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WORLD POPULATION IN THE 21ST CENTURY

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I. Introduction

As the world enters the 21st century, world population continues to be an issue of critical concern. A key question at the center of the population debate and at forefront of the international agenda is: What kind of demographic future will the new century bring? Can one confidently conclude, for example, that the era of rapid population growth is over? Will below replacement fertility become the norm? Is world population likely to begin declining in the foreseeable future? In short, where is world population headed?

Attempts to forecast the world's demographic future are plagued with considerable uncertainty and inherent difficulty as well as past failure and ample cautionary advice. Here are just a few of many examples:

> "It may safely be pronounced, therefore, that population, when unchecked goes on doubling itself every twenty-five years, or increases in a geometric ratio" (Thomas Malthus, 1816)

> "… England and all civilized nations stand in deadly peril of not having enough to eat. As mouths multiply, food resources dwindle. Land is a limited quantity, and the land that will grow wheat is absolutely dependent on difficult and capricious natural phenomena." (William Crookes, 1898)

> "Little have the proponents of the birth control movement realized how powerful a force they have released and what serious national and international consequences would follow in the train of their propaganda. … What will be the result of this clash of low and high birth rate nations in the future world? In the last analysis, numbers will count. ... If the people of Russia, of India and of China continue to people the earth, will they not, in all probability, be the dominating influence in it also?" (Louis I. Dublin, 1931)

> "The steady decline in the birth rate threatens Western civilization both from within and from without. Decline in numbers and multiplication of the unproductive age will of necessity undermine the materialistic base upon which the industrial civilization of Western Europe and America rests. A thinning of ranks may expose the social superstructure of non-growing nations to the onslaughts or the overflow of the swarming peoples." (Joseph J. Spengler, 1932)

> "The most essential thing at the present time is to implant in the members of a modern community a firm grasp of the fact that they are responsible for its future in the sense that, if they do not replace themselves, the community will be extinguished. … replacement is a social duty, a fact which at present is entirely unfamiliar to people at large. … the small family problem is so much more urgent and difficult than is generally realized." (A.M. Carr-Saunders, 1936)

> "If present trends continue, by 1960 there will be 10,000,000 empty desks in schools and colleges. … all experts now agree that instead of population shooting steadily upward for hundreds of years, its crest is only a few years off. … the milk industry is in for some painful readjustments. … All industries catering to the aged will be stimulated. … Golf will expand… we have no experience with an economy which does not expand in numbers. … we must brace ourselves for a terrific outburst of wild schemes to reverse the birthrate trends." (Stuart Chase, 1939)

"The science of demography has not yet reached a stage of development where the future growth of population and its subgroups can be predicted." (William Brass, 1979)

Despite the uncertainty, difficulty, failures and warnings, population projections are generally recognized as an essential and fundamental activity of modern society. Population projections are significant because they offer a picture of the future as well as plausible implications of these trends for society and the individual.

In many respects, population projections constitute a sort of "demographic compass". This demographic compass provides explicit and likely indications of where we are headed as well as who we will be in the coming decades. Accordingly, population projections play a role, at times central, in the formulation and implementation of polices and programs relating to virtually every area of human activity, including education, health care, social services, housing, employment, environment, social security and pensions, defense, financial markets, product and service provision and development, and of course politics (National Research Council, 2000).

Valuable insight into the likely course of world population in the 21st century may be gained from an understanding of humanity's demographic past, especially its recent past. Therefore, before turning to the future, a brief review of the world's demographic trends prior to and during the 20th century is offered.

II. Prior to the 20th Century

For most of human history, life was especially harsh. The growth of population was largely kept in check by war, pestilence and famine. Living conditions were poor, especially in urban areas, and death rates were high. Infant and child deaths and maternal mortality were common, and relatively few people reached 60 years of age. Birth rates were also high; contraceptive use was limited, with women having numerous pregnancies.

As a result of high birth and death rates, world population grew very slowly (figure I). Two thousand years ago, for example, world population is believed to have been around 300 million people. Near the close of the 15th century world population was approaching the half billion mark. And when Thomas Malthus wrote his essay on population at the end of the 18th century, world population had not yet reached the one billion mark.

Also, up until relatively recently, virtually all of the world's population lived off the countryside, engaged in agrarian, pastoral and hunting activities. A thousand years ago, for example, at most a few percent of the world's population of roughly 300 million lived outside rural areas (figure II). Even in 1700, this proportion had changed little and only five cities had more than a half a million inhabitants, namely, Istanbul, Tokyo, Beijing, Paris and London. By 1800, about three percent of the world's population of some 1 billion lived in cities or urban places of 5,000 or more inhabitants. By 1900, about 15 percent of the world's population of 1.6 billion resided in urban areas and the number of cities with more than a half a million inhabitants had increased eight-fold.

At the beginning of the 19th century, China had approximately 300 million people; today, it has nearly a billion more people. India had fewer than 200 million people; today, it has a population of about 1 billion. And the United States had 6 million people two hundred years ago; today, it is 47 times larger, with a population of

about 283 million.

At the close of the 19th century, world population was growing at roughly a half a percent per year, or about 9 million persons per year (table 1). Life expectancy at birth was some 30 years, average family size was around 5 children and the median age was close to 23 years. The population aged 65 years or older accounted for 4 percent of the population and there were about 15 persons aged 15-64 years for each person aged 65 years or older. The majority of people resided in Asia, 57 percent, followed by Europe, 25 percent; Africa, 8 percent; and Latin America and Northern America, each with roughly 5 percent (table 2).

II. The 20th Century

In striking contrast to earlier periods, the 20th century was a century of revolutionary demographic developments, unparalleled during all preceding centuries. In fact, the 20th century set more world demographic records than any other century in the world's recorded history, a distinction it is expected to retain into the foreseeable future. In particular, the 20th century experienced:

- *Nearly a quadrupling of world population.* At the beginning of the 20th century, world population was approximately 1.6 billion; by the end of the century, it had reached 6.1 inhabitants.

- *Highest annual population growth rate.* In the late 1960s, the world reached an unprecedented annual growth rate of 2.0 percent. At the beginning of the 20th century, the rate of growth was one-fourth this peak level, i.e., about 0.5 percent. The current rate of population growth is 1.2 percent per year.

- *Largest annual population increase*. The world was adding a record 86 million people per year in the late 1980s. At the start of the 20th century, the annual increase was about one tenth of this peak growth, i.e., about 9 million per year. At present, the annual increase is 77 million.

- *Shortest doubling time for world population*. The world's population doubled from three to six billion in the 33-year period between 1960 and 1999. In contrast, the second most rapid doubling from two to four billion took 47 year, i.e., between 1927 and 1974.

- *Shortest duration to add one billion people.* The growth of the world's population from five billion to its current six billion took 12 years, i.e., between 1987 and 1999. In contrast, the world's growth from one to two billion took 123 years, i.e. from 1804 to 1927. Future increases of one billion are expected to be longer than 12 years.

- *Revolutionary improvements in mortality and longevity.* Infant, child and adult mortality rates are a fraction of what they were at the beginning of the century. With lower mortality rates, life expectancies have increased dramatically. For example, life expectancy at birth for the world in 1900 was around 30 years; today it is roughly 65 years. Improvements in decreasing mortality rates and increased longevity constitute one of the greatest, if not the greatest achievement of humanity.

- *Unprecedented declines in fertility and family size.* Throughout much of the 20th century, the average number of children was five or more; today the average number of children per woman for the world is

about half that earlier level, i.e. under three children per woman.

- *Control over reproduction and widespread contraceptive use.* The 1960s saw the introduction of the oral contraceptive pill and other effective and convenient methods of birth control. The consequences of the pill have been enormous. Among other things, it gave couples, in particular women, control over their reproductive behavior. Also, more than half of all married couples in developing countries now use contraception and in industrialized countries, contraception is the norm.

- *Significant international migration.* Historically, the flows were from Europe to the outside, primarily to the Western Hemisphere and to a lesser extent Africa and Asia. Today, the world is seeing increasing numbers of people migrating (or wishing to migrate) from less developed regions to more developed regions. Also, during the last ten years alone the number of refugees has more than doubled.

- *Increased urbanization.* One hundred years ago, a small minority of world population lived in urban areas; today close to half of the world's inhabitants live in urban places.

- *Emergence of mega-cities.* By the middle of the 20th century, only one city had a population of 10 million or more, New York. Today, there are 19 cities in the world of this size.

III. The 21st Century

What demographic changes will the 21st century bring? In all likelihood, and broadly speaking, it appears that world population in the future will be very different from what it is today. The expected major demographic features of world population at least by the middle of the 21st century may be summarized as follows:

First, larger population. World population continues to increase markedly. All variants (high, medium and low) from the recent United Nations projections, the *2000 Revision*, show a growing world population during the coming decades (figure III). For the year 2050, the range is from a low of 7.9 billion to a high of 10.9 billion, with medium variant being 9.3 billion.

The projected increase of approximately 3 billion during the next 50 years (medium variant) is the second highest half century increase in human history; the record setting 3.5 billion was added to the world between 1950 and 2000. With respect to the second half of the 21st century, it appears highly likely that any increase in the world's population will be substantially less than projected for the first half. For example, by mid-century the world is projected to be adding 43 million people annually, which is 57 percent of its current annual increment of 77 million. In the unlikely event the world's annual increase were to remain constant at that level until the beginning of the 22nd century, world population would be grow by at least 2 billion more people in the latter half of the 21st century. But, most long-range projections, however, anticipate that the growth of world population for that period will be only a fraction of this unlikely increase (United Nations, 2000).

With the rapid growth of world population, it is not surprising that the number of relatively large countries is increasing. For example, whereas in 1950 nine countries had populations of 50 million or more, today there are 23, and by mid-century the number is projected to reach 39 (table 3).

Second, slower growth. The growth of world population peaked in the late 1960s at an annual growth rate

of 2.0 percent (figure IV). At the beginning of the 20th century, the rate of growth was one-fourth the peak level, i.e., 0.5 percent, and the current rate of population growth is estimated at 1.2 percent per year and expected to continue declining. By 2050, the annual growth of world population ranges from a high of 1 percent to a low of 0 percent, with the medium variant being about a half a percent.

In terms of absolute growth, the current annual increment of world population - 77 million - remains relatively high. In the late 1980s, the world was adding a record 86 million people per year. In the coming several decades, the annual increases are expected to continue to be relatively high. However, by mid-century, the annual increase according the medium variant is projected to be around 43 million.

Third, lower fertility. Fertility levels - the engine of population growth - have come down markedly during the 20th century in virtually every corner of the world, and are expected to continue to do so (table 4). For example, whereas in the 1950s women in less developed regions were having on average six children, today they are having half that level.

In addition, it is estimated at present that 64 countries, accounting for 44 percent of the world's population or 2.7 billion people, have fertility at or below the replacement level (2.1 children per woman). Moreover, by 2050 according to the medium variant projections, every major region of the world except Africa will be at or below replacement level fertility. Africa's fertility is expected to be slightly higher than replacement fertility, at 2.4 children per woman (table 4).

Fourth, lower mortality and longer life. As has been the case throughout the 20th century, mortality rates and increased longevity are expected to continue improving in the 21st century. Today for the world as a whole, life expectancy at birth is 65 years, which is more than double the level at the beginning of the 20th century and 20 years more than the level in 1950 (table 1). By mid-century, the global life expectancy at birth is projected to increase by some 10 years, i.e., reaching around 76 years.

The considerable regional differences in mortality are highlighted in the life expectancies at birth shown in table 5. Life expectancies currently range from 66 to 77 years, except for Africa's, which stands substantially lower at 51 years. Global improvements in mortality are assumed to continue into the future, with Northern America reaching a high of nearly 83 years. Again, however, Africa's mortality lags behind, with its life expectancy at birth by mid-century expected to be much the same as the level existing in Latin America today.

Over the last several years, the impact of HIV/AIDS epidemic has worsened in terms of increased morbidity, mortality and population loss. The number of excess deaths due to AIDS among the 45 most affected countries, for example, is estimated to be around 3 million people per year during the period 2000-2005. Although the projections assume significant declines in the chances of being infected by HIV in the future, the long-term impact of the AIDS epidemic remains grim. Already life expectancy at birth for these 45 countries is believed to have been reduced by close to 3 years; and by 2015, it is projected to be 5 years lower than it would have been in the absence of the epidemic (United Nations, 2001).

Nevertheless, despite the devastating impact of the epidemic, the populations of even the hardest hit countries are projected to be larger by mid-century than they are today. For example, the population of the largest African country, Nigeria, is expected to increase from its current size of 114 million to 279 million by 2050 (medium variant). One country that more clearly demonstrates the distressing impact of the AIDS epidemic is South Africa. As its fertility rate does not counterbalance the higher mortality due to AIDS, South Africa is the

only highly affected country where population growth is projected to be negative during the period 2010-2025; thereafter, the rate returns to being positive.

Fifth, older population. By mid-century, the number of persons 65 years or older in the world is expected to more than double by 2050. And the numbers of the oldest-old, those 80 years and over will increase five-fold. In many countries, one person out of three is expected to be 65 years or over and the number of persons of working age per one older person will be halved, from four to two.

Also, the older population is itself ageing. More people are reaching old ages, i.e., attaining 80, 90 and even 100 years. Furthermore, because women survive to higher ages than men do, there are strikingly more women than men among the older population groups. Among those 60 years or older, 55 percent are women. Among the oldest old (80 years or older), there are nearly two women for every male among those 80 years or older; and among those 100 years or older, there are about 4 women for every male.

Sixth, increased international migration. International migration is expected to remain high during the 21st century. The more developed regions are expected to continue being net receivers of international migrants, with an average gain of about 2 million per year over the next 50 years. Today, many developed countries already rely for their modest population growth on international migration. Although fertility may rebound in the coming decades, few believe that fertility in most developed countries will recover sufficiently to reach replacement level in the foreseeable future. Because of their very low fertility, international migration has a significant impact on population growth in the more developed regions.

Seventh, more urbanized. Most of the world's population growth is taking place in urban areas. Over the next three decades, for example, urban areas in less developed regions are expected to double in size, growing from 1.9 billion today to 3.9 billion by 2030. As a result, world population will see a historic reversal in its urban-rural composition. Thirty-five years ago about two-thirds of the world lived in rural areas; thirty-five years from today, nearly two-thirds of the world's population will be living in urban areas.

Also noteworthy in this context is the emergence of very large cities. The number of mega-cities - agglomerations of 10 million or more inhabitants - has grown rapidly during the second half of the 20th century. In 1950, there was one city in this category: New York with 12.3 million inhabitants. By 1975, the number increased to five: Tokyo, New York, Shanghai, Mexico City and Sao Paulo. Today there are 19 mega-cities and moreover, many of these cities have reached unprecedented sizes, exceeding 15 million or even 20 million inhabitants. By 2015, the number of mega-cities is projected to increase by 4 (all in Asia), thereby reaching a total of 23.

A notable aspect of the emergence of this constellation of mega-cities is that it bypasses Europe entirely, at least until 2015. In addition, the relative position of the European cities on the world stage has changed markedly over the last 50 years. For example, while in 1950 Europe had ten of the world's 25 largest cities, today it has three, and by 2015 it will have none.

Eighth, more concentrated in less developed regions. Nearly all of the world's future population growth will be taking place in the less developed regions**.** While the population of individual countries may decline (e.g., those of Europe and Japan) or increase (e.g., United States, Canada and Australia), the population of the more developed regions taken as a whole is projected to remain near its present size of some 1.2 billion

inhabitants.

As a result of these different demographic paths, the distribution of world population will continue its shift towards the less developed regions (table 2). For example, the proportion of world population residing in the less developed regions has increased from 68 percent in 1950 to 80 percent today; by 2050, the proportion is expected to reach 87 percent.

IV. Discussion

Behind these global and regional trends and averages lies considerable demographic diversity in terms of growth rates and the basic components of change, i.e. fertility, mortality and migration. For example, while some regions and countries are expected to continue growing rapidly, others will in all likelihood grow slowly and still others are projected to decline in population size. In the coming decades, the effects of such diversity are likely to become even more evident and consequential economically, socially and politically.

An important consequence of demographic diversity is the regional shift in world population. In 1950, for example, there were two people residing in the less developed regions for every person in the more developed regions; today this ratio is four to one; and by 2050, this ratio is expected to be seven to one. Also after World War II, Europe accounted for 22 percent of the world population and Africa 8 percent. Today both regions have approximately the same share of world population, about 13 percent. By 2050, Africa is expected to be three times as large as Europe.

A comparison of the world's two largest economic powers further illustrates the regional shift in population that is underway. As the United States and the European Union are following distinctly different demographic paths, the population of the United States, which today is about 93 million smaller than the European Union, is projected to be 58 million larger than the European Union by the year 2050.

The shift in the relative position of Europe is especially noteworthy. For example, while at the beginning of the 20th century about 25 percent of the world's population lived in Europe, the proportion is half that level today, i.e., 12 percent. And by mid-century, it will be halved again, with around 6 percent of the world's population expected to be living in Europe.

With world population shifting increasingly to the less developed regions, the ranking of the world's largest countries is being changed markedly. For example, while six of the ten largest countries in 1950 were more developed, today there are three, and by 2050, there will be only one more developed country among the top ten, i.e., the United States (table 6).

The biggest six contributors to global population increase countries are India, China, Pakistan, Nigeria, Bangladesh and Indonesia. In today's world of 6.1 billion people, these six countries account for half of the world's annual growth of 77 million. Moreover, the annual population growth of India alone (some 21percent) is equal to the growth of the next three countries combined, i.e., China, Pakistan and Nigeria.

As a result of India's more rapid growth, it is projected to be larger than China by 2050 (1.6 billion vs. 1.5 billion). The growth of India's population may also be appreciated by the following comparison. For the entire year of 2000, the natural increase of the population (births minus deaths) of the European Union was 343,000

persons; India achieved this amount of population growth during the first week of this year.

In contrast to the big six population contributors, the populations of Japan and virtually all countries of Europe are growing very little, if at all, due to low fertility and limited migration. By mid-century, for example, the populations of 39 countries are projected to be smaller than they are today. Consider the case of Italy. The population of Italy is projected to be 25 percent smaller in 2050 than it is today; in fact, Italy's population in 2050 is projected to be smaller than it was in 1950, i.e., 43 million versus 47 million. Other examples of expected population declines include Japan and Germany, both 14 percent smaller in 2050 than today; Slovenia and Hungary, both 25 percent smaller; and the Russian Federation, Georgia and Ukraine between 28 to 40 percent smaller. In stark contrast, several more developed countries are projected to be significantly larger by 2050. Perhaps most noteworthy is the case of the United States, which is projected to be 40 percent larger by 2050. Other examples are Canada, 33 percent larger, and Australia, 38 percent larger, by 2050.

The extent of below replacement fertility among many European nations and Japan is especially noteworthy. These levels of fertility have been said to be lower than at any crucial point in European history, perhaps with the exception of the plague (Livi-Bacci, 2001). Moreover, contrary to the historical experience of lowered fertility levels in times of crisis, the present levels of fertility are not believed to be a temporary phenomenon (Lesthaeghe and Willems, 1999).

International migration in the 21st century is likely to differ markedly from the past. While during the 19th century and most of the 20th century the major migratory flows originated in the more developed countries of Europe, a new pattern has emerged during the last quarter century. Increasing numbers of countries are attempting to restrict immigration. For example, the percentage of countries with policies to reduce immigration flows steadily increased from 6 percent in 1976 to 19 percent in 1986, and reached 35 percent in 1995 (United Nations, 1998a). At the same time, the various economic, social and political crises in many less developed countries, especially in Africa, combined with rapid population growth and urbanization have increased pressures to emigrate to the wealthy countries of the north. As a result, migration has become more varied, including all levels of skills, and, in the face of increasing restrictions to labor migration, growing numbers of asylum seekers, temporary and undocumented migrants. In addition, the outflow of the highly skilled and educated, i.e., "the brain drain", from the less developed countries, particularly Africa, is likely to further challenge and undercut developmental efforts in many of these countries (Lobo, 2001).

As was noted earlier, a good number of more developed countries are already relying on international migration for their modest population growth. For instance, net migration to the European Union in 2000 was more than twice the natural population growth (816,000 versus 343,000). With prospects of returning to replacement fertility considered remote, the populations of many of the more developed countries are projected to decline relatively soon without international migration. In fact, without migration the population of more developed regions as a whole would start declining in 2003 rather than in 2025; and by 2050, the population would be 10 percent less than projected under the assumption of continued migration. Thus, international migration from less developed countries to more developed countries can be expected to play an increasingly important demographic role in the 21st century.

Coupled with rapidly ageing populations, these projected declines in population size and their consequences, e.g., reduced labor force and increased old-age dependency, are forcing the European Union and other more developed countries to reconsider their current policies and programs concerning international migration. In

addition to their current demographic circumstances and future prospects, many European countries are also eager to compete with the United States, as well as Canada and Australia, for highly skilled professionals, scientists and technicians from less developed countries. Largely as a result of this competition for talent and current demographics, the stance against labor immigration is reportedly eroding among political parties in many European countries, such as Germany (Stewart, 2001; Zachary and Rohwedder, 2001).

While less developed countries are also experiencing declining fertility, their populations continue to increase in size. The populations of Africa, for example, are continuing to grow very rapidly. In the past 50 years Africa's population more than tripled in size, from 221 million to 794 million. In the coming decades Africa's population is expected to more than double, reaching 2 billion by 2050. The case of Kenya illustrates vividly the incredible demographic changes taking place in the African continent. Kenya was 6 million in 1950; today it is 31 million; and by 2050, it is expected to reach 55 million.

Particularly rapid growth is expected among the group of 49 countries classified as least developed. Their population is expected to nearly triple between 2000 and 2050, passing from 667 million to 1.85 billion, despite the fact that their fertility is projected to decline markedly in the future. Consequently, whereas today about 10 percent of world population is living in least developed countries, this proportion is expected to increase to 20 percent by mid-century.

In contrast to the least developed countries, some developing countries have already achieved fertility levels similar to the more developed countries. Countries, such as Brazil, China, Iran, Mexico, Lebanon, and Tunisia, are among the increasing number of countries that are near or below replacement level fertility. The future path of fertility in these countries remains an important demographic issue. Will, for instance, these and other developing countries follow the patterns of very low fertility now exhibited in Europe and Japan?

Differential rates of growth also have significant consequences at the sub-regional level. Fifty years ago, for instance, Spain's population was three times larger than Morocco's; in 50 years, Morocco is expected to be 60 percent larger than Spain. In 1950, the Russian Federation was close to three times larger than Pakistan. Fifty years from now, Pakistan will be three times larger than the Russian Federation. A third example concerns the population of Israel and the Palestinian population in the West Bank and Gaza Strip. Today, the population of Israel is nearly twice the size of the Palestinian population; by 2050, the Palestinian population of the West Bank and Gaza Strip is expected to be 17 percent larger than Israel's population.

Differential rates of population growth may also have significant consequences within countries. Due to international migration and/or differing fertility patterns, differential rates of population growth may lead to significant changes in a country's, state's or city's composition by language, religion, ethnicity or nationality. History has shown that such compositional shifts, whether actual or perceived, can produce negative public sentiment and xenophobia. However, history has also demonstrated that such shifts can generate innovation and revitalization.

With fertility rates continuing to decline and life expectancies increasing generally, countries have already attained age structures older than ever seen in the past. For example, according to the 2000 census, the number of Japanese aged 65 or older has surpassed those below age 15 for the first time since records have been kept. Of the 127 million Japanese, 17.5 percent are aged 65 or older compared to 14.5 percent below age 15. Moreover, the global ageing process currently underway is expected to accelerate in the coming decades,

especially in less developed nations.

The extensive consequences of population ageing are of mounting concern and significance for more developed countries and increasingly for less developed countries as well. The prospects of population ageing and population decline in many more developed countries are already raising crucial issues for countries, states and cities in areas such as employment, economic growth, health care services, retirement, pensions and social support services. Population decline and ageing will have far-reaching repercussions, forcing Governments to reconsider many of their existing economic, social and political policies and programs, including those relating to international migration.

The consequences of population ageing will be especially relevant for women, who outlive men and are usually the principal caregivers to elderly relatives. In addition, among the elderly the imbalance of the sex ratio in favor of women increases with age. Among those 80 years or older, for example, there are two women for every man; and among those 100 years or older, the ratio is four to one.

At the other end of the age distribution, the balance between males and females is reversed. Normally, the sex ratio at birth is around 105 boys per 100 girls. With new technologies, however, e.g., sonograms, the sex of the fetus can be accurately determined at the early stages of pregnancy. As a result of technology combined with a preference for sons rather than daughters, noteworthy deviations from the normally occurring sex ratio at birth are raising unease in a number of countries and areas, e.g., China and India (Chu, 2001; Dyson 2001; United Nations, 1998b). Several countries, in fact, have passed legislation forbidding prenatal sex determination (Chu, 2001). Have the changes in the sex ratio at birth actually developed to such an extent that they constitute a matter of serious demographic concern, i.e., a potential shortage of women in the marriage market? While perhaps not yet, reported imbalances in the sex ratio at birth need are troubling developments for a number of Governments and interested parties.

V. Conclusion

At the outset of this paper, the central question posed was: What kind of demographic future will the new century bring? In brief, it does not appear unreasonable, and probably no longer surprising, to conclude that world population by mid-century will be in all likelihood very different from what it is today. The major features of world population in 2050 in comparison to today may be summarized as follows:

1. **Larger population;**
2. **Slower growth;**
3. **Lower fertility;**
4. **Lower mortality and longer life;**
5. **Older population;**
6. **Increased international migration;**
7. **More urbanized;**
8. **More concentrated in less developed countries.**

Finally, as was noted earlier, behind these general trends and averages lies considerable diversity. While birth and death rates have declined or are continuing to decline virtually everywhere, significant differentials between regions and countries as well as within countries among various sub-populations and major groups are

likely to persist throughout most of this century. In addition, urbanization and international migration are important factors contributing to demographic diversity in virtually all regions of the world.

With increasing globalization and anti-globalization reactions, mounting attention is being paid to these demographic differentials and their economic, social and political consequences. In particular, critical questions are being raised relating to issues of equality and equity in the distribution of goods, services and opportunities, especially with regard to health, education, housing, employment and old-age security. Most recently, for example, in his speech of 17 July 2001 to the World Bank in Washington D.C., United States President George W. Bush stated:

> "The needs are many and undeniable. And they are a challenge to our conscience and to complacency. A world where some live in comfort and plenty, while half of the human race lives on less than $2 a day, is neither just, nor stable."(*New York Times*, 2001)

No doubt these issues will be among the vital challenges facing Governments and the international community in the 21st century.

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Table 1. World population, age structure and demographic indicators, 1900-2050.

	A. Population (millions)			
Age group (years)	1900	1950	2000	2050
0-4	220	339	606	584
5-9	184	271	594	582
10-14	171	258	599	581
15-19	159	239	554	587
20-24	145	221	509	593
25-29	132	194	504	600
30-34	118	165	477	602
35-39	105	161	428	593
40-44	93	146	372	578
45-49	82	127	331	563
50-54	70	107	266	548
55-59	58	90	209	529
60-64	45	74	187	511
65-69	32	56	152	438
70-74	20	38	119	358
75-79	10	22	79	293
80 or older	5	14	70	370
Total population	1,650	2,520	6,057	9,322

	B. Demographic Indicator			
Indicator	1900	1950-1955	1995-2000	2045-2050
Population growth rate (%)	0.56	1.77	1.33	0.34
Crude birth rate (per 1000)	39.0	37.3	22.1	13.5
Crude death rate (per 1000)	33.4	19.7	8.9	10.1
Total fertility rate	5.2	5.0	2.7	2.0
Life expectancy at birth (years)	30.0	46.5	65.4	76.3
Median age (years)	23.2	23.5	25.4	37.8
Population aged 65 or older (%)	4.1	5.2	6.9	15.6
Potential support ratio (15-64/ 65+)	14.9	11.7	9.2	3.9

Source: United Nations 2001.

Table 2. Population for World and Major Areas, 1900-2050.

Major area	1900	1950	2000	2050
	A. Population (millions)			
World	1,650	2,519	6,057	9,322
More developed	540	814	1,191	1,181
Less developed	1,110	1,706	4,865	8,141
Africa	133	221	794	2,000
Asia	947	1,399	3,672	5,428
Europe	408	548	727	603
Latin America	74	167	519	806
Northern America	82	172	314	438
Oceania	6	13	31	47
	B. Percentage distribution			
World	100.0	100.0	100.0	100.0
More developed	32.7	32.3	19.7	12.7
Less developed	67.3	67.7	80.3	87.3
Africa	8.1	8.8	13.1	21.5
Asia	57.4	55.5	60.6	58.2
Europe	24.7	21.8	12.0	6.5
Latin America	4.5	6.6	8.6	8.6
Northern America	5.0	6.8	5.2	4.7
Oceania	0.4	0.5	0.5	0.5

Source: United Nations, 2001.

Table 3. Countries with a population of 50 million or more, 1950, 2000 and 2050 (medium-variant)

Country	Population in 1950	Country	Population in 2000	Country	Population in 2050
1 China	554 760	1 China	1 275 133	1 India	1 572 055
2 India	357 561	2 India	1 008 937	2 China	1 462 058
3 United States	157 813	3 United States	283 230	3 United States	397 063
4 Russian Fed.	102 702	4 Indonesia	212 092	4 Pakistan	344 170
5 Japan	83 625	5 Brazil	170 406	5 Indonesia	311 335
6 Indonesia	79 538	6 Russian Fed.	145 491	6 Nigeria	278 788
7 Germany	68 376	7 Pakistan	141 256	7 Bangladesh	265 432
8 Brazil	53 975	8 Bangladesh	137 439	8 Brazil	247 244
9 United Kingdom	50 616	9 Japan	127 096	9 D.R. Congo	203 527
		10 Nigeria	113 862	10 Ethiopia	186 452
		11 Mexico	98 872	11 Mexico	146 651
		12 Germany	82 017	12 Philippines	128 383
		13 Viet Nam	78 137	13 Viet Nam	123 782
		14 Philippines	75 653	14 Iran	121 424
		15 Iran	70 330	15 Egypt	113 840
		16 Egypt	67 884	16 Japan	109 220
		17 Turkey	66 668	17 Russian Fed.	104 258
		18 Ethiopia	62 908	18 Yemen	102 379
		19 Thailand	62 806	19 Uganda	101 524
		20 United Kingdom	59 415	20 Turkey	98 818
		21 France	59 238	21 Tanzania	82 740
		22 Italy	57 530	22 Thailand	82 491
		23 D.R. Congo	50 948	23 Afghanistan	72 267
				24 Colombia	70 862
				25 Germany	70 805
				26 Myanmar	68 546
				27 Sudan	63 530
				28 France	61 832
				29 Saudi Arabia	59 683
				30 United Kingdom	58 933
				31 Kenya	55 368
				32 Argentina	54 522
				33 Iraq	53 574
				34 Angola	53 328
				35 Nepal	52 415
				36 Niger	51 872
				37 Rep.of Korea	51 560
				38 Algeria	51 180
				39 Morocco	50 361

Source*:* United Nations, 2001.

Table 4. Total Fertility Rate for the World and Major Areas by Variant, 1950-2050

Major area	1950-1955	1995-2000	2045-2050		
			Low	Medium	High
World	5.01	2.82	1.68	2.15	2.62
More developed	2.84	1.57	1.52	1.92	2.33
Less developed	6.16	3.10	1.70	2.17	2.65
Africa	6.71	5.27	1.91	2.39	2.88
Asia	5.88	2.70	1.60	2.08	2.56
Europe	2.66	1.41	1.41	1.81	2.20
Latin America	5.89	2.69	1.60	2.10	2.59
Northern America	3.47	2.00	1.68	2.08	2.48
Oceania	3.87	2.41	1.61	2.06	2.50

Source: United Nations, 2001.

Table 5. Expectation of Life at Birth for the World and Major Areas, 1950-2050

Major area	1950-1955	1995-2000	2045-2050
World	46.5	65.0	76.0
More developed	66.2	74.9	82.1
Less developed	41.0	62.9	75.0
Africa	37.8	51.4	69.5
Asia	41.3	65.8	77.1
Europe	65.7	73.2	80.8
Latin America	51.4	69.3	77.8
Northern America	68.9	76.7	82.7
Oceania	60.9	73.5	80.6

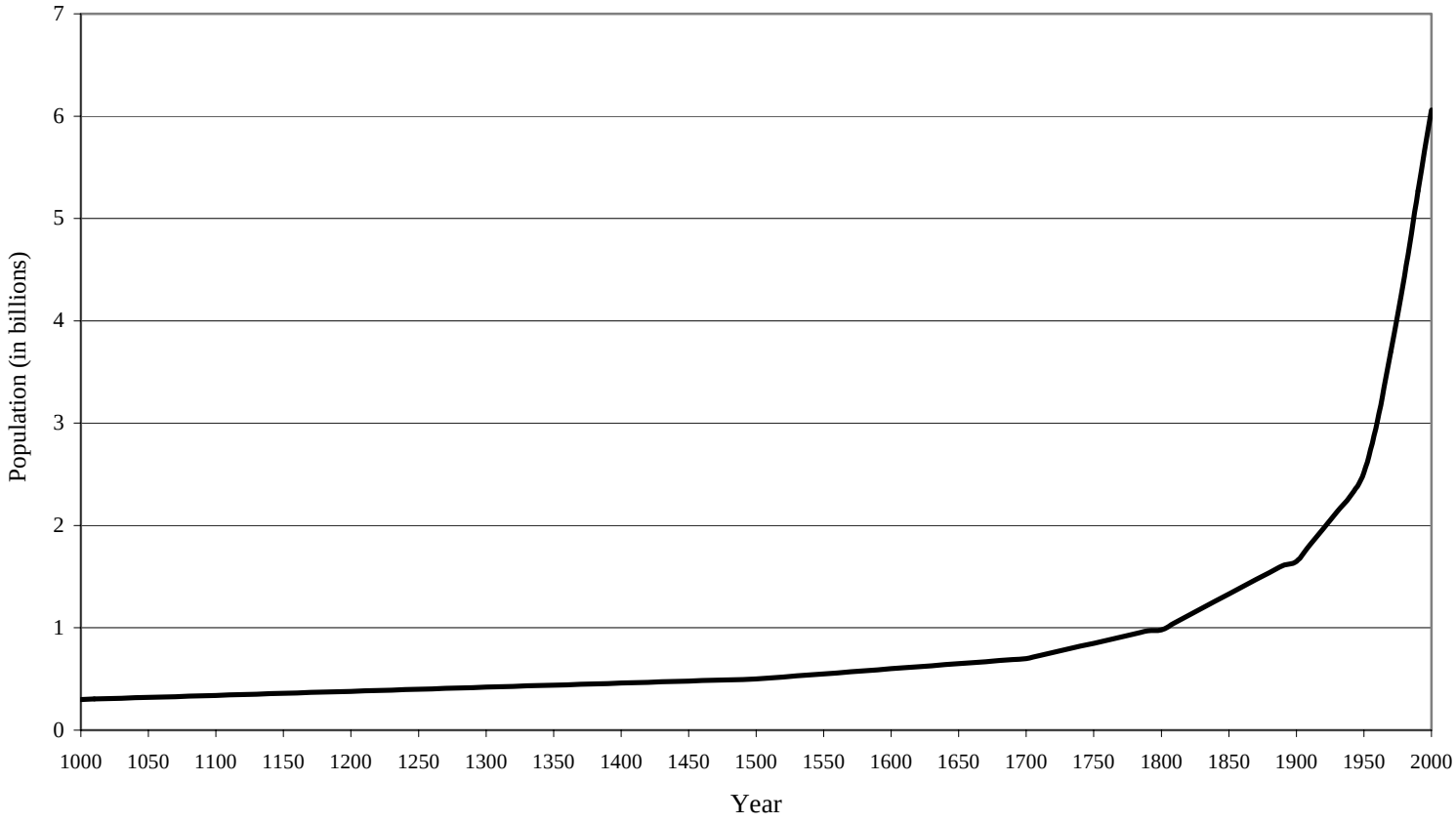
Source: United Nations, 2001.

Table 6. Population and Cumulative Percent of 10 Largest Countries, 1950, 2000 and 2050.

	1950			2000			2050	
	Country	Population	Percent	Country	Population	Percent	Country	Population	Percent
1	China	554 760	22.0	China	1 275 133	21.1	India	1 572 055	16.9
2	India	357 561	36.2	India	1 008 937	37.7	China	1 462 058	32.5
3	United States	157 813	42.5	United States	283 230	42.4	United States	397 063	36.8
4	Russian Fed.	102 702	46.6	Indonesia	212 092	45.9	Pakistan	344 170	40.5
5	Japan	83 625	49.9	Brazil	170 406	48.7	Indonesia	311 335	43.8
6	Indonesia	79 538	53.0	Russian Fed.	145 491	51.1	Nigeria	278 788	46.8
7	Germany	68 376	55.7	Pakistan	141 256	53.4	Bangladesh	265 432	49.7
8	Brazil	53 975	57.9	Bangladesh	137 439	55.7	Brazil	247 244	52.3
9	United Kingdom	50 616	59.9	Japan	127 096	57.8	D.R.Congo	203 527	54.5
10	Italy	47 104	61.8	Nigeria	113 862	59.7	Ethiopia	186 452	56.5

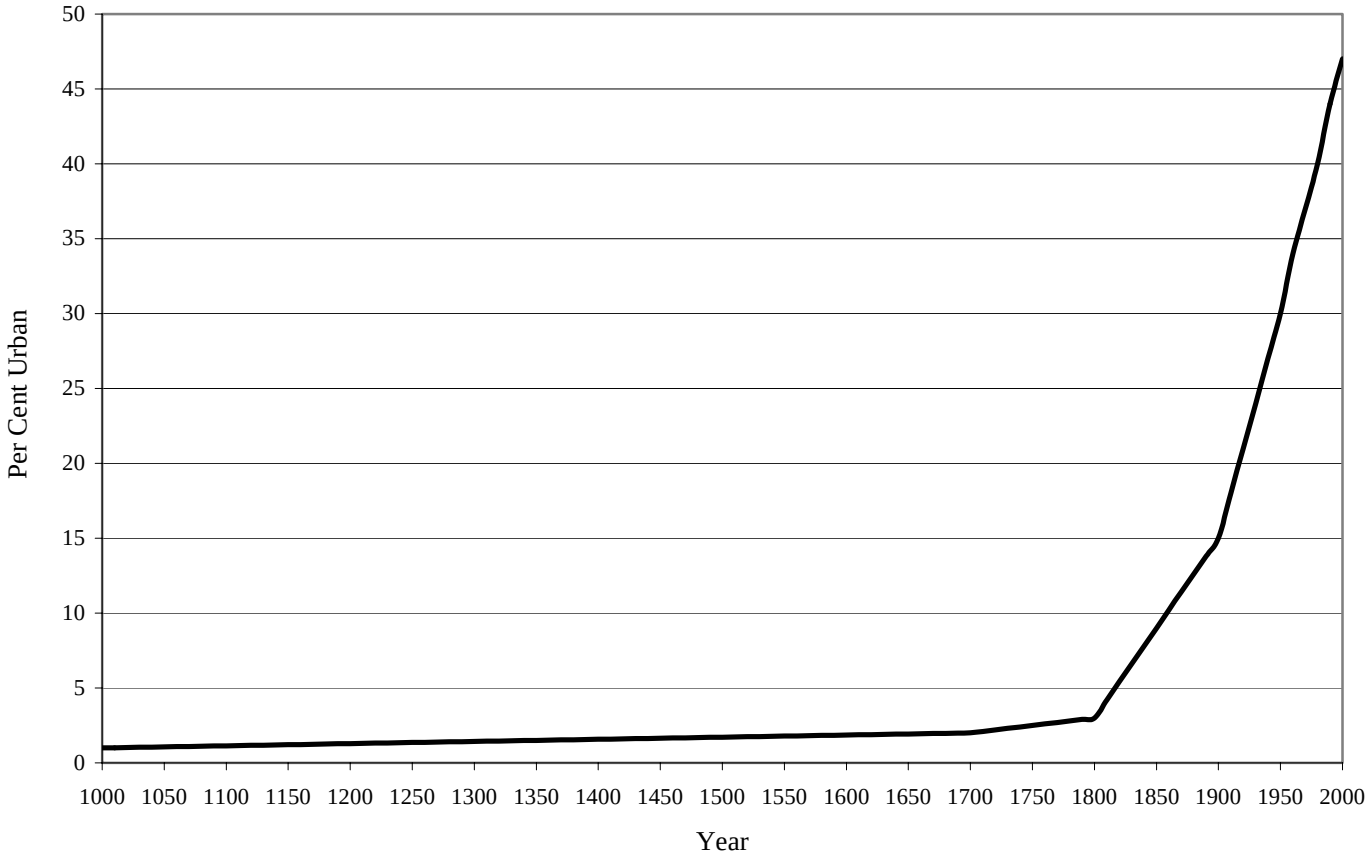
Source: United Nations, 2001.

Figure I. World Population, 1000-2000
(in billions)



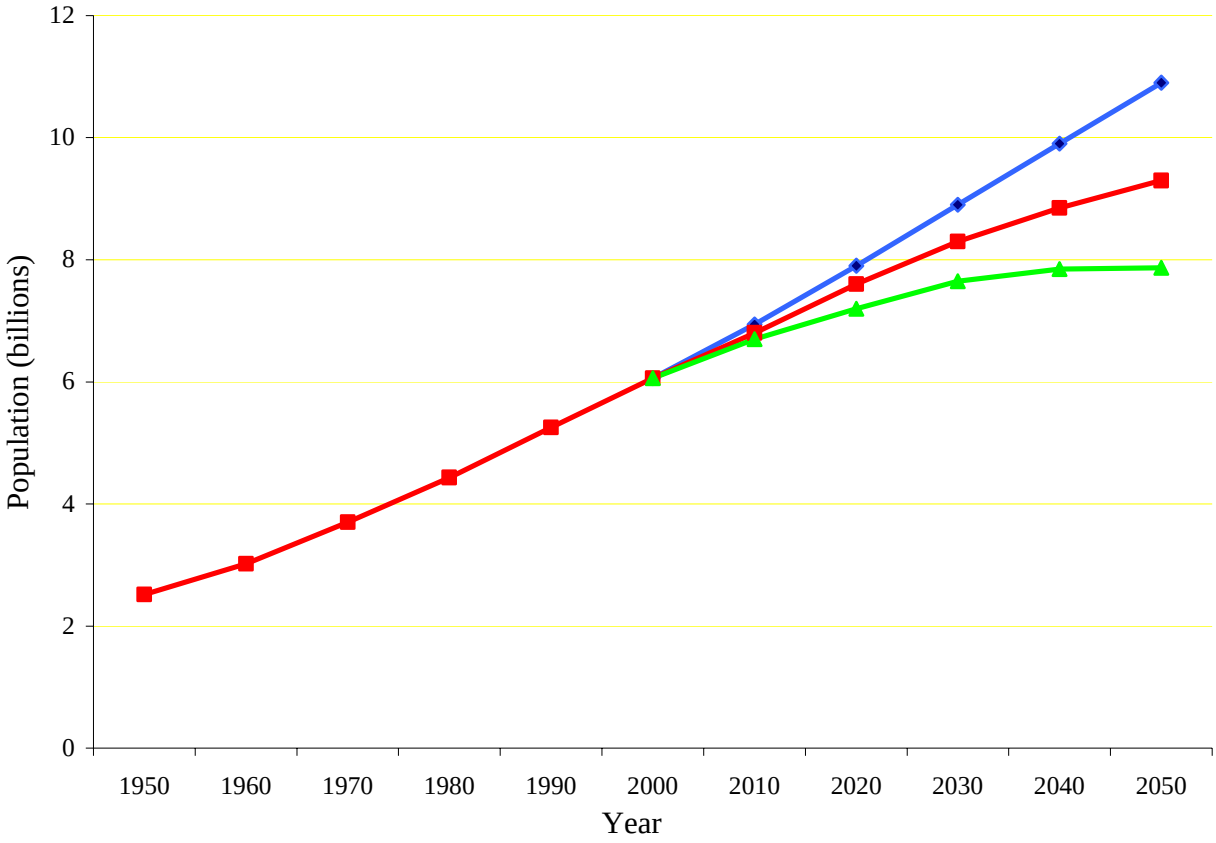
Source: United Nations, 2001.

Figure II. Per Cent of World Population Urban, 1000-2000



Source: United Nations, 2001.

Figure III. World Population by Variant, 1950-2050
(High, Medium and Low)



Source: United Nations, 2001.