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World demographic trends

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Report of the Secretary-General

Summary

Prepared in accordance with resolution 1996/2 of the Economic and Social Council, the present report provides an overview of the latest demographic trends worldwide for major areas and for selected countries, as assessed in the seventeenth round of official United Nations population estimates and projections, *World Population Prospects: the 2000 Revision*.

According to the *2000 Revision*, world population reached 6.1 billion in mid 2000 and is currently growing at a rate of 1.2 per cent annually, implying a net addition of 77 million people per year. Six countries account for half of that annual increment: India for 21 per cent; China for 12 per cent; Pakistan for 5 per cent; Nigeria for 4 per cent; Bangladesh for 4 per cent, and Indonesia for 3 per cent. By 2050, world population is expected to be between 7.9 billion (low variant) and 10.9 billion (high variant), with the medium variant producing 9.3 billion people.

The population of more developed regions, currently estimated at 1.2 billion, is anticipated to change little during the next 50 years, although fertility levels are expected to remain below the replacement level. However, by mid century the populations of 39 countries are projected to be smaller than they are today (e.g., Russian Federation, Georgia and Ukraine, between 28 and 40 per cent smaller; Italy and Hungary, 25 per cent smaller; Japan and Germany, 14 per cent smaller).

The population of the less developed regions is projected to rise steadily, from 4.9 billion in 2000 to 8.2 billion in 2050 (medium variant). This projection assumes continuing declines in fertility. In the absence of such declines, the population of the less developed regions could reach 11.9 billion. Particularly rapid growth is expected in the group of 48 countries classified as the least developed. Their population is expected nearly to triple between 2000 and 2050, passing from 658 million to 1.8 billion, despite the fact that their fertility is projected to decline markedly.

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I. Introduction

1. This report presents an overview of world demographic trends based on the results of *World Population Prospects: the 2000 Revision*, the seventeenth round of official United Nations population estimates and projections prepared by the Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat.[1] These are used throughout the United Nations system as the basis for activities requiring population information.

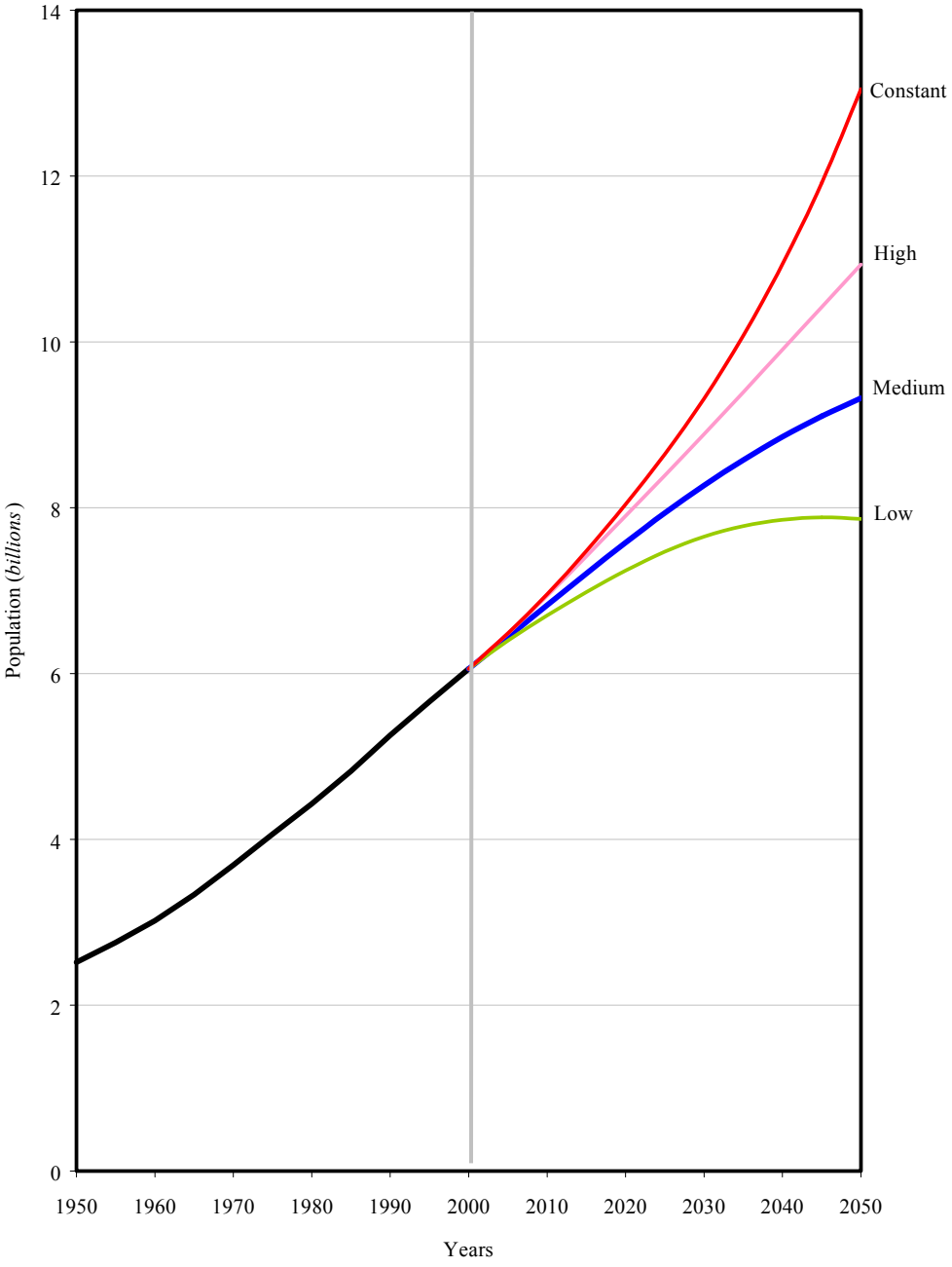
2. Population projections are produced for the 228 inhabited countries or areas of the world. For the 187 countries or areas with an estimated 2000 population surpassing 140,000, projections of the population by age and sex are prepared by using the components method which requires that explicit assumptions be made about future levels and trends of fertility, mortality and international migration. For the other 41 countries or areas, projections of the total population are made by making assumptions about the future path of the growth rate. For all countries or areas, past estimates for 1950-2000 are prepared by analysing and evaluating the available demographic evidence with the aim of ensuring both the international comparability and consistency of the estimates obtained. Country-level estimates and projections are then combined, as appropriate, to produce estimates and projections for the 28 world regions, the five major areas, the various development groups and the world.

3. According to the 2000 Revision, world population reached 6.1 billion in mid 2000 and is currently growing at a rate of 1.2 per cent annually, implying a net addition of 77 million people per year. Six countries account for half of that annual increment: India for 21 per cent; China for 12 per cent; Pakistan for 5 per cent; Nigeria for 4 per cent; Bangladesh for 4 per cent, and Indonesia for 3 per cent. By 2050, world population is expected to be between 7.9 billion (low variant) and 10.9 billion (high variant), with the medium variant producing 9.3 billion people (fig. I).

4. The population of the more developed regions, currently estimated at 1.2 billion, is anticipated to change little during the next 50 years, although fertility levels are expected to remain below the replacement level.[2] However, by mid-century the populations of 39 countries are projected to be smaller than today (e.g., Russian Federation, Georgia and Ukraine, between 28 per cent and 40 per cent smaller; Italy and Hungary, each 25 per cent smaller; and Japan and Germany, each 14 per cent smaller).

5. The population of the less developed regions is projected to rise steadily, from 4.9 billion in 2000 to 8.2 billion in 2050 (medium variant). This projection assumes continuing declines in fertility. In the absence of such declines, the population of the less developed regions could reach 11.9 billion. Particularly rapid growth is expected among the group of 48 countries classified as the least developed. Their population is expected nearly to triple between 2000 and 2050, passing from 658 million to 1.8 billion, despite the fact that their fertility is projected to decline markedly in the future.

Figure I
Estimated and projected population of the world, by projection variant, 1950-2050



Source: United Nations, Population Division.

6. The difference between the projected population in 2050 according to the *2000 Revision* (9.3 billion) and that projected in the *1998 Revision* (8.9 billion) is 413 million people. Higher future fertility levels projected for 16 developing countries whose fertility has not yet shown signs of a sustained decline are responsible for 59 per cent of that difference. The somewhat higher recent fertility estimated in the *2000 Revision* for several populous countries (e.g., Bangladesh, India and Nigeria) accounts for a further 32 per cent of the difference.

7. For 1995-2000, life expectancy at birth in the more developed regions is estimated to be 75 years. In the less developed regions, life expectancy was nearly 12 years lower, or 63 years. By 2045-2050 the less developed regions are expected to attain a life expectancy of 75 years, whereas in the more developed regions the projected level is 82 years, implying that the gap between the two groups may narrow.

8. The *2000 Revision* indicates a worsening of the impact of the HIV/AIDS epidemic in terms of increased morbidity, mortality and population loss. Thus, during the next five years, the number of excess deaths because of AIDS among the 45 most affected countries (up from the 34 considered in the *1998 Revision*) is estimated at 15.5 million. Despite the devastating impact of the HIV/AIDS epidemic, the populations of the most affected countries are expected to be larger by mid century than today. For the nine countries in Africa most affected by the epidemic (with HIV prevalence at or above 14 per cent), the population is projected to increase from 115 million in 2000 to 196 million in 2050. Even in Botswana, where HIV prevalence is 36 per cent, or in Swaziland and Zimbabwe, where it is above 25 per cent, the population is projected to increase significantly between 2000 and 2050: by 37 per cent in Botswana, 148 per cent in Swaziland, and 86 per cent in Zimbabwe. Only in South Africa, whose fertility is lower than that of Botswana or Zimbabwe, does the growth rate of the population become negative during 2010-2025, being positive thereafter.

9. Although the probability of being infected by HIV is assumed to decline significantly in the future (particularly after 2015), the long-term impact of the epidemic remains dire. For the 45 most affected countries, the expectation of life at birth has already been reduced by nearly three years. By 2010-2015, expectation of life is projected to stand at 60 years, five years lower than it would have been in the absence of HIV/AIDS.

10. Globally the number of older persons (aged 60 years or over) will more than triple, increasing from 606 million today to nearly 2 billion by 2050. The increase in the number of the oldest old (aged 80 years or over) is expected to be even more marked, passing from 69 million in 2000 to 379 million in 2050, more than a five-fold increase.

11. In the more developed regions, the population aged 60 years or over currently constitutes about 20 per cent of the population; by 2050 it will account for 33 per cent. The older population there has already surpassed the child population (persons aged 0-14), and by 2050 there will be two older persons for every child. In the less developed regions, the proportion of the population aged 60 years or over will rise from 8 per cent in 2000 to close to 20 per cent in 2050.

12. International migration is projected to remain high during the twenty-first century. The more developed regions are expected to remain net receivers of

international migrants, with an average gain of about 2 million per year over the next 50 years. Because of low fertility, this migration will have a significant impact on population growth. Without migration, the population of the more developed regions would start declining in 2003 rather than in 2025, and by 2050 it would be 126 million less than the 1.18 billion projected under the assumption of continued migration (fig. II).

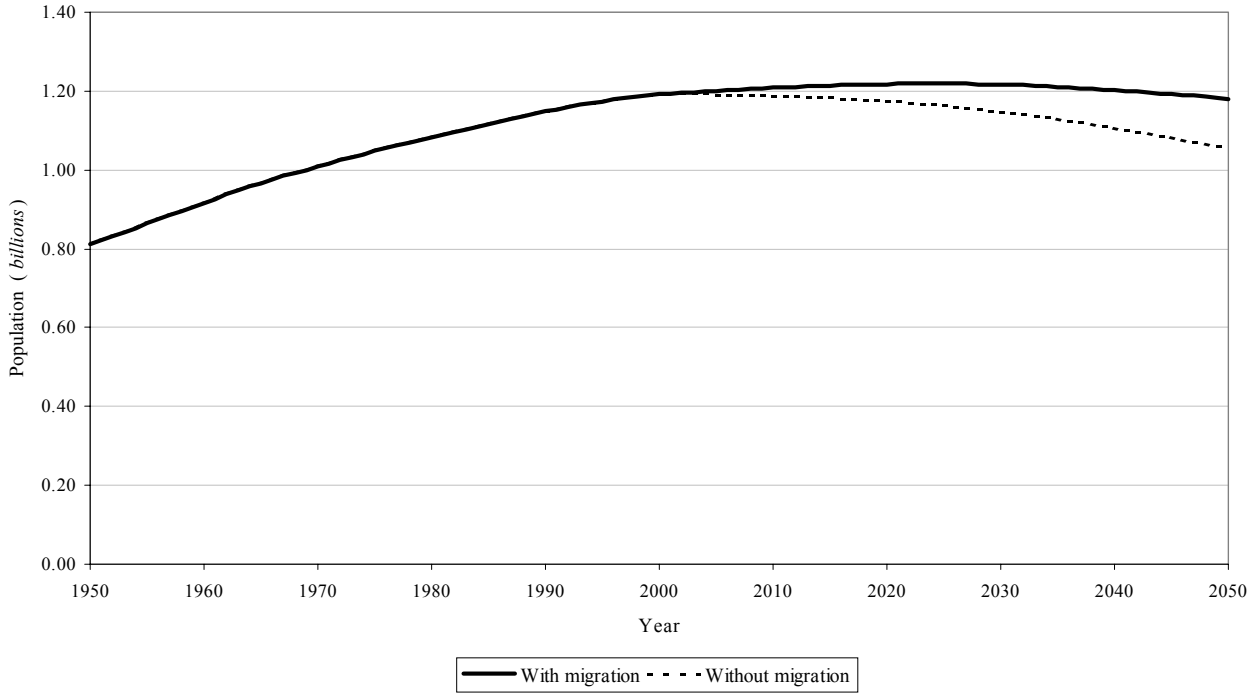
13. According to the *2000 Revision*, the heterogeneity that characterizes today's demographic trends at the country level is expected to continue well into the future. Thus, during the next half century, although most countries are expected to move towards replacement level, at least 16 are projected to remain above replacement level until 2050, when their position will contrast markedly with that of the 67 countries whose fertility is expected to remain below replacement level. Among the latter, 39 are expected to experience a reduction in population between 2000 and 2050, largely as a result of low fertility.

14. There is also increasing heterogeneity in terms of mortality trends. Whereas the populations of most countries are projected to experience declining mortality, those highly affected by the HIV/AIDS epidemic face higher risks of death in the future. Furthermore, the pace of mortality decline is projected to vary considerably even among populations where HIV/AIDS is not yet expected to have a significant impact. As a result, by 2045-2050, a 17-year difference is projected between the life expectancy of southern Africa, the region most seriously affected by HIV/AIDS, and that of Western Europe, the region with the highest life expectancy in 2045-2050 (83.5 years). Moreover, within Europe, life expectancy in Eastern Europe is expected to be similar to that of Asia or South America, or six years lower than that projected for Western Europe.

II. World population trends

15. The world population reached 6.1 billion by mid 2000 and is projected to grow to 9.3 billion by 2050, according to the medium variant (table 1). In that variant, total fertility at the world level is expected to decline from 2.82 children per woman in 1995-2000 to 2.15 children per woman in 2045-2050, and the expectation of life at birth is expected to increase from 65 years to 76 years. As a consequence of the expected reduction of fertility, the population growth rate is projected to drop from 1.35 per cent per year in 1995-2000 to 0.47 per cent per year in 2045-2050.

Figure II
Population estimates for the more developed regions, 1950-2000, and projections with and without migration, 2000-2050 (medium variant)



Source: United Nations, Population Division.

Table 1
Estimated and projected population of the world, major development groups and major areas, 1950, 2000 and 2050, by projection variant

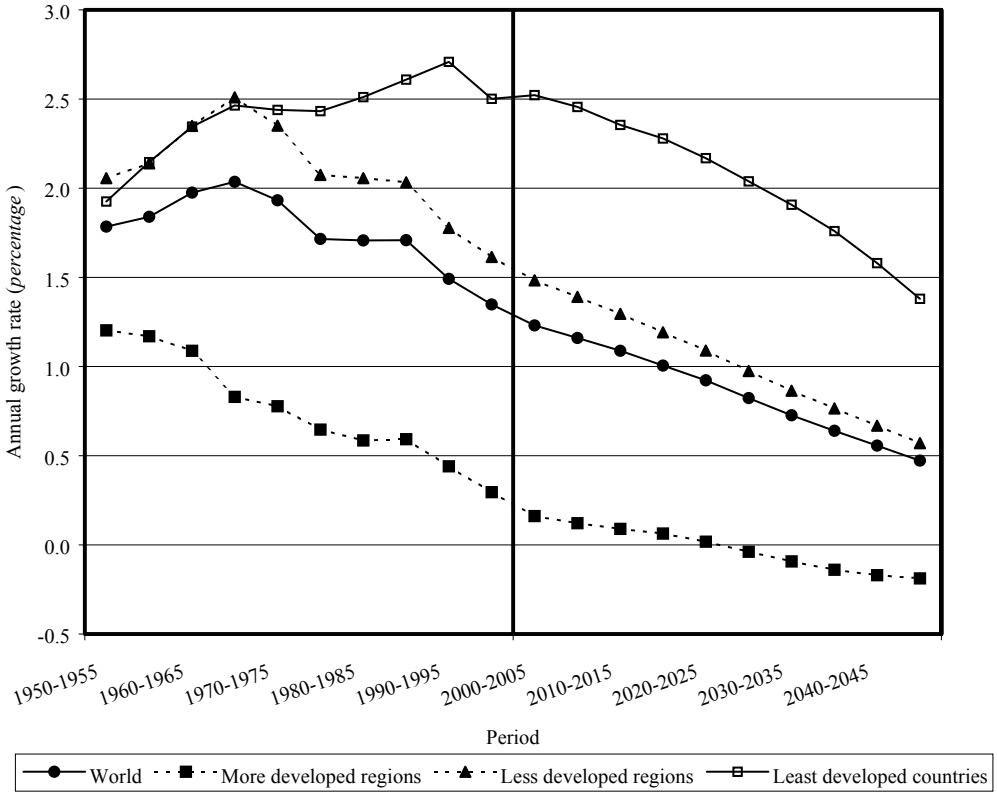
	Estimated population (millions)		*Population in 2050 (millions)*			
Major area	*1950*	*2000*	*Low*	*Medium*	*High*	*Constant-fertility*
World	2 519	6 057	7 866	9 322	10 934	13 049
More developed regions	814	1 191	1 075	1 181	1 309	1 162
Less developed regions	1 706	4 865	6 791	8 141	9 625	11 887
Least developed countries	197	658	1 545	1 830	2 130	3 150
Other less developed countries	1 508	4 207	5 246	6 312	7 495	8 738
Africa	221	794	1 694	2 000	2 320	3 566
Asia	1 399	3 672	4 527	5 428	6 430	7 376
Latin America and the Caribbean	167	519	657	806	975	1 025
Europe	548	727	556	603	654	580
Northern America	172	314	389	438	502	446
Oceania	13	31	42	47	53	56

Source: United Nations, Population Division.

16. Population growth is projected to slow down in both the more developed and the less developed regions. However, whereas the growth rate remains positive for the less developed regions until 2050, it turns negative after 2025 for the more developed regions. By 2045-2050, the population in the more developed regions is projected to be declining at a rate of -0.19 per cent per year, whereas the population of the less developed regions will be growing at a robust rate of 0.57 per cent per year (fig. III).

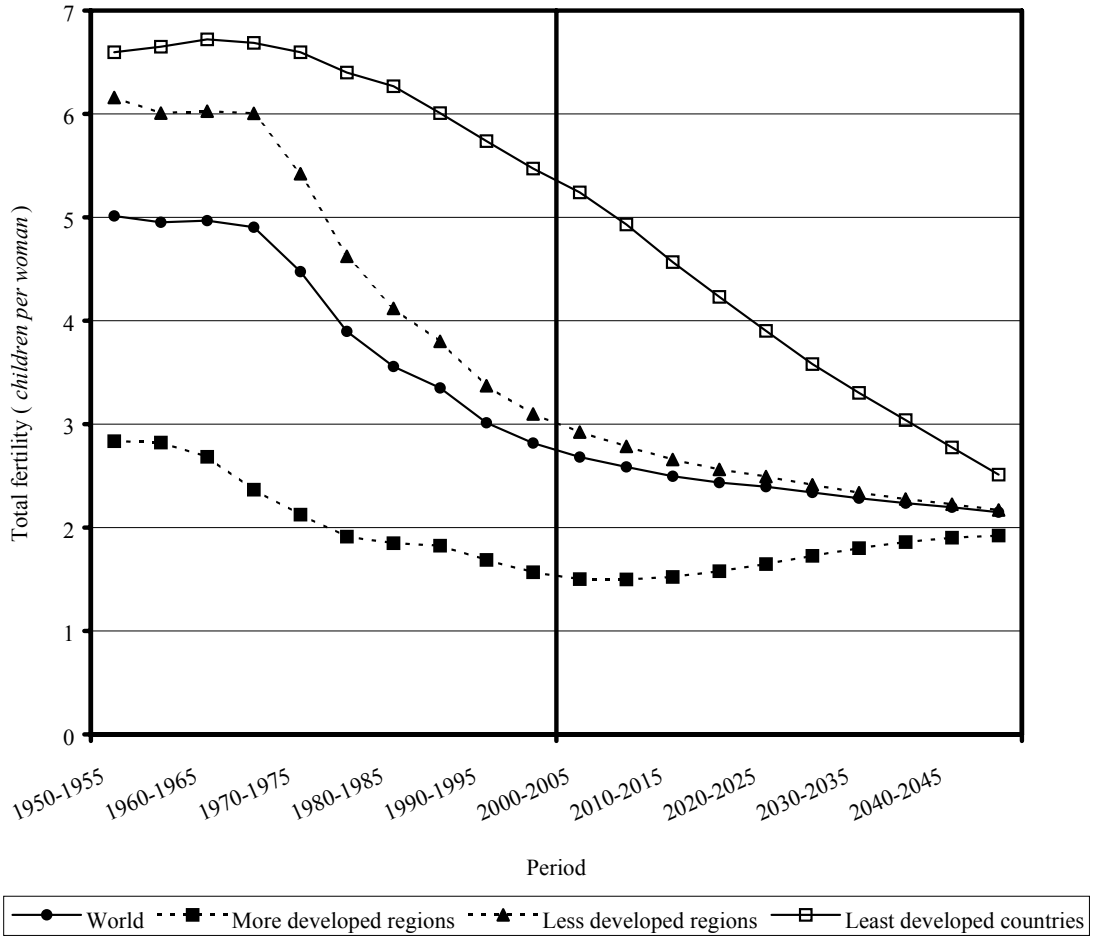
17. The difference in growth trajectories between the more developed and the less developed regions is mainly the product of their current levels of fertility and the path fertility is expected to follow in the future. Although considerable differences in fertility exist among the countries of the more developed regions, in virtually all of them fertility is currently below replacement level (i.e., below 2.1 children per woman) and, although it is projected to rise somewhat in the future, it will generally remain below replacement level until 2050. Thus, for the more developed regions as a whole, total fertility is expected to decline from 1.57 children per woman in 1995-2000 to 1.50 children per woman in 2005-2010 and then to rise slowly to 1.92 children per woman in 2045-2050 (fig. IV).

Figure III
Annual growth rate for the world and major development groups, 1950-2050



Source: United Nations, Population Division.

Figure IV
Total fertility trajectories in the medium variant for the world and major development groups, 1950-2050



Source: United Nations, Population Division.

18. In contrast, in the less developed regions as a whole, fertility is still above replacement level (at 3.1 children per woman in 1995-2000) and is projected to remain above replacement level until 2045-2050, when it reaches 2.17 children per woman. However, these averages mask the considerable heterogeneity that characterizes fertility levels in developing countries. Indeed, the less developed regions include both low-fertility countries such as China, where fertility is already below replacement level, and a number of high-fertility countries, such as Afghanistan, the Democratic Republic of the Congo, Niger and Yemen, where fertility has not yet shown signs of declining. For the latter group, fertility levels over the next five years are expected to remain high and although reductions are projected thereafter at a rate of 1 child per decade, replacement level will not necessarily be reached by 2045-2050.

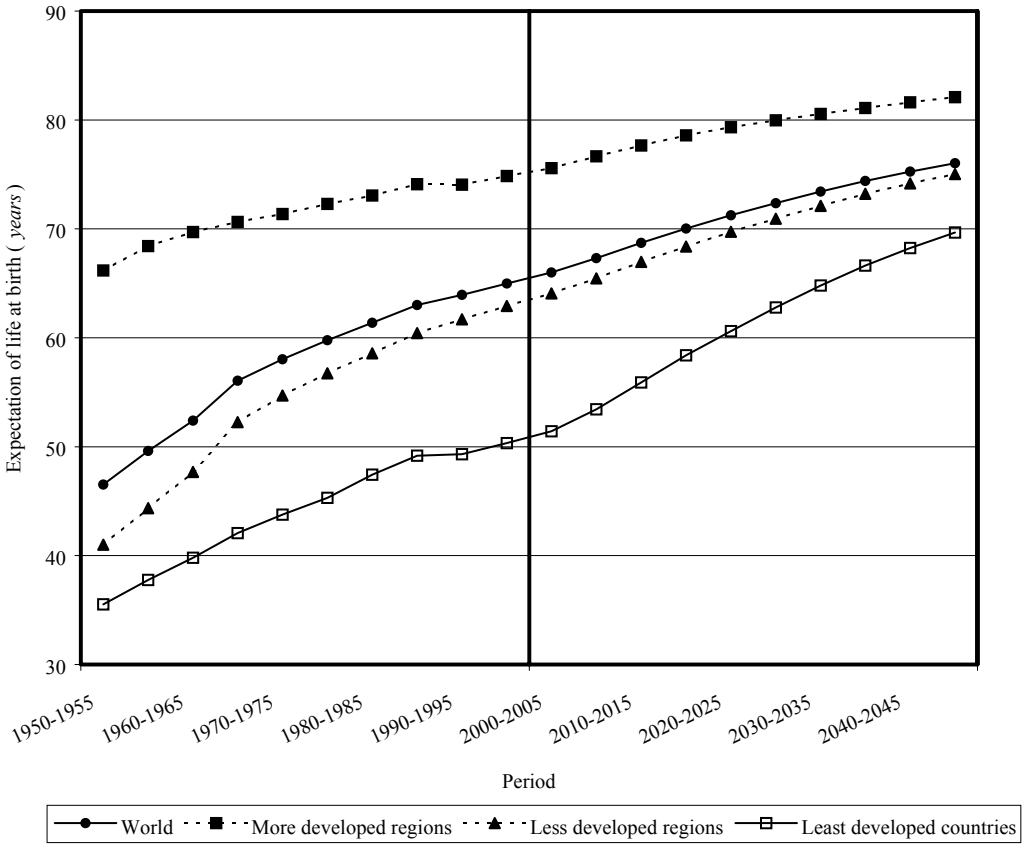
19. Most high-fertility countries, including those that have not yet experienced a decline of fertility or where the decline is incipient, belong to the group of the least developed countries. Relatively high fertility is expected to characterize that group of countries in the future (table 2). In 1995-2000, the 48 least developed countries had a total fertility of 5.74 children per woman, which is projected to decline to 2.51 children per woman in 2045-2050, a level that is still well above replacement level. In contrast, the rest of the countries in the less developed regions exhibit a total fertility of 3.06 children per woman in 1995-2000 and are projected to have 2.06 children per woman in 2045-2050.

20. Among the major areas, Africa has currently the highest fertility and is expected to continue experiencing high fertility over the next 50 years. Between 2000 and 2050, Africa's total fertility is expected to decline markedly, from 5.3 children per woman to 2.4 children per woman, according to the medium variant, but it will remain above replacement level until 2045-2050. As a result, Africa's growth rate, which was estimated at 2.4 per cent per year during 1995-2000, is expected to be still above 1 per cent per year in 2045-2050 (table 3) and its population is very likely to more than double, passing from 794 million in 2000 to 2 billion in 2050. At the other end of the spectrum, Europe will experience the lowest fertility among all major areas. Its fertility is projected to decrease from 1.4 children per woman in 1995-2000 to 1.3 during 2000-2015 and to rise thereafter so as to reach 1.8 children per woman in 2045-2050. Such low fertility will result in a substantial population reduction: from 727 million in 2000 to 603 million in 2050 and in negative growth rates starting in 2025.

21. Equally striking are the differences in expectation of life at birth (table 3 and fig. V). The more developed regions experience the lowest mortality and have, therefore, higher levels of life expectancy at birth than the less developed regions as a whole (75 years vs. 63 years in 1995-2000). Although the gap between the two groups of countries is expected to narrow over the next 50 years, by 2045-2050 the more developed regions are still expected to have considerably higher life expectancy at birth than the less developed regions (82 years vs.75 years).

22. Within both the more developed and the less developed regions, certain groups of countries have higher mortality than the rest. For example, in the more developed regions, Eastern Europe has experienced increased mortality over the past decade and exhibits relatively low levels of life expectancy at birth (68 years in 1995-2000). By 2045-2050, Eastern Europe's projected life expectancy, at 78 years, is the lowest among those of the more developed regions.

Figure V
Expectation of life for the world and major development groups, 1950-2050



Source: United Nations Population Division.

Table 2
Estimated and projected total fertility for the world, major development groups and major areas, 1995-2000 and 2045-2050, by projection variant

	Total fertility (average number of children per woman)				
		2045-2050			
Major area	*1995-2000*	*Low*	*Medium*	*High*	*Constant-fertility*
World	2.82	1.68	2.15	2.62	3.87
More developed regions	1.57	1.52	1.92	2.33	1.70
Less developed regions	3.10	1.70	2.17	2.65	4.06
Least developed countries	5.47	2.02	2.51	3.02	5.90
Other less developed countries	2.78	1.58	2.05	2.53	3.43
Africa	5.27	1.91	2.39	2.88	5.78
Asia	2.70	1.60	2.08	2.56	3.40
Latin America and the Caribbean	2.69	1.60	2.10	2.59	2.93
Europe	1.41	1.41	1.81	2.20	1.43
Northern America	2.00	1.68	2.08	2.48	2.01
Oceania	2.41	1.61	2.06	2.50	3.11

Source: United Nations, Population Division.

Table 3
Expectation of life at birth for the world, major development groups and major areas, 1995-2000 and 2045-2050

Major area	*1995-2000*	*2045-2050*
World	65.0	76.0
More developed regions	74.9	82.1
Less developed regions	62.9	75.0
Least developed countries	50.3	69.7
Other less developed countries	65.5	76.6
Africa	51.4	69.5
Asia	65.8	77.1
Latin America and the Caribbean	69.3	77.8
Europe	73.2	80.8
Northern America	76.7	82.7
Oceania	73.5	80.6

Source: United Nations, Population Division.

23. Among the less developed regions, those that are highly affected by the HIV/AIDS epidemic have some of the lowest life expectancies recorded in recent times and are projected to experience continued high mortality over the next 50

years. Sub-Saharan Africa, in particular, with 35 highly affected countries in 1999, had an estimated life expectancy of 49 years in 1995-2000, one year lower than it was 10 years earlier (50 years). By 2010-2015, life expectancy is expected to show some recuperation, rising to 52 years. Yet, although the incidence of HIV infection is projected to decline, by 2045-2050 life expectancy in sub-Saharan Africa is still expected to be the lowest among the world's major areas (68 years).

24. The 48 least developed countries, which include 26 of the countries that are highly affected by HIV/AIDS, already experience fairly high mortality levels. Their life expectancy at birth was 50 years in 1995-2000 and is expected to remain relatively low during the next 50 years, reaching 70 years in 2045-2050.

25. Despite being subject to high mortality, the population of the least developed countries is expected nearly to triple between 2000 and 2050, rising from 658 million to 1.83 billion. The high fertility levels prevailing there are largely responsible for the increase. Growth will also be substantial in the rest of the developing countries, whose population is projected to increase from 4.2 billion to 6.3 billion between 2000 and 2050. Consequently, the population of the less developed regions as a whole is projected to increase from 4.9 billion in 2000 to 8.1 billion in 2050. Such an increase in size is moderate if one considers that, were fertility to remain constant at current levels in the less developed countries, their total population would rise to 11.9 billion in 2050, 3.8 billion more than projected under the medium variant.

26. In the more developed regions, the population is projected to grow slightly between 2000 and 2025, rising from 1.19 billion to 1.22 billion, only to decline thereafter to reach 1.18 billion by 2050. If fertility were to remain constant at the levels reached in 1995-2000, the total population in 2050 would not be very different (1.16 billion), partly because a considerable part of the population growth in the more developed regions is associated with the projected net inflow of international migrants. If net migration from the less developed to the more developed regions were zero, the population of more developed regions would be 1.06 billion in 2050, 126 million less than in the medium variant, and population decline would set in by 2003 instead of 2025.

27. Not only are there major differences in the expected growth of the population of the major development groups, but differences become magnified at the country level. Today, six countries account for half of the world's population — namely, China, India, the United States of America, Indonesia, Brazil and the Russian Federation, in order of size (table 4). In 2050, eight countries will likely account for a similar proportion: India, whose population is expected to surpass that of China; China, the United States of America, Pakistan, Indonesia, Nigeria, Bangladesh and Brazil. In addition, whereas in 2000, 23 countries account for nearly three quarters of the world population, by 2050, 28 countries are needed to account for that proportion. That is, as population trends become more diverse at the country level, the distribution of the population becomes less concentrated.

28. The opposite trend, however, is evident with respect to the distribution of the annual increment of the world population. In 2000-2005, 77 million persons were added to the world's population every year, and 22 countries were responsible for 75 per cent of that increment (table 5). By 2045, 15 countries are expected to account for 75 per cent of the 44 million persons added to the population annually. The latter include both populous countries that are expected to reached replacement-level

fertility before 2050 and countries whose fertility is projected to remain above replacement level. The maintenance of relatively high fertility combined with declining mortality among the latter group of countries accounts for the fast growth both in absolute and in relative terms.

29. At the other end of the spectrum, low fertility, sometimes combined with significant out-migration, is expected to lead to substantial reductions of the population of 39 countries (table 6). In absolute terms, the Russian Federation is expected to see its population decline by the largest amount (41 million), followed by Ukraine (20 million), Japan (18 million), Italy (15 million) and Germany (11 million). In relative terms, Estonia, Bulgaria, Ukraine and Georgia are projected to experience a population reduction of at least 35 per cent between 2000 and 2050.

30. These findings indicate that the diversity of demographic trends that characterizes the countries of the world today is expected to continue at least until 2050. Although total fertility for the majority of countries is projected to converge to 2.1 children per woman, those in which total fertility remains above replacement level are expected to experience very rapid population growth and those in which fertility remains below replacement level will be prone to experience population reductions. Such opposite trends will result in marked differences in age structure so that, although all countries will experience an increase in the median age, population ageing will be slow in the high fertility countries and rapid in the low fertility ones. These trends will be reviewed in more detail below.

Table 4
Countries with a population of 50 million or more, 1950, 2000 and 2050 (medium variant)

Country	*Population in 1950 (thousands)*	*Cumulated percentage*	*Country*	*Population in 2000 (thousands)*	*Cumulated percentage*	*Country*	*Population in 2050 (thousands)*	*Cumulated percentage*
1. China	554 760	22.0	1. China	1 275 133	21.1	1. India	1 572 055	16.9
2. India	357 561	36.2	2. India	1 008 937	37.7	2. China	1 462 058	32.5
3. United States of America	157 813	42.5	3. United States of America	283 230	42.4	3. United States of America	397 063	36.8
4. Russian Federation	102 702	46.6	4. Indonesia	212 092	45.9	4. Pakistan	344 170	40.5
5. Japan	83 625	49.9	5. Brazil	170 406	48.7	5. Indonesia	311 335	43.8
6. Indonesia	79 538	53.0	6. Russian Federation	145 491	51.1	6. Nigeria	278 788	46.8
7. Germany	68 376	55.7	7. Pakistan	141 256	53.4	7. Bangladesh	265 432	49.7
8. Brazil	53 975	57.9	8. Bangladesh	137 439	55.7	8. Brazil	247 244	52.3
9. United Kingdom	50 616	59.9	9. Japan	127 096	57.8	9. Democratic Republic of the Congo	203 527	54.5
			10. Nigeria	113 862	59.7	10. Ethiopia	186 452	56.5
			11. Mexico	98 872	61.3	11. Mexico	146 651	58.1
			12. Germany	82 017	62.7	12. Philippines	128 383	59.5
			13. Viet Nam	78 137	64.0	13. Viet Nam	123 782	60.8
			14. Philippines	75 653	65.2	14. Iran (Islamic Republic of)	121 424	62.1
			15. Iran (Islamic Republic of)	70 330	66.4	15. Egypt	113 840	63.3
			16. Egypt	67 884	67.5	16. Japan	109 220	64.5
			17. Turkey	66 668	68.6	17. Russian Federation	104 258	65.6
			18. Ethiopia	62 908	69.6	18. Yemen	102 379	66.7
			19. Thailand	62 806	70.7	19. Uganda	101 524	67.8
			20. United Kingdom	59 415	71.6	20. Turkey	98 818	68.9
			21. France	59 238	72.6	21. United Republic of Tanzania	82 740	69.7
			22. Italy	57 530	73.6	22. Thailand	82 491	70.6
			23. Democratic Republic of the Congo	50 948	74.4	23. Afghanistan	72 267	71.4
						24. Colombia	70 862	72.2
						25. Germany	70 805	72.9
						26. Myanmar	68 546	73.7
						27. Sudan	63 530	74.3

Country	*Population in 1950 (thousands)*	*Cumulated percentage*	*Country*	*Population in 2000 (thousands)*	*Cumulated percentage*	*Country*	*Population in 2050 (thousands)*	*Cumulated percentage*
						28. France	61 832	75.0
						29. Saudi Arabia	59 683	75.6
						30. United Kingdom	58 933	76.3
						31. Kenya	55 368	76.9
						32. Argentina	54 522	77.4
						33. Iraq	53 574	78.0
						34. Angola	53 328	78.6
						35. Nepal	52 415	79.2
						36. Niger	51 872	79.7
						37. Republic of Korea	51 560	80.3
						38. Algeria	51 180	80.8
						39. Morocco	50 361	81.4

Source: United Nations, Population Division.

Table 5
Countries accounting for 75 per cent of population growth in the world, 1950-1955, 2000-2005 and 2045-2050 (medium variant)

Country	*Annual population increase 1950-1955 (thousands)*	*Cumulated percentage*	*Country*	*Annual population increase 2000-2005 (thousands)*	*Cumulated percentage*	*Country*	*Annual population increase 2045-2050 (thousands)*	*Cumulated percentage*
1. China	10 849	23	1. India	15 929	21	1. India	6 361	15
2. India	7 507	39	2. China	92 466	33	2. Pakistan	3 455	23
3. United States of America	2 652	45	3. Pakistan	3 818	38	3. Democratic Republic of the Congo	3 129	30
4. Brazil	1 782	48	4. Nigeria	3 172	42	4. Nigeria	2 965	37
5. Russian Federation	1 740	52	5. Bangladesh	3 023	46	5. Ethiopia	2 917	43
6. Indonesia	1 384	55	6. Indonesia	2 649	49	6. Yemen	2 362	49
7. Japan	1 238	58	7. United States of America	2 567	53	7. Uganda	1 861	53
8. Bangladesh	864	60	8. Brazil	2 136	55	8. Bangladesh	1 832	57
9. Pakistan	816	61	9. Democratic Republic of the Congo	1 852	58	9. United States of America	1 827	61
10. Mexico	800	63	10. Ethiopia	1 611	60	10. Niger	1 166	64
11. Nigeria	707	64	11. Philippines	1 470	62	11. Indonesia	1 075	67
12. Philippines	645	66	12. Mexico	1 453	64	12. Angola	1 070	69
13. Thailand	627	67	13. Egypt	1 184	65	13. Afghanistan	998	71
14. Turkey	610	68	14. Viet Nam	1 052	67	14. Somalia	850	73
15. Egypt	572	70	15. Iran (Islamic Republic of)	1 007	68	15. United Republic of Tanzania	837	75
16. Ukraine	560	71	16. Turkey	908	69			
17. Viet Nam	537	72	17. Afghanistan	880	70			
18. Poland	491	73	18. United Republic of Tanzania	863	71			
19. Iran (Islamic Republic of)	436	74	19. Yemen	827	72			
20. Canada	400	75	20. Uganda	805	73			
			21. Sudan	758	74			
			22. Thailand	739	75			
World	**47 044**	**100**	**World**	**76 857**	**100**	**World**	**43 496**	**100**

Source: United Nations, Population Division.

Table 6
Countries or areas whose population is projected to decrease between 2000 and 2050 (medium variant)

Rank order	*Country or area*[a]	*Population (thousands)*		*Difference*	
		2000	*2050*	*Absolute*	*Percentage*
1	Russian Federation	145 491	104 258	-41 233	-28.3
2	Ukraine	49 568	29 959	-19 609	-39.6
3	Japan	127 096	109 220	-17 876	-14.1
4	Italy	57 530	42 962	-14 568	-25.3
5	Germany	82 017	70 805	-11 212	-13.7
6	Spain	39 910	31 282	-8 629	-21.6
7	Poland	38 605	33 370	-5 235	-13.6
8	Romania	22 438	18 150	-4 288	-19.1
9	Bulgaria	7 949	4 531	-3 419	-43.0
10	Hungary	9 968	7 486	-2 481	-24.9
11	Georgia	5 262	3 219	-2 043	-38.8
12	Belarus	10 187	8 305	-1 882	-18.5
13	Czech Republic	10 272	8 429	-1 842	-17.9
14	Austria	8 080	6 452	-1 628	-20.1
15	Greece	10 610	8 983	-1 627	-15.3
16	Switzerland	7 170	5 607	-1 563	-21.8
17	Yugoslavia	10 552	9 030	-1 522	-14.4
18	Sweden	8 842	7 777	-1 066	-12.1
19	Portugal	10 016	9 006	-1 010	-10.1
20	Kazakhstan	16 172	15 302	-871	-5.4
21	Slovakia	5 399	4 674	-724	-13.4
22	Republic of Moldova	4 295	3 577	-718	-16.7
23	Lithuania	3 696	2 989	-707	-19.1
24	Latvia	2 421	1 744	-677	-28.0
25	Belgium	10 249	9 583	-667	-6.5
26	Estonia	1 393	752	-642	-46.1
27	Armenia	3 787	3 150	-637	-16.8
28	Bosnia and Herzegovina	3 977	3 458	-519	-13.0
29	United Kingdom	59 415	58 933	-482	-0.8
30	Finland	5 172	4 693	-479	-9.3
31	Croatia	4 654	4 179	-474	-10.2
32	Slovenia	1 988	1 527	-461	-23.2
33	Cuba	11 199	10 764	-435	-3.9
34	Guyana	761	504	-257	-33.7
35	Denmark	5 320	5 080	-240	-4.5
36	TFYR Macedonia[b]	2 034	1 894	-140	-6.9
37	Channel Islands	144	120	-25	-17.2
38	Netherlands	15 864	15 845	-18	-0.1
39	Barbados	267	263	-4	-1.7

Source: United Nations, Population Division.

[a] Countries or areas with 140,000 persons or more in 2000.

[b] The former Yugoslav Republic of Macedonia.

III. Fertility

31. According to the *2000 Revision*, total fertility — that is, the average number of children a woman would bear if fertility rates remained unchanged during her lifetime — was 2.82 in 1995-2000 at the world level. This average results from very varied experiences at the country level. In 1995-2000, 64 countries or areas (43 of them located in the more developed regions) experienced fertility levels at or below replacement level, whereas 123 countries or areas (122 of which are located in the less developed regions) experienced total fertility levels above replacement level. Among the latter, 48 had total fertility levels at or above 5 children per woman, and the majority of them are among the countries classified as the least developed.

32. In 2000, the 64 countries where total fertility was at or below replacement level accounted for 44 per cent of the world's population, or 2.7 billion people, whereas the countries with above-replacement fertility had 3.4 billion people in 2000, or 56 per cent of the total. Because of their low fertility and the expectation that it will not rise markedly in the future, the countries with below-replacement fertility are projected to have only a slightly larger population in 2050 than today (2.9 billion people). In contrast, the countries whose fertility is currently above replacement level are expected to experience a marked population increase, reaching 6.4 billion by 2050 and accounting then for 69 per cent of the global population.

33. The pace of fertility decline during 1950-2000 varied significantly among developing countries. Although most countries in the less developed regions are already far advanced in the transition from high to low fertility, there are 16 countries that exhibit sustained high fertility and for which there is either no recent evidence about fertility trends or the available evidence does not indicate the onset of a fertility reduction. In those countries, even though fertility is projected to decline after 2005 at a rate of 1 child per decade, it is not expected to reach replacement level by 2045-2050.

34. The high fertility of those 16 countries, with a combined population of 269 million in 2000, leads to very rapid population growth, and their overall population nearly quadruples between 2000 and 2050, slightly surpassing 1 billion in 2050. The countries involved — Afghanistan, Angola, Burundi, Burkina Faso, Chad, Congo, the Democratic Republic of the Congo, Ethiopia, Liberia, Malawi, Mali, Niger, Somalia, Sierra Leone, Uganda and Yemen — all belong to the group of the least developed countries, and several are already highly affected by the HIV/AIDS epidemic. Moreover, a number of them have been experiencing civil strife and political instability in recent years, factors that militate against the provision of basic services for the population. Clearly, the continuation of rapid population growth poses serious challenges to their future development.

35. For a few populous countries which are already fairly advanced in the transition to low fertility, recent analyses of past fertility trends indicate that the rapid declines that were previously assumed to have taken place in the 1990s did not materialize. For Bangladesh and Nigeria, for instance, estimated fertility for 1995-2000 is now believed to be higher than that projected for the same period in *World Population Prospects: the 1998 Revision*.[3] Consequently, projected fertility trends for the next few decades are also higher in the *2000 Revision* than in the previous one. For India as well, a small upward revision of the fertility estimate for 1995-

2000 results in a change in the fertility trajectory that its population is expected to follow in the future, a change that produces a significantly larger population size in 2050. Largely as a result of those changes, the total population of Bangladesh, India and Nigeria combined is now expected to reach 2.1 billion in 2050, a figure about 131 million higher than the one projected in the *1998 Revision*.

36. Similarly, for the 16 high-fertility countries mentioned above, the 2050 population projected by the *2000 Revision* is 243 million higher than that projected by the *1998 Revision*. In total, therefore, differences relative to the projected populations of the 16 high-fertility countries and those of Bangladesh, India and Nigeria amount to 374 million people and account for about 91 per cent of the 413 million difference between the world population in 2050, as projected by the *2000 Revision* and the *1998 Revision*.

IV. The demographic impact of HIV/AIDS

37. As in previous revisions, the impact of HIV/AIDS has been explicitly incorporated in the projections of the population of highly affected countries. In the *2000 Revision*, 45 countries are in that category, up from 34 in the *1998 Revision*. Among their populations aged 15-49, HIV prevalence in 1999 was estimated to be 2 per cent or more. A few populous countries with lower prevalence levels were included, because they had a large number of persons living with HIV.

38. Of those 45 countries, 35 are in sub-Saharan Africa (Angola, Benin, Botswana, Burundi, Burkina Faso, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Djibouti, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea-Bissau, Kenya, Lesotho, Liberia, Malawi, Mali, Mozambique, Namibia, Nigeria, Rwanda, Sierra Leone, South Africa, Swaziland, Togo, Uganda, United Republic of Tanzania, Zambia, Zimbabwe), four in Asia (Cambodia, India, Myanmar, Thailand), and six in Latin America and the Caribbean (Bahamas, Brazil, Dominican Republic, Guyana, Haiti, Honduras). Of the 33 million adults in the world infected by HIV by 1999, 29 million, or 88 per cent, resided in those 45 countries.[4]

39. The *2000 Revision* confirms yet again the devastating toll AIDS has taken in terms of increased morbidity, mortality and population loss. In the 35 highly affected countries of Africa, life expectancy at birth is estimated at 48.3 years in 1995-2000, 6.5 years less than it would have been in the absence of AIDS (table 7). By 2015, the population of those 35 African countries is projected to be 84 million less, or 10 per cent less, than it would have been without AIDS (table 8). The demographic impact of AIDS is even more dramatic in the nine African countries with the highest HIV prevalence (at or above 14 per cent) — namely, Botswana, Kenya, Lesotho, Malawi, Namibia, South Africa, Swaziland, Zambia and Zimbabwe. In 1995-2000 average life expectancy in those countries was 49.3 years, instead of the 61.5 years it would have been in the absence of AIDS, a reduction of 12 years. And the impact of HIV/AIDS is expected to intensify in the future. By 2005-2010, average life expectancy at birth in those countries is projected to decrease to 45 years instead of rising to 65 years, as projected in the absence of the disease.

Table 7
Expectation of life at birth with and without AIDS for groups of affected countries in major areas and for the most affected countries, 1995-2000, 2000-2005 and 2010-2015

	1995-2000		*2000-2005*		*2010-2015*	
Country group or country	*With AIDS*	*Without AIDS*	*With AIDS*	*Without AIDS*	*With AIDS*	*Without AIDS*
All 45 highly affected countries	56.9	59.8	57.5	61.7	60.4	65.2
In Africa (35)	48.3	54.8	48.2	57.1	52.4	61.2
In Asia (4)	62.2	62.8	64.0	64.9	67.7	68.9
In Latin America and the Caribbean (6)	66.1	66.9	67.2	68.2	69.5	70.7
With prevalence of 14 per cent or more (9)	49.3	61.5	45.3	63.6	47.5	67.1
Most affected countries						
Botswana	44.4	67.6	36.1	69.7	43.0	73.0
South Africa	56.7	63.3	47.4	65.8	42.0	69.6
Swaziland	50.8	60.2	38.1	62.7	39.2	67.2
Zimbabwe	42.9	66.5	42.9	68.5	50.2	71.4

Source: United Nations, Population Division.

Table 8
Difference in projected population as a result of AIDS and percentage difference for groups of affected countries in major areas, 2000, 2015 and 2050

	2000		*2015*		*2050*	
Country group	*Population difference (thousands)*	*Percentage difference*	*Population difference (thousands)*	*Percentage difference*	*Population difference (thousands)*	*Percentage difference*
All 45 highly affected countries	-19 739	-1	-96 913	-4	-302 090	-8
In Africa (35)	-17 069	-3	-83 693	-10	-267 019	-15
In Asia (4)	-2 185	0	-11 272	-1	-30 161	-2
In Latin America and the Caribbean (6)	-485	0	-1 948	-1	-4 910	-2
With prevalence of 14 per cent or more (9)	-5 298	-4	-30 869	-18	-85 180	-30

Source: United Nations, Population Division.

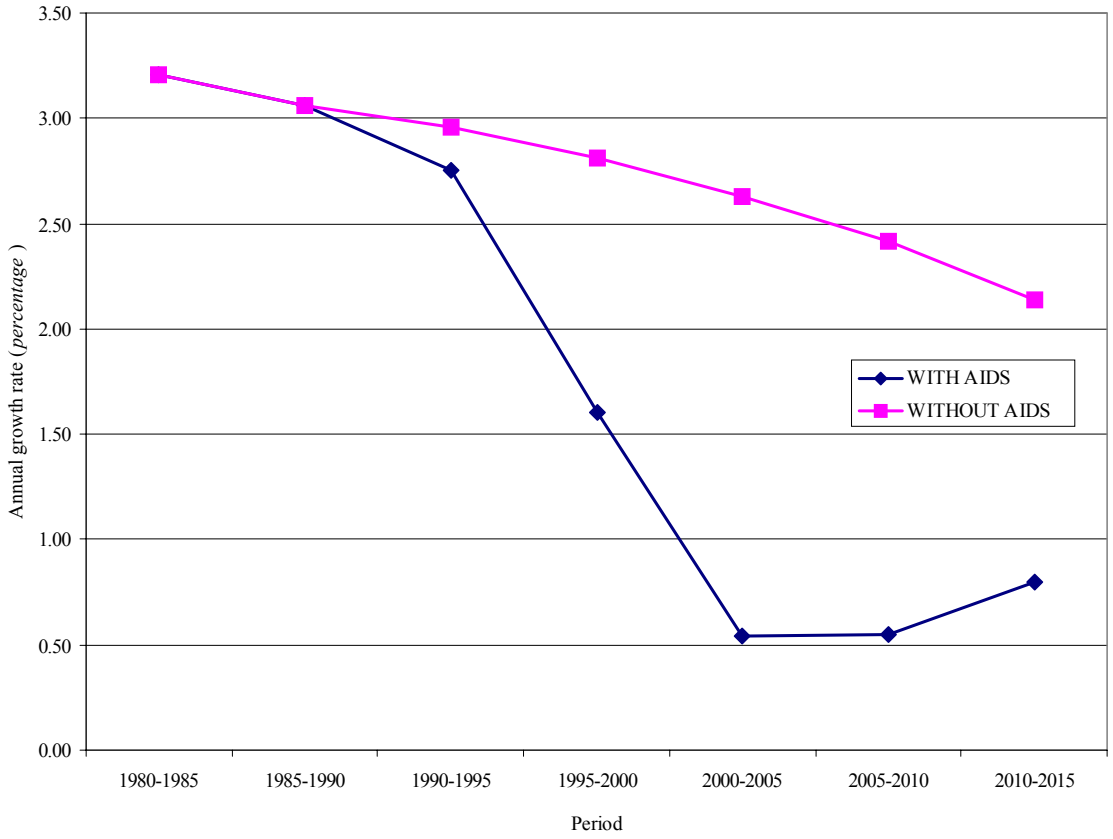
40. In Botswana, the country with the highest HIV prevalence, about one out of every three adults is HIV-positive. Life expectancy has dropped from 60.2 years in 1990-1995 to 44.4 years in 1995-2000 and is projected to fall further, to 36 years, in 2000-2005, a figure about 34 years lower than the life expectancy projected in the absence of AIDS. Because of increased mortality, population growth in Botswana has been and is expected to be significantly reduced. The average annual population growth rate dropped from 3.2 per cent per year in 1980-1985 to 1.6 per cent in 1995-2000 and will likely fall further, to 0.5 per cent, between 2000 and 2010 (fig. VI). In the absence of AIDS, Botswana's population would have experienced a growth rate above 2.5 per cent per year between 1990 and 2005. As a result of AIDS, Botswana's population in 2015 is expected to be 28 per cent smaller than it would have been; yet, because of high fertility, it is not projected to decrease during 2000-2050.

41. In Zimbabwe, another country with very high HIV prevalence, one out of every four adults is infected. Life expectancy at birth, estimated at 43 years in 1995-2000, is 23.5 years lower than it would have been without AIDS (66.5 years), and it is expected to remain unchanged at 43 years in 2000-2005. As in Botswana, the impact of HIV/AIDS on population growth has been staggering. Estimated at 3.8 per cent per year in 1980-1985, the annual growth rate fell to nearly 1.9 per cent in 1995-2000 and will likely fall further to 1.7 per cent in 2000-2005 (fig. VII). In the absence of AIDS, Zimbabwe would have experienced annual growth of 3.1 per cent in 1995-2000 and 2.5 per cent in 2000-2005. As a result of AIDS, in 2015 Zimbabwe's population is expected to be 22 per cent smaller than it would have been.

42. In Swaziland, where one out of every four adults is infected, the AIDS epidemic is also expected to take a devastating toll on human lives. Although the more recent start of the epidemic in that country means that life expectancy was barely affected by 1990-1995, it is projected that by 2000-2005 nearly 25 years will be lost because of HIV/AIDS. Since the impact of the disease is projected to intensify in the next decade, by 2005-2010, nearly 30 years of life expectancy will be lost. At that time, life expectancy at birth is expected to be a low 35 years. Population growth, while remaining positive, is also expected to be markedly reduced because of the AIDS epidemic. Swaziland's annual growth rate is expected to decrease from 1.6 per cent in 1990-1995 to 0.4 per cent in 2005-2010, whereas in the absence of AIDS it would have been 2.4 per cent in 2005-2010. By 2015, Swaziland's population is expected to be 25 per cent smaller than it would have been in the absence of AIDS.

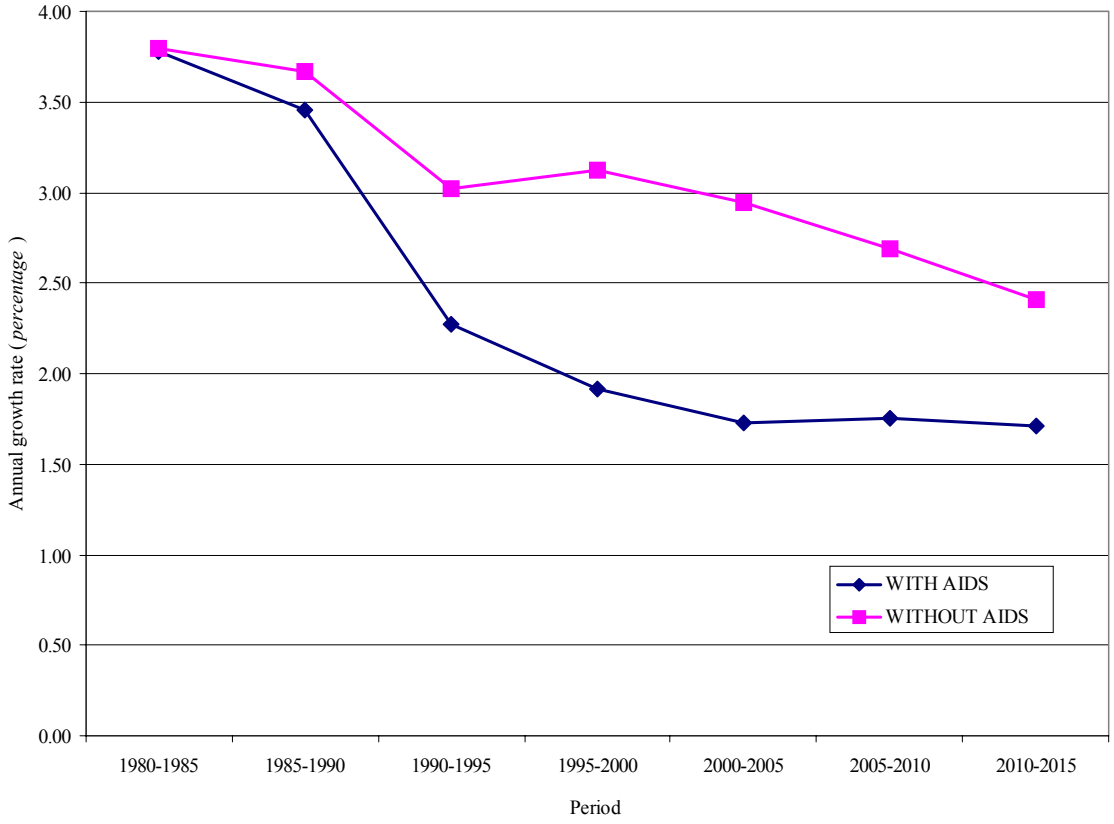
43. In South Africa, the epidemic also started later than in other countries of the region. By 1999, one out of every seven adults was infected by the disease. Because of its late start, the major demographic impact of the epidemic is yet to come. Although life expectancy was barely affected by 1990-1995, by 2005-2010, it is projected to drop to 47.4 years, 18 years lower than it would have been without AIDS. Although the reduction of life expectancy in Botswana or Zimbabwe is greater than in South Africa, South Africa's lower fertility cannot counterbalance the higher death toll associated with the disease. Consequently, South Africa is the only highly affected country where population growth is expected to turn negative: the annual growth rate is projected to decrease from 1.9 per cent in 1990-1995 to nearly zero by 2005-2010 and become negative by 2010-2015. However, negative growth persists only until 2025, with the growth rate becoming positive thereafter (fig. VIII). By 2015, South Africa's population is expected to be 21 per cent smaller than it would have been in the absence of the AIDS epidemic.

Figure VI
Annual population growth rate, Botswana, 1980-1985 to 2010-2015



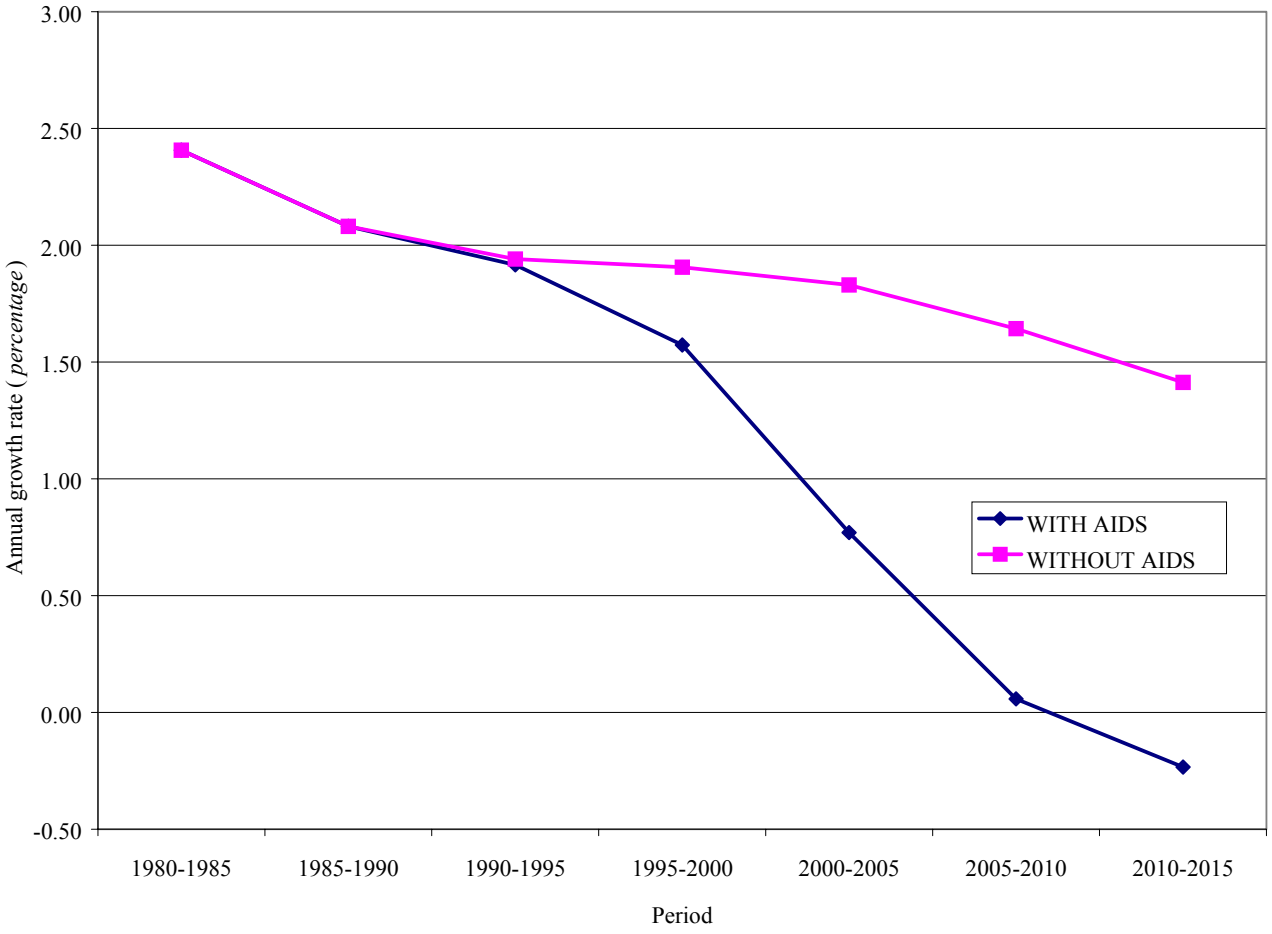
Source: United Nations, Population Division.

Figure VII
Annual population growth rate, Zimbabwe, 1980-1985 to 2010-2015



Source: United Nations, Population Division.

Figure VIII
Annual population growth rate, South Africa, 1980-1985 to 2010-2015



Source: United Nations, Population Division.

44. Compared to Africa, the relative impact of the HIV/AIDS epidemic in Asia and in Latin America and the Caribbean is still low. Thus, whereas by 2015 the population of the 35 highly affected African countries is projected to be 10 per cent lower than it would have been in the absence of the disease, that of the four Asian countries affected and of the six countries in Latin America and the Caribbean will be just 1 per cent lower. However, because of the large populations of Brazil and India, the impact of the disease in terms of the estimated number of excess deaths is substantial. In Asia an estimated 2.2 million excess deaths will occur in 2000-2005 because of AIDS, and in Latin America and the Caribbean the equivalent figure will be nearly 0.4 million (table 9). India alone is expected to experience 1.6 million excess deaths because of the AIDS epidemic. In comparison, the 35 affected countries in Africa are expected to experience 12.9 million excess deaths during 2000-2005.

45. Lastly, it should be emphasized that, although the demographic impact of HIV/AIDS outside of Africa remains relatively low, the number of countries where the prevalence of the disease has become significant has been growing more rapidly in Asia and Latin America and the Caribbean than in Africa. Thus, the number of highly affected countries in those two regions doubled, from 5 to 10, between the *1998 Revision* and the *2000 Revision*. Clearly, the spread of HIV in Asia and Latin America and the Caribbean will require careful monitoring. While it is not yet certain that the spread will follow the pattern observed in Africa, rapid and effective responses may be required to avert the devastation that Africa is already experiencing.

Table 9
Excess deaths in a projection with AIDS in relation to a projection assuming no AIDS for groups of affected countries in major areas, 1995-2000, 2000-2005 and 2010-2015

	1995-2000		*2000-2005*		*2010-2015*	
Country group	*Excess deaths (thousands)*	*Percentage increase*	*Excess deaths (thousands)*	*Percentage increase*	*Excess deaths (thousands)*	*Percentage increase*
All 45 highly affected countries	10 010	11	15 468	17	17 877	19
In Africa (35)	8 332	25	12 866	37	14 457	40
In Asia (4)	1 412	3	2 230	5	2 976	6
In Latin America and the Caribbean (6)	266	4	372	5	443	6
With prevalence of 14 per cent or more (9)	2 958	61	5 361	110	6 526	128

Source: United Nations, Population Division.

V. Population ageing

46. As world fertility continues to decline and life expectancy rises, the population of the world will age faster in the next 50 years than during the past half century. An increase in the median age — the age that divides the population into two equal halves — is used as an indicator of the shift of the population age distribution towards older ages, which is known as "population ageing". Over the past half century, the median age for the world increased 3 years, from 23.6 years in 1950 to 26.5 years in 2000. Over the next 50 years, the median age is expected to rise by 10 years, reaching 36.2 years in 2050 (table 10).

Table 10
Median age, by major area, 1950, 2000 and 2050 (medium variant)

	Median age (years)		
	1950	*2000*	*2050*
World total	23.6	26.5	36.2
More developed regions	28.6	37.4	46.4
Less developed regions	21.4	24.3	35.0
Least developed countries	19.5	18.2	26.5
Africa	19.0	18.4	27.4
Asia	22.0	26.2	38.3
Europe	29.2	37.7	49.5
Northern America	29.8	35.6	41.0
Latin America and the Caribbean	20.1	24.4	37.8
Oceania	27.9	30.9	38.1

Source: United Nations, Population Division.

47. The proportion of children (i.e., persons aged 0-14) has declined from 34 per cent in 1950 to 30 per cent in 2000, just as the proportion of older persons (those aged 60 years or over) has increased from 8 per cent to 10 per cent. Over the next 50 years, the proportion of children is projected to drop by a third, reaching 21 per cent in 2050, whereas the proportion of older persons will likely double, reaching 21 per cent.

48. The more developed regions have been leading the process of population ageing. In 1950, the proportion of children in these regions was 27 per cent while that of older persons was 12 per cent. By 2000, the proportion of older persons in the more developed regions had surpassed that of children (19 per cent vs. 18 per cent) and in 2050, the proportion of older persons is expected to be double that of children (33 per cent vs. 16 per cent). As a result of these changes, the median age in the more developed regions, which rose from 28.6 years in 1950 to 37.4 in 2000, is projected to reach the unprecedented level of 46.4 years in 2050.

49. Until 2000, population ageing has been considerably slower in the less developed regions, where fertility is still relatively high. The proportion of children declined from 38 per cent in 1950 to 33 per cent in 2000, while the proportion of older persons increased from 6 to 8 per cent. A period of more rapid population

ageing lies ahead. By 2050, the proportion of older persons in the less developed regions will rise to 19 per cent, whereas the proportion of children is expected to decline to 22 per cent. The median age, which had barely changed during 1950-2000 (passing from 21.4 years to 24.3) is projected to increase by 10 years, to reach 35 years in 2050. Thus, by mid century the less developed regions will likely have an age structure similar to that of today's more developed regions.

50. Population ageing will result in a rapid increase of the number of people aged 60 years or over. At the global level, that number will rise from 606 million in 2000 to almost 2 billion in 2050. The absolute increase will be less marked in the more developed regions, where the number of older persons is projected to rise from 231 million in 2000 to 395 million in 2050, but it will be dramatic in the less developed regions, where the older population will more than quadruple, from 374 million in 2000 to 1.6 billion in 2050.

51. Europe is the major area of the world where population ageing is most advanced. The proportion of children is projected to decline from 17 per cent in 2000 to 14 per cent in 2050, while the proportion of older persons will increase from 20 per cent in 1998 to 37 per cent in 2050. By then, there will be 2.6 older persons for every child and more than one in every three persons will be aged 60 years or over. As a result, the median age will rise from 37.5 years in 2000 to 49.5 in 2050.

52. Japan is currently the country with the oldest population (its median age is 41 years), followed by Italy, Switzerland, Germany and Sweden, with median ages of 40 years each. In 2050, Spain is projected to have the oldest population, with a median age of 55 years. Italy, Slovenia and Austria, with median ages of 54 years each in 2050, will also have populations where persons aged 50 or over predominate. In fact, in Germany, Greece, Italy and Japan there are already at least 1.5 persons aged 60 or over for every child, and by 2050 Italy and Spain are each expected to have nearly four older persons per child.

53. Africa remains the major area with the youngest population. However, the proportion of children there is expected to decline from 43 per cent in 2000 to 28 per cent in 2050, and the proportion of older persons will likely double from 5 per cent to 10 per cent over the next 50 years.

The oldest old

54. In 2000, 69 million persons in the world were aged 80 or over (the oldest old) and they were the fastest growing segment of the population (table 11). By 2050, they are projected to reach 379 million, increasing more than 5.5 times. Although the proportion of the oldest old is still low (1 per cent of the world population), it will rise to 4 per cent in 2050. Currently, the oldest old already constitute 3.2 per cent of the population of Northern America and 3 per cent of the population of Europe. In Sweden, 5.1 per cent of the population is aged 80 or over, while in Norway and the United Kingdom, the equivalent proportion is over 4 per cent. China has currently the largest number of people aged 80 years or over (11.5 million), followed by the United States of America (9.2 million), India (6.1 million), Japan (4.8 million), Germany (3.0 million) and the Russian Federation (3.0 million). Together, these countries account for 54 per cent of today's oldest old.

Table 11
Average annual growth rates of the total population and the population in broad age groups, by major area, 2000-2050 (medium variant)
(Percentage)

Major area	*Age group*				*Total population*
	0-14	*15-59*	*60+*	*80+*	
World	0.15	0.79	2.35	3.40	0.86
More developed regions	-0.34	-0.42	1.07	2.23	-0.02
Less developed regions	0.21	1.01	2.87	4.22	1.03
Least developed countries	1.26	2.38	3.37	4.07	2.04
Africa	1.01	2.18	3.26	4.06	1.85
Asia	-0.09	0.68	2.67	4.08	0.78
Europe	-0.82	-0.84	0.81	2.06	-0.37
Northern America	0.35	0.39	1.70	2.41	0.66
Latin America and the Caribbean	-0.03	0.78	2.96	3.95	0.88
Oceania	0.33	0.74	1.98	2.75	0.87

Source: United Nations, Population Division.

55. In 2050, 19 countries or areas are projected to have at least 10 per cent of their population aged 80 years or over: Austria, Belgium, Channel Islands, Finland, France, Germany, Greece, Hong Kong (SAR of China), Italy, Japan, Macao (SAR of China), the Netherlands, Norway, Singapore, Slovenia, Spain, Sweden, Switzerland, United Kingdom. Furthermore, six countries will have more than 10 million people aged 80 years or over: China (99 million), India (48 million), the United States of America (30 million), Japan (17 million), Brazil (10 million) and Indonesia (10 million). Together they will account for 57 per cent of all the oldest old people in the world.

56. The number of older persons declines rapidly as age increases. Octogenarians (aged 80-89) outnumber nonagenarians (aged 90-99) by a wide margin, and the proportion of centenarians (over 100) among the oldest old is small. It is estimated that in 2000 about 88 per cent (61 million) of the 69 million persons aged 80 or over were octogenarians, and about 12 per cent (8 million) were nonagenarians. The proportion of centenarians among the oldest old was 0.3 per cent, or 180,000.

57. The number of octogenarians is projected to increase to 314 million in 2050, 5.2 times the number in 2000, whereas the number of nonagenarians will reach 61 million, an eight-fold increase. But the number of people aged 100 years or over will grow the fastest, so that by 2050 it will be 18 times as large as in 2000.

58. Although the proportion of people who survive past their 100th birthday is small, their number is not negligible. In 2000 there were an estimated 180,000 centenarians in the world; by 2050 they are projected to number 3.2 million. Japan will have the highest proportion of centenarians in 2050 (nearly 1 per cent of the population). It will be followed by Finland, France, Singapore, Sweden, and Switzerland, where centenarians are projected to account for 0.2 per cent of the population in each country. In 2050, the largest centenarian populations will be in Japan (959,000), the United States of America (473,000), China (471,000) and India (142,000).

VI. Assumptions underlying the *2000 Revision*

59. The *2000 Revision* includes six projection variants. Four differ among themselves with respect to the assumptions made regarding the future course of fertility. The fifth differs with respect to the assumptions made about the future course of mortality, and the sixth differs with respect to the future course of migration.

A. Fertility assumptions

60. Fertility assumptions are described in terms of the following three groups of countries:

(a) *High-fertility countries*: Countries that until 2000 have had no fertility reduction or only an incipient decline;

(b) *Medium-fertility countries*: Countries where fertility has been declining but whose level is still above replacement level (2.1 children per woman);

(c) *Low-fertility countries*: Those with fertility at or below replacement level (2.1 children per woman) plus a few with levels very close to replacement level that are judged ready to drop below replacement level in the near future.

Medium-fertility assumptions

- Fertility in high-fertility countries is generally assumed to decline at an average pace of nearly 1 child per decade starting in 2005 or later. Consequently, some of these countries do not reach replacement level by 2050.
- Fertility in medium-fertility countries is assumed to reach replacement level before 2050.
- Fertility in low-fertility countries is generally assumed to remain below replacement level during most of the projection period, reaching by 2045-2050 the fertility of the cohort of women born in the early 1960s or, if that information is lacking, reaching 1.7 children per woman if current fertility is below 1.5 children per woman or 1.9 children per woman if current fertility is equal to or higher than 1.5 children per woman.

High-fertility assumptions

- Fertility in high-fertility and medium-fertility countries remains above the fertility in the medium-fertility assumption and eventually reaches a value 0.5 children above that reached by the medium-fertility assumption in 2045-2050.
- For low-fertility countries, the value eventually reached is 0.4 children per woman above that reached by the medium-fertility assumption in 2045-2050.

Low-fertility assumptions

- Fertility in high-fertility and medium-fertility countries remains below the fertility in the medium-fertility assumption and eventually reaches a value 0.5 children below that reached by the medium-fertility assumption in 2045-2050.
- For low-fertility countries, the value eventually reached is 0.4 children per woman below that reached by the medium-fertility assumption in 2045-2050.

Constant-fertility assumption

- For each country, fertility remains constant at the level estimated for 1995-2000.

B. Mortality assumptions

Normal-mortality assumption

- Mortality is projected on the basis of the models of change of life expectancy produced by the United Nations. In countries highly affected by the HIV/AIDS epidemic, estimates of the impact of the disease are made explicitly through assumptions about the future course of the infection — that is, by projecting the yearly incidence of HIV infection.

Constant-mortality assumption

- For each country, mortality remains constant at the level estimated in 1995-2000.

C. International migration assumptions

Normal-migration assumption

- The future path of international migration is set on the basis of past international migration estimates and an assessment of the policy stance of countries with regard to future international migration flows.

Zero-migration assumption

- For each country, international migration is set to zero for the period 2000-2050.

61. Table 12 presents the different assumptions underlying the six projection variants. As shown, the four fertility variants (low, medium, high and constant-fertility) share the same assumptions regarding mortality and international migration. They differ among themselves only with respect to the assumptions regarding fertility. A comparison of their results allows, therefore, an assessment of the effects that different fertility paths have on other demographic parameters.

Table 12
Projection variants in terms of assumptions for fertility, mortality and international migration

	Assumptions		
Projection variant	*Fertility*	*Mortality*	*International migration*
Low	Low	Normal	Normal
Medium	Medium	Normal	Normal
High	High	Normal	Normal
Constant-fertility	Constant	Normal	Normal
Constant-mortality	Medium	Constant	Normal
Zero-migration	Medium	Normal	Zero

Source: United Nations, Population Division.

62. In addition to the four fertility variants, a constant-mortality variant and a zero-migration variant were prepared. They both have the same fertility assumption (i.e., medium fertility). Furthermore, the constant-mortality variant has the same international migration assumption as the medium variant. Consequently, the results of the constant-mortality variant can be compared with those of the medium variant to assess the effect that changing mortality has on other demographic parameters. Similarly, the zero-migration variant differs from the medium variant only with respect to the underlying assumption regarding migration. Therefore, the zero-migration variant allows an assessment of the effect that non-zero migration has on other demographic parameters.

D. Summary of the methodological changes made for the *2000 Revision*

63. The following changes and adjustments were made in the *2000 Revision* in relation to procedures followed in the *1998 Revision*:

(a) High-fertility countries do not necessarily reach replacement level fertility by 2050.

(b) For a greater number of countries than in the *1998 Revision*, net international migration is assumed to be non-zero over the entire 50-year projection period.

(c) A more systematic analysis of available data on international migration was undertaken in order to produce estimates of past flows and assess the prospects for the future of international migration at the country level. Emphasis was put on the analysis of data sources having information on both the origin and destination of international migrants including, in particular, the historical database on refugee stocks produced by the Office of the United Nations High Commissioner for Refugees.

(d) The estimation and projection of the impact of HIV/AIDS was modified to take better account of population dynamics and the feed-back mechanisms related to the epidemic. Assumptions about the future course of the epidemic were made on the basis of incidence, taking into account the size of the susceptible population.

(e) Two projection variants have been added for comparative purposes in order to assess the impact of non-zero net international migration and declining mortality on population growth and ageing.

Notes

[1] To be issued in 2001 as a United Nations publication.

[2] Replacement-level fertility is the level necessary to ensure that the population replaces itself over the long run. For most populations, replacement is ensured with a fertility of 2.1 children per woman.

[3] United Nations publication, Sales No. E.99.XIII.10.

[4] Report on the Global HIV/AIDS Epidemic (Geneva, UNAIDS 2000).