

# *Population, Development and the Environment*

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## *1. Introduction*

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Population is one of the most sensitive and explosive topics under discussion by many people nowadays. With the rapidly increasing global population, some are now wondering how to feed, cloth and provide proper healthcare for the ever increasing number of humans on earth.

This paper seeks to examine some of the core issues surrounding population studies, development and the environment.

## 2. Thomas Robert Malthus (1766 - 1834)

It is almost impossible to have a discussion on population issues without examining some of the works of Reverend Thomas Robert Malthus, whose essay on the "Principle of Population" in 1798, continues to have a great deal of influence on population studies in our time.

Thomas Malthus was born in Dorking, Surrey, England and graduated with a Masters degree at Jesus College, University of Cambridge. He was ordained as a minister of the church of England in 1788,

Malthus saw a rapidly growing population and feared that the population, which was growing in geometrical patterns (i.e. 1, 2, 4, 8, 16, 32, 64, etc.) and food production, which was in arithmetical progression (i.e. 1, 2, 3, 4, 5, 6, 7, etc.), would not be enough to feed the ever increasing population.

Malthus believed that if the rapid population increase was not kept under a constant check, it would result in unpleasant and disastrous consequences. He suggested both positive and preventative checks to be in place to control the rise. **Positive checks** include starvation, diseases, etc, all of which increase the death rate. **Preventative checks** are postponement of marriage, etc, which will reduce the birth rate, in order to keep it in line with food production. He conceded however, that both measures are characterised by misery and vice.

The following is part of Malthus' essay on the Principle of Population:

*"The different ratio in which population and food increase – The necessary effects of these different ratios of increase – Oscillation produced by them in the condition of the lower classes of society – Reasons why this oscillation has not been so much observed as might be expected – Three propositions on which the general argument of the Essay depends – The different states in which mankind have been known to exist proposed to be examined with reference to these three propositions.*

*I said that population, when unchecked, increased in a geometrical ratio, and subsistence for man in an arithmetical ratio.*

*Let us examine whether this position be just. I think it will be allowed, that no state has hitherto existed (at least that we have any account of) where the manners were so pure and simple, and the means of subsistence so abundant, that no check whatever has existed to early marriages, among the lower classes, from a fear of not providing well for their families, or among the higher classes, from a fear of lowering their condition in life. Consequently in no state that we have yet known has the power of population been left to exert itself with perfect freedom.*

*In a state therefore of great equality and virtue, where pure and simple manners prevailed, and where the means of subsistence were so abundant that no part of the society could have any fears about providing amply for a family, the power of population being left to exert itself unchecked, the increase of the human species would evidently be much greater than any increase that has been hitherto known.*

*In the United States of America, where the means of subsistence have been more ample, the manners of the people more pure, and consequently the checks to early marriages fewer, than in any of the modern states of Europe, the population has been found to double itself in twenty-five years.*

*This ratio of increase, though short of the utmost power of population, yet as the result of actual experience, we will take as our rule, and say, that population, when unchecked, goes on doubling itself every twenty-five years or increases in a geometrical ratio.*

*Let us now take any spot of earth, this Island for instance, and see in what ratio the subsistence it affords can be supposed to increase. We will begin with in under its present state of cultivation.*

*If I allow that by the best possible policy, by breaking up more land and by great encouragements to agriculture, the produce of this Island may be doubled in the first twenty-five years, I think it will be allowing as much as any person can well demand.*

*In the next twenty-five years, it is impossible to suppose that the produce could be quadrupled. It would be contrary to all our knowledge of the qualities of land. The very utmost that we can conceive, is, that the increase in the second twenty-five years might equal the present produce. Let us then take this for our rule, though certainly far beyond the truth, and allow that, by great exertion, the whole produce of the Island might be increased every twenty-five years, by a quantity of subsistence equal to what it at present produces. The most enthusiastic speculator cannot suppose a greater increase than this. In a few centuries it would make every acre of land in the Island like a garden.*

*Yet this ratio of increase is evidently arithmetical. It may be fairly said, therefore, that the means of subsistence increases in an arithmetical ratio. Let us now bring the effects of these two ratios together.*

*The population of the Island is computed to be about seven millions, and we will suppose the present produce equal to the support of such a number. In the first twenty-five years the population would be fourteen millions, and the food being also doubled, the means of subsistence would be equal to this increase. In the next twenty-five years the population would be twenty-eight millions. In the next*

*period the population would be fifty-six millions, and the means of subsistence just sufficient for half that number. And at the conclusion of the first century the population would be one hundred and twelve millions and the means of subsistence only equal to the support of thirty-five millions, which would leave a population of seventy-seven millions totally unprovided for.*

*A great emigration necessarily implies unhappiness of some kind or other in the country that is deserted. For few persons will leave their families, connections, friends, and native land, to seek a settlement in untried foreign climes, without some strong subsisting causes of uneasiness where they are, or the hope of some great advantages in the place to which they are going.*

*But to make the argument more general and less interrupted by the partial views of emigration, let us take the whole earth, instead of one spot, and suppose that the restraints to population were universally removed. If the subsistence for man that the earth affords was to be increased every twenty-five years by a quantity equal to what the whole world at present produces, this would allow the power of production in the earth to be absolutely unlimited, and its ratio of increase much greater than we can conceive that any possible exertions of mankind could make it.*

*Taking the population of the world at any number, a thousand millions, for instance, the human species would increase in the ratio of – 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, etc. and subsistence as – 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, etc. In two centuries and a quarter, the population would be to the means of subsistence as 512 to 10: in three centuries as 4096 to 13, and in two thousand years the difference would be almost incalculable, though the produce in that time would have increased to an immense extent.*

*No limits whatever are placed to the productions of the earth; they may increase for ever and be greater than any assignable quantity. Yet still the power of population being a power of a superior order, the increase of the human species can only be kept commensurate to the increase of the means of subsistence by the constant operation of the strong law of necessity acting as a check upon the greater power...*

*...It is an evident truth that, whatever may be the rate of increase in the means of subsistence, the increase in population must be limited by it, at least after the food has been divided into the smallest shares that will support life. All the children born, beyond what would be required to keep up the population to this level, must necessarily perish, unless room be made for them by the deaths of grown persons.....To act consistently, therefore, we should facilitate, instead of foolishly and vainly endeavouring to impede, the operation of nature in producing this mortality, and if we dread the too frequent visitation of the horrid form of famine, we should*

*sedulously encourage the other forms of destruction, which we compel nature to use.*

*Instead of recommending cleanliness to the poor, we should encourage contrary habits. In our towns we should make the streets narrower, crowd more people into the houses, and court the return of the plague. In the country we should build our villages near stagnant pools, and particularly encourage settlements in all marshy and unwholesome situations. But above all, we should reprobate specific remedies for ravaging diseases: and those benevolent, but much mistaken men, who have thought they were doing a service to mankind by projecting schemes for the total extirpation of particular disorders. If by these and similar means the annual mortality were increased ..... we might probably every one of us marry at the age of puberty and yet few be absolutely starved....."*

The question is, are the doom and bleak population predictions of Thomas Malthus accurate? And to what extent does the rapid population growth impact on development?

### ***3. Global Population***

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On 12<sup>th</sup> October 1999, the world's population reached the 6 billion mark, and since then, 356,000 more children are born every day, making a total of 78 million children each year. By 1<sup>st</sup> April 2004, the population is already over 6.36 billion people; with China and India representing 25 per cent of the total global population, their populations hitting 1.32 billion and 1.08 billion people respectively, It is projected that there will be over 9 billion people on earth by 2050.

In a statement by Dr Nafid Sadik (the Executive Director, United Nations Population Fund), when the world population reached 6 billion in 1999, said:

*"Today the world will pass another milestone in the steady growth of human population: 6 billion people are alive on Earth, twice as many as in 1960 and three times as many as in 1927. The last billion was added in record time, just 12 years after reaching 5 billion.*

*These numbers represent individual lives, each uniquely valuable, with needs to be met and rights to be projected. Each one of us is a symbol of the Day of 6 Billion.*

*Today, some 356,000 babies will be born around the world, 90 per cent of them in developing countries. A third will be born into poor families. Their early life will be a struggle for the elements of human dignity – water, food, clothing, housing, sanitation, basic education and health care.*

*Half of today's children will be female, and many of them will bear the additional burdens of gender-based discrimination – unequal educational opportunities, second-class status in law and custom; vulnerability to sexual violence, sexually transmitted diseases and unwanted pregnancy; and denial of reproductive health and rights.*

*Human numbers are still growing by 78 million each year, and that growth is concentrated in the countries that are already struggling hardest to meet their people's needs. In many of the poorest countries fertility rates remain high. Women lack choices: up to half of the nearly 175 million pregnancies each year are unwanted or ill-timed. Many women start childbearing too early, continue too long and have their children too close together. Their health suffers.*

*Nearly 600,000 women die each year as a result of pregnancy and inadequate care in childbirth, and 70,000 die due to unsafe abortion. Many times this number suffer infection or injury. Some 350 million women in developing countries still do not have access to a range of safe and effective family planning methods. Yet people today want fewer children than their parent's generation: if all women and men had their choice, families would be smaller and population growth slower.*

*Yet we have something to celebrate on 12 October. Thirty years ago, when UNFPA began its operations, many experts felt that the planet simply could not support 6 billion people.*

*Not only our numbers but our quality of life have defied the experts. Population growth has slowed as a result of broader choice and lower fertility, life expectancy has increased, and infant mortality rates have declined. A higher proportion of girls are entering school.*

*Family size in developing countries is half what it was in 1969 – three children per woman instead of six. The idea of integrated reproductive health care, and an approach based on gender equity and equality are gaining ground. The emphasis today is increasingly on meeting people's needs and enabling them to exercise their reproductive rights..."*

The table below shows the projected rise in global population from 1950 to 2050.

### Projected Total Population of the World: 1950 - 2050

Year	Population	Average annual growth rate (%)	Average annual population change
1950	2,555,360,972	1.47	37,785,986
1951	2,593,146,958	1.61	42,060,389
1952	2,635,207,347	1.71	45,337,232
1953	2,680,544,579	1.77	47,971,823
1954	2,728,516,402	1.87	51,451,629
1955	2,779,968,031	1.89	52,959,308
1956	2,832,927,339	1.95	55,827,050
1957	2,888,754,389	1.94	56,506,563
1958	2,945,260,952	1.76	52,335,100
1959	2,997,596,052	1.39	42,073,278
1960	3,039,669,330	1.33	40,792,172
1961	3,080,461,502	1.80	56,094,590
1962	3,136,556,092	2.19	69,516,194
1963	3,206,072,286	2.19	71,119,813
1964	3,277,192,099	2.08	69,031,982
1965	3,346,224,081	2.08	70,238,858
1966	3,416,462,939	2.02	69,755,364
1967	3,486,218,303	2.04	71,882,406
1968	3,558,100,709	2.08	74,679,905
1969	3,632,780,614	2.05	75,286,491
1970	3,708,067,105	2.07	77,587,001
1971	3,785,654,106	2.01	76,694,660
1972	3,862,348,766	1.95	76,183,283
1973	3,938,532,049	1.90	75,547,134
1974	4,014,079,183	1.81	73,265,577
1975	4,087,344,760	1.74	71,797,582
1976	4,159,142,342	1.72	72,213,985
1977	4,231,356,327	1.69	72,172,286
1978	4,303,528,613	1.73	75,085,409
1979	4,378,614,022	1.71	75,655,181
1980	4,454,269,203	1.69	75,864,564
1981	4,530,133,767	1.75	80,105,008
1982	4,610,238,775	1.73	80,253,764
1983	4,690,492,539	1.68	79,312,007
1984	4,769,804,546	1.68	80,596,505
1985	4,850,401,051	1.68	82,324,417
1986	4,932,725,468	1.71	85,142,812
1987	5,017,868,280	1.69	85,667,332
1988	5,103,535,612	1.66	85,671,996
1989	5,189,207,608	1.66	86,677,681
1990	5,275,885,289	1.58	83,940,351
1991	5,359,825,640	1.55	83,939,711
1992	5,443,765,351	1.48	81,404,054
1993	5,525,169,405	1.44	80,191,434
1994	5,605,360,839	1.43	80,626,257
1995	5,685,987,096	1.38	79,173,661
1996	5,765,160,757	1.37	79,745,131
1997	5,844,905,888	1.34	78,784,175
1998	5,923,690,063	1.31	78,308,546
1999	6,001,998,609	1.27	77,008,373
2000	6,079,006,982	1.23	75,318,861
2001	6,154,325,843	1.20	74,315,460
2002	6,228,641,303	1.18	73,845,390

2003	6,302,486,693	1.16	73,395,376
2004	6,375,882,069	1.14	72,898,133
2005	6,448,780,202	1.12	72,714,711
2006	6,521,494,913	1.11	72,772,754
2007	6,594,267,667	1.10	72,776,911
2008	6,667,044,578	1.08	72,703,236
2009	6,739,747,814	1.07	72,485,099
2010	6,812,232,913	1.06	72,447,829
2011	6,884,680,742	1.05	72,509,964
2012	6,957,190,706	1.03	72,261,423
2013	7,029,452,129	1.02	71,803,520
2014	7,101,255,649	1.00	71,144,072
2015	7,172,399,721	0.98	70,443,548
2016	7,242,843,269	0.96	69,755,219
2017	7,312,598,488	0.94	68,928,253
2018	7,381,526,741	0.92	67,997,557
2019	7,449,524,298	0.89	66,966,195
2020	7,516,490,493	0.87	65,973,432
2021	7,582,463,925	0.85	65,024,404
2022	7,647,488,329	0.83	63,958,545
2023	7,711,446,874	0.81	62,831,316
2024	7,774,278,190	0.79	61,670,133
2025	7,835,948,323	0.77	60,634,107
2026	7,896,582,430	0.75	59,728,215
2027	7,956,320,645	0.74	58,800,509
2028	8,015,121,154	0.72	57,842,466
2029	8,072,963,620	0.70	56,862,516
2030	8,129,826,136	0.69	55,988,383
2031	8,185,814,519	0.67	55,209,498
2032	8,241,024,017	0.66	54,325,204
2033	8,295,349,221	0.64	53,388,484
2034	8,348,737,705	0.64	52,432,568
2035	8,401,170,273	0.61	51,582,599
2036	8,452,752,872	0.60	50,825,199
2037	8,503,578,071	0.59	49,945,328
2038	8,553,523,399	0.57	49,018,566
2039	8,602,541,965	0.56	48,111,036
2040	8,650,653,001	0.55	47,314,021
2041	8,697,967,022	0.53	46,592,583
2042	8,744,559,605	0.52	45,712,304
2043	8,790,271,909	0.51	44,766,065
2044	8,835,037,974	0.50	43,861,193
2045	8,878,899,167	0.48	43,037,087
2046	8,921,936,254	0.47	42,237,824
2047	8,964,174,078	0.46	41,228,872
2048	9,005,402,950	0.44	40,089,886
2049	9,045,492,836	0.43	39,002,569
2050	9,084,495,405	-	-

Source: U.S. Bureau of the Census, International Date Base.

**Projected Population of the World's Megacities (cities with 10 people or over) as at 1975, 2000 and 2015 (in millions)**

<b>Name of City</b>	<b>1975</b>	<b>2000</b>	<b>2015</b>
1. Tokyo	19.8	26.4	26.4
2. New York	15.9	16.6	17.4
3. Shanghai	11.4	17.0	14.6
4. Mexico City	11.2	18.1	19.2
5. Sao Paulo	10.0	17.8	20.4
6. Mumbai (Bombay)	-	18.1	26.1
7. Lagos	-	13.4	23.2
8. Los Angeles	-	13.1	14.1
9. Kolkata (Calcutta)	-	12.9	17.3
10. Buenos Aires	-	12.6	14.1
11. Dhaka	-	12.3	21.1
12. Karachi	-	11.8	19.2
13. Delhi	-	11.7	16.8
14. Jakarta	-	11.0	17.3
15. Osaka	-	11.0	11.0
16. Metro Manila	-	10.9	14.8
17. Beijing	-	10.8	12.3
18. Rio de Janeiro	-	10.6	11.9
19. Cairo	-	10.6	13.8
20. Istanbul	-	-	12.5
21. Tianjin	-	-	10.7
22. Hyderabad	-	-	10.5
23. Bangkok	-	-	10.1

Source: United Nations Population Fund (2001)

There is no doubt that this population increase is having profound effects on the globe, but particularly in developing countries which represent 90% of the rise. As the rate of rise in the population exceeds the rate of rise in economic development in some developing countries, they are finding it hard to not only feed their people, but also to provide essential services to their population.

#### ***4. Population in Developed Countries***

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While the population of developing countries increases rapidly, the opposite seems to be happening in the developed world, particularly in Western Europe, where the fear is population decline, as a result of declining birth rates.

Indeed, in some European countries like Italy, a drastic population decline is already happening, to the extent that Italy's population is expected to nose-dive by 28 per cent by 2050.

Although, not as drastic as Italy, the United Kingdom (a population of 60 million people) is also experiencing a declining birth rate, as the table below shows. The table shows the birth rate in England and Wales (not the whole of the UK) from 1992 to 2002.

#### Birth Rate in England and Wales from 1992 – 2002

Year	No. of Births
1992	689,656
1993	673,467
1994	664,726
1995	648,138
1996	649,485
1997	643,095
1998	635,901
1999	621,872
2000	604,441
2001	594,634
2002	596,122

Source: Office of National Statistics, UK – 2002

While on average, fewer children are born in the UK each year, the number of the elderly population is increasing, to the extent that 21% of the UK population is now over 60 years old. This presents serious challenges to the government, in terms of the provision of adequate housing, welfare, pensions and other resources that are required by elderly people. The fear is that a declining birth rate will, in the end, make it impossible for the reduced working population to finance the system, by means of taxation and national insurance contributions. Thus, many western governments have resorted to increased immigration of skilful workers from abroad to remedy the huge manpower shortfall.

However, the increasing number of older people is not just a UK issue, but a global phenomenon, as the figures below show.

#### Age Composition of the Oldest-Old, World, 1998 and 2050 (Median Variant)

Age Group		1998	2050
		Population size (millions)	
<b>Oldest-Old</b>	80+	66.0	370.4
Octogenarian	80-89	58.6	311.3
Nonagenarian	90-99	7.3	56.9
Centenarian	100+	0.1	2.2
		Population (per	

		cent)	
<b>Oldest-Old</b>	80+	100	100
Octogenarian	80-89	88.8	84.0
Nonagenarian	90-99	11.0	15.4
Centenarian	100+	0.2	0.6

Source: United Nations Population Division, World Population Prospects: The 1998 Revision.

## ***5. Causes of High Fertility Rate in Developing Countries***

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Below are some of the causes of the high birth rate in developing countries.

(a) Poverty

As people are so poor and have nothing to do, as a result of unemployment, they are more likely to make more babies.

(b) Lack of Education

Lack of education, and birth control education in particular, means that many in developing countries do not know about any birth control measures.

(c) Birth Control Facilities

As a follow up of (b) above, many could not apply effective birth control measures, even if they are educated in it, because they are too poor to afford the means of effective birth control.

(d) Women have little say in Birth Control

Another problem in many developing countries is the place of women in birth control decisions. The problem is that many women have little or no control over such decisions, so may turn out to be a "baby factory".

(e) High Child Mortality

Though improved over the years, many children in developing countries die unnecessarily, as a result of diseases and malnutrition. Thus, it has been the tendency of many families to have as many children as possible, so that some might survive.

However, even in developing countries, the tendency for many families is to have fewer children, as the child mortality rate declines. Some have decided to have fewer children as a result of the economic realities.

(f) Tradition, Culture and Religion

Having many children is a matter of cultural and religious belief in some communities.

(g) Children as a Workforce

Though, unacceptable in the west, children are seen as a valuable workforce in some communities. Thus, more children one has, the more productive the family becomes.

(h) Urban Migration

Urban Migration in itself does not increase the total population of a country, but will surely increase the population of cities. This may then have profound adverse effects in that, the available resources (in terms of jobs, housing, hospitals, etc) are not able to cope with the increased urban population.

It is said that the world is ever becoming more urbanised, as people migrate to big cities in search of jobs and other opportunities that are not available in small towns and villages.

(i) Polygamous Marriages

Polygamy is acceptable and practised in many developing countries. Therefore, family sizes are likely to be bigger in such communities.

## ***6. Advantages of a Large Population***

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A large human population is not always a problem, but can be an asset to a country. Some of the main advantages of a large population are discussed below.

(a) Food Production

One obvious advantage of a large population is that there are large enough numbers of persons involved in food production for both internal and external consumption.

(b) Vast Manpower

Clearly, a large population has vast manpower that can be utilised in its quest for prosperity.

(c) Economic Strength

A country with vast manpower has the potential to increase productivity and economic strength. One of the reasons for the economic success of the United States of America is its large population of about 300 million people.

(d) Political Stability

A country with enough food, vast manpower and superior economic strength is also likely to experience political stability.

(e) Military Strength

Countries with large populations can also boast a large military strength to defend the country and its citizens.

(f) Global Influence

There is no doubt that a country with a large population, that can feed itself and has economic and political stability is bound to have a great deal of influence in the world.

(g) Global Respect

Having global influence can without doubt, lead to being respected by both governments and people all over the world.

(h) Progress in Other Areas

It is very likely that such countries will have successes in other areas such as inventions, technological innovations, research, sport and social development.

## ***7. Problems with Large Population***

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It has been said above that large populations can be an asset to a country. However, there are many problems and disadvantages as well, particularly when productivity is slower than the population rise, as is experienced in many countries of Africa, Asia and South America.

Some of the main problems associated with a rapidly growing population are examined below.

(a) Economic Decline

A large population can contribute to a country's economic downturn where the rate of population rise exceeds the productivity and growth of the economy.

(b) Increased Poverty

Economic decline can naturally lead to an increase in poverty of the country and its people.

Many countries are experiencing this in the world now, and according to the United Nations Population Fund, some 1.2 billion people live on less than US \$1 a day and half of the world's population live on US \$2 a day or less.

(c) Food Shortage and Famine

As several examples in Africa show, excessive population, not matched by economic progress can cause food shortage and famine, which has claimed millions of lives.

(d) Problem with Healthcare

The UN Population Fund (UNFPA-2001) provides that

*"more than a billion people cannot fulfil their basic needs for food, water, sanitation, healthcare, housing and education. Nearly 60 per cent of the 4.4 billion people living in developing countries lack basic sanitation, almost one third do not have access to clean water supplies, one quarter lack adequate housing, 20 per cent do not have access to modern health services, and 20 per cent of children do not attend school through grade five. Worldwide, 1.1 billion people are malnourished, unable to meet minimum standards for dietary energy; and protein and micronutrient deficiencies are widespread. Nearly 2 billion people in developing countries are anaemic."*

A heavily populated and overcrowded environment makes it more difficult to control the spread of diseases.

(e) Problems with Housing and other Infrastructure

With the ever-increasing population and levels of urbanisation, developing countries are finding it extremely difficult to meet the demand for housing and other infrastructure.

According to UNFPA 2001):

*“Almost 3 billion people live in urban areas. Over 75 per cent of the population of North America, Europe and Latin America now live in cities, and worldwide 411 cities have populations of more than 1 million, compared with 326 in 1990. In Western Europe and North America, in contrast with other regions, there is a move out of large cities into suburbs and smaller urban centres.*

*By 2015, 1.6 billion people will be living in cities of more than 1 million people, 622 million in cities of more than 5 million. In the less developed regions, the numbers of city dwellers will swell in the next 15 years, from 1.9 billion to 2.9 billion. (in more-developed regions they will increase from 0.9 to 1.0 billion). By 2030, most people in every major region will live in cities. Growth on this scale will have severe consequences for the quality of life and surrounding environments.*

*In the 1970s, the United Nations coined the term “megacities” to describe cities with 10 million or more residents. In 1975, there were five megacities worldwide. Today, there are 19 megacities. By 2015, the number of megacities will grow to 23.”*

(f) Corruption

This volatile state of poverty, disease, hunger and malnutrition breeds corruption, as people struggle to survive and cope with daily living.

(g) Instability and Wars

There is clear evidence that a poor, hungry and frustrated population can trigger instability and wars. There is no doubt that some of the wars in Africa in recent times are attributable to poverty.

(h) Terrorism

Many experts now believe that the global population explosion, with a staggering increase in poverty, hunger, unemployment inequality and hopelessness is likely to lead to an increase in global terrorism.

(i) Diminishing Natural Resources

The drastic increase in global population means that humans are struggling with other creatures and natural resources for space to live and to survive.

Thus, this has adversely affected the population of animals, fish, trees, forests and other natural resources.

(j) Environmental Pollution

One of the major consequences of a large and ever increasing global population is its impact on environmental pollution, which can have catastrophic effects on the health of planet earth and its inhabitants.

According to UNFPA 2001:

*“Air pollution kills an estimated 2.7 million to 3.0 million people every year, about 90 per cent of them in the developing world. The most critical components include: sulphur dioxide (from the burning of oil and high-sulphur coal); particulate matter (from domestic fires, power and industrial plants, and diesel engines); carbon monoxide and nitrogen dioxide (from petrol fumes from motor vehicles); ozone (from the effect of sunlight on vehicle emission-generated smog), and atmospheric lead (from burning petrol or coal).*

*Outdoor air pollution harms more than 1.1 billion people and kills an estimated half million people per year, mostly in cities. Nearly 30 per cent of these deaths are in developed countries. Fine particulate pollution is responsible for up to 10 per cent of respiratory infections in European children (and twice as much in the most-polluted cities). The situation is particularly serious in the former Soviet Union where, despite reduced levels of industrial output, automobile transport has increased markedly.*

*Densely populated and rapidly growing megacities in developing countries subject their populations to levels of air pollution exposure far in excess of allowances recommended by the World Health Organisation.”*

(k) Water and Population

Although 75 per cent of the earth’s surface is covered with water, many people on earth have not got good water to drink.

*“only about 2.5 per cent of all water on the planet is fresh water, essential for most human purposes – and only about 0.5 per cent is accessible groundwater or surface water. Rainfall quantities vary greatly around the world. Portions of Northern Africa and Western Africa receive very small amounts of rain...*

*Worldwide, 54 per cent of the annual available fresh water is being used. If consumption per person remains steady, by 2025 we could be using 70 per cent of the total because of population alone. If per capita consumption everywhere*

*reached the level of more developed countries we could be using 90 per cent of the available water by 2025...*

*In the year 2000, 508 million people lived in 31 water-stressed or scarce countries. By 2025, 3 billion people will be living in 48 such countries. The number of people living in conditions of scarcity will double, and those living in water stress will increase six-fold.*

*For some purposes, river basins are a more appropriate unit than countries for analysing water flows. Many of the world's major river basins encompass more than one country. Currently 2.3 billion people live in river basins that are at least water stressed; 1.7 billion live in basins where scarcity conditions prevail.*

*By 2025 these numbers will be 3.5 billion and 2.4 billion, respectively."*

Source: UNFRA (2001)

Many cities and countries are already experiencing water shortages and the problem is expected to get worse.

In an article titled "Thirsty California Starts to Drink the Pacific", the Guardian newspaper of 13<sup>th</sup> April 2004 (page 14) notes:

*'Peter MacLaggan turns the small tap and carefully fills the plastic cup with a clear liquid that is precious and scarce. Holding it up to the light, he looks proud of what he had done. 'This may not be the entire solution, but it is part of the solution' says the man from Poseidon Resources. The problem is drinking water, and how California is going to provide enough of it for the people who live here. The clear liquid in the plastic cup is water; but not ordinary water. Mr MacLaggan's water is filtered seawater, desalinated to make it safe for human consumption.*

*Some 90% of California's water is piped more than 250 miles to its customers, the majority of it from the Colorado River. But with that supply endangered by declining levels, rising costs and contamination – and with memories still fresh of the droughts of the 1970s and 1980s – attention is turning to alternative sources....."*

(l) Greenhouse Gas Emissions and Climate Change

There is now clear evidence that the constant emissions of greenhouse gases is affecting global climate change, and that is already having extremely disastrous consequences for the earth and its people.

In this regard, the UNFPA (2001) states:

*“Carbon dioxide and other “greenhouse gases” trap heat in the atmosphere and raise average global surface temperatures. Emissions of carbon dioxide grew 12-fold between 1900 and 2000, from 534 million metric tons per year in 1900 to 6.59 billion metric tons in 1997.*

*In the same period, human population nearly quadrupled, from 1.6 billion to 6.1 billion, progressively consuming greater quantities of fossil fuels – oil, gas and coal. Expanded agriculture, destruction of forests and increased production of certain chemicals also increased greenhouse gases in the atmosphere.*

*It is unlikely that human population could ever have reached its present size without the energy provided by fossil fuels. Conversely, the needs of the growing population have provided an ever-expanding market for exploration and production...*

*...The human and ecological impacts of rising oceans include increased flooding, coastal erosion, salinization of aquifers, and loss of coastal cropland, wetlands and living space. The intensity and frequency of hurricanes and other hazardous weather may also increase, endangering the growing human population in coastal areas.*

*Rising global surface temperatures and changes in precipitation magnitude, intensity and geographical distribution may well redraw the world renewable resources map. Whether or not these climate changes affect net global agricultural production, they are almost certain to shift productivity among regions and countries, and within nations...*

*A warming climate also poses a significant public health threat. The redistribution of precipitation would markedly increase the number of people living in regions under extreme water stress – a problem compounded by increasing population. The geographical range of temperature – sensitive tropical diseases, such as malaria and dengue fever, would also expand. Higher average temperatures mean longer and more intense heat waves, with a corresponding rise in heat-related health problems.*

*The combined effects of population growth and climate change would produce regional resource shortages, which in turn could result in the exploitation of environmentally sensitive areas such as hillsides, flood plains, coastal areas and wetlands. These conditions may also increase environmental refugees, international economic migration and associated socio-political challenges. Climate and environmental policy should*

*address the geographical distribution and movement of people in the 21<sup>st</sup> century, as well as their absolute numbers."*

## ***Conclusion***

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Are Rev Thomas Malthus' gloomy predictions right? It seems like they are not right when applied to developed countries where food is so plentiful that a lot is actually destroyed each year.

However, it is clear that the same is not the case in the developing world (where the majority of the world's population live) where there is extreme levels of poverty, disease, hunger and hopelessness. Thus, Malthus seems to be correct in this regard.

## ***Self-Assessment Questions***

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- 1. Explain Thomas Malthus' principle of population.*
- 2. To what extent has the world's population grown since Malthus' time?*
- 3. What are some of the causes of high fertility rates in developing countries?*
- 4. What are some of the possible advantages of a large population?*
- 5. What possible problems can a large population cause?*
- 6. Is Malthus' essay on the principles of population correct? Justify your answer.*
- 7. What, in your opinion, can be done to minimise the effects of a large and growing population?*

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