

Advancing the Welfare of People and the Planet with a Common Agenda for Reproductive Justice, Population and the Environment

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The challenge of sustainable development

The welfare of most of the planet's people is unacceptable— about 800 million people suffer from chronic food insecurity and half of us are poor with an income of less than \$5.50 a day.¹ Millions of us do not have adequate health care, education, housing, employment or enjoy the benefits of good governance, personal freedom, and security from crime and violence.

More than 25 years ago, in 1992, more than 1,700 of the world's leading scientists—including a majority of Nobel laureates in science—considered the future of the environment and population. The scientists warned: "If we do not stabilize population in voluntary, humane ways, it will be done for us by Nature; it will be done brutally, relentlessly and whether we wish it or not."²

Driven by increasing individual consumption and increasing population numbers, human demands are depleting many of the Earth's natural resources that are essential to support human life, causing damage to crop lands, fresh water, fisheries, forests, and driving climate change—the existential challenge of modern history. By 2050, life-supporting ecosystems may have to accommodate 2 billion additional people as world population is projected to reach 9.7 billion;³ support desperately needed advances in living standards for those in poverty; and provide for increasing affluence and consumption in both rich and poor countries.

This report describes why the planetary economy is not on a trajectory toward sustainable development, commonly defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs,"⁴ and offers a strategy to both protect the natural systems that all life depends on and improve the welfare of people.

A common agenda for policy and action is needed

The communities concerned with reproductive justice, abortion rights, family planning, population dynamics, climate, food security, and ecosystem preservation have differing goals and agendas. This report argues that they should adopt a common agenda that is consistent with the UN sustainable development goals,⁵ and support an agreed-on course of action on the closely linked issues of reproductive health and rights, population dynamics and environmental preservation. This will make it more likely that the necessary beneficial policies will be adopted, workable programs initiated, and the needed funds will be forthcoming.

Advocates for women's rights, health and welfare have adopted reproductive justice as a policy framework. It calls for the right to have children or not have children, to choose their number and timing, and the right to parent children in supportive environments that provide reproductive

rights, equal opportunities for women, education, fair wages, housing and health care.⁶⁷ These advocates have raised concerns about the coercive potential, and actual past coercive history of some family planning/population programs—notably mandatory birth limitation and forced abortions in China and involuntary sterilization in India and the U.S.

A common position of this community is that recognizing rapid population growth as a problem will lead to coercive state-directed programs, like China's one-child policy, focused on numerical targets rather than individual choice. They do not always recognize that concern with population size and environmental degradation is fundamental to the attainment and preservation of a safe, healthy environment, a legitimate goal of reproductive justice.

Family planning advocates espouse the public health, social and economic benefits of family planning and focus on ensuring the universal availability of contraceptive services and safe abortion care. Even so, major non-government organizations (NGOs), governments, and foreign aid programs supporting family planning and reproductive health services, often severely limit access for certain categories of people who need services—for example, teenagers, unmarried women, and women who need abortion care.

Many, but certainly not all, advocates for the preservation of the environment, downplay the environmental impact of population growth or consider the trajectory of population growth to either be immutable or that population will stabilize in size in the near future. Rather than addressing population as an issue of concern, they typically advance solutions to environmental problems that rely on lifestyles that feature decreased consumption and adoption of “greener” environmentally friendly technologies. Environmentalists often state that they have no moral standing to deal with international population issues because the per capita consumption of rich countries far exceeds that of the developing world. In the few high consumption wealthy countries with rapid population growth, such as the U.S. (estimated to add 50 million residents by 2050), population is seldom addressed as a contributor to increased consumption and ecosystem degradation.

Advocates for the environment seldom consider that as the five times more populous developing countries gain wealth and consume more, as they deserve to, their contribution to environmental damage could greatly exceed that of currently wealthy countries. For example, although still relatively poor, China has become the country that is the world's leading consumer of natural resources and the greatest emitter of the greenhouse gas CO₂. One estimate is that by 2030, China, India, Brazil, Indonesia and other developing countries will have been responsible for half of cumulative atmospheric carbon loading.⁸

Environmentalists also have relied on UN population projections that indicate that in the relatively near-term, world population size will level off, even though UN projections have repeatedly underestimated future world population growth by billions of people. For example, the 2019 UN projection for Africa's population size in 2050 is 2.5 billion, about 700 million larger than the UN projection made in 2002.

The environmental community also has been wary of addressing population, contraception and abortion because of fears that it would unnecessarily enmesh their programs in controversial

topics. They have failed to recognize that access to safe abortion care is integral to and essential to reproductive justice, to the success of family planning, to slowing world population growth and will benefit the environment.⁹

As explained by Karen Newman, et al., tensions between these groups are long-standing and remain to this day, but it is possible and appropriate to both care about population dynamics and care about sexual and reproductive health and rights.¹⁰ Probably some influential voices and interests will not join in supporting a common agenda, but undoubtedly there is a “big tent” that could bring many of the adherents of these communities together, strengthen their voices in the public arena, and move advantageous policies, funding and programs forward.

It is particularly important in the era of “alternative facts” and vigorous attacks on important areas such as abortion rights and climate change to adopt broad, mutually supportive policy positions relating to population, reproductive justice, reproductive health and environmental preservation. As Benjamin Franklin (1706-1790) opined, “We must, indeed, all hang together or, most assuredly, we shall all hang separately.”

Links between reproductive justice, sexual and reproductive health, population and the environment: what are the facts?

Reproductive justice

At the United Nations conferences on women, population and development in Cairo in 1994 and Beijing in 1995, participants adopted principals of reproductive justice, i.e., that the right to control the number, and timing of one’s childbearing is a fundamental right.^{11 12} This requires that individuals and couples have access to family planning information and contraceptive and abortion services. But surveys in many developing countries reveal substantial deficiencies in access. Up to a quarter of women who want to either stop childbearing altogether or delay the arrival of their next child, lack access to contraception or have concerns about the safety and side effects of available methods.¹³

Unintended pregnancies, (those occurring too soon or not wanted), are common in all countries— in developing regions 43% of pregnancies are unintended.¹⁴ A high proportion of unintended pregnancies, 25% of all pregnancies worldwide, an estimated 56 million, ended in induced abortions each year during 2010–2014.¹⁵ Because access to safe abortion services is limited, an estimated 25 million unsafe abortions occur each year in in developing regions and they result in about 23,000 deaths.^{16 17}

Population dynamics—past and future

After the Second World War, the green revolution improved food security; and better health care and public health measures, such as clean water and immunization, brought about a rapid reduction of death rates (mortality) in many developing countries. But without simultaneous strong efforts to provide birth control, birth rates (fertility) remained high and the developing countries experienced rapid population growth.¹⁸

Between 1950 and 2019 the world population increased from 2.5 billion to 7.7 billion people. Wealthy regions, mainly North America, Europe and Japan, increased from 722 million to 1.27 billion. However, the developing regions increased rapidly, by 4.6 billion people, to a population size of 6.4 billion. The most rapidly growing region, Africa, increased from a population of 229 million to 1.3 billion.¹⁹ Urban clusters – meaning urban centers and their suburbs – have grown by a factor of approximately 2.5 since 1975.

Current world population growth is about 83 million a year. Future population growth rates and size depends mainly on total fertility rates (TFR, the average number of children borne per woman in her lifetime), as well as timing of births and mortality rates. Over decades, small differences in fertility, result in large differences in total population size. According to the UN, if global average fertility and mortality rates stayed at their present levels, there would be 21.6 billion people on Earth in the year 2100. Conversely, the UN low variant projection is that if fertility levels consistently were half a child below replacement fertility (TFR of 2.1), it would lead to a global population of 8.9 billion at mid-century, declining to 7.3 billion in 2100.²⁰

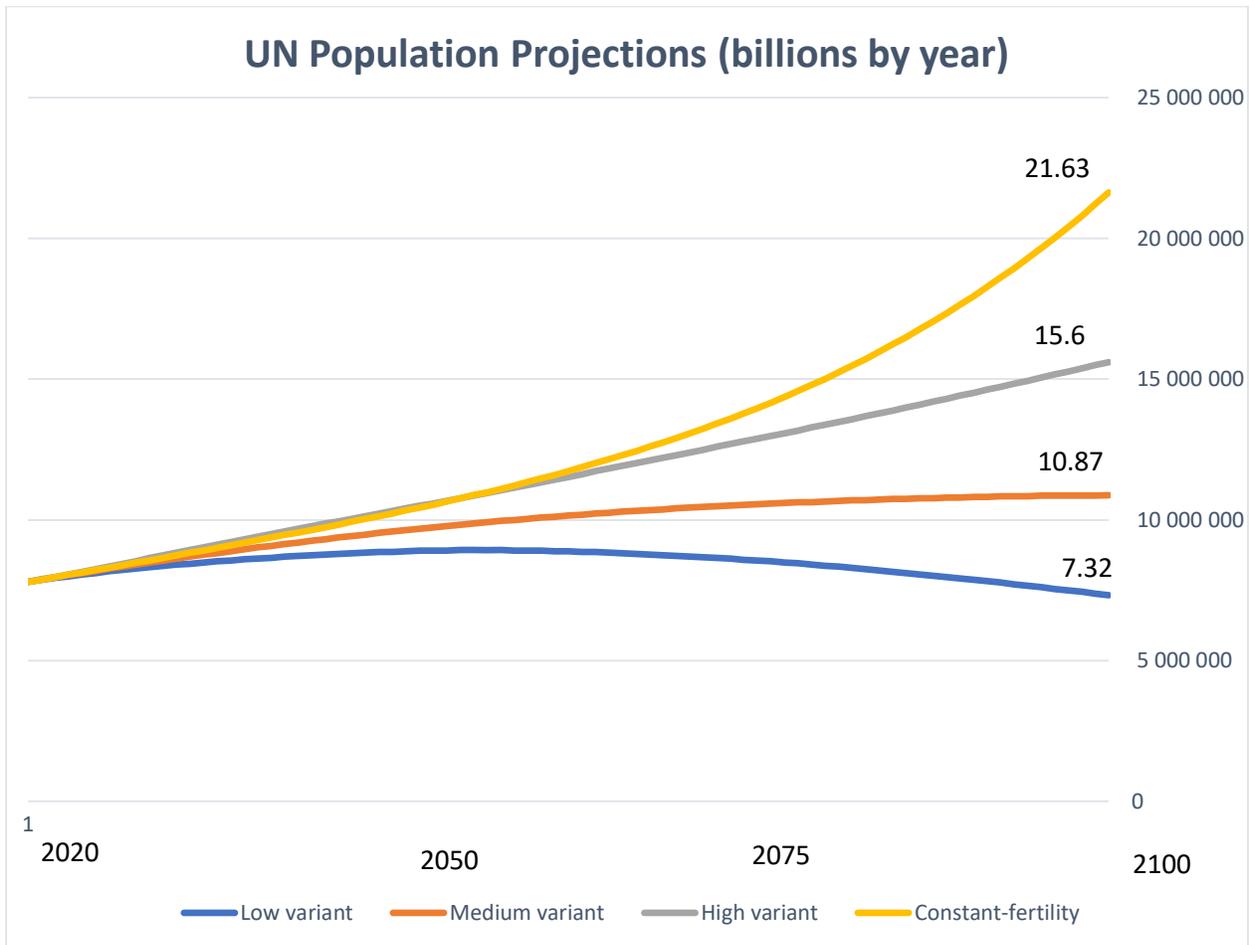
The most recent (2019) UN projections of population size estimate that there is a 95% probability that the size of the global population will increase from 7.7 billion in 2019 to between 9.4 and 10.1 billion in 2050 and between 9.4 and 12.7 billion in 2100.²¹ Population growth remains especially high in the group of 47 countries designated by the UN as the least developed countries, including 32 countries in sub-Saharan Africa. The population of this group is projected to nearly double in size from 1 billion inhabitants in 2017 to 1.9 billion in 2050, and to increase further to 3 billion in 2100. The UN projects that up to two-thirds of growth between 2019 and 2050 will be driven by current age structures with a very large generation of young people entering their reproductive years. This “population momentum” effect could be attenuated by delaying initiation of childbearing, longer birth spacing and decisions to have fewer than two children.

The UN medium variant projection is that nine countries will account for more than half of the projected world population growth of 3.1 billion between 2019 and 2100 with the top ten contributors being India, Nigeria, Pakistan, Democratic Republic of Congo, Ethiopia, Tanzania, Indonesia, Egypt, and the United States.

The U.N. Population Division’s 2019 “medium variant” projections of fertility change remain optimistic about declining fertility. For example, they assume that average TFR in Africa will decline rapidly from 4.5 children per woman, to 2.14 by 2100. But even the “medium variant” growth projection has profound implications—that Africa will grow from 1.3 billion in 2019 to 2.5 billion in 2050 and 4.3 billion in 2100. The “high variant” projection estimates that Africa’s population would reach 5.9 billion people by 2100, a population nearly equal the 6 billion inhabitants in the entire world in the year 1999.

In contrast, close to half of the world’s population lives in countries or areas with below-replacement-level fertility. The UN medium projection is that the populations of 55 these countries will decline during the 21st century. In order of population size, the ten most populous countries with below replacement fertility are China, the U.S., Brazil, the Russian Federation, Japan, Viet Nam, Germany, the Islamic Republic of Iran, Thailand, and the United Kingdom.

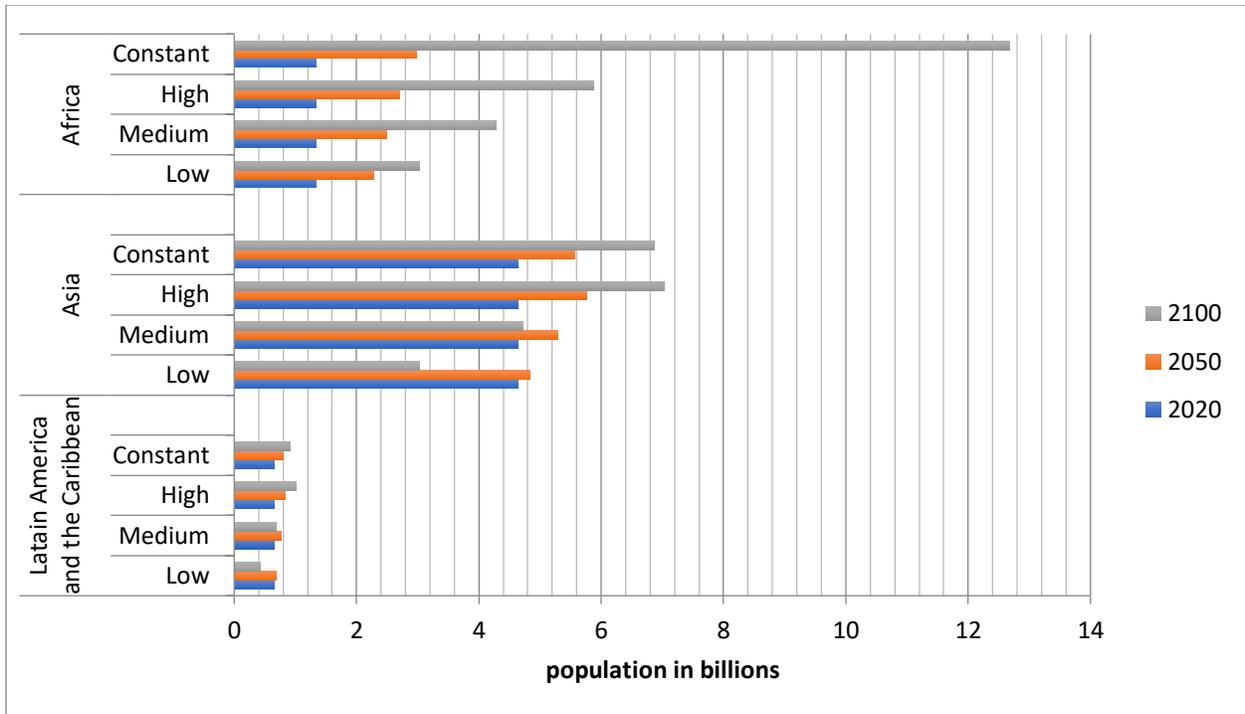
A graphic of the various United Nations projections is shown in figure 1.



Source of data: United Nations, Department of Economic and Social Affairs, Population Division. *World Population Prospects 2019, Online Edition. 2019.*

UN projections of future population size assuming low, medium, high and constant (unchanged) fertility according to Latin America, Asia and Africa regions in 2050 and 2100 are shown in Figure 2, below. Compared to Asia and Latin America, the percentage of population increase in Africa will be much greater.

Figure 2. Population of Africa, Asia and Latin America, in 2020 and Low, Medium, High and Constant Fertility U.N. Population Projections for 2050 and 2100 in billions



Source of data: United Nations, Department of Economic and Social Affairs, Population Division. *World Population Prospects 2019, Online Edition. 2019.*

The current high rate of population growth cannot continue

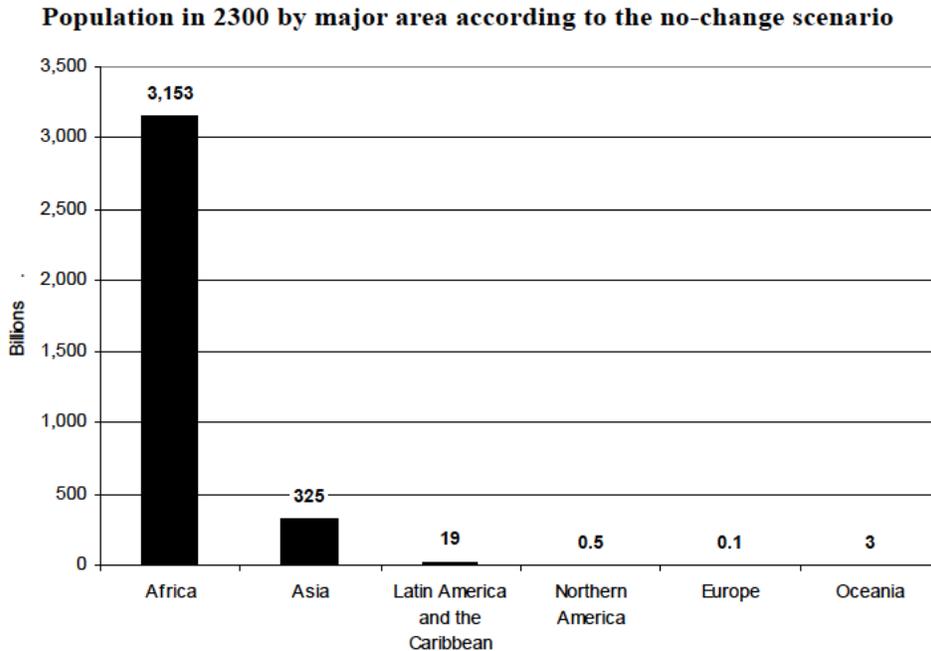
Nigeria, Africa’s most populous country at 206 million, illustrates the population challenge faced by many sub-Saharan African countries. Nigeria is about one-third larger in area than the U.S. state of Texas. UN projections suggest that Nigeria will need to accommodate between 500 million and a billion people by 2100. In comparison, the 2019 population of Texas is 29 million, and the U.S. about 328 million.

Agriculture and environment expert Stephen Warren has noted that throughout history population size has often if not usually been limited by food supply.²² The projections of population growth for Nigeria suggest that unless access to family planning is strengthened, there is a strong possibility that the Nigeria will not be able to rely on its own farmers, world food trade or aid to feed and otherwise support such a large population. Nigeria’s population size may be constrained by increased death rates and large flows of emigrants.

Even the high UN projections for the future of world population growth assume a rapid decline in family size. But what if fertility does not decline? In 2011 the UN projected future population size based on unchanged fertility and mortality up to the year 2300. As is shown in

Figure 3 below, Asia’s population would reach 325 billion in 2300 and Africa’s population would reach 16.2 billion in 2100 and an impossible 3.2 trillion in 2300.²³

Figure 3.



Source: United Nations. World demographic trends, report of the secretary general to the commission on population and development. E/CN9/2011/6, 21. UN Economic and Social Council. January 2011.

A clear implication of these projections is that the demographic status quo is untenable. Either birth rates will decline through the benefits of reproductive justice that include humane voluntary family planning programs, or death rates will rise because of food shortages, disease, political instability, civil unrest, war or other problems beyond the capability of developing nations to cope with.²⁴ High rates of population growth in the poor countries are already making it hard if not impossible for their governments to eradicate poverty, reduce inequality, combat hunger and malnutrition, strengthen and expand weak education and health systems, and improve the provision of basic services.

Preserving the environment—the role of human impacts

The UN-sponsored Millennium Ecosystem Assessment (MEA) was a comprehensive study of the state of ecosystems and their implications for human health and well-being conducted by more than 1,300 scientists from 95 countries. According to the MEA, between 1950 and 2000, human activity changed ecosystems more rapidly and extensively than during any other period, primarily to meet increasing demands for food, fresh water, timber, fiber and fuel.²⁵ The MEA estimated that about half of the productivity of the Earth’s biosystems has been diverted to human use, and an estimated 60% of ecosystem services—the benefits people obtain from

ecosystems such as providing food, water, raw materials and regulating climate—are being degraded or used unsustainably.

A 2013 *Scientific consensus on maintaining humanity's life support systems in the 21st Century* made by world scientists concluded that there is strong scientific evidence that humans are depleting the earth's natural resources, and harming life-supporting ecosystems.²⁶ The following sections incorporate an abridged version of scientist's statement. It is available at: <http://mahb.stanford.edu/consensus-statement-from-global-scientists/>.

The Consensus Statement groups human impacts into five areas of key concern:

- Climate disruption—more, faster climate change than since humans first became a species is driven mainly by extensive use of fossil fuels and the release of greenhouse gasses. Food security is threatened by shortage of fresh water and extreme temperatures. Coastal farm land and cities are increasingly vulnerable to rising sea-levels, floods and storm surges caused by climate change and extreme weather events.
- Extinctions—more rapid than since the dinosaurs went extinct.
- Wholesale loss of diverse ecosystems—humans have farmed, paved, or otherwise transformed more than 40% of Earth's ice-free land.
- Pollution—environmental contaminants in the air, water (including marine litter and ocean acidification) and land are at record levels and increasing, seriously harming people and wildlife. Air pollution is a major contributor to the global burden of disease, leading to between 6 million and 7 million premature deaths annually.²⁷
- Human population growth and consumption patterns—7.7 billion people alive today may increase by more than 2 billion by 2050, and the pressures of high levels of consumption among a growing middle class and the wealthy may intensify.

In 2017 more than 15,000 world scientists warned that humanity has failed to make sufficient progress in solving foreseen environmental challenges, and alarmingly, most of them are getting far worse.²⁸ Especially troubling to the scientists is the current trajectory of potentially catastrophic climate change due to rising greenhouse gasses from burning fossil fuels,²⁹ deforestation,³⁰ and agricultural production—including from raising ruminants for meat consumption.³¹ The report noted that, "...we have unleashed a mass extinction event, the sixth in roughly 540 million years, wherein many current life forms could be annihilated or at least committed to extinction by the end of this century."

The 2019 UN report *Global Environmental Outlook–GEO-6* concluded that "unsustainable human activities globally have degraded the Earth's ecosystems, endangering the ecological foundations of society."³²

Also in 2019, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) released a *Global assessment report on biodiversity and ecosystem services*³³

that notes that, “While more food, energy and materials than ever before are now being supplied to people in most places, this is increasingly at the expense of nature’s ability to provide such contributions in the future and frequently undermines nature’s many other contributions, which range from water quality regulation to sense of place. The biosphere, upon which humanity as a whole depends, is being altered to an unparalleled degree across all spatial scales. Biodiversity – the diversity within species, between species and of ecosystems – is declining faster than at any time in human history... The great expansion in the production of food, feed, fibre and bioenergy has occurred at the cost of many other contributions of nature to quality of life, including regulation of air and water quality, climate regulation and habitat provision.”

The IPBES describes the rate of global change in nature during the past 50 years as unprecedented in human history. The indirect drivers are human population dynamics and trends, production and consumption patterns, trade, technological innovations and local through global governance. Over this time span the human population has doubled, the global economy has increased in size nearly 4-fold and global trade has grown 10-fold, together these indirect drivers have increased demands for energy and materials. These fundamental demographic and economic drivers have led to five direct drivers of biodiversity loss: changes in land and sea use, direct exploitation of organisms, climate change, pollution, and invasion of alien species. Globally, land-use change is the direct driver with the largest relative impact on terrestrial and freshwater ecosystems, while direct exploitation of fish and seafood has the largest relative impact in the oceans.

Climate Change.

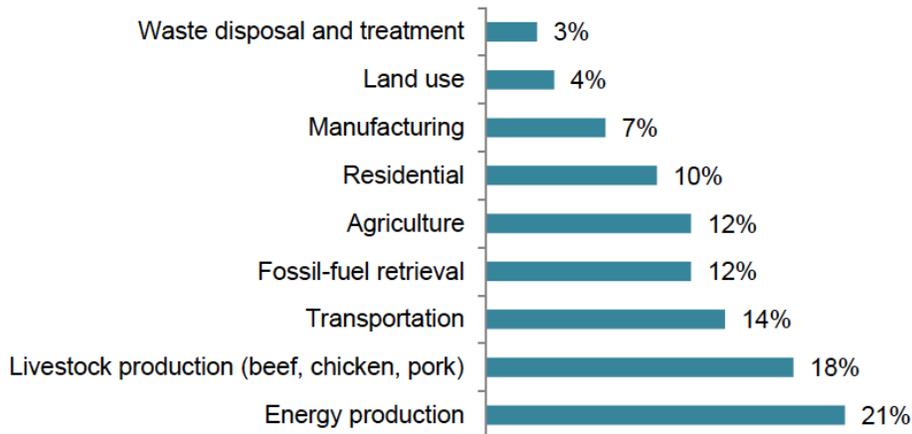
Time is running out to prevent irreversible and dangerous impacts of climate change. According to GEO-6, increased (and still increasing) historical and ongoing global greenhouse gas (GHG) emissions, primarily carbon dioxide (CO₂), nitrous oxide (NO), and methane (CH₄), are caused by human activities. They have committed the world to an extended period of climate change; global warming of air and oceans; rising sea-levels; melting of glaciers, permafrost and Arctic sea ice; changes in carbon and water cycles; food security crises; fresh water scarcity; and more frequent and extreme weather events. Higher atmospheric concentrations of carbon dioxide also lead to ocean acidification and affect the composition, structure and functionality of ecosystems.

According to the Intergovernmental Panel on Climate Change (IPCC), “Anthropogenic GHG emissions are mainly driven by population size, economic activity, lifestyle, energy use, land use patterns, technology and climate policy.”³⁴ Best-case emissions scenarios project that Earth will be hotter than modern humans ever experienced by the year 2070, and possibly sooner.^{35 36} If the current warming rate continues, the world would reach human-induced global warming of 1.5°C around 2040.³⁷ Continuing current emission trends would, by 2100, likely cause average global temperature to rise between 4.3-11.5°F (2.4-6.4°C), with the best estimate being 7.2°F (4°C). The last time it was this hot was 14 million years ago.

As is shown in Figure 4, fossil fuel retrieval and energy production are the greatest sources of greenhouse gas emissions. Nearly as great are livestock production and agriculture that accounts for about 30% of global emissions. Emissions from agriculture have been increasing because population growth requires greater food production. Expansion of agricultural lands causes up to

80% of all deforestation that releases the CO₂ stored in trees and soils. In addition, global economic growth has led to significant increases in global livestock production for consumption of meat, the source of about 18% of greenhouse gas emissions.³⁸

Figure 1: Greenhouse gases emissions, as a percent of the total from each source



A more recent assessment of the role of agriculture on climate made by the IPCC concluded, “If emissions associated with pre- and post-production activities in the global food system are included, the emissions are estimated to be 21-37% of total net anthropogenic GHG emissions (medium confidence).”³⁹

Impacts that would be detrimental to humanity by 2100, if not before, should greenhouse gas emissions continue at their present pace, include the following:

- Longer and more intense heat waves, possibly making some areas where people now live to be too hot for humans to survive. At 1.5⁰ C. warming, twice as many megacities (such as Lagos, Nigeria and Shanghai, China) could become heat stressed, exposing more than 350 million more people to deadly heat by 2050 under midrange population growth.⁴⁰
- More frequent damaging storms.
- Major damage to coastal cities as sea level rises, mainly from ice melt but also from thermal expansion of oceans and storm surges. Global average sea levels are expected to continue to rise—by at least several inches in the next 15 years and by 1–4 feet by 2100. A rise of as much as 8 feet by 2100 cannot be ruled out.⁴¹ Raising sea level to even the lower estimates (0.6-1.9 feet) would flood extensive cropland areas, large parts of major cities worldwide and force the permanent resettlement of millions of people. About 100 million people now live less than 3.3 feet (1 meter) above mean sea level and would be impacted by projections of sea level rise of as high as 2.6-13.1 feet (0.8-4.0 meters) by 2100. If climate change were to cause a 32.8 foot (10-meter) rise in sea level, it could displace more than 600 million people.⁴²
- Water shortages in populous parts of the world. Regions, cities and farmlands that rely on the

seasonal accumulation of water in glaciers, snow pack and slow spring melt, and arid regions that rely on water from major rivers and aquifers, all are at risk.

- Reduction of crop yields that has already decreased food availability where the most undernourished people live, notably most of Africa and India.⁴³ For example, maize yields in Africa may decline by 22-35% by 2030, due largely to increased variability in rainfall and local temperature changes.⁴⁴ California, which provides half of the fruits, nuts, and vegetables for the United States, will experience droughts and uncertain weather patterns.⁴⁵
- Spread of infectious disease. As temperate regions warm, costly and debilitating mosquito borne diseases such as dengue, malaria, and zika are expected to increase in both developed and developing nations.
- Pest expansions that cause severe ecological and economic losses.
- Major damage to unique ecosystems. Warming and acidification of ocean water is expected to destroy a large portion of the world's coral reefs, and forests worldwide face drought-induced decline, especially in tropical and subtropical regions with the most terrestrial biodiversity.
- Extinction of species. Currently at least 20-40% of assessed species—are possibly at increased risk of extinction if mean global temperature increases 2.7-4.5°F (1.5-2.5°C).
- Economic losses, social strife and political unrest subsequent to damage to coastal areas, flooding of cities and ports, water shortages, adverse weather and crop failures from draught.⁴⁶

Extinctions

As noted by the Consensus Statement, biological extinctions cannot be reversed and therefore are a particularly destructive kind of global change. Wildlife populations have been halved in the past 40 years.⁴⁷ Between 1970 and 2014, global vertebrate species (mammals, birds, reptiles, amphibians, and fish), population sizes declined by on average 60%.⁴⁸ ⁴⁹ The proportion of insect species in decline is 41%, nearly twice that of vertebrates.⁵⁰ Populations—groups of interacting individuals that are the building blocks of species—are dying off at an even faster rate than species.

Losing the world's plants, animals, insects, fungi, and microbes imposes direct economic losses (at least 40% of the world's economy and 80% of the needs of the poor are derived from biological resources), and regardless of their intrinsic value, lessens the effectiveness of nature to serve human needs. Threatened ecosystem services include moderating and stabilizing weather; stabilizing water supplies; filtering drinking water; protecting agricultural soils; disposing of wastes; pollinating crops and wild plants; providing food; controlling spread of pathogens; and helping to reduce greenhouse gases in the atmosphere. Continuing extinction at the present pace would threaten food supplies, and jobs and considerably degrade the parks and wildlife that provide emotional and aesthetic enjoyment.

The principal sources of human-caused extinction are through:

- Environmental contamination and habitat destruction from ecosystem transformation from ocean pollution, unsustainable forestry (logging) and conversion of land for ranching, agriculture, suburban sprawl, and roads.
- Climate change. Models predict that by the year 2100, between 12% and 39% of the planet will have developed climates that no living species has ever experienced, and conversely, the climate that many species currently live in will disappear from 10% to 48% of Earth's surface.⁵¹ In the oceans, acidification from absorption of atmospheric CO₂ disrupts growth and development of marine animals with shells such as clams and oysters, and causes collapse of physical reef infrastructure on which most marine species ultimately depend.
- Intensive exploitation of wild species for profit. Animals are being hunted to extinction to serve as pets (tropical birds), to make trophies and curios (elephant ivory), for purported health products (rhino horn, pangolin scales) or food (Bluefin tuna).

Ecosystem transformation

Conversion for agriculture to feed a growing world population accounts for most landscape change, with as of 2012, somewhat more than 41% of Earth's ice-free lands (36% of total land surface) having been converted to farms, ranches, cities, suburbs, roads, and other human constructs.⁵² Land degradation hotspots and areas of desertification where some 3.2 billion people live cover approximately 29% of global land, and 40% of all wetlands have been lost since 1970.

Global forests have declined to 68% of pre-industrial levels, with 22% of forests lost in the last 100 years.^{53 54} Mainly to expand agricultural lands, deforestation is proceeding at the rate of about 30,000 square kilometers (11,000 square miles) per year,⁵⁵ the equivalent of clear-cutting the entire country of Belgium. Half of tropical deforestation between 2000 and 2012 occurred in Brazil and Indonesia, in large part driven by logging, cattle, soy, and oil palm production.⁵⁶ Substantial greenhouse gas emissions are attributed to deforestation. Forest losses in 2010–2015 (most of which was natural forest) were offset partially by a combination of natural expansion of forests on abandoned agricultural land and the establishment of planted forests.⁵⁷

Climate change and overuse of rivers and underground aquifers for irrigation have caused severe and intensifying freshwater shortages. Worldwide, agriculture uses an average of 70% of all fresh water withdrawals, rising to 90% in many poorer countries. Today, over 1.7 billion people are threatened by groundwater depletion.⁵⁸ Depletion of fossil aquifers threatens production of grain in the world's top grain supplying countries—China, India, and the U.S. In some Indian states, water tables have fallen by at least 1 meter (3.3 feet) each year, putting nearly one-quarter of the nation's food crop at risk.⁵⁹ Increasing glacial and snowpack melt as a result of global warming will affect regional and seasonal water availability, especially in Asian and Latin American rivers, which provide water for some 20% of the global population. By 2025, due mainly to population growth, three out of four people worldwide will face some degree of water scarcity.⁶⁰

Ocean acidification, temperature increases, pollution (plastic, untreated sewage, industrial waste), but mainly overfishing, has led to declines in global fish supply. More than 3.1 billion people rely on fish for 20% of their protein, yet 93% of global fisheries have been over-fished (33%) or fished to their biological limits (60%).^{61 62} The loss of half the world's mangroves and coral reefs has reduced the breeding grounds of many fish species that humans consume. Pollution, especially with plastics, trawling, and ship traffic and noise have caused major changes to oceans, especially along most of the world's coastlines.^{63 66 67}

- The need to feed, house, and provide acceptably high standards of living for the 7.7 billion people that are now on the planet plus 2.2 billion more that demographers project will be added by 2050, means that the demands for land use and its transformation will accelerate.

In summary, the ongoing wholesale ecological transformation of more than half of Earth's ecosystems by direct human impacts is prone to trigger unanticipated, irreversible degradation even in ecosystems that are not directly utilized by humans.⁶⁴

Pollution

In addition to greenhouse gasses, traces of other human-produced environmental contaminants including pesticides and industrial pollutants are found everywhere on earth. Smog in many cities is far above levels considered safe.⁶⁵ Environmental pollution with pharmaceuticals, hormone-disruptors and cancer-causing chemicals is widespread and ends up in the bodies of humans. At least 125 million people are now at direct risk from toxic wastes produced by mining, manufacturing, and recycling of electronic equipment. As of 2010 air pollution caused up to 6 million premature deaths per year.⁶⁶ Excess nitrogen from farm fertilizers, sewage plants, pens, and coal plants eventually ends up waterways and makes it way to the oceans, where it stimulates prodigious algal growth, depletion of oxygen and large dead zones occurring near major population centers.

Population growth, resource consumption and the environment

The environmental impact of population relates both to the number of people on Earth and their 'ecological footprint,' a way of quantifying each human's use of resources.⁶⁷ There is a wide disparity between countries and societal sectors, with a relatively small proportion of humanity inefficiently using and impacting an inordinately large proportion of ecological resources.

According to the 2019 UN report Global Environmental Outlook–GEO-6, population pressure, and economic development have been acknowledged for many decades as the primary drivers of environmental change.⁶⁸ Unsustainable production and consumption patterns in most countries have resulted in increased per capita consumption, and a rapid growth of world population size is increasing the number of consumers. Together with climate change they are the major causes of environmental damage

The impact of humans on their environment is related to the number of consumers (population size), their per capita consumption, and the environmental impact of the technology used to

produce what is consumed.⁶⁹ Although an oversimplification, this relationship has been represented by the “IPAT” equation: I [impact] = P [population] x A [affluence/consumption] x T [technology]. Environmental degradation grows even more rapidly than in direct proportion to population size (assuming constant per capita consumption and modes of production) because deleterious feedbacks and synergies generally amplify risk.⁷⁰

Among the key ways population growth contributes to environmental problems are the following.

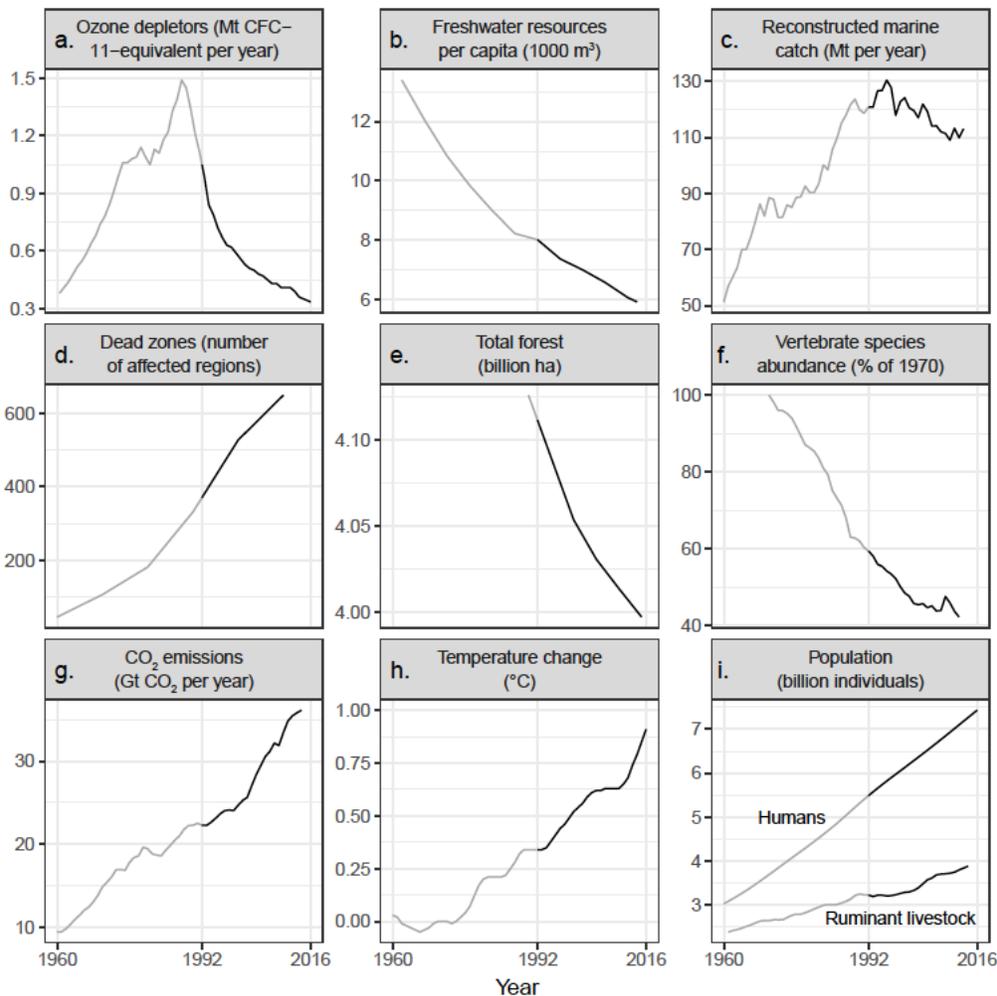
Each of the 7.7 billion people now on Earth contributes at some level to climate disruption, extinctions, ecosystem transformation, and pollution. And if they have children each person has a legacy of additional climate impact not only of their children but from grandchildren and subsequent generations. One such estimate for a person living in the U.S. is that over time, the summed carbon emissions of the children an average individual may be more than five times greater than their own.⁷¹ The actual contributions vary by geography and especially markedly between rich and poor with a much larger per capita climate footprint in highly industrialized, wealthier countries, and a lower per capita footprint in developing, poorer countries.

- Climate disruption. So far, as population has grown, greenhouse gas emissions and consequent climate disruption has increase proportionately.
- Extinctions. Habitat destruction and overexploitation of natural resources can be expected to increase as billions more people occupy and use more and more of the planet. Food production is the main driver of biodiversity loss, a major polluter of air, fresh water and seawater, from use of chemical pesticides and fertilizers and a leading source of soil degradation and deforestation. The Consensus Statement notes that humans now consume from 23% to 40% of all the fixed amount of net primary productivity (NPP is a measure of the “natural energy” available to power the global ecosystem.) So, the more NPP that humans use, the less is available for other species. Calculations that assume no change in human consumption patterns indicate that the amount of NPP required by 20 billion people—which would occur by the year 2088 if fertility rates stayed the same as they were in 2017—would cause the extinction of most other species on Earth.¹¹⁰ It is doubtful that the planet can sustain a human population of that size.
- Ecosystem Transformation. According to the Consensus Statement, a little less than 2 acres of land has already been converted from its natural state for use by each person on Earth. If that per capita rate of land conversion continued, adding 2 billion or more people to the planet means that the majority of Earth’s lands—a little over 50%—would have been changed into farms, pastures, cities, towns, and roads by 2050. Continuing to use land at the rate of 2 acres per person would mean that 85% of Earth’s lands would have to be used—including inhospitable places like deserts, the Arctic, and the Antarctic—if the population hit 15 billion. Such unworkable scenarios underscore that population cannot grow substantially unless the human footprint per capita is greatly reduced.
- Pollution. All of the most dangerous sources of pollution result from per capita demand for goods and services and, given current practices, will increase both proportionately with the number of people on Earth and as people emerge from poverty. The problem of treating and

disposing of human waste (sewage and garbage), also multiplies roughly in proportion to numbers of people.

Over many years, the U.S. National Academies of Science, the Royal Society, and dozens of national academies of science have echoed the concerns of the scientist’s warning. On the 25th anniversary of the scientist’s warning, an evaluation of progress in preventing environmental destruction signed by more than 15,000 scientists concluded (As shown in figure 5.) that with the exception of ozone depletors, humanity had failed to make sufficient progress in coping with environmental challenges.⁷²

Figure 5. Trends over time for environmental issues identified in the 1992 scientists’ warning to humanity



Source: Ripple WJ, Wolf C, Newsome TM, Galetti M, Alamgir M, Crist E, Mahmoud MI, Laurance WF, 15,364 scientist signatories from 184 countries, World Scientists’ Warning to Humanity: A Second Notice. *BioScience*. 2017;67(12):1026–1028.

We are jeopardizing our future by not reining in our intense but geographically and demographically uneven material consumption and by not perceiving continued rapid population growth as a primary driver behind many ecological and even societal threats.⁷³

Meeting the challenge of advancing the welfare of people and the planet with a common agenda for reproductive justice, population and the environment

Clearly the problems documented in the above sections of this report are daunting, but fortunately there is much within the scope of existing knowledge, technology and availability of resources that can be done to address them. It must be acknowledged that the policies and programs to address reproductive justice, population and the environment that are advanced in the following sections do not directly address many aspects of what is needed to improve human and planetary welfare, such as good governance, health care, shelter and employment.

Needed action on climate

Avoiding the worst impacts of human-caused climate change will require reducing emissions of greenhouse gases substantially.⁷⁴ This appears to be possible through rapid innovation and scaling-up of carbon-neutral energy production (solar, wind, hydro, geothermal, hydrogen fuel-cells, possibly nuclear, microbe-based biofuels) and increased efficiency in energy use (e.g., better gas mileage for cars and trucks, more energy efficient buildings) and carbon capture and storage (CCS) from major emitters like cement and steel plants. The countries that have rapidly reduced GHG emissions, notably Sweden and France, have done so through nuclear power generation. Unfortunately, as of 2019, construction of more than 1000 coal fired power plants are planned or being built. Nuclear power plants that are scheduled to be decommissioned should be replaced with carbon-neutral energy sources.

Other measures include research to devise and social incentives to promote new green technologies; adopting large-scale renewable energy sources; phasing out the trillion-dollar subsidies to fossil fuels⁷⁵; ending deforestation; and promoting dietary shifts towards mostly plant-based foods. The International Energy Agency estimated that \$5 trillion of investment in clean energy alone was needed by 2020 to keep a rise in global temperatures to within 2 degrees Celsius (3.6 Fahrenheit).

Although the previous very low UN population projections now seem unlikely, in 2010, O’Neil estimated that *reaching what was then the lowest UN fertility scenario could contribute 16% to 29% of the reduction in greenhouse gas emissions needed by 2050, and with a world population declining to about 6 billion 37-41% of that needed by 2100, to avoid global warming of 2°C.*⁷⁶

Other studies have estimates of the role of population policies in carbon emissions reduction and concluded that decreased population growth through investment in family planning and female education is a less costly approach to carbon emissions abatement than other options for low-carbon energy such as solar and wind.⁷⁷

Needed action on extinctions

Biodiversity can be protected by the economic valuation of natural capital and ecosystem services; protection of forests and other undisturbed areas from logging and conversion to agriculture and ranching, adoption and enforcement of national laws, international agreements to prevent illegal trafficking in timber and wildlife products; enhanced protection of species in public oceanic and terrestrial reserves; development and implementation of effective policies to ensure sustainable fisheries; and the establishment of interconnected well-funded and well-managed reserves for a significant proportion of the world's terrestrial, marine, freshwater, and aerial habitats.⁷⁸

Needed action on ecosystem transformation

Maintaining nature's ecosystem services requires halting the conversion of forests, grasslands, and other native habitats; restoring forests and wetlands; and ending the poaching, exploitation and trade of threatened species. Avoiding global ecosystem transformation will also require keeping climate change to a minimum.

Because food production is the chief transformer of natural ecosystems, a key challenge will be feeding more people without significantly adding to the environmental footprint of existing agriculture and fisheries. Studies indicate that without use of more land it is feasible to increase food production substantially in an environmentally sound way by improving yields; efficient water, energy, and fertilizer use; eating less meat; and reducing food waste.⁷⁹ Adapting crop strains both to cope with a changing climate and to maximize yields is needed.^{80 81} In the oceans, enhanced fisheries management and sustainable aquaculture is needed.

Needed Action on pollution

Significant reductions in pollution from agriculture and manufacturing can be achieved through better regulation and oversight of industries using and producing hazardous wastes; enhancement of technology for management and treatment of pollutants; and minimizing location of potentially hazardous industries near population centers. Reducing air pollution (including greenhouse gases) requires phasing out coal-fired power plants and high-emissions vehicles and replacing most fossil fuel sources of energy with clean energy. Agricultural pollution can be minimized by efficient use of fertilizers, pesticides, and antibiotics. Science should guide synthetic chemistry in the development of a new generation of inherently safer materials and the use of the precautionary principal (verification of no harmful effects) should be used to regulate use of new chemical entities.⁸²

Needed action on reproductive justice family planning and population—low fertility is advantageous for individuals, families, nations and the environment

Family planning enables individuals and couples to plan and manage their sexual and reproductive lives. Access to sexual and reproductive health services foster gender equality by empowering women and freeing them to pursue education, employment and other life opportunities.⁸³ Contraception prevents unintended, often high-risk pregnancies—such as those among women who are adolescent or over age 35. A two-year or longer spacing between births

is associated with a 30% reduction in maternal deaths and a 10% decrease in newborn and infant mortality.^{84, 85} In addition to the benefits of preventing unintended pregnancies, contraception contributes to a pleasurable and anxiety-free sexual life, and some methods of family planning have direct health benefits.⁸⁶

Reproductive justice calls for women to be afforded equal rights and to have access to health, educational and financial resources. In 2015, at a poverty standard of \$3.20 per day, over a quarter of the world's population had less income and nearly half of the world lived on less than \$5.50 per day.⁸⁷ Family planning is doubtless not sufficient, but is necessary to reduce poverty. The research of Jane O'Sullivan indicates that *with the exception of a few oil-rich nations, no country has lifted itself out of poverty without first reducing its fertility rate.*^{88 89}

Economic research in developing countries shows that individuals and families that choose to have fewer children have multiple benefits including better health, and higher social and economic status. Families with fewer children can direct more resources toward the health and education of each child. Economists have concluded that slowing population growth improves the economic well-being of individuals, communities and entire countries. When Thailand, South Korea, Malaysia, Taiwan and Singapore provided family planning and adopted sound economic policies, they were able to take advantage of the rapid declines in average family size that reduced the dependency ratio—the number of workers in the labor force compared to children, youth, and elderly who are not as economically productive. Fewer nonworking dependents provided a *demographic dividend*, that contributed to the *Asian economic miracle* that occurred in these countries.⁹⁰

According to the Guttmacher Institute, by satisfying the unmet need for modern contraception in developing countries, the currently high numbers of unintended pregnancies, unplanned births and abortions would drop by almost three-fourths. This in turn will slow population growth, foster economic development and reduce the pressure of burgeoning human population on the environment.

The Characteristics of Successful Family Planning Programs

If voluntary family planning programs are to succeed in fostering reproductive justice, minimizing unintended pregnancies and births, and limiting population growth, they require appropriate *policies, motivation* to limit fertility on the part of potential users of family planning, well designed, accessible and affordable contraceptive and abortion *services*. In general access to family planning is better in wealthy countries than in the developing world but often abortion care is limited in both rich and poor countries.

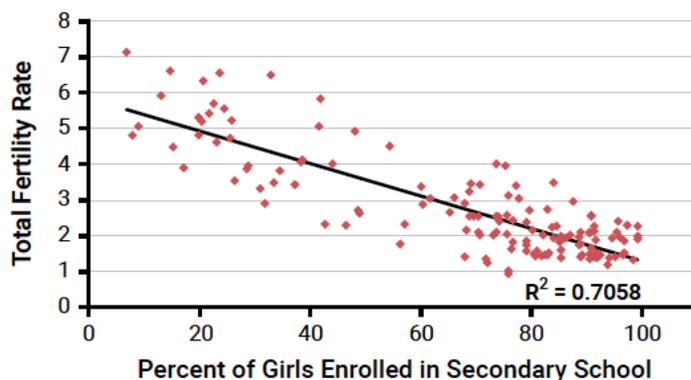
Motivation to limit childbearing

Of the forces affecting family size preferences, the most powerful are the education and empowerment of women, and the availability of high-quality family planning and abortion services.

Surveys in developing countries show that most women want to limit childbearing, but according to the Guttmacher Institute, as of 2017, more than 200 million of these women of reproductive age (15–49) who want to avoid pregnancy are not using a modern contraceptive method.⁹¹ These same surveys suggest that a sizable number of women desire large numbers of children and others avoid family planning for reasons such as of fears about the safety and side effects of contraceptives or fatalism about childbearing.⁹² Although declining, cultural support for large families based on traditional gender roles and opposition from spouses and other family members is still widespread in some countries.⁹³ Research has found that more schooling, higher survival of children and higher incomes are associated with lower desired family size.⁹⁴

As shown in figure 6., female secondary school enrollment is strongly correlated with fertility rates. However, the provision of high-quality family planning services, as occurred in Thailand, virtually eliminated the difference in adoption of family planning between those with little education and those who were better educated. Potts and Marsh have observed that, “Education reduces family size because more educated women are better able to surmount the many barriers separating them from the information and technologies they need to manage their childbearing. When these barriers are removed, then differences in fertility between illiterate and educated women largely disappear.”⁹⁵

Figure 6. Secondary School Enrollment vs. Total Fertility Rate



Source: Earth Policy Institute (2011)

The UN Educational, Scientific and Cultural Organization (UNESCO), estimates that the cost of achieving universal pre-primary, primary and secondary education in low and lower middle-income countries is projected to increase from \$149 billion annually in 2012 to \$340 billion annually, on average, between 2015 and 2030.⁹⁶ Expenditures in low income countries need to increase from \$14 billion in 2012 to an average of \$50 billion between 2015 and 2030. The projected increases reflect a combination of greater numbers of students and higher per-student expenditure to improve quality. In addition to current aid flows of \$4.4 billion a year for education, UNESCO called on donors to provide an additional \$10.6 billion a year for educational programs in low-income countries and \$11.8 billion a year more to middle-income countries.

Family planning programs generally use education and communication programs to provide women with information about birth control methods, how to obtain them, and they may also explain the health and other advantages of small families. This information increases the social acceptability of birth control and counters unfounded rumors and negative perceptions of contraceptive methods. Their messages, especially on radio and television, together with government support, have a substantial impact on fertility preferences and increase demand for family planning.⁹⁷

Because family planning programs influence fertility preferences and increase demand for their use—it is not necessary to wait for the slow pace or lack of progress in improving social and economic development to reduce preferences for large families.⁹⁸ However, as John Bongaarts has pointed out, family planning programs alone are not enough to eliminate unintended pregnancies, they must go beyond simply providing supplies and services; they must also help reduce or eliminate other social and cultural obstacles.⁹⁹

Robert Engelman cites the example of Tunisia as evidence that social change together with access to contraception and abortion are crucial to the acceptance of family planning and lower fertility. He notes that in 1957 Tunisia's first president, Habib Bourguiba, "...guaranteed women full citizenship rights, including the right to vote and to remove the veil. He pledged universal primary school attendance for girls as well as boys, banned polygamy, raised minimum marriage ages and granted women the right to divorce. He legalized contraception and then subsidized abortions for women with large families. By the mid-1960s mobile family-planning clinics were offering oral contraceptives throughout the country." By the early 2000s Tunisian fertility had declined from seven children to two. Engelman notes that, "...women who can raise their sights high and manage their own lives also decide—and manage—to have fewer children and to have them later in life."¹⁰⁰ And that, "Mauritius and Tunisia demonstrate that the key to trimming family size is a consistent focus on improving women's lives, including economic opportunities and legal guarantees that are as equal as possible with those for males. Despite perceptions to the contrary, national economic growth alone does not push fertility down powerfully."

The impact of organized family planning programs on population growth is clear: Such programs have been responsible for much of the fertility decline in both developed and developing countries. *Significant fertility decline has not been observed in a poor and largely illiterate country in the absence of a strong family planning program.*¹⁰¹

The experience of many countries has taught us the keys to effective family planning programs:¹⁰²

- High-level political commitment, especially from governments.
- Broad support from leadership groups.
- Smaller families and modern contraception legitimized by mass media, e.g., through serial dramas (soap operas).
- Availability of a broad choice of contraceptive methods including the most effective methods, sterilization and long-acting reversible contraceptive (LARC) methods, the IUD and implant.

- Woman-centered counseling, information and services from a variety of convenient sources, e.g., medical facilities, social marketing, and outreach services through field workers.
- Access to safe abortion care.
- Adequate funding to ensure contraceptive and abortion availability at an affordable cost.

Although voluntary family planning programs offering information, counseling and high-quality services can go far toward meeting the existing demand for family planning and lowering fertility, social science and biomedical research to bring about improvements in service delivery methods and fertility regulation technology is still needed. An analysis of Demographic and Health Surveys in 52 countries found that among married women who wanted to avoid a pregnancy, the most common reason for not using contraception was concern about contraceptive side effects and health risks.¹⁰³ A multi-country survey found that 25-50% of women had stopped using a contraceptive because they experienced or feared side effects and adverse health consequences from their use.¹⁰⁴ So research to improve contraceptive technology is needed.

Access to contraceptive services

The Guttmacher Institute estimates that as of 2017, about half of the 1.6 billion women of reproductive age (15–49) who live in developing regions currently want to avoid a pregnancy.¹⁰⁵ Of these 885 million women, 671 million have access to and are using modern contraceptives. This leaves an estimated 214 million of the women who want to avoid pregnancy not using a modern contraceptive method. They are considered to have an unmet need for contraception.

Of an estimated 206 million pregnancies in 2017 in developing regions, 43% (89 million) were unintended (occurring too soon or not wanted). Nearly three-quarters of the unintended pregnancies occurred among women who for various reasons were not using contraception and an additional 10% occurred among women using traditional methods that are less effective.

Access to abortion services is essential to the success of family planning

Although contraception decreases the need for abortion, contraception is not always available, it may not be used, or it may fail. Methods that are highly effective when used perfectly, such as oral contraceptives, frequently fail under typical conditions of use. To achieve their fertility goals and avoid the social and economic burdens caused by an unintended pregnancy, worldwide each year more than 50 million women with unintended pregnancies turn to abortion regardless of its legal status.¹⁰⁶ In developing regions, improved abortion care is needed to reduce the 23,000 deaths and about 7 million complications needing treatment that result from an estimated 25 million unsafe abortions that occur each year. Medically safe abortion causes few complications only rarely causes fatalities--it is about ten times safer than childbirth.^{107 108}

All countries with low fertility rely on extensive use of abortion. Demographers Christopher Tietze and John Bongaarts have documented that it is unlikely any population ever attained low fertility (TFR ≤ 2.2) without abortion, legal or illegal.¹⁰⁹ As Malcolm Potts has noted: “*All societies with unconstrained access to fertility regulation, including abortion, experience a rapid*

*decline to replacement levels of fertility, and often lower.”*¹¹⁰ Safe abortion should be an integral part of the services provided by family planning programs.¹¹¹

Access to maternal health services

According to the Guttmacher Institute, among the 127 million women who give birth each year in developing regions the disparities in use of maternal and newborn health care across regions are substantial.¹¹² The proportion of women delivering in a health facility is lowest (55%) in low-income countries and highest (94%) in upper-middle-income countries. Of women giving birth in Africa 56% deliver in a health facility, compared with 91% in Latin America and the Caribbean. In 2017, an estimated 308,000 women in developing countries died from pregnancy-related causes, and 2.7 million babies died in the first month of life. Most of these deaths could have been prevented with full access to contraceptive and maternal and newborn health care.

Cost and benefit of contraceptive services

*The Guttmacher Institute estimates that increasing expenditures from the current \$6.3 billion a year to \$12.1 billion could satisfy all unmet need for modern contraception in developing countries.*¹¹³ *It would decrease unintended pregnancies from the current 89 million to 22 million per year, unplanned births from 30 million to seven million per year (thereby reducing annual population growth by nearly 30%), induced abortions from 49 million to 12 million per year and would result in an estimated 76,000 fewer maternal deaths each year.*

Cost and benefits of maternal and newborn care

Providing all pregnant women and their infants with the level of maternal and newborn health care recommended by the World Health Organization would require increasing expenditures for these services from the current \$25.7 billion a year to \$54.1 billion. This would reduce maternal deaths by 64%, to 112,000 per year, assuming no change in contraceptive use or in the number of unintended pregnancies. Newborn deaths would drop by 76%, to 655,000.

Cost savings of providing contraception and maternal and newborn care together

Fully meeting the needs for both modern contraception and maternal and newborn care would save much of the \$8.3 billion now spent on maternal and newborn care related to unintended pregnancies, and would cost \$53.6 billion annually—a net savings of \$6.9 billion compared with investing in maternal and newborn health care alone.

Business as usual is not an option for sustainable development—a new green economy is needed

Sustaining the quality of life that exists in wealthy countries while at the same time improving living standards in developing countries and adding billions of people to the planet requires reducing the per capita human footprint in the wealthy countries and not increasing it excessively in developing countries.

We must radically alter the world's current model of economic progress that is seemingly based upon ever-expanding growth and consumption. Neither developed countries nor the developing world can afford this model. Developed countries must adopt a low-consumption economy, and developing countries must bypass the wasteful lifestyle of wealthy countries and proceed directly to the same new economy.

Attenuating population pressure is essential but insufficient to preserve the environment. The global community must cease the profligate and ecologically unsustainable exploitation of natural resources and evolve a new economy that reduces consumption and the resulting waste and pollution, as well as preserves and restores natural systems.¹¹⁴

We must move from an energy economy based on fossil fuels to one powered mainly by wind, photovoltaic, geothermal and other renewable energy sources. At the same time, we must dramatically decrease per capita energy use through energy-efficient appliances, lighting, buildings and homes. We must improve public transportation, and make our streets bicycle and pedestrian-friendly.

Lifestyle changes to minimize meat consumption are healthier, could allow humans to consume the grains that are now fed to animals and diminish emission of greenhouse gasses.¹¹⁵ We must replant forests to sequester carbon; curb deforestation for lumber, paper and fuel; and conserve and rebuild soil through appropriate plantings, limiting overgrazing and better farming practices. We can restore fisheries by limiting catches, establishing marine preserves, and protecting reefs and wetlands. Also, we must preserve and husband water resources through better irrigation practices, reduction of groundwater use, and increased use of composting toilets for the 2.6 billion people who now lack adequate sewage and sanitation facilities.¹¹⁶

Low and middle-income countries cannot emulate the development strategies of the wealthy

The lifestyle of each person in a rich country has a greater detrimental impact on the environment than each person in a poor country. Surely people deserve to emerge from poverty, but when they have done so, their consumption has increased. Since five times as many people live in developing countries as live in developed countries, as they emerge from poverty, it is essential to avoid the possibility of catastrophic environmental degradation. The policy of “get rich first, clean up later” that has been adopted by some developing countries is not feasible.

Paul and Anne Ehrlich estimated in 2013 that with current consumption patterns to support a world population of 7 billion sustainably would require a 50% larger Earth, and if this many people consumed at a U.S. level, it would take four to five more Earths.¹¹⁷ The noted biologist, E. O. Wilson made a similar estimate in 2003, that sustainable worldwide consumption at U.S. levels would require four more Earths.¹¹⁸

In 1998, Wilson summed up the environmental challenge of increasing consumption by the large number of people living in developing countries as follows: “Homo sapiens is approaching the limit of its food and water supply. Unlike any species that lived before, it is also changing the

world's atmosphere and climate, lowering and polluting water tables, shrinking forests, and spreading deserts. Most of the stress originates directly or indirectly from a handful of industrialized countries. Their proven formulas for prosperity are being eagerly adopted by the rest of the world. The emulation cannot be sustained, not with the same levels of consumption and waste. Even if the industrialization of developing countries is only partly successful, the environmental aftershock will dwarf the population explosion that preceded it.”¹¹⁹

This aftershock is vividly illustrated by China where per capita consumption, as measured by GNI per capita, was only 28% of that of the U.S. in 2017, (\$16,760 vs. \$60,200), but population is more than four times larger (1.39 billion vs. 328 million).¹²⁰ With the exception of petroleum products, China is now the number one consumer of almost all commodities such as steel, grain and meat, and the largest emitter of the greenhouse gas, carbon dioxide.¹²¹ Of global CO₂ emissions from fossil fuels, China is responsible for 30%, the U.S. 15%, European Union 9%, India 7%, Russia 5%, Japan for 4% and all other countries 30%.¹²² The African continent is projected to have nearly twice the population of China by 2050. If Africa were to emerge from poverty with a developed world consumption pattern, its environmental impact could exceed that of China.

As Lester Brown has noted: “The growth in resource consumption in China, now eclipsing that of the United States, provides convincing new reasons for shifting quickly from the fossil-fuel-based, automobile-centered, throwaway economy to a renewable energy-based, diversified transport, reuse-recycle economy. In this restructuring, time is not on our side. It would be tempting to reset the clock, but we cannot. Nature is the timekeeper.”¹²³

The world community must take on a dual challenge, reducing the per capita use of resources in economically developed countries, while still supporting improvements in the quality of life in developing countries. This requires a transformation of energy and resource-consumption regimes in both rich and poor nations, using current state-of-the-art technologies and research on new technological breakthroughs.

Reproductive justice and population

When women (and men) experience the benefits of reproductive justice, especially education, empowerment and access to affordable fully voluntary family planning and abortion services, they can be counted on to make wise decisions about fertility—decisions that benefit their families, communities and nations. Reproductive justice ensures that women are free to choose many different numbers and timing of childbearing. Some women will have large families, others will choose to remain childless, but the experience of many countries suggests that in countries that better fulfill the goals of reproductive justice, average family size usually declines. Already there countries with below-replacement-level fertility that account for 50% of the world’s population. The UN medium projection is that the populations of 55 these countries will decline during the 21st century.¹²⁴

Ramping up international development assistance to Africa and other rapidly growing “demographic hotspots” would make it more likely that the UN low population-growth projections would prevail. In addition to most of Africa, especially sub-Saharan Africa, the

following countries have high birth rates. In Central America and the Caribbean: Belize, Guatemala, Honduras, Panama, and Haiti; in South America: Bolivia, Ecuador, Paraguay, and Peru; in Asia: Mongolia, Philippines, Cambodia, and Laos; and in the Middle East: Iraq, Afghanistan, Syria, Palestine, Yemen, Tajikistan, and Pakistan.

When considering ways to lessen the impact of humans on the environment, the role of rapid population growth and its enormous increase in size in recent decades is seldom considered, even though the world grew by one billion people over the last 12 years. More attention has been given to decreasing the environmental footprint of the technology used for production of what is consumed and to lessening individual consumption, waste and pollution.

Eileen Crist, et al., urge advocates and policy makers to “move beyond the prevailing dichotomy of whether it is excessive consumption or unsustainable population that fundamentally underlies humanity’s impact.”¹²⁵ They note that, “Humanity is using Earth excessively both as source (for land cultivation and grazing, freshwater, wild fish, bushmeat, fossil fuels, wood products, and so on) and as sink (for nonabsorbable wastes such as trash, nitrogen, pesticides, confined livestock manure, plastic, and industrial chemicals). Stabilizing and lowering our numbers globally—noncoercively, through the exercise of reproductive rights—is a strategy for scaling down consumption on all fronts.”

Crist, et al., point out that, “International developments further contradict binary arguments of excessive consumption as a developed-world problem and population concerns as a developing-world issue. A crisp dichotomy between the global North and the global South is becoming outmoded by the growth of a global consumer class, which has increased by hundreds of millions of people in the past two decades and will grow by billions in the decades ahead. A global middle class of 3.2 billion people in 2016 is expected to rise to roughly 5 billion by 2030.”

They go on to observe, “As the middle class in Africa, Asia, and Latin America continues to grow—an equitable expectation and policy orientation—the stress added to that of the developed world on the biosphere will become extreme. As the global middle class grows, the world is converging in the direction of increased consumption. Rising meat consumption, increasing purchases of processed and packaged foods, more international travel, and burgeoning numbers of automobiles, personal computers, and electronic devices are only a few areas in which the impacts from consumer demand for food, energy, materials, and infrastructure are poised to escalate. The global consumer society emerging in our time invites recognition that stabilizing and eventually reducing the global population is crucial for lowering total consumption.”

As GEO-6 noted, “Society-wide risks associated with environmental degradation and climate change effects are generally more profound for people in a disadvantaged situation, particularly women and children in developing countries.” The livelihoods of 70% of people living in poverty directly depend on natural resources. Environmental impacts may lead to economic stress and loss of livelihood; increased morbidity and mortality. Environmental degradation may increase the potential for violent conflict, human mass migration and decreasing social resilience.

GEO-6 calls for “Key actions include reducing land degradation, biodiversity loss, and air, land and water pollution; improving water management and resource management; climate change mitigation and adaptation; resource efficiency; addressing decarbonization, decoupling and detoxification; and the prevention and management of risk and disasters. Those all require more ambitious and effective policies, including sustainable consumption and production, greater resource efficiency and improved resource management, integrated ecosystem management, and integrated waste management and prevention.”

“Unequal access to education, and lack of empowerment of women, as well as their lack of access to sexual and reproductive health services, all contribute to high birth rates. Without changes in production and consumption patterns, population growth will continue to increase environmental pressures.”

Overall, the world is not on track to achieve the environmental dimension of the 2030 Agenda for Sustainable Development and internationally agreed environmental goals by 2050. Urgent action is now needed to reverse those trends and restore both environmental and human health.

GEO-6 notes that, “Decoupling of environmental degradation and resource use from economic growth and associated production and consumption patterns is required for achievement of the Sustainable Development Goals.”

Summing up—a Common Agenda

Individual and societal wellbeing is compromised by lack of high-quality family planning and reproductive health services, and by the accelerating environmental damage from climate disruption, extinction, ecosystem loss, pollution, and human population growth. We are impairing the life-support ecosystems upon which we all depend for continuing the high quality of life that some people already enjoy and to which many others aspire to and deserve. To advance human and planetary welfare we must relieve the global pressures that have the strongest detrimental synergies, namely *population growth, per capita resource consumption, and greenhouse gas emissions*.

The key elements of a common agenda:

- Note that the elements of a common agenda for sexual and reproductive health, population and the environment is congruent with many of the goals and targets of the UN 2030 Agenda for Sustainable Development Goals (SDGs).¹²⁶ Goal 3 is *Ensure healthy lives and promote well-being for all at all ages*; Goal 5, *Achieve gender equality and empower all women and girls* calls for strengthening access to reproductive health and rights: i.e., “By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes;” Goal 12 is *Ensure sustainable consumption and production patterns*; Goal 13 is *Take urgent action to combat climate change and its impacts*; Goal 14 is *Conserve and sustainably use the oceans, seas and marine resources for sustainable development*; and, Goal 15 is *Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage*

forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

- Note that according to the current negative trends in biodiversity and ecosystems will undermine progress towards 80% (35 out of 44) of the assessed targets of goals related to poverty, hunger, health, water, cities, climate, oceans and land (Sustainable Development Goals 1, 2, 3, 6, 11, 13, 14, and 15).¹²⁷ And that there are “Important positive synergies between nature and goals on education, gender equality, reducing inequalities and promoting peace and justice...” and “declines in nature, have greater impacts on women and girls...”
- Recognize that a difficult challenge for a common agenda will be for wealthy people and communities to transition to a lifestyle and economy that is acceptable, preserves the environment and halts climate change while at the same time to provide improved living standards for the poor without causing unsustainable harm to the climate and environment. We must decouple our vision of a good and meaningful life from ever-increasing material consumption.
- Recognize that fulfilling the goals of reproductive justice that include women’s rights, education, sexual and reproductive health—supports equity, human rights, and sustainable development.
- Recognize that with the exception of a few oil-rich nations, no country has lifted itself out of poverty without first reducing its fertility rate,^{128 129} and that significant fertility decline has not been observed in a poor and largely illiterate country in the absence of a strong family planning program.¹³⁰
- Recognize that current population birth and death rates would lead to population growth from 7.7 billion in 2020 to 21.6 billion in 2100; that a population of this size is not likely to be supportable; and that population growth will slow either through humane voluntary means or increased death rates.¹³¹
- Recognize that 214 million women in developing countries have an unmet need for modern contraception that contributes to 89 million unintended pregnancies and population growth of 83 million each year.
- Establish laws, policies and programs that support sexual and reproductive health and rights and ensure universal access and remove all barriers to the use of family planning and abortion care.¹³²
- Recognize that all countries with low fertility rely on use of abortion,¹³³ and that all countries with unconstrained access to fertility regulation, including abortion, experience a rapid decline to replacement levels of fertility, and often lower.¹³⁴
- Increase expenditures for modern contraceptive services in developing countries from the current \$6.3 billion a year to \$12.1 billion a year, or better yet, to support both modern

contraception and maternal and newborn care by increasing expenditures from \$32 billion to \$53.6 billion annually.

- Support demographic, social science, operations and biomedical research that addresses population and reproductive health—including improved contraceptive and abortion technologies.
- Recognize that education has many benefits, including leading to reduction in family size because more educated women are better able understand the value of limiting family size and to attain the information and technologies they need to manage their childbearing—but also recognize that when barriers to access are removed, differences in fertility between illiterate and educated women largely disappear.¹³⁵
- Increase annual expenditures from \$149 billion to the \$340 billion needed to achieve high quality universal pre-primary, primary and secondary education for boys and girls in low and lower middle-income countries, with a substantial share of that total provided by development assistance.
- Attain the low UN projection of gradual global population decline through extension of the equity, education and rights benefits of reproductive justice to all countries—83 countries have already reached fertility levels that are below replacement, and in almost all of these countries this has been made possible by voluntary noncoercive services that are consistent with the principles of reproductive justice.
- Both adapt to and minimize climate change by decreasing greenhouse gas emissions through carbon-neutral energy technologies, agricultural and energy efficiency and forest conservation. Incorporate population and reproductive health and rights, and population, health, environment (PHE) activities into climate National Adaption Programmes of Action. Recognize that reaching the UN low fertility scenario could contribute up to 40% of the reduction in greenhouse gas emissions needed by 2100 to avoid global warming of 2°C.¹³⁶
- Curb the manufacture and release of toxic substances into the environment.
- Minimize the transformation of natural ecosystems into farms and cities and manage ecosystems to preserve biodiversity.
- Reduce per-capita resource use in wealthy countries and improve efficiency in production and use of goods in all countries.
- The International Renewable Energy Agency has called for outlays of \$120 trillion between 2015 and 2050 to combat climate change.¹³⁷ The worldwide costs of climate adaptation are likely to be between \$280 billion and \$500 billion per year by 2050.¹³⁸ Consideration should be given to using funds that are targeted on clean energy and climate adaption to support family planning, reproductive health and environmental preservation.

Humanity must develop and practice a more environmentally sustainable alternative to the current unsustainable economic system. The price of some of the elements, namely universal access to reproductive health and education is very low compared to the cost of inaction. Hans-Peter Kohler and Jere R. Behrman estimate that an annual investment of \$3.6 billion to address unmet need for family planning in developing countries would provide annual benefits of \$326-\$470 billion.¹³⁹

Addressing the problems described in this report will require recognition of their urgency by people and governments at all levels and in all countries. The technological expertise is available to mitigate many of the harmful impacts that are now occurring. Science and technology can provide the knowledge and means to address these issues, but it remains up to society to summon the needed political will to decide to take the needed actions. The science supporting the need to address population and the environment is clear, but as Newman and her colleagues pointed out, the "...challenge is to ensure that the agenda is built in ways that include sexual and reproductive health and rights, and gender and empowerment issues."¹⁴⁰

Now is the time for a common agenda to support a global effort to prevent the human suffering caused by inadequate attention to reproductive health and rights and to prevent catastrophic biodiversity and ecosystem loss accompanied by widespread human misery. With each passing year of inaction, the problems not only become worse, they become more expensive and difficult to solve, and the chances of avoiding the worst outcomes diminish.¹⁴¹

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