4)	28.3 (2.9)	28.4 (2.6)	28.6 (2.2)	28.9 (1.9)	29.1 (1.5)	0.0
Major projects	-	11.8 (2.7)	137.8 (23.6)	141.6 (19.7)	310.2 (31.9)	271.4 (25.2)	256.0 (19.8)	241.5 (16.0)	227.1 (11.8)	-
Small-scale industry:										
rural	1.0 (0.4)	1.8 (0.4)	2.9 (0.5)	4.6 (0.6)	6.9 (0.7)	10.3 (1.0)	15.4 (1.2)	23.3 (1.5)	35.9 (1.9)	10.5
urban	0.4 (0.1)	0.8 (0.2)	2.6 (0.4)	6.7 (0.9)	11.3 (1.2)	15.9 (1.5)	21.6 (1.7)	28.8 (1.9)	39.2 (2.0)	
Modern industry	166.3 (59.9)	271.7 (63.6)	280.3 (48.0)	381.8 (53.2)	432.2 (44.5)	513.6 (47.8)	661.2 (51.2)	778.3 (51.5)	1026.0 (53.4)	4.7
Government	54.4 (19.6)	70.2 (16.4)	78.8 (13.5)	96.6 (13.5)	105.6 (10.9)	127.3 (11.8)	153.8 (11.9)	184.3 (12.2)	222.0 (11.6)	3.6
TOTAL	277.5 (100)	427.0 (100)	584.0 (100)	717.7 (100)	971.5 (100)	1075.3 (100)	1291.2 (100)	1511.5 (100)	1921.6 (100)	4.96

Table 11.2: Basic projection - provision of education and infrastructure units: employment in '000 persons; expenditures in \$'m (1968/69 prices)

	1966	1971	1976	1981	1986	1991	1996	2001	2006
<u>Provision of Education</u>									
Employment	5.4	8.0	10.9	13.8	17.7	22.0	26.6	31.6	37.1
Wage bill	14.2	20.3	25.8	29.0	34.3	42.0	50.1	58.6	69.3
Demand for industrial products	5.5	9.8	14.5	18.7	26.6	29.4	33.9	38.5	43.6
<u>Provision of Infrastructure</u>									
Employment	30.1	34.0	41.5	54.1	65.7	78.1	92.7	110.1	130.8
Wage bill	40.2	49.9	53.0	67.6	71.3	85.3	103.7	125.7	152.8
Demand for industrial products	81.4	101.1	123.5	160.8	195.3	232.1	275.6	327.3	388.7
Total wage bill ¹	54.4 (19.6)	70.2 (16.4)	78.8 (13.5)	96.6 (13.5)	105.6 (10.9)	127.3 (11.8)	153.8 (11.9)	184.3 (12.2)	222.0 (11.6)
Total expenditure ¹	141.3 (50.1)	181.1 (42.4)	216.8 (37.1)	276.1 (38.5)	327.5 (33.7)	388.8 (36.2)	463.3 (35.9)	550.1 (36.4)	654.4 (34.1)

1 Figures in brackets are percentages of total monetary sector production

Table 11.3: Basic projection - final demand for industrial products
units: \$'m (1968/69 prices); figures in brackets are percentage of total

Source of demand	1966	1971	1976	1981	1986	1991	1996	2001	2006
Consumption: expatriates	48.3	74.3 (11.3)	26.3 (5.6)	27.6 (3.3)	3.1 (0.4)	1.6 (0.2)	1.3 (0.1)	1.0 (0.1)	0.7 (0.0)
indigenous, urban	37.3	43.4 (6.6)	89.4 (19.0)	125.5 (15.0)	158.6 (22.0)	189.5 (22.1)	249.2 (22.7)	289.1 (22.4)	392.4 (23.0)
indigenous, rural	18.4	26.3 (4.0)	30.0 (6.4)	39.7 (4.8)	53.4 (7.4)	72.3 (8.4)	101.1 (9.2)	144.1 (11.2)	215.3 (12.6)
Investment: major projects	n.a.	144.8 (22.0)	17.4 (3.7)	215.4 (25.8)	33.4 (4.6)	32.0 (3.7)	15.3 (1.4)	15.3 (1.2)	15.3 (0.9)
modern industry	n.a.	188.7 (28.7)	75.6 (16.1)	129.9 (15.6)	110.2 (15.3)	131.3 (15.3)	218.4 (19.9)	220.3 (17.1)	330.1 (19.3)
other	n.a.	18.3 (2.8)	18.8 (4.0)	24.6 (3.0)	33.2 (4.6)	44.4 (5.2)	61.9 (5.6)	86.2 (6.7)	128.9 (7.5)
Government expenditure	86.9	110.9 (16.9)	138.0 (29.3)	179.4 (21.5)	221.9 (30.8)	261.5 (30.5)	309.5 (28.1)	365.8 (28.4)	432.4 (25.3)
Exports	19.8	51.1 (7.8)	75.0 (15.9)	92.1 (11.9)	106.8 (14.8)	123.8 (14.5)	143.5 (13.1)	166.3 (12.9)	192.8 (11.3)
TOTAL	n.a.	657.8	470.5	834.2	720.6	856.4	1100.2	1288.1	1707.9

Table 11.4: Basic projection - supply and demand for industrial products
 units: \$'m (1968/69 prices); figures in brackets are percentage of total demand

	1966	1971	1976	1981	1986	1991	1996	2001	2006
<u>Supply</u>									
Small-scale industry: rural	2.0	3.8 (0.4)	6.0 (0.7)	9.4 (0.7)	14.3 (1.1)	21.3 (1.4)	31.7 (1.6)	47.9 (2.1)	74.0 (2.4)
urban	0.9	1.5 (0.2)	5.2 (0.6)	13.9 (1.1)	23.3 (1.8)	32.7 (2.2)	44.5 (2.3)	59.4 (2.6)	80.7 (2.7)
Modern industry	341.0	559.9 (58.0)	577.6 (70.1)	786.6 (60.6)	890.6 (69.0)	1058.3 (69.6)	1362.4 (70.2)	1603.6 (70.2)	2114.1 (70.0)
Total domestic production	343.9	565.2 (58.6)	588.8 (71.5)	810.0 (62.4)	928.1 (71.9)	1112.4 (73.1)	1438.6 (74.2)	1711.0 (74.9)	2268.7 (75.1)
Imports	n.a.	399.9 (41.4)	234.9 (28.5)	487.5 (37.6)	362.0 (28.1)	407.9 (26.9)	501.6 (25.8)	574.7 (25.1)	752.1 (24.9)
<u>Total supply</u>	n.a.	965.0 (100)	823.7 (100)	1297.5 (100)	1290.1 (100)	1520.3 (100)	1940.1 (100)	2285.7 (100)	3020.8 (100)
<u>Demand</u>									
Final demand	n.a.	657.8	470.5	834.2	720.6	856.4	1100.2	1288.1	1707.9
Intermediate demand	n.a.	307.2	353.2	463.3	569.5	663.9	839.9	997.6	1312.9
<u>Total demand</u>	n.a.	965.0	823.7	1297.5	1290.1	1520.3	1940.1	2285.7	3020.8

Table 11.5: Basic projection - wage employment by sectors
units: '000 persons; figures in brackets are percentage of total

Sector	1966	1971	1976	1981	1986	1991	1996	2001	2006
Government service: teachers	5.4 (3.7)	8.0 (3.8)	10.9 (5.3)	13.8 (5.8)	17.7 (6.8)	22.0 (7.3)	26.6 (7.2)	31.6 (7.6)	37.1 (7.1)
other	30.1 (20.6)	34.0 (16.3)	41.5 (20.3)	54.1 (22.8)	65.7 (25.1)	78.1 (26.0)	92.7 (25.2)	110.1 (26.3)	130.8 (25.0)
Plantations	42.5 (29.1)	50.8 (24.3)	46.1 (22.6)	26.5 (11.1)	20.9 (8.0)	20.0 (6.7)	19.5 (5.3)	18.9 (4.5)	18.4 (3.5)
Major projects	-	8.0 (3.8)	3.8 (1.9)	14.3 (6.0)	8.1 (3.1)	7.3 (2.4)	6.1 (1.6)	5.8 (1.4)	5.5 (1.1)
Modern industry	67.9 (46.5)	108.2 (51.8)	101.9 (50.0)	129.1 (54.3)	149.4 (57.1)	172.9 (57.8)	223.0 (60.6)	251.6 (60.2)	331.5 (63.4)
TOTAL	145.9 (100)	208.9 (100)	204.2 (100)	237.8 (100)	261.8 (100)	300.3 (100)	367.8 (100)	418.0 (100)	523.2 (100)

Table 11.6: Basic projection - wage employment by skill level

units: numbers employed: '000 persons

Skill Level	1966	1971	1976	1981	1986	1991	1996	2001	2006
Unskilled									
nos employed	119.4	163.9	155.0	170.2	182.6	204.9	247.8	275.9	342.7
% of total empl.	(81.8)	(78.5)	(75.9)	(71.6)	(69.7)	(68.2)	(67.4)	(66.0)	(65.5)
% indigenous	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
Skilled									
nos employed	17.7	28.1	29.0	40.5	45.5	53.7	67.6	79.1	102.0
% of total empl.	(12.1)	(13.5)	(14.2)	(17.0)	(17.4)	(17.9)	(18.4)	(18.9)	(19.5)
% indigenous	(48)	(64)	(82)	(83)	(99)	(100)	(100)	(100)	(100)
Sub-professional									
nos employed	7.0	13.6	16.4	22.1	27.3	33.8	42.1	50.5	62.6
% of total empl.	(4.8)	(6.5)	(8.0)	(9.3)	(10.4)	(11.2)	(11.4)	(12.1)	(12.0)
% indigenous	(29)	(49)	(82)	(92)	(99)	(100)	(100)	(100)	(100)
Professional									
nos employed	1.8	3.4	3.8	5.0	6.3	8.0	10.3	12.6	16.0
% of total empl.	(1.2)	(1.6)	(1.9)	(2.1)	(2.4)	(2.7)	(2.8)	(3.0)	(3.1)
% indigenous	(0)	(17)	(50)	(82)	(92)	(94)	(96)	(98)	(99)
TOTAL									
nos employed	145.9	208.9	204.2	237.8	261.8	300.3	367.8	418.0	523.2
% indigenous	(89)	(91)	(95)	(96)	(99)	(99.8)	(99.9)	(100)	(100)

Table 11.7: Basic projection - personal disposable incomes
units: \$'million (1968/69 prices)

	1966	1971	1976	1981	1986	1991	1996	2001	2006
<u>Expatriate Residents</u>	86.1	116.8	57.2	49.1	5.9	3.0	2.5	1.9	1.4
<u>Indigenous wage employees:</u>									
wages, net of income tax	67.0	85.2	143.7	202.2	247.3	293.2	367.9	428.5	547.6
dividends from mod. industry	0.0	1.0	1.4	1.8	4.5	10.3	20.2	33.5	53.1
less remittances to rural and urban self-employed	4.1	9.2	20.7	28.5	30.6	33.3	38.0	39.8	44.5
Net disposable income	62.9	77.0	124.4	175.5	221.2	270.2	350.0	422.2	556.1
<u>Urban self-employed:</u>									
net income from informal industrial production	0.3	0.4	1.7	3.8	6.2	8.8	12.2	16.4	22.9
remittance from wage earners	1.1	2.5	11.0	16.3	17.1	19.1	22.5	24.5	28.8
Net disposable income	1.4	2.9	12.7	20.1	23.3	27.9	34.7	40.9	51.8
<u>Rural self-employed:</u>									
net income from smallholder agriculture	20.5	27.1	34.1	45.8	63.4	89.9	127.6	187.8	285.3
net income from informal industrial production	0.5	1.0	1.6	2.4	3.7	5.0	8.7	13.4	21.2
dividends from plantations	0.0	0.0	0.0	0.2	0.4	0.7	1.2	1.9	3.0
remittance from wage earners	3.0	6.7	9.7	12.2	13.5	14.2	15.5	15.3	15.7
Net disposable incomes	24.0	34.8	45.5	60.6	81.1	109.8	153.1	218.5	325.3

Table 11.8: Basic projection - incomes per worker by occupation
 units: dollars per year (1968/69 prices)

Occupation	1966	1971	1976	1981	1986	1991	1996	2001	2006
Rural self employed:									
subsistence production	228	228	228	228	228	228	228	228	228
cash income ¹	24	28	31	40	46	59	73	92	119
remittances from wage earners	3	7	8	10	9	9	8	7	6
total	225	263	267	278	283	296	309	327	353
Urban self-employed:									
income from small-scale industry	31	21	36	56	60	68	89	88	110
remittances from wage earners	114	131	233	240	165	148	164	131	138
total	145	152	269	296	225	216	253	219	248
Wage employees:									
average wage rate	430	470	780	950	1030	1060	1090	1120	1140
income per head after allowing for dividends and remittances	381	407	641	769	848	901	953	1011	1063

1 Income from smallholder agriculture, small-scale industry and dividends from plantations.

Table 11.9: Basic projection - concentration ratios

(u) concentration ratio of urban incomes
 (o) concentration ratio of all indigenous cash incomes
 (definitions of these ratios may be found in Section 9.2)

Ratio	1966	1971	1976	1981	1986	1991	1996	2001	2006
(u)	n.a.	0.19	0.20	0.22	0.27	0.29	0.27	0.30	0.28
(o)	n.a.	0.54	0.59	0.60	0.58	0.56	0.54	0.51	0.47

Table 11.10: Basic projection - expenditure on gross monetary sector product
units: \$'m (1968/69 prices)

	1966	1971	1976	1981	1986	1991	1996	2001	2006
1. Consumption of non-subsistence foods	43.8	64.1	68.5	85.2	97.7	117.5	147.6	182.2	238.3
2. Consumption of industrial products	104.0	144.1	145.7	192.7	215.0	263.3	351.6	434.2	608.4
3. Investment in major projects	-	156.7	18.6	230.5	35.3	33.9	16.2	16.2	16.2
4. Other investment demand	n.a.	207.0	94.4	154.5	143.3	175.7	280.3	306.5	458.8
5. Government expenditure: wage bill	54.4	70.2	78.8	96.6	105.6	127.3	153.8	184.3	222.0
6. industrial products	86.9	110.9	138.0	179.4	221.9	261.5	309.5	365.8	432.4
7. Exports: agricultural	60.9	78.7	90.8	90.0	105.5	131.9	169.0	227.9	318.3
8. industrial	19.8	51.1	75.0	92.1	106.8	123.8	143.5	166.3	192.8
9. major projects	-	-	167.3	154.9	377.3	329.9	312.2	294.5	276.8
10. Imports: 1 food	n.a.	-55.9	-58.1	-70.7	-75.0	-81.6	-90.0	-92.2	-90.4
11. industrial products	n.a.	-399.9	-234.9	-487.5	-362.0	-407.9	-501.6	-574.7	-752.1
12. Gross monetary sector product	277.5	427.0	584.0	717.7	971.5	1075.3	1291.2	1511.5	1921.6

1 Negative signs are used so that the sum of each column is equal to total GMSP

Table 11.11: Basic projection - disposition of gross monetary sector product
units: \$'m (1968/69 prices); figures in brackets are percentage of total

	1966	1971	1976	1981	1986	1991	1996	2001	2006
Personal disposable incomes: ¹									
indigenous	88.3 (31.8)	114.6 (26.8)	182.5 (31.3)	256.2 (35.7)	325.5 (33.5)	407.9 (37.9)	537.9 (41.6)	681.5 (45.1)	933.2 (48.6)
expatriate	86.1 (31.0)	116.8 (27.3)	57.2 (9.8)	49.1 (6.9)	5.9 (0.6)	3.0 (0.3)	2.5 (0.2)	1.9 (0.1)	1.4 (0.1)
Government revenue ²	n.a.	41.5 (9.7)	86.3 (14.8)	147.2 (20.5)	322.5 (33.2)	345.2 (32.1)	399.4 (30.9)	429.3 (28.4)	513.4 (26.7)
Profits accruing abroad:									
major projects	n.a.	-	84.4 (14.5)	40.6 (5.7)	87.9 (9.1)	90.9 (8.5)	87.1 (6.8)	86.2 (5.7)	86.6 (4.5)
other	n.a.	95.2 (22.3)	94.0 (16.1)	129.6 (18.1)	102.3 (10.5)	84.4 (7.9)	95.7 (7.4)	104.6 (6.9)	124.6 (6.5)
Depreciation	n.a.	50.0 (13.8)	79.5 (13.6)	95.0 (13.2)	127.3 (13.1)	143.9 (13.4)	168.6 (13.1)	208.0 (13.8)	262.4 (13.7)
Gross monetary sector product	277.5	427.0	584.0	717.7	971.5	1075.3	1291.2	1511.5	1921.6

1 A further breakdown of these figures is shown in Table 11.7.

2 This figure does not include revenue from customs duties, which are not part of gross (domestic) monetary sector product. These duties are included in the total domestic revenue shown in Table 11.12.

Table 11.12: Basic projection - government outlays and receipts
 units: \$'m (1968/69 prices); figures in brackets show percentage of total receipts

	1966	1971	1976	1981	1986	1991	1996	2001	2006
Outlays									
Provision of education	19.7	30.1 (13.5)	40.3 (18.3)	47.7 (10.8)	60.9 (14.1)	71.4 (16.4)	84.0 (16.5)	97.1 (16.6)	112.9 (16.1)
Provision of infrastructure	121.6	151.0 (67.5)	176.5 (80.2)	228.4 (51.8)	266.6 (61.6)	317.4 (73.0)	379.3 (74.6)	453.0 (77.2)	541.5 (77.1)
Net lending to rural smallholders ¹	n.a.	0.2 (0.1)	0.4 (0.2)	1.0 (0.2)	0.8 (0.2)	0.6 (0.1)	0.7 (0.1)	1.4 (0.2)	2.9 (0.4)
Purchase of ownership in modern sectors ² of the economy	n.a.	42.4 (18.9)	2.5 (1.1)	146.7 (33.3)	125.9 (29.1)	17.8 (4.1)	47.8 (9.4)	14.6 (2.5)	60.1 (8.6)
Accumulation of reserves	n.a.	-	0.5 (0.2)	17.1 (3.9)	-21.2 (-4.9)	27.6 (6.3)	-3.4 (-0.7)	20.5 (3.5)	-15.2 (-2.2)
TOTAL OUTLAYS	n.a.	223.7 (100)	220.1 (100)	440.8 (100)	433.1 (100)	434.8 (100)	508.3 (100)	586.6 (100)	702.2 (100)
Receipts									
Indirect taxes ³	n.a.	29.5 (13.2)	19.8 (9.0)	36.5 (8.3)	29.6 (6.8)	33.4 (7.7)	40.7 (8.0)	46.1 (7.9)	58.6 (8.3)
Income tax	n.a.	14.2 (6.3)	17.3 (7.9)	25.3 (5.7)	21.7 (5.0)	25.9 (6.0)	33.1 (6.5)	39.6 (6.8)	51.8 (7.4)
Plantations: taxes plus dividends	n.a.	2.8 (1.2)	3.0 (1.4)	3.1 (0.7)	3.8 (0.9)	5.8 (1.3)	7.7 (1.5)	9.1 (1.6)	8.1 (1.2)
Modern industry: taxes on profits	n.a.	20.7	19.2	31.9	37.4	55.4	98.7	118.7	183.7
dividends	n.a.	2.1	2.7	8.0	57.1	92.3	104.6	115.9	133.9
sub-total		22.8 (10.2)	21.9 (10.0)	39.9 (9.1)	94.5 (21.8)	147.7 (34.0)	202.3 (39.8)	234.6 (40.0)	317.6 (45.2)
Major projects: Bougainville	-	-	42.4	75.5	77.7	57.7	43.6	29.4	15.3
Project 2	-	-	-	-	119.7	101.1	103.6	104.5	104.0
Sub-total	-	-	42.4 (19.3)	75.5 (17.1)	197.4 (45.6)	158.8 (36.5)	147.2 (29.0)	133.9 (22.8)	119.3 (17.0)
TOTAL DOMESTIC REVENUE	n.a.	69.3 (31.0)	104.4 (47.4)	180.3 (40.9)	347.0 (80.1)	371.6 (85.5)	431.0 (84.8)	463.3 (79.0)	555.4 (79.1)
Foreign aid	n.a.	120.5 (53.9)	134.7 (61.2)	137.0 (31.0)	122.0 (28.2)	107.0 (24.6)	92.0 (18.1)	77.0 (13.1)	62.0 (8.8)
Net overseas borrowing	n.a.	34.0 (15.2)	-18.9 (-8.6)	123.7 (28.1)	-36.0 (-8.3)	-43.8 (-10.1)	-14.7 (-2.9)	46.3 (7.9)	84.9 (12.1)
TOTAL RECEIPTS	n.a.	223.7 (100)	220.1 (100)	440.8 (100)	433.1 (100)	434.8 (100)	508.3 (100)	586.6 (100)	702.2 (100)

1. This item shows new loans less repayments on earlier loans.

2. Major projects, plantations and modern industry.

3. The components of indirect tax are listed in Section 10.2.

Table 11.13: Basic projection - balance of payments account¹
units: \$'m (1968/69 prices)

	1966	1971	1976	1981	1986	1991	1996	2001	2006
Imports (net of customs duty)	n.a.	-428.5	-275.4	-524.8	-410.7	-460.1	-556.9	-627.0	-791.9
Exports: major projects	n.a.	0.0	167.3	154.9	377.3	329.9	312.2	294.5	276.8
other	n.a.	129.8	165.7	182.1	212.2	255.6	312.5	394.2	511.1
<u>Balance of trade</u>	n.a.	-298.6	57.6	-187.8	178.8	125.4	67.8	61.7	- 4.0
Foreign investment ²	n.a.	256.6	25.4	131.8	- 94.9	17.8	32.7	33.4	45.5
Foreign aid	n.a.	120.5	134.7	137.0	122.0	107.0	92.0	77.0	62.0
Net borrowing, interest charges and adjustment of reserves	n.a.	39.2	- 15.4	103.3	- 13.7	- 74.0	- 8.8	19.3	108.3
Profits accruing overseas	n.a.	- 69.2	-185.1	-166.2	-190.3	-175.3	-182.8	-190.7	-211.2
Remittance of savings by expatriate residents	n.a.	- 48.5	- 17.2	- 18.1	- 2.0	- 1.0	- 0.9	- 0.7	- 0.5
<u>Balancing item</u>	n.a.	298.6	-57.6	+187.8	-178.8	-125.4	-67.8	-61.7	+ 4.0

1 All receipts are indicated by positive, all payments overseas by negative signs.

2 This item indicates net foreign investment in plantations, major projects and modern industry.

Table 11.14: Basic projection - expansion of the education system
 units: enrolments and staff, '000 persons; expenditure, \$'m (1968/69 prices)

	1966	1971	1976	1981	1986	1991	1996	2001	2006
Primary schools: enrolments	153.0	195.9	270.2	377.9	505.0	630.9	766.9	911.5	1068.2
staff	4.8	6.6	9.0	11.7	15.1	18.7	22.7	27.1	32.0
wage bill	9.5	11.9	14.3	19.3	25.4	31.7	38.9	46.4	56.1
total expenditure	10.5	13.1	17.4	25.1	33.7	41.1	49.8	59.4	71.0
Secondary schools and Senior High Schools: enrolments	9.2	21.2	31.5	40.9	52.0	67.3	81.4	98.6	116.4
staff	0.6	1.1	1.3	1.4	1.8	2.4	3.0	3.5	3.9
wage bill	3.2	6.3	6.7	4.6	4.1	5.6	6.9	8.1	9.2
total expenditure	5.5	10.6	11.7	9.7	14.0	16.7	20.2	23.1	26.5
Universities: enrolments	0.1	0.8	2.5	2.8	2.8	2.8	2.8	2.8	2.8
Primary teachers' colleges: enrolments	1.0	1.7	2.4	2.8	3.2	3.7	4.3	5.0	5.8
Secondary teachers' colleges: enrolments	0.0	0.3	0.5	0.7	0.7	0.8	0.9	0.9	1.0
Other tertiary: enrolments	0.1	0.4	0.9	1.0	1.2	1.3	1.5	1.8	2.0
All tertiary institutions: enrolments	1.2	3.2	6.3	7.3	7.9	8.6	9.5	10.5	11.6
staff	0.1	0.3	0.7	0.8	0.8	0.9	0.9	1.0	1.1
wage bill	1.4	2.1	4.8	5.1	4.9	4.0	4.4	4.1	3.9
total expenditure	3.7	6.4	11.3	12.9	13.2	13.6	14.1	14.6	15.3
All institutions: enrolments	163.4	220.3	308.0	426.1	564.9	706.8	857.8	1020.6	1196.2
staff	5.4	8.0	10.9	13.8	17.7	22.0	26.6	31.6	37.1
wage bill	14.2	20.3	25.8	29.0	34.3	42.0	50.1	58.6	69.3
total expenditure	19.7	30.1	40.3	47.7	60.9	71.4	84.0	97.1	112.9

Table 11.15: Basic projection - educational composition of all adults (aged 15-60 years)
 units: '000 persons; figures in brackets are percentage of total

Qualifications	1966	1971	1976	1981	1986	1991	1996	2001	2006
University completed	-	0.2 (0.0)	1.4 (0.1)	5.0 (0.3)	8.9 (0.5)	12.8 (0.6)	16.7 (0.7)	20.7 (0.7)	24.7 (0.7)
Other tertiary education completed	-	1.2 (0.1)	6.0 (0.4)	12.9 (0.8)	20.9 (1.1)	30.0 (1.4)	40.4 (1.6)	52.4 (1.8)	66.2 (1.9)
Secondary school completed ¹	2.1 (0.2)	7.5 (0.6)	20.1 (1.4)	34.7 (2.2)	61.1 (3.3)	97.5 (4.5)	147.5 (5.8)	210.1 (7.1)	286.5 (8.2)
Primary school completed	18.3 (1.6)	55.9 (4.5)	140.7 (10.1)	289.7 (18.1)	490.9 (26.4)	760.8 (35.2)	1110.6 (43.9)	1546.2 (52.1)	2056.3 (58.8)
No formal qualifications	1092.4 (98.2)	1174.2 (94.8)	1230.8 (88.0)	1260.0 (78.6)	1274.2 (68.7)	1262.5 (58.4)	1215.2 (48.0)	1139.3 (38.4)	1063.6 (29.6)
TOTAL	1112.8 (100)	1239.0 (100)	1399.0 (100)	1602.3 (100)	1856.0 (100)	2163.6 (100)	2530.4 (100)	2968.7 (100)	3497.3 (100)

¹ All persons who have completed Form 4 or above.

Table 11.16: Basic projection - summary of effects on the population
units: '000 persons, figures in brackets are percentages

	1966	1971	1976	1981	1986	1991	1996	2001	2006
Total population	2153.0	2431.6	2711.3	3182.7	3679.6	4284.0	5012.8	5876.4	6879.6
Population under 15 years (per cent of total population)	889.4 (41.3)	1035.9 (42.6)	1182.1 (43.6)	1403.6 (44.1)	1630.1 (44.3)	1902.1 (44.4)	2235.7 (44.6)	2626.8 (44.7)	3061.4 (44.5)
Total workforce (per cent of total population)	1018.2 (47.3)	1114.2 (45.8)	1257.2 (46.4)	1436.0 (45.1)	1662.9 (45.2)	1942.1 (45.3)	2282.8 (45.5)	2683.3 (45.7)	3168.0 (46.0)
Wage employment (per cent of total workforce)	145.9 (13.6)	208.9 (15.8)	204.2 (14.4)	237.8 (14.9)	261.8 (14.8)	300.3 (14.6)	367.8 (15.3)	418.0 (14.8)	523.2 (15.7)
Urban population (per cent of total population)	250.9 (11.7)	439.9 (18.1)	536.3 (19.4)	644.7 (20.3)	767.6 (20.9)	891.4 (20.8)	1045.9 (20.9)	1246.9 (21.2)	1486.9 (21.6)
Urban workforce not in wage employment (per cent of urban workforce)	11.0 (6.8)	22.9 (13.0)	51.3 (24.1)	74.3 (28.2)	103.9 (32.5)	129.2 (34.3)	141.5 (32.0)	182.4 (35.1)	203.5 (32.9)

Table 11.17: Basic projection - expected incomes by location
 units: dollars (1968/69 prices)

	1966	1971	1976	1981	1986	1991	1996	2001	2006
1. Present value of urban unskilled wages over a six-year time horizon	709	714	1498	1642	1666	1722	1782	1834	1886
2. Probability of finding wage employment on arrival in urban areas	.69	.53	.25	.25	.11	.12	.16	.15	.13
3. Present value of expected income in urban areas, allowing for probability of being in wage employment over a six-year time horizon, and for incomes per head in self-employment	698	481	580	658	391	501	683	676	631
4. Present value of expected incomes of persons remaining in rural areas	493	509	517	531	549	570	597	634	688

Table 11.18: Basic projection - migration rates by education
 units: proportions of adult males (aged 15-60 years)
 migrating to urban areas per year

Educational qualifications	1966	1971	1976	1981	1986	1991	1996	2001	2006
No formal qualifications	0.077	0.050	0.012	0.003	0.004	0.001	0.007	0.001	0.020
Primary education completed	0.691	0.502	0.206	0.139	0.057	0.035	0.062	0.016	0.053
Secondary education completed	0.898	0.843	0.836	0.748	0.661	0.632	0.565	0.490	0.462
All groups ¹	0.087	0.058	0.041	0.049	0.031	0.023	0.046	0.015	0.050

¹ This row shows the weighted average rate of migration for all males.

Table 11.19: Basic projection - participation rates
 units: proportions of each group participating in the workforce

	1966	1971	1976	1981	1986	1991	1996	2001	2006
Urban: males (15-60 years)	0.95	0.95	0.95	0.96	0.96	0.96	0.95	0.96	0.96
females (15-60 years)	0.25	0.30	0.35	0.41	0.45	0.50	0.54	0.56	0.58
Total population:									
males (15-60 years)	0.94	0.94	0.94	0.94	0.94	0.94	0.95	0.95	0.95
females (15-60 years)	0.87	0.87	0.88	0.88	0.88	0.89	0.89	0.90	0.90

Table 11.20: Basic projection - job seekers and job opportunities

	1966	1971	1976	1981	1986	1991	1996	2001	2006
Total number of job-seekers ('000 persons)	38.2	49.6	75.6	108.5	131.2	162.0	195.0	231.6	290.5
Percentage of job-seekers: previously self-employed	19.3	20.7	53.6	55.0	65.7	68.8	61.8	73.4	58.8
others from urban areas	19.0	40.2	27.9	27.5	21.9	21.0	22.2	19.8	23.0
rural-urban migrants	61.7	30.1	18.5	17.5	12.4	10.2	16.0	6.8	18.2
Percentage of wage job opportunities to the total number of job-seekers	69	53	25	25	11	12	16	15	13

Table 11.21: Basic projection - fertility rates

	1966	1971	1976	1981	1986	1991	1996	2001	2006
<u>Rural:</u> total fertility rate (TFR) ¹	6.9	6.9	6.9	6.8	6.7	6.5	6.3	6.1	5.9
current TFR as proportion of 1966 TFR	1.00	0.99	0.99	0.98	0.96	0.94	0.91	0.88	0.84
proportion of decline caused by rising income per head ²	-	-	-	-	0.33	0.40	0.43	0.45	0.56
<u>Urban:</u> total fertility rate (TFR) ³	6.3	6.9	6.3	5.6	5.1	4.9	4.5	4.5	4.0
current TFR as proportion of 1966 TFR	1.00	1.09	0.99	0.85	0.80	0.77	0.71	0.71	0.63
proportion of decline caused by rising income per head	-	-	-	0.55	0.62	0.59	0.63	0.60	0.67
proportion of decline caused by rising income per head and changes in educational composition ⁴	-	-	-	0.30	0.27	0.31	0.26	0.29	0.24

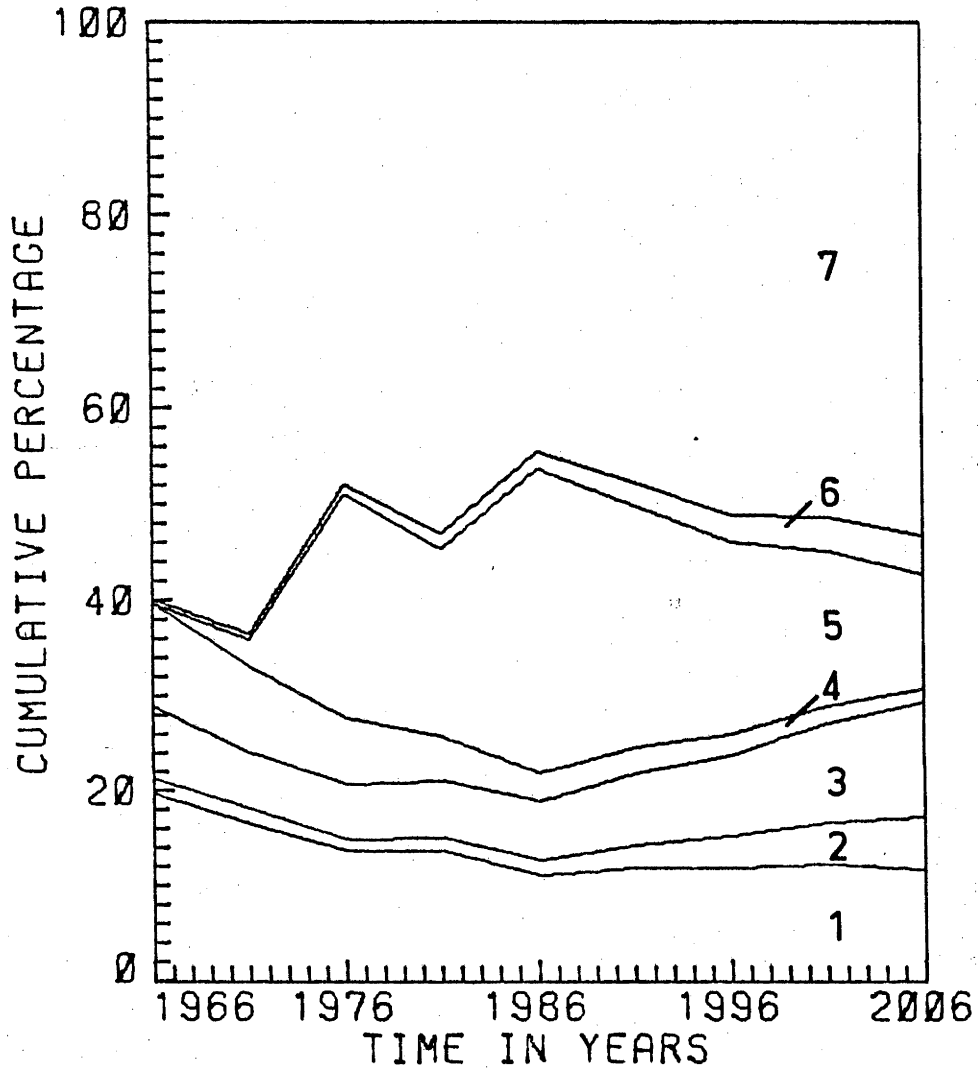
1 For definition of TFR, see Section 4.2.

2 Remainder of decline is attributed to changes in educational composition.

3 For definition of TFR, see Section 4.2.

4 Remainder of decline is attributed to changes in the proportion of women (aged 15-49 years) in wage employment.

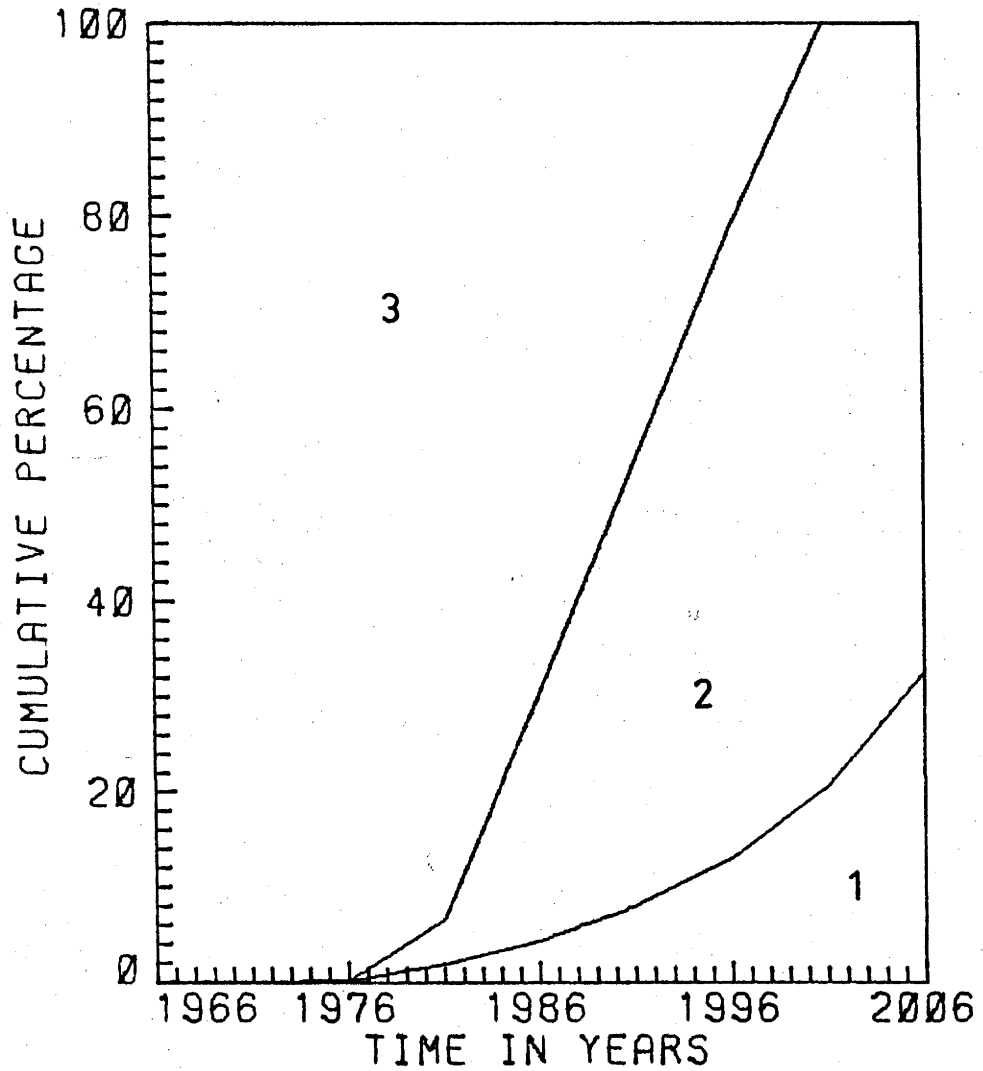
CHART 11.1: BASIC PROJECTION -
VALUE ADDED BY SECTORS



KEY

- 1 GOVERNMENT SECTOR
- 2 RURAL SMALLHOLDER FOOD PRODUCTION
- 3 RURAL SMALLHOLDER EXPORT CROP PRODUCTION
- 4 PLANTATIONS
- 5 MAJOR PROJECTS
- 6 SMALL-SCALE INDUSTRY
- 7 MODERN INDUSTRY

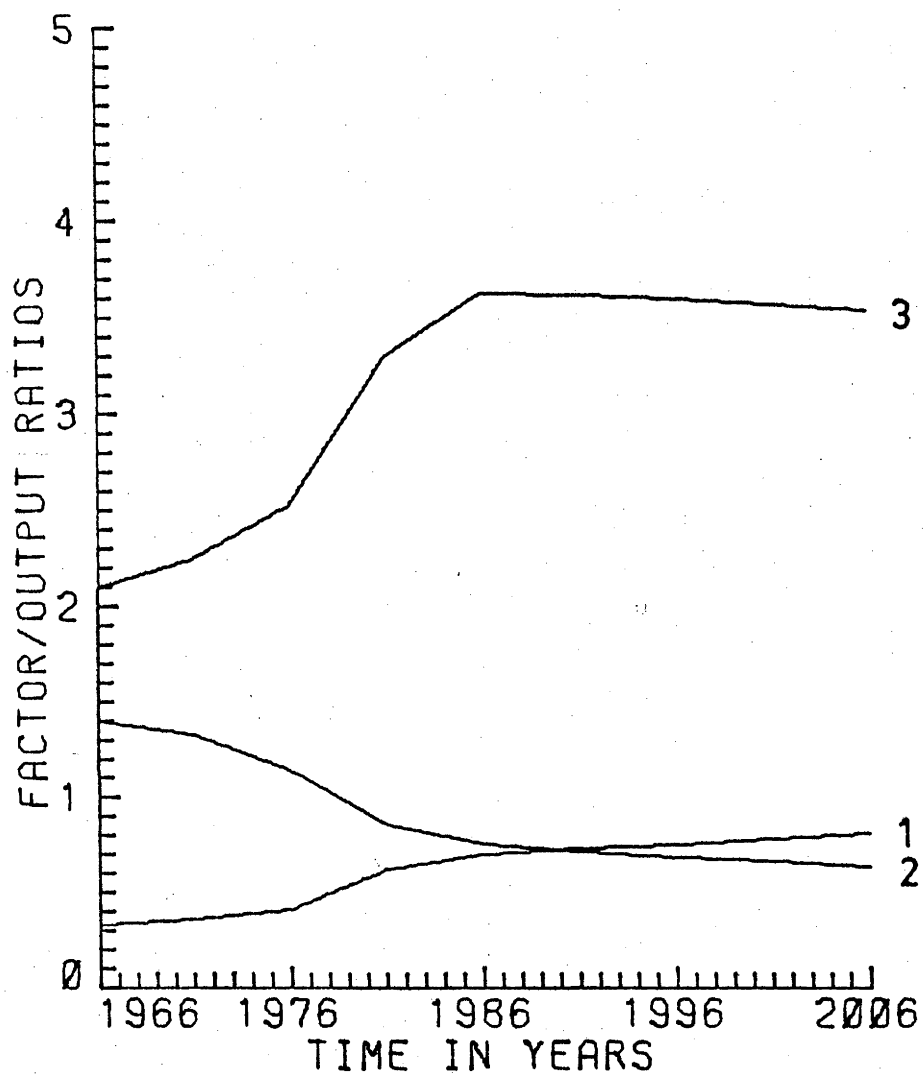
CHART 11.2: BASIC PROJECTION - OWNERSHIP OF PLANTATIONS



KEY

- 1 SHARE OWNED BY : RURAL SMALLHOLDERS
- 2 " " " : GOVERNMENT
- 3 " " " : FOREIGNERS

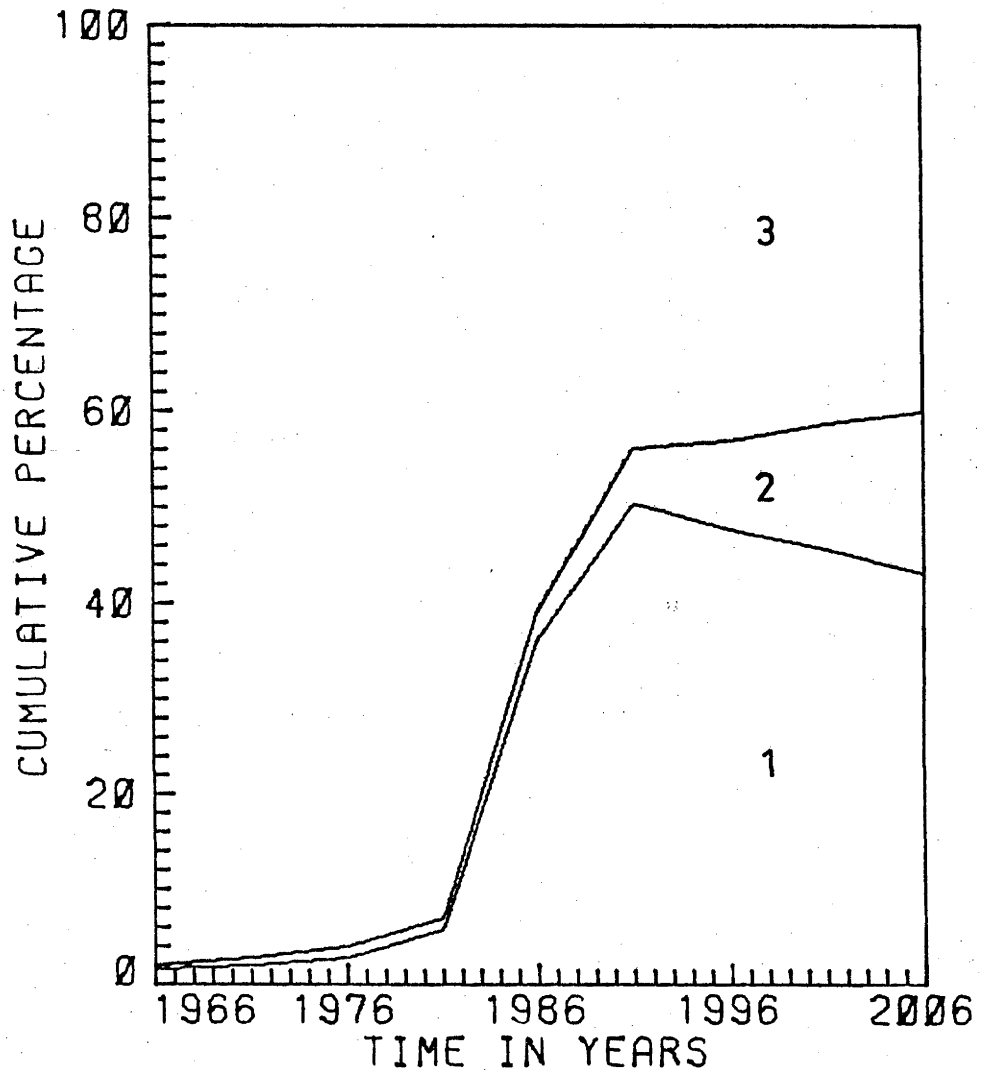
CHART 11.3: BASIC PROJECTION -
LABOUR AND CAPITAL USE : PLANTATIONS



KEY

- 1 AVERAGE WAGE : PLANTATION SECTOR (¢'000 P.A.)
- 2 LABOUR (¢000 PERSONS) PER ¢'MILL. VALUE ADDED
- 3 CAPITAL (¢'MILL.) PER ¢'MILL. VALUE ADDED

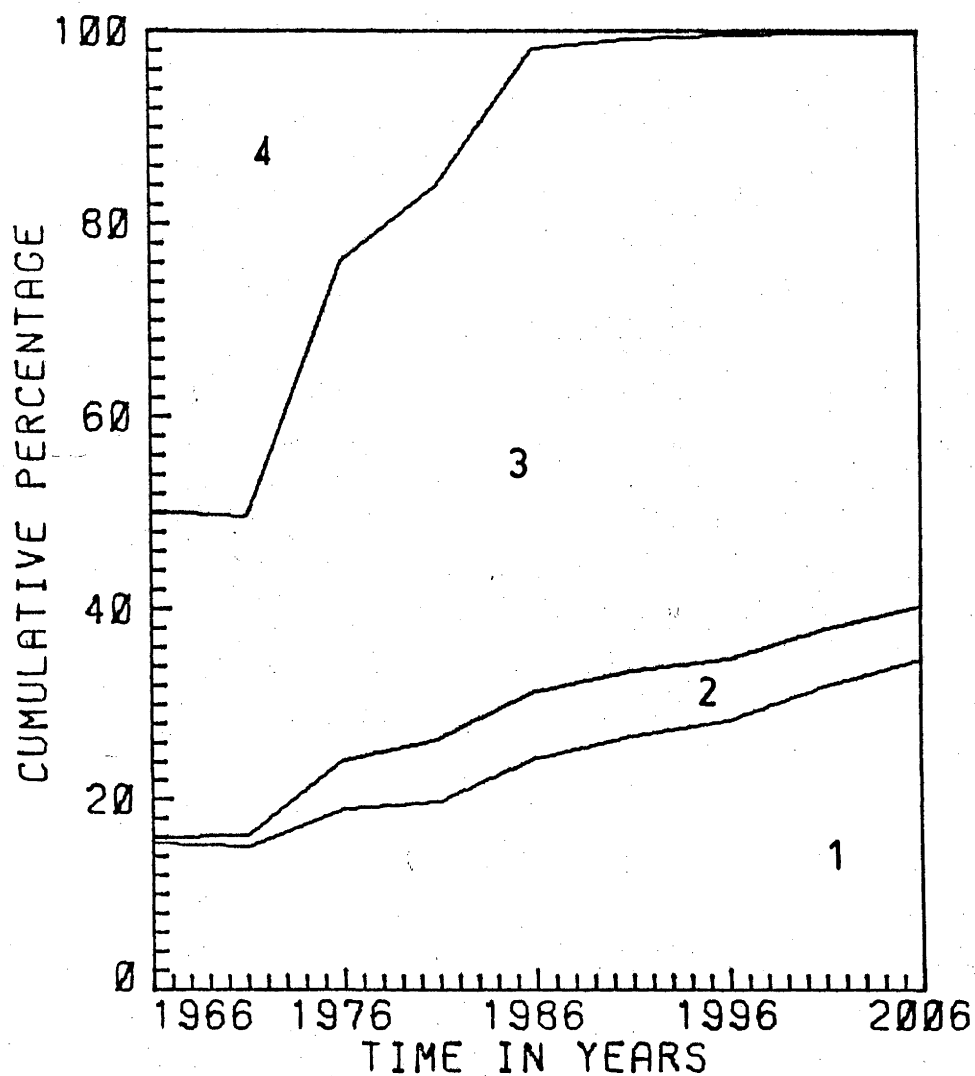
CHART 11.4: BASIC PROJECTION -
OWNERSHIP OF MODERN INDUSTRY



KEY

- 1 SHARE OWNED BY : GOVERNMENT
- 2 " " " : INDIGENOUS RESIDENTS
- 3 " " " : FOREIGNERS

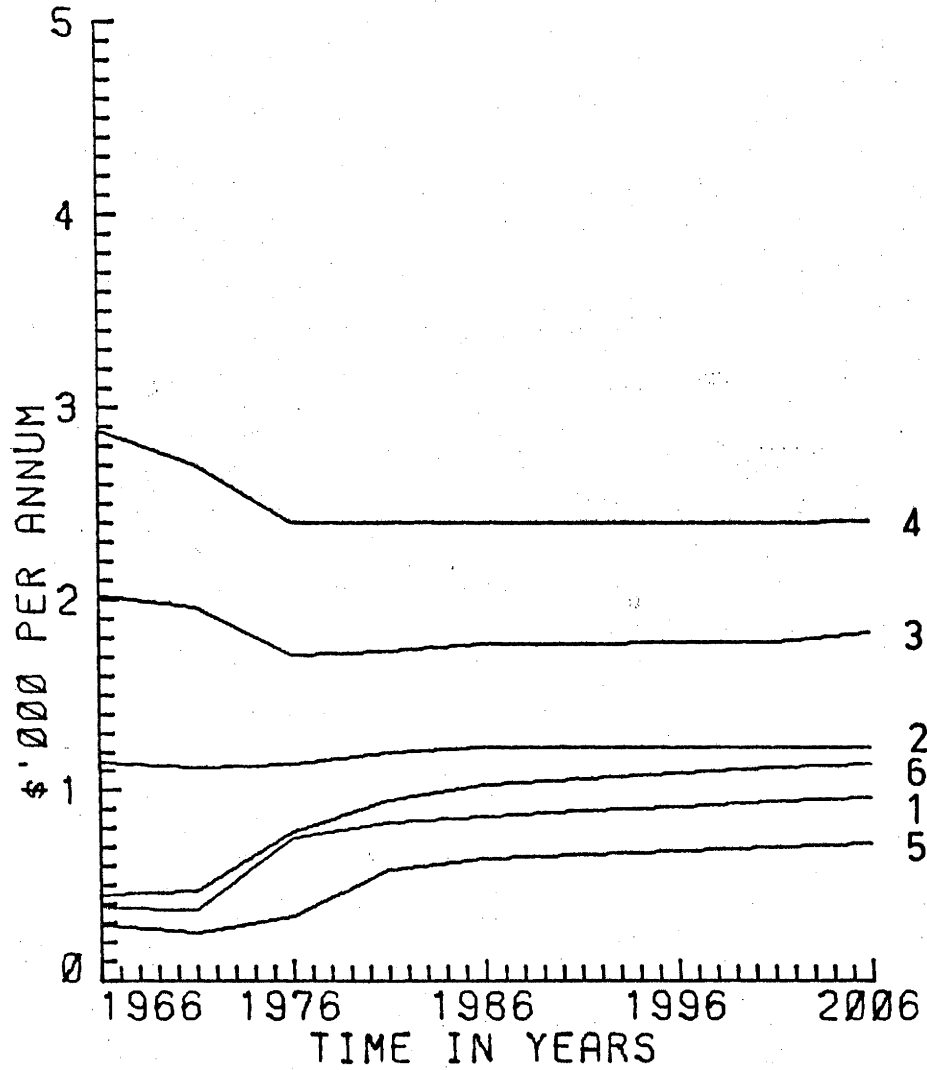
CHART 11.5: BASIC PROJECTION -
DISTRIBUTION OF PERSONAL INCOMES



KEY

- | | |
|---|--------------------------------------|
| 1 | SHARE ACCRUING TO RURAL SMALLHOLDERS |
| 2 | " " " URBAN SELF-EMPLOYED |
| 3 | " " " INDIGENOUS WAGE EMPLOYEES |
| 4 | " " " EXPATRIATE RESIDENTS |

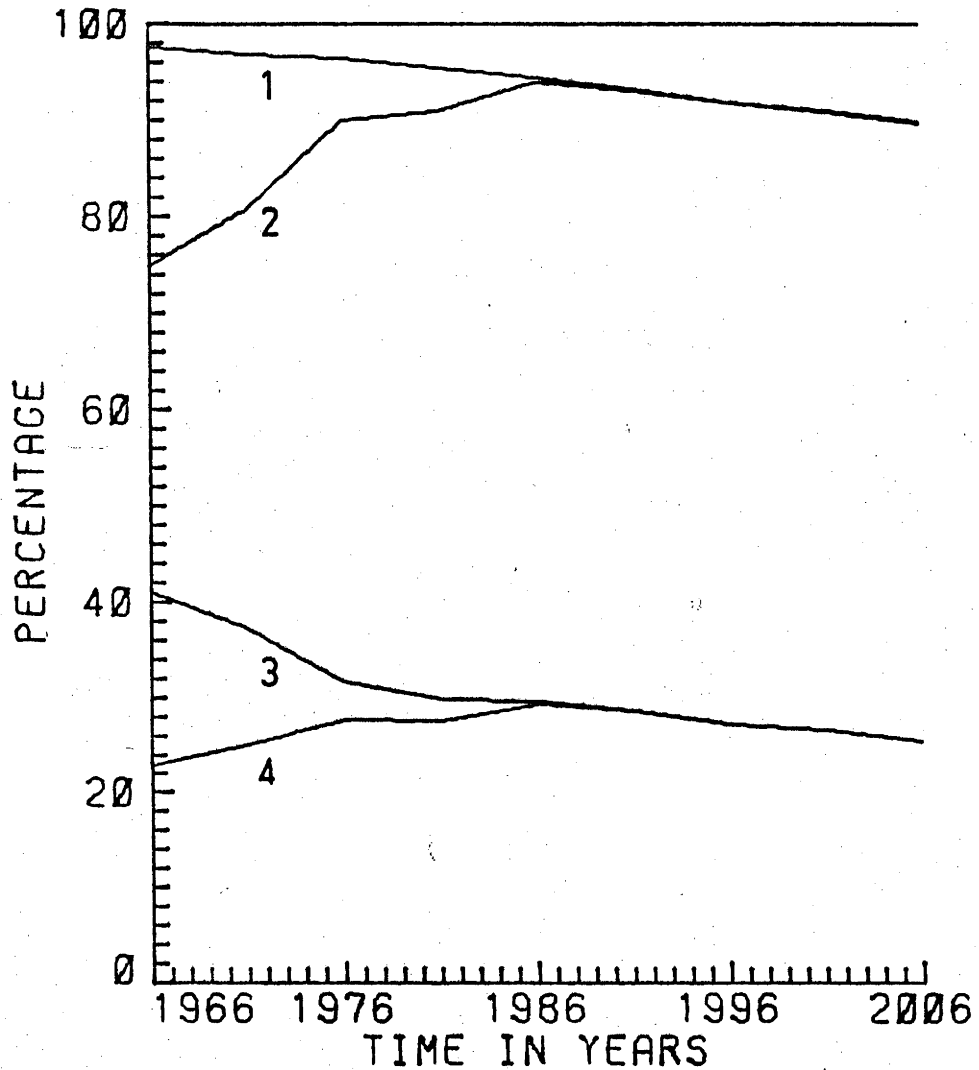
CHART 11.6: BASIC PROJECTION -
INDIGENOUS WAGE RATES



KEY

- 1 WAGE RATE FOR UNSKILLED EMPLOYEES
- 2 " " " SKILLED EMPLOYEES
- 3 " " " SUB-PROFESSIONAL EMPLOYEES
- 4 " " " PROFESSIONAL EMPLOYEES
- 5 " " " UNSKILLED EMPL. (PLANTATIONS)
- 6 AVERAGE WAGE FOR INDIGENOUS EMPLOYEES

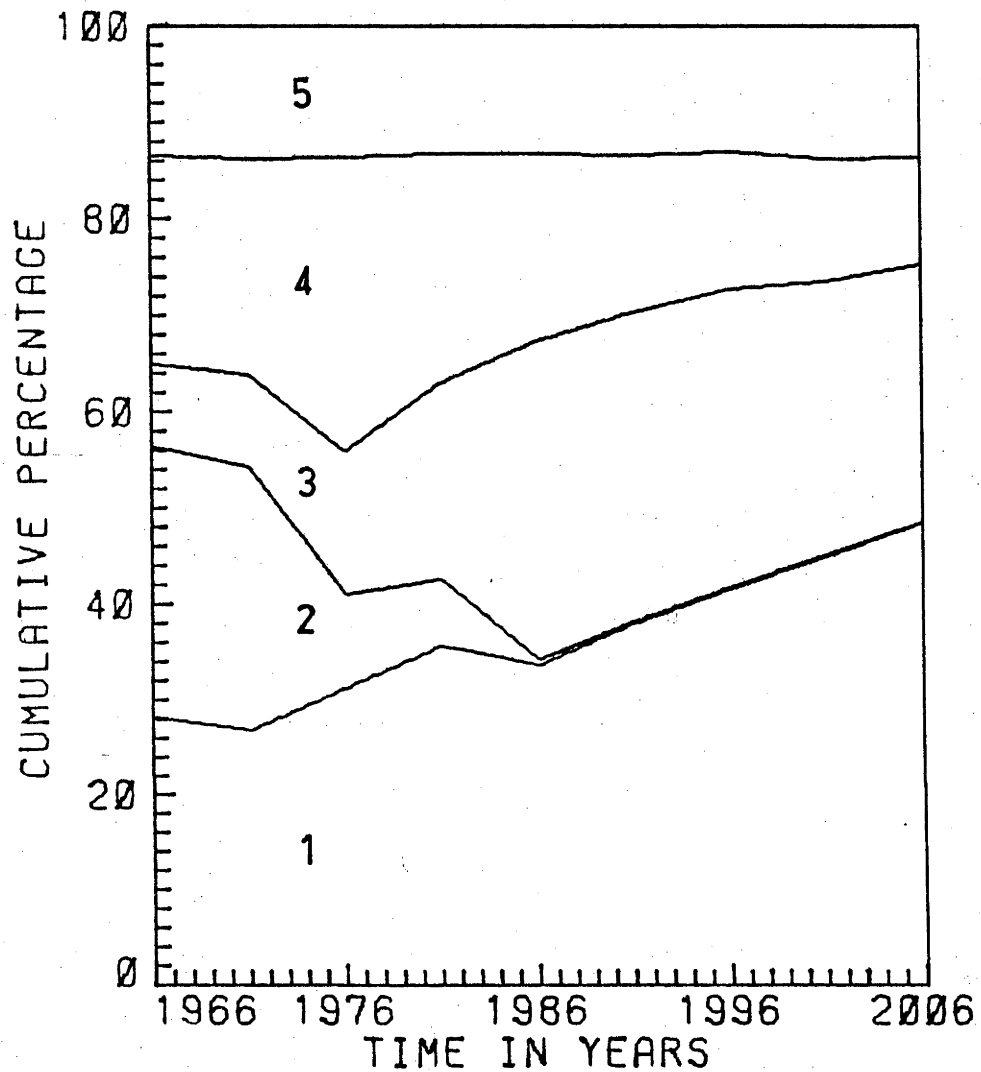
CHART 11.7: BASIC PROJECTION -
CONSUMPTION PATTERNS



KEY

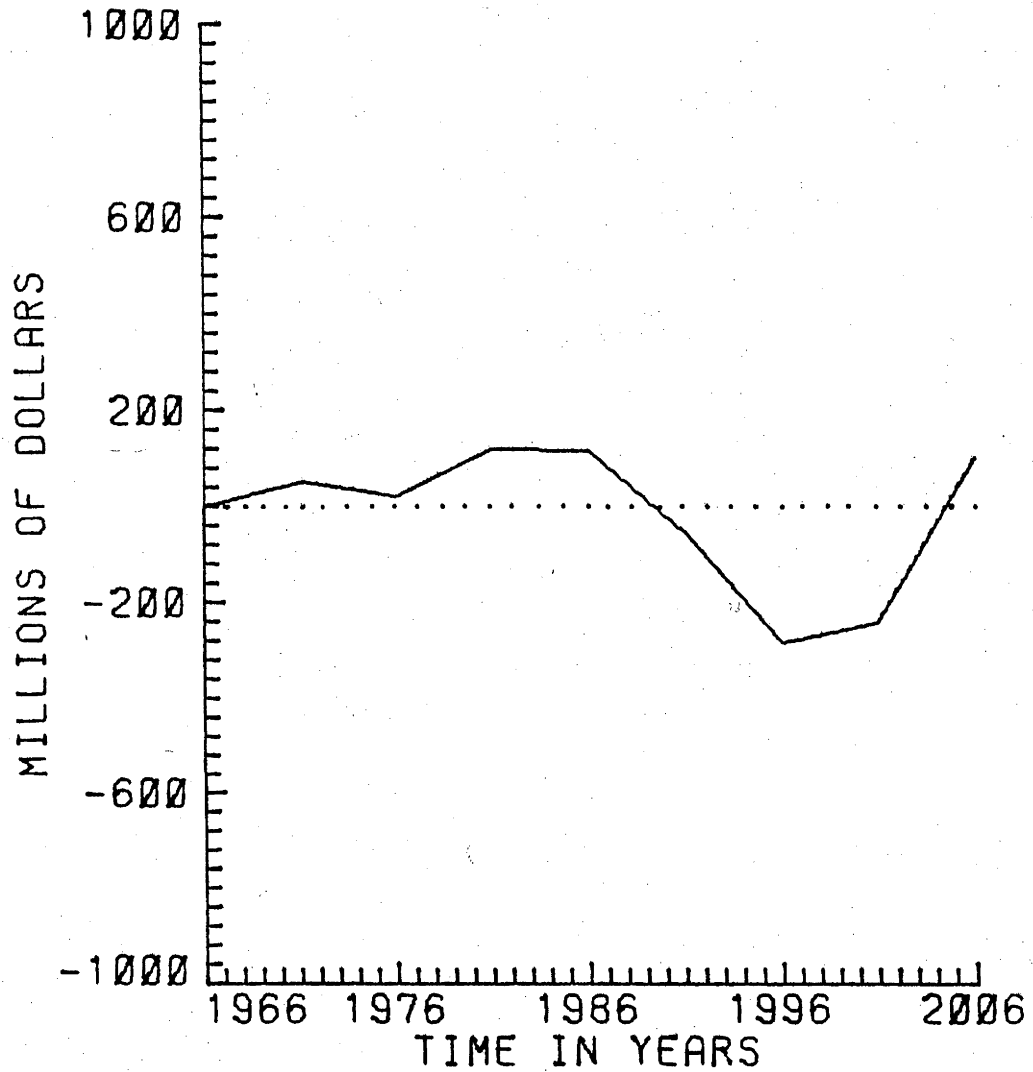
- 1 A.P.C. : INDIGENOUS INCOMES
- 2 A.P.C. : ALL DISPOSABLE INCOMES
- 3 A.P.C. (FOOD) : INDIGENOUS INCOMES
- 4 A.P.C. (FOOD) : ALL DISPOSABLE INCOMES
(A.P.C = AVERAGE PROPENSITY TO CONSUME)

CHART 11.8: BASIC PROJECTION -
DISPOSITION OF MONETARY INCOMES



KEY

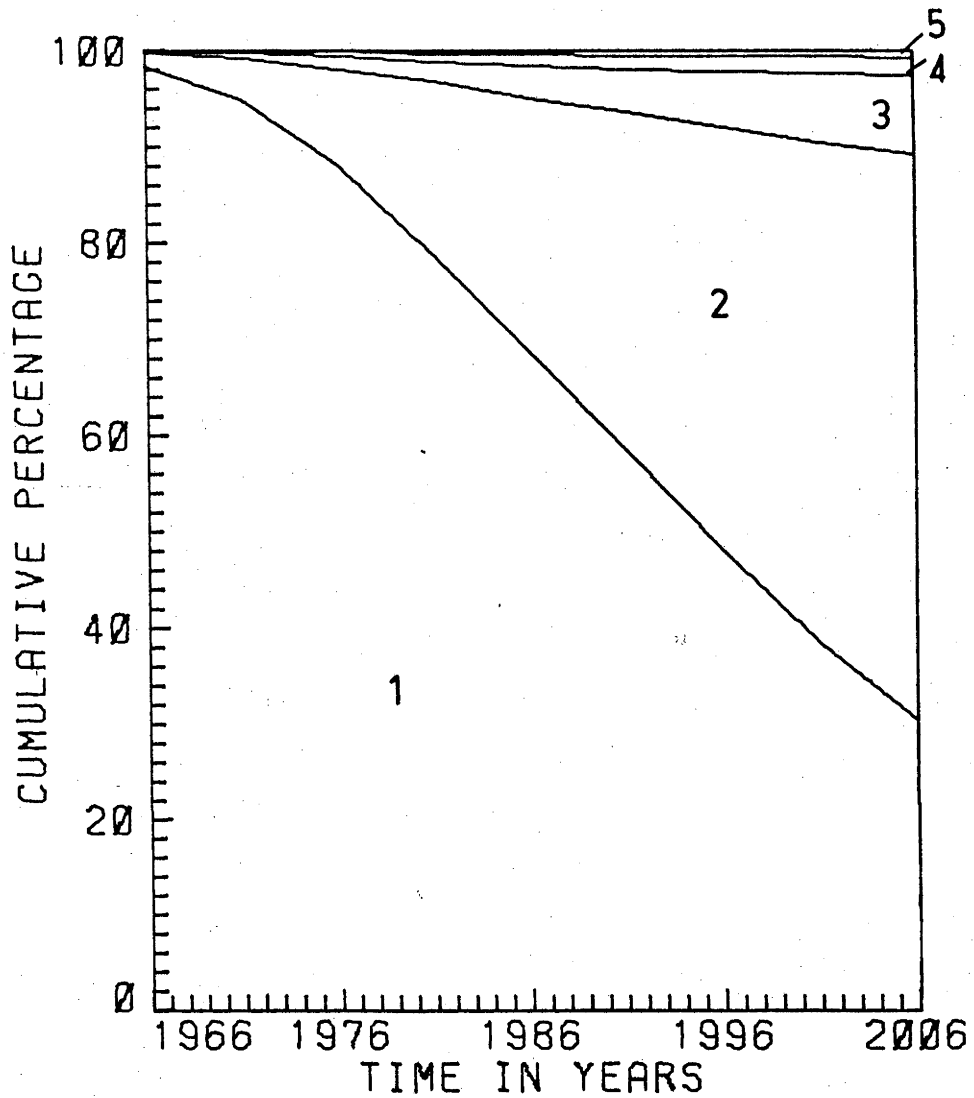
- 1 INDIGENOUS DISPOSABLE INCOMES
- 2 EXPATRIATE RESIDENTS
- 3 GOVERNMENT REVENUE FROM DOMESTIC SOURCES
- 4 PROFITS ACCRUING ABROAD
- 5 ALLOWANCE FOR DEPRECIATION

CHART 11.9: BASIC PROJECTION -
GOVERNMENT INDEBTEDNESS

KEY

GOVERNMENT'S NET INDEBTEDNESS OVERSEAS

CHART 11.10: BASIC PROJECTION -
EDUCATIONAL COMPOSITION (AGES 15-60)

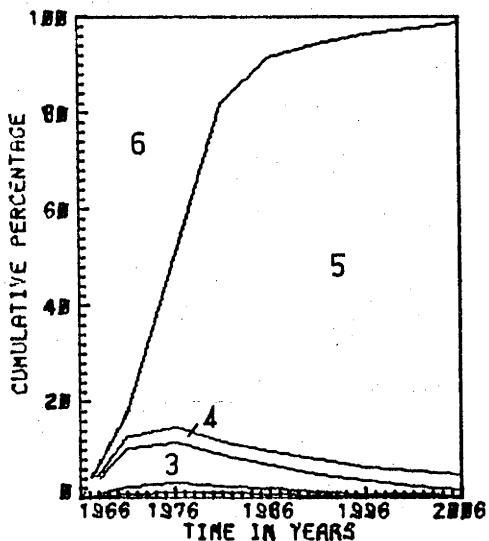


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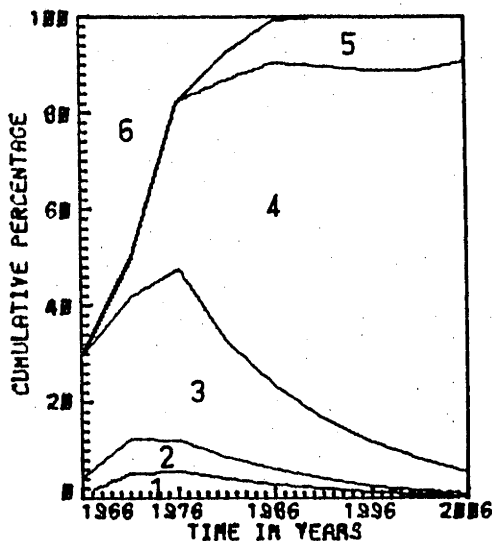
- 1 NO FORMAL QUALIFICATIONS
- 2 PRIMARY EDUCATION COMPLETED
- 3 SECONDARY EDUCATION COMPLETED
- 4 TERTIARY (NOT UNIVERSITY) EDUCATION COMPLETED
- 5 UNIVERSITY EDUCATION COMPLETED

CHART 11.11: BASIC PROJECTION - WAGE EMPLOYMENT BY EDUCATION

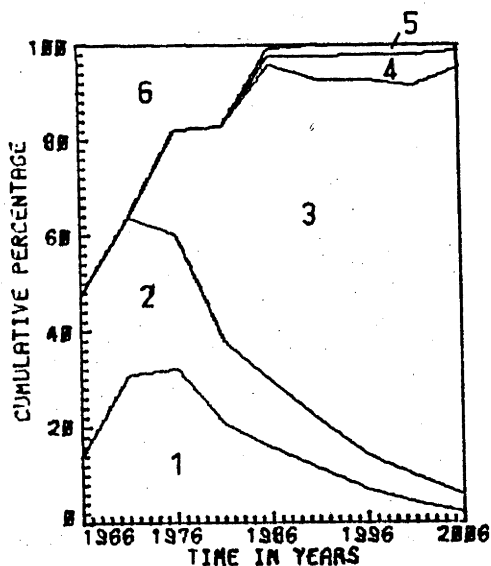
(A) PROFESSIONAL WAGE EMPLOYMENT



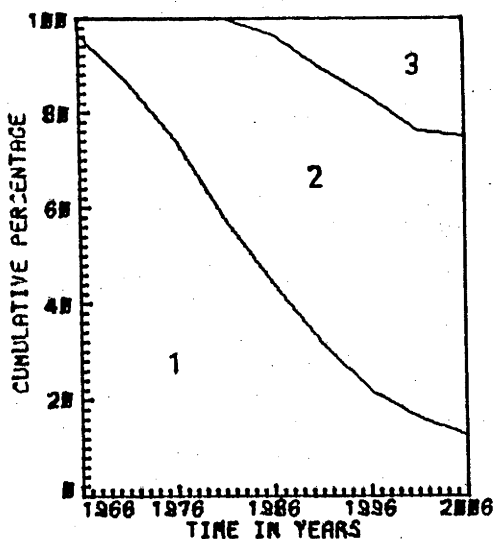
(B) SUB-PROFESSIONAL WAGE EMPLOYMENT



(C) SKILLED WAGE EMPLOYMENT



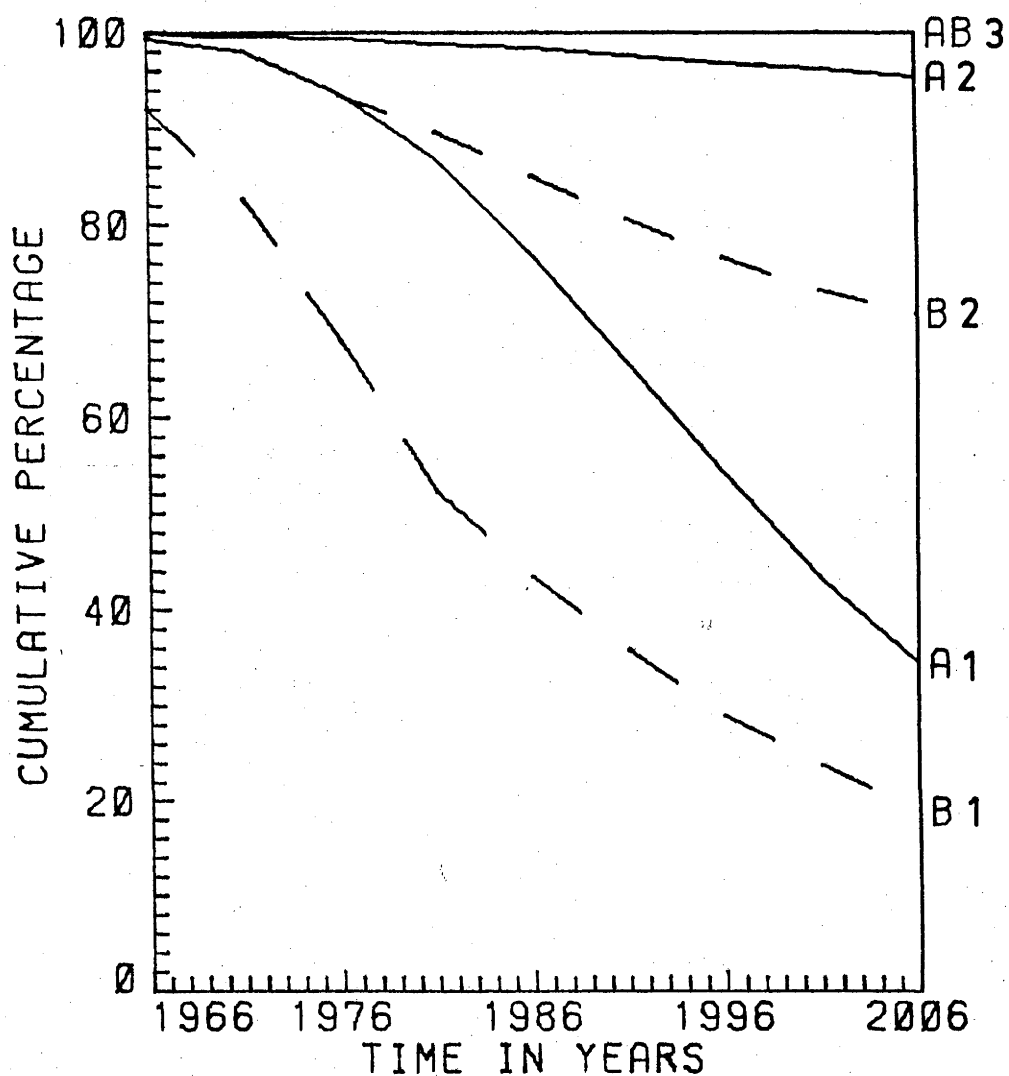
(D) UNSKILLED WAGE EMPLOYMENT



KEY

- 1 NO FORMAL QUALIFICATIONS
- 2 PRIMARY EDUCATION COMPLETED
- 3 SECONDARY EDUCATION COMPLETED
- 4 TERTIARY (NOT UNIVERSITY) EDUCATION COMPLETED
- 5 UNIVERSITY EDUCATION COMPLETED
- 6 EXPATRIATE EMPLOYEES

CHART 11.12: BASIC PROJECTION -
EDUCATION BY LOCATION

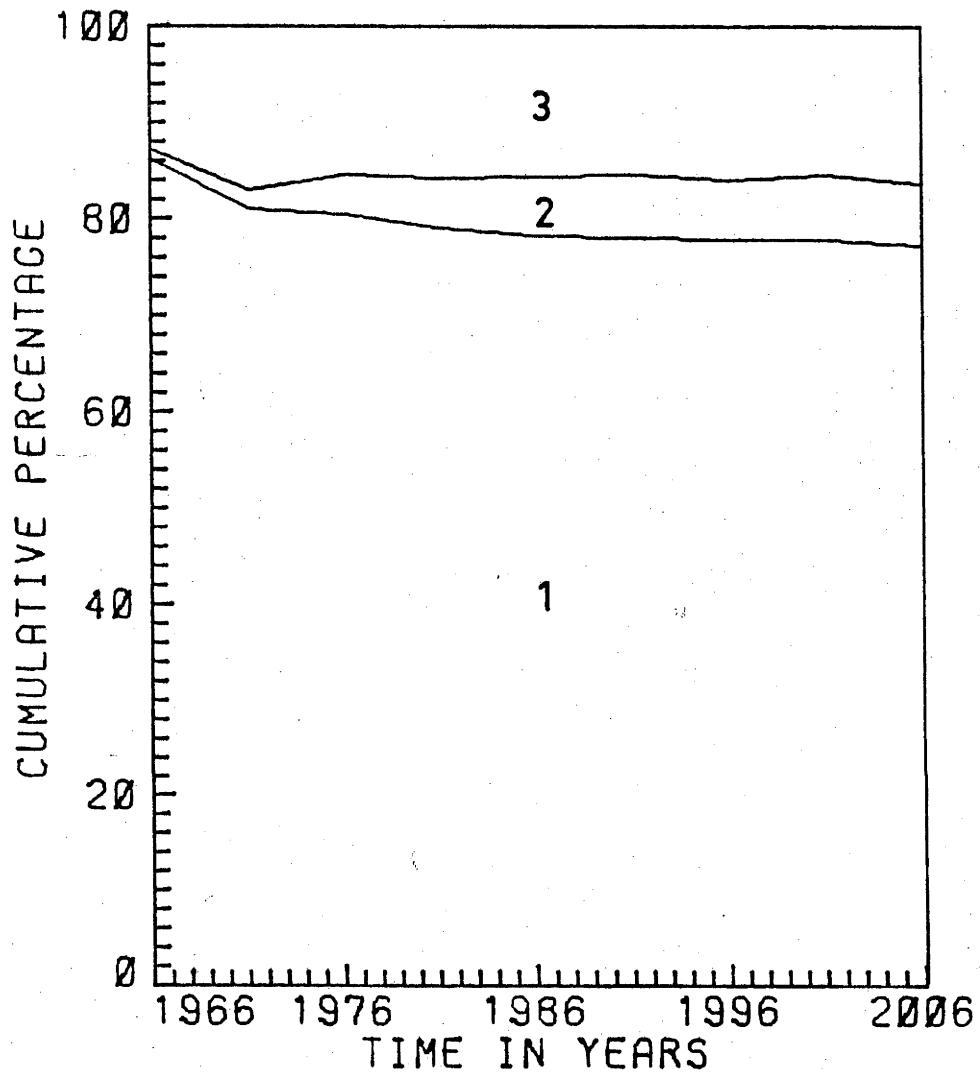


KEY

- < 1 NO FORMAL QUALIFICATIONS
- 1-2 PRIMARY EDUCATION COMPLETED
- 2-3 SECONDARY (OR HIGHER) EDUCATION COMPLETED

- A RURAL ADULTS (AGED 15-60 YRS.)
- B URBAN ADULTS (AGED 15-60 YRS.)

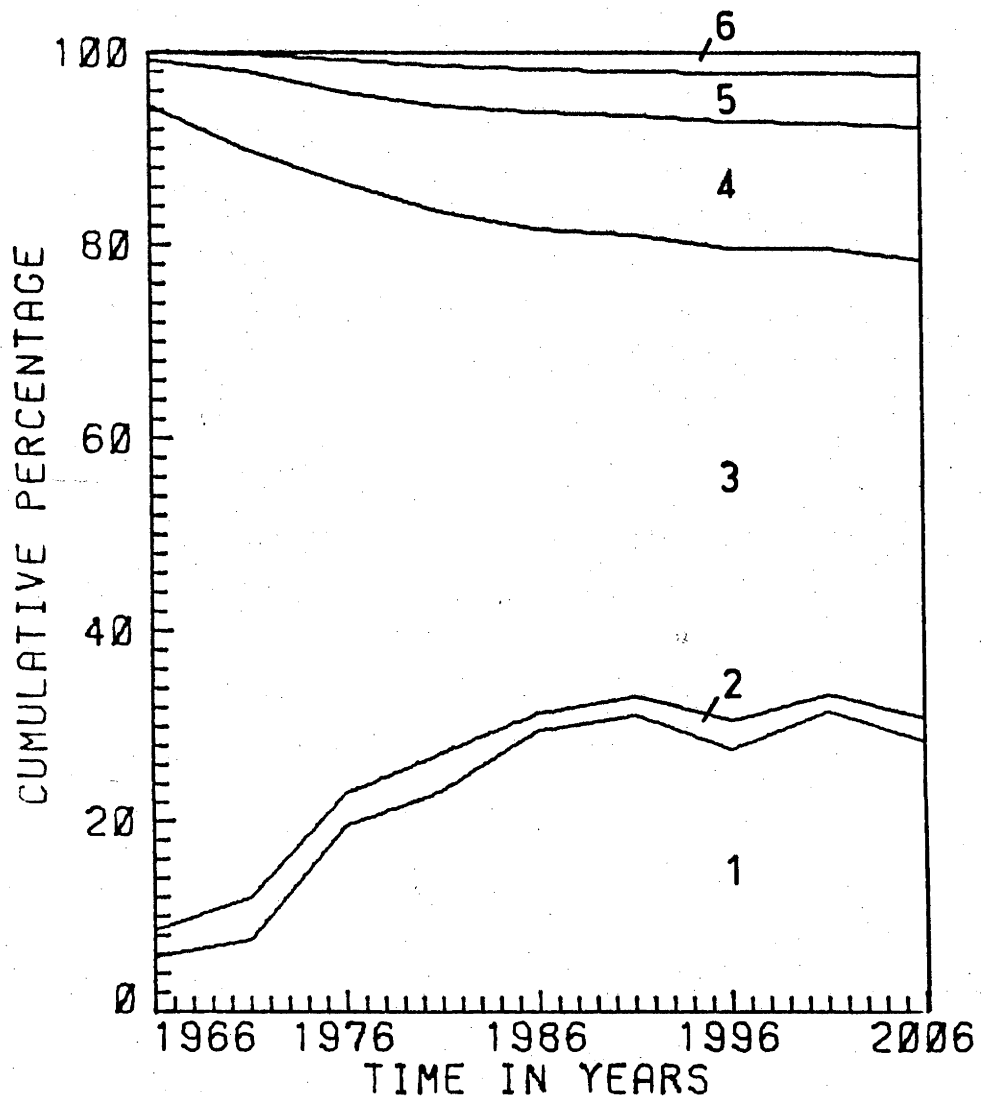
CHART 11.13: BASIC PROJECTION -
COMPOSITION OF THE WORKFORCE



KEY

- 1 SELF-EMPLOYED IN RURAL AREAS
- 2 URBAN WORKFORCE NOT IN WAGE EMPLOYMENT
- 3 WAGE EMPLOYMENT

CHART 11.14: BASIC PROJECTION -
COMPOSITION OF THE URBAN WORKFORCE



KEY

- 1 SELF-EMPLOYED IN URBAN SMALL-SCALE INDUSTRY
- 2 UNEMPLOYED
- 3 UNSKILLED WAGE EMPLOYMENT
- 4 SKILLED WAGE EMPLOYMENT
- 5 SUB-PROFESSIONAL WAGE EMPLOYMENT
- 6 PROFESSIONAL WAGE EMPLOYMENT

Table 12.1: Cut in foreign aid -
compensating strategy changes

units: \$'m (1968/69 prices)

		Aid Cut		
		Basic Projection	Govt. provision of infra- structure reduced	Infra- structure & ownership of modern industry reduced
Inflow of aid:	1986	122	102	102
	1996	92	32	32
	2006	62	20	20
Expenditure on provision of infrastructure:	1986	267	236	238
	1996	379	326	334
	2006	542	452	470
Ownership of modern industry by Papua New Guinea govt.:	1986	42%	42%	42%
	1996	47%	47%	43%
	2006	43%	43%	35%
Percentage of total monetary sector income accruing to foreigners:	1986	20.2%	20.3%	20.3%
	1996	14.4%	14.9%	15.3%
	2006	11.1%	11.6%	12.9%
Government indebtedness	2006	106	107	114

Table 12.2: Cut in foreign aid - summary of effects on the population

units: '000 persons, figures in brackets are percentages

	2006	Basic projection		A i d		C u t	
				Govt provision of infra-structure reduced		Infrastructure and ownership of modern industry reduced	
Total population:	2006	6880		6918		6913	
Urban population: (per cent of total)	1986	768	(20.9)	743	(20.2)	744	(20.2)
	1996	1046	(20.9)	1019	(20.3)	1022	(20.4)
	2006	1486	(21.6)	1394	(20.2)	1415	(20.5)
Wage employment: (per cent of total workforce)	1986	262	(14.8)	242	(13.7)	245	(13.8)
	1996	368	(15.2)	337	(14.0)	343	(14.2)
	2006	523	(15.7)	489	(14.6)	498	(14.9)
Urban workforce not in wage employment: (per cent of urban workforce)	1986	104	(32.5)	108	(35.0)	107	(34.5)
	1996	142	(32.0)	151	(35.0)	146	(34.3)
	2006	203	(32.9)	182	(32.4)	187	(32.3)

Table 12.3: Cut in foreign aid - value added by sectors (2006)

units: \$'m (1968/69 prices)

Sector	Basic projection	A i d C u t	
		Govt provision of infra- structure reduced	Infrastructure and ownership of modern industry reduced
Smallholder agriculture	341	326	328
Plantations	29	29	29
Major projects	227	227	227
Small-scale industry	75	60	62
Modern industry	1026	965	981
Government services	222	194	199
TOTAL	1922	1801	1827

Table 12.4: Cut in foreign aid - effect on domestic revenue (2006)

units: \$'m (1968/69 prices)

Source of Revenue	Basic Projection	A i d C u t	
		Govt provision of infra-structure reduced	Infrastructure and ownership of modern industry reduced
Indirect taxes	59	55	56
Income taxes	52	47	48
Plantations (taxes and dividends)	8	8	8
Modern industry:			
taxes on profits	184	172	176
dividends	134	126	104
Major projects	119	119	119
TOTAL DOMESTIC REVENUE	555	527	511

Table 12.5: (A) Falling subsistence production:
 (B) Slower decline of fertility:
 - incomes per head by occupation

units: dollars per worker per year (1968/69 prices)

Occupation		Basic projection	(A) Falling subsistence production	(B) Slower decline of fertility
Rural cash income per smallholder: ¹				
	1986	48	48	48
	1996	73	70	72
	2006	119	107	110
Subsistence production per rural worker:1986				
	1996	228	216	228
	2006	228	203	228
Rural income per worker including allowance for subsistence production:				
	1986	276	271	276
	1996	301	286	300
	2006	347	310	338
Income per participant in urban informal sector: ¹				
	1986	60	59	59
	1996	89	85	84
	2006	110	96	96
Wage rate for unskilled employment in modern industry:				
	1986	859	859	859
	1996	911	911	911
	2006	963	963	963

1 These incomes per head are calculated without allowance for remittances to these groups by indigenous wage employees.

Table 12.6: (A) Falling subsistence production:
 (B) Slower decline of fertility:
 - concentration ratios of indigenous incomes
 (u) concentration ratio of urban incomes
 (o) concentration ratio of all cash incomes

Date	Basic projection		(A) Falling subsistence production		(B) Slower decline of fertility	
	(u)	(o)	(u)	(o)	(u)	(o)
1981	.22	.60	.22	.60	.22	.60
1986	.27	.58	.27	.58	.27	.58
1991	.29	.56	.29	.57	.29	.56
1996	.27	.54	.27	.55	.27	.54
2001	.30	.51	.31	.52	.30	.51
2006	.28	.47	.30	.49	.29	.48

Table 12.7: (A) Falling subsistence production:
 (B) Slower decline of fertility:
 - pattern of rural expenditures (2006)

units: \$'m (1968/69 prices); figures in brackets
 are percentage of total

Expenditures	Basic projection	(A) Falling subsistence production	(B) Slower decline of fertility
<u>Consumption:</u>			
non-subsistence foods	83 (23.6)	86 (27.5)	83 (24.4)
industrial products	233 (66.1)	199 (63.5)	225 (65.9)
<u>Total consumption</u>	317 (89.8)	286 (91.1)	308 (90.3)
<u>Investment:</u>			
smallholder agriculture	25 (7.2)	20 (6.2)	23 (6.8)
rural small-scale industry	7 (2.0)	6 (1.8)	7 (1.9)
plantations	4 (1.1)	3 (0.9)	3 (1.0)
<u>Total investment</u>	36 (10.2)	28 (8.9)	33 (9.7)
<u>Total expenditure</u>	353 (100)	314 (100)	341 (100)

Table 12.8: (A) Falling subsistence production:

(B) Slower decline of fertility:

- value added by sectors (2006)

units: \$m (1968/69 prices); figures in brackets are average annual rates of growth 1966-2006

Sector	Basic projection	(A) Falling subsistence production	(B) Slower decline of fertility
Smallholder agriculture:			
food	111 (8.2)	97 (7.8)	107 (8.1)
export crops	232 (6.2)	210 (6.0)	225 (6.2)
Plantations	29 (0.0)	29 (0.0)	29 (0.0)
Major projects	227 -	227 -	227 -
Small-scale industry:			
rural	36}	32}	35}
urban	39} (10.5)	36} (10.3)	34} (10.3)
Modern industry	1026 (4.7)	978 (4.5)	1017
Government	222 (3.6)	222 (3.6)	222 (3.6)
TOTAL	1922 (4.96)	1831 (4.83)	1897 (4.92)

Table 12.9: (A) Falling subsistence production:
 (B) Slower decline of fertility:
 - summary of effects on the population

units: '000 persons; figures in brackets are percentages

		Basic projection	(A) Falling subsistence production	(B) Slower decline of fertility
Total population:	1986	3680	3682	3709
	1996	5013	5033	5135
	2006	6880	6969	7248
Urban population: (per cent of total)	1986	768 (20.9)	769 (20.9)	789 (21.3)
	1996	1046 (20.9)	1050 (20.9)	1106 (21.5)
	2006	1486 (21.6)	1489 (21.4)	1587 (21.9)
Wage employment: (per cent of total workforce)	1986	262 (14.8)	261 (14.7)	261 (14.8)
	1996	368 (15.3)	365 (15.1)	367 (15.2)
	2006	523 (15.7)	507 (15.2)	521 (15.3)
Urban workforce not in wage employment (per cent of urban workforce)	1986	104 (32.5)	105 (32.7)	104 (32.5)
	1996	142 (32.0)	145 (32.7)	142 (32.2)
	2006	203 (32.9)	214 (34.6)	205 (33.1)
Per cent of total population below 15 years:	2006	(44.5)	(45.0)	(46.4)
Primary school enrolments:	1976	270	270	270
	1996	631	632	641
	2006	1068	1088	1152
Percentage of adult males migrating from rural to urban areas in response to economic incentives	1986	3.1	3.1	3.0
	1996	4.6	4.7	4.1
	2006	5.0	4.7	4.0

Table 12.10: (A) Falling subsistence production:
(B) Slower decline in fertility:
 - total fertility rates (TFR) by location

units: live births per woman; see definition
 Section 4.2 (figures in brackets relate fall to
 TFR in either location in 1966)

	Basic projection			(A) Falling subsistence incomes		(B) Slower decline of fertility	
Total fertility rate, rural:	1986	6.7	(0.97)	6.7	(0.97)	6.8	(0.98)
	1996	6.4	(0.92)	6.5	(0.94)	6.6	(0.96)
	2006	5.9	(0.85)	6.2	(0.89)	6.4	(0.93)
Total fertility rate, urban:	1986	5.1	(0.81)	5.1	(0.81)	6.0	(0.95)
	1996	4.5	(0.72)	4.6	(0.72)	5.7	(0.91)
	2006	4.0	(0.63)	4.1	(0.65)	5.5	(0.87)

Table 12.11: (A) Faster replacement of industrial imports:
 (B) Increased effect of education on productivity:
 - supply of industrial products (2006)

units: \$'m (1968/69) prices; figures in brackets are percentage
 of total

Source of supply	Basic projection	(A) Faster import replacement	(B) Higher productivity of education
Small-scale industry:			
rural	74 (2.4)	77 (2.2)	109 (3.1)
urban	81 (2.7)	85 (2.4)	101 (2.9)
Modern industry	2114 (70.0)	2616 (74.7)	2378 (68.6)
Total domestic production	2269 (75.1)	2779 (79.4)	2588 (74.6)
Imports	752 (24.9)	723 (20.6)	880 (25.4)
Total supply	3021 (100)	3502 (100)	3468 (100)

Table 12.12: (A) Faster replacement of industrial imports:
 (B) Increased effect of education on productivity:
 - value added by sectors (2006)

units: \$'m (1968/69 prices) figures in brackets are percentage of total

Sector	Basic projection	(A) Faster import replacement	(B) Higher productivity of education
Smallholder agriculture:			
food crops	111 (5.8)	116 (5.3)	155 (7.0)
export crops	232 (12.1)	241 (11.0)	308 (14.0)
Plantations	29 (1.5)	29 (1.3)	29 (1.3)
Major projects	227 (11.8)	227 (10.4)	227 (10.3)
Small-scale industry:			
rural	36 (1.9)	38 (1.7)	49 (2.2)
urban	39 (2.0)	41 (1.9)	53 (2.4)
Modern industry	1026 (53.4)	1270 (57.9)	1154 (52.5)
Government	222 (11.6)	231 (10.6)	224 (10.2)
TOTAL	1922 (100)	2193 (100)	2200 (100)

Table 12.13: (A) Faster replacement of industrial imports:
 (B) Increased effect of education on productivity:
 - disposition of Gross Monetary Sector Product (2006)

units: \$'m (1968/69 prices); figures in brackets are percentage
 of total

	Basic projection	(A) Faster import replacement	(B) Higher productivity of education
Personal disposable incomes:			
expatriate residents	1 (0.1)	1 (0.1)	1 (0.1)
indigenous wage employees	556 (28.9)	645 (29.4)	598 (29.2)
urban self-employed	52 (2.7)	58 (2.6)	64 (2.9)
rural self-employed	325 (16.9)	342 (15.6)	445 (20.2)
Government revenue	513 (26.7)	613 (27.9)	563 (25.6)
Profits accruing abroad			
major projects	87 (4.5)	87 (4.0)	87 (3.9)
other	125 (6.5)	156 (7.1)	144 (6.5)
Depreciation	262 (13.7)	291 (13.3)	297 (13.5)
TOTAL	1922 (100)	2193 (100)	2200 (100)

Table 12.14: (A) Faster replacement of industrial imports:
 (B) Increased effect of education on productivity:
 - incomes per head by occupation

units: dollars per worker per year (1968/69 prices)

Occupation		Basic projection	(A) Faster import replacement	(B) Higher productivity of education
Rural cash incomes per smallholder: ¹				
	1986	48	50	51
	1996	73	77	85
	2006	119	131	169
Rural incomes per worker including allowance for subsistence production:				
	1986	276	278	279
	1996	301	305	313
	2006	347	359	397
Income per participant in urban informal sector: ¹				
	1986	60	72	71
	1996	89	97	111
	2006	110	118	160
Wage rate for unskilled employment in modern industry:				
	1986	859	860	859
	1996	911	914	912
	2006	963	967	964

¹ These figures do not take into account remittances from indigenous wage employees.

Table 12.15: (A) Faster replacement of industrial imports:
 (B) Increased effect of education on productivity:
 - concentration ratios of indigenous incomes

(u) concentration ratio of urban incomes
 (o) concentration ratio of all cash incomes

Date	Basic projection		(A) Faster import replacement		(B) Higher productivity of education	
	(u)	(o)	(u)	(o)	(u)	(o)
1981	.22	.60	.22	.59	.21	.59
1986	.27	.58	.24	.58	.26	.58
1991	.29	.56	.30	.56	.28	.55
1996	.27	.54	.26	.54	.26	.51
2001	.30	.51	.32	.50	.27	.46
2006	.28	.47	.27	.46	.25	.40

Table 12.16: (A) Faster replacement of industrial imports:
 (B) Increased effect of education on productivity:
 - summary of effects on the population

units: '000 persons; figures in brackets are percentage of total

		Basic projection		(A) Faster import replacement		(B) Higher productivity of education	
Total population:	2006	6880		6855		6788	
Urban population: (per cent of total)	1986	768	(20.9)	801	(21.7)	771	(21.0)
	1996	1046	(20.9)	1151	(23.0)	1063	(21.3)
	2006	1487	(21.6)	1697	(24.8)	1568	(23.1)
Wage employment: (per cent of total workforce)	1986	262	(14.8)	288	(16.3)	265	(15.0)
	1996	369	(15.3)	409	(17.1)	376	(15.6)
	2006	523	(15.7)	607	(18.3)	566	(17.0)
Urban workforce not in wage employment: (per cent of urban workforce)	1986	104	(32.5)	100	(29.2)	103	(32.0)
	1996	142	(32.0)	149	(30.8)	143	(31.7)
	2006	203	(32.9)	212	(30.6)	204	(31.3)
Tertiary enrolments 2006							
university ¹		3.8		3.8		3.8	
other		7.8		9.5		8.5	
Adults aged 15-60 with university completed ¹							
other tertiary quals. 2006		25	(0.7)	25	(0.7)	25	(0.7)
(per cent of all adults)		66	(1.9)	71	(2.0)	68	(1.9)

1 Including secondary teachers' colleges

Table 12.17: (A) Faster replacement of industrial imports:
 (B) Increased effect of education on productivity:
 - changes in factor/output ratios

units: figures indicate changes relative to 1966 (=100)

		Basic Projection	(A) Faster import replacement	(B) Higher productivity of education
Capital/output ratios:				
smallholder agriculture	1966	100.0	100.0	100.0
	1986	92.9	92.8	91.2
	2006	85.0	84.7	77.8
rural small-scale industry	1966	100.0	100.0	100.0
	1986	93.7	93.6	91.3
	2006	85.8	85.3	78.7
urban small-scale industry	1966	100.0	100.0	100.0
	1986	89.8	89.6	88.2
	2006	83.5	83.1	72.2
Modern industry:				
capital/output ratio:	1966	100.0	100.0	100.0
	1986	91.4	90.6	91.3
	2006	79.5	78.8	79.2
labour/output ratio:	1966	100.0	100.0	100.0
	1986	84.8	84.7	84.8
	2006	78.2	77.5	78.3

Table 12.18: Increased effect of education on productivity - assumed changes in relative productivity by education in smallholder agriculture or small-scale industry

Educational qualifications	Relative productivity coefficients	
	Basic projection	Higher productivity of education
Primary education not completed	1.00	1.00
Primary education completed	1.10	1.25
Secondary education completed	1.20	1.50
Tertiary education completed	1.20	1.50

Table 12.19: Changes in the migration response -
migration rates by education

units: percentage of rural males (15-60 years)
migrating to urban areas each year

Education		Basic projection	Higher migration response by all groups	Higher migration response by educated	Longer waiting time in employment
No formal education	1966	7.7	7.7	7.7	7.7
	1976	1.2	1.2	1.1	1.1
	1986	0.4	0.4	0.3	0.4
	1996	0.7	0.4	0.3	1.0
	2006	2.1	1.9	1.5	2.1
Primary education completed	1966	60.3	60.3	60.3	60.3
	1976	20.6	24.4	24.9	20.6
	1986	5.7	5.6	5.7	4.9
	1996	6.2	6.3	6.4	5.6
	2006	5.3	5.3	5.3	4.8
Secondary education completed	1966	89.8	89.8	89.8	89.8
	1976	83.7	85.7	86.5	83.9
	1986	66.2	72.3	72.5	66.2
	1996	56.5	67.9	67.8	56.4
	2006	46.2	59.5	59.5	46.3
Weighted average for all education groups	1966	8.5	8.5	8.5	8.5
	1976	4.1	4.5	4.6	4.0
	1986	3.7	3.0	3.0	2.6
	1996	4.6	4.6	4.6	4.3
	2006	5.0	5.0	4.9	4.5

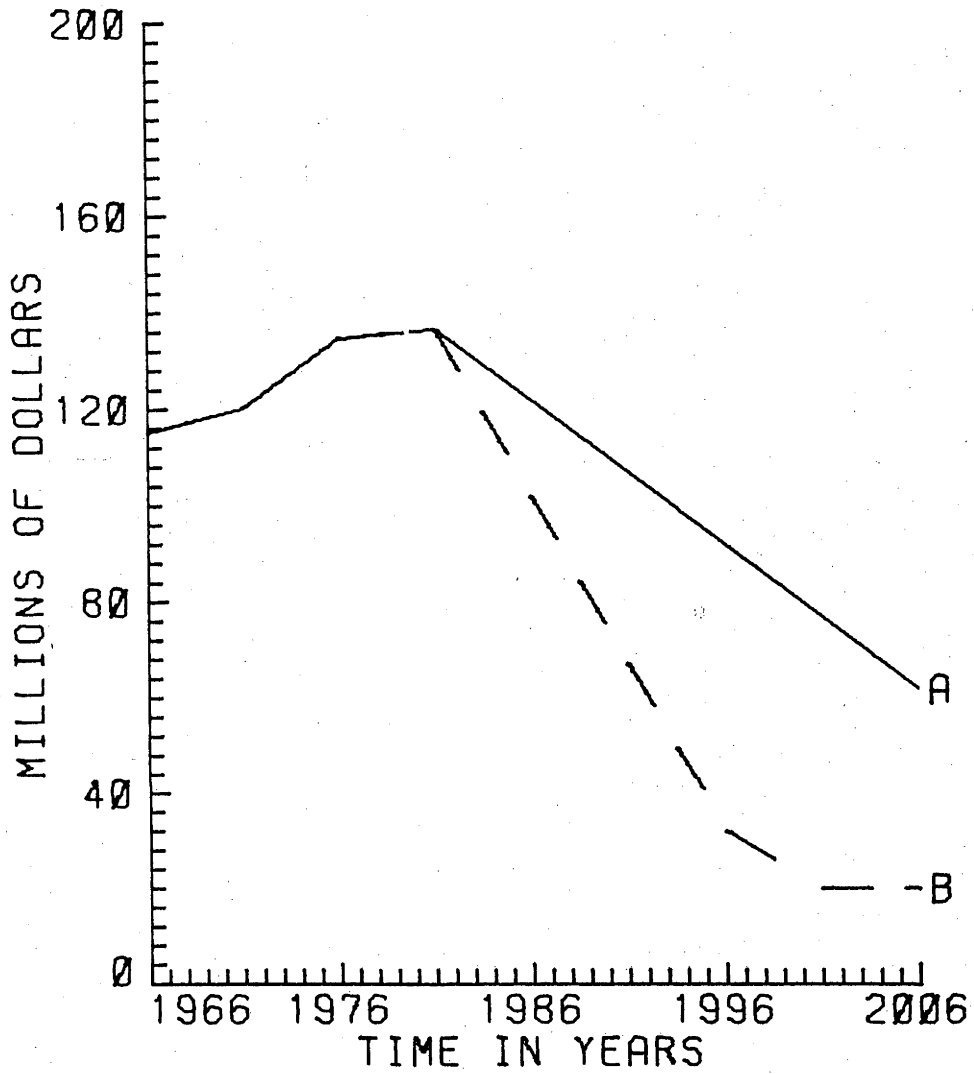
Table 12.20: Changes in the migration response -
urbanisation and employment rates

units: percentages

		Basic Projection	Higher migration response by all groups	Higher migration response by educated	Longer waiting time in unemployment
Percentage of the total population in urban areas					
	1981	20.3	20.8	20.8	20.4
	1986	20.9	21.5	21.4	20.7
	1991	20.8	21.6	21.5	20.8
	1996	20.9	21.7	21.6	20.7
	2001	21.2	21.9	21.9	21.0
	2006	21.6	22.2	22.2	21.4
Percentage of the urban workforce not in wage employment ¹					
	1981	28.2	29.6	29.5	30.0
	1986	32.5	33.8	33.6	33.7
	1991	34.3	35.6	35.5	35.4
	1996	32.0	33.5	33.5	33.5
	2001	35.1	36.1	36.1	36.1
	2006	32.9	33.7	33.8	34.4
Percentage of the urban workforce in self-employment					
	1986	30.7	32.1	31.8	30.4
	1996	28.9	30.5	30.5	28.1
	2006	30.3	31.1	31.3	29.8
Percentage of the urban workforce unemployed					
	1986	1.8	1.7	1.8	3.3
	1996	3.1	3.0	3.0	5.4
	2006	2.6	2.6	2.5	4.6

1 Percentage not in wage employment is the sum of the percentages self-employed and unemployed in the corresponding years.

CHART 12.1: CUT IN FOREIGN AID

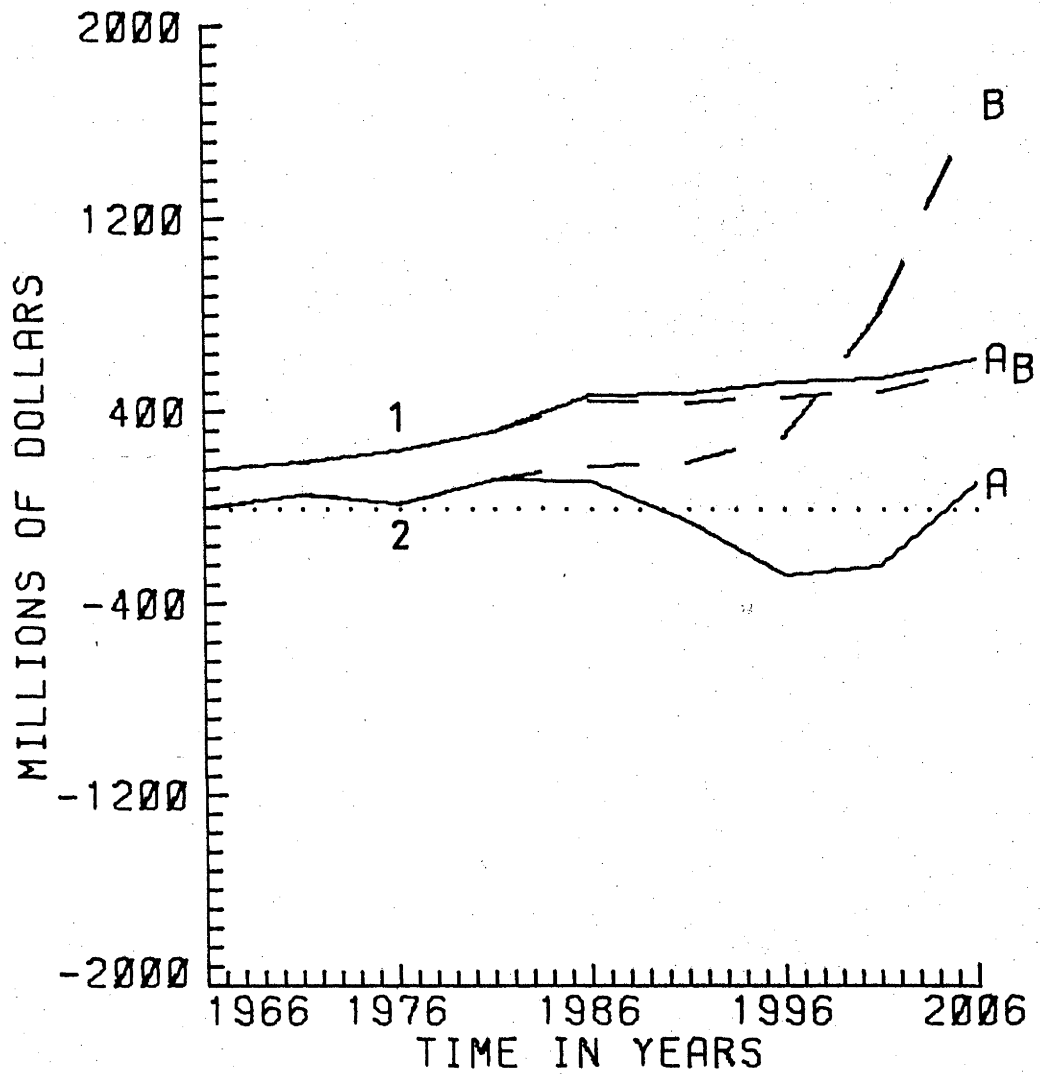
KEY

ANNUAL INFLOW OF AID

A BASIC PROJECTION

B REDUCED FLOW OF AID

CHART 12.2: CUT IN FOREIGN AID -
NO ADJUSTMENT IN EXPENDITURE



KEY

- 1 GOVERNMENT REVENUE (EXCLUDING BORROWING)
- 2 GOVERNMENT'S NET INDEBTEDNESS OVERSEAS
- A BASIC PROJECTION
- B REDUCED FLOW OF AID

Table 13.1: Alternative wage strategies -
summary of effects on the population

		Liberal	Basic	Tight
Total population, (thousands of persons)	2006	6854	6880	6895
Per cent of total population in urban areas	1986	20.2	20.9	21.3
	1996	18.9	20.9	22.0
	2006	18.2	21.6	23.2
Per cent of total workforce in wage employment	1986	14.0	14.8	15.6
	1996	13.1	15.3	16.1
	2006	13.0	15.7	16.3
Per cent of urban workforce not in wage employment	1986	34.0	32.5	30.6
	1996	36.9	32.0	31.6
	2006	36.3	32.9	33.7

Table 13.2: Alternative wage strategies -
value added by sectors (2006)

units: \$'million (1968/69 prices)

Sector	Liberal	Basic	Tight
Smallholder Agriculture	339	342	345
Smallscale Industry	73	75	73
Major Projects	227	227	227
Plantations	24	29	32
Modern Industry	986	1026	989
Government Services	240	222	202
TOTAL	1889	1922	1868

Table 13.3: Alternative wage strategies -
wage employment by sectors (2006)

units: '000 persons

Sector	Liberal	Basic	Tight
Teachers	37	37	37
Other Government Services	108	131	137
Major Projects	5	5	5
Plantations	13	18	22
Modern Industry	275	332	340
TOTAL	438	523	542

Table 13.4: Alternative wage strategies -
allocation of monetary sector income (2006)

units: \$'million (1968/69 prices); figures
in brackets are percentage of total income

	Liberal	Basic	Tight
Rural self-employed	321 (17.0)	325 (16.9)	327 (17.5)
Urban self-employed	51 (2.7)	52 (2.7)	49 (2.6)
Indigenous wage employees	552 (29.2)	556 (28.9)	525 (28.1)
Expatriate wage employees	1 (0.1)	1 (0.1)	1 (0.1)
Domestic revenue			
taxes and dividends from modern industry & plantations	269	326	329
taxes and dividends from major projects	119	119	119
income taxes	73	52	39
other	16	16	18
Total domestic revenue	476 (25.2)	513 (26.7)	505 (27.0)
Profits accruing abroad	217 (11.5)	211 (11.0)	203 (10.9)
Depreciation	271 (14.3)	262 (13.7)	258 (13.8)
TOTAL	1889 (100)	1922 (100)	1868 (100)

Table 13.5: Alternative wage strategies - concentration ratios of personal incomes

(u) concentration ratio of urban incomes

(o) concentration ratio of all indigenous cash incomes

Date	Liberal		Basic		Tight	
	(u)	(o)	(u)	(o)	(u)	(o)
1981	0.22	0.60	0.22	0.60	0.21	0.59
1986	0.28	0.60	0.27	0.58	0.25	0.58
1991	0.31	0.58	0.29	0.56	0.28	0.55
1996	0.31	0.56	0.27	0.54	0.26	0.53
2001	0.32	0.53	0.30	0.51	0.28	0.49
2006	0.32	0.50	0.28	0.47	0.28	0.44

Table 13.6: Alternative wage strategies -
migration rates by education

units: percentage of rural males (15-60 yrs)
migrating annually to urban areas

Education		Liberal	Basic	Tight
Less than primary				
	1986	0.2	0.4	0.4
	1996	0.0	0.8	1.3
	2006	1.1	2.1	1.3
Primary education completed				
	1986	4.0	5.7	9.2
	1996	3.1	6.2	8.8
	2006	3.3	5.3	3.7
Secondary education completed				
	1986	68.5	66.2	65.0
	1996	60.4	56.9	53.8
	2006	54.2	46.2	42.0
Weighted average for all education groups				
	1986	2.2	3.1	4.7
	1996	2.3	4.6	6.5
	2006	3.2	5.0	3.5

Table 13.7: Phased wage strategy -
summary of effects on the population

		Basic	Phased
Total population, (thousands of persons)	2006	6880	6898
Percentage in urban areas	1986	20.9	21.5
	1996	20.9	22.3
	2006	21.6	22.6
Percentage of total workforce in wage employment	1986	14.8	16.1
	1996	15.3	16.7
	2006	15.7	15.9
Percentage of urban workforce not in wage employment	1986	32.5	29.1
	1996	32.0	30.0
	2006	32.9	33.6

Table 13.8: Phased wage strategy -
wage employment by sectors

units: '000 persons

Sector		Basic	Phased
Teachers	1986	18	18
	1996	27	27
	2006	37	37
Other Govt. Sectors	1986	66	70
	1996	93	98
	2006	131	132
Major Projects	1986	8	8
	1996	6	6
	2006	5	5
Plantations	1986	21	23
	1996	19	24
	2006	18	19
Modern Industry	1986	149	166
	1996	223	246
	2006	332	337
Total Wage Employment	1986	262	285
	1996	368	401
	2006	523	531

Table 13.9: Phased wage strategy -
concentration ratios of personal incomes

(u) concentration ratio of urban incomes

(o) concentration ratio of all indigenous
cash incomes

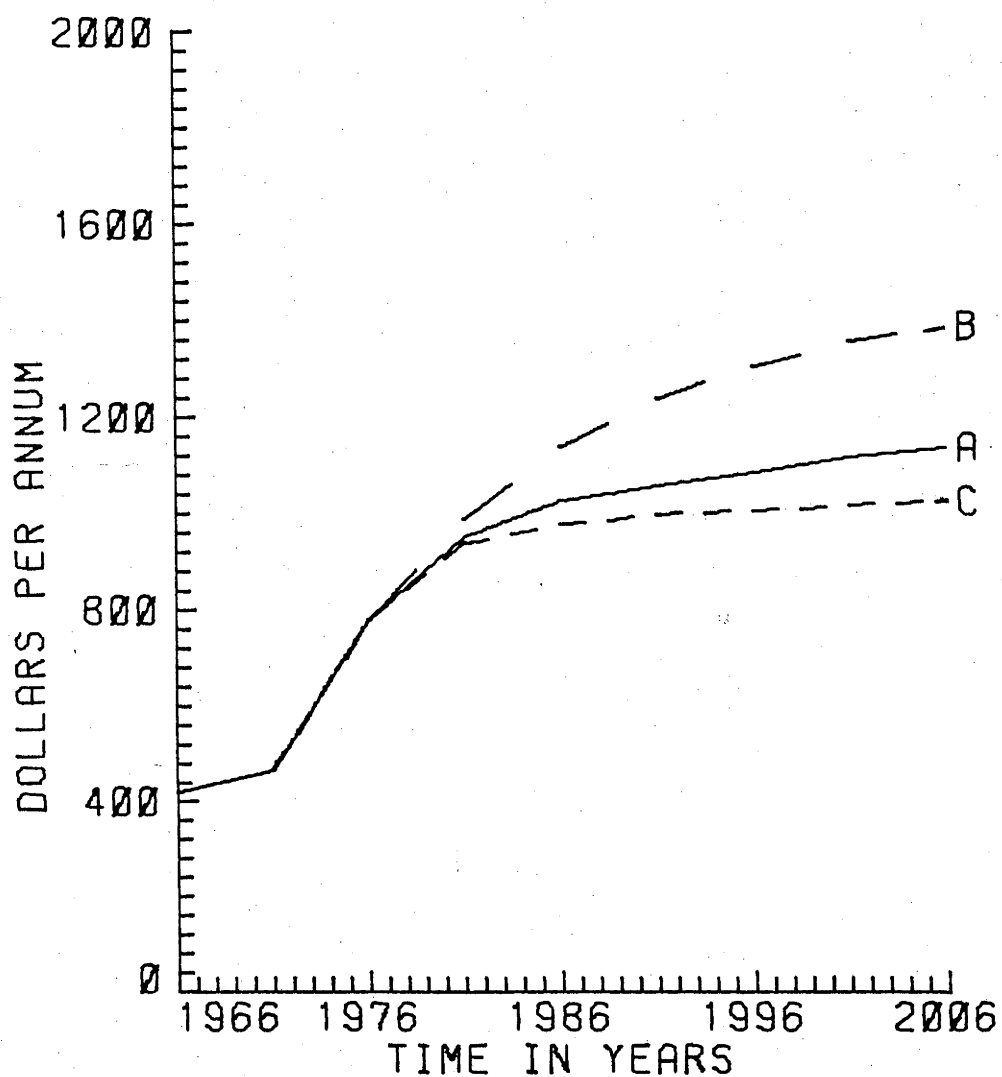
	Basic		Phased	
	(u)	(o)	(u)	(o)
1981	0.22	0.60	0.21	0.59
1986	0.27	0.58	0.23	0.58
1991	0.29	0.56	0.29	0.55
1996	0.27	0.54	0.25	0.53
2001	0.30	0.51	0.30	0.49
2006	0.28	0.47	0.28	0.46

Table 13.10: Phased wage strategy -
migration rates by education

units: percentage of rural males (15-60 yrs)
migrating annually to urban areas

Education		Basic	Phased
Less than primary	1986	0.4	0.5
	1996	0.8	1.3
	2006	2.1	0.7
Primary education completed	1986	5.7	10.5
	1996	6.2	9.0
	2006	5.3	3.4
Secondary education completed	1986	66.2	64.5
	1996	56.9	53.9
	2006	46.2	44.9
Weighted average for all education groups	1986	3.1	5.3
	1996	4.6	6.4
	2006	5.0	3.1

CHART 13.1: ALT. WAGE STRATEGIES -
AVERAGE WAGE FOR INDIG. EMPLOYEES

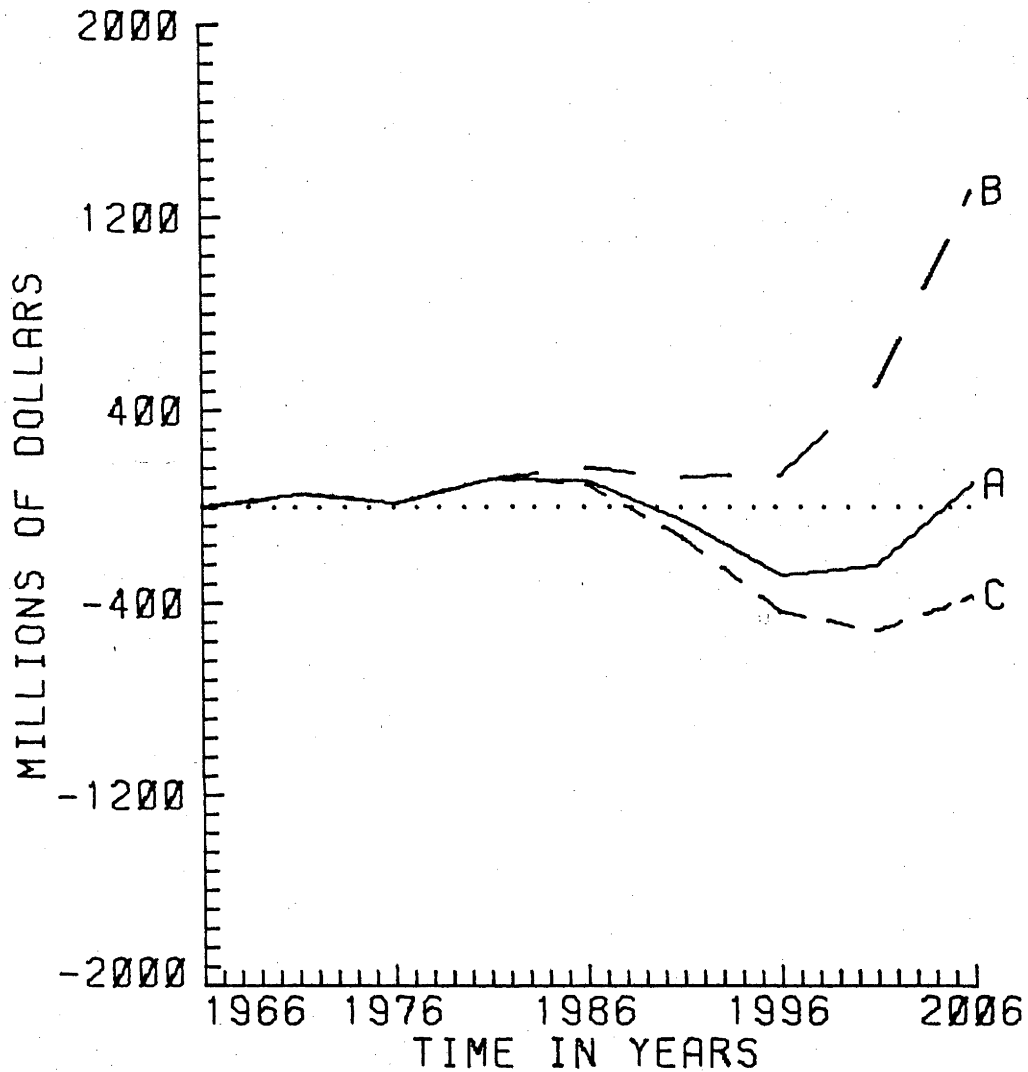


KEY

AVERAGE WAGE FOR INDIGENOUS EMPLOYEES

- A BASIC PROJECTION
- B LIBERAL WAGE STRATEGY
- C TIGHT WAGE STRATEGY

CHART 13.2: ALT. WAGE STRATEGIES -
NO ADJUSTMENT OF GOVT. EXPENDITURE

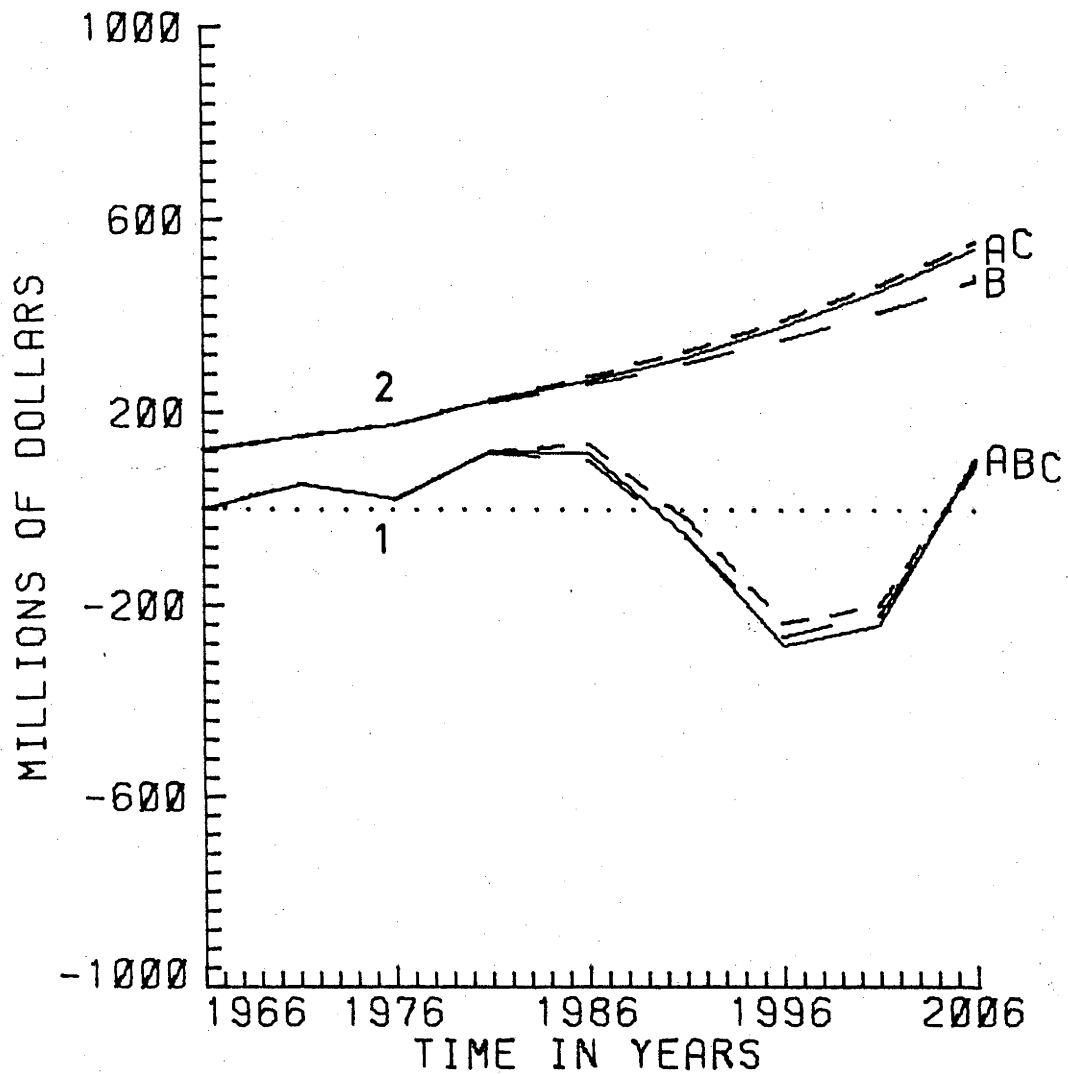


KEY

GOVERNMENT'S NET INDEBTEDNESS OVERSEAS

- A BASIC PROJECTION
- B LIBERAL WAGE STRATEGY
- C TIGHT WAGE STRATEGY

CHART 13.3: ALT. WAGE STRATEGIES -
ADJUSTMENT OF GOVT. EXPENDITURE

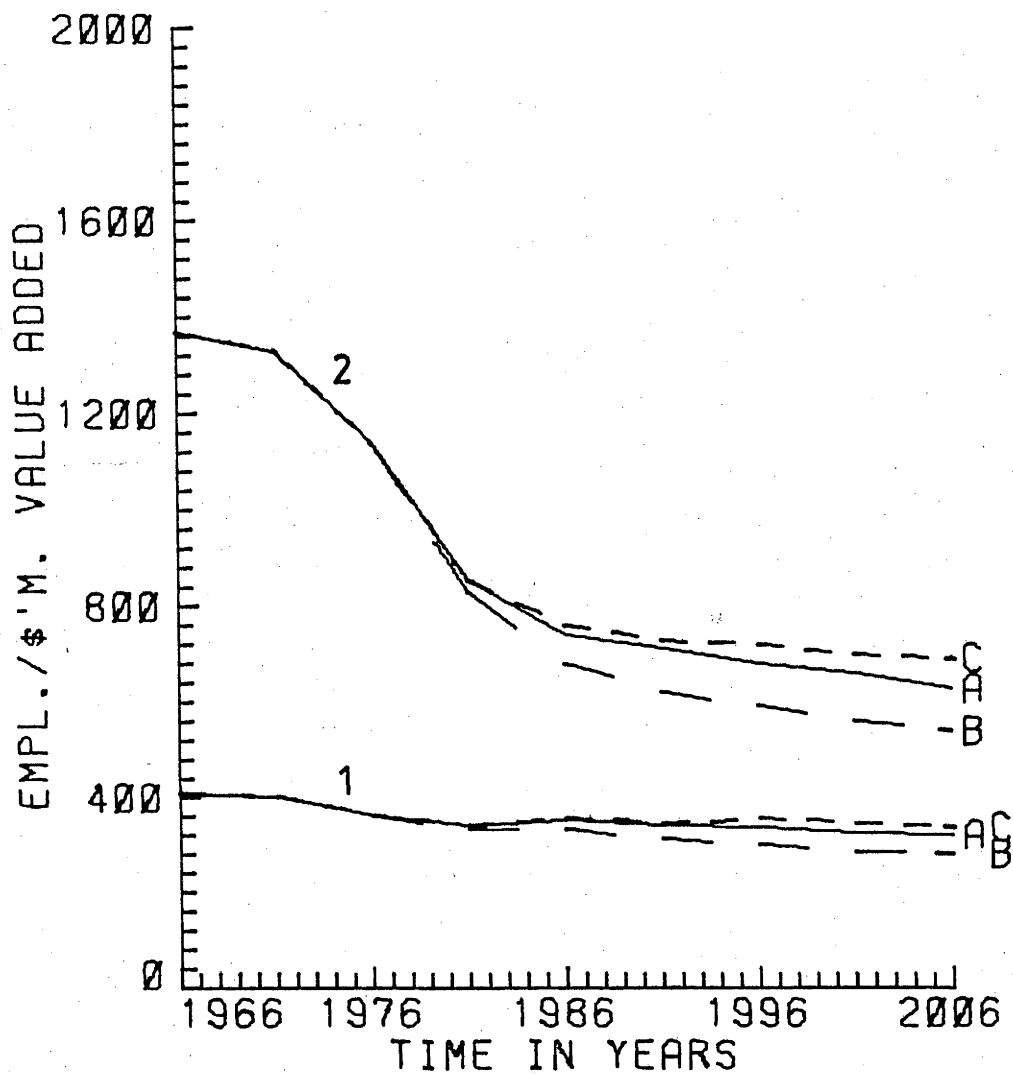


KEY

- 1 GOVERNMENT'S NET INDEBTEDNESS OVERSEAS
2 EXPENDITURE ON INFRASTRUCTURE

- A BASIC PROJECTION
- - B LIBERAL WAGE STRATEGY
- - C TIGHT WAGE STRATEGY

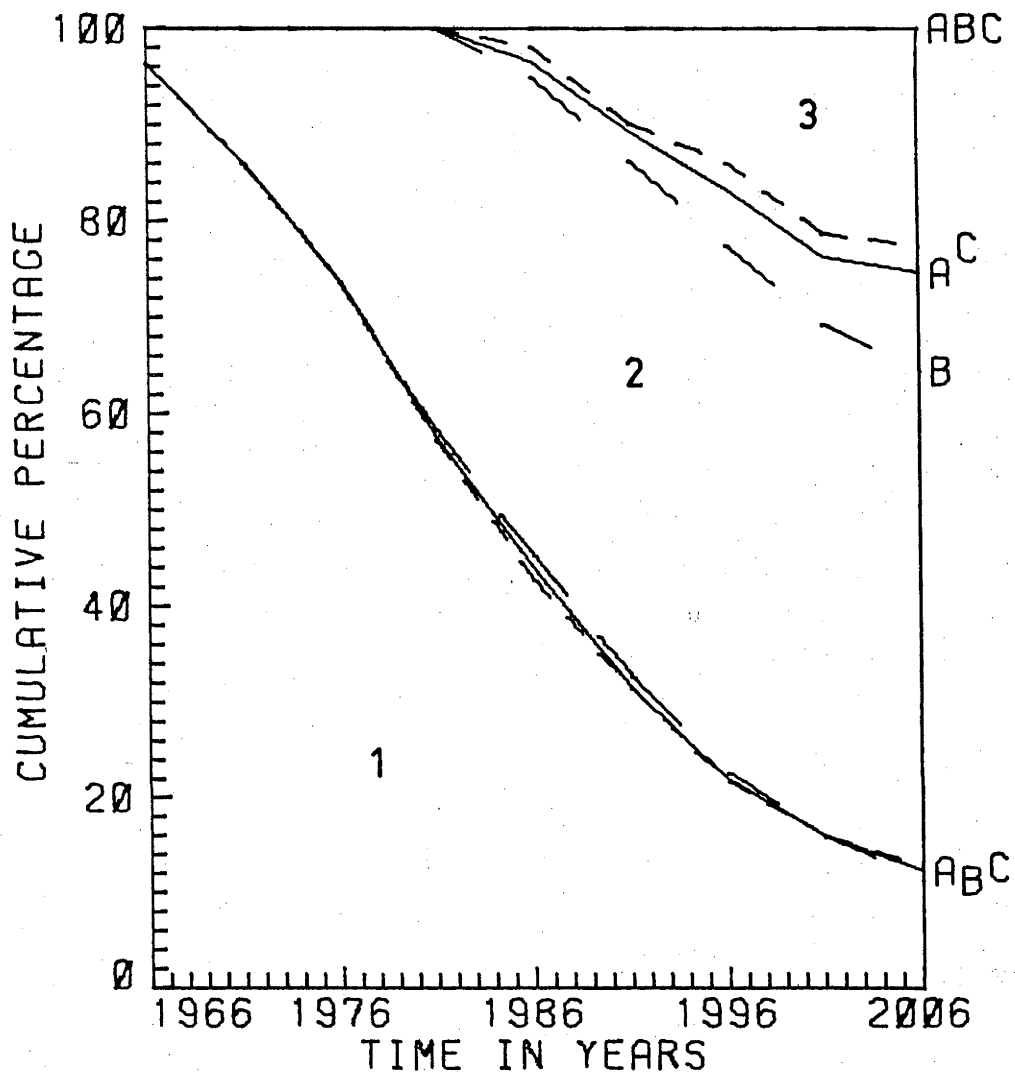
CHART 13.4: ALT. WAGE STRATEGIES -
LABOR / VALUE ADDED RATIOS



KEY

- 1 EMPLOYMENT/\$'M. : MODERN INDUSTRY
 2 " " " : PLANTATIONS
- A BASIC PROJECTION
 B LIBERAL WAGE STRATEGY
 C TIGHT WAGE STRATEGY

CHART 13.5: ALT. WAGE STRATEGIES -
UNSKILLED EMPLOYMENT BY EDUCATION

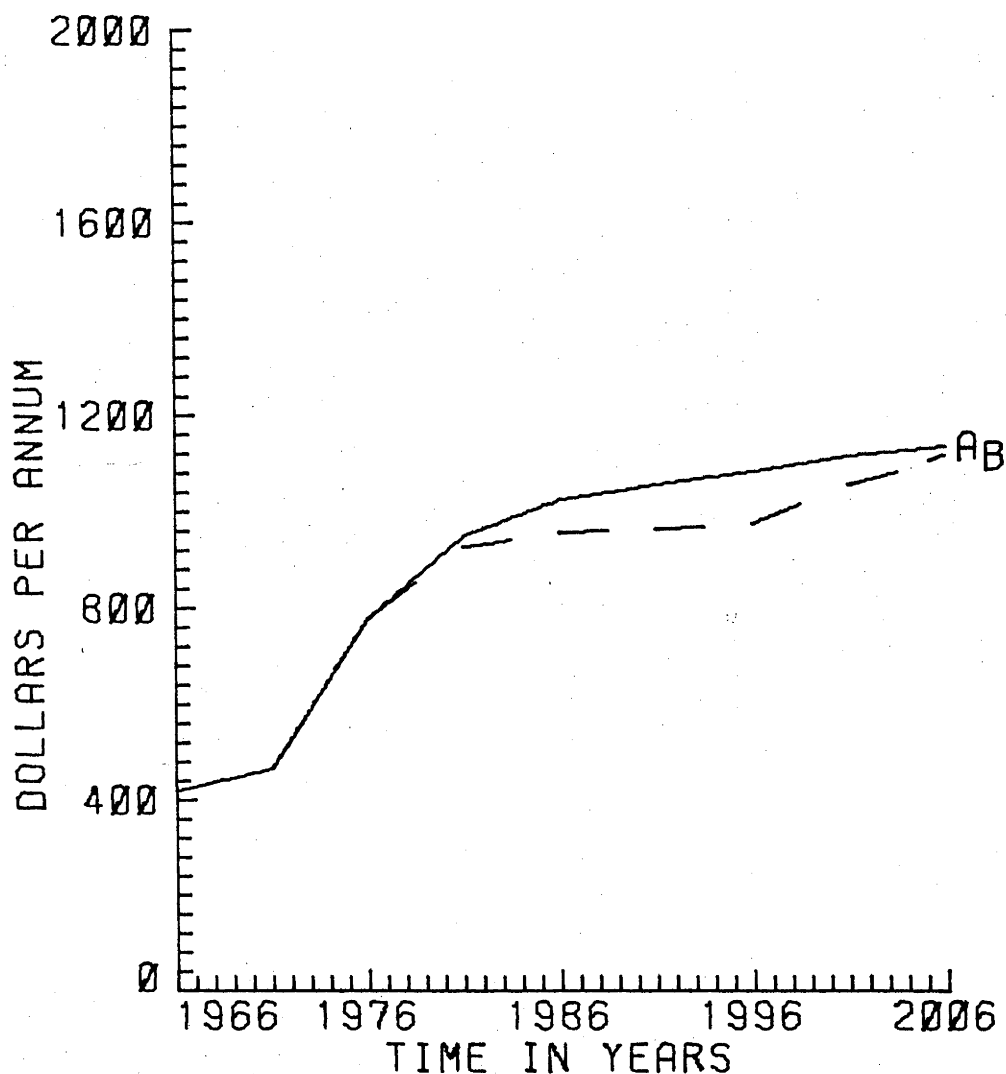


KEY

- 1 NO FORMAL QUALIFICATIONS
- 2 PRIMARY EDUCATION COMPLETED
- 3 SECONDARY EDUCATION COMPLETED

- A BASIC PROJECTION
- B LIBERAL WAGE STRATEGY
- C TIGHT WAGE STRATEGY

CHART 13.6: PHASED WAGE STRATEGY -
AVERAGE WAGE FOR INDIG. EMPLOYEES

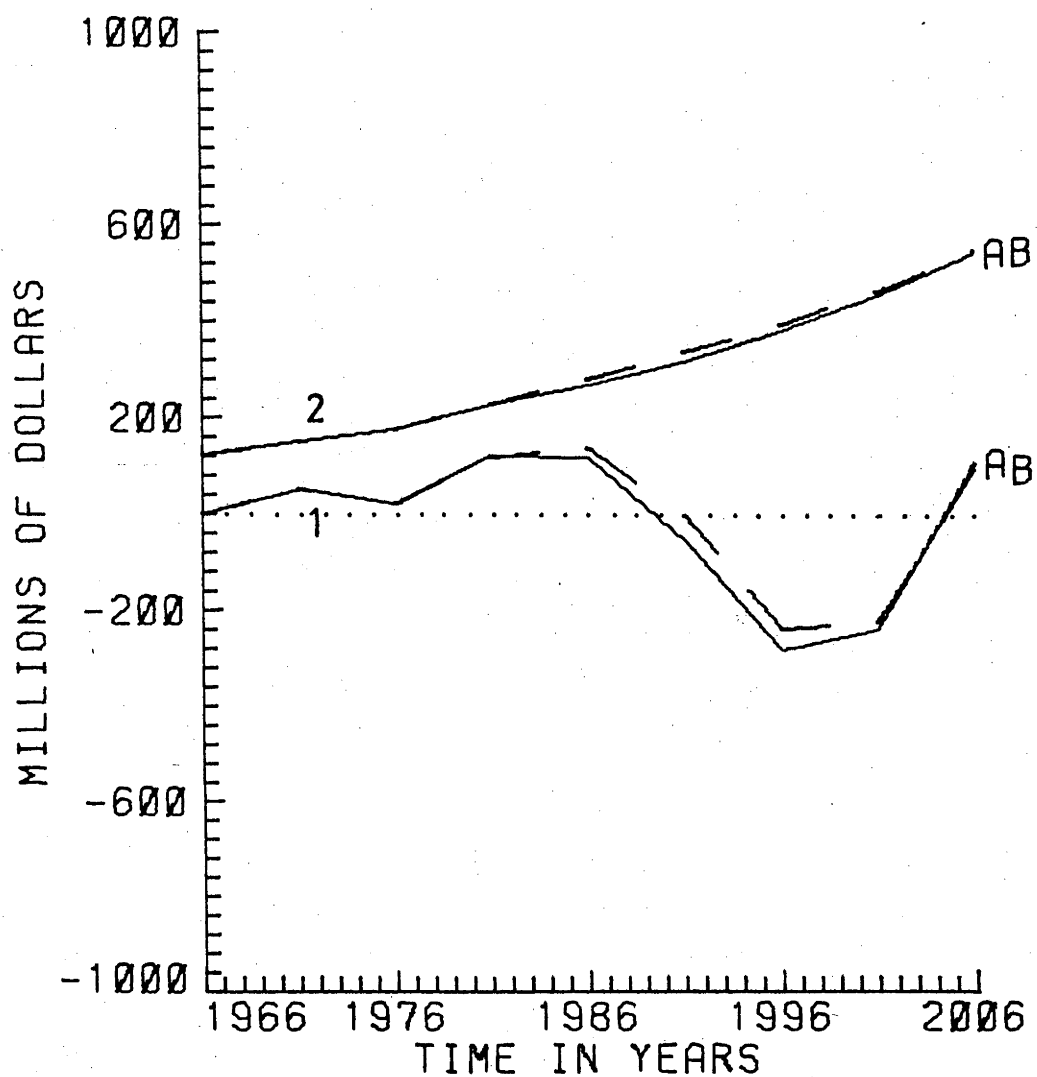


KEY

AVERAGE WAGE FOR INDIGENOUS EMPLOYEES

- A BASIC PROJECTION
 - - B PHASED WAGE STRATEGY

CHART 13.7: PHASED WAGE STRATEGY -
ADJUSTMENT OF GOVT. EXPENDITURE



KEY

- 1 GOVERNMENT'S NET INDEBTEDNESS OVERSEAS
2 EXPENDITURE ON INFRASTRUCTURE

- A BASIC PROJECTION
- - B PHASED WAGE STRATEGY

Table 14.1: Increased lending to smallholders -
net investment in rural smallholder agriculture

units: \$'million (68/69 prices)

Date	Basic			Ambitious		
	Investment: rural incomes	from loans from govt.	Total	from rural incomes	loans from govt.	Total
1981	3.4	1.5	4.9	3.4	1.5	4.9
1986	4.6	2.3	6.9	4.7	2.9	7.6
1991	6.6	3.3	9.9	7.1	4.7	11.8
1996	9.9	5.0	14.9	11.2	7.5	18.7
2001	15.4	7.7	23.1	18.7	12.5	31.2
2006	25.3	12.7	38.0	33.8	22.5	56.3

Table 14.2: Increased lending to smallholders -
value added by sectors (2006)

units: \$'million (1968/69 prices); figures in brackets are average annual rates of growth 1966-2006.

Sector	Basic		Ambitious	
Smallholders:				
Food	111	(8.2)	148	(9.0)
Export	232	(6.2)	274	(6.7)
Plantations	29	(0.0)	29	(0.0)
Major Projects	227	n.a.	227	n.a.
Industry:				
small-scale rural	36	} (10.5)	41	} (10.8)
urban	39		42	
Modern Industry	1026	(4.7)	1121	(4.9)
Government	222	(3.6)	222	(3.6)
TOTAL	1922	(4.96)	2105	(5.20)

Table 14.3: Increased lending to smallholders -
summary of effects on the population

units: '000 persons; figures in brackets are percentages.

		Basic		Ambitious	
Total Population:	2006	6880		6830	
Urban population (per cent of total)	1986	768	(20.9)	768	(20.9)
	1996	1046	(20.9)	1054	(21.0)
	2006	1486	(21.6)	1533	(22.4)
Wage employment (per cent of total workforce)	1986	262	(14.8)	263	(14.9)
	1996	368	(15.3)	374	(15.5)
	2006	523	(15.7)	555	(16.7)
Urban workforce not in wage employment (per cent of urban workforce)	1986	104	(32.5)	103	(32.2)
	1996	142	(32.0)	140	(31.5)
	2006	203	(32.9)	200	(31.3)

Table 14.4: Increased lending to smallholders -
concentration ratios of indigenous incomes

(u) concentration ratio of urban incomes

(o) concentration ratio of all cash incomes

Date	Basic		Ambitious	
	(u)	(o)	(u)	(o)
1981	0.22	0.60	0.22	0.60
1986	0.27	0.58	0.26	0.58
1991	0.29	0.56	0.28	0.55
1966	0.27	0.54	0.26	0.52
2001	0.30	0.51	0.28	0.48
2006	0.28	0.47	0.27	0.42

Table 14.5: Increased lending to smallholders -
incomes per head by occupation

units: dollars per worker per year (1968/69 prices)

Occupation		Basic	Ambitious
Rural cash income per smallholder ¹	1986	48	49
	1996	73	80
	2006	119	148
Rural income per smallholder including allowance for subsistence production	1986	276	277
	1996	301	308
	2006	347	376
Income per participant in urban informal sector ¹	1986	60	61
	1996	89	93
	2006	110	123
Wage rate for unskilled employment in modern industry	1986	859	859
	1996	911	911
	2006	963	963

- 1 These incomes per head are calculated without allowance for remittances to these groups by indigenous wage employees.

Table 14.6: Increased lending to smallholders-
balance of trade (2006)

units: \$'million (1968/69 prices)

	Basic		Ambitious	
<u>IMPORTS</u>				
Demand for food outside the subsistence sector: rural	77		92	
urban	<u>161</u>	238	<u>165</u>	257
Production of food		<u>148</u>		<u>198</u>
<u>Imports of food</u>		90		59
Demand for industrial goods:				
Rural Consumption	215		263	
Urban Consumption	393		415	
Rural Investment (gross)	104		134	
Urban Investment (gross)	370		434	
Other ¹	<u>1939</u>	3021	<u>2070</u>	3316
Domestic Production:				
Rural small scale	74		84	
Urban small scale	81		87	
Modern industry	<u>2114</u>	<u>2269</u>	<u>2309</u>	<u>2480</u>
<u>Imports of industrial goods</u>		752		836
Customs duties		<u>50</u>		<u>54</u>
<u>Total imports (less duty)</u>		792		841
<u>EXPORTS</u>				
Export crops				
Rural smallholders	282		336	
Plantations	<u>36</u>	318	<u>36</u>	372
Industrial goods		193		193
Exports from major projects		<u>277</u>		<u>277</u>
<u>Total exports</u>		788		841
<u>BALANCE OF TRADE</u>		- 4		0

1 Government expenditure, demand for exports and intermediate demand for industrial products.

Table 14.7: Fall in subsistence incomes -
value added by sectors (2006)

units: \$'million (1968/69 prices); figures
in brackets are average annual rates of
growth 1966-2006

Strategy on lending	Basic		Basic		Ambitious	
Subsistence income per head	Constant		Falling as monetary sector production rises			
Smallholders:						
Food	111	(8.2)	97	(7.8)	127	(8.5)
Exports	232	(6.2)	210	(6.0)	242	(6.4)
Plantations	29	(0.0)	29	(0.0)	29	(0.0)
Major projects	227	n.a.	227	n.a.	227	n.a.
Industry:						
Smallscale rural	36	} (10.5)	32	} (10.3)	36	} (10.5)
urban	39		36		38	
Modern Industry	1026	(4.7)	978	(4.5)	1045	(4.7)
Government	222	(3.6)	222	(3.6)	222	(3.6)
TOTAL	1922	(4.96)	1831	(4.83)	1965	(5.02)

Table 14.8: Fall in subsistence incomes -
summary of effects on the population

units: '000 persons; figures in brackets
are percentages

Strategy on Lending		Basic	Basic	Ambitious
Subsistence income per head		constant	falling as monetary sector production rises	
Total population:	2006	6880	6969	6939
Urban population (per cent of total)	1986	768 (20.9)	769 (20.9)	769 (20.9)
	1996	1046 (20.9)	1050 (20.9)	1057 (21.0)
	2006	1486 (21.6)	1489 (21.4)	1524 (22.0)
Wage employment (per cent of total workforce)	1986	262 (14.8)	261 (14.7)	262 (14.8)
	1996	368 (15.3)	365 (15.1)	370 (15.4)
	2006	523 (15.7)	507 (15.2)	530 (15.9)
Urban workforce not in wage employment (per cent of urban workforce)	1986	104 (32.5)	105 (32.7)	104 (32.5)
	1996	142 (32.0)	145 (32.7)	143 (32.2)
	2006	203 (32.9)	214 (34.6)	211 (33.4)

Table 14.9: Fall in subsistence incomes -
incomes per head by occupation

units: dollars per worker per year
(1968/69 prices)

Strategy on lending		Basic	Basic	Ambitious
Subsistence income per head		Constant	Falling as monetary sector production rises	
Rural cash income per smallholder ¹	1986	48	48	49
	1996	73	70	76
	2006	119	107	128
Rural income per smallholder including allowance for subsistence production	1986	276	271	272
	1996	301	286	290
	2006	347	310	325
Income per participant urban informal sector ¹	1986	60	59	60
	1996	89	85	88
	2006	110	96	105
Wage rate for unskilled employment in modern industry	1986	859	859	859
	1996	911	911	911
	2006	963	963	963

1 These incomes per head are calculated without allowance for remittances to these groups by indigenous wage employees.

Table 14.10: Export tax - value added
by sectors (2006)

units: \$'million (1968/69 prices); figures
in brackets are average annual rates of
growth 1966-2006

Strategy on lending	Basic		Basic		Ambitious	
Export tax	None		10% export tax from 1981			
Smallholders:						
Food	111	(8.2)	104	(8.0)	129	(8.6)
Exports	232	(6.2)	152	(5.1)	174	(5.5)
Plantations	29	(0.0)	29	(0.0)	29	(0.0)
Major Projects	227	n.a.	227	n.a.	227	n.a.
Industry:						
Smallscale rural	36)	(10.5)	26)	(9.9)	29)	(10.1)
urban	39)		33)		35)	
Modern Industry	1026	(4.7)	915	(4.4)	964	(4.5)
Government	222	(3.6)	230	(3.7)	230	(3.7)
TOTAL	1922	(4.96)	1717	(4.66)	1817	(4.81)

Table 14.11: Export tax -
summary of effects on the population

units: '000 persons; figures in
brackets are percentages

Strategy on Lending		Basic	Basic	Ambitious
Export tax		None	10% beyond 1981	
Total population:	2006	6880	6989	6959
Urban population (per cent of total)	1986	768 (20.9)	779 (21.1)	780 (21.2)
	1996	1046 (20.9)	1078 (21.4)	1084 (21.5)
	2006	1486 (21.6)	1523 (21.8)	1541 (22.1)
Wage employment (per cent of total workforce)	1986	262 (14.8)	269 (15.2)	270 (15.3)
	1996	368 (15.3)	366 (15.2)	370 (15.4)
	2006	523 (15.7)	488 (14.6)	504 (15.1)
Urban workforce not in wage employment (per cent of urban workforce)	1986	104 (32.5)	103 (31.7)	103 (31.5)
	1996	142 (32.0)	154 (33.9)	153 (33.6)
	2006	203 (32.9)	236 (37.7)	231 (36.5)

Table 14.12: Export tax - concentration ratios of indigenous incomes

(u) concentration ratio of urban incomes

(o) concentration ratio of all cash incomes

Strategy on lending	Basic		Basic		Ambitious	
Export tax	None		10% beyond 1981			
Date	(u)	(o)	(u)	(o)	(u)	(o)
1981	0.22	0.60	0.22	0.62	0.22	0.62
1986	0.27	0.58	0.26	0.61	0.26	0.61
1991	0.29	0.56	0.30	0.60	0.30	0.59
1996	0.27	0.54	0.29	0.59	0.28	0.58
2001	0.30	0.51	0.32	0.57	0.31	0.55
2006	0.28	0.47	0.33	0.55	0.32	0.51

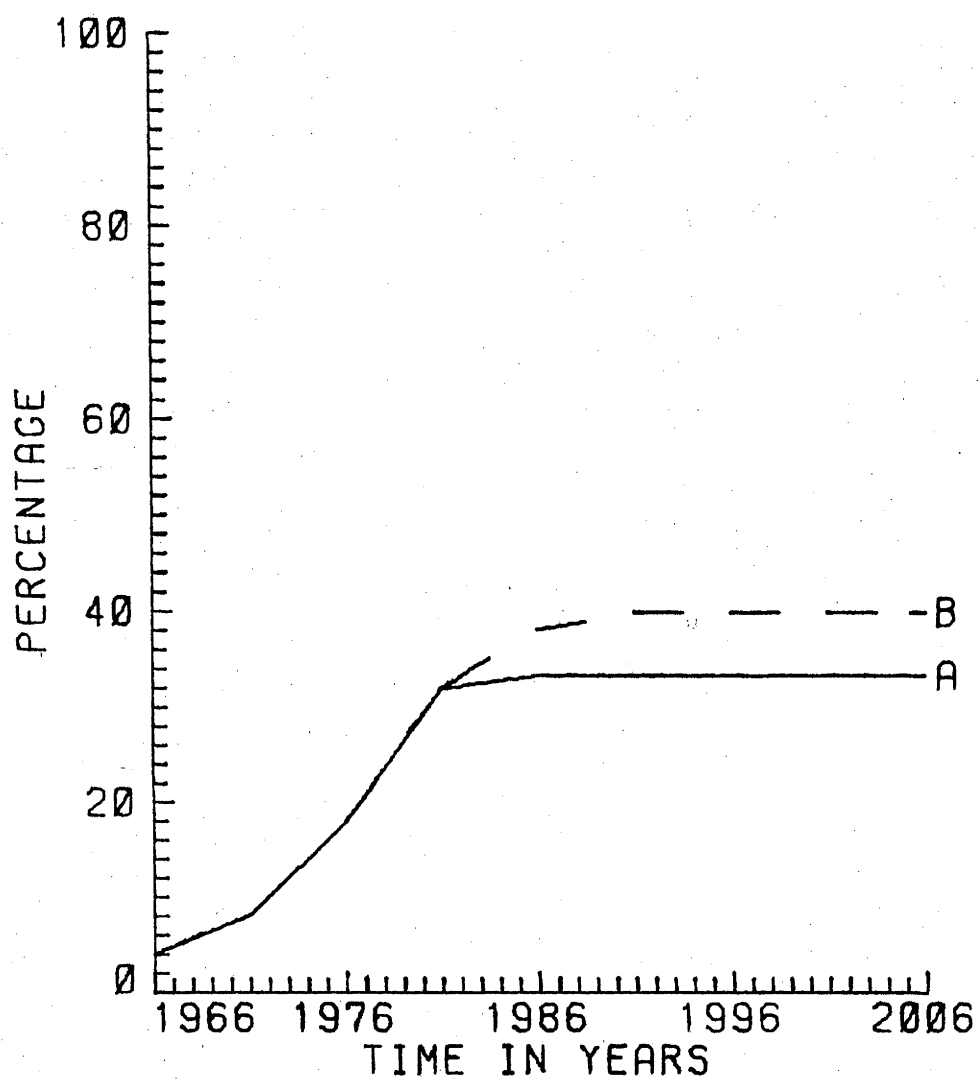
Table 14.13: Export tax - incomes per head by occupation

units: dollars per worker per year
(1968/69 prices)

Strategy on lending		Basic	Basic	Ambitious
Export tax		None	10% beyond 1981	
Rural cash income per smallholder ¹	1986	48	40	41
	1996	73	56	61
	2006	119	80	94
Rural income per smallholder including allowance for subsistence production	1986	276	268	269
	1996	301	284	289
	2006	347	308	322
Income per participant in urban informal sector ¹	1986	60	63	64
	1996	89	80	81
	2006	110	77	83
Wage rate for unskilled employment in modern industry	1986	859	860	860
	1996	911	914	914
	2006	963	968	968

1 These incomes per head are calculated without allowance for remittances to these groups by indigenous wage employees.

CHART 14.1: LENDING TO SMALLHOLDERS

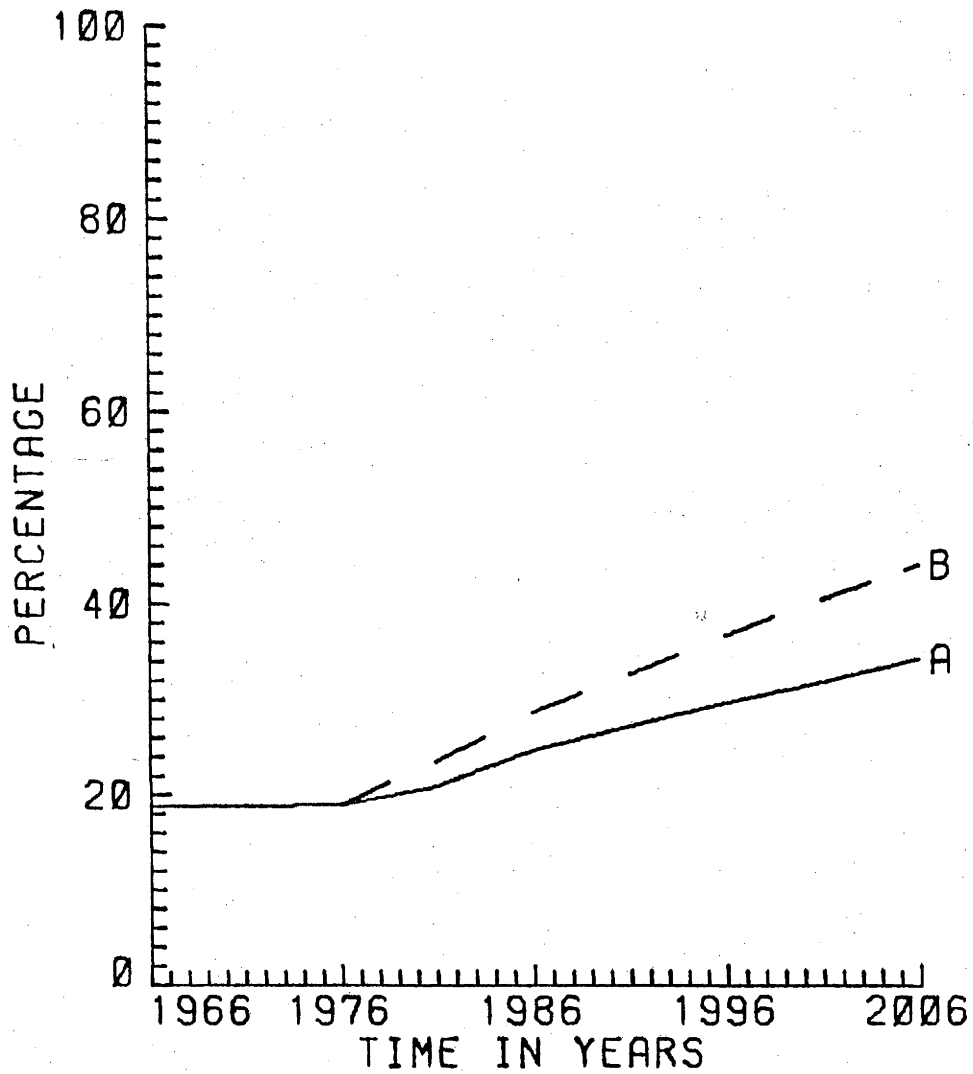
KEY

PROP. OF NET INVESTMENT FINANCED BY GOVT.

A BASIC PROJECTION

B AMBITIOUS STRATEGY ON LENDING

CHART 14.2: EXPORT TAX -
ALLOCATION OF SMALLHOLDER INVESTMENT



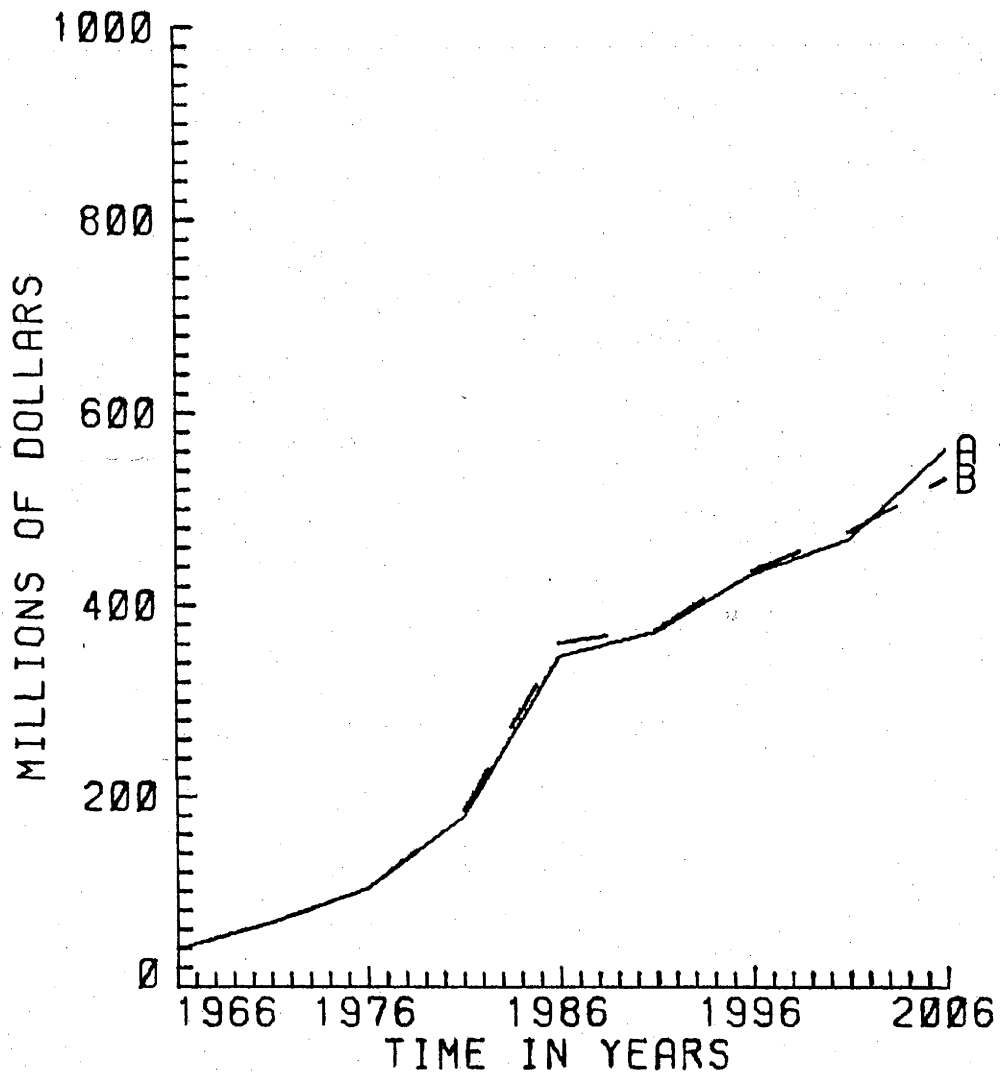
KEY

PROP. OF SMALLHDR. INVESTMENT IN FOOD CROPS

A BASIC PROJECTION

B EXPORT TAX ON SMALLHOLDER AGRICULTURE

CHART 14.3: EXPORT TAX -
GOVERNMENT REVENUE



KEY

TOTAL DOMESTIC REVENUE

- A BASIC PROJECTION
 - - B EXPORT TAX ON SMALLHOLDER AGRICULTURE

Table 15.1: Hydroelectric project -
inputs per unit output during the production phase

Input	Proportion of output
Raw materials:	
- copper concentrate from other PNG projects	.07
- other (imported)	.30
Use of industrial goods and services	.10
Value added	.53
Value of product	1.00

Table 15.2: Hydroelectric project -
composition of the labour force during the
production phase

Skill Level	Proportion of total employment
Unskilled	.641
Skilled	.293
Sub-professional	.038
Professional	.028
TOTAL ¹	1.000

1 Total employment during production phase = 11,000 persons

Table 15.3: Hydroelectric project -
summary of effects on the population

units: '000 persons; figures in brackets
are percentages

		Basic Projection		With hydroelectric project			
				aid flow unchanged		aid flow cut	
Total Population	2006	6880		6797		6826	
Urban Population (figs in brackets: % of total popn.)	1986	768	(20.9)	806	(21.9)	794	(21.6)
	1996	1046	(20.9)	1295	(25.9)	1261	(25.2)
	2006	1486	(21.6)	1894	(27.9)	1743	(25.5)
Wage employment (figs in brackets: % of total workforce)	1986	262	(14.8)	306	(17.1)	299	(16.8)
	1996	368	(15.3)	430	(18.1)	413	(17.4)
	2006	523	(15.7)	646	(19.7)	601	(18.2)
Urban workforce not in wage employment (figs in brackets: % of urban workforce)	1986	104	(32.5)	91	(26.8)	90	(26.8)
	1996	141	(32.0)	179	(33.6)	178	(34.3)
	2006	204	(32.9)	246	(32.2)	224	(31.8)

Table 15.4: Hydroelectric project - demand for industrial products (2006)

units: \$'m (1968/69 prices); figures in brackets are percentages of total

Source of demand	Basic Projection		With hydroelectric project			
			aid flow unchanged		aid flow cut	
Consumption -						
expatriate	1	(0.0)	1	(0.0)	1	(0.0)
urban indigenous	392	(13.0)	490	(12.9)	452	(12.8)
rural indigenous	215	(7.1)	246	(6.5)	235	(6.7)
Investment -						
agricultural	86	(2.8)	100	(2.6)	95	(2.7)
industrial	373	(12.4)	442	(11.6)	410	(11.6)
copper projects	15	(0.5)	15	(0.4)	15	(0.4)
hydroelectric project	0	(0.0)	28	(0.7)	28	(0.8)
Government expenditure	432	(14.3)	616	(16.2)	536	(15.2)
Exports	193	(6.4)	193	(5.1)	193	(5.5)
Intermediate demand -						
agriculture	126	(4.2)	141	(3.7)	136	(3.9)
industrial	1136	(37.6)	1419	(37.3)	1309	(37.2)
copper products	51	(1.7)	51	(1.4)	51	(1.5)
hydroelectric project	0	(0.0)	58	(1.5)	58	(1.6)
TOTAL	3020	(100)	3801	(100)	3520	(100)

Table 15.5: Hydroelectric project -
value added by sectors (2006)

units: \$'m 1968/69 prices; figures
in brackets are percentages of total

Sector	Basic Projection		With hydroelectric project			
			aid flow unchanged		aid flow cut	
Smallholder agriculture	342	(17.8)	388	(14.7)	372	(15.0)
Plantations	29	(1.5)	30	(1.1)	30	(1.2)
Major projects	227	(11.8)	541	(20.5)	541	(21.8)
Small-scale industry	75	(3.9)	98	(3.7)	89	(3.6)
Modern industry	1026	(53.4)	1276	(48.3)	1179	(47.5)
Government services	222	(11.6)	310	(11.7)	271	(10.9)
TOTAL	1922	(100)	2642	(100)	2482	(100)
Average annual rate of growth of total value added (1966-2006)	4.96%		5.80%		5.63%	

Note: Changes in the percentage of total value added contributed by the major projects over the projection period are shown in Chart 15.4.

Table 15.6: Hydroelectric project -
wage employment by sectors

units: '000 persons

Sector		Basic Projection	With hydroelectric project	
			aid flow unchanged	aid flow cut
Government services:				
education	1986	18	18	18
	1996	27	27	27
	2006	37	38	38
infrastructure	1986	66	75	69
	1996	93	124	112
	2006	131	191	165
Plantations:	1986	21	21	21
	1996	19	19	19
	2006	18	18	18
Major projects:	1986	8	12	12
	1996	6	18	18
	2006	5	17	17
Modern industry:	1986	149	181	179
	1996	223	242	238
	2006	332	382	364
TOTAL:	1986	262	306	299
	1996	368	430	413
	2006	523	646	601

Table 15.7: Hydroelectric project -
government receipts and outlays (2006)

units: \$'m (1968/69 prices); figures in
brackets are percentages of total

	Basic Projection		With hydroelectric project			
			aid flow unchanged		aid flow cut	
<u>RECEIPTS</u>						
Indirect taxes	59	(8.3)	75	(7.4)	70	(7.9)
Income taxes	52	(7.3)	72	(7.1)	64	(7.2)
Taxes on profits + dividends						
modern industry + plantations	326	(45.8)	410	(40.2)	374	(42.3)
copper projects	119	(16.7)	119	(11.7)	119	(13.5)
hydroelectric project	0	(0.0)	142	(13.9)	142	(16.0)
Repayments of loans by smallholders	9	(1.3)	10	(1.0)	9	(1.0)
Net borrowing from abroad	85	(11.9)	130	(12.7)	86	(9.7)
Foreign aid	62	(8.7)	62	(6.1)	20	(2.3)
<u>TOTAL RECEIPTS</u>	712	(100)	1020	(100)	885	(100)
<u>OUTLAYS</u>						
Expenditure on education	113	(15.9)	123	(12.1)	119	(13.4)
Expenditure on infrastructure	542	(76.1)	803	(78.7)	689	(77.8)
Lending to smallholders	11	(1.5)	14	(1.4)	14	(1.6)
Other	46	(6.5)	80	(7.8)	63	(7.1)
<u>TOTAL OUTLAYS</u>	712	(100)	1020	(100)	885	(100)

Table 15.8: Hydroelectric projects -
balance of payments account (2006)¹

units: \$'m (1968/69 prices)

	Basic Projection		With hydroelectric project			
			aid flow unchanged		aid flow cut	
Imports: food	- 85		-112		-101	
industrial products	-707		-910		-853	
raw materials for hydroelectric project	0	-792	<u>-179</u>	-1201	<u>-179</u>	-1133
Exports: agricultural	318		349		339	
industrial	193		193		193	
copper projects	277		238		238	
output from hydroelectric project	<u>0</u>	788	<u>588</u>	1368	<u>588</u>	1358
<u>Balance of trade</u>		-4		+ 167		+ 225
Foreign investment in modern industry		45		71		58
Foreign aid		62		62		20
Net borrowing, interest charges and adjustment of reserves		108		74		58
Profits accruing overseas						
modern industry	-124		-159		-146	
copper projects	- 87		- 87		- 87	
hydroelectric project	<u>0</u>	-211	<u>-128</u>	- 374	<u>-128</u>	- 361
Remittance of savings by expatriate residents		-1		-1		-1
<u>Balancing item</u>		+4		- 167		- 225

1 All payments overseas are indicated by negative signs.

Table 15.9: Hydroelectric project -
disposition of gross monetary sector product (2006)

units: \$'m (1968/69 prices); figures in brackets
are percentages of total

	Basic Projection		With hydroelectric project			
			aid flow unchanged		aid flow cut	
Government revenue	513	(26.7)	763	(28.9)	718	(28.9)
Rural smallholders	325	(16.9)	373	(14.1)	356	(14.3)
Urban self-employed	52	(2.7)	71	(2.7)	63	(2.6)
Indigenous wage employees	556	(28.9)	714	(27.0)	654	(26.4)
Expatriate wage employees	1	(0.1)	2	(0.1)	2	(0.1)
Profits accruing abroad						
modern industry	125	(6.5)	159	(6.0)	146	(5.9)
projects	87	(4.5)	215	(8.1)	215	(8.7)
Depreciation	262	(13.7)	346	(13.1)	328	(13.2)
TOTAL	1922	(100)	2642	(100)	2482	(100)

Table 15.10: Hydroelectric project -
concentration ratios of indigenous incomes

(u) concentration ratio of urban incomes

(o) concentration ratio of all cash incomes

Date	Basic Projection		With hydroelectric project			
			aid flow unchanged		aid flow cut	
	(u)	(o)	(u)	(o)	(u)	(o)
1981	.22	.60	.21	.60	.22	.60
1986	.27	.58	.22	.58	.22	.59
1991	.29	.56	.27	.56	.28	.56
1996	.27	.54	.28	.53	.29	.53
2001	.30	.51	.25	.50	.27	.50
2006	.28	.47	.27	.45	.27	.46

Table 15.11: Alternative strategies concerning the hydroelectric project - summary of effects of the population

units: '000 persons; figures in brackets are percentages

		1	2	3
Rate of return to capital in hydro. project		10%	12%	10%
Govt share of ownership in hydro. project		20%	20%	50%
Total population:	2006	6797	6810	
Percentage of population in urban areas:	1986	(21.9)	(21.8)	as
	1996	(25.9)	(25.7)	for
	2006	(27.9)	(27.0)	column
Percentage of total workforce in wage employment	1986	(17.1)	(17.0)	one
	1996	(18.1)	(17.8)	
	2006	(19.7)	(19.1)	

Table 15.12: Alternative strategies concerning the hydroelectric project - value added by sectors (2006)

units: '\$'m (1968/69 prices); figures in brackets are percentages of total

		1	2	3
Rate of return to capital in hydro. project		10%	12%	10%
Govt share of ownership in hydro. project		20%	20%	50%
Smallholder agriculture	388 (14.7)	381 (14.8)		
Plantations	30 (1.1)	30 (1.2)		as
Major projects	541 (20.5)	541 (21.0)		for
Small-scale industry	98 (3.7)	94 (3.7)		column
Modern industry	1276 (48.3)	1235 (48.0)		one
Government service	310 (11.7)	291 (11.3)		
TOTAL	2642 (100)	2571 (100)		

Table 15.13: Alternative strategies concerning the hydroelectric project - government receipts (2006)

units: \$'m (1968/69 prices)

	1	2	3
Rate of return to capital in hydro. project	10%	12%	10%
Govt share of ownership in hydro. project	20%	20%	50%
Indirect taxes	75	73	75
Income taxes	72	67	72
Taxes on profits + dividends			
modern industry + plantations	410	396	410
copper projects	119	119	119
hydroelectric project			
taxes	110	78	110
dividends	32	38	80
Repayment of loans by smallholders	10	10	10
<u>Total domestic revenue</u>	828	781	876
Net borrowing from abroad	130	122	82
Foreign aid	62	62	62
<u>Total receipts</u> ¹	1020	965	1020

1 Government expenditure is not altered in the strategy where a higher (50%) share of ownership is acquired: columns 1 and 3 indicate the alternative financing of identical expenditures.

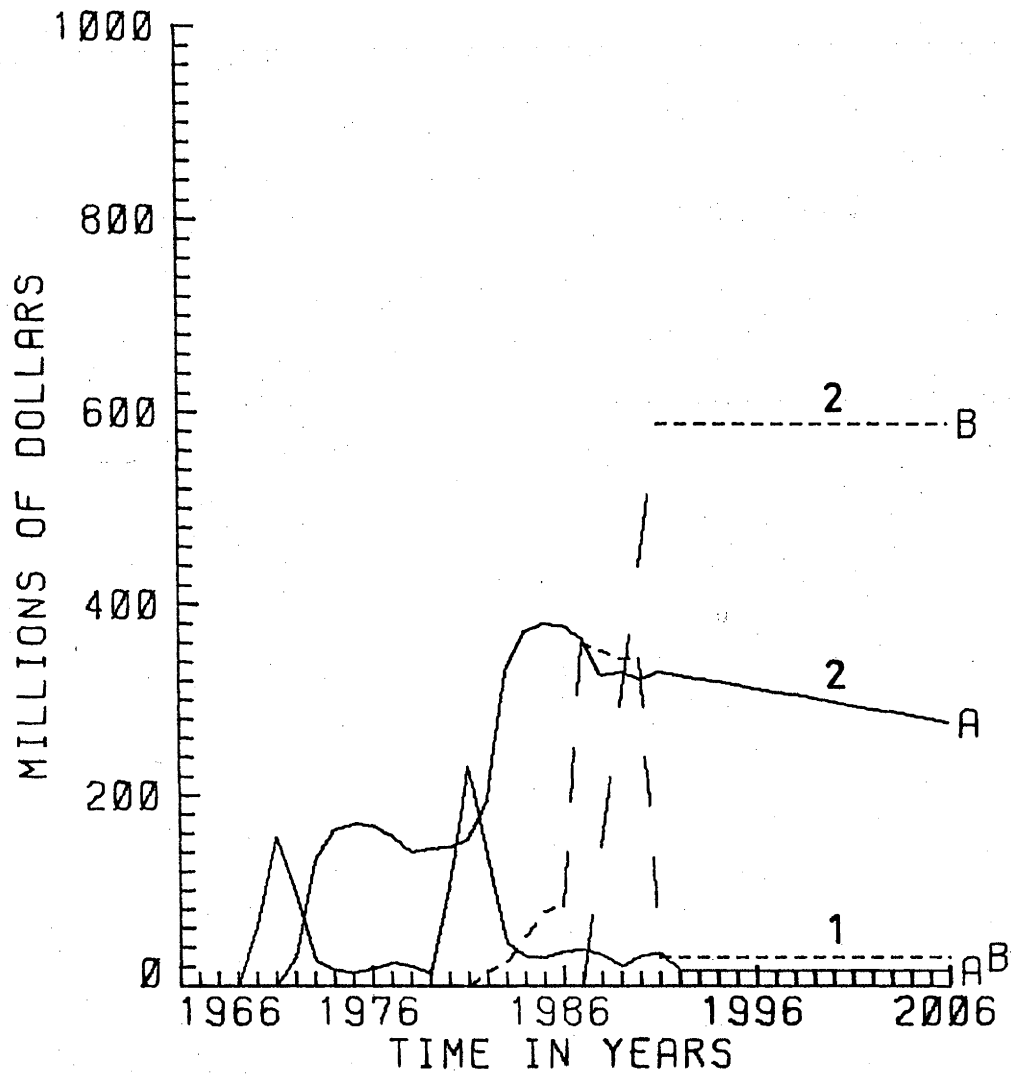
Table 15.14: Alternative strategies concerning the hydroelectric project - disposition of gross monetary sector product (2006)

units: \$'m (1968/69 prices); figures in brackets are percentages of total

Rate of return to capital in hydro. project	10%	12%	10%
Govt share of ownership in hydro. project	20%	20%	50%
Government revenue	828 (31.3)	781 (30.4)	876 (33.2)
Profits accruing abroad			
modern industry	159 (6.0)	169 (6.6)	159 (6.0)
copper projects	87 (3.3)	87 (3.4)	87 (3.3)
hydroelectric project	128 (4.8)	153 (6.0)	80 (3.0)
Other ¹	1440 (54.4)	1381 (53.7)	1440 (54.5)
TOTAL	2642 (100)	2571 (100)	2642 (100)

- 1 This item includes all personal incomes, and allowance for depreciation. These are not tabulated separately since they are not significantly affected by these strategy choices.

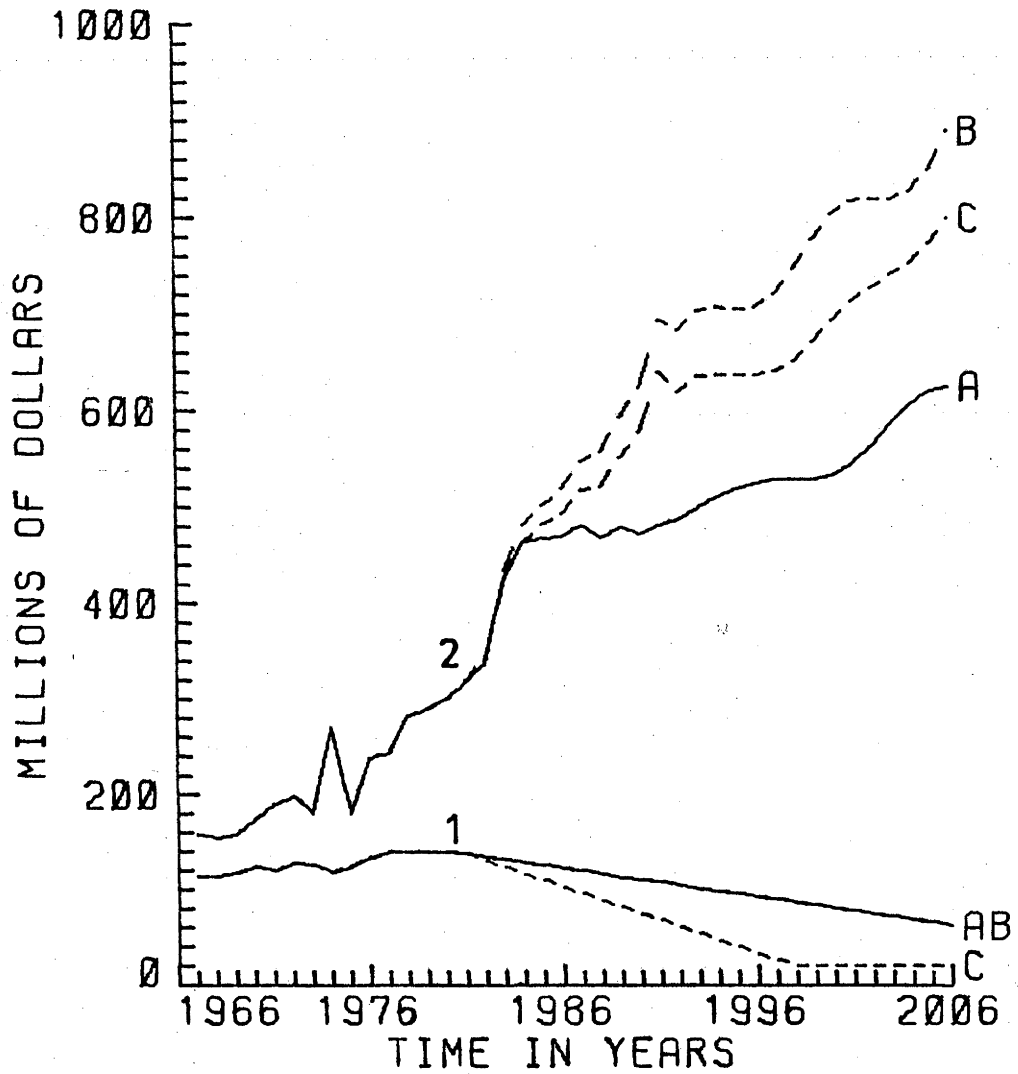
CHART 15.1: HYDROELECTRIC PROJECT -
INVESTMENT AND PRODUCTION



KEY

- 1 INVESTMENT (INCLUDING REPLACEMENTS)
- 2 PRODUCTION (AT 1972 PRICES FOR OUTPUT)
- A TWO COPPER PROJECTS
- B HYDROELECTRIC PROJECT

CHART 15.2: HYDROELECTRIC PROJECT -
GOVERNMENT REVENUE

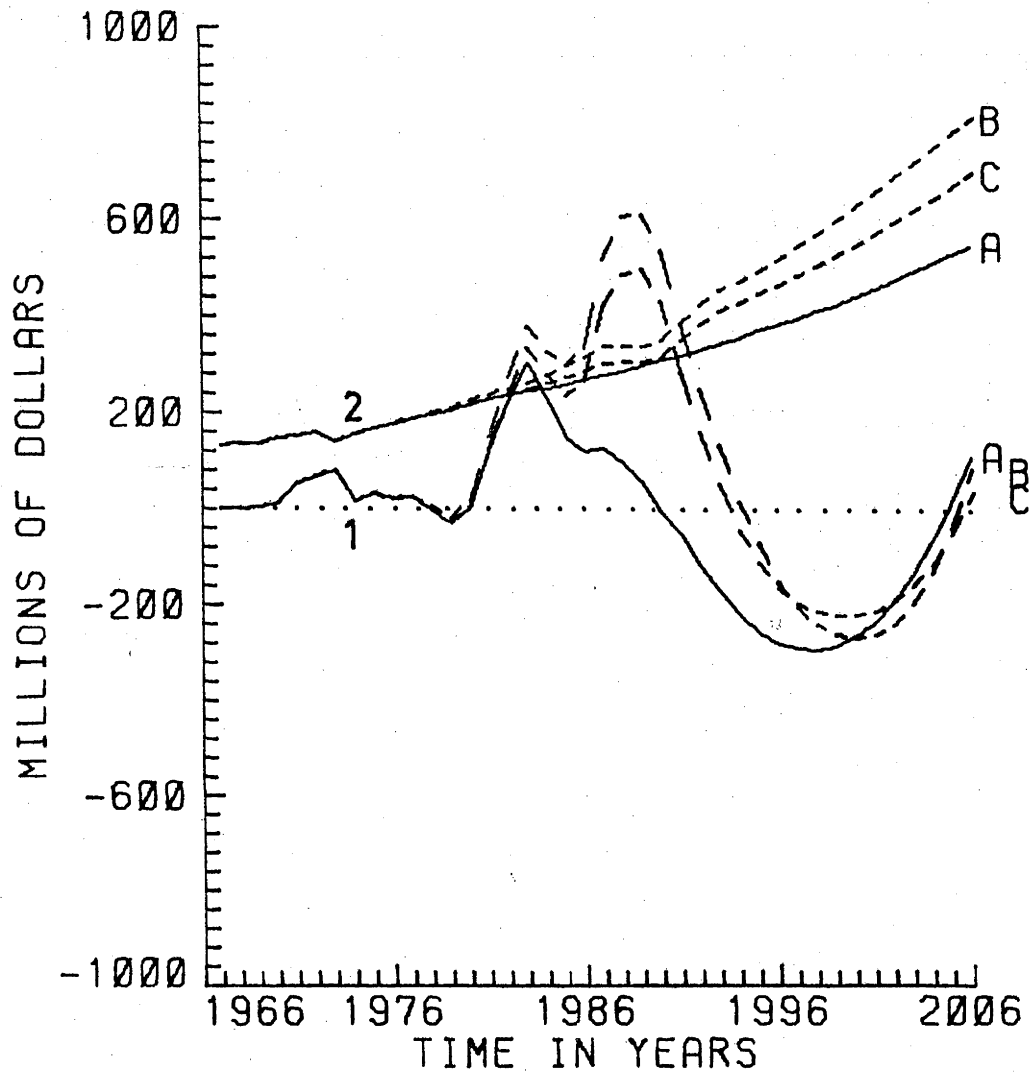


KEY

- 1 FOREIGN AID
- 2 TOTAL GOVERNMENT REVENUE

- A BASIC PROJECTION
- B HYDROELECTRIC PROJECT. AID FLOW UNCHANGED
- C " " " AID FLOW CUT

CHART 15.3: HYDROELECTRIC PROJECT -
ADJUSTMENT OF GOVT. EXPENDITURE

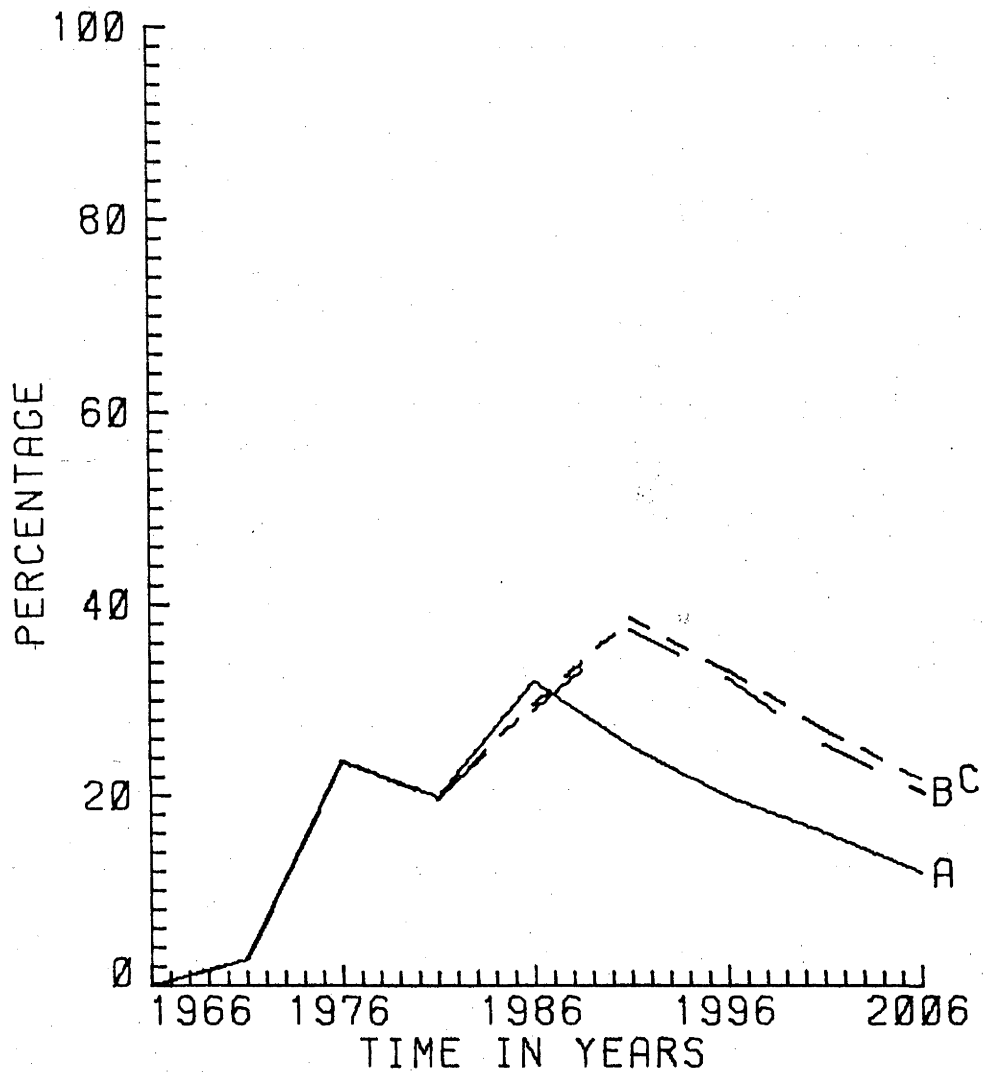


KEY

- 1 GOVERNMENT'S NET INDEBTEDNESS OVERSEAS
- 2 EXPENDITURE ON INFRASTRUCTURE

- A BASIC PROJECTION
- B HYDROELECTRIC PROJECT, AID FLOW UNCHANGED
- C " " " AID FLOW CUT

CHART 15.4: HYDROELECTRIC PROJECT -
SHARES OF MONETARY SECTOR PRODUCT



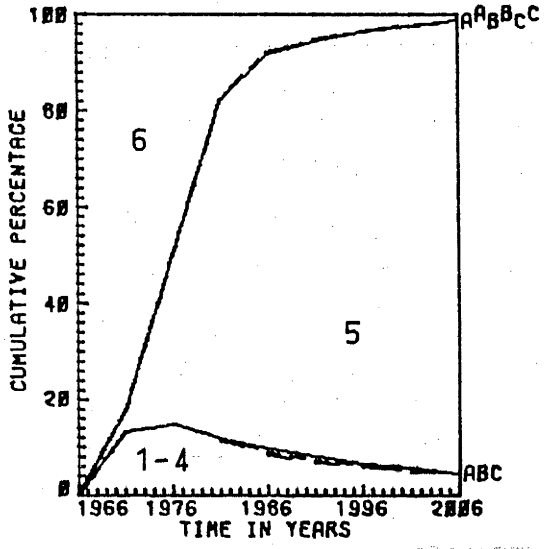
KEY

PROJECTS' SHARE OF MONETARY SECTOR PRODUCT

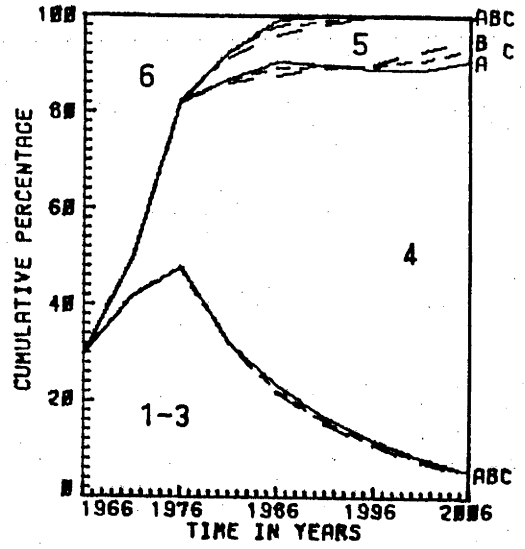
- A BASIC PROJECTION
 B HYDROELECTRIC PROJECT: AID FLOW UNCHANGED
 C " " " : AID FLOW CUT

CHART 15.5: HYDROELECTRIC PROJECT WAGE EMPLOYMENT BY EDUCATION 106

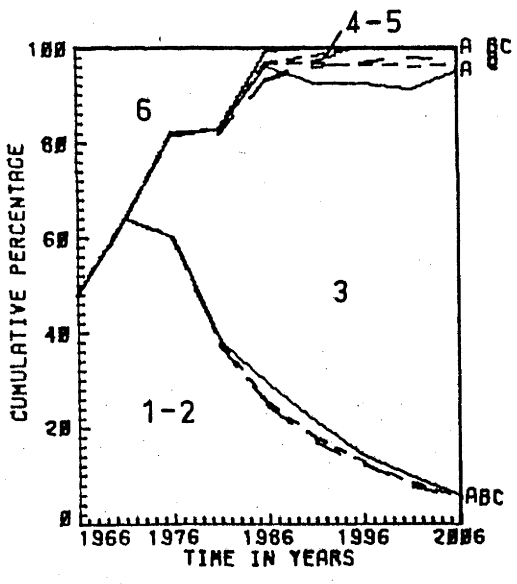
(A) PROFESSIONAL WAGE EMPLOYMENT



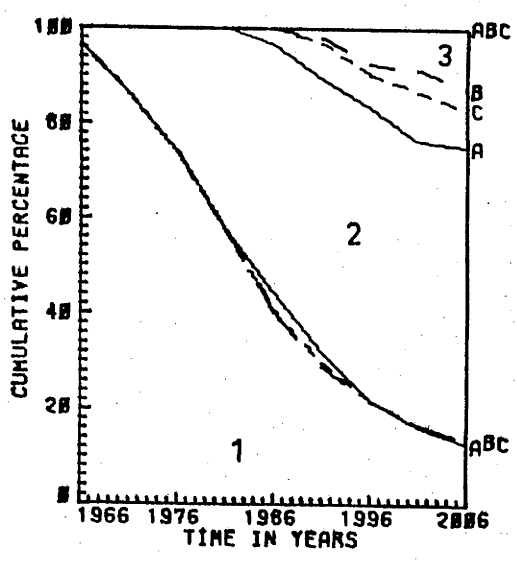
(B) SUB-PROFESSIONAL WAGE EMPLOYMENT



(C) SKILLED WAGE EMPLOYMENT



(D) UNSKILLED WAGE EMPLOYMENT

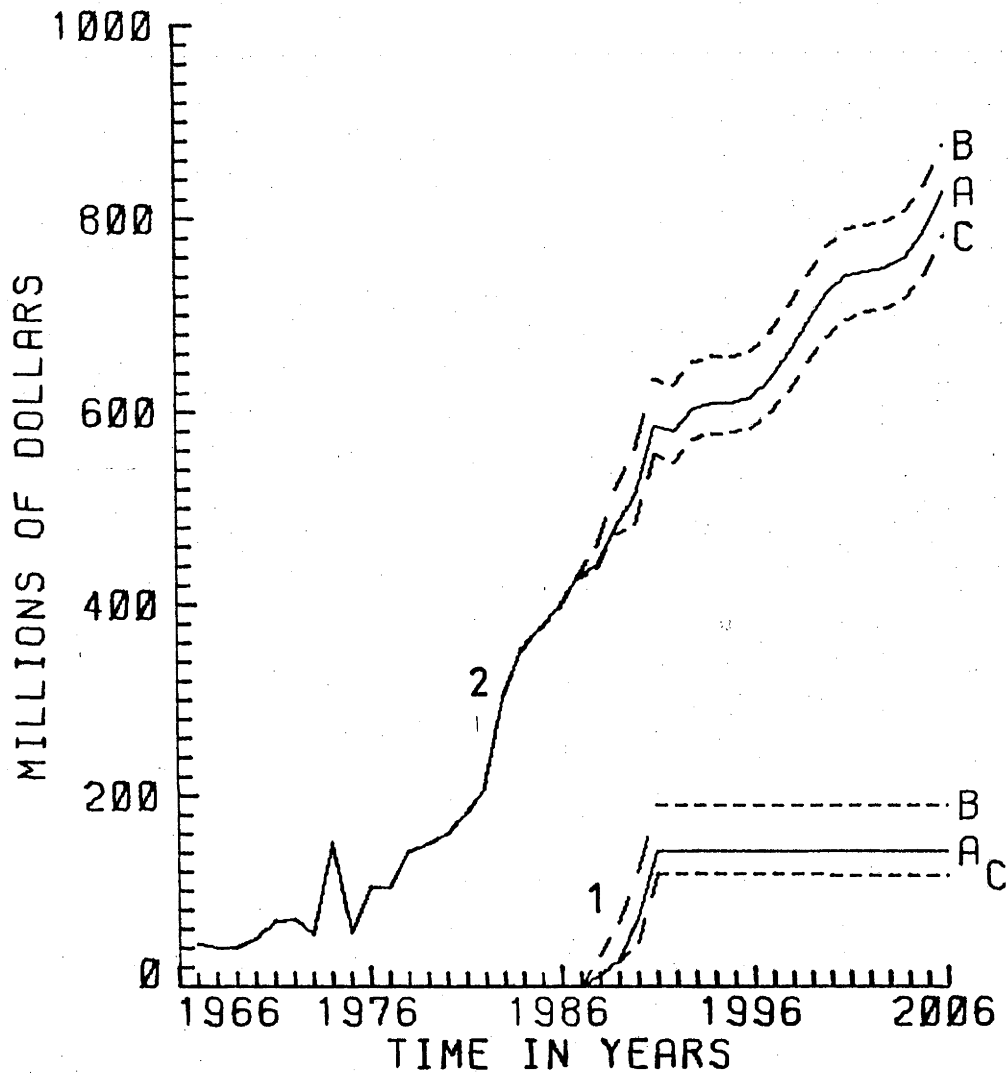


KEY

- 1 NO FORMAL QUALIFICATIONS
- 2 PRIMARY EDUCATION COMPLETED
- 3 SECONDARY EDUCATION COMPLETED
- 4 TERTIARY (NOT UNIVERSITY) EDUCATION COMPLETED
- 5 UNIVERSITY EDUCATION COMPLETED
- 6 EXPATRIATE EMPLOYEES

- A BASIC PROJECTION
- B HYDROELECTRIC PROJECT. AID FLOW UNCHANGED
- C " " " AID FLOW CUT

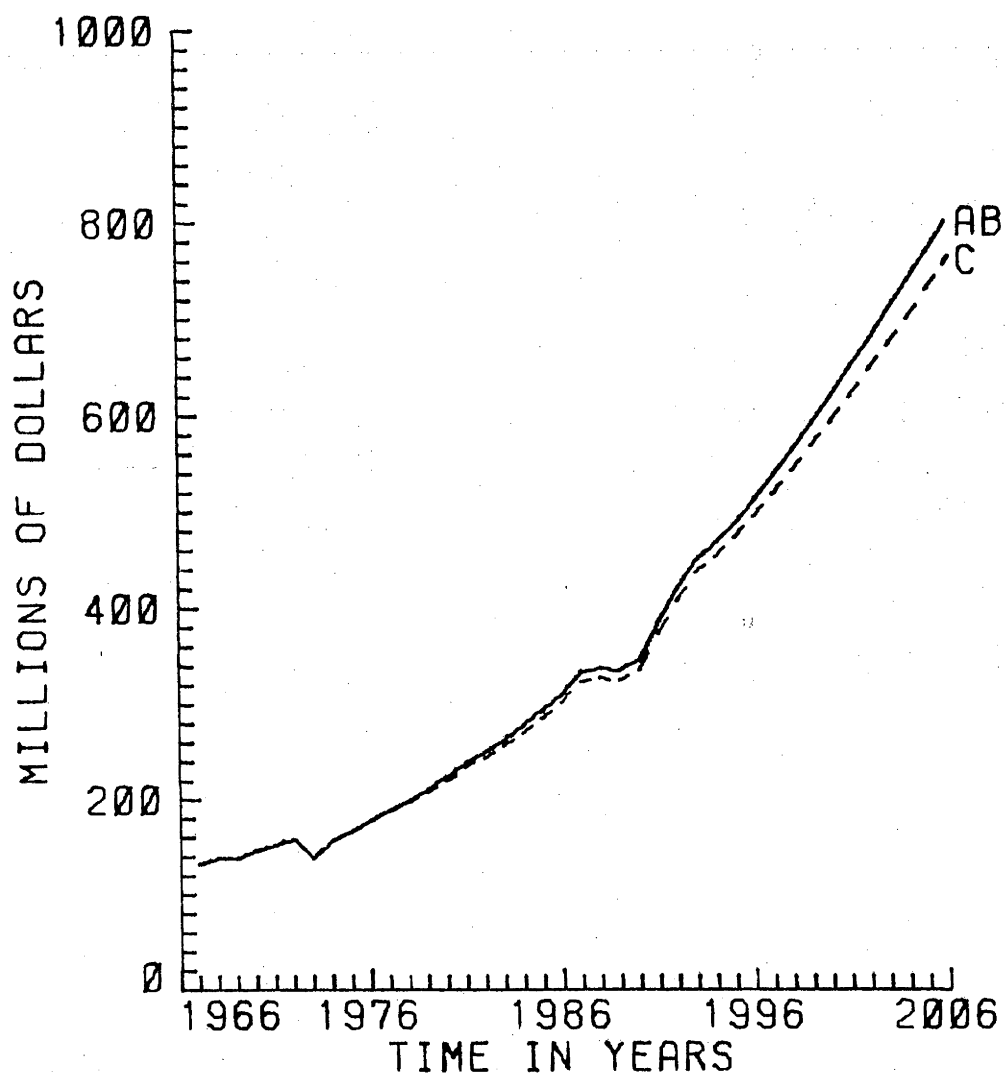
CHART 15.6: HYDROELECTRIC PROJECT -
DOMESTIC REVENUE



KEY

- 1 REVENUE FROM HYDROELECTRIC PROJECT
- 2 TOTAL DOMESTIC REVENUE
- A AID FLOW UNCHANGED
- B HIGHER GOVT. OWNERSHIP
- C HIGHER RATE OF RETURN TO CAPITAL

CHART 15.7: HYDROELECTRIC PROJECT -
EXPENDITURE ON INFRASTRUCTURE

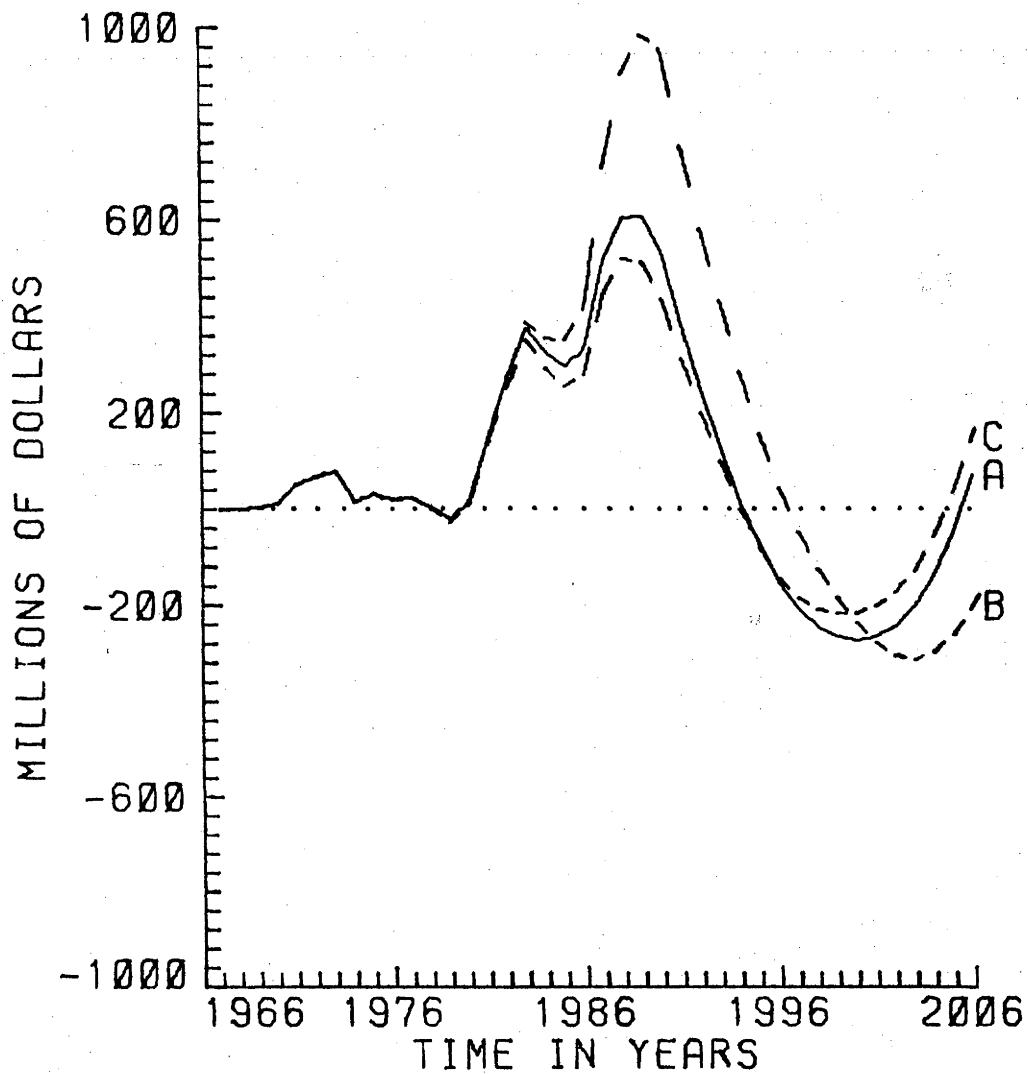


KEY

EXPENDITURE ON INFRASTRUCTURE

- A AID FLOW UNCHANGED
- B HIGHER GOVT. OWNERSHIP
- C HIGHER RATE OF RETURN TO CAPITAL

CHART 15.8: HYDROELECTRIC PROJECT -
GOVERNMENT INDEBTEDNESS



KEY

GOVERNMENT'S NET INDEBTEDNESS OVERSEAS

- A AID FLOW UNCHANGED
- B HIGHER GOVT. OWNERSHIP
- C HIGHER RATE OF RETURN TO CAPITAL

Table 16.1: Alternative strategies for education -
 (a) enrolments in the education system

units: '000 persons

Enrolments		Restricted	Basic	Accelerated
Primary schools	1986	440	505	518
	1996	635	767	769
	2006	869	1068	1070
Secondary schools (Forms 1-4)	1986	34	47	56
	1996	38	73	110
	2006	41	105	159
Senior High Schools	2006	10	11	13
Teachers' colleges: primary	2006	4	6	6
	secondary	2006	0.3	1
Universities	2006	3	3	5
Other tertiary	2006	3	2	1
Total tertiary	2006	10	12	14

(b) Staff and expenditure on the provision of education

units: staff in '000 persons, expenditure in
 \$'m (1968/69 prices)

		staff	cost	staff	cost	staff	cost
Primary schools	1986	13	30	15	34	15	35
	1996	18	41	23	50	23	50
	2006	25	57	32	71	32	71
Secondary (including Senior High Schools)	1986	2	8	2	14	2	17
	1996	2	10	3	20	4	29
	2006	2	11	4	27	7	42
Tertiary education	1986	0.7	11	0.8	13	0.9	15
	1996	0.8	12	0.9	14	1.2	18
	2006	1.0	14	1.1	15	1.5	21
TOTAL	1986	16	49	18	61	18	67
	1996	21	64	27	84	28	97
	2006	28	82	37	113	40	134

Table 16.2: Alternative strategies for education -
summary of effects on the population

units: '000 persons, figures in brackets are percentages

		Restricted	Basic	Accelerated
Total population:	1986	3681	3680	3682
	1996	5017	5013	5019
	2006	6913	6880	6887
Urban population: (per cent of total)	1986	761 (20.7)	768 (20.9)	775 (21.1)
	1996	1024 (20.4)	1046 (20.9)	1110 (22.1)
	2006	1525 (22.1)	1486 (21.6)	1527 (22.2)
Wage employment: (per cent of total workforce)	1986	266 (15.0)	262 (14.8)	253 (14.3)
	1996	371 (15.4)	368 (15.2)	362 (15.1)
	2006	512 (15.4)	523 (15.7)	534 (16.0)
Urban workforce not in wage employment: (per cent of urban workforce)	1986	103 (31.7)	104 (32.5)	110 (34.5)
	1996	136 (30.9)	142 (32.0)	159 (34.8)
	2006	219 (34.9)	203 (32.9)	204 (32.3)
<u>Composition by education:</u>				
<u>2006</u>				
(per cent of all adults)				
University completed ¹		22 (0.6)	25 (0.7)	34 (0.9)
Other tertiary education completed		58 (1.7)	66 (1.9)	64 (1.9)
Secondary school completed ²		166 (4.7)	287 (8.2)	412 (11.8)
Primary school completed		1890 (54.0)	2056 (58.8)	1951 (55.7)
No formal qualifications		1363 (39.0)	1064 (29.6)	1040 (29.7)
All adults (ages 15-60)		3499 (100)	3497 (100)	3501 (100)

1 Including graduates from Secondary Teachers' Colleges.

2 Form 4 or above.

Table 16.3: Alternative strategies for education -
 (a) primary graduates (15-60 years) by workforce status: 2006
 units: '000 persons, figures in brackets are percentages

Workforce status	Restricted		Base		Accelerated	
Non-participants	129	(6.8)	128	(6.2)	110	(5.6)
Attending secondary schools	31	(1.6)	60	(2.9)	86	(4.4)
Self-employed:						
rural	1316	(69.6)	1523	(74.1)	1472	(75.4)
urban	113	(6.0)	117	(5.7)	103	(5.3)
Unemployed	20	(1.1)	11	(0.5)	8	(0.4)
Wage employees:						
unskilled	277	(14.7)	213	(10.4)	168	(8.6)
skilled	4	(0.2)	4	(0.2)	4	(0.2)
sub-professional	0	(0.0)	0	(0.0)	0	(0.0)
professional	0	(0.0)	0	(0.0)	0	(0.0)
TOTAL	1890	(100)	2056	(100)	1951	(100)

(b) secondary graduates (15-60 years) by workforce status: 2006

Non-participants	8	(4.8)	14	(4.9)	18	(4.4)
Attending tertiary institutions	11	(6.6)	12	(4.2)	14	(3.4)
Self-employed:						
rural	41	(24.7)	74	(25.8)	117	(28.4)
urban	2	(1.2)	4	(1.4)	20	(4.9)
Unemployed	0	(0.0)	4	(1.4)	6	(1.5)
Wage employees:						
unskilled	10	(6.0)	86	(30.0)	144	(35.0)
skilled	91	(54.8)	90	(31.4)	90	(21.8)
sub-professional	3	(1.8)	3	(1.0)	3	(0.7)
professional	0	(0.0)	0	(0.0)	0	(0.0)
TOTAL	166	(100)	287	(100)	412	(100)

Table 16.4: Alternative strategies for education -
migration rates by education

units: percentage of rural males (15-60 years)
migrating to urban areas in each year

Education		Restricted	Basic	Accelerated
No formal education	1986	0.4	0.4	0.3
	1996	2.4	0.7	0.0
	2006	1.3	2.1	0.1
Primary education completed	1986	6.7	5.7	4.3
	1996	11.0	6.2	2.5
	2006	8.7	5.3	2.6
Secondary education completed	1986	66.4	66.2	68.2
	1996	47.6	56.5	49.8
	2006	42.6	46.2	38.8
Weighted average for all education groups	1986	3.5	3.7	2.3
	1996	7.4	4.6	2.0
	2006	6.0	5.0	2.5

Note: These figures do not include the movement of rural primary school leavers who enter secondary school (at age 13 years) in urban areas.

Table 16.5: Alternative strategies for education -
(a) value added by sectors (2006)

units: \$'m (1968/69 prices)

Sector	Restricted	Basic	Accelerated
Smallholder agriculture	337	341	342
Plantations	29	29	29
Major projects	227	227	227
Small-scale industry: rural	35	36	36
urban	41	39	30
Modern industry	1015	1026	1054
Government service: education	53	69	76
infrastructure	164	153	146
TOTAL	1900	1922	1939

(b) growth of total value added

TOTAL	1986	978	971	954
	1996	1299	1291	1280
	2006	1900	1922	1938

Table 16.6: Alternative strategies for education, combined
with an increased effect of education on
productivity - summary of effects on the population

units: '000 persons, figures in brackets are percentages

		Restricted	Basic	Accelerated
Total population:	1986	3679	3678	3680
	1996	5001	4997	5003
	2006	6830	6788	6794
Urban population: (per cent of total)	1986	763 (20.8)	771 (21.0)	777 (21.1)
	1996	1041 (20.8)	1063 (21.3)	1117 (22.3)
	2006	1583 (23.2)	1568 (23.1)	1582 (23.3)
Wage employment: (per cent of total workforce)	1986	269 (15.2)	265 (15.0)	256 (14.5)
	1996	380 (15.8)	376 (15.6)	372 (15.5)
	2006	549 (16.5)	566 (17.0)	579 (17.4)
Urban workforce not in wage employment: (per cent of urban workforce)	1986	101 (31.2)	103 (32.0)	109 (34.0)
	1996	136 (30.5)	143 (31.7)	154 (33.6)
	2006	217 (33.2)	205 (31.3)	192 (29.4)

Table 16.7: Alternative strategies for education combined
with an increased effect of education on
productivity - value added by sectors

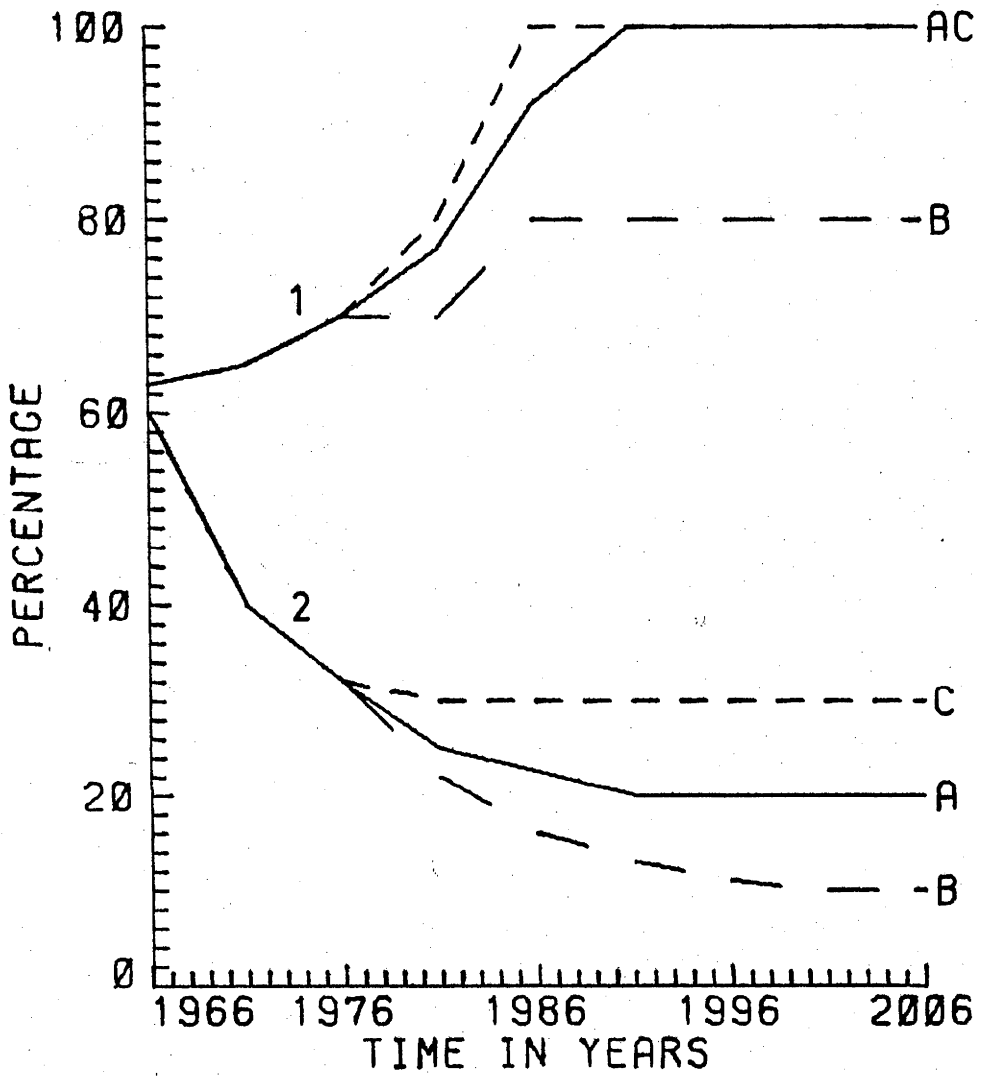
units: \$'m (1968/69 prices)

Sector		Restricted	Basic	Accelerated
Smallholder agriculture	1986	80	80	80
	1996	175	176	176
	2006	442	463	463
Plantations ¹	2006	29	29	29
Major projects ¹	2006	227	227	227
Small-scale industry:				
rural	1986	7	7	7
	1996	18	18	18
	2006	47	49	49
urban	1986	13	13	12
	1996	26	25	23
	2006	53	53	45
Modern industry	1986	446	439	422
	1996	697	683	679
	2006	1133	1154	1184
Government service:				
education	1986	31	35	37
	1996	40	51	54
	2006	53	70	76
infrastructure	1986	75	72	69
	1996	111	105	100
	2006	168	154	148
TOTAL	1986	990	984	966
	1996	1351	1343	1335
	2006	2152	2200	2221

1 Figures for 1986 and 1996 are also identical for all three alternatives.

Note: The time paths of the growth of total monetary sector product are illustrated in Chart 16.7.

CHART 16.1: STRATEGIES FOR EDUCATION - ENTRY RATES TO PRIMARY AND SECONDARY

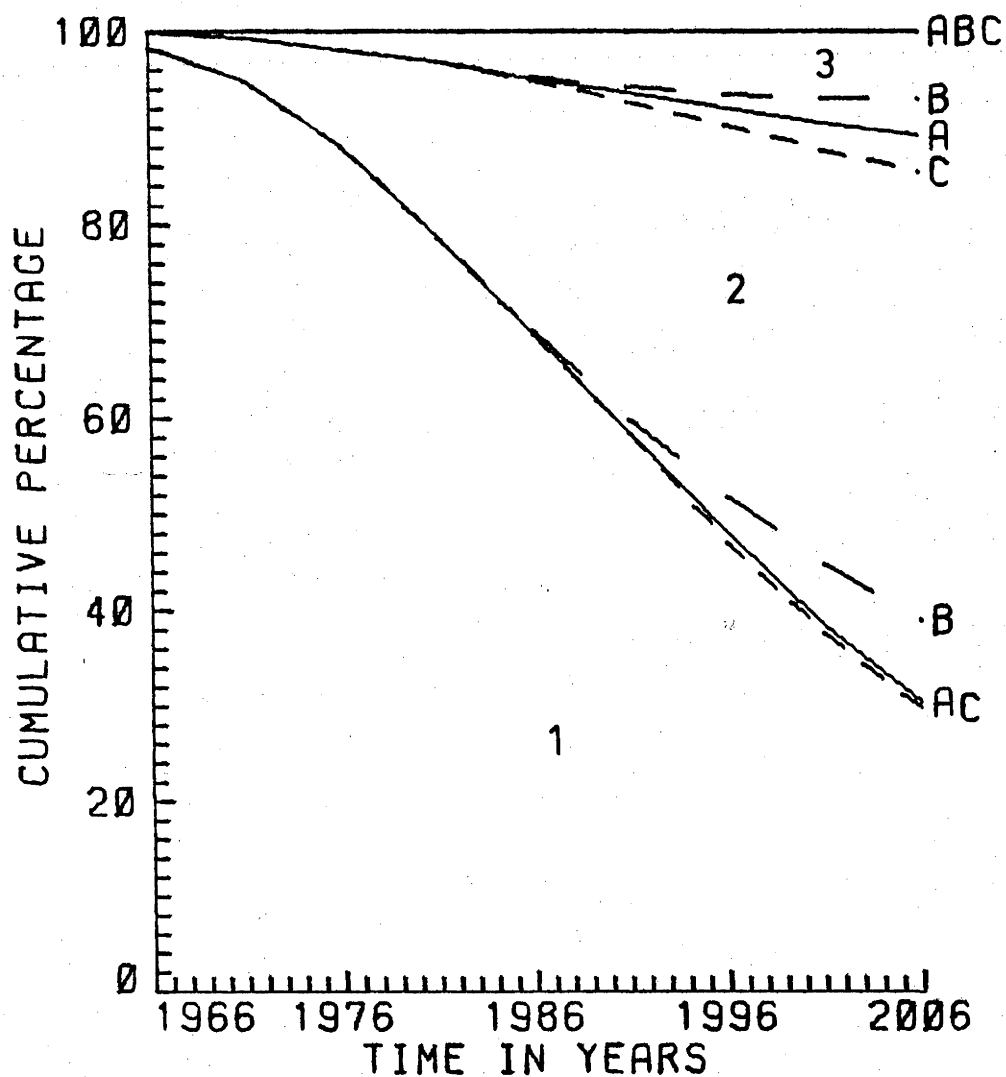


KEY

- 1 % OF 7-YEAR OLD CHILDREN ADMITTED TO PRIMARY
- 2 TRANSFER RATE FROM PRIMARY TO SECONDARY

- A BASIC PROJECTION
- B RESTRICTED STRATEGY FOR EDUCATION
- C ACCELERATED " " "

CHART 16.2: STRATEGIES FOR EDUCATION
ADULTS (AGED 15-60) BY EDUCATION



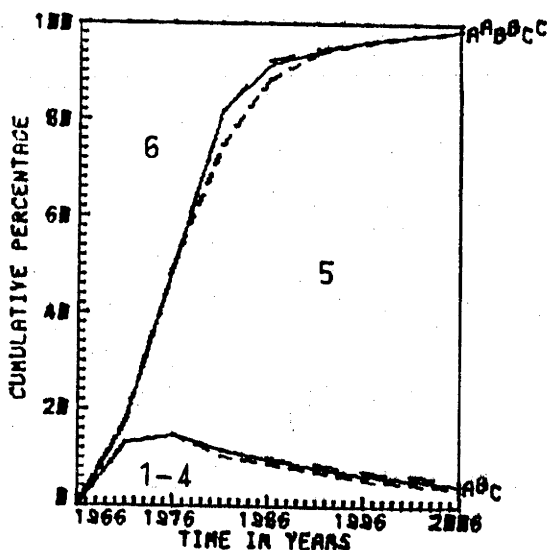
KEY

- 1 NO FORMAL QUALIFICATIONS
- 2 PRIMARY EDUCATION COMPLETED
- 3 SECONDARY EDUCATION COMPLETED

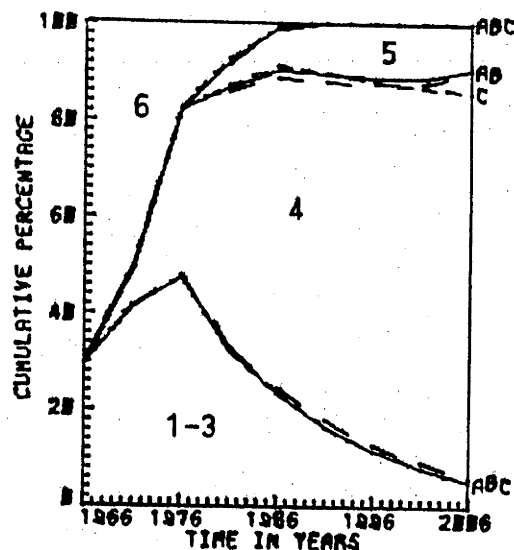
- A BASIC PROJECTION
- B RESTRICTED STRATEGY FOR EDUCATION
- C ACCELERATED " " "

CHART 16.3: STRATEGIES FOR EDUCATION WAGE EMPLOYMENT BY EDUCATION

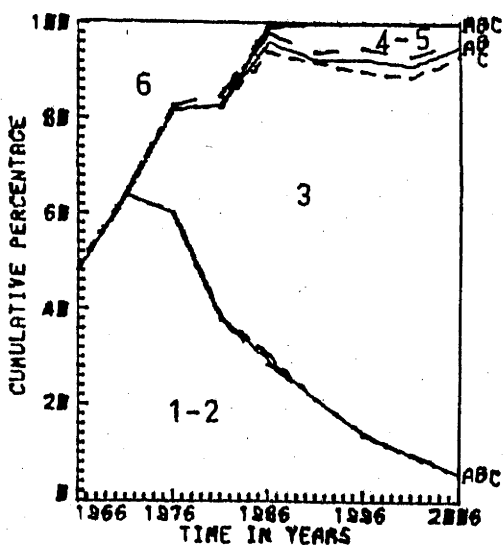
(A) PROFESSIONAL WAGE EMPLOYMENT



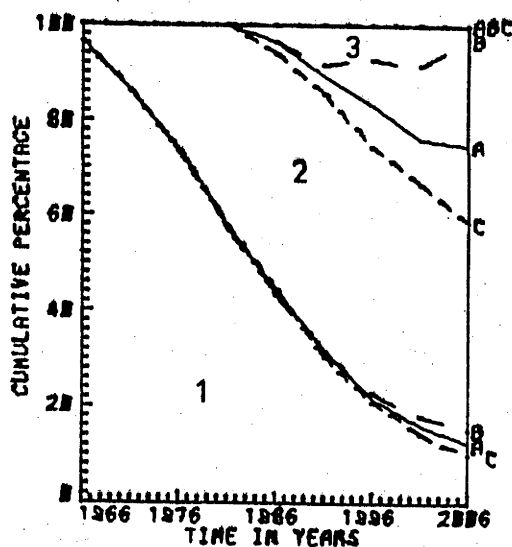
(B) SUB-PROFESSIONAL WAGE EMPLOYMENT



(C) SKILLED WAGE EMPLOYMENT



(D) UNSKILLED WAGE EMPLOYMENT

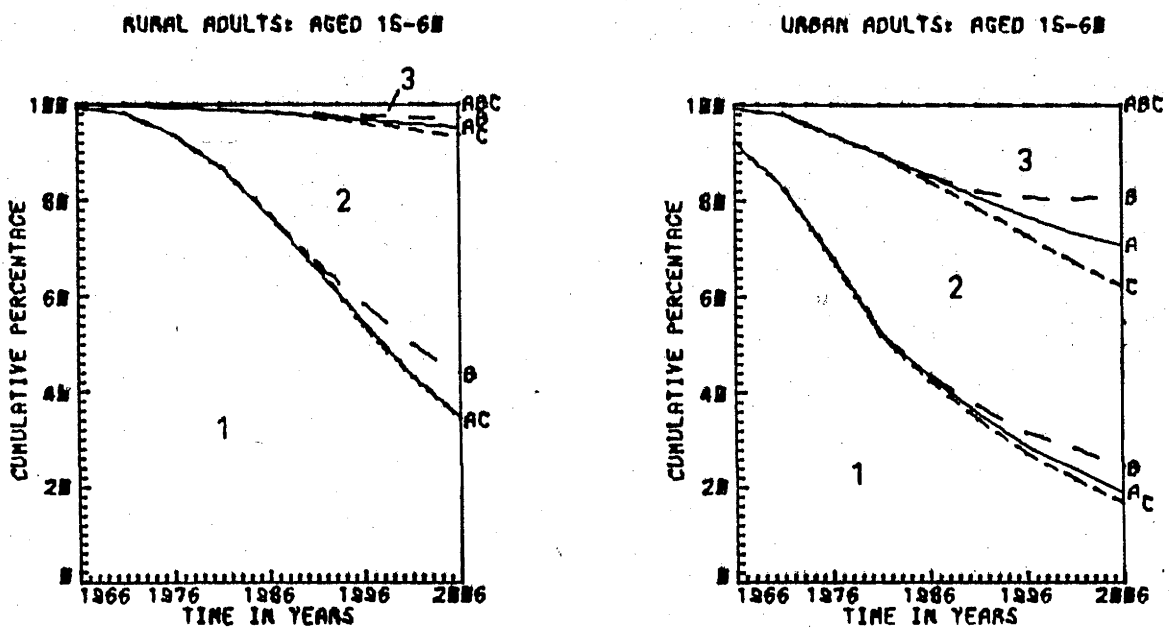


KEY

- 1 NO FORMAL QUALIFICATIONS
- 2 PRIMARY EDUCATION COMPLETED
- 3 SECONDARY EDUCATION COMPLETED
- 4 TERTIARY (NOT UNIVERSITY) EDUCATION COMPLETED
- 5 UNIVERSITY EDUCATION COMPLETED
- 6 EXPATRIATE EMPLOYEES

- A BASIC PROJECTION
- B RESTRICTED STRATEGY FOR EDUCATION
- C ACCELERATED " " "

CHART 16.4: STRATEGIES FOR EDUCATION
EDUCATION BY LOCATION

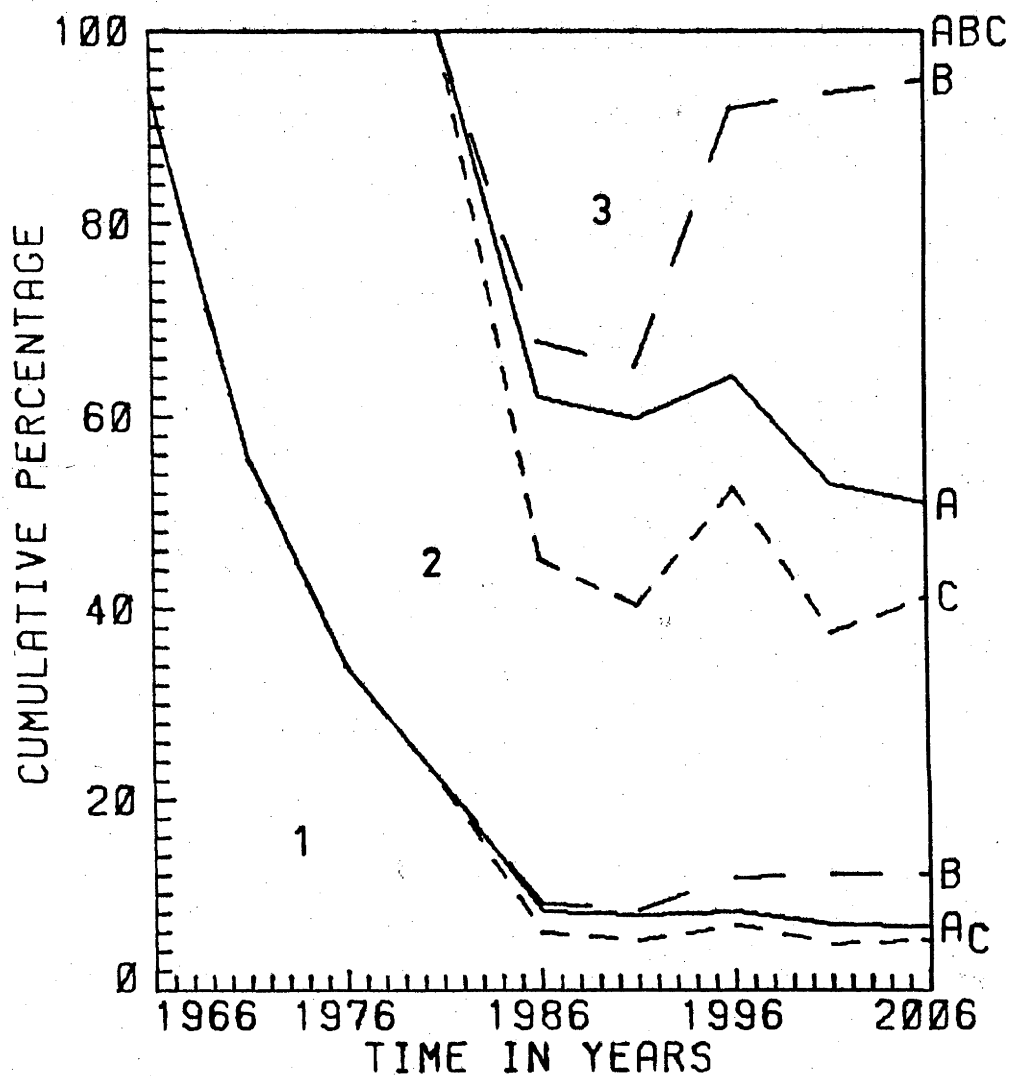


KEY

- 1 NO FORMAL QUALIFICATIONS
- 2 PRIMARY EDUCATION COMPLETED
- 3 SECONDARY EDUCATION COMPLETED

- A BASIC PROJECTION
- B RESTRICTED STRATEGY FOR EDUCATION
- C ACCELERATED " " "

CHART 16.5: STRATEGIES FOR EDUCATION
- RECRUITMENT TO UNSKILLED EMPL.

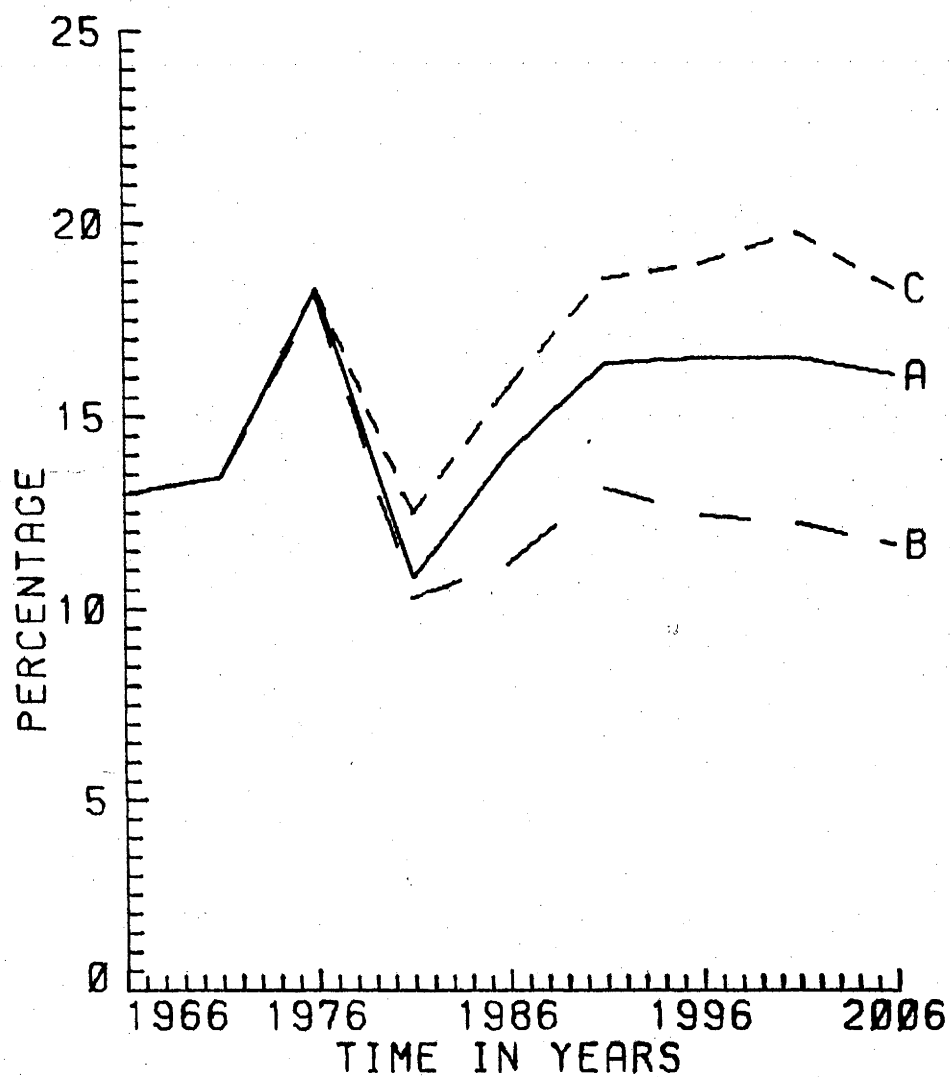


KEY

- 1 NO FORMAL QUALIFICATIONS
- 2 PRIMARY EDUCATION COMPLETED
- 3 SECONDARY EDUCATION COMPLETED

- A BASIC PROJECTION
- B RESTRICTED STRATEGY FOR EDUCATION
- C ACCELERATED " " "

CHART 16.6: STRATEGIES FOR EDUCATION
- EXPENDITURE ON EDUCATION

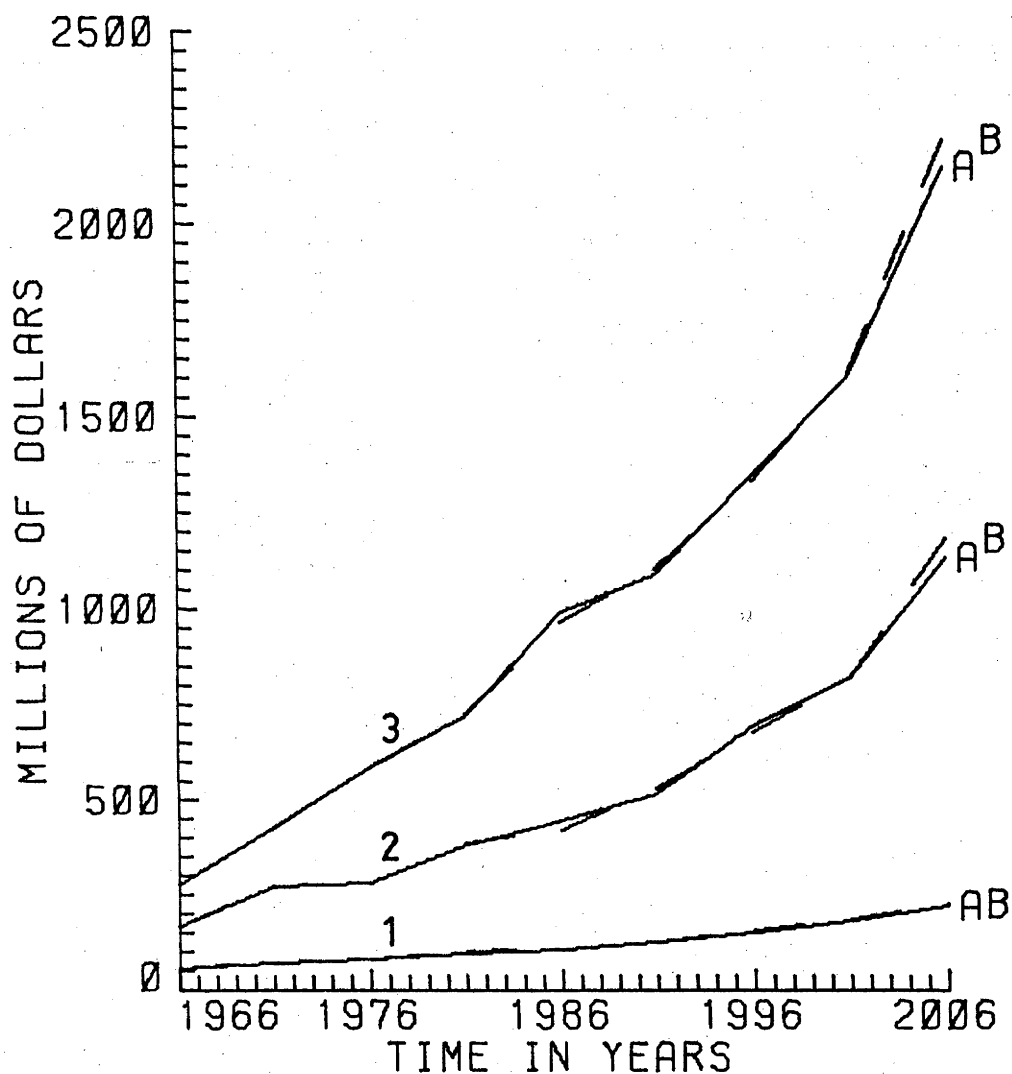


KEY

SHARE OF TOTAL GOVERNMENT EXPENDITURE

- A BASIC PROJECTION
- B RESTRICTED STRATEGY FOR EDUCATION
- C ACCELERATED " " "

CHART 16.7: STRATEGIES FOR EDUCATION
- VALUE ADDED BY SECTORS



KEY

- 1 GOVERNMENT SECTOR
- 2 MODERN INDUSTRY
- 3 TOTAL

- A RESTRICTED STRATEGY FOR EDUCATION
- - B ACCELERATED " " "

APPENDIX I

Estimation of initial values for the
composition of the population and rates
of production by sectors

This appendix sets out the derivation of the composition of the population, and the rates of production in the various sectors of the economy for 1966, the base year of the projections included in this study.

Composition of the population

The basis of classification of the indigenous population by age, sex, education, location and workforce status was presented in detail in Section 3.2. Most of the data used to establish the number of persons in each subdivision of the population is drawn from the 1966 Population Census, which was the first attempt to measure the size and characteristics of the indigenous population of Papua New Guinea.

The total population enumerated in the 1966 Census was 2.185 million of whom 2.150 million were indigenous, and 0.035 million were expatriates.¹ The total (indigenous) population of each sex in village, rural non-village and urban locations according to this census are shown in Table A.1; as explained in Chapters 2 and 3, the rural non-village and urban populations have been amalgamated under the 'urban' classification for the purposes of this study.

1 The discussion in this appendix concerns the indigenous population and 'population' is henceforth used to refer to the 'indigenous population'.

Table A.1: Indigenous population of
Papua New Guinea, 1966 : distribution by sex and location
units: '000 persons

Location	Males	Females	Total
Rural village	947.5	954.6	1902.0
Rural non-village	104.3	40.3	144.6
Urban	68.6	35.1	103.7
Urban including rural non-village	172.9	75.4	248.3
TOTAL	1120.3	1030.0	2150.3

Source: 1966 Population Census, Preliminary Bulletin No.20,
Table 2.

Distribution by age

The distribution of the population into five-year age groups is taken from Van de Kaa (1971), who adjusted the age distribution given in the 1966 Census to reduce errors caused by the misreporting of ages.¹ The adjustment, to derive the age distributions, shown in Table A.1(a), leaves reported totals by sex and locations unaffected.

Distribution by education

The distribution of the population by education, according to the 1966 Census is shown in Table A.2.

1 Such errors arose since 85% of ages recorded in the 1966 Census were estimated by interviewers. The assumptions and techniques used to make these adjustments are presented in Van de Kaa (1971), Chapters 4 and 7.

Table A.1(a): Indigenous population of
Papua New Guinea, 1966 : distribution by age,
sex and location

units: '000 persons

Age group	Rural		Urban ¹	
	Male	Female	Male	Female
0 - 4	167.1	158.9	16.6	15.6
5 - 9	136.2	129.1	12.1	10.0
10 - 14	110.2	107.4	15.8	9.6
15 - 19	74.7	87.8	34.1	11.7
20 - 24	56.3	74.8	37.3	10.0
25 - 29	55.3	65.4	25.4	7.0
30 - 34	56.6	57.9	13.4	4.2
35 - 39	53.5	51.3	7.5	2.3
40 - 44	49.0	45.5	4.0	1.4
45 - 49	43.5	39.9	2.4	1.0
50 - 54	37.8	34.8	1.4	.7
55 - 59	32.1	29.7	1.0	.6
60 - 64	26.7	24.8	.8	.5
65 - 69	20.3	19.4	.6	.4
70 - 74	14.4	13.9	.4	.3
75 - 79	7.9	8.1	.2	.2
80 +	5.8	5.8	.1	.1
TOTAL	947.4	954.6	172.9	75.4

1 Including rural non-village.

Source: Van de Kaa (1971).

Table A.2: Indigenous population of
Papua New Guinea, 1966 : distribution by sex and education
units: '000 persons

Educational qualifications	Male	Female	Total
No schooling	760.0	781.0	1541.6
Primary school not completed	333.9	242.6	576.4
Primary education completed	24.2	6.3	30.4
Secondary education completed to Form 4, plus persons who have completed teacher, or other tertiary training but not completed Form 4	1.7	0.3	2.1
Form 4 and tertiary training completed	0.025	0.006	0.031
Form 4 and university completed	0.002	0.000	0.002
TOTAL	1120.3	1030.0	2150.3

Source: 1966 Population Census, Preliminary Bulletin No.20, Tables 17 and 18.

The 1966 Census gave a classification of the population by sex, education and location only for the money-raising workforce.¹ The corresponding classification for the whole population was estimated as described below. Those persons with primary education completed who were not attending secondary schools (in urban areas) in 1966, and were not enumerated in the money-raising workforce were assumed to be village residents. The small number of persons who had completed secondary education in 1966,

1 1966 Population Census, Double-entry Tabulation No.5, (unpublished).

but were not members of the money-raising workforce were assumed to be attending tertiary institutions (in urban areas). All persons with Form 4 and some tertiary qualifications were in urban areas, and the distribution by location of those with less than primary education completed was finally obtained as a residual.

Classification of the population by age and education was not available from the 1966 Census. The distribution, shown in Table A.3, was derived indirectly from the corresponding distribution in the 1971 Census, and the enrolments at various stages of each educational institution from 1960 to 1971.¹

Distribution by workforce status

Classification of the 1966 population by workforce and occupational status was carried out in several steps:

- i. subtract persons enrolled in educational institutions from the total population;
- ii. classify the remainder into participants and non-participants in the workforce;
- iii. classify participants into wage-employed, self-employed and unemployed;
- iv. classify persons in wage employment by skill levels.

Enrolments in various educational institutions in 1966 were taken from the data sources listed above.² The remainder of the population was divided into participants

1 These data were available from the Papua New Guinea Department of Education and Manpower Planning Unit; see also Fry (1970).

2 See note 1.

Table A.3: Indigenous population of
Papua New Guinea, 1966 : distribution by age,
sex and education

units: '000 persons

age group	less than primary education completed		primary education completed		secondary education completed	
	M	F	M	F	M	F
0 - 9	330.6	313.0	0.0	0.0	0.0	0.0
10 - 19	219.0	253.1	14.7	5.1	1.3	0.3
20 - 29	168.1	156.2	5.9	0.9	0.5	0.1
30 - 39	128.4	115.8	0.8	0.0	0.0	0.0
40 - 59	171.0	153.7	0.0	0.0	0.0	0.0
60 +	77.5	73.5	0.0	0.0	0.0	0.0
TOTAL	1094.4	1024.3	24.2	6.3	1.7	0.4

Source: see text

and non-participants according to the proportions of the population in each age, sex by location group classified as participants in the census.¹ These proportions were used to derive the average labour force participation rates shown in Table A.4. Allowance was made for higher participation rates by the relatively small number of persons with formal educational qualifications. If q_0 is the proportion of persons with no formal qualifications not participating from a given age, sex and location group

1 1966 Population Census (unpublished), Double-entry Tabulations Nos 11 and 12.

Table A.4: Indigenous population of
Papua New Guinea, 1966 : labour force participation
rates by age, sex and location

Age group	Rural		Urban ¹	
	M	F	M	F
0 - 14 ²	.00	.00	.00	.00
15 - 19	.79	.91	.70	.32
20 - 24	.96	.98	.91	.24
25 - 29	.99	.98	.92	.22
30 - 34	.99	.98	.90	.24
35 - 39	.99	.98	.83	.25
40 - 44	.97	.98	.83	.28
45 - 49	.95	.96	.76	.27
50 - 54	.90	.91	.69	.26
55 - 59	.81	.87	.66	.25
60 - 64	.71	.72	.56	.24
65 - 69	.60	.55	.50	.22
70 - 74	.50	.45	.40	.13
75 - 79	.30	.30	.20	.04
80 +	.00	.00	.00	.00
Weighted average	0.94	0.88	0.95	0.25

1 Including rural non-village.

2 Participation rates for ages 0-14 are assumed to be zero.

Source: 1966 Population Census:

Double-entry Tabulation No.11: Occupation by age, sex and location of the money raising workforce;
Double-entry Tabulation No.12: Subsistence workforce by age and sex.

then the proportion of primary school leavers not participating was set to be $q_1 = .67q_0$; for secondary school leavers $q_2 = .22q_0$ and for tertiary graduates $q_3 = .13q_0$. These were then pro-rated so that the (weighted) average participation rates were equal to those shown in Table A.4.¹

Wage employment

The total number of persons in wage employment was estimated from several data sources as it was considered that the 1966 Census estimate for the number of persons unemployed and actively seeking work (1,964 persons) was too low, due to unwillingness to admit to being unemployed. Hence the Census figure of 140,217 employees had to be modified. The estimate of wage employment given in the Department of Labour and Industry, Labour Information Bulletin, No.4, for March 1966 was 94,141, excluding domestic servants and those employed on religious missions.

The intermediate estimate of total wage employment used in the study was obtained as follows:

- (a) An estimate of 170,630 for indigenous employment in 1970 by Parker (1973) was accepted.
- (b) Of this number 18,200 were classified by Parker (1973) as 'personal service', leaving 152,430 to be compared to the Department of Labour's estimate² of 128,585 for 1970.

1 The decline in the weighted average participation rates resulting from the changing educational composition of the population in the basic projection are shown in Table 11.19.

2 See Labour Information Bulletin, No.7.

- (c) It was assumed that the proportion of under-enumeration in the Department of Labour's survey was the same in 1966 as in 1970, giving an estimate of 113,650 for indigenous wage employment (excluding personal service) in 1966.
- (d) The number in personal service in 1966 was estimated to be 16,300 by extrapolating backward from estimates for 1970 and 1978 by Parker (1973).

Total indigenous wage employment in 1966 was thus estimated to be 129,950; this is somewhat below the Census estimate, thus allowing for a larger number of persons to be self-employed and unemployed in urban areas.¹ These were split into self-employed and unemployed in the ratio² of 7:3, to give an estimate of 3,600 for the unemployed in urban areas; which is approximately twice the Census figure. The resulting classification of the population by workforce status is shown in Table A.5.

Wage employment by industry and skill level

The composition of wage employment by industry (or sector) is shown in Table A.6(a). The classification of indigenous employment is taken from the Labour Information Bulletin, No.4, adjusted for the estimate for total indigenous employment. The composition of expatriate

-
- 1 All participants in the village workforce were assumed to be in self-employment. As explained in Chapter 3, the wage employees sent to villages (teachers, etc.) have been treated as part of the urban workforce for the purposes of this study.
- 2 The ratios for particular age by sex groups were allowed to vary on the assumption that the unemployed were dominated by young males recently arrived from villages.

Table A.5: Indigenous population of
Papua New Guinea, 1966: distribution by workforce status
units: '000 persons

Workforce status	Number
Non participants: rural	797.4
urban	92.0
Attending educational institutions:	
rural	133.8
urban	29.7
Self-employed: rural	955.1
urban	8.8
Unemployed	3.6
Wage employment: unskilled	119.4
skilled	8.5
sub-professional	2.1
professional	0.0
all skill levels	129.9
TOTAL	2150.3

Source: see text

employment is from the Papua New Guinea Manpower Planning Unit (1969). In both cases, the number of teachers has been revised to equal figures supplied by the Papua New Guinea Department of Education.

Wage employees have been classified into four skill categories, based on the five-fold classification used by the Papua New Guinea Manpower Planning Unit, which subdivided wage employment according to the minimum

Table A.6(a): Wage employment classified by
race and sector

units: '000 persons

Sector	Indigenous	Expatriate	Total
Plantations	40.38	1.22	41.60
Modern industry	59.44	9.03	68.47
Teachers	3.85	1.76	5.61
Government service n.e.i.	26.28	3.93	30.21
TOTAL	129.95	15.94	145.98

Source: see text

educational qualifications required for each job. The specification of these categories is set out in Table A.6(b). The original purpose of the distinction between unskilled and semi-skilled employment was to identify those positions which could be filled by persons with no formal qualifications. As the flow of primary school leavers already exceeds the total number of positions below the skilled level to be filled each year, this distinction has ceased to be of significance and the two categories have been amalgamated in this study.

The numbers of expatriate and indigenous employees at each skill level were available from the Papua New Guinea Manpower Planning Unit (1969).¹ Departures from those figures were as follows: firstly, all primary teachers have been classified as sub-professional, and all secondary

1 See Tables 2.8, 8.2, 8.3 and 8.6 in Volume I.

Table A.6(b): Basis of classification of wage employment by skill level

Classification adopted in the model	Corresponding categories in the Manpower Planning Unit classification	Educational qualifications required ¹
Professional	<u>Class A:</u> Professional, managerial and related workers	university degree
Sub-professional	<u>Class B:</u> Sub-professional, higher technical and related workers	diplomates of post-secondary course of at least two years duration
Skilled	<u>Class C:</u> Skilled workers	higher secondary schooling (Form 3 and above)
Unskilled	<u>Class D:</u> Semi-skilled workers	lower secondary schooling (Form 2 and below)
	<u>Class E:</u> Unskilled workers	no formal education required

- 1 The complete description of these manpower categories appears in PNG Manpower Planning Unit (1974), p.x. These are minimum qualifications for current recruitment; the actual composition of employment at each skill level by educational qualifications will depend on the relative supply and demand for educated manpower.

teachers as professional employees; secondly, the small number of expatriates employed at the unskilled level has been neglected.

The classification of indigenous wage employees by age and sex, shown in Table A.7, is derived from the distribution of indigenous employees enumerated by the

Table A.7: Indigenous population of
Papua New Guinea, 1966 : wage employees
classified by age and sex

units: '000 persons

Age group	Male	Female	Total
15 - 19	28.2	0.8	29.0
20 - 24	40.1	1.4	41.5
25 - 29	42.7	1.5	44.2
30 - 39	11.2	0.4	11.6
40 - 49	3.0	0.1	3.1
50 +	0.6	0.0	0.6
TOTAL	125.8	4.1	129.9

Source: See text

Department of Labour survey for March 1967.¹ The final step in the classification of the population was to classify by age, sex and education within each skill level. All persons with secondary (or above) educational qualifications were placed in sub-professional employment. The remaining indigenous employees at the sub-professional and skilled levels were assumed to have completed primary school and the required number was found by taking an equal proportion of such persons from each age by sex subgroup. The remaining persons with primary education completed in urban areas

1 Distribution of indigenous employees by age and sex, March 1967, is presented in an unpublished tabulation held at the Papua New Guinea Department of Labour and Industry.

were assumed to be in unskilled employment, while the age-sex composition of unskilled employees with no formal qualifications was derived as a residual from the figures shown in Table A.7.

Production by sectors

The value added, in 1966, in the sectors of production distinguished in this study, shown in Table A.8, were estimated as follows:

1. Government sector: the value added in this sector is equal to the wage bill; government expenditure on goods and services contributes to demand, and hence to value added in modern industry. The wage bills were derived from the numbers employed in the provision of education and infrastructure, classified by race and by skill level (see Table A.6(a)), and the wage rates shown in Table 2.9 (Volume I).
2. The total value added by the market component of agriculture in 1966 is taken from the Papua New Guinea National Accounts Statistics (1974). This figure was split between plantations and smallholder production of export and food crops as explained below. Parker (1973) gives the following breakdown of commercial agricultural production for 1970:

Plantation production of major export crops ¹	44.5%
Smallholder production of major export crops	34.3%
Other agriculture	21.2%

1 Copra, coffee, cocoa, rubber, tea and palm oil.

Table A.8: Value added by sectors
(monetary sector) : 1966

units: \$'million (1968/69 prices)

Sector	Value added	% of total
Government: education	14.9	5.4
infrastructure	39.5	14.2
Agriculture:		
plantations	30.0	10.8
smallholder food crops	4.8	1.7
export crops	20.6	7.4
Major projects	0.0	0.0
Industry:		
modern industry	166.3	59.9
small-scale rural	0.9	0.3
urban	0.5	0.2
TOTAL	277.5	100.0

Source: see text

The other, minor agricultural crops¹ are also produced on plantations and smallholdings. Half of this production was assigned to plantation production and half to smallholder production for the domestic markets.

3. Major natural resource based projects: the first of these, the Bougainville copper project was not commenced until 1969.

1 Including rice, peanuts, passionfruit, staple tubers, green vegetables.

4. Small-scale industry: there is no direct information available on value added in 1966 by these sectors. The value added in rural areas was estimated by assuming that production in rural small-scale industry supplied 10% of demand for industrial goods and services generated out of rural monetary incomes. The urban small-scale (or 'informal') industrial sector is very small, as remarked in Chapter 2;¹ hence value added in this sector has been set, arbitrarily, at the low figure of \$0.5 million. On this assumption average value added per participant in this sector is less than 10% of the wage for unskilled employees in modern industry.
5. Finally, value added in modern industry was derived as a residual from the figure for the total monetary sector income for 1966 in the Papua New Guinea National Accounts Statistics (1974).

Table A.9: Condensed input-output table

Industry	A	B	C
A. Agricultural production	-	-	.014
B. Major projects	-	-	-
C. Industrial production	.182	.046	.316
Imports	.071	.137	.185

Source: Parker 1973.

1 See also Conroy and Vines (1973).

Condensed input-output table

The coefficients shown in Table A.9 were derived by condensing the input-output table for 1970, drawn up by Parker (1973). The coefficients have been assumed to be the same for the sectors included in the agricultural and industrial groups in the above table, and the coefficients have been assumed to remain constant for the purpose of the present study.

APPENDIX II

PROGRAMMING TECHNIQUES

This appendix explains some of the techniques used for programming, and the facilities required for using the simulation model. It does not describe the operation of the computer programs in detail - full listings of program and data files are available on request.

The programs have been written in FORTRAN. This programming language has been used because of its flexibility, and its widespread use. Unlike most specialised simulation languages, FORTRAN is available on practically all currently used computers, and is familiar to all professional programmers who may subsequently be called upon to make adaptations to the simulation program.

The simulation model has been constructed to economise on computer facilities. The present version has been designed for use on a UNIVAC 1108 system, and requires 50K words of memory.¹ This limit has been achieved by breaking down the model into four separate programs, whose functions are described below:

1. RESET: A full set of time paths for policy and other exogenous variables are stored on a disc (or tape) file. RESET carries out any adaptations to these time paths that are required for the next execution of the simulation program.
2. SIM: The simulation program reads the array set

1 1K = 1024 words.

up by RESET and generates long-term projections.

Parameters values are held in core storage for only two successive years to reduce memory requirements. The calculations for each year are carried out in one long program 'loop'. Subroutines corresponding to the various sub-models¹ are executed in turn. At present the entire program is held in core throughout, but these modules could be overlaid to reduce memory requirement to 20K, so the program can be executed on the computer system (ICL 1902) used by the Papua New Guinea government. In order to achieve a further reduction in memory requirements, values of endogenous variables, derived in each year of the projection run, are written onto a disc (or tape) file to be read by the following programs:

3. RRR: This program tabulates the results generated by SIM in the detail desired by the user. Ratios, percentages, sums, cumulative sums, growth rates etc. can be generated by changing parameters in the 'command file'.²
4. AAA: This is a specialised program that allows results to be plotted either on a line printer,

1 To facilitate further programming changes the sub-models are each programmed as several FORTRAN subroutines, all of which can be separately revised and tested.

2 The role of this file is outlined below.

or on a plotter where available.¹

The full sequence of programs required a little over five minutes of processing time on the UNIVAC 1108.

The sequence of programs has been assembled to make it simple to use. The command file is held on a disc (or tape) file. It contains instructions to generate a comprehensive set of tabulations; extended or limited versions can be generated by simple editing of the command file. Similarly, the present version of command file is set up to generate the 'basic' projection, but adaptations to the file containing time paths of exogenous variables may be made by the insertion of simple instructions into the command file. For example, the 'basic' time path of foreign aid is held on the file of variables, while the 'reduced' path also shown in Chart 12.1, can be set up by the following instruction:

```
22 5 416 -7. 20
```

The code '22,5' identifies the particular time path (a full 'dictionary' is available) while '4' calls for linear change at -7. per year from year 16 (equivalent to 1982 = 1966 + 16) until a limit of 20. is reached. Similar, simple instructions can be used to enter stepwise changes by an increment or ratio for all or part of the period, or to generate time paths corresponding to geometric rates of change.

1 Line printer plots were used in testing the program and selecting runs for presentation, while the plotter was used to generate the charts included in the thesis.

It is also possible to change the starting point of time paths by a simple instruction; which facilitates the simulation of alternative timing for the introduction of any major natural resource based projects.