

THE SCALE OF THINGS AND DEMOGRAPHIC FATIGUE

An NPG Forum Paper by Walter Youngquist

The earth is straining under a demographic assault on a scale never before seen. The overwhelming scale of its problems comes from resource demands of continued population growth, the problem that underlies nearly all other problems.

From the time of the appearance of modern humans it took 200,000 years to reach the first billion in population in 1840. As late as 1750, at the beginning of the Industrial Revolution, world population was only an estimated 725 million. Then from improved living standards – marked especially by increased food production, advances in sanitation, and medicine – population began to grow exponentially, so that by 1930 it was globally two billion. As recently as 1960 world population was only three billion, but by 1975 it had reached four billion. It is now 7.3 billion, and it took only 12 years for the most recent billion to arrive. This scale of population growth has no precedent.

The United Nations now projects world population will reach 11.2 billion by the year 2100. Humans are now appropriating Earth's finite resources to support the growing numbers at exponential rates. Here are a few consumption growth rates just from 1958 to 2008: Copper from 3.2 million tons to 15.4 million tons, iron ore from 405 million tons to 2.2 billion tons, phosphate rock from 33.7 million tons to 161 million tons. And oil, our current single-most important energy source, from 7.6 billion barrels a year in 1958 to 33 billion barrels in 2016. The world has consumed approximately 1.2 trillion barrels of oil since the time of the Drake well in 1859. Half of that total consumption has occurred since 1988. Global energy demand is projected to increase by 25 percent by 2040. But oil production now may be very close to its peak.

We have heard the admonition “go forth and multiply,” but what must inevitably follow is “and now divide.” Here we are running into the problems of scale, as depleting nonrenewable natural resources are faced with an exponentially increasing demand that ultimately cannot be met. Perhaps even by mid-century these two factors will collide head-on, and the fabric of our industrialized economies – and the societies they support – will begin to unravel. Governments will be hard pressed to maintain their structures. Political promises of what have come to be called “entitlements” will fall short against natural resource limitations. Natural resources are the ultimate basis for economic growth from which tax revenues are expected to finance the entitlements. Such revenues may not materialize.

Continued population growth defeats efforts to improve

lives as was stated in the title of an excellent study by environmental scientist Leon Kolankiewicz: *Demographic Trends Undermine Hope for a Better World Future*. Norman Borlaug, Nobel Prize winner in agriculture, was noted for his work in developing the “Green Revolution.” This greatly increased grain yields, but he was afraid that population growth would absorb all gains he made for the food supply of Pakistan. And that is what happened. From its current population of 199 million, Pakistan is projected to have 344 million people by 2050 – with no more Green Revolutions in sight. In his closing laureate address, Borlaug stated:

“There can be no permanent progress in the battle against hunger until the agencies that fight for increased food production and those that fight for population control unite in a common effort.”

In Africa, the food supply situation is especially dire. With a 2015 population of nearly 1.19 billion projected to grow to almost 2.48 billion by 2050, Africa's food situation can only get worse. Ethiopia – already experiencing two famines – is projected to grow from 99.3 million to 188 million by 2050, Zambia from 16.2 million to 42.9 million, Niger from 19.9 million to 72.2 million, Chad from 14 million to 35.1 million, and Nigeria from 182 million to 398.5 million. Island nation Madagascar, with its unique fauna and flora already imperiled by the current population of 24.2 million, is projected to grow to 55.2 million by 2050.

These figures clearly show the massive scale of the problem of adequate food for these additional expected millions. With declining freshwater supplies and continuing erosion of topsoil, it is doubtful that these demands can be met. Famines will stalk these lands – as happened in the not-too-distant past. It is nature's way of trimming exuberant growth. Nature bats last.

Food is the critical resource for everyone, and its production depends on the Earth's thin veneer of fertile soil. In his classic book *Dirt: The Erosion of Civilization* (2007), David R. Montgomery states that topsoil is now being lost 10 times as fast as it is being generated. It is estimated that half of Iowa's topsoil is now in the Mississippi River drainage and in the delta at the river mouth in Louisiana.

Due to excessive water withdrawal for irrigation, at times no water reaches the ocean from the Yellow River of China, the Nile in Egypt and eastern Africa, and the Colorado River in the southwestern United States.

The Ogallala groundwater aquifer of the west central United States underlies irrigated farmland in states from Nebraska to north Texas, where in the latter region some 15,000 acres of farmland have been abandoned for lack of groundwater. The water level in the Ogallala is declining everywhere. The Kansas Geologist Survey describes the decline/recharge situation as “withdrawing a dollar from the bank and depositing a dime.” A recent estimate from the Survey stated that the Ogallala aquifer is now 50 percent depleted over a wide area. With no significant surface water supplies this region, and with its many small towns, much of the land will simply have to be abandoned.

In India, all major food producing areas are partially- mostly-irrigated from groundwater. From the more than 21 million wells drilled into the aquifers, water tables have dropped below the level where many wells – mostly shallow wells used by the poorest people – are dry, restricting crop production. How to feed the expected 1.7 billion Indians in 2050 from the current size of 1.3 billion is unknown. In India, as in Pakistan, the “Green Revolution” is now maxed out.

Close to the United States, population growth projections are for Mexico to grow from 127 million in 2015 to 163.8 million by 2050; Guatemala from 16.2 million to 27.5 million; Venezuela, already in a food supply crisis, from 30.6 million to 40.5 million. Haiti – one of 27 other countries already on international food aid – had a 2015 population of 10.9 million, which is projected to be 16.9 million by 2050.

An overall view of world food supplies raises questions as to the ability of the Earth to provide an adequate food supply wherein food production will have to increase by about 60 percent to meet the demands by 2050. Already more than a billion people are malnourished. In this vital matter, with ongoing degradation of fertile soil and diminishing freshwater supplies, the Earth even now with its 7.3 billion people is showing demographic fatigue. How can the food demands of the projected 11.2 billion people be met? Many migrants are now fleeing impoverished lands. This flood is only likely to increase as populations grow.

A significant part of world food supplies comes from irrigated farm land, and 40 percent of the water now comes from groundwater, but everywhere both groundwater and surface water supplies are being overdrawn. Worldwide, a significant portion of agricultural production is supported by unsustainable aquifer exploitation. This means less food for the nearly four billion more people projected to be here by 2100.

Lester Brown introduced the term “food bubbles,” meaning food supplies that are now produced by unsustainable methods. He states:

“The gap between the continuously growing use of water and the sustainable supply is widening each year... Underlying the urgency of dealing with the fast-tightening water situation is the sobering realization that not a single country has succeeded in stopping the fall of its water tables and stabilizing water levels.”

In the arid southwestern United States, legally-given Colorado

River water rights already exceed its flow. California draws substantial amounts of water from the Colorado, but also derives supplies from east of the Sierra Nevada where Owens Lake is now a dusty desert basin. Many small streams have their water diverted to Los Angeles, their banks conspicuously marked with the sign: “Property of Los Angeles Water and Power.” Las Vegas, Nevada is almost entirely dependent on Colorado River water.

The Los Angeles basin gets less than eight inches of rain annually, and the local water supply could support no more than a million people at best. As of 2014, Los Angeles proper had 3.9 million people – and the Los Angeles metropolitan area had a population of 13.2 million – with more being added every day.

With more than 39 million residents in 2015, does water-stressed California need any more people? Yet the population is projected to grow from 39 million to nearly 50 million by 2050.

In California’s historically very productive agricultural San Joaquin Valley, source of more than half the nation’s fruit and vegetables, the west side of the valley surface has dropped as much as 29 feet in places from excessive overpumping of the underlying aquifer. The aquifer has collapsed – and once collapsed, an aquifer is lost forever. This has permanently reduced the agricultural production of the valley, and negatively affected the food supply of the United States as a whole.

It has been said that “Egypt is the Nile.” Egypt’s 2015 population of 89.1 million people, projected to grow to 162.4 million by 2050, is entirely dependent on Nile water both for personal needs and agricultural use. Egypt, being at the lower end of the Nile, is subject to the upstream demands of other countries – the most significant of which is Ethiopia, holding most of the Nile’s headwaters. Ethiopia, now with 98.1 million people, is planning extensive irrigation projects using Nile water to take care of the expected 165.1 million people by 2050. Egypt, now more than 89 million, is unable to feed itself from domestic sources. And when Egypt has the projected 162 million in 2050...?

We occasionally hear the suggestion that our resource problems can be averted by substitution, but there is absolutely no substitute for water. Every living cell demands it. The world cannot get along without water. It has been said, and is likely true, that the last war will be fought over water. Some wars already have had that cause.

It all gets back to the simple fact that people use Earth resources and more people use more resources. Energy keeps people alive and able to move. Food is the most basic and important energy source, and it depends on fertile soil and freshwater for its production. Fertile soil and freshwater everywhere are under assault from the scale of current population size and continued population growth.

The chief problem we now face is most dramatically made clear by the fact that between 2015 and 2050, world population is projected to increase at the astounding average rate of nearly 243,000 people a day. Roughly every five days, a million more mouths will be at the world’s dinner table. This is, in the

overriding scale of things, most pressing of all – and this situation will impact this century as no other event has ever done before.

With food derived from the land, each person depends on some minimum amount of land. Geomorphologist David Montgomery states:

“The world’s most intensively farmed regions use about 0.2 hectares to support a person. Increasing the average global agricultural productivity to this level would support 7.5 billion people. Yet by 2050 the amount of available cropland is projected to drop to less than 0.1 hectare per person. Simply staying even in terms of food production will require major increases in per hectare crop yields – increases that simply may not be achievable despite human ingenuity.”

Soil formation is a long geological process – and, like the amount of freshwater, is beyond human control. Yet it can be lost in a matter of days or hours, under extreme circumstances of floods or heavy rainfall. Worldwide, soil needs more care.

The grim reality coming from all these data on freshwater depletion and soil loss is that future food requirements for a still growing population are unlikely to be met. Food supply, as in the past, will be the ultimate control of size of population, inevitably fewer than now.

The integrity of the environment and population growth are now in an inverse relationship. The world is a full house as daily people jostle one another in traffic jams, on beaches, recreational areas, and many other places. Dr. Nafis Sadik, retired Executive Director of the United Nations Population Fund, states:

“The quality of human life is inseparable from the quality of the environment. It is increasingly clear that both are inseparable from the question of human numbers and concentrations.”

Isaac Asimov has concisely framed several important problems caused by increased population. He noted:

“...democracy cannot survive overpopulation. Human dignity cannot survive it. Convenience and decency cannot survive it. As you put more and more people onto the world, the value of life not only declines, but it disappears.”

In the United States in 1972, the Presidentially-appointed Rockefeller Commission – charged with noting the effects of population growth – stated that there was no advantage to having more people. The report was ignored. In 1970, the United States’ population was 203 million and now is 323 million – and that is not the end point, only a marker along the way as population is forecast to continue to grow. The U.S. is now the third most populous nation in the world just behind India and China, and expected to retain that relative position in 2050 and beyond.

U.S. population is projected to grow from the current 323 million to 347 million by 2025, reaching 400 million by 2051 – nearly all of that growth stemming from immigration. It is time for the United States to consider the relationship between continued immigration and the available supporting resources. It seems inevitable that there will be a less affluent future for

the United States, with food becoming increasingly expensive.

The United States has no population policy, and the question of what the optimum size should be has never been addressed by any administration. No political party and no politician want to touch this most basic issue. Yet it is fundamental to the future of the nation as it is faced with diminishing supporting resources. And the incoming wave of immigrants continues.

Should we not strive to be better, rather than bigger? We need another Rockefeller Commission, only this time its findings should be heeded and implemented with a national policy to support it. The United States’ population is projected to reach 500 million – that is half a billion people – by 2100. This growth will intensify nearly every economic, environmental, and resource problem we have today – and negatively impact the lives of future generations.

In our neighbor to the north, Canada, ecologist/naturalist David Suzuki tells me that as he spoke of resource limitations he suffered much abuse from those still under the illusion that sustainable growth is not an oxymoron – which, on a finite planet, it surely is.

Numerous studies have shown that many vital natural systems are now showing demographic fatigue. Rivers of some countries, most notably in China and India, are unable to cope with the human and industrial wastes being dumped into them by the millions of tons every day. Wetlands are now much diminished (90% lost in California), and cannot effectively continue to act as the “kidneys of the Earth,” cleansing the volumes of polluted waters pushed into them by growing populations.

Governments are experiencing demographic fatigue, unable to meet the many demands put upon them by expanding populations. Infrastructures such as sewers, water supply systems, roads, and bridges cannot be properly maintained. Our basic supporting systems are under continual assault by more and more people. These problems are exacerbated by the mass immigration of people fleeing the poverty of lands no longer able to meet the scale of resource demands from unsustainable continued population growth.

As immigration continues from impoverished lands to more affluent regions, this begs the question: Can islands of affluence survive in a sea of poverty? Or will all borders be overwhelmed to the extent that with 11.2 billion people on the planet in 2100, it will become a starving mass of humanity?

Some governments, notably in Africa, barely exist as viable organizations under the impact of more and more people. Governments are being ever more stressed by the demands of growing populations upon Earth resources, both renewable and nonrenewable. As Lester Brown has stated in his book *Outgrowing The Earth*, we have exceeded the ability of the Earth’s natural systems to support even the population now here.

More and more people are being pushed further and further out on a limb of both nonrenewable and renewable resources, where demands from increasing population are slowly sawing off that limb. Note that many renewable resources are not renewable

within the frame of many human lifetimes. As we deplete stores of nonrenewable resources and exceed the annual incremental dividend from renewable resources to meet human demands, we are not on a road to a sustainable future. There does not appear to be any viable safety net for humanity's future with continuing population growth and resource depletion.

The standard of living based solely on renewable natural resources, despite the popular illusion to the contrary, is likely to be considerably lower than that enjoyed by our current largely oil-based industrialized civilization. In retrospect these times will be viewed as a brief bright blip of affluence in human history, never to be repeated.

The limits to growth will bear down on everyone. We face a "future of less." Everyone is happier when the economic pie continues to grow. But the size of the economic pie is based on the economic availability of natural resources. E.O Wilson states:

"The raging monster upon the land is population growth. In its presence, sustainability is but a fragile theoretical construct."

To call for "stabilizing" population is not acceptable. The need is to reduce population to the size that can be sustained indefinitely in the forthcoming time of permanent dependence on the annual increment of resources obtained from renewable resources on a finite Earth. This sustainability can only be achieved with a smaller population.

SOURCES

1. PBS, "World Population to Hit Milestone With Birth of 7 Billionth Person," October 27, 2011. http://www.pbs.org/newshour/bb/world-july-dec11-population1_10-27/.
2. U.S. Census Bureau, "U.S. and World Population Clock," accessed March 22, 2016. http://www.census.gov/popclock/?intcmp=home_pop.
3. United Nations, Department of Economic and Social Affairs, Population Division. *World Population Prospects, the 2015 Revision*. <http://esa.un.org/unpd/wpp/>.
4. Population Reference Bureau, 2015 World Population Data Sheet, August 2015. http://www.prb.org/pdf15/2015-world-population-data-sheet_eng.pdf.
5. Borlaug, Norman. Acceptance Speech: Nobel Peace Prize, December 10, 1970. http://www.nobelprize.org/nobel_prizes/peace/laureates/1970/borlaug-acceptance.html.
6. United Nations, Department of Economic and Social Affairs, Population Division. *World Population Prospects, the 2015 Revision*. <http://esa.un.org/unpd/wpp/>.
7. Brown, Lester R. *Outgrowing the Earth: The Food Security Challenge in an Age of Falling Water Tables and Rising Temperatures*, W.W. Norton & Co., 2005. http://www.earth-policy.org/images/uploads/book_files/outh06.pdf.
8. U.S. Census Bureau, American FactFinder, Advanced Search. <http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>.
9. California Department of Finance, Demographic Research Unit, Population Projections (Baseline 2013), State and County Population Projections, 2010-2060. <http://www.dof.ca.gov/research/demographic/projections/>.
10. Montgomery, David R. *Dirt: The Erosion of Civilizations*, p. 239. University of California Press, April 10, 2012. https://books.google.com/books?id=D2im0qYGG2YC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false.
11. Chattopadhyay, et al. *Sustainable Development: Issues and Case Studies*, p. 33. Concept Publishing Company, January 1, 1998. https://books.google.com/books?id=ZiLNb7BQ3IcC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false.
12. PBS, Transcript, "Bill Moyers' World of Ideas: Isaac Asimov – Part I," aired: October 17, 1988. <http://www-tc.pbs.org/moyers/faithandreason/print/pdfs/woi%20asimov1.pdf>.
13. U.S. Census Bureau, "1970 Census of Population," p. 8. http://www2.census.gov/prod2/decennial/documents/1970a_v1pAs1-01.pdf.
14. U.S. Census Bureau, "International Migration is Projected to Become Primary Driver of U.S. Population Growth for First Time in Nearly Two Centuries," May 15, 2013. <https://www.census.gov/newsroom/press-releases/2013/cb13-89.html>.
15. Wilson, Edward O. *The Diversity of Life*, p. 328. W.W. Norton & Co., 1999. https://books.google.com/books?id=FzPaB_6Pw4MC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false.



Dr. Walter Youngquist has worked both as a petroleum geologist and a minerals geologist in the United States and abroad. He has visited more than 70 countries, observing the ongoing problem of continued population growth and declining supporting Earth resources. A Fellow of the Geological Society of America and the American Association for the Advancement of Science, he is the author of *GeoDestinies* and several NPG Forum papers.

NOTE: The views expressed in this article are those of the author and do not necessarily represent the views of NPG, Inc.



Negative Population Growth, Inc.
2861 Duke Street, Suite 36
Alexandria, VA 22314

Phone: (703) 370-9510
Fax: (703) 370-9514
Email: npg@npg.org

Board of Directors

Donald Mann, *President*
Josephine Lobretto,
Secretary/Treasurer
June Bauernschmidt
Sharon Marks
Diane Saco

NPG Executive Office

Craig Lewis, *Executive Vice President*
Tracy Canada, *Deputy Director*

**SIGN UP TODAY AT WWW.NPG.ORG
TO RECEIVE NPG COMMENTARY ONLINE!**