

Youth Earth Plan

Version 0.5



A mutually enhancing relationship
between humans and Earth.

Conference for Release of the Youth Earth Plan (YEP)

18 August 2008, Arlington, VA 22201

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Civil: Kristin Goss, League of Women Voters, professor of political science, Duke
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and Development
Organization of Islamic Conference
Sustainability Institute
The Great Work
The Millennium Project Report
The Natural Step
Transparency International
UN Convention on the Elimination of all
UN Forms of Discrimination Against
Women
UN Convention on the Rights of the
Child
UN Declaration of Commitment on
HIV/AIDS
UN Global Compact: The Nine
Principles,
UN Millennium Declaration
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Universal Declaration of Human Rights
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World Bank Comprehensive
Development Framework
World Bank World Development Report:
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Foreword

The Youth Earth Plan (YEP) has been two years in the making. Forty thoughtful young adults (aged about 15 to 25) from fifteen countries have contributed to the effort (see www.OurTask.org/about-ourtask.asp), and dozens of mentors and financial contributors have supported the work (see <http://www.OurTask.org/acknowledge.asp>).

The YEP is not finished. In the current version 0.5 we have for the first time a relatively complete and coherent draft. We are seeking comments and suggestions for its improvement, and created a special part of our blog (<http://blog.ourtask.org/2008/08/yep-comments.html>) for suggestions. All suggestions and comments will be available at the blog site as of 12:00 noon EDT on Monday 18 August 2008, as will be discussion of the YEP. We plan to produce a second version by the end of the year.

We are holding a conference on 18 August 2008 in Arlington, Virginia, USA to release version 0.5. We would like to thank the following persons for speaking at the conference and providing insightful comments on the YEP:

Government: Hon. Walter Tejada, Chair, Arlington, County Board
International: Jim Adams, Vice President, East Asia, World Bank
Corporate: To be announced
Spiritual: T.C. Morrow, Associate Director of the Churches' Center for Theology and Public Policy, and Program Associate, Greater Washington Interfaith Power and Light (GWIPL)
Education: Michelle McKay, Vice President, Second Nature: Education for Sustainability
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Media: Alan Heil, Formerly Deputy Director and Program Director, Voice of America
Civil: Kristin Goss, League of Women Voters, professor of political science, Duke University

Our next step with the YEP is dialog with increasing numbers of young adults from more countries and with representatives of governmental, international, corporate, spiritual, educational, scientific, media, and civil institutions. To follow and suggest events, see <http://ourtask.org/events.asp>.

Emerging young leaders everywhere face a unique challenge and opportunity. They— together with all of us alive on the planet today—have the opportunity to lead us all into a mutually enhanced relationship between humans and Earth. Let's all rise to the occasion!

Gerald O. Barney
Chair, Our Task

Executive Summary

We, the youth of today, will soon inherit this planet Earth from our parents and grandparents. We know the Earth we hope to inherit, and have fears about the Earth we seem destined to inherit.¹

To understand the challenges that await us, Our Task (OT) * has spent two years collecting and analyzing some of the most respected and globally-focused future studies and outlook reports for the world's social, economic, resource, and ecological systems. These studies were published by United Nations (UN) agencies, the World Bank (WB), and other respected organizations.²

These studies present a sobering picture of our inheritance. If policies and trends do not change, the world, by the middle of the 21st century, will have over 2 billion more people, with a growing proportion of them living in slum settlements. While poverty is projected to decrease somewhat (assuming rapid economic growth), the resulting demand for energy, food, and other commodities would lead to a peak (and decline) in world oil production, damaging erosion and other land degradation, commercial extinction of most wild fisheries, large increases in the areas of water stress, and large losses of tropical forests. The present trends puts us on a course for global climate disruption, with hundreds of millions of people displaced from flooded coastal areas, threatened by more frequent droughts and floods, and affected by reduced water for drinking and irrigation. Continued emissions of carbon dioxide will hasten the acidification of the oceans, leading to the loss of coral reefs and thousands of other species by 2100. The number of diseases and the ease with which they spread is also expected to increase. Overall, the conditions will be conducive to large-scale economic disruption, continued inequities, and increased violence. The prospects become even more troubling when the studies' many unrealistically optimistic assumptions and self-contradictions are taken into account.

The issues of poverty, climate, energy, food, and security are all interlinked in ways that are not adequately addressed by the separate and individual outlook studies. In reality, the current course of our development is the increase in problems in all areas simultaneously. The neglected feedbacks among the problems caused by traditional economic growth are exacerbating food, energy, extinction, problems, climactic disaster, and violence. Human demands on Earth already exceed what Earth can continue to provide, and attempting to address poverty and inequity through traditional economic growth will increase human demands on Earth still further. Already, environmental consequences of growth have brought hardship, suffering, destitution, and even death to millions of people, especially children and women, around the world. Put simply, poverty and injustice must be addressed, but they cannot be successfully addressed by attempting to “grow” the poor to the levels of waste and overconsumption of the rich. Other means must be found to address poverty and injustice.

* Our Task is an international network of young adults aged about 15 to 25. OT has members in 15 countries. For further information, see www.OurTask.org.

We know what we need to do. We need to drastically reduce poverty and inequalities globally while simultaneously minimizing our demands on the planet (including on the climatic system), stabilizing our population, and ensuring human rights and security without violence. And we know we need to act with the speed demanded of the global crisis we all face together.

Our fundamental problem is that we are not acting in spite of knowing what we must do. Our culture is not demanding that we act on these planet-level problems quickly and effectively. Our culture has not even sounded an adequate alarm. Our largest, most respected institutions—our international, governmental, spiritual, corporate, educational, scientific, media, and civil institutions—have not even provided an adequate criticism of what we are doing or offered an effective action plan.[†] Instead, these institutions are simply allowing us all to drift along toward ecological disaster and social disorder of planetary proportions. We face a cultural disorder.

The root cause of our situation seems to lie in our cultural values and assumptions and in the aspirations and actions they inspire. Currently much of our global culture sees Earth as a limitless resource for human exploitation, rather than as a system and community of life for which we humans have responsibility to maintain and preserve. Following this exploitation paradigm, we measure progress in terms of Gross Domestic Product (GDP). While our population growth increases the number of people needing resources, many costs, such as the depletion of a country's natural capital, are written off as "externalities" and left off the national accounts. With this system, we deplete the very resources on which we rely. Under the influence of this exploitation paradigm, we seem to think growth takes priority over sustainable living. Successful change, we believe, must start with a reconsideration of these and related cultural systems and assumptions.

So, Our Task is not making recommendations aimed directly at poverty, climate, energy, food, or security. Instead, Our Task is focusing on how our paradigm of planetary exploitation is supported and sustained by our international, governmental, spiritual, corporate, educational, scientific, media, and civil culture-shaping institutions. We are addressing requests for change to each of our culture-shaping institutions. Through these institutional changes we hope it will be possible to redirect our entire global cultural system away from unsustainable exploitation of Earth and toward a sustainable future.

While we our hope that institutions will act on our suggestions, we recognize that our recommendations are not complete and need input from people more experienced with the individual institutions of the global culture system. We do believe, however, that changes in the values and assumptions of our current global cultural establishments are necessary and urgently needed

[†] The recent *Growth Report* by the prestigious Commission on Growth and Development illustrates this point. Parts 1, 2, and 3 of the Growth Report celebrate and promote traditional economic growth, while part 4 euphemistically describes adverse consequences of growth (including rising food and fuel prices, global warming, inequality, protectionism, global impacts China, India and other rapidly growing economies, and implications of everyone attempting "export led growth") as "New Global Trends". See: http://www.growthcommission.org/index.php?option=com_content&task=view&id=96&Itemid=169.

Our desire is to begin an intergenerational dialog on how together we can reorganize human affairs to achieve and maintain a mutually enhancing relationship between humans and Earth. Our generation deserves a voice in decisions being made concerning our future. This is our primary request to our parents' and grandparents' generations.

Introduction

We, the youth of today, will soon inherit this planet Earth from our parents and grandparents. Will this inheritance be smooth, or problematic?

As we young people look about in anticipation of our inheritance, we see a very mixed prospect. In some places we see peace, prosperity, cooperation, and plenty. But in many parts of the world, we see we see brutally violent conflicts, widespread poverty, hunger, disease, population growth, high costs of energy, food, and other commodities, unsustainable environmental deterioration, and extremely destructive global climate disruption.[‡] We are afraid we face a seriously problematic inheritance.

In an attempt to understand the challenges that await us, Our Task (OT) has collected and analyzed some of the most respected and globally-focused future studies and outlook reports for the world's social, economic, resource, and ecological systems. This report is our synthesis of studies, outlooks, and projections published by United Nations agencies, the World Bank (WB), and other organizations.³ Most of these studies make projections to 2030 (with a few projecting to 2015, 2050, or 2100).

We first prepared summaries of each of the eighteen outlooks for the major social, economic, resources, environmental, and security topics.⁴ In our summaries we report what, in our opinion, are the most important findings of each study for the future of young people. Our intent is to make this rich and important collection of materials more accessible to concerned young adults, and others, everywhere.

A major goal of our effort is to encourage us all to “think globally”, that is, to think about our planet Earth. As a small step in this direction, we capitalize “Earth” (as other planets’ names are capitalized) when we write about our planet. When we write about the ground, we write “earth” with a lower case “e”.

This report provides our synthesis and analysis of the international outlook studies. The next section presents our distillation of the international outlook studies. This is followed by our assessments of the assumptions and models used in the studies. Finally, based on our reading and analysis, we present Our Inheritance, our own assessment of the Earth we are likely to inherit.

The International Outlook Studies

The international outlook reports that are summarized below provide future outlooks for our global social, economic, resource environmental, and security trends.

[‡] A note on terminology: We use the term “climate disruption” to describe the human-induced alteration of global climate that has been in progress since the beginning of the industrial revolution and has accelerated greatly in the last two decades. The term “climate disruption” is being used increasingly in the professional literature, and we feel it describes more accurately what is happening than does the term “climate change”. The term “global warming” seems to us very inadequate to describe the seriousness of what we humans are doing.

Social Outlook

The social outlook is based on population projections made by the UN Population Division, education projections provided by the UN Educational, Scientific, and Cultural Organization (UNESCO), and health projections provided by the World Health Organization (WHO). Supplemental information is drawn from reports by the United Nations Children's Fund (UNICEF) and several academic studies.

Population⁵

Between 2007 and 2050, our human population is projected to grow by 2.5 billion to 9.2 billion. This increase of 2.5 billion people is equivalent to the total population in 1950⁶ (see Figure 1). Generally, fertility rates are expected to continue to decline slowly nearly everywhere, but to remain above replacement levels[§] in many parts of the world.

Mortality rates, however, have declined more rapidly. As a result, population continues to grow, albeit at a slower rate than in recent decades. With the exception of the United States, the wealthiest countries are projected to have declining populations. Most of the population growth is projected to occur in what are already the most populous and least developed regions. By 2050, the populations of the 50 least developed countries are expected to double, and almost 80 percent of our global population will be concentrated in Asia (59 percent) and Africa (20 percent). China (15 percent), India (18 percent), and sub-Saharan Africa (19 percent) combined will have over half of the world's population.

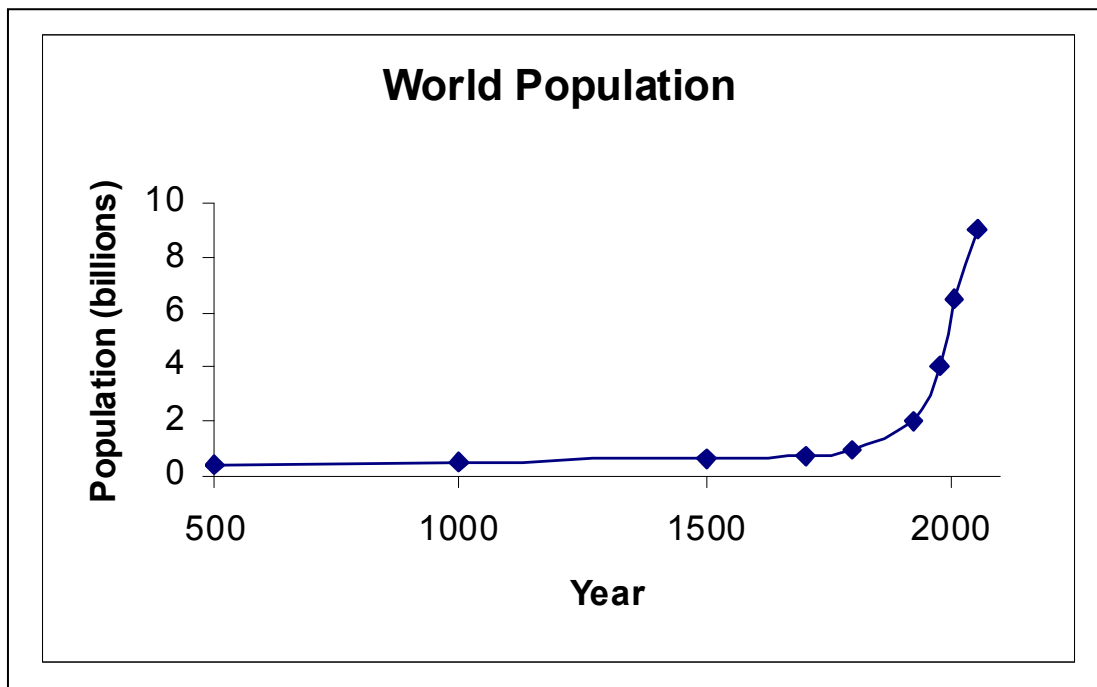


Figure 1: Growth in Human Population, Historic 500-2000 and Projected 2000-2050.
Source: UN Population Division. *World Population Prospects: The 2006 Revision and Millennium Ecosystem Assessment.*

[§] A total fertility rate of 2.1 children per fertile woman.

Urbanization⁷

Ninety-five to one hundred percent of the projected population growth is likely to occur in the urban areas of developing countries. In 2030, 4.9 billion people (60 percent of our total population) are expected to live in urban areas. There will be 22 megacities, defined as urban areas with populations of 10 million or more each. The fastest urban growth in the 21st century is expected to occur in small cities of less than one million, spurred by continuing migration from the countryside. Unplanned, dense settlements in and around these expanding cities will be home to most of Earth's poorest people. If current trends continue, destitute shantytowns may come to characterize cities in many parts of the developing world where urbanization has become virtually synonymous with slum formation. Acceptable housing, food, water, sanitation, employment, education, health services, security, and justice will be largely nonexistent in these slums.

Education⁸

Education experts estimate 72 million primary age children were out of school worldwide in 2003. Over 20 percent of children still do not reach grade five, and about 50 percent of children do not attend secondary school. In 2005, on average worldwide, 94 girls started grade one for every 100 boys. Children from poor, indigenous, and disabled populations are expected to continue to be at an educational disadvantage.

While many developing countries have significantly improved their education programs over the past decade, literacy rates and other educational indicators are still below the levels needed for countries to compete globally, or even for their children to rise out of poverty. For example, 20 percent adult illiteracy rates (25 percent for women) plague the world and keep a large portion of our population on the fringes of society. Over a hundred countries have still not achieved universal literacy and of these, about seventy will not have achieved it by 2015.

For the future, rapid urbanization, growing populations, HIV/AIDS and other epidemics, inadequate educational budgets, and violence and socio-political instability are expected to complicate educational efforts. Schools, even when accessible to disadvantaged communities, often lack teachers and adequate facilities or are simply unaffordable. For example, by 2015 more than 18 million new teachers will be needed, with 3.7 million needed in sub-Saharan Africa alone. In many African countries, many teachers contract HIV/AIDS and are unable to teach more than a few years. In Zambia, for example, three quarters of newly trained teachers are needed just to replace teachers who have died of AIDS. Furthermore, a significant number of well-trained teachers, as well as other educated professionals, in many developing countries migrate to other (usually wealthier) countries that offer better opportunities.

In short, under current trends the key educational goal of ensuring that all boys and girls complete a full course of primary schooling will not be met by 2015.⁹ Failure to meet these goals will adversely impact the future for young people everywhere, but especially in the countries where boys and girls are unable to obtain primary schooling.

Health¹⁰

The future prospects for health are expected to be shaped by a number of major global trends and developments. Assuming continued domestic and international funding and transfer of technology, improvements in health care are expected, although at a slower pace.

People are expected to live longer in places where progress in sanitation and public health is reducing deaths from diarrhea, malaria, and other preventable and treatable diseases. As a result of the longer life expectancies, an increasing proportion of the population will be elderly. Cancer, heart disease, depression, obesity, diabetes, and traffic accidents are expected to become the leading causes of death.

People in low-income countries are expected to continue losing many healthy years from their life expectancy, about 20 times as many years as those in high-income countries. These lost years are due primarily to unsafe water, poor sanitation, inadequate hygiene, and indoor air pollution (mostly from cooking on open fires).

Rural-urban migration to inappropriately dense settlements around megacities creates the conditions for outbreaks of many communicable diseases. Safe drinking water is simply not available or is very expensive in these slum areas, and many people cannot afford even basic health care.

Extensive international travel and trans-border shipments of livestock will increase the risk of pandemics. Death tolls from AIDS and Tuberculosis (TB) are projected to continue to rise, killing working-age cohorts and leaving many young orphans. New diseases and new health challenges are projected to arise due to climate disruption, antibiotic resistance, and the increased presence of toxic substances in the environment.

The supply of health care professionals and the availability of health care infrastructure are not expected to keep pace with population growth in developing countries and with migration to urban areas.

Economic Outlook¹¹

The economic outlook is based on projections by the World Bank.

The projections assume: that through 2030 developing countries' GDP grows at 3.1 percent per year and GDP in developed countries grows at 1.9 percent per year; that technological advances will overcome any energy or other natural resource constraints; that there will be no significant economic consequences of climate disruption; and that opposition to trade liberalization will not increase.

Output of the global economy is projected to more than double from \$35 trillion in 2005 to \$72 trillion in 2030, an average annual increase of 3 percent. Industrializing countries are projected to grow more rapidly than industrialized countries. China, with 15 percent of the world population, is expected to become the world's largest consumer market and

exporter. Industrializing countries, especially China and India, will produce a third of global economic output with half of the world's purchasing power.

The average per capita income in industrializing countries is projected to jump from \$4,800 today to \$11,000 in 2030—an increase of 130 percent. Increases of 16 percent to 22 percent in per capita incomes for low- and middle-income countries, respectively, are expected. The number of people subsisting on less than \$2 per day in 2030 is expected to be fewer than today.

Despite economic growth in developing regions, average per capita incomes in most of the world will be less than one quarter of those in high income countries. The wealthy are projected to remain significantly wealthier than the poor, and likely price increases could nullify the effects of increased income for the poor. Furthermore, inequalities *within* countries are estimated to increase in 80 percent of the industrializing world (not including China), undermining the poverty-reducing effects of growth and fanning social tensions that could derail growth. In short, a great global wealth disparity exists between and within many countries, and is likely to remain.

Global employment is projected to increase until 2015 and then decrease until 2030 as the global population ages. Consequently, the composition of the global economy is expected to shift from expenditures to meet the needs of youth to expenditures on the care of the elderly.

The authors of the economic projections acknowledge both downside and upside risks to their projections, with the downside risks predominating under current policies and practices. Some of the downside risks include: peak oil production leading to high energy costs that could contribute to slower poverty reduction; recession due to the housing market crisis in a few high-income countries; and the deterioration of the U.S. assets position due to its increasing debt.

Resource Outlook

The future outlook for energy, food (grains, meat, and fish), land, and water resources are reviewed in this section. The energy outlook is based on projections by the International Energy Agency (IEA), the food outlook on projections by the UN Food and Agriculture Organization (UNFAO), the land outlook on reports from the UN Environment Programme (UNEP), and the water outlook on research by the UNEP, UNFAO, and the UN Educational, Scientific, and Cultural Organization (UNESCO).

Energy¹²

The energy projections assume:

- global economic growth of 4 percent in 2004-2015 falling to 2.9 percent in 2015-2030;
- global population growth of 1 percent per year on average, from 6.4 billion in 2004 to 8.1 billion in 2030;
- energy efficiency and production technology increase steadily;
- crude oil import price of \$60 per barrel in 2005, declining to \$55 in 2030;

- biofuels compete with food for arable land; and
- total proven oil reserves (2005) of 1,293 billion barrels, total economically recoverable resource of 800 billion barrels, total unconventional petroleum resources of 1 trillion barrels, proven gas reserves (2005) of 180 trillion cubic meters, ultimately recoverable total of 314 trillion cubic meters, and proven coal reserves (2005) of 909 billion tons.

In the reference scenario, global primary energy demand is projected to increase by more than 50 percent by 2030, with an average annual growth rate of 1.6 percent (see Figure 2). Developing countries (especially China and India) account for over 70 percent of this increase due to high population and economic growth rates relative to the more industrialized countries. About half of the increase goes to generating electricity and a fifth to meeting transportation needs in developing countries, which are met almost entirely with fossil fuels. In fact, fossil fuel demand is projected to increase significantly and account for 83 percent of the overall increase in energy demand between 2004 and 2030. World oil demand, 84 million barrels per day (mb/day) in 2005, is projected to reach 116 mb/day in 2030. Coal is expected to be the fastest growing energy source over the period and natural gas demand is expected to grow despite increasing prices.

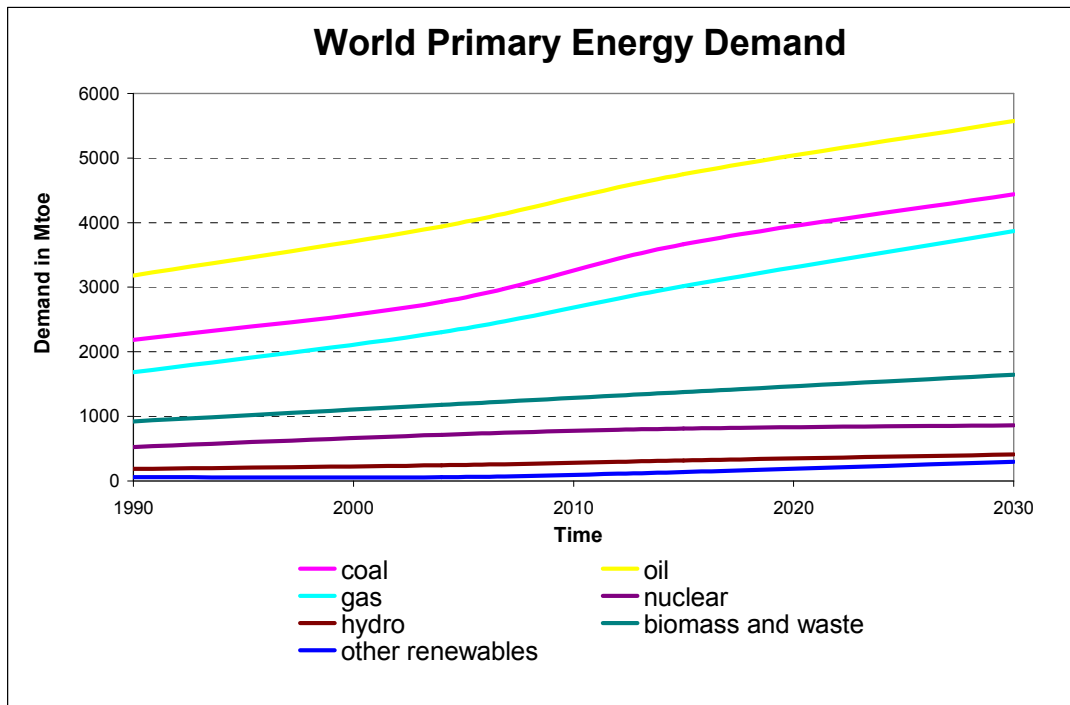


Figure 2: Energy Demand Outlook to 2030. Source: *World Energy Outlook, International Energy Agency*

Increasing energy demand and geopolitical insecurity are expected to keep supply tight and volatile, thereby sustaining fossil fuel prices, which are assumed to rise to \$55 in

2030.** Energy demand becomes increasingly insensitive to energy price, increasing the vulnerability of importing countries to supply disruption and price shocks.

Other sources of concern include the current shortage of skilled and trained energy-industry personnel, the higher than expected decline of production rate in developed oil fields, regulatory delays, and cost inflation. Global oil production is expected to peak sometime in the period 2011 to 2035.

To satisfy growing global energy demand, investments on the order of \$20 trillion (2005 US\$) are needed over the 2005-2030 period. China alone needs to invest about \$3.7 trillion (18 percent of the world total). Organisation for Economic Cooperation and Development (OECD) countries are seeking investments aimed at maintaining current energy production levels in the face of increasing depletion and rapid rates of decline. There is uncertainty on whether and when the needed investments will be forthcoming.

From 2004, carbon dioxide (CO₂) emissions are projected to grow at 1.7 percent annually reaching 40 gigatonnes (Gt) in 2030, a 55 percent increase.

Food¹³

The projections assume:

- a global population range of 7.7 to 8.9 billion by 2030;
- relatively high growth in GDP, ^{††} dramatic poverty alleviation, and additional food demand;
- technological changes (e.g., genetically modified organisms) to increase food production (e.g., triple wheat production) and reduced energy inputs;
- fertilizer consumption increases by 1.0 percent per year;
- several assumptions concerning energy inputs (especially petroleum and wood) to agriculture;
- total irrigated area increases by 20 percent (little detail on water price or availability);
- no disrupting impacts from climate disruption, energy prices, air pollution, land availability or quality, water price or availability, or loss of biological diversity.

Important issues related to the agriculture projections include food costs, undernourishment, protein deficiency, caloric consumption, cost of food, farm income, resource requirements of agriculture (land, water, energy, etc.), pollution from agriculture, and competition between production of food and biofuel.

Presently, world per capita average daily caloric consumption is around 2,800 kilocalories, up from 2,360 kilocalories (kcal) per person in the mid-1960s. In spite of the increases in average caloric intake, some 570 million individuals still subsist on less than 2,200 kcal per day. This global number of undernourished^{‡‡} people is roughly

** These projected future prices are significantly lower than market prices in mid-2008.

†† Average per capita GDP is projected to grow at 1.9 % from 2000 to 2015; no projection reported beyond 2015.

‡‡ Defined as consuming on average less than 2,200 kilocalories (kcal) per day.

equivalent to half the current population of China or India or twice the population of the United States. Put simply, while the real price of food declined, those most in need of more food still cannot afford it.

By 2030, growth in food demand is projected to abate (due largely to the assumed slowdown in global population growth), but there will continue to be significant regional differences. South Asia is projected to achieve strong improvements in food security, but overall progress in sub-Saharan Africa will be constrained by population growth.

By 2030, world average per capita food consumption is projected to reach 3,000 kcal per day. These averages largely reflect the growing consumption in the developing countries. The largest increases will come in developing countries, including populous countries (China, India, Pakistan, Indonesia, Brazil, Mexico, and Iran) and a few countries (Gambia, Nigeria, El Salvador, Mali, Benin, Mauritania, Chad, Burkina Faso, and Ghana) that have increased their food consumption despite economically or socially challenging circumstances. Nonetheless, there are still expected to be several countries in which undernourishment continues to be common.

Increased caloric consumption is largely due to the shift in diets towards more caloric-rich foods such as vegetable oils and livestock products and away from staples such as roots and tubers. Oilcrops, which produce edible oils, now account for nearly 10 percent of the global average caloric content. Due to their high caloric content, edible oils (e.g., palm oil), soybeans, groundnuts, and other oilcrops have increased food security in many developing countries. Growth in the consumption of oilcrops is expected to continue.

While cereals now provide 65 percent of all calories consumed and continue to be the world's most important source of caloric intake, global diets and food consumption patterns have shifted to include more livestock products. Average consumption of meat products reached around 36 kilograms per person per year globally in 1997/99 and 26 kilograms per person per year in developing countries in the same period. While this dietary shift helps reduce protein deficiency, it increases pressure on farmland soils because producing a calorie of meat requires about 7 calories of grain.

World crop production is projected to increase 55 percent over the 2000-2030 period, less than the 126 percent increase for 1970-2000. The main sources of growth are projected to be yield increases and increased cropping intensities (i.e., increasing multiple cropping and shorter fallow periods which together account for about 80 percent of growth), and expansion of arable land under production (accounting for the other 20 percent).

Irrigated area in developing countries is projected to expand by 40 million hectares (20 percent) over the 2000-2030 period, considerably less than the 100 million hectare increase that occurred during the 1970-2000 period. For the 93 developing countries addressed in the FAO projections, the use of water for irrigation is expected to grow by 14 percent, much lower than the expected 33 percent increase in harvested irrigated area. The difference is expected to be covered by improvements in irrigation technologies and better irrigation management practices.

Environmental impacts of agriculture are expected to persist or increase locally and globally. Continuing issues include greenhouse gas emissions, burning of biomass for fertilizer, water pollution, clearing of natural habitats, cultivation of sloped lands, draining of wetlands, and overall land degradation. In addition, environmental impacts from expanding livestock production will include: tropical deforestation (for livestock pasture and operations); non-point source water and air pollution (e.g., runoff from pastures); and point-source pollution (e.g., feedlots).

Fish¹⁴

The fish projections come from the same source as the food projections and use the same assumptions. In addition, further trade liberalization is assumed to reduce trade barriers for fish production.

Annual fish demand is projected to increase from 16.3 kg per capita in 1999 to 22.5 kilograms per capita by 2030—an increase of more than 70 percent. Total world demand would reach 186 million tons by 2030, nearly 90 million tons more than in 1999. Consumption will depend largely on product availability and ability to pay. Fish will remain an important source of protein for many regions.

While demand for fish has been increasing, wild capture fisheries have approached or exceeded the biologically sustainable limit for many species. Since the 1950s fishing technology has increased marine catches, but increasingly fishery areas and species have been overfished, flattening out the global catch. Of the world's 16 fishing regions, 4 are at their maximum historical level of production, 8 are somewhat overfished and slightly below historical maximum production, and the remaining 4 are significantly overfished and well below maximum production. Of 441 specific species, 9 percent of species are depleted, 18 percent overfished, 1 percent recovering, 47 percent appeared fully exploited, 21 percent moderately exploited, and 4 percent underexploited. Also high-value large species of fish are declining as a fraction of the catch and being replaced by shorter-lived and smaller species. Nonetheless, it is projected that the wild capture catch will continue near today's levels.

Inland fishery production during the 1990s expanded about 30 percent from 6.4 million tons in 1990 to nearly 8.3 million tons in 1999.

Aquaculture (fish farming) is expected to be a significant source of future growth in fish production. During the 1990s, aquaculture production exploded at around 10 percent per year and increased aquaculture's share percentage of total fish production to 39 percent of the total annual value of \$76 billion. Although aquaculture helps increase the fish supply, it has both social and environmental issues, including: environmental degradation (e.g., the release of concentrated amounts of fish waste into the water around aquaculture pens); disruption of local social and economic structures (e.g., destroying the incomes of local fishers and disrupting the local economy); and disturbances of the wild fish ecosystems (especially those of large fish species) by feeding small species of fish to

those being grown for aquaculture production. Nonetheless, aquaculture is projected to expand, especially in Asia.

Land¹⁵

Land projections are from the Global Environment Outlook published by the United Nations Environment Program.

Land resources (soil, minerals, habitats, ground space, and landscapes) total 140 million square kilometers (km²), roughly a third of Earth's surface. Land resources are the foundation for all plant and animal life on Earth and help regulate the carbon and hydrological cycles.

The majority of land has now been altered by human activity or converted to human uses—including urban, industrial, forest harvesting, mining, agricultural, recreation, and waste disposal uses—each of which causes land degradation. Food production continues to be the driving force behind land degradation, especially through deforestation for cropland and grazing pasture. Causes of land degradation (with the areas affected) are as follows: overgrazing (680 million hectares (mha)), deforestation (580 mha), agricultural production (550 mha), fuelwood production (137 mha), and industrialization and urbanization (19.5 mha). Climate disruption and poor water management will exacerbate land degradation, threatening both food security and biodiversity.

Although the rate of conversion has declined by a third within 30 years, by 2030, an additional 57 million hectares (ha) in Africa, and 41 million ha in Latin America are expected to be under cultivation—increases of 25 percent and 20 percent respectively.

Water¹⁶

Projections about global water are primarily from the Global Environmental Outlook published by United Nations Environment Program.

Less than 2.5 percent of the world's water is freshwater, and of that small part, the vast majority is locked up in ice or snow. Thus, only a tiny fraction is available for human consumption.

Worldwide, over a billion people do not have access to safe drinking water, while another 2.6 billion lack access to adequate sanitation. Rivers, lakes and groundwater basins are our primary sources of freshwater, but a large number of rivers now run dry for at least part of the year before they reach the ocean. In addition, less than 1 percent of the available water is safe to drink. Microbe-contaminated water is still the greatest cause of global human sickness and death, and yet we humans continue to pollute our own water.

Approximately one-third of the world's population lives under water stress, meaning that the demand for clean water exceeds its availability. By 2025, almost two-thirds of the world's people are expected to be living under water stress, and by 2050, 5.1 billion people could be living under water stress. The explosion of water stress in the near future will be caused by a 40 percent population growth in these countries, increased per capita

water usage, a 17 percent increase in irrigation, increased industrial use of water, pollution of water sources, and climate disruption.

Globally, irrigation is the greatest consumptive use of water, taking more than 70 percent of freshwater use. The availability of freshwater for irrigation is a limiting factor in food production in many countries. The need for irrigation water is projected to grow as demand for grain increases.

About 60 percent of the world's largest 227 rivers have been strongly or moderately fragmented by dams, diversions, or canals which directly affect the freshwater ecosystems that lie downstream. In addition, such alterations contribute to water consumption through evaporation. Since most of the rivers in both developing and industrialized countries already have dams, this alteration of water use is expected to increase less than some others.

Industrial use, including thermoelectric generation, accounts for 22 percent of global water usage. Industrial water is often discharged with dangerous pollutants or high temperatures that are damaging to local ecosystems. Water and thermal pollution are projected to grow in parallel with significantly expanded industrial water demand projected by 2030.

Climate disruption—which has already begun—causes, among other things, changes in precipitation and changes in the flows of rivers from melting glaciers. Such changes are expected to cause additional water stress.

More than 260 rivers worldwide are shared by two or more countries, and conflicting interests of upstream and downstream water users can generate social friction or even war over water resources. Two well-known examples are Lake Chad and the Jordan River. By 2030, there will be many more multilateral water issues to be addressed.

Over half of the world's major rivers have either dried up from overuse or are severely polluted, disrupting ecosystems and threatening downstream populations. By 2030, the proportion of dried or severely polluted rivers is likely to increase.

During the last century, water development projects destroyed nearly half of the world's marshes and wetlands, altered the natural courses of water flow, contaminated aquifers, and caused high death rates and reproductive failure among wildlife in the affected areas. Experts estimate that over half of the world's wetlands were lost during the 20th century. Pressures on wetlands are expected to continue to increase through 2030.

A third of all humans now obtain freshwater supplies from groundwater sources, which provide about 50 percent of current potable water, 40 percent of water for self-supplied industry, and 20 percent of water for irrigated agriculture. In many cases, groundwater is being removed faster than it is recharged, effectively “mining” the “fossil” water. Countries have been slow to recognize the importance of water, and while many

countries are now concerned about groundwater quantity, quality, and safety, many more will be by 2030.

Ecological Outlook

The Ecological Outlook is based on projections by the US National Academies of Science and Engineering, International Panel on Climate Change (IPCC), World Resources Institute (WRI), UN Food and Agriculture Organization (UNFAO), UN Environment Programme (UNEP), and Global Footprint Network.

The ecological impact of human numbers, technology, and economy is extensive and growing, and we humans need a metric or indicator of how extensive our impact is. We will look first at such an overall metric and then examine some individual environmental issues.

Ecological Footprint

Devising an overall metric of ecological impact of human activities is difficult because trade allows the impacts of production of consumer products to be separated widely from where they are produced and used, and transport of pollutants and wastes separates waste creation from waste disposal. In short, great physical distances and time delays (such as the separation between carbon dioxide emissions and their resulting impacts on the atmosphere, oceans, and climate) separate human actions from their ecological consequences.

A widely used and highly regarded ecological metric is the Ecological Footprint (EF), which was developed by the Ecological Footprint Network (EFN) and is published biannually by the EFN itself and the World Wildlife Fund (WWF). In simple terms, the EF measures the amount of land needed to sustain current life styles indefinitely into the future. It sums up the amount of cropland, grazing land, forestland, fishing grounds, built up land and other artificial landscapes needed to maintain a specific population (individual, family, community, province, country, or world) at a given lifestyle. In addition, an amount of forest land is added equivalently to the amount of natural resources needed to grow enough trees to absorb the carbon dioxide the lifestyle emits.

The EF is measured in average hectares to take into account differing land productivities. Changing technologies are also incorporated in the average hectares. Thus the EF grows as increasing human populations and changing lifestyles place heavier demands on Earth. The maximum sustainable EF, however, is one Earth.

Figure 3 shows the Ecological Footprint for all of us humans from the early 1960s to 2003. The red curve is our total biological demands on the planet, and the blue line represents the planet's actual biocapacity.

Demand vs. Biocapacity

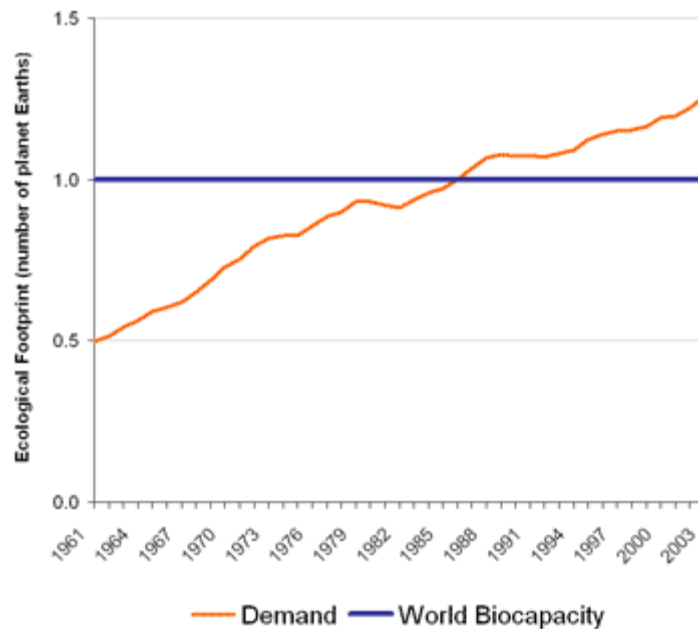


Figure 3: Total Human Ecological Footprint, 1961-2002. Source: http://assets.panda.org/downloads/living_planet_report.pdf.

As shown in Figure 3, our collective EF in the 1960s was sustainably well below 1 Earth. By the mid-1980s, the human Ecological Footprint reached 1.0 Earth. This is the maximum Footprint Earth can sustain. Since then, our EF has grown to about 1.3 Earths,¹⁷ which means that we are now in overshoot and steadily eating into and eroding the capacity of Earth to support the human civilization.

It is important to realize that the size of a population's Ecological Footprint depends on both the size of the population and its lifestyle. As shown in Figure 4, some regions (e.g., North America) have relatively small populations, but their lifestyles produce a very large Footprint per capita. Others regions (e.g., Asia Pacific) have less impact per capita, but still produce a large total Footprint because of their large numbers of people.

Footprint by region

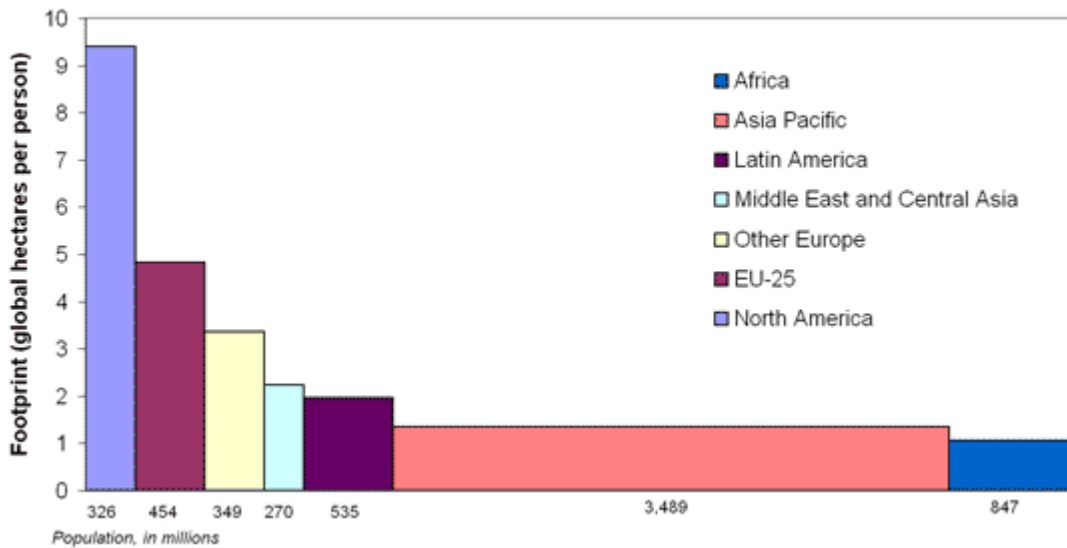


Figure 4: Total Human Ecological Footprint, by Region. Source: http://assets.panda.org/downloads/livng_planet_report.pdf.

We must bring our Footprint back below one Earth, and every single day we delay reduces the resources and opportunities that young people will have to manage their lives and futures. Furthermore, social tensions that give rise to violent conflicts are likely to follow from great disparities in our respective Footprints and consumption patterns.

Atmosphere and Climate¹⁸

The atmosphere and climate outlook is based on projections from the Intergovernmental Panel on Climate Change (IPCC) and other sources.

Projections for the future state of the atmosphere show that the atmosphere will be dangerously altered in two ways. One alteration is the thinning of the stratospheric ozone layer that protects all life from ultraviolet (UV-B) light, an electromagnetic radiation of just the right frequency to disintegrate and alter biological molecules such as DNA and cause cancers. Chemicals being emitted into the atmosphere, especially chlorofluorocarbons (CFCs) have depleted and are continuing to deplete the stratospheric ozone allowing UV-B to penetrate the atmosphere and cause serious harm to all forms of life. In the last century, many synthetic chemicals, including CFCs and other related halons, have been produced and released, thus depleting and thinning the protective ozone layer in the stratosphere. In the coldest parts of the stratosphere above Antarctica, the ozone layer was depleted so extensively that a continent-sized hole formed in the stratospheric ozone layer. Since the ozone layer blocks harmful UV rays, its depletion has led to more skin cancer and cataract cases, especially at higher latitudes, near the hole in the ozone layer.

The 1987 Montreal Protocol, a major international environmental collaboration, restricted the use of these chemicals and began a century-long process of healing the ozone layer. Although the efforts were initially successful, recent increases in the use and release of hydrochlorofluorocarbons (HCFCs) for air conditioning, especially in developing countries, is again causing damage to the ozone layer.

The second dangerous alteration to the atmosphere is the increasing concentration of greenhouse gasses (GHGs) in the atmosphere. These gasses (especially carbon dioxide, methane, nitrous oxides, and CFCs) allow high-frequency radiation (light) to pass through to Earth's surface but prevent the emission of low-frequency radiation (heat) back into space. The atmospheric GHG concentration needs to stay within a narrow range to keep the whole planet at temperatures suitable for life. Over the 150 years since the beginning of the industrial revolution, the burning of coal, gasoline, and other fossil fuels has increased global emissions of carbon dioxide by some 10,000 percent. As a result, a global climate disruption of immense significance has been initiated. Earth's temperature has already increased 1.13° F since the Industrial Revolution, which on a global scale is a huge change. Eleven of the last 12 years have been the hottest since temperature records were begun in 1850. Global temperatures are now rising nearly twice as fast, at 0.3° C (0.54° F) per decade, as they did over the previous 100 years.

The world's most respected experts on climate have assessed many scenarios for the future of the atmosphere. The key finding for the momentum (or business-as-usual) scenario is as follows: if we continue to rely heavily on fossil fuels and improve the efficiency with which we use energy at current rates, global temperatures are expected to rise 4° C (7.2° F).

All of the implications of such a change are not known, but we do know that global temperatures rose 7.2°C (13°F) over just a few centuries during the mass extinction event that ended the Paleocene Epoch 55 million years ago. At a projected rate of 4°C (7.2° F) increase per century, current trends in GHG emissions and temperature increases are uncomfortably similar to those that ended the Paleocene Epoch.

Continuing GHG emissions at current rates are projected to cause climate disruption that leads to rapid ecological changes, which will be extremely difficult for human societies (and other species) to adapt to. While it is impossible to know the exact impacts of climate disruption, some changes will likely include:

- rising sea levels, leading to millions of displaced people each year, including coastal populations of London, Shanghai, Bangladesh, and many small island states;
- water stress on over one-sixth of the world's population due to changes in seasonal melt water that supplies water for food production, personal use, and industry;
- increased water stress in regions that already experience water stress;
- increased risk of extinction for 20 to 30 percent of species;
- increased droughts and floods, threatening food production in many regions;

- decreases in global crop production if global temperatures rise over 3°C;
- significant changes in ecosystems and species interactions.

Billions of the world's poorest people, especially women and children, will suffer the most because they have little capital to help them relocate or adapt to changing circumstances when their homes are flooded, their source of water dries up, or climate disruption prevents them from producing the crops they have relied upon to survive.

Oceans¹⁹

The Oceans outlook is based on projections by the IPCC and several academic institutions.

The oceans are vitally important to the whole community of life on Earth, including humans. Oceans provide freshwater (through rain), three-fourths of our oxygen (from photosynthesis performed by algae or phytoplankton), an abundant source of protein, and the regulation of our climate. Oceans are also a source of recreation and inspiration.

We have underestimated our ability to damage oceans and coastal ecosystems. In fact, the well-being of the world's oceans is now threatened by changes in their temperature, acidity (pH), oxygen levels, fish stocks, and biodiversity. Respected scientists from many disciplines working with the IPCC have collaborated on marine projections under a number of scenarios. Listed below are the principal findings.

By 2100, increased GHG concentrations in the atmosphere are projected to raise ocean surface temperatures between 1° to 4° C, assuming we improve energy efficiency but continue to rely on fossil fuels. The consequences are expected to include sea level rise, rapid melting of ice caps and ice sheets (40 percent shrinkage of the Arctic ice cap by 2050), an increase in toxic algal blooms, and accelerated bleaching^{§§} and death of corals everywhere.

- By 2100, sea level is projected to rise between 260 and 590 millimeters (mm). No comparable sea level change has occurred in the last 125,000 years. Such a rise has the potential to flood many low-lying areas including London, Shanghai, New York, Tokyo, Bangladesh, Vietnam, Cairo, Hong Kong, and small islands and creating hundreds of millions of climate refugees.
- By 2100, ocean acidity is projected increase (a fall of 0.14 to 0.35 pH units) as the oceans absorb more carbon dioxide from the atmosphere (due to the increasing carbon dioxide content in the atmosphere). A drop of this magnitude is unprecedented in the last 55 million years. In laboratory settings, corals do not survive in such acidic waters. For corals to survive, it would be necessary to reduce our emissions of carbon dioxide by 98 percent within a decade. Shellfish, pteropods (tiny snails), and plankton are vital to marine food chains, and although

^{§§} “Coral bleaching” refers to the loss of color of corals, due to stress-induced expulsion of symbiotic unicellular algae.

they are less sensitive to acid than corals are, it is doubtful they could survive the expected pH changes. As a result all of the large ocean animals that depend on these tiny organisms would be endangered.

- By 2020 the pollution of the oceans will increase in severity and negatively impact most regions of the world. Eutrophication, the gradual death of freshwater ecosystems due to oxygen depletion from the water, is expected to intensify from the increased use of fertilizers, and increased quantities of human sewage. Widespread problems such as suspended solids, microbial pollution, and chemical pollution are expected to continue or increase due to deforestation, destructive land use, and untreated sewage and waste water. Under current policies and practices, further population growth, industrialization, agricultural development, and urbanization will severely increase pollution in coastal and marine areas.
- By 2030, the outlook for the most diverse marine habitat—coral reefs—is grim. Even if we limit our carbon dioxide emissions to their 2000 rates (proposed, but highly unlikely) coral reefs may not survive because the carbon dioxide we have already put into the atmosphere will continue to be absorbed by and acidify the oceans. In addition, dynamite fishing, deepwater trawling, other destructive fishing practices, and overfishing are reducing the corals' resilience to a changing environment. The loss of coral reefs would significantly decrease marine biodiversity and indirectly destroy a critical source of protein for millions of people.

Forests²⁰

The forest outlook is based on projections by the Food and Agriculture Organization (FAO) of the United Nations and the Global Environmental Outlook by the United Nations Environment Program (UNEP).

The global forest area is 3,870 million hectares, equivalent to 30 percent of land area. Of the total global forests, 48 percent are in tropical and subtropical regions, and the remaining 52 percent are in temperate and boreal regions. Over half of forests are inaccessible, legally protected, or economically unrewarding, which limits wood production from these areas but also protects the species and provides carbon dioxide absorption capacity there.

Over 80 percent of the Earth's original forests are gone. Between 1990 and 2000, forest lands declined about 9.4 million hectares annually, with 14.6 million hectares cleared and 5.2 million hectares reforested. Tropical deforestation continues at an average annual rate of 130,000 km², about 2,000 trees per minute in the Amazon region. The decline in the area of temperate forest has been reversed with an average annual increase of 30,000 km² between 1990 and 2005.

Wood production in 2000 was 3.2 billion cubic meters, of which 55 percent (1.7 billion cubic meters) is burned as fuelwood, mostly by developing countries. Of the remaining

1.5 billion cubic meters of global wood production, 66 percent (1 billion cubic meters) is used in industrialized countries.

World forest experts have explored scenarios for the future of forests.²¹ Their principal findings for 2030 show:

Demand for wood is projected to increase, driven by population growth and increased per capita income. Demand for industrial roundwood is projected to increase by 60 percent, reaching 2,400 million cubic meters.

- Supply is less certain. Trade and market mechanisms are expected to ensure an adequate supply of forest products for the near future. Harvesting will begin to shift towards intensively managed plantations, expected to reach 5 percent of total forest lands and to supply a third of the industrial roundwood by 2030. New technologies and innovative developments will be needed to assure an adequate supply.
- While per capita consumption of fuelwood is expected to decrease due to increases in personal income and easier access to alternative fuels, fuelwood demand over the next 30 years will depend primarily on per capita income and the availability of alternative fuel sources.
- While the rate of deforestation is expected to slow in many countries and efforts to improve forests to increase in others, progress toward collaborative forest management is expected to make only modest progress in the medium term.

Forest conservation in the future could be inspired by efforts to regulate climate, to protect biodiversity, to achieve other environmental protection and to protect recreational uses of forests. With concern over increasing levels of carbon dioxide in the atmosphere, forests will receive additional attention because of their capacity for absorbing carbon dioxide.

Biodiversity²²

The outlook for biodiversity is based on projections from Global Environmental Outlook and the Millennium Ecosystem Assessment.

The number of species on Earth is estimated to be between 5 and 30 million, of which approximately 1.75 to 2 million have been identified and described. The number of species is declining, and humans are responsible for increasing the extinction rates by over 1,000 times in the past few hundred years. Over the next 100 years the extinction rate of vertebrate groups alone could be as high as 15 to 20 percent.

Ecosystem services on which all life (including human life) depends is being impacted. The UN Millennium Ecosystem Assessment found that 15 out of 24 ecosystem

services^{***} are being degraded or used unsustainably. These included freshwater, capture fisheries, air and water purification, and the regulation of regional and local climate, natural hazards, and pests.

World experts have identified the major causes of the decline in biodiversity and the prospects for the future. The loss and degradation of habitat is the most important factor causing the loss of species, and a change of land use inevitably means loss and degradation of habitat. About half of Earth's species need forests as habitat. If we continue current practices, by 2050 we will have almost completely destroyed tropical forests largely through conversion to farmland and logging. We will also continue to destroy other forest and coastal ecosystems to build cities and add cropland.

Climate disruption will have disruptive impacts on every ecosystem on the planet. Some ecosystems will completely disappear (e.g., habitat of polar bears), others will degrade dramatically (e.g., expanding deserts), and still others will change dramatically in biological productivity and species composition (e.g., oceans as they become more acidic).

Fixed nitrogen from fertilizers and agricultural runoff enters fresh or marine waters, depleting oxygen and initiating eutrophication, which leads to the creation of dead zones, which are large areas where all aquatic life is killed. Globally there are already more than 400 dead zones. Also, nitrogen deposition has seriously impacted coral reefs and soil quality in many areas. If current rates of nitrogen deposition continue, both land and aquatic ecosystems will be seriously threatened over the 21st century.

Trade, tourism, canals, and other human activities move species across biome boundaries where they often have no natural predators. As a result, foreign exotic species populations often multiply wildly beyond the natural ecological balance. A few of many possible examples include rabbits (Australia), Channidae ("snakehead") fish (U.S.), and Kudzu vine (U.S.), all of which are very destructive. This exchange of species between ecosystems, called biotic exchange, can cause severe alteration in the food chain as indigenous species are threatened, are forced into extinction, and have their habitats destroyed. Continuation of current trends in trade and current inadequate regulation, enforcement, and penalties mean that the already severe toll of biotic exchange will become even heavier.

The acidification of aquatic biomes through absorption of carbon dioxide from the atmosphere has been mentioned earlier. The impacts of increased acidity (falling pH) are expected to be greatest in ocean ecosystems. Even the current levels of atmospheric carbon dioxide will destroy many, if not all, coral reefs by the end of the 21st century.

Toxic Substances²³

Today, most toxic substances we encounter are synthetic toxins that humans have created within the past century. Though we have discovered ways to counteract many of the

^{***} Ecosystem services are services (such as purifying water) that are provided by ecosystems.

common natural toxins, we have added substantially more synthetic toxins into our environment. We typically only encounter these synthetic toxins in small, possibly harmless doses, but many of them do not degrade, and have the potential to accumulate in our environment and bodies, eventually reaching harmful levels.

In our efforts to design new materials, chemicals, and drugs, humans have created and are continuing to create thousands of new substances. Yet in many cases, we do not understand the impact of those substances on our health or on other species. Financial and social pressures to commercialize such substance are strong and often discourage long-term testing that might help us to avoid serious health and environmental problems.

Of the toxic substances reported to the U.S. Environmental Protection Agency (EPA) in 2005, only 22 percent were reported as disposed of safely, meaning they were disposed of in ways that limit environmental contamination and human exposure.

Under current policies, regulations, enforcement, and penalties, toxic substances will increase in number and will continue to build up in our environment. As a result, we the younger generation, will likely see increased incidences of cancer, increased birth defects, increased respiratory problems, and similar health problems due to exposure to toxins.

Security Outlook²⁴

US intelligence experts divide security issues into two groups, those involving violence from state entities and those involving violence from non-state entities.

Experts project that violence from state entities is likely to decrease during the early part of the 21st century because the prevalence of nuclear or other massively-destructive weapons would assure mutual destruction of the nations involved. These experts feel that increased transparency and diplomacy will reduce large-scale international violence such as a world war. Nonetheless, it remains troubling that there are limits of major power diplomacy (e.g., Iraq), that there is no apparent long-term solution for the Middle East, and that international economic sanctions (e.g., Myanmar, Iran, and North Korea) can provoke serious military actions.

Experts also think that there may be an increase in violence from non-state entities. Indirect and lower-level conflicts such as terrorism, intimidation, guerilla warfare, and internal conflicts are expected to continue and possibly increase. Targets will likely include civilians and businesses. Domestic conflicts not involving other states are thought to have the greatest potential for destabilization, and such conflicts will produce growing numbers of refugees and internally displaced persons.

The prevalence and nature of violence is expected to be greatly influenced by: the distribution of resources, information, and wealth; the distribution of weapons and offensive capabilities; the distribution and advancement of science and technology; and the nature of interactions between governmental and non-governmental entities.

Non-state entities are expected to gain more offensive capabilities, including the use of information technology to spread propaganda. They will also have greater access to weapons through the liberalized and deregulated global economy. Terrorists are likely to be based in weakly governed countries, countries with weak economies, and countries with existing ideological tensions.

While globalization—shared information, goods, ideas, and culture—is expected to increase global economic growth and stability, the resulting economic growth will not affect all regions equally. As discussed in the economics section, per capita incomes in most of the world will be less than one quarter of those in high income countries, the wealthy are projected to remain significantly wealthier than the poor, likely price increases could nullify the effects of increased income for the poor, and inequalities *within* countries are estimated to increase in 80 percent of the developing world. As a result, tensions can be expected to arise from those impacted negatively by economic growth or left economically, culturally, or ideologically disconnected from the rest of the world.

Unequal distribution of energy and other resources is expected to persist, and, thus, the gap between people's standards of living is expected to increase both regionally and within individual countries. The increasing wealth disparity will lead to an increased number of people who feel disenfranchised, particularly in regions where disparity is based upon racial, ethnic, or ideological differences. Ethnic heterogeneity is expected to increase in nearly all countries. The growing ethnic diversity will increase the potential for economic and ethnic tensions, especially in countries where large economic disparities exist, where religious views are fused with ethnic grievances, where immigration is resisted, and where there are indigenous protest movements.

The governments of developed countries are expected to increase their transparency and efficiency of public services, and to reduce large-scale criminality. The governments of weak states, however, are not expected to be able to check the ability of non-government actors (including criminals and terrorists) to control people, resources, and even the government itself. Such developments will certainly lead to increased tensions with neighboring countries and their allies as well as between opposing ideological factions within countries with weak and failing governments.

People everywhere are demanding increased international cooperation and increased national transparency to deal with complexities of globalization, but such cooperation will require decades to achieve.

An Assessment of the Outlook Studies

First, our thanks to everyone and every institution that contributed to the outlook reports and future studies. Collectively, these reports provide an immense amount of useful information, and they are critically important for the thoughtful management of human affairs on Earth in the decades ahead. They lead us to reflect on not just our individual national situations, but the overall global situation. They start us reflecting on our role as one species among many in the whole community of life. And most importantly to us

young people, they constitute a very explicit manifestation of concern for our future and that of the generations to follow us.

That being said, however, we need to ask: How reliable are the future outlook studies in describing the Earth we will inherit? To answer this question, we have made an effort to examine the assumptions, feedbacks, and consistency of the models underlying the outlook reports.

All of the outlook projections are based on models. Some are based on the “mental models” in the minds of the authors. Others are based on explicit mathematical models. All of the models are based on assumptions and all must be examined for accuracy and consistency of their assumptions. To this end, Our Task’s analytical team has made an assessment of the models, their assumptions, and their consistency. Our findings are presented briefly below and in more detail in our report “The Model Assessment Report for Youth Earth Plan” (see: http://OurTask.org/youth_earth_plan/analysis.asp). Our assessment is not exhaustive, and needs to be continued and taken deeper.

Interactions among the sectors of the global system are increasingly central to understanding medium- and long-term trends, about which the young generation is vitally concerned. Our analysis suggests that leading models, while very detail-rich in specific sectors, include few interactions with other sectors. In effect, most are “silo” models, with sharp boundaries largely limited to a single sector. For example the economic, population, and several other models have sharply defined boundaries that severely limit the inputs concerning the impacts of changes projected by the environmental models.

Such linkages between models are not completely missing. We found the energy, food, and economic models do have important inputs from other models. For example, the energy model receives input information from the population, environment and resources, technology, and economic models.

However, important feedbacks are missing from many models. For example, the population model makes projections of fertility, mortality, migration, and population levels with no explicit inputs of education, health, food, technology, energy, and economic projections—all of which are certainly important causal determinants of population dynamics. In some cases, only half of important feedback loops are present. For example, the food model receives exogenous inputs of population projections (half of a feedback loop), but the population model is not influenced by the food projections (the other half of a closed feedback loop). Since full, closed feedbacks are very important in determining the behavior of the overall global system, these missing linkages (open feedback loops) are a special concern.

How do such limitations in the respected models influence the inheritance we can expect? They have a significant influence, generally in the direction of overestimating and overstating the quality and quantity of our inheritance. A systematic revision of the projections is beyond what can be done here, but we can share with our readers our sense of what the outlooks would be if they were fully integrated.

Integrated Social Outlook

The population models project a continued deceleration in rate of population growth. The causal assumptions underlying the projected decline in population growth rate are unspecified in the population model, but seem to us likely to include an assumed general improvement in educational and health services (including access to contraceptives), better infrastructure, increasing per capita incomes, dietary improvements, and increased access to energy by the poorest, all resulting in a decline in desired family size. Many of the other projections—even when taken at face value—raise questions about a general continuation of these trends. *Taking all of the projections into account*, it seems likely to us that important causal determinants of future fertility and mortality (e.g., access to education, contraceptives, and basic health care) cannot be assumed to be increasingly available, and as a result, total fertility rates, life expectancies, and desired family sizes may not decrease as rapidly in the future as they have in the past few decades. It also seems to us that no matter how population grows in the decades ahead, it is still likely to be dangerously high and vulnerable to natural and human-induced disasters of many kinds.

Most of the population increase is expected to go into rapidly-expanding, poor, unplanned settlements around a few dozen megacities in industrializing parts of the world. Continued poverty in rural areas will feed this rural-urban migration, and it will be very difficult to provide adequate infrastructure or health and education services in the nearly-ungovernable slums within and around megacities. *Taking all of the projections into account*, it seems likely to us that the forces driving the creation of megacities will increase, contributing to human trafficking, domestic abuse, crime, high birth rate, and the potential for violence.

The health services currently available to the majority of people are seriously inadequate. Many do not even have safe drinking water or elementary sanitation facilities, and many die from preventable waterborne diseases and inadequate nutrition. Others, however, suffer from obesity and diabetes from rich foods and inadequate exercise. HIV/AIDS and TB are expected to continue to spread. *Taking all of the projections into account*, it seems likely to us that health services for most humans will not improve significantly because only the wealthy few will have access to adequate health services. Where health services have increased life expectancy but social circumstances have not reduced birth rates, continued population growth will threaten health and quality of life in other ways as well. For example, global pandemics will be increasingly difficult to control, new diseases will continue to emerge, and the resistance of staphylococcus bacterium and other pathogens to antibiotics will likely increase.

Education is projected to improve in some regions, but not universally. Without education, we cannot compete globally, limit our fertility, or protect ourselves from HIV/AIDS and other diseases. *Taking all of the projections into account*, it seems doubtful to us that governments' commitments to education will withstand budget pressures and that huge numbers of children will continue to receive inadequate—or no—education, leaving many young people ignorant of critical life skills and important issues. In addition, the gap between highly educated people and uneducated people will continue

to grow, creating a greater disconnects and making it more difficult to build community consensus for needed action.

Integrated Economic Outlook

Assuming no economic impacts from climate disruption or from increasing prices of energy, the global economic outlook projects a 3 percent average annual economic growth through 2030. The climate projections, however, conclude very explicitly that there will be significant economic impacts of climate disruption, and the energy projections conclude very clearly that there will be significant economic impacts of increasing energy prices. The economic projections assume no significant public opposition to further reductions in the regulation of trade, but the security outlook is far less sanguine about public reaction to unregulated trade. Already, there are criticisms of trade policy and growth even in industrialized countries like the United States. *Taking all of the projections into account*, it seems likely that many of the assumptions underlying the economic projections are questionable. Furthermore, we agree with economic projection's self-assessment: While there are both downside and upside risks to the economic projections, the downside risks seem likely to predominate.

Integrated Resource Outlook

The energy model calculates energy demand, supply, and investment endogenously, based generally on GDP, population, technology, and international energy prices, all of which are assumed exogenous inputs. For example, the international price of crude oil import is assumed to reach \$55 in 2030, far less than the actual price reached in mid-2008. It is assumed further that the energy sector will out-compete other sectors in attracting trillions of dollars for energy-infrastructure investment and the energy sector will be allowed to increase its carbon dioxide emissions more than half by 2030. *Taking all of the projections into account*, it seems likely to us that energy availability and price will be influenced more by competition for capital, water, land, and concerns over climate disruption than is suggested by the energy projections.

The food model provides projections of global food supply and demand based upon anticipated population, economic growth, and trends in food production. Projected increases include a 55 percent increase in world crop production, a 70 percent increase in world fish production, and a 72 percent increase in world meat production. The model assumes that the growth of global food production will not be constrained by energy prices, land area and quality, water availability, climate disruption, ecological consequences of fertilizers and pesticides, production of biofuels and the use of genetically modified (GM) crops. Although few technological specifics are provided, technology is definitely assumed to meet much of future food demand. *Taking all of the projections into account*, it seems to us that the assumptions about water, energy, land, and climate are not realistic and that such constraints are likely to challenge food production increasingly and alter food consumption patterns. The food projections do not give any warning of the increases in food prices and hoarding that occurred in 2008.

There is no global model of land use and land condition, and while the databases are improving, they are not well-integrated. Without question, pressures on land will

increase dramatically from agriculture, forestry, grazing, mining, industry, energy (especially biofuels), urbanization, and climate disruption. *Taking all of the projections into account*, we expect land degradation and competition for land to be significantly more severe than is assumed by several of the food and forestry projections. In particular, efforts to increase crop- and pasture-lands will compete with efforts to preserve forests and reduce carbon dioxide concentrations in the atmosphere, and urban residents and factories will increasingly compete with agriculture for water and energy.

While there is no global model for water and the various databases are not well integrated, it is clear that water stress and outright water shortages already exist in many parts of the world. *Taking all of the projections into account*, it seems likely to us water stress will become more severe in most parts of the world by 2030 and the rain patterns will become more erratic because of climate disruption. These expectations for water seem significantly different from the water assumptions implicit in the health, agriculture, economic, forestry, and energy projections.

The models projecting the outlook for fish and meat consumption assume that rising incomes to 2015 will lead to increases in fish and meat consumption. *Taking all of the projections into account*, it seems that since the global wild catch has peaked, any further increase in global fish availability will have to come from aquaculture, which will increase pollution and loss of biodiversity. Decreases in local fish stocks could leave many poor people without a source of protein, especially if fish prices rise due to high demand and low supply. Over a longer period of time, a similar trend might develop for meat if the amount of land available to raise meat decreases, demand increases, and if production of biofuels from corn and other grains increases.

Integrated Environmental Outlook

The world's governments and international institutions do not have a model of the "environment" ^{†††} of the planet. While the UN Environment Programme publishes a series of "State of the World's Environment" documents reporting on parts of the overall bio-geo-chemical system, the most comprehensive and brief indicator of the health of the planet is the Ecological Footprint (EF).²⁵ The EF is defined as the land area necessary to provide indefinitely for the current way of life of the Earth's total population. Since we have only one Earth, the maximum sustainable EF is 1.0 Earth. Human's total EF is now about 1.3 Earths, which means that humans collectively are now eroding the ecological capital we young people will need over the course of our lives. *Taking all of the projections into account*, it seems that we are not on a course to reduce our EF back below one Earth, but are instead on a course to increase our collective footprint further, thereby seriously undermining the prospects for every young person on Earth.

There are several climate models used to project GHG emissions and global temperature changes over the course of the next century. All are based on assumptions concerning (a)

^{†††} This term "environment" is problematic because it implies that we humans are somehow separate and apart from Nature. In fact there is no "environment", only a global bio-geo-chemical system of which humans are an inseparable and integral. Our destiny and the destiny of Earth's bio-geo-chemical system are one.

population change (increasing steadily or peaking mid-century), (b) technological change (toward efficiency), (c) energy sources (whether fossil or non-fossil based), (d) economic growth (rapid and globally linked or geographically diverse and local), and (e) scale of thinking (global v. local sustainability). There are long delays between changes in these areas and experiencing the associated change of climate. *Taking all of the projections into account*, it seems likely to us that collectively we are on a course toward a global climate disruption that will be extremely detrimental to humans (especially young people and future generations) and to the ecological systems on which they rely. Maintenance of our current economies and efforts to reduce and eliminate poverty all depend on burning fossil fuels, which exacerbate climate disruption. We are currently planning to meet future demands for food and fuel-wood by clearing forests to increase crop- and pasture-lands, which will also add to the climate disruption. So, the challenge of climate disruption is indeed severe.

The greatest threat to marine ecosystems is acidification, which is caused by the absorption of carbon dioxide from excessive and growing amounts of carbon dioxide in the atmosphere. There are long delays between an increase in the atmospheric concentration of carbon dioxide and the corresponding change in ocean acidity and even the present concentration of carbon dioxide in the atmosphere will cause massive damage to Earth's oceans. *Taking all of the projections into account*, it seems likely to us that because of our carbon emissions and deforestation, we are on a course toward destroying most of the biological utility of the oceans.

The world's forests absorb huge quantities of carbon out of the atmosphere, and the absorption capacity lost through deforestation is equivalent to about a fifth of all carbon dioxide emissions. In addition, the world's forests contain about half of the species on Earth, so deforestation destroys the habitats of a large portion of life on Earth and disrupts many millions of dollars worth of ecosystem services. Most deforestation is the result of expansion of agricultural lands, use of fuel wood for cooking and heating, and production of industrial wood and paper products. *Taking all of the projections into account*, it seems likely to us that the pressures driving deforestation are likely to increase for decades, exacerbating climate disruption, causing large losses in biodiversity, and destroying forest and ecosystem resources for future generations.

Ecological models of biodiversity analyze the impacts of land use changes (especially deforestation), climate disruption, nitrogen deposition, introduction of invasive species, and increased carbon dioxide on future biodiversity. *Taking all of the projections into account*, it seems to us that trends in all of these areas will continue to drive a global wave of extinctions for decades.

Integrated Security Outlook

The security projections suggest that intimidation, terrorism, internal, and guerilla-type conflicts will be common in the decades ahead and that these conflicts will be caused by: tensions between those who benefit from economic growth and those negatively impacted or left culturally and ideologically disconnected; weak economies and governments; feelings of disenfranchisement; unequal distribution of resources,

especially energy and water; wealth and income disparity; racial, ethnic, or ideological discrimination; and ethnic and religious grievances. *Taking all of the projections into account*, it seems likely to us that the underlying causes of conflict are very likely to increase in the decades ahead and that the prospects for peace and security will be challenged. Many young people will be drawn into the violence because it is young people who are always asked to do the fighting. In many places violence, abuse of women and children, crime, terror (including threats of weapons of mass destruction), genocide, and anarchy already constitute extreme human rights abuses and will likely become even worse unless the underlying causes are addressed.

Overall Assessment of the Outlooks

Collectively, the outlook studies we have reviewed provide an immense amount of useful information. We feel, however, that their overall utility is reduced by what seems to us to be some limitations.

The first limitation concerns the isolation of the individual outlooks and their resulting inconsistencies. For example, all but one of the studies assumes no conflicts, yet the one that addresses conflicts identifies underlying causes of conflicts as being likely to intensify.

A second limitation concerns assumptions of individual studies that are inconsistent with the findings of other studies. For example, many studies assume there will be adequate land, investment capital, water, energy, disposal space for wastes, including carbon dioxide, whereas the studies in these areas do not support these assumptions.

A third limitation concerns what appears to us to be wishful thinking. The economic projections simply assume away increases in prices for energy, minerals, and materials and impacts of climate disruption. The energy projections simply assume that there will be trillions of dollars to invest in energy infrastructure. The population projections simply assume the social and economic conditions necessary to reduce desired family size. The agricultural projections simply assume the availability of all the water and energy agriculture might want and neglect to take seriously the enormous ecological damage caused by agricultural technology. Such wishful thinking is neither realistic nor helpful in achieving the changes we young people so urgently need.

Our Inheritance and Our Challenge

After reviewing carefully all of the respected future outlook studies, we young adults associated with Our Task sense that we are inheriting an Earth troubled with three enormous and interrelated issues. One issue concerns balancing human needs and the needs of Earth, both immediate and long term, so that Earth can continue to support human life. A second issue concerns finding ways to achieve the much greater and more effective global collaboration and cooperation we will need to effectively address the other issues. Finally, there is the issue of our fundamentally unsustainable human culture and the need to reorient our culture on a global scale.

Balancing Human-Needs and Earth-Needs

The balancing challenge is illustrated in Figure 5. The graph demonstrates an enormous inequity. Fewer than a billion people have relatively high incomes of at least \$30,000. Approximately three billion have per capita incomes on the order of \$5,000, and more than two billion people have incomes of only a few dollars per day. This inequity seems to us to be morally wrong and a grave danger to prospects for peace and security for both the rich and the poor.

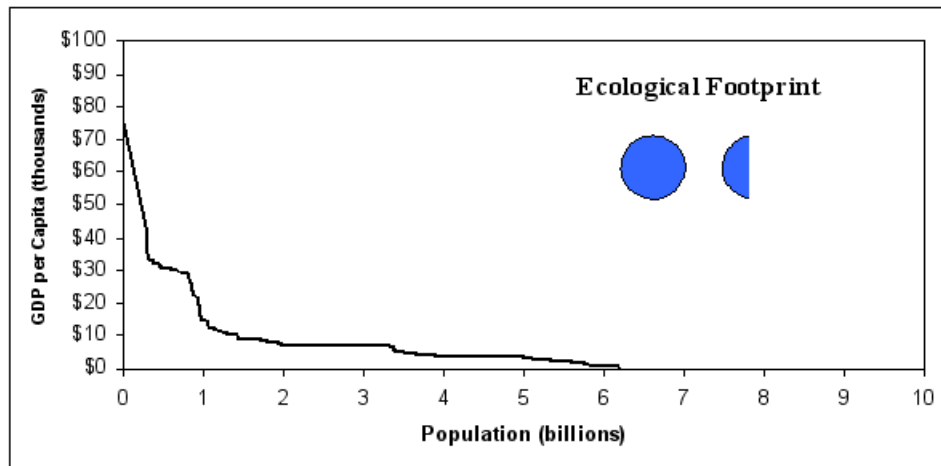


Figure 5: Population of the World by Per Capita Income.

Source: World Bank data for 2005

The balance challenge is simply that global economy is undermining, eroding, and depleting the biological capacity of the planet to support us humans. As depicted by the graph in Figure 5, the global economy has an unsustainable Ecological Footprint of 1.3 Earths—symbolized by the blue circles. This means the global economy has already overshoot what can be sustained for the long term.

To address the inequity challenge, we need to flatten the curve in Figure 5. One hypothetical approach to flattening the curve is illustrated in Figure 6, namely for everyone to live as the rich do now. This approach would involve a large amount of growth, enough to bring each person along the black curve up to the red curve.

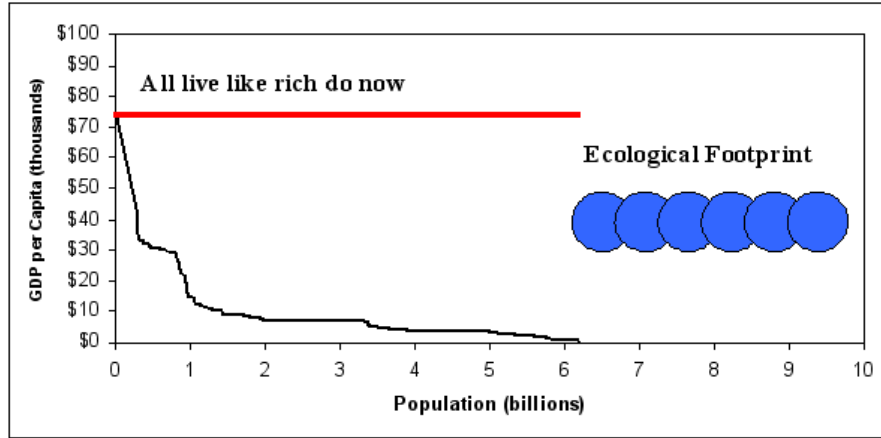


Figure 6: One Option for Addressing Global Inequity (All Live as the Rich Do Now) and the Estimated Ecological Footprint.

Such immense growth has implications for the balance challenge, though. If lifestyles and consumption habits of the whole world were to rise up to the red line, we would need about six Earths to support us.^{†††} Since we have just one Earth, however, this would simply not be sustainable.

There are other possibilities, of course. For example Figure 7 illustrated the possibility that all have enough—enough for a civilized and full life, but not for waste and extravagance—while reducing the Ecological Footprint back to one Earth. This approach creates by far the best prospect for young people and future generations. Some people (including some Americans) are beginning to realize that we simply cannot continue to consume at current levels and are making changes to reduce those levels, but very few people are yet thinking about the magnitude of change needed bring our collective Footprint down below one Earth. Many political issues will need to be resolved.^{§§§}

^{†††} The Ecological Footprint is approximately proportional to the Gross World Product (GWP), which is the area under the black GDP curve in Figure 6. If global inequity were addressed by “growing” every point on the black curve up to the red curve, the GWP (area under the red curve) would be about six times what it is for the black curve.

^{§§§} A question has been raised as to whether consumption would be better than income as a measure to use in Figures 5-7. Probably consumption would be better, but national accounts data generally provide income (actually GDP) data, not consumption figures. Even if one wants to distinguish between consumption and investment, however, they both make demands on the planet. So, income/GDP is probably an adequate measure to use here.

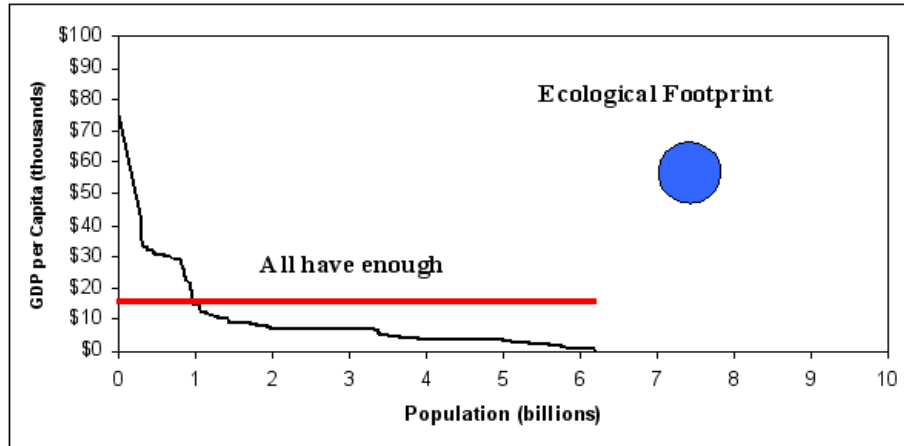


Figure 7: Another Option for Addressing Global Inequity (All Have Enough) and the Estimated Ecological Footprint.

There are some simple truths associated with Figures 6 and 7. The first is that we cannot all live like the wealthiest—full stop. If the projected footprint in Figure 6 were say 1.5 or even 2.0 Earths, one might argue that more research or refined calculations would change the conclusion. A footprint of six Earths, however, is simply beyond the pale. Another truth is that we were wrong, all of us, in assuming that Earth was too big to be seriously disturbed by anything humans might do. Our Footprint makes clear that we can, and in fact have, damaged and disrupted the functioning of the whole planet. Furthermore, as long as our collective footprint remains larger than one Earth, we are eating our ecological capital and undermining the prospects for young people everywhere. Unless we are just going to run the planet in the ditch and leave it there for our children, we must reduce our Footprint to well below one Earth and begin to restore the planet. Finally, there remains the illusory option of forgetting about injustice and letting the wealthy do their best to hang on to what they have allowing the poor drift into ecological chaos and political anarchy. This option, however, doesn't work because of what it implies for our collective and individual continence, because of the ways GHGs, diseases, crime, drugs, and much else move across borders and around the planet, and because of the way we have all become dependent on the food, forests, and energy from other parts of the world. We must bring our Ecological Footprint safely well below one Earth.

What does Figure 8 mean for families anywhere in the world with per capita incomes in excess of \$17,000, say maybe \$70,000 for a family of four? Does it mean destitution, starvation, and the end of civilization? No. Does it mean change? Yes it does. It means changes in values, in consumption, and much else. How would the change be accomplished? That question will require much further work. We are only taking the first step of putting the issue out for discussion. The fact is that we cannot all live as the rich do now; we all need to understand that fact and discuss it.

Collaborating on Difficult Changes

A second key challenge will be for people of varying culture, nationality, perspective, and economic standing to collaborate peacefully on the changes we urgently need to make. As the security outlooks point out, the prospects for violence—internal conflicts, intimidation, terrorism, and guerrilla wars—are high and will be increased by tensions between those who benefit from economic growth and those who are negatively impacted, left behind, disenfranchised, or deprived of resources such as energy, water, and land. The economic projections, unrealistically optimistic as they are, acknowledge that globalization is exacerbating inequalities within developing countries. Wealth and income disparity, all forms of discrimination, as well as ethnic, political, and religious grievances will contribute to the potential for violence. Already there is anarchy in many failed states, and we young people could live to see yet more failed states while we are trying to resolve some of the most difficult issues of inequity and balance with Nature that have ever been faced by humans.

In the past, we have assumed that each of us individually (and all of us collectively) could make demands without limit on the resources and environment of our planet Earth. We now know this assumption was wrong. We all cannot make demands on Earth comparable with those made currently by the wealthiest few. We have assumed that even in the face of huge inequities and injustice, security—if not peace—can be achieved through violence and threats of violence, but we realize now that true security and peace can be achieved only through justice and equity.

Reorienting Human Culture

To arrive safely at 2100 we need to ask ourselves how we—all of us on Earth—managed to get ourselves into our dangerously unsustainable situation. Is it due to a particular technology we are using? Is there a specific law or treaty that can be changed to put things right? Is there a “silver bullet” solution?

We do not think so. While technologies, laws, and treaties are all contributing factors, the root of our global problem is much deeper: it is the mindset we used in creating our technologies, laws, and treaties. Our goal has been to benefit one part of society or one country or group, rather than to benefit all and improve our species' relationship with the planet. We have been slow to recognize our dependence on nature and our ability to disrupt the natural systems on a planetary scale. We also neglected the inherent dependence of societies on the wellbeing of everyone. As a result, we have created a global culture that is self-destructing.

Albert Einstein said that “[a] problem can't be solved with the same mindset that created it”. We think his insight definitely applies to the planet-level challenges we face.

Therefore, to face squarely the challenges ahead, we must broaden our perspective and work together not as separate countries and peoples, but as a united human species. Fortunately, there is widespread understanding of what we must do. We must:

- drastically reduce poverty and inequalities

- reduce our Ecological Footprint, including stabilizing climate and population
- ensure security without violence while protecting human rights

While many groups and individuals are giving attention to each of these “musts”, our collective progress is slow. The institutions that we have created and entrusted to guide us safely into the future—our governmental, corporate, spiritual, international, scientific, educational, media, and civic institutions—have been unable to recognize the magnitude of the challenges ahead, to effectively sound the alarm in a timely manner, and to provide adequate vision and leadership. Our largest institutions are leading us down a self-destructive path, creating a serious cultural disorder, perhaps even a cultural pathology.

How does one address a cultural disorder? How does one deliberately and thoughtfully change culture on a global scale? Is it even possible to make changes of such a magnitude? Our Task believes that there are other, more desirable ways for all of us to organize and conduct ourselves on the planet. We are also convinced that each of our culture-shaping institutions has a role to play in helping us reach that more desirable future.

We also believe that our governmental, corporate, spiritual, international, scientific, educational, media, and civic institutions all influence each other and a meta-institution we call our “global culture system”, as illustrated in Figure 8. The global culture system consists of all of our culture-shaping establishments influencing and guiding each other.

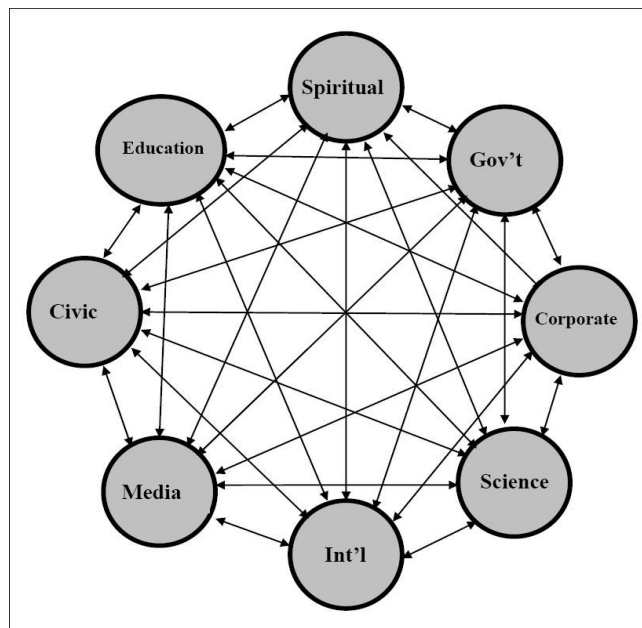


Figure 8: The Global Culture System: A Schematic Representation of Interactions among Our Culture-Shaping Establishments—Our Governmental, Spiritual, Corporate, Scientific, International, Media, Civic, and Educational institutions.

The combined influence of these eight institutions is moving human affairs on Earth in an unsustainable direction. Is it possible to redirect this constellation of the most powerful institutions on Earth?

Directly and significantly changing any one of these deeply-rooted establishments would be a Herculean task, and changing them all is a truly daunting prospect, probably impossible—unless they can somehow be induced to help each other change. If a small change could be made in education, for example, that change would make it easier for other constructive changes to occur in media, or in science, or in the corporate world.

Therefore, Our Task is making recommendations—requests, really—to thoughtful individuals within each of the guiding institutions. Our hope is that they will realize that they are a part of a meta-establishment that is guiding all of us along the path to the future. Having recognized this, we hope that they will then take up the challenge of inducing the institutional changes that will redirect human culture and civilization toward a more enjoyable and sustainable future.

Requests to Our Culture-Shaping Institutions

In preparing our recommendations, we studied and summarized fifty sustainable development strategies published by the member institutions of the global culture system (Figure 8).²⁶ We also studied many books and articles on globally sustainable development and thinking. There are many more useful ideas in the sustainable development strategies than can possibly be included here. In choosing our requests, we have focused on those that (1) would produce lasting, long-term benefits, (2) address the three interrelated problems, namely, reducing our ecological footprint to a sustainable level, protecting human rights, and promoting peace and security, and (3) would support and facilitate constructive changes in other institutions within the overall global culture system.

International Institutions

International organizations such as the United Nations, the Breton Woods financial institutions (the International Bank for Reconstruction and Development (IBRD, now part of the World Bank Group) and the International Monetary Fund (IMF)), and the General Agreement on Tariffs and Trade (GATT) and its successor, the World Trade Organization (WTO), were created six decades ago to address post-World War II issues such as national sovereignty, human rights, national aggression, and commercial and financial relations among industrial states. Today, we face a very different set of issues (e.g., poverty, climate, and energy) that are truly global in extent and nature rather than just "inter-national". While our existing international organizations provide very valuable services through their numerous programs, we have no adequately funded and mandated organization to help us make the planet-level decisions that urgently need to be made. Our international institutions' response to the current issues is still being shaped by their sixty-year-old constitutional make-up, and we need to consider the possibility that some international institutions, as currently constituted, are inadequate for current

challenges and need to be reconstituted, or that some have outlived their usefulness and need to be closed, or even that some new institutions are needed.

Individually, international institutions should:

- Continue to advocate with national governments for permanent sources of funding, which is essential for international organizations to carry out their missions independently and effectively. One suggestion would be to require contributions from member countries.
- Develop a global legal framework for the chartering and regulating of transnational corporations. Through establishing a legal framework requiring high labor and environmental standards everywhere, international institutions can prevent the intimidation and exploitation of individual countries and create a level playing field for all transnational corporations. Such a framework would be effectively enforced with appropriate fees and penalties.

Collectively, international institutions should:

- Acknowledge the limited capacity of international organizations, as currently constituted, to address climate disruption, poverty, energy, species losses, trade, and other global issues of the 21st century and advocate for new global capacities to effectively facilitate and enforce planet-level decisions. Promote a mutually enhancing relationship between humans and Earth by encouraging governments to refrain from self-interested actions that place the welfare of the planet at risk. Use the precautionary principle, which is especially important in making planet-level decisions.
- Give balanced attention to the needs of the natural world and the needs of future generations when taking a "rights-based approach" to economic development and poverty reduction. This means that granting rights to people (like the right to electricity) cannot come at the expense of unsustainable demands on Earth. In other words, a right to electricity does not include a right to obtain the electricity in an unsustainable manner. Without Nature, development and poverty reduction are not possible.
- Continue to create and improve future outlook studies. As discussed in our analysis of the UN, World Bank and other outlook studies, a massive effort is urgently needed to coordinate assumptions among the various outlook projects of international agencies and to improve the transparency and consistency of the models used. Additionally, international institutions should continue to bolster efforts to improve the accuracy and effectiveness of data reported by countries. We all need the data and outlook reports to better understand the condition of the planet and the issues being passed on to us young people. We especially thank the teams that prepared UNEP's Global Environmental Outlook and the Millennium Ecosystem Assessment; these efforts help us all understand the rate and extent of human alteration of the planet.
- Encourage individual countries to act in ways that take into account the welfare of other countries, thereby shifting focus to global welfare rather than just the welfare of individual countries. In thinking about national security, governments need to give increased attention to environmental, disease, social, and injustice

problems, which all readily cross man-made borders. Notions of national sovereignty cannot continue to give countries license to prosper at the expense of other countries.

- Strengthen efforts to protect the rights of women. The situation of many women in the world is simply appalling. Ensuring rights and education for women bolsters social and economic development across the world according to a UNICEF study that showed “healthy, educated and empowered women have healthy, educated and confident daughters and sons. The amount of influence women have over the decisions in the household has been shown to positively impact the nutrition, health care, and education of their children”.²⁷
- Expand the rights of children to include a healthy environment and adequate resources. Unless they inherit a healthy environment and plenty of resources, young people have a bleak outlook indeed. The Ecological Footprint provides a good overall measure and must be kept safely and sustainably well below 1.0 Earth.
- Continue to defend and protect human rights, a duty which has emerged, for example, in the Universal Declaration of Human Rights and UN Conventions on Genocide and Human Rights, among others.
- Adopt a new model for development, one which includes human and environmental well-being as economic indicators and does not rely solely on economic growth. Abandon GDP growth as a metric for measuring development and replace it with the Human Development Index and the Ecological Footprint.

Governmental Institutions

Many national governments are nation-states (or at least states) and are based on the concept of sovereignty, meaning that the state has total control over what crosses its borders and over what happens within those borders. Most governments operate under an explicit or implicit social contract under which its citizens cede power to their government in exchange for social and economic order and protection. The social contract includes giving the state a monopoly on violence within its borders, including the right to execute individuals, and to wage war with other states. The government then has responsibility for security, administration of justice, enactment of laws and policies, collection and distribution of community funds, and maintaining relations with other national governments. These tasks include balancing the interests of individuals (including corporations) with the common good and mediating short- and long-term interests to meet the needs of the present generation without sacrificing the needs of future generations. In fulfilling its tasks, governments require foresight on both the physical and social state of its citizens and its natural capital so as to be able to anticipate and alter trends that may prove dangerous.

Individually, governments should:

- Require "Youth Impact Statements" that describe the long-term (100-year) impact of every significant governmental action, including laws, budgets, and policies. We young people and the generations to follow us are very significant stakeholders in virtually all major governmental decisions, but we have little more influence on those decisions than does the environment or Nature. We need to

count on our parents' and grandparents' generations to think systematically about our future welfare. And if the "discounting" methodology is used in inter-generational calculations, the rate should 0.5 percent or less^{****} as was used by Sir Nicholas Stern in his review of the economics of climate change.

- Require media corporations, as a condition for renewal of their corporate charter, to demonstrate that they are providing a public service through their programming.
- Tax resource use and waste generation heavily and use the income generated to stimulate reuse, recycling, and other increasingly sustainable practices and technologies. Strictly enforce the tax and monitor carefully its expenditure. It should not go into the general national budget, but instead be used to protect each country's natural capital and to ensure that future generations have resources available to them throughout their lives.
- Take effective steps to stabilize population while being sensitive to human rights and cultural considerations. It is the combination of population size and lifestyle that determines our Ecological Footprint.
- Cut military expenditures and shift the funds to addressing the underlying causes of conflicts, including poverty and inequality, environmental degradation, and resource depletion. Strive for security for citizens and political stability through attention to domestic issues, reduced dependence on the resources of other countries, and diplomacy and improved relationships with other countries.
- Improve the education and opportunities of women and children. This improvement will ensure the access to life skills and tools that future generations need to improve themselves and their societies. Investing in Social Capital, such as education, infrastructure, a justice system, and health, is the most important thing a nation can do to ensure its long-term success. It is the individual government's responsibility to expand and improve the lives of all citizens. The government must introduce legislation and policy in order to protect the women's rights, including access to education, health care, and improvements thereof.
- Combat corruption through transparent accounting, procedures, and practices as recommended in the guidelines provided by Transparency International (see: <http://www.transparency.org/publications/sourcebook>). Transparency helps create effective, fair, and efficient governments. If individual governments are unable to achieve transparency on their own, they should seek assistance from NGOs and international organizations. If individual governments are unwilling to assure transparency, NGOs and international organizations should lobby the governments.
- Require policy, legislation, and practices to create and enforce the protection of all human rights. The policy should also include education on rights and subsequently on tolerance as well. Individual governments will need to work together with all institutions in order to enforce these new policies. A good

^{****} "Discounting" is a method of giving more attention to the present than the future. For a 7 percent discount rate (quite commonly used), both the cost and benefits are "discounted" by 50 percent in ten years, which is no long enough to consider impacts on young people and future generations. For a discount rate of 0.5 percent, costs and benefits are discounted by half after 140 years, a time period long enough to begin to take into account future generations.

example of the large array of human rights and how they impact local, regional, and global society can be seen through the work of Human Rights Watch.

Collectively, governments should:

- Create a United Earth Organization (UEO). Currently, humans have no effective means of making planet-level decisions and enforcing them. The United Nations, the G-8, the Breton Woods institutions, and the World Trade Organization were invented half a century ago for to address various human-human issues, and are ill-suited to the human-Earth issues we face today. These issues include, but are not limited to, energy and other resource shortages, climate change, and the surge in global extinctions, all of which have implications on security. These human-Earth issues that our generation and future generations face require cooperation on a global scale if they are to be resolved in a just and lasting manner. While the old, international institutions may be able to continue to contribute on human-human issues, the UEO would focus on human-Earth issues. The UEO needs to be able to tax member institutions. It should not be based on the outmoded concepts of national sovereignty or free trade, but on developing and maintaining a mutually enhancing relationship between humans and Earth. Nature makes a mockery of the concept of sovereign control of national borders. The wind blows where it will taking GHGs and CFCs with it. So does water. So do diseases. So do migrating species. This is why countries increasingly need to work together as though without boundaries, and a UEO would facilitate such collaboration.
- Establish through UEO the paramount global goal of increasing the consumption level of the world's poor while at the same time reducing humanity's total Ecological Footprint (or some other comprehensive measure of human demands on Earth). The four system conditions developed by the non-governmental organization, Natural Step, provide an excellent starting point: (1) substances from the Earth's crust must not systematically increase in the ecosphere, (2) substances produced by society must not systematically increase in the ecosphere, (3) the physical basis for productivity and diversity of nature must not be systematically diminished, and (4) resources must be used fairly and efficiently with respect to meeting human needs. An improved situation for the poor is a moral and political necessity, and reducing humanity's Ecological Footprint is a matter of survival for today's young people.
- Refine the system of national accounts to include so-called external costs. Ecological and social costs are generally omitted in national accounting. As the books are now kept, environmental disasters increase the Gross Domestic Product (GDP) because of all the additional work required for clean up, but the unaccounted external costs are enormous, especially for future generations. Until the full costs of deforestation, overfishing, soil erosion, aquifer depletion, and water pollution are entered into our national accounts, we will be making decisions on fundamentally wrong and misleading data.
- Develop minimum standards for chartering and regulating corporations. Currently corporations relocate to countries with loose chartering standards and regulations, making effective governmental supervision of large corporations impossible.

- Replace growth of GDP as the primary measure of progress and well-being of countries individually and collectively. GDP needs to be replaced with a measure that includes natural capital, social welfare, and the internalized costs of ecological destruction. The Ecological Footprint would be an excellent starting point. Growth of GDP does not sufficiently account for the escalating impacts of increased throughput of material resources through an economy. A nation's economy cannot be sustained if it depletes its natural resources, if the health of its people declines, or if it develops hostile relationships with other countries over water flows, air pollution, and other environmental issues.
- Give attention to the deteriorating health, environment, and economic conditions that cause governments to lose effective control over their people and territory, and take nonviolent action both to prevent violent unrest and to restore order and peace when states fail. Failed states are a threat to their people and to all other states and persons on Earth. Health, welfare, and security depend on states functioning effectively.
- Act quickly. Massive changes in the way humans are organized on the planet are essential in a matter of years, not decades.

Spiritual Institutions

The world's faith traditions are an integral part of the overall network of culture shaping institutions. The world's faith traditions provide their faithful with comfort, routine, challenge, and authority, in varying degrees. They interpret or explain the meaning and purpose of human existence. Most faith traditions are based on stories, especially stories of origin and destiny, which influence our concepts of what is possible and desirable in human society, and therefore suggest a vision of global society. The stories also influence our sense of what is good and evil and the degree to which humans are by nature good or evil. Faith traditions have a pervasive, profound, and often unacknowledged influence on all of the other culture shapers. Everywhere, the stories, teachings, and traditions of our faiths traditions provide inspiration for, or excuse justification for, our laws and concepts of right and wrong. Some faiths provide guidelines for human-human, human-divine, and human-Earth relations. Concerning human-human relations, most faiths include the admonition to "do unto others as you would like them to do unto you", which of course is prudent given the reality of our condition of interdependence and the resulting realities. Guidance on human-Earth relations is being given increasing attention by leaders of some faiths.

Individually, faith traditions should:

- Be an integral part of and help to lead the culture change called for in this document.
- Encourage, embolden, or challenge our teachers, elders, wisdom-keepers, and prophets, to speak out on what is happening to Earth (as well as to people) and on the difficult, wrenching choices that need to be made if we are all to live peacefully and sustainably together.
- Encourage people to reflect and meditate on such concepts as vocation, right livelihood, calling, giving, and greater purpose that will contribute to a mutually

enhancing relationship between humans and Earth, and to reduced violence and suffering in the world for people of all faiths, genders, races, and nationalities.

- Inspire a sense of understanding, respect, and tolerance for persons of other faiths and respect for all, especially those discriminated against in the past on the basis of race, ethnicity, gender, age, or sexual orientation.
- Promote awareness of being an integral part of a planet—one species in a community of species—and lead the cultural development of interspecies ethics.
- Inspire an emotional connection with future generations of humans locally and globally.
- Set an example of openness to change for other faiths and for other institutional members of the global culture system by reflecting carefully as an institution on the following questions:
- What are the traditional teachings—and the range of other opinions—within your faith tradition on how to meet the legitimate needs of the growing human community without destroying the ability of Earth to support the community of all life?
- What are the traditional teachings—and the range of other opinions—within your faith tradition concerning a proper relationship between institutions of different faith traditions, including the process for interfaith dialog?
- What are the traditional teachings—and the range of other opinions—within your faith tradition concerning a proper relationship between persons of different races or genders (conditions they cannot change), and between persons of different cultures, or politics, or faith?
- What are the traditional teachings—and the range of other opinions—within your faith tradition on the possibility of criticism, correction, reinterpretation, and even rejection of traditional assumptions and “truth” in light of new understandings or revelations?

Collectively, faith traditions should:

- Lead the other institutional members of the global culture system in declaring a joint human responsibility for creating a mutually enhancing relationship between humans and Earth.
- Actively promote respect for human dignity and human rights for people of all faiths, genders, races, and nationalities.
- Lead the cultural development of “thinking as a species” and the practice of “interspecies ethics”.
- Promote a cultural concept of “enough” as an alternative to consumerism, consumption, wealth, and perpetual growth. Promote personal fulfillment through giving and receiving in interpersonal relationships, contributing to society, and personal growth, rather than through acquisition and consumption.
- Focus on conflict prevention, beginning with each faith tradition honestly reexamining its relations with other faiths and its teachings on violence, war, and injury to innocent persons. Strengthen interfaith institutions dealing with planet-level issues.

Corporate Institutions

Corporations are chartered by a state, originally on condition of meeting a particular public need, but increasingly with few conditions. Investors are shielded from liability for the actions and decisions of the corporation, and it is the fiduciary responsibility of the directors to maximize the return on the investors' money. Under the law, corporations are "fictitious persons" that have been granted many of the rights of real people. Corporations can own property. They can employ and discharge people. They can increase in number by incorporating other fictitious persons. They can contract with both real and fictitious persons. Although they are not real persons, they have the right of "free speech". They have standing in court. Corporations have been an enormously successful social invention, especially for creating capital. Many transcend national boundaries and laws with the largest corporations (e.g., Exxon-Mobil, Wal-Mart, and Shell) controlling most of the natural resources of the planet and receiving annual revenues comparable with countries like Denmark, South Africa, and Argentina. Corporations have enormous influence on societies through lobbying, guiding the direction of scientific research, employing workers, consuming resources, generating waste, establishing working conditions, respecting human rights, advertising, and mass communication. Their accountability period is often short, in many cases only three months. While corporations have changed the lives of large numbers of people through mass production, corporations have done immense damage to Earth, the effects of which will be felt for centuries. Examples include the Exxon Valdez oil spill in Alaska and the Union Carbide toxic release in Bhopal, to name only two.

Individually, corporations should:

- Rewrite their mission statements to include sustainable business practices, such as those proposed by the Coalition for Environmentally Responsible Economies (CERES). Such mission statements limit shareholder suits against corporations' boards and executives for the costs of environmentally responsible actions, such as energy conservation, safe labor conditions, safe products, and general environmental protection. Ideally, accountability to shareholders should inspire boards and executives to follow the promises in their mission statement.
- Submit to third party regulation by either government or a non-governmental organization (NGO). Third party regulation, including free trade or fair trade products, protects workers and neighboring communities from abusive practices and environmental damage and helps consumers find more sustainable products.

Collectively, corporations should:

- Develop and enforce business codes and principles to help businesses contribute to a globally sustainable future, including publishing audited "triple bottom line" reports (economic, environmental and social) and internalizing into business accounting what are now considered to be external costs, including social and environmental costs. A highly self-replicating, efficient, rich, and environmentally indifferent institution must either develop effective methods of self-regulation or society must impose regulations and penalties. It might even prove necessary to remove the liability immunity of investors.

- Collaborate to discourage over-consumption and consumerism. Over-consumption and consumerism are major problems, especially in industrialized countries and are exacerbated by both advertising and short product lifetimes, especially so called disposable products. To reduce resource consumption and waste generation, businesses should shift to durability and upgrades rather than replacements. To this end, corporations everywhere should take responsibility for or be made responsible for, the disposal of their products, creating an incentive for durable and non-toxic products.
- Corporations should lobby for and promote global standards for corporate social and environmental responsibility. Doing so will remove many of the financial incentives to pollute and to relocate to countries with low standards. If corporations do not regulate themselves, individual governments, regional organizations, and international organizations must create and strictly enforce global labor and environmental standards
- Collaborate to assure the global practice of the precautionary principle, which states that if an action or policy might cause severe or irreversible harm to the public or to the environment, in the absence of a scientific consensus that harm would not ensue, the burden of proof falls on those who would advocate taking the action. In other words, the absence of full scientific certainty shall not be used as a reason to postpone measures where there is a risk of serious or irreversible harm to public health or the environment. In practice, the precautionary principle is implemented significantly though laws concerning burden of proof on safety.

Educational Institutions

Our schools are the institutions humans developed to pass life skills from generation to generation. Without our schools—from elementary through post-doctoral—society could not function. Schools provide students a framework with which to understand the world. Education also teaches social and technical skills and knowledge that are needed to function in society. Education is a powerful tool for addressing the cultural, social, and health issues of a society. Colleges, universities, and technical institutes are especially significant components of our overall educational system because they support the various fields of scientific and other research that have given humans such extensive—and often dangerous—control over the natural world. They also are the place where we train the members of our professions, including law, medicine, education, engineering, and management, all of which have contributed to our current problems and all of which are needed to resolve them. Professional education passes on the values of society and assumptions of the professions to young professionals who then become leaders in all of society's institutions.

Individually, educational Institutions should:

- Reduce their Ecological Footprint. A first step would be to sign the Talloires Declaration and green the campus. Help is available from the Association of University Leaders for a Sustainable Future (ULSF).
- Transform the curriculum. Those of us involved in Our Task find that we are completing secondary school with no adequate knowledge of what is happening to Earth or of the major planet-level decisions that so urgently need to be made.

Our Youth Earth Plan is in part an effort at our own remedial education, and it (and the supporting materials on our web site) may be of use to others as well. Help is also available from the Association of University Leaders for a Sustainable Future (ULSF).

- Be examples of intercultural communication and tolerance. Countries, especially their educational institutions, are becoming more diverse, and given the other issues that lie ahead, hatreds and hostilities can develop. While an intellectual understanding of other cultures is certainly needed, a compassionate rapport is also needed. So, teach intercultural communication and tolerance through example.

Collectively, educational Institutions should:

- Seek the support of all institutional members of the global culture system to assure that all children everywhere are able to receive a basic education. Education greatly increases the likelihood that we young people will be able to handle the challenges facing us today and in the future.
- Encourage systemic, holistic thinking. The greatest challenges ahead for young people are highly interconnected. It is not enough to say that everything is connected to everything else. We need tools for systems thinking, such as those provided by the Creative Learning Exchange (<http://www.clexchange.org/>) for K-12 education and colleges and those provided by the System Dynamics Society (<http://www.systemdynamics.org/>) for colleges and universities.
- Develop a global holistic approach to education, including environmental, economic, cultural, social, political, community, personal, and spiritual dimensions. The greatest challenges ahead—poverty, security, climate, energy, food—are truly global. Yet we young people find that we are finishing secondary school and even college or university with no real grounding in what is happening to our planet or the major decisions being considered to address global problems. Our Youth Earth Plan (and the supporting material on our web site) might provide useful supplementary material for courses both in secondary schools and in colleges and universities.
- Transform the education of professions to focus on sustainability. Many of our professional schools continue to teach and promote unsustainable values, concepts, practices, and habits, neglecting sustainable alternatives. We need to reorient our curricula for all professions so they shift from promoting exploitation to developing and sustaining a mutually enhancing relationship between humans and Earth.

Media Institutions

Media institutions (newspaper, radio, television, Internet, film, etc.) inform the public generally about what is happening in the community. Media organizations also serve as watch dogs, monitoring the performance and behavior of all major institutions and prominent individuals. Beyond simply giving information, the media educate on many issues, entertain, and provide a forum for personal opinion, artistic expression, and debate of public issues. The media also provide socialization and entertainment and can enrich and bring together cultures by exposing people to both new worlds and different aspects

of their own. Thus, the media are both a tool for education and a place for the expression of ideas. The media and the information they share greatly impact thinking, culture, policy, and trends in the community.

Individually, media institutions should:

- Continue to provide a forum for expression of thoughtful personal perspective, but distinguish clearly between scientific consensus and individual opinion. Check carefully on sources of financial support minority opinion to determine if self-serving interests are involved.
- Continue to reflect on issues raised by filmmakers, musicians, and other creative artists.
- Open the media increasingly to contributions and perspectives from civil institutions.
- Disclose assumptions and conflicts of interest. Reporting on studies and polls, for example, should clearly explain the methodology, assumptions, and funding, as well as the findings.

Collectively, media institutions should:

- Assure the continued functioning of the media in reliably informing the public about important issues. Such assurance requires first and foremost a viable, adequate, continuing, and un-controlling source of revenue. Potential funding sources include traditional and new forms of advertising, direct consumer payments, and patronage from sources such as nonprofit groups. A key issue is maintaining a measure of independence from funders, governments, and the marketplace, and doing thorough research on issues.
- Bring a global, holistic, and systematic perspective to reporting by systematically describing the feedback loops of causal relations and lags and nonlinear effects. Causal loop diagrams would be helpful in many stories. Important feedback loops are often missing from reporting today. Systems thinking is vitally important to the successful resolution of the global issues confronting young people, and systems-oriented reporting can contribute to the development of systems thinking in the public generally.
- Report on the global issues of our time from the perspective of humanity as a whole within the whole community of life. The media currently report primarily on human-human issues, and the most vital issues of the future are the global human-Earth issues. The issues of energy, climate, poverty, and security are truly global in extent and involve every person on Earth. Report on their full interconnectedness and on the contributions that each and every one of us must make to their resolution.
- Do not allow a minority opinion (political, scientific, or otherwise) to unduly block consensus and action out of a misplaced concern for balance or a desire to build readership through controversy. The excessive reporting in the United States of minority opinions on the causes of climate disruption (often funded by vested interests) is a case in point. Nonetheless, minority opinion is not always bad. It was a minority opinion for awhile that the world was round, and that minority turned out to be right!

- Continue with other institutions to develop reliable sources for understanding and reporting on the systemic global issues of today. Share such sources with the public so that students and others can educate themselves beyond what they learn from news stories. This can be done through an associated web site with hyperlinks to the sources.
- Promote sustainability and counter consumerism. Encourage buying only enough durable goods rather than replacing goods frequently in response to fads, trends, and advertising.

Scientific Institutions

Scientists and their institutions seek to understand the complex nature and workings of the universe, especially Earth. Inspired by hypotheses, scientists perform experiments and make empirical observations on which to develop theories for testing through further experimentation. The knowledge derived from science has led to countless inventions and technologies that shape our lives, economies, and cultural beliefs. Scientific research, for example, has greatly altered our beliefs on the origins of disease and the place of the Earth in the universe. Scientific knowledge, skills, and technologies can be used for good or for ill, and we rely on other institutions to help evaluate and guide decisions to use or not use certain scientific findings. For example, the decision to use the knowledge of nuclear fusion to create nuclear weapons has had fateful consequences for human kind. The discovery of the smallpox virus has also had significant, but very different, consequences. The scientific discoveries that made possible the industrial revolution, green revolution, and genetic engineering continue to impact not only on our societies and economies, but also the environment for the whole planet. Knowledge from science, as well as our ability to assess the future consequences of applying scientifically based technologies, will be increasingly important as we work to halt and reverse the damage we are inflicting on Earth. Public understanding of science will be vital as we collectively work to guide the direction and funding of science by governments, corporations, and universities.

Individually, scientific institutions should:

- Create collaborations and programs with educational and civil institutions to educate national and global communities about the nature, relevancy, and social implications of current research. Candid technical dialog with non-scientists is not common and could help scientific institutions to gain community support and help the general public to understand the social implications of possible technological developments. Such initiatives would increase the public's scientific literacy, encourage research relevant to our biggest problems, and spur interest in the research.
- Collaborate with the other institutional members of the global culture system in developing policies, technologies, and processes which will reduce our Ecological Footprint. It will be especially important to increase energy efficiency, reduce overall resource consumption, and reduce waste generation. These efforts should be integrated into the community's education programs. Every type of scientific institution can contribute research in these areas, and this research will be beneficial to the scientific institution as well as the stakeholders (businesses,

consumers, schools, and community) by helping save money and increase the sustainability and security of the local, national, and global community.

Collectively, scientific institutions should:

- Assess the social and environmental impacts of research areas. While many scientific and technological discoveries have provided economic and social benefits, such discoveries often have unanticipated side effects that create external costs (like environmental damage) that are not accounted for by companies marketing technologies. These external costs must be covered, ultimately, by the community. The cost of cleaning up toxic chemicals, for example, is vastly higher than preventing the contamination in the first place. Scientific institutions typically report and promote the benefits of their technologies, but often ignore the known or possible negative consequences. Scientific institutions should allot funding and create procedures specifically for the impact assessment of each research project.
- Provide reporters, teachers, scientists, and general public with an online location to find the latest global scientific consensus on key global issues. While millions of scientists and reporters publish scientific articles daily, and while Internet search engines do enable people to access this information, these articles and reports may include misleading information that must be sorted and processed to reach the latest globally accepted consensus. A few civil society organizations have tried to help define and communicate scientific consensus, but there is not a globally accepted, publicly promoted one-stop location for scientists or the general public to access the global scientific consensus on each issue. It would be a boon to both scientists and the general public.
- Create initiatives and partnerships to communicate the extent of human alteration of the planet's ecosystems. Currently the vast majority of people do not understand the magnitude, extent, and implications of human impacts on the planet's ecological systems. Though evidence abounds and the implications are critical, the general public needs, but lacks, a clear message that explains the problems and, if possible, how we can address them.
- Communicate to the general public the extent of human-ecological impacts and inspire people to make changes that minimize our negative impacts. These communications should be undertaken with the other institutional members of the global culture system.
- Create initiatives and programs that increase research in three complementary directions: accelerating efforts to understand Earth's ecosystems; reducing the impact of current activities on Earth's ecosystems; and creating new technologies and processes to reduce our overall ecological footprint. These initiatives need to be created in collaboration with other institutional members of the global culture system. Governments, corporations, and universities need to provide funding. Educational institutions need to create a curriculum that is easily accessible to all.
- Promote a shift in funding and research priorities towards the critical areas of understanding the large-scale impacts of human activities on our health, our environment, and the Earth's ability to support us indefinitely. A shift in scientific research towards these areas would increase the resources available to businesses

and governments for addressing some of the most pressing problems in the 21st century. The biggest threat to security is the collective disruption of Earth's systems (including climate stabilization). Security for all requires much greater expenditures on protecting and restoring Earth's systems, which, for example, could be funded with 15-20 percent of current global military budgets and would contribute greatly to everyone's security.^{††††}

Civil Institutions

Civil institutions and civil society generally are a means by which members of a society organize themselves to meet a perceived need not being met by another culture shaping institution. They are generally non-profit organizations financed by charitable donations. As a group, they provide a vehicle through which community consensus can form and action can be inspired, whether it is political, environmental, or service based. These institutions can help people lobby for change within larger institutions, including all of the other culture shaping institutions. They can also serve as watchdogs for the government, corporations, and the media. Civil institutions often provide needed community services, such as giving help to the poor, and in extreme cases, even standing in for the governments of failed states. They are important social tools for community support, service, information, advocacy, and action. They have been, and continue to be, a vital source of innovation and constructive change.

Individually, civil institutions should:

- Adopt policies and practices which reflect an essential concern for global welfare and sustainability. Civil institutions bring together people with common interests and passions, and members of these groups are affected by the group's social norms and policies. When a group's policies and practices promote a global world view and a sustainable lifestyle, such as recycling, purchasing durable goods, and reducing waste, the example they set can help change consumer behavior and bring specific social and environmental issues to light.
- Work to bring about changes in business practices, focusing on sustainability. Civil society organizations can set helpful examples through their procurement policies and relations with employees and community, but usually businesses need additional incentives to change. Civil institutions can provide additional encouragement by gathering community support, lobbying for government regulations and policies concerning business, collaborating with competing businesses, and engaging other institutions to provide further incentives.
- Include concern for future generations in the institution's mission and message. Civil institutions can help create shifts in culture through their programs and messages to the public. By reflecting on the immediate mission in the context of

^{††††} Restoring the planet will require money. The only big source of money is military budgets, not just in the west, but all over the world. Also, restoring the planet is an important alternative to violence in achieving security because many of the factors that drive people to asymmetrical or even suicidal warfare are feelings of being left behind when it comes to water, land, energy, and other resources. So, an alternative and critically important approach to gaining security is to take money from military budgets put it into planet restoration and social programs like health and education. For more on this point, see L. R. Brown, *Plan B 3.0*, Norton: New York, 2008, pp 280-85.

the whole system of global problems—economic injustice, an unsustainable Ecological Footprint, human rights abuses, and a growing potential for violence—civil institutions can bring a more holistic approach to their missions. We need to address both today's and tomorrow's problems. For example, an organization helping orphans might adopt sustainable building principles when they create new facilities.

- Monitor accuracy in advocacy. Good decisions require good information. Incorrect, misleading, or incomplete information leads to ineffective or harmful decisions, misunderstandings, and delays. Additionally, when thorough research is not done, institutions can undermine their legitimacy and harm their cause by producing inaccurate information. Civil institutions can help everyone through efforts to increase the accuracy, relevance, and timeliness of information.

Collectively, civil institutions should:

- Advocate for policies and practices reflecting an essential concern for global welfare and sustainability. Globally, civil institutions are a strong moral force for constructive change. When the policies and practices of such groups promote a global world view and a sustainable lifestyle, they constitute a powerful influence on the whole global culture system.
- Advocate for laws that allow for the free association of people—a human right—in civil institutions. Support laws that allow citizens to make tax-deductible contributions to charitable civil society organizations.

A Concluding Request to Ourselves

Humans are rushing forward on a course of development and consumption that cannot be sustained, is grossly inequitable and unjust, and is undermining the viability of Earth. If current policies, values, and trends continue, the future for all of us—especially for future generations—is imperiled. Yet if we think carefully, choose wisely, and act decisively, we can improve our outlook. We believe we have enough time and sufficient resources to change direction, but absolutely no time nor resources to waste.

Our Youth Earth Plan has focused largely on recommendations to culture-shaping institutions because we believe that we face a severe cultural disorder. Our cultures have led us into lifestyles that are unraveling the very fabric of our planet and have not sounded timely and effective warning of the extreme dangers we humans now face. For these reasons, we believe it is necessary to reorient our culture.

We also realize that in a few decades, we young people will be the leaders of the institutions that guide and shape culture. Thus, what we make of ourselves will ultimately have a significant influence on the direction of culture. Therefore, in addition to the institutional requests made above, we are making some requests to our own generation. Let's help each other:

- Use our educational opportunities wisely, learning as much as we possibly can about the state of our planet and the options for putting it on a sustainable course to the future.

- Develop a personal lifestyle focused on the concept of enough, rather than on consumption, style, wealth, and waste.
- Learn to get along with people different from ourselves.
- Engage in serious but respectful dialog with our parents' and grandparents' generations about the changes we would like them to help us make.
- Work to change the way our institutions value the whole community of life.
- Choose carefully when selecting a spouse, a school, a vocation, a faith tradition, or a political candidate, and help those who do not have the luxury of such choices to obtain such freedoms.
- Be thoughtful and prudent in how we exercise our gift of human fertility.
- Not abuse our bodies with drugs or other risky behaviors.
- Care for Earth.
- Use well and wisely the influence we have and join together to increase our influence.

Youth, even children, can often influence their elders, so let's have the courage to speak truth about our future to our elders and ask them to change. Our current powerful system of culture-shaping institutions is not guiding human civilization toward a just, peaceful, and sustainable future. We young people need to speak this truth to our parents, our relatives, our friends, and to our acquaintances in all of the culture-shaping institutions.

Coming into our inheritance will not be easy. There will be challenging circumstances and huge responsibilities none of us wanted. But our dreams drive our actions, so let's all dream together about creating and enjoying a mutually enhancing relationship between humans and Earth. Let's work together on changes to improve our inheritance. How we all—children, parents, and grandparents—handle this inheritance process will set the direction for every future generation.

And youth, even children, can sometimes successfully call their elders to account, so let's have the courage to speak truth to power. Our powerful system of culture-shaping institutions is not guiding human civilization toward a just, peaceful, and sustainable future. We young people need to speak this truth to our parents, our relatives, our friends, and to our acquaintances in all of the culture-shaping institutions.

This speaking-truth is especially important in our faith traditions. They need to be part of—actually to lead—the culture change. Unfortunately, if past centuries are a good indicator, our faith traditions are unlikely respond to the individual or the collective challenges above. However, faith traditions do respond to the prophetic challenges and exhortations of great and respected teachers. So we youth in all faith traditions need to encourage, embolden, or challenge our teachers, elders, wisdom-keepers, prophets, to speak out on what is happening to Earth (as well as to people) and on the difficult, wrenching choices that need to be made if we are all to live peacefully and sustainably together. And perhaps there are among us young persons with the gift and courage of the prophetic tradition, and we need to embolden them to speak out. Speaking out prophetically—challenging the status-quo, smashing the prevailing icons—has historic

precedence in every faith tradition, but it is always fraught with danger for the individual who is called to do it. So, let's support those who do.

Coming into our inheritance will not be easy. There will be challenging circumstances and huge responsibilities none of us wanted. But our dreams drive our actions, so let's dream together, all of about creating a mutually enhancing relationship between humans and Earth. How we all—children, parents, and grandparents—handle this inheritance process will set a direction for many for generations to come.

¹ See http://www.ourtask.org/youth_earth_vision.asp.

² See list at http://www.ourtask.org/Youth_Earth_Plan/OutlookSources.pdf.

³ See list at http://www.ourtask.org/Youth_Earth_Plan/OutlookSources.pdf.

⁴ See http://www.ourtask.org/Youth_Earth_Plan/OutlookSources.pdf.

⁵ See Population Outlook for further details and references:

http://www.ourtask.org/Youth_Earth_Plan/outlook/population.asp.

⁶ UN Population Division. World Population Prospects: The 2006 Revision. New York: United Nations. 2007. P. v.

⁷ See Urbanization and Megacities Outlook for further details and references:

http://ourtask.org/Youth_Earth_Plan/outlook/urbanization.asp.

⁸ See Education Outlook for further details and references:

http://ourtask.org/Youth_Earth_Plan/outlook/education.asp.

⁹ See: http://portal.unesco.org/education/en/ev.php-URL_ID=53844&URL_DO=DO_TOPIC&URL_SECTION=201.html and

<http://www.un.org/millenniumgoals/>.

¹⁰ See Health Outlook for further details and references:

http://ourtask.org/Youth_Earth_Plan/outlook/health.asp.

¹¹ See Economic Outlook and Technology Commentary for further details and references:

http://www.ourtask.org/Youth_Earth_Plan/outlook/econ.asp;

http://www.ourtask.org/Youth_Earth_Plan/outlook/tech.pdf.

¹² See Energy Outlook for further details and references:

http://ourtask.org/Youth_Earth_Plan/outlook/energy.asp.

¹³ See Food Outlook for further details and references:

http://ourtask.org/Youth_Earth_Plan/outlook/food.asp.

¹⁴ See Fisheries Outlook for further details and references:

http://ourtask.org/Youth_Earth_Plan/outlook/fisheries.asp.

¹⁵ See Land Outlook for further details and references:

http://ourtask.org/Youth_Earth_Plan/outlook/land.asp.

¹⁶ See Water Outlook for further details and references:

http://ourtask.org/Youth_Earth_Plan/outlook/water.asp.

¹⁷ 1.25 Earths in 1993, http://assets.panda.org/downloads/living_planet_report.pdf; extrapolated to 1.3 Earths in 2007, Mathus Wakernagel, personal communication, 23 October 2007.

¹⁸ See Atmosphere Outlook for further details and references:

http://ourtask.org/Youth_Earth_Plan/outlook/atmosphere.asp.

¹⁹ See Oceans and Coasts Outlook for further details and references:

http://ourtask.org/Youth_Earth_Plan/outlook/oceanscoasts.asp.

²⁰ See Forests Outlook for further details and references:

http://ourtask.org/Youth_Earth_Plan/outlook/forest.asp.

²¹ [World Agriculture: towards 2015/2030: An FAO Perspective. Rome: UN Food and Agriculture Organization. 2003.](#)

²² See Biodiversity Outlook for further details and references:

http://ourtask.org/Youth_Earth_Plan/outlook/biodiversity.asp.

²³ See Toxic Substances Outlook for further details and references:

http://ourtask.org/Youth_Earth_Plan/outlook/toxic.asp.

²⁴ See War and Violence Outlook for further details and references:

http://www.ourtask.org/Youth_Earth_Plan/outlook/war.pdf.

²⁵ See <http://www.footprintnetwork.org/>. A short, easily-understood explanation of the EF is provided in D. Meadows, et al., *Limits to Growth: The 30 Year Update*, White River Junction: Chelsea Green Publishing Company, 2004, pp. 291-2.

²⁶ See our summaries at <http://www.ourtask.org/strategies.asp>.

²⁷ State of the World's Children 1999, Summary, UNICEF, p. viii.