

Executive Summary

An estimated 225 million women in developing countries lack affordable access to high quality voluntary family planning services. Meeting the already existing need for modern contraceptive services would contribute to improved health; foster social justice; decreases the need to expand health facilities, schools and jobs; allow couples to invest more in the welfare of each child; and provide the economic benefits of a “demographic bonus” due to a favorable age distribution with fewer dependents who are not working.

By reducing unintended pregnancies and slowing population growth, strengthened family planning programs would also powerfully and inexpensively contribute to improvements in food security and the reduction of the greenhouse gas emissions that cause climate change. A confluence of long-term environmental and population trends is undermining world food availability and driving climate change. These trends include quickening climate changes and difficulty adapting to its effects; widespread depletion of water, soils and fisheries; increased diversion of grains from human consumption to bio-fuel production and livestock and poultry feed; rapid population growth, particularly in sub-Saharan Africa and South Asia; and increasing affluence and consumption in middle income countries.

Insufficient food is a serious problem for nearly 800 million people. Future food security could improve substantially if decreased population growth reduces future demand for food. Since agriculture and livestock together emit 30% of all greenhouse gasses, reducing the need to increase production of crops and farm animals will also help stabilize the climate. Clearly the developed nations of the world bear much responsibility for curbing greenhouse gas emissions, but as current low-income countries become more populous and more successful in reducing poverty, consumption and greenhouse gas emissions will increase as they have in India, Brazil, Indonesia and especially in China—now the country emitting the largest amount of greenhouse gasses (Figure 6).

Food demand and climate change planners commonly use UN estimates of world population growth, which recently projected with an 80% probability that world population size will increase from today’s 7.3 billion to between 10 and 12.5 billion in 2100, with almost all growth occurring in developing countries. World population growth of 2.7 billion rather than 5.2 billion is unlikely without increased investment in family planning. An increase from an estimated \$4.1 billion to \$9.4 billion annually is needed to provide family planning to women in developing countries who want to end or delay childbearing (1). An annual expenditure of \$9.4 billion is less than 5% of the \$209 billion annual expenditure estimated to be necessary to meet the need for food in developing countries between now and 2050 (2).

Research shows that investment in global family planning can make a substantial contribution toward improving food security and reducing the greenhouse gas emissions—at a relatively low cost. It would be appropriate for the research, policy, and program communities that address world hunger and global warming to make family planning a priority in the new Sustainable Development Goals. Investment of an additional \$3.5 billion annually by foreign aid donors and an additional \$1.8 billion from developing country governments would fill the \$5.3 billion gap in funds for family planning. Specifically, such an investment could:

- Slow global climate change, by providing 16-29% of the needed emissions reductions (3);
- Improve food security by slowing population growth;
- Satisfy existing demand for contraception services; and

- Prevent an estimated 52 million unintended pregnancies every year.

Population, Food Security, and Global Climate Change



The state of food security and climate change

Slowing the growth of population through meeting the existing need for voluntary family planning services in developing countries would powerfully and inexpensively contribute to improvements in food security, and would be an effective intervention to limit climate change.

Despite the worldwide production of sufficient food supplies to feed our current global population of 7.3 billion, food security is still out of reach for many. An estimated 795 million people, or 11% of the world's population, are chronically hungry (4). Sub-Saharan Africa remains the region with the highest prevalence of undernourishment (23%).

The causes of food shortage

Food shortages are caused by poverty and other economic barriers; extreme weather events; water scarcity; population growth; low productive capacity of croplands, rangelands, and fisheries; and lack of availability of agricultural technologies. Food insecurity both exacerbates and is exacerbated by political instability and inadequate national security (5). In 2007 and 2008, there were major food riots in 60 countries, due in part to draught in grain producing countries and spikes in commodity prices (6). In just 13 years, from 2000 to 2013, world population increased by 1 billion people and the FAO Food Price Index more than doubled, from 91.1 to 209.8. Food conflicts in the least developed countries are also intensified by urbanization and oppressive political regimes (7).

The causes of climate change

The earth's climate is changing in ways that affect our weather, freshwater cycle, oceans, and the ecosystems and societies built upon these natural systems. The U.S. National Climate Assessment 2014 (<http://nca2014.globalchange.gov/downloads>) concluded that Americans are feeling the effects of global warming in every part of the country. Across the globe, from India to Madagascar to the Philippines, communities are struggling to adapt to the harmful effects of climate change on agricultural production, water availability, mental and physical health, and personal security (8). Human activities are contributing to these changes, primarily through the release of billions of tons of carbon dioxide (CO₂) and other greenhouse gases

The Sahel: interactions of population, food security, and climate

The Sahel region bordering the Sahara Desert has the highest population growth rate in the world. In 1950, 31 million people inhabited the region. By 2050 there may be more than 300 million inhabitants and by 2100 more than 600 million.

Today, there are 12 to 18 million hungry people in the Sahel. Many factors contribute to food insecurity: poverty, weak infrastructure, widespread conflict, and the abysmal status of women. Despite a 1% increase in the region's overall crop yield in the last five years, the per capita crop yield *decreased* by 13% due to population growth (64).

The effects of global warming in the Sahel will be more rapid and adverse than other regions, due to its geographic location and dependence on rain-fed agriculture. Its soils are inherently fragile, and poor in plant nutrients. The Sahel's rapidly changing climate is straining already limited natural resources, and population growth will add more strain.

At the same time, there is an unmet desire for family planning among women in the Sahel, where early marriage is common. Unmet need for family planning ranges from 16% to 37% among countries in the Sahel (1).

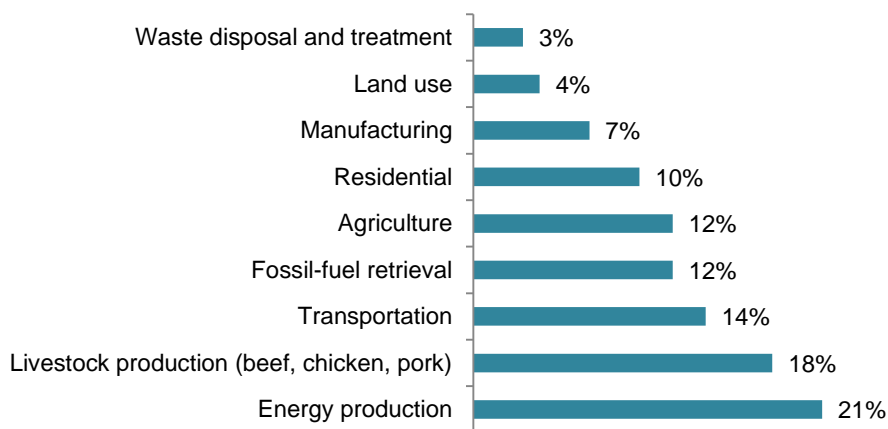
every year (9). The extensive use of fossil fuels for transportation, energy, agricultural production, waste disposal, and manufacturing is responsible for increasingly high rates of greenhouse gas emissions. Past and present-day greenhouse gas emissions will affect the global climate far into the future.

Challenges to improving food security and slowing climate change

To feed a larger, more urban and affluent population in 2050, the FAO estimates food production must increase by 50-70 % (2; 10). Annual cereal production will need to increase by 70% (from 3 billion to 5.1 billion tons) and in order to meet the growing demand for meat, production will need to rise by over 75% (to reach 470 million tons)—unless more people maintain or adopt a healthy vegetarian or vegan diet. Increases in agricultural production of this magnitude are not unprecedented, but they will be especially challenging in light of accelerating environmental degradation and climate change, and the fact that the most arable land is already in use.

Agriculture and livestock and poultry production currently account for 30 % of greenhouse gas emissions (See Figure 1). The largest sources of agricultural greenhouse gas emissions are carbon dioxide from tropical deforestation, methane from livestock and rice production, and nitrous oxide from nutrient additions to croplands (11; 12). Worldwide meat production alone emits more greenhouse gases than all forms of global transportation or industrial processes. This is one reason many environmentalists advocate moving toward a plant-based diet.

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



Source: 13.

Note: Total is greater than 100% due to rounding.

Based on current greenhouse gas emissions, global warming will continue and climate changes are likely to intensify. Average global temperatures are projected to increase by 2 to 11.5° Fahrenheit by 2100 (9), with some regions being more affected than others. The warming of the planet is driving changing precipitation patterns (14), increases in ocean temperatures, rising sea levels, higher ocean acidity, and melting glaciers and sea ice (9). A 10-meter (32.8 feet) rise in sea level could displace more than 600 million people (15). Increasing temperatures have already affected food production in many parts of the world (16). Research from Stanford University shows that small increases in mean temperature (<2° Fahrenheit) can cause a 2.5 to 16 % decline in crop yields (17; 18; 19). Researchers also project maize yields in Africa may decline by 22 to 35 % by 2030, due largely to increased variability in rainfall and local temperature changes (18; 19).

Overuse of rivers and underground aquifers for irrigation have caused severe and intensifying freshwater shortages. Today, over 1.7 billion people are threatened by groundwater depletion (20). By 2025, due largely to population growth (Figure 2), three out of four people worldwide will face some degree of water scarcity (21). Depletion of fossil aquifers threatens production of grain in the world's powerhouse 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 (22). Farmers who cannot afford to dig deeper wells have been faced with financial ruin, this is one reason about 250,000 have committed suicide in the last 16 years (23; 24).

Converting forests to cropland in response to increased demand for food is accelerating deforestation. Global forests have declined by 50 % in the last 10,000 years, and the loss is accelerating (25); 22 % of forests have been lost in the last 100 years (26). Half of tropical deforestation between 2000 and 2012 occurred in Brazil and Indonesia, in large part driven by cattle, soy, and oil palm production (27; 28; 29). Greenhouse gas emissions attributed to deforestation vary by region, up to 40% for tropical Asia (30; 31; 32) and 32% for tropical Africa (33).

Arable land degradation is shrinking the amount of cropland available. Drylands are home to two billion people, the majority of whom live in developing countries. Drylands degradation—including loss of topsoil—costs developing countries 4 to 8 % of their gross domestic product. Between 1981 and 2003, nearly one-quarter of all arable land worldwide became degraded. The land lost annually could produce 20 million tonnes of grain (34).

Overfishing has led to declines in global fish supply. More than 2.9 billion people rely on fish for protein, yet 80 % of global fisheries have been over-fished or fished to their biological limits (35).

Biodiversity loss has increased rapidly due to human impacts, such as habitat depletion, pollution, introduction of diseases and invasive species, and exploitation of commercially desirable species. Since 1800, the rate of extinction has increased exponentially; wildlife populations have been halved in the past 40 years (36). Biodiversity loss threatens human food supply; for example, the loss of half the world's mangroves and coral reefs has reduced the breeding grounds of many fish species that humans consume (37).

Ethiopia: interactions of population, food insecurity and climate

Ethiopia grew rapidly, from 40 million in 1984 to 82 million in 2010. Due to the large number of young people who have not yet started their families, Ethiopia's population is expected to double again by 2050.

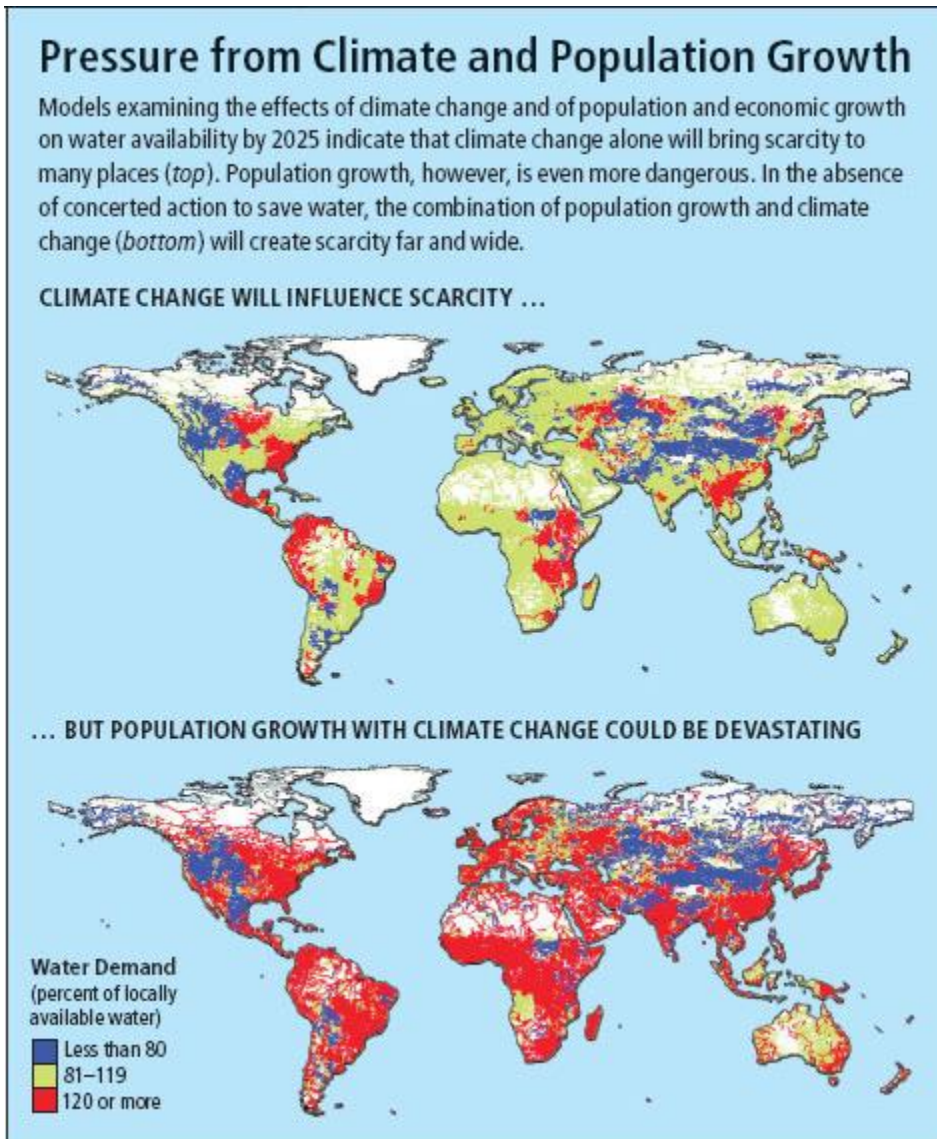
Persistent food insecurity is a challenge, particularly in rural Ethiopia. The poorest 60% of Ethiopia's rural residents have insufficient food for health and wellbeing. Overall calorie consumption of the country's poorest quintile is 1,672 kcal daily, while the wealthiest quintile consumes 2,367 kcal.

Climate change and environmental degradation are already affecting food production. Data show that the average temperature in Ethiopia has increased by 3-4° F since 1960. Annually, Ethiopia's farmers lose an estimated 1.5 billion tons of topsoil, and 82% of the country's land area has eroded soils. Most farmers experience the extremes of drought and flooding rainfall.

Researchers predict that the food gap in 2050 will increase due to the combined effects of high population growth and climate change.

Source: 63

Figure 2: Global freshwater scarcity with and without population growth by 2025



Credit: Global Water Resources: Vulnerability From Climate Change and Population Growth By Charles J. Vörösmarty et al., in *SCIENCE*, vol. 289; July 14, 2000 (*maps*) as seen in *Scientific American* August 2008.

Source: 38

Population projections

Each year, the planet adds about 83 million residents (UN). The United Nations medium-variant projection estimates that population will increase from 7.3 billion in 2015 to 9.7 billion people by 2050 and 11.2 billion by 2100 (40). However, these estimates assume that fertility rates in the least developed countries will decline as rapidly as they have in developing countries in the past. They also assume that the average woman in all countries will eventually have about two children. In fact, family sizes have not declined as much as the UN has predicted they would, and the UN has repeatedly increased their medium-variant projection of world population for 2050: from 9.1 billion (in 2008) to 9.3 billion (in 2010) to 9.6 billion (in 2012) to 9.7 billion (in 2015). The most recent UN analysis of world population growth estimates with an 80% probability that population size in

2100 will be between 10 and 12.5 billion, and will not reach the UN's highest estimate of 16.6 billion people by 2100 (41; Figure 3). If average birth and death rates remained the same as they are today, world population would reach 10.9 billion by 2050 and 26 billion by 2100.

The Democratic Republic of Congo (DRC) exemplifies the challenges to family planning in sub-Saharan Africa. Currently, the average woman in the DRC will have more than 6 children. The UN's medium-variant for the DRC assumes that the average woman will have fewer than 3 children by 2050, despite the fact that family size has changed very little for many years (42; 43). In 2012, only 6 % of women in the DRC were using a modern method of family planning, 25% had an unmet need for family planning and existing services were inadequate to meet their need. Simply meeting the existing unmet need in the DRC would help reduce the average family size. Moreover, increasing availability of family planning in countries with low contraceptive use, like in the DRC, tends to lead to even greater demand for these services, as ideas and norms about family planning are spread. Countries like DRC have great potential for decreased family size with better family planning programs, but this would require a substantially increased effort to build and expand voluntary family planning services nationwide—to meet the current large latent demand.

The fight for water is really the fight for life... It's tied to energy and climate and health and economics and politics and natural resources. In the end, it's really tied to everything.

Peter Gleick

Ninety countries have average family sizes that over time will result in stable or declining populations. But in countries where family sizes remain high, large increases in population are expected. The ten countries with the largest average family sizes are in sub-Saharan Africa (39), a region where unmet need for family planning is also high (1). Most countries with severe and protracted food insecurity have rapidly growing populations, threatening to make future food insecurity worse (Table 1).

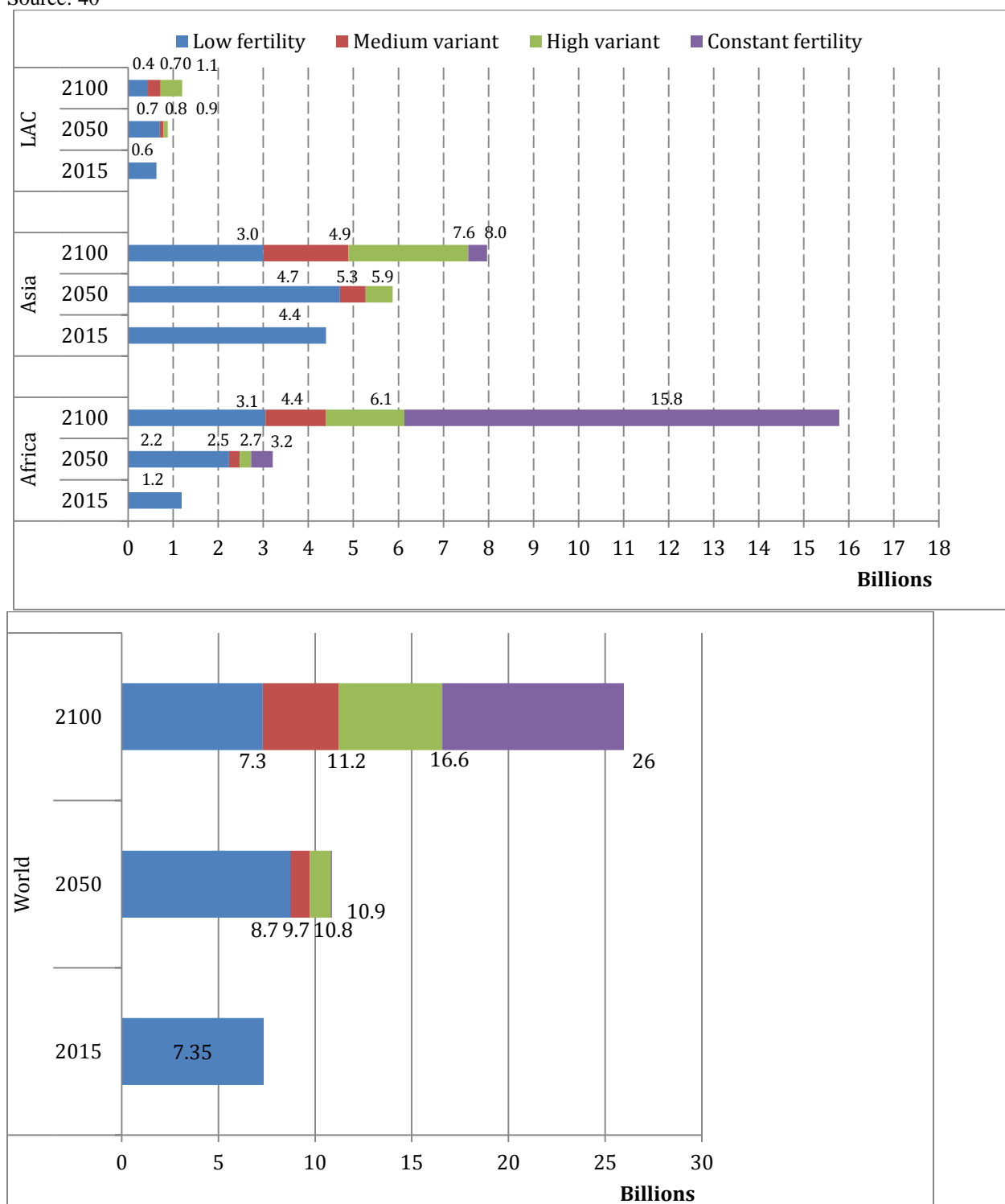
Table 1: Population growth in the ten largest countries with severe food insecurity, 2010 to 2050 (UN medium projections)

Country	Population 2010 (millions)	Population 2050 (millions)	Projected increase
Ethiopia	87.09	188.46	116%
DRC	62.19	195.28	214%
Sudan	35.65	80.28	125%
Kenya	40.91	95.51	133%
Uganda	33.99	101.87	199%
Iraq	30.96	83.65	170%
Afghanistan	28.40	55.96	95%
PR Korea	24.50	26.90	1%
Cote d'Ivoire	18.98	48.80	157%
Angola	19.55	65.47	234%

Sources: 40; 4

Figure 3: Low, Medium, High and Constant Variant Population Projections, by Region and World

Source: 40



Unintended pregnancy and unmet need for family planning

About 40% of pregnancies in developing countries are unwanted or mistimed, collectively referred to as unintended (45). About 25% of women in developing countries who are not using modern family planning want to stop childbearing or delay the birth of their next child (46). The gap between desire and ability to use family planning is partly due to lack of access to reproductive health and voluntary family planning services. The

personal choices made possible by these services have a significant benefit not only for individuals and families but also at the population level and influence nations' sizes and rates of growth.

In 2014, an estimated 225 million women in developing countries had an unmet need for family planning including many women who also suffer from chronic food insecurity (1). The number of women with unmet need will only increase further if access to family planning does not improve to keep pace with population growth and with growing demand for smaller families and safe birth spacing (46). The United Nations Population Fund (UNFPA) estimates that global demand for family planning will increase by 40% during the next 15 years (47).

The large personal, family, and societal benefits that come from empowering women to have smaller families include:

- More years of education for girls
- Delayed marriage and childbearing
- Improved health and survival for children under five years old (48)
- The “demographic dividend” (faster economic growth as the proportion of productive workers increases relative to dependents) (49).

If all women with unmet need used a modern contraceptive method, 52 million unintended pregnancies... would be averted *each year*.

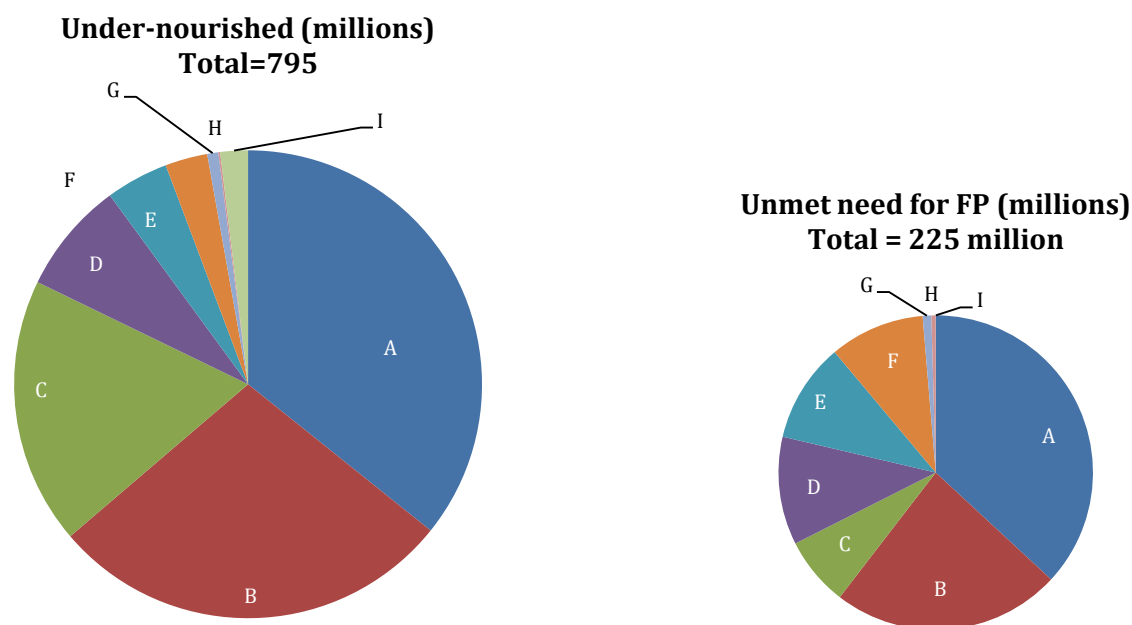
Singh, Darroch & Ashford

Until recently, foreign assistance funds specifically set aside for family planning were lower than the levels of 20 years ago. The funding decline reflected a shift in focus to other areas of reproductive health such as HIV/AIDS and safe childbirth services, which are also essential to families' health and wellbeing. However, family planning is also a highly cost-effective investment that contributes to reducing mother-to-child transmission of HIV (50; 51) and maternal, infant and child mortality (52) while simultaneously contributing to improvements in women's status and economic welfare.

Addressing food security, climate change, family planning, and women's reproductive health simultaneously

To slow climate change, improve food security and enhance the health and wellbeing of families in developing countries, national governments and development agencies should address all three issues simultaneously. These issues usually co-occur, increasing the potential efficiencies and benefits of simultaneous efforts. For example, the regions suffering most from under-nutrition also have the highest rates of unmet need for family planning (Figure 4).

Figure 4: Under-nutrition and unmet need for family planning, by region

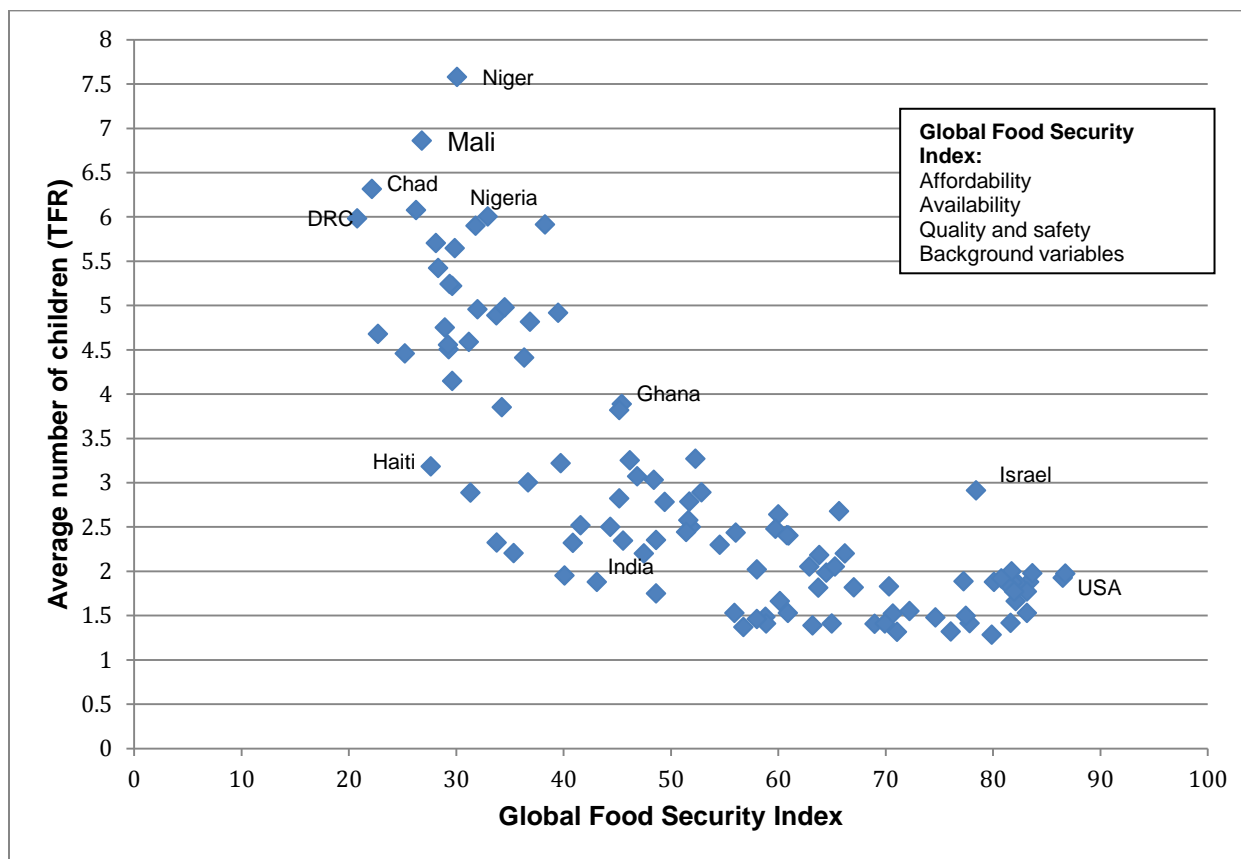


	<i>Region</i>	<i>Under-nourished (millions)</i>	<i>Unmet need for FP (millions)</i>
A	Southern Asia	281	83
B	Sub-Saharan Africa	220	53
C	Eastern Asia	145	16
D	South-Eastern Asia	61	25
E	Latin American & Caribbean (LAC)	34	23
F	Western Asia & North Africa	23	22
G	Caucasus & Central Asia	6	2
H	Oceania	1	1
I	Developed	15	Unknown
	Total	795	225

Sources: 4; 1

Large family sizes and inadequate access to family planning are more likely to occur in countries with low food security (Figure 5). This relationship is not necessarily causal; other factors affecting the relationship between family size and food security include income and education.

Figure 5: Average number of children and Food Security Index, by country



Source: 53; 40.

Because so far global greenhouse gas emissions per capita have not decreased, some climate experts have considered the importance of population size on climate change. 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 below 6 billion 37-41% of that needed by 2100, to avoid global warming of 2°C (3).

However, the relationship between family size, emissions, and economic growth, is complex: economic growth increases per capita consumption and, therefore, is likely to increase emissions, but it can also lead to smaller families, decreasing the *number* of consumers. Although climate change will adversely affect agriculture, with fewer people to feed, food security could improve in countries with the lowest incomes today (54).

Let’s stop debating either-or scenarios: either we focus on efforts on population growth or greenhouse gas emissions. The same holds true when deciding how to address the other vital issues facing humanity—poverty, education, housing, aging, health, food, water. The right approach is focusing on all of the above.

Joseph Chamie

Experience shows that family planning services can facilitate the transition to smaller family sizes *before* economic growth occurs by addressing unmet need in less developed countries.

Low-income countries contribute relatively few emissions per capita. Given this fact, many argue that focusing on improving access to family planning, reducing unintended pregnancy, and slowing population growth in

these countries will not significantly contribute to reducing climate change. However, low-income countries are actively and rightly aspiring to reduce poverty. Poverty reduction is one of the Millennium Development Goals; it will undoubtedly feature prominently in the new Sustainable Development Goals; and it is a moral imperative for a just world.

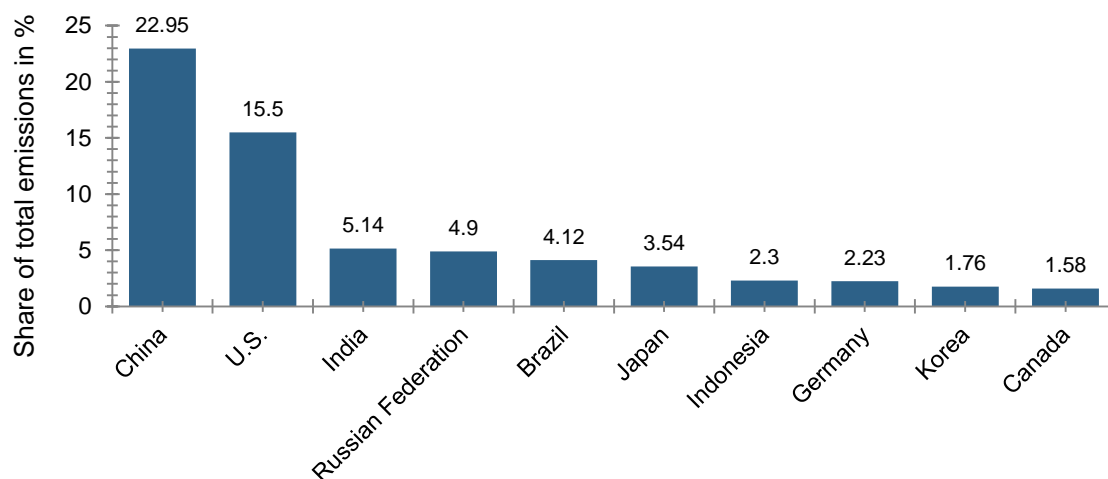
Even if the industrialization of developing countries is only partly successful, the environmental aftershock will dwarf the population explosion that preceded it.

EO Wilson

The Intergovernmental Panel on Climate Change considers population growth and economic development the two most important drivers of increasing carbon dioxide emissions. Clearly the developed nations of the world bear much of the responsibility for curbing greenhouse gas emissions, but as current low-income countries become more populous and more successful in reducing poverty, consumption, greenhouse gas emissions from these countries will increase as they have in India,

Brazil, Indonesia and especially in China—now the country emitting the largest amount of greenhouse gasses (Figure 6).

Figure 6: Largest emitters of carbon dioxide worldwide by country, 2013



Source: Germanwatch (55)

All countries need to embark on alternative greener paths to economic development, that reduce ecologically unsustainable exploitation of natural resources, overconsumption, waste and pollution. Family planning, as well as other interventions such as decarbonization (56) and improved energy efficiency, can facilitate such greener paths.

Costs of investing in family planning

A recent study suggests that improving access to family planning is a relatively inexpensive intervention for carbon emission abatement, compared to other options such solar, wind, and nuclear power; second-generation biofuels; and carbon capture and storage (57). Other studies suggest that family planning is cost-competitive with forest conservation and other improvements in forestry and agricultural practices. For every \$7 spent on family planning, carbon emissions would be reduced more than one tonne; the same emissions reduction from low-carbon energy production technologies would cost at least \$32 (58). Satisfying unmet need for family planning would prevent at least 34 gigatonnes of carbon emissions between 2010 and 2050 (58). Family planning is therefore a highly cost-effective component of climate adaptation strategies. The United Nations

Framework Convention on Climate Change (UNFCCC) recognizes family planning as a climate adaptation strategy, with family planning projects eligible for climate adaptation financing (58).

Current strategies for addressing food insecurity and climate change are focused on better use of existing technologies and investments in new technologies to increase the food supply, limit greenhouse gas emissions, and adapt to climate changes already in progress. Family planning is a catalytic, multi-beneficial intervention that is relatively inexpensive (Figure 7).

For nearly two decades, the amount of donor funding provided specifically for family planning services was in decline. However, since the 2012 launch of the Family Planning 2020 initiative, there have been welcome (but still insufficient) increases in funding. To provide high-quality family planning services to all women in need, the global community must increase its annual investment by \$5.3 billion, from \$4.1 billion to a total of \$9.4 billion annually (1).

Figure 7: Developing-country funding gaps in family planning, food security, and climate change

	Family Planning	Food Security	Climate Change
Funding needed	\$9.4 billion annual investment in family planning	\$209 billion annual gross investment in food production	Up to \$1.5 trillion annual investment in climate change mitigation & adaptation
Current funding	\$4.1 billion annual investment in FP by the global community	\$142 billion annual investment in agriculture over the past decade by developing countries	\$100 billion annual investment from developed countries for developing countries
Gap in funding	\$5.3 billion annual investment still needed (~100% increase)	\$67 billion annual investment still needed (~50% increase)	\$500 billion + annual investment still needed (500% increase)

Sources: 1; 2; 59

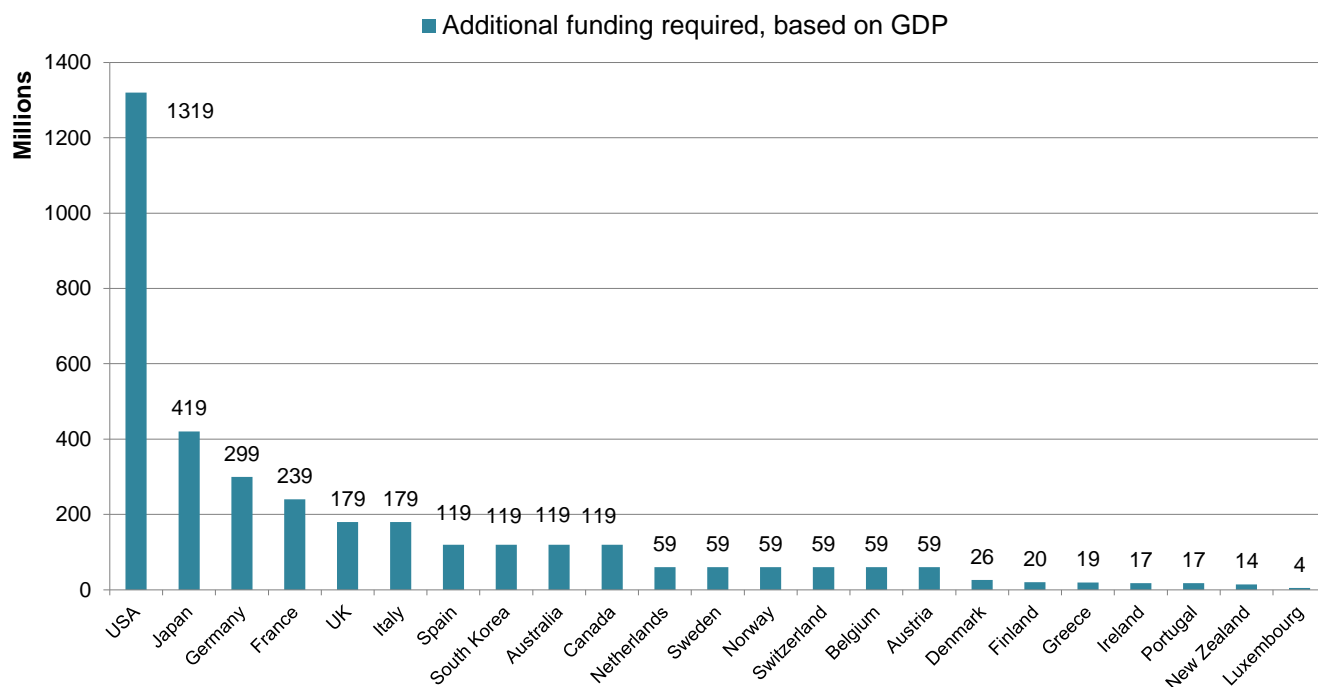
Recommendations

Increase funding for population and family planning to recommended levels. The total cost to satisfy unmet need for contraception in the developing world is \$9.4 billion per year, or an increase of \$5.3 billion annually from current levels (1). This is a small increase relative to the net official development assistance (ODA) of \$134.8 billion provided by donors in 2013 (<http://www.oecd.org/dac/stats/>). Family planning is cheaper, and more cost effective, than most other investments that address food security or climate change. The increase in funding needed to meet family planning goals is just 8% of the amount needed to sufficiently increase food production by 2050. The Family Planning 2020 initiative has contributed to recent government and philanthropic commitments to increase family planning funding. This new effort is an important step forward, but well short of the estimated \$5.3 billion needed.

The countries with the most prevalent food insecurity and the highest unmet need for family planning are the least developed and are unlikely to meet their citizens' family planning needs without substantial external assistance. Considering the poverty of the countries where access to family planning is the least available, we propose that foreign aid donors pay a larger share than one-third of funds originally agreed upon at the Cairo

conference in 1994. The needed increased investment of \$5.3 billion could be reached with an additional annual expenditure of \$1.8 billion from developing countries (or one-third the needed increase) and \$3.5 billion from foreign aid donors (or two-thirds the needed increase). The additional funding required from each developed country donor to eliminate global unmet need would be modest if contributions were made in proportion to their gross domestic product (Figure 8).

Figure 8: Working together, donor countries can provide two-thirds of the funds needed to satisfy the global unmet need for family planning with modestly increased investments



Source: The World Bank 2013 (10); Guttmacher Institute (1)

Integration of family planning with sexual and reproductive health services. Many countries and international donors recognize the benefits and efficiencies of integrated family planning and reproductive health programs. The Guttmacher Institute and UNFPA estimate that the total cost of simultaneously meeting the need for modern family planning and maternal and newborn health services in 2014 would be \$39.2 billion, more than double current expenditures (1).

Impact: Investing an additional \$5.3 billion annually to satisfy the existing demand for contraception would prevent an additional 52 million unintended pregnancies and 21 million unintended births in developing countries (1). Worldwide replacement level fertility (2.1 children per woman) by 2050 would reduce demand for crops in 2050 by roughly 600 trillion kcal per year—enough to close about 9 % of the 6,500 trillion kcal per year gap between crops available in 2006 and those needed in 2050 (60).

Limiting the number of children will help us to cope with the change in climate...

Woman with 3 children, age 25, rural Ethiopia

Collaborate across sectors to advocate for a sustainable planet and healthy population.

Climate, food security, and family planning advocates share a common cause: sustainability, health, and human rights for all. Active collaboration could help produce effective action with cross-cutting improvements for

environmental sustainability, food security, family planning, and the slowing of population growth. Both lay people and development program implementers in the field understand the linkages between these sectors. For example, in interviews about the challenges Ethiopians face in adapting to climate change, participants said that family size contributes to observed environmental changes. Participants reported that the households with fewer children were better positioned to deal with current environmental challenges (61). Interviewees also identified access to family planning as a strategy that would increase their resiliency to current and future climate changes. There is a wide range in the projected number of future inhabitants of Earth, from 7 to more than 16 billion by 2100 (40). This number is highly dependent on how successful we are at enabling women to meet their desired family size through access to high quality, fully voluntary family planning services. Especially for communities likely to be hit hard by climate change, family planning is one of the factors that should be addressed by mitigation and adaptation strategies (61).

In the field, some programs are already integrating family planning, reproductive health, food security, and climate adaptation strategies for a more holistic approach. A review of National Adaptation Programs of Action (NAPA) submitted to the UN Framework Convention on Climate Change found that almost all of the least developed countries who submitted a NAPA recognized linkages between large family sizes and climate change. Six programs of action stated that investments in family planning should be considered among the country's priority adaptation actions (62). Large food aid programs, like Feed the Future, and climate adaptation tools, like CARE's *Climate Vulnerability and Capacity Analysis Handbook*, could integrate social sector adaptation strategies like family planning and reproductive health, in response to requests from those experiencing these challenges daily on the ground.

Impact: Integrated strategies could enhance the effectiveness of food and climate programs, particularly given that family planning programs are a very cost-effective intervention that contribute to environmental and food sustainability.

Strengthen the evidence base for integrated programs addressing food security, climate, and family planning.

Although some programs are integrating family planning, food security, and climate adaptation, there have been few rigorous evaluations. Better scientific evidence is needed to build appropriate policies and set priorities. In addition, there is a need to conduct modeling that will quantify the relationships between food security, climate change, and family planning.

Impact: A strengthened evidence base for integrated programs would lay the foundation for robust policy and program changes within both developing countries and international institutions, and help to convince developed country donors and individual foundations to fund programs that span these three sectors.

Ensure inclusion of family planning in a post-2015 vision. Despite the strong evidence that family planning access reduces maternal and infant deaths and strengthens economic growth, family planning was incorporated in the Millennium Development Goals only after a prolonged battle. The new Sustainable Development Goals should include family planning and recognize that it is a basic human right, and that it contributes to the success of other sustainability goals. A shared vision, measures, and benchmarks for family planning and reproductive health in the post-2015 era are needed.

Impact: A shared vision, measures, and benchmarks for family planning and reproductive health in the post-2015 era will lead to greater political and financial support for family planning service delivery on the ground.

Conclusions

Increasingly the world community is recognizing that food security and climate change are among the most important and urgent issues of the 21st century. It is time for political leaders, policy makers, scientists,

advocates, and development program funders and managers in both donor and developing countries to recognize that their goals can be more easily met if voluntary family planning in developing countries is strengthened. Family planning and reproductive health remains underfunded. The substantial and growing political and policy clout of food and climate leaders and scientists needs to be used to influence international organizations, donor and developing country governments, charitable foundations, the media, and other appropriate elements of civil society to ensure that more policy and financial support for family planning is forthcoming. In particular, the new Sustainable Development Goals should include family planning and reproductive health.

Sustainable development requires a balance between meeting the needs of the present without compromising the ability of future generations to meet their own needs. Increasing access to voluntary family planning will help women and men avoid unplanned and unwanted births, and achieve their family size goals. Voluntary family planning also contributes to better health and women's rights; it fosters the economic potential of individuals, families, and nations; and it helps reduce food insecurity and moderate the speed and effects of climate change. Investment in international family planning alone will not solve the problems of food insecurity and climate change—two of the most important challenges of our times—but it can make an important and substantial contribution to their solutions at a lower cost than most other strategies.

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