



We may be in a race between the increasing proliferation of threats and our increasing ability to improve the human condition. This drama drives many people around the world to fight destructive fatalism by implementing innovations benefiting humanity. Yet the emergence of world conscience strategically focused on global challenges is too often distracted by trivia in the media, government pettiness, valueless marketing, daily complexities of survival, and all forms of information pollution. Nevertheless, enough wisdom has prevailed to accelerate human development for a growing majority of the world.

The insights in this year's *State of the Future* can help decisionmakers and educators who work to counter hopeless despair, blind confidence, and ignorant indifference—attitudes that too often have blocked efforts to improve the prospects for humanity. Last year's edition began with the statement:

After seven years of accumulative global futures research by the Millennium Project, it has become increasingly clear that humanity has the resources to address its global challenges; what is less clear is how much wisdom, good will, and intelligence will be focused on these challenges.

This eighth year of the Project's work further confirms this conclusion. One of the greatest dramas is whether current and future efforts to achieve sustainable development will be sufficient to prevent global warming from seriously damaging civilization and life-support systems, eventually leading to a greenhouse effect growing beyond human control. Atmospheric CO₂ has gone up again for another record year, three of the last five years were the warmest in recorded history, and the world could use more than twice as much fossil fuels over the next 50 years as over past 50.

We face numerous other daunting challenges: water tables are falling on every continent, agricultural land is becoming brackish, ground-water aquifers are being polluted, 1.1 billion people do not have access to safe drinking water, and 2.4 billion lack adequate sanitation. By 2050 more than 2 billion people could be living in water-scarce areas, forcing masses of people to migrate into inhumane conditions. Without sufficient nutrition, shelter, water, and sanitation, it is reasonable to expect increased migrations, conflicts, and disease.

At the same time, millions of people around the world work daily to produce more intelligent human-nature symbioses. Although the interdependence of economic growth and technological innovation has made it possible for 3–4 billion people to have relatively good health and living conditions today, unless our financial, economic, environmental, and social behaviors are improved along with our industrial technologies, the long-term future could be more difficult. However, with cheaper materials and better automation we can easily cut inputs in half and double outputs; with better ICT we can more optimally match ideas, people, resources, and challenges worldwide in real time; with emerging global ethics and decision support systems, improved policies seem possible. But will this be sufficient to engage our thinking far enough into the future to get ahead of problems and seize opportunities?

The dynamics of urbanization coordinates with so many important improvements to the human condition that urbanization—once thought of as a problem—is now seen as part of the solution to poverty, ignorance, disease, and malnutrition.

By 2050 there could be 2 billion people who are 60 or older, which will be more than the number who are under 15. Assuming no major breakthroughs in life extension research, one UN alternative forecast projects that by the end of this century world population could actually be a billion lower than today. This would force changes

in retirement and in health care systems and cultures worldwide. Yet the current population of 6.4 billion is forecasted to grow to 8.9 billion by 2050; 98% of this growth is expected in the poorer countries. The North is suffering from aging, declining populations and the need to provide retirement benefits, while the South is suffering from growing populations with very limited opportunities. It seems that a global strategy to match these needs and resources should be on the international agenda.

The number of democracies is growing, the number of dictatorships is decreasing, and more people will vote this year than ever before in history. At the same time, there are approximately 50 failed nation-states. What are the international community's responsibilities for anticipating future failed states and rescuing current ones?

Globally oriented, future-oriented politicians are urgently needed. There is no escaping the need to educate the public, who could in turn elect more global future-minded politicians. The completion of the Human Genome Project, the Internet, AIDS, management of the International Space Station, globalization of the news media, and the evolution of the WTO, NATO, and the EU—all relatively unthinkable just 25 years ago—are some of the factors that demonstrate the acceleration, complexity, and globalization that are increasing the need for global, long-term perspectives in our decisionmaking. Yet graduate programs in global futures research are scarce.

Meanwhile, the merging of information and telecommunications technologies is creating a self-organizing mechanism that can improve the collective intelligence of humanity. As mobile phones and the Internet merge, China is set to become a unique cyber phenomenon: it has the largest number of mobile phone users in the world and within two years it will also have the most Internet users. As the integration of cell phones, video, and the Internet grows, prices will fall, accelerating globalization and allowing swarms of people to quickly form and disband,

coordinate actions, and share information ranging from stock market tips to bold new contagious ideas (*meme epidemics*). About 13% of humanity connects to the Internet, and the digital divide is narrowing. At the same time, civilization is vulnerable to cyber terrorism, power outages, information pollution (misinformation, pornography, junk e-mail, media violence), and virus attacks. (The probability of a catastrophic attack—global damages in excess of \$100 billion from a chain of combined events—has risen from 2.5% for 2003 to about 30% for 2004, according to mi2g Ltd.)

In the past 20 years, income per capita has grown almost 10%, life expectancy has increased about seven years, secondary school enrollments have grown by 30%, and infant mortality has dropped by almost 40%. Yet without major policy interventions, the income disparities could grow enough to create global instabilities. The ratio of the average income of people in the top 5% to the bottom 5% has grown from 6:1 in 1980 to over 200:1 now.

More than 30 new and highly infectious diseases have been identified in the last 20 years, such as avian flu, Ebola, AIDS, SARS, and cross-species viruses in Africa; for many there is no treatment, cure, or vaccine. The Copenhagen Consensus rated the fight against HIV/AIDS as the most important issue facing the world, and our State of the Future Index studies also show this as one of the most important threats to the future in quantitative terms. Another study showed that spending \$60 billion to promote condom use and distribute antiretroviral drugs would save \$3 trillion. Meanwhile, nurses and teachers in some parts of Africa are dying of AIDS faster than they can be replaced. Yet some important progress is being made: the yearly cost of antiretroviral medicine available to some in developing countries has fallen as low as \$300 per person, a new 40-hour AIDS test may affect the spread of the disease, and a genetically modified vaginal bacteria that can be stored in freeze-dried tablets may be able to protect women against HIV.

While the number of major armed conflicts (those with 1,000 or more deaths) continues to fall, some major powers have not fully understood that Industrial Age military force is not sufficient to counter asymmetrical warfare. Engagement of the disenfranchised by the more powerful is essential to reducing terrorism and ethnic conflicts. This engagement will be increasingly important since, according to one study, there are 285 minority groups that could be in future conflicts due to different forms of injustice, and within the next 25 years it is possible that single individuals acting alone might use advances in science and technology to create and use weapons of mass destruction. There are more than 53,000 UN peacekeepers (military personnel and civilian police) from 96 countries currently deployed in 15 missions on three continents. Yet the vast majority of the world is living in peace, trans-cultural ethics is being studied, dialogues among differing worldviews are increasing, formal EU and informal East Asia regional groupings of powers are adding to stability, and intra-state conflicts are increasingly being settled by international interventions.

Next year marks the tenth anniversary of the Fourth World Conference of Women in Beijing—the largest UN conference in history. Although it accelerated efforts to improve women's lives, many nations have not fulfilled their commitments to international conventions, declarations, and platforms for improving the status of women in their countries, even though this could be one of the most cost-effective strategies for addressing the global challenges of our age. Meanwhile, violence against females between 15 and 44 years of age causes more death and disability than cancer, malaria, traffic accidents, and even war. Amnesty International estimates that one out of every three women has been physically assaulted by an intimate male partner at some point in her life.

The more than \$2 trillion amassed per year by transnational organized crime allows its participants to buy the knowledge and technology to create new forms of crime to generate even more

profits. Nation-states can be understood as a series of decision points that are vulnerable to the vast amounts of money from crime syndicates. Transnational organized crime is increasingly interfering with the ability of governments to act. It is time for an international campaign by all sectors of society to develop a global consensus for action to counter transnational organized crime.

Most people do not appreciate how fast science and technology will change over the next 25 years. People are surprised to learn that even today we can see proteins embedded in a cell's membrane tens of billionths of a meter across, that organic transistors with a single-molecule channel length have been developed, that gene variants for schizophrenia, depression, and other mental diseases have been discovered, and that light has been stopped by a yttrium-silica crystal and then released and has been slowed in gas and then accelerated, promising vast improvements in computer capacity. The synergies and confluence of nanotechnology, biotechnology, information technology, and cognitive science—known as NBIC—will dramatically increase individual and group performance and the support systems of civilization. Dramatic increases in collective human-machine intelligence are possible within 25 years.

Today, it takes 33% less energy to produce a unit of GDP in industrial economies than it did in 1973. Nevertheless, world energy demand is forecast to increase by 54% from 2001 to 2025 and to require about \$16 trillion in new investments to meet demands by 2030. A Millennium Project international panel rated the commercial availability of non-nuclear fission and non-fossil fuel means of generating baseload electricity by 2025 at prices competitive with today's fossil fuels as the most important mission for science and engineering to improve the future. Unless significant progress is made on carbon sequestration, the environmental movement may try to close down the fossil fuel industries, just as it stopped atomic energy growth 30 years ago.

The synergies of NBIC technologies plus robotics and genomics promise god-like powers with ethical implications beyond current discourse. Information overload makes it increasingly difficult to separate the noise from the signal of what is important to know in order to make a good decision. Because the unprecedented speed of change makes people unsure about the future and because globalization is challenging philosophical and religious certainty, people are unsure of the basis on which to make decisions. Chapter 1 presents executive summaries of 15 Global Challenges for humanity, while more substantial details for each are included in the CD's Chapter 1.

State of the Future Index

On what basis should the world's resources be allocated on behalf of humanity? The State of the Future Index is a tool in development to help answer that question. It is a statistical combination of key indicators and forecasts related to 15 Global Challenges as a whole that assesses whether the future is improving or getting worse over the next 10 years. It integrates expert judgments from around the world to answer in quantitative terms which issues deserve attention to diminish risk or improve the future.

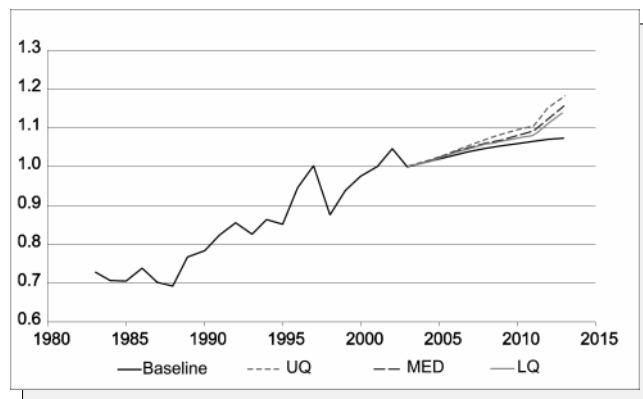
Several years ago the Millennium Project examined the interaction among the Challenges and found that improving one improved most of the others, while deterioration in one makes the condition of all the Challenges worse. This led to the belief that more may be learned about effective policies by studying the relationships among the elements of a system than by studying the elements themselves. Why not search for the policies that have the most beneficial effects across the set of issues? SOFI provides a mechanism for doing just that. With SOFI, someone could conceive a hypothetical policy and test it to determine not only whether it promises to satisfy its primary intent but what its overall effect will be on the general future outlook.

This year, new software was developed to ease the chore of data entry and the computation of the SOFI. Sensitivity tests were performed to determine the response of the SOFI to changes in assumptions about two or three key external developments. The policies that held the key to the future were found to be associated with lowering the projected number of AIDS deaths and diminishing the probability of a high number of deaths due to terrorism. Without effective policies in these areas, there is a significant chance of a much darker future, with a SOFI sharply lower than it might have been. (See Figure 1 for a graphic representation of the 2004 SOFI.)

The future cannot be reduced to a number, but the process of developing this index forces people to consider what they mean when they say the future is getting better or worse. An international panel of more than 200 scientists, business planners, decisionmakers, and futurists who work for international organizations, governments, corporations, NGOs, and universities identified and rated developments that might alter the SOFI variables. Chapter 3 presents an executive summary of these insights, and the full details can be found in the CD's Chapter 2. Chapter 4 introduces the first national SOFIs.

2004 State of the Future Index

Figure 1



Middle East Peace Scenarios

The time and energy it would require to rectify past injustices felt today might be better spent on building a more just, humane future. We do not have to forget the past, but we should not let it enslave our ability to build a better tomorrow together. In this spirit, at the suggestion of the Cairo Node of the Project, the Millennium Project agreed to produce three alternative normative peace scenarios for the Israeli-Palestinian situation. Even though this conflict is one of the most analyzed issues today, there are no well-researched, objective, plausible peace scenarios for the Middle East—not frameworks, proposals, treaties, or road maps, but scenarios that are stories with causal links connecting the future and the present.

Working backward from an imagined peace sometime in the future, seven conditions were identified that had to exist just before peace was achieved. Actions to address each precondition were identified and rated by an international panel as to their likelihood, the importance of achieving the precondition, and the possibility that it could backfire or make things worse. The results from a two-round questionnaire were used to write draft scenarios, which were submitted to the panel members for comment. The pattern of results of this third round was used to write the three scenarios presented in Chapter 5. These can now be used as a basis for discussion among the interested parties. The full study with the results of all three rounds is available on the CD.

Scenario 1: Water Works—Water crises led to water negotiations that built trust that peace was possible and boosted political negotiations. Momentum increased with new youth political movements, the “Salaam-Shalom” TV series complemented by Internet peace phone swarms, tele-education in refugee camps, the Geneva Accords complemented by parallel hardliner negotiations, joint development with Arab oil

money and Israeli technology, participatory development processes, new oil pipelines from the Gulf to the Mediterranean, and a unique “calendar-location matrix” for time-sharing of the holy sites. UN troops enforced agreements with non-lethal weapons, and new forms of international collaboration cemented the peace.

Scenario 2: The Open City—The new Pope challenged Jewish and Muslim religious leaders to solve the question of governance in Jerusalem. Politics, power, and media all played a role in reaching a proposed solution that was ultimately codified in a resolution adopted by the UN General Assembly. The threat of a fatwa ended the suicide bombings; when the bombings stopped, so did the Israeli retaliatory missions. Education of young Muslims gradually changed; schools that once taught hatred moderated. On the question of refugees, the Israelis were concerned about being overwhelmed and outvoted by Palestinian immigrants in their democratic society. The issue promised to be inimical but a compromise restricted the right to vote to people who had lived in Israel for more than seven years. Finally, a historic proposal came to the UN from Israel—it traded guarantees of Israeli security for establishment of a permanent Palestinian state.

Scenario 3: Dove—“Dove” was a secret, contested Israeli plan to de-escalate and unilaterally renounce retaliation in order to demonstrate that Palestinians were aggressors. At the same time, a secret debate was taking place among extremist Palestinians on whether to escalate to more lethal weapons. Those against escalation said “If we desist, Israel will be seen as the aggressor.” So each side had reasons for wanting to stop but seemed frozen by circumstances. The tide changed when 27 Israeli pilots said they would not participate in future air raids, initiating the “Refusnik” movement. What happened next was like a chess game. The Israelis got a guarantee that the bombing would stop; the Palestinians got an agreement that the Israelis would withdraw to

the pre-1967 borders. A series of non-aggression treaties and agreements stated that Israel had a right to exist. Jerusalem became an open city, with its own democratic government. Immigration quotas were established. Foreign capital flowed into the area. New businesses were established, and unemployment among the Palestinians dropped sharply. It was a self-fulfilling cycle: the move toward peace sparked the environment for peace.

While writing these scenarios, it became increasingly clear that the speed of building better conditions must be so fast that the voices of those who would have us understand the past before we move forward are less audible than before. It is a race. It is easy to say there are many alternative scenarios for the Middle East that show variations on the current violence, but without plausible stories of how peace could evolve with cause-and-effect relations woven into peace scenarios, it is difficult to motivate people to move toward more cooperative pursuits to build a new story for the region.

Environmental Security

The links between the environment and security are increasingly becoming the subject for international agreements. Environmental security is environmental viability for life support with three sub-elements: preventing or repairing military damage to the environment, preventing or responding to environmentally caused conflicts, and protecting the environment due to the moral value of the environment itself. The Millennium Project has been scanning a variety of sources to identify emerging environmental issues with treaty and military implications. Over 200 items have been identified during the last two years. A summary is presented in Chapter 6, and the full text of these items and their sources can be found in CD Chapter 9.1, Emerging Environmental Security Issues. Some general patterns and insights from the items include:

- “Business as Usual” will be a misleading forecast: New sensor technologies, increasing environmental awareness, and international agreements mean that many actions accepted over the past 10–20 years will not be tolerated over the next decade or two.
- Military roles are increasing in documenting military chemicals, food, equipment, and impacts and locations of weapons (such as the spent uranium shelling controversy), in securing pathogens and toxins from terrorists, in conducting more-sophisticated post-conflict clean ups, and in anticipating disaster responses as the impact and number of disasters rises and as disasters become more acute due to climate change and chemical and biological pollution.
- Environmental causes of conflicts are expected to become more significant as environmental deterioration increases the number of “environmental refugees,” which will in turn increase the number and scale of conflicts related to migration.
- Environmental issues continue to rise on the international political agenda.
- The Aarhus Convention reinforces the growing trend of increased public and NGO participation in shaping national, regional, and international policy, legislation, and treaties.
- Sovereignty and environmental security may increasingly be in conflict.
- Global warming is not going away, and legal mechanisms to recover damage seem inevitable.
- A global framework for chemical, nuclear, and biological weapons is needed.
- New initiatives to increase eco-efficiency and eco-security are emerging all over the world and at all levels—the UN, regional groups, and national and local organizations.

Weblog Database

There are many methods for exploring prospects for the future, but probably the most fundamental way to support futures research is using a system to identify developments that promise change and to keep track of changes that are under way. Such a system is referred to as an early warning or environmental scanning system. The term “environmental” in this case does not refer to nature but to the “environment” being scanned for change. This could be the social, political, technological, or economic as well as the natural environment.

To facilitate an evolving collective intelligence, the Millennium Project is creating a weblog database to monitor global change and to update and improve the 15 Global Challenges and the State of the Future Index (see Chapter 7). Comments on the entries can be made by anyone (with editorial oversight). From time to time the entries will be reviewed for possible input to the 15 Global Challenges and SOFI. The results will be placed into a knowledge database tailored to support the updating process. This will provide an additional on-going feedback system to increase the collective intelligence of the Millennium Project. The database is available via a link at www.stateofthefuture.org.



Reinforcement for Previous Research

This year's research supports much of the Project's previous research, which merits repeating.

Globalization and advanced technology allow fewer people to do more damage, in less time, than ever before; hence, the welfare of anyone should be the concern of everyone. Such platitudes are not new, but the consequences of their failure will be quite different in the future than in the past.

Long-range goals like landing on the moon or eradicating smallpox that were considered impossible did excite many people who went beyond selfish, short-term interests to great achievements. The de facto decision system of the world is not adequately addressing the Global Challenges. The 15 Global Challenges or the eight UN Millennium Development Goals could be the basis for "trans-institutions"—a new concept of an institution that is composed of some income and personnel from governments, corporations, NGOs, universities, and international organizations without the majority from any one category of institution. Such trans-institutions would commit the resources and talent to address the goal and would act through each category of conventional institution.

Most people in the world may be connected to the Internet within 15 years, making cyberspace an unprecedented medium for civilization. This new distribution of the means of production in the knowledge economy is cutting through old hierarchical controls in politics, economics, and finance. It is becoming a self-organizing mechanism that could lead to dramatic increases in humanity's ability to invent its future.

Because weapons of mass destruction may be available to single individuals over the next generation, we should begin to explore how to connect education and security systems in a healthy way to prevent their use.

The cost of military operations to comply with environmental regulations may become so high that the nature of conflict and military operations could change.

There are many answers to many problems, but there is so much extraneous information that it is difficult to identify and concentrate on what is truly relevant. Since healthy democracies need relevant information, and since democracy is becoming more global, the public will need globally relevant information to sustain this trend.

The great paradox of our age is that while more and more people enjoy the benefits of technological and economic growth, growing numbers of people are poor and unhealthy and lack access to education. World leaders are increasingly seeking a common platform among UN organizations, the World Bank, the IMF, the WTO, multinational corporations, and other key actors of globalization in order to address this issue.

Creating global partnerships between the rich and poor to make the world work for all, which seemed like an idealistic slogan before September 11th, may prove to be the most pragmatic direction as the possibilities increase that individuals may one day have access to weapons of mass destruction.

The factors that caused the acceleration of S&T innovation are themselves accelerating; hence the acceleration of scientific and technological accomplishments over the past 25 years will appear slow compared with the rate of change in the next 25. The process of scientific R&D that uses peer-reviewed journals and government support is being challenged by those using venture capital and press releases to get products to the market more quickly. Since technology is growing so rapidly along several fronts, the possibility of it growing beyond human control must now be taken seriously. National decisionmakers have not been trained in the theory and practice of decisionmaking,

and few know how advanced decision support software could help them. Formalized training for decisionmakers could result in a significant improvement in the quality of global decisions. In addition to policymakers needing training in how to make decisions, processes to set priorities (local, national, and international) need further development.

We know the world is increasingly complex and that the most serious challenges are global in nature, yet we don't seem to know how to improve and deploy Internet-based management tools and concepts fast enough to get on top of the situation.

The role of the state is more important in countries where there is little private-sector activity; hence policies that make sense in western industrial countries that include leadership from the private sector are less applicable in poorer regions.

When the actions of one country threaten the security of many, when do the many have the right to invade the one? The extent of national sovereignty continues to be a key element in the analysis of environmental security, terrorism, climate change, the International Criminal Court, and management of future S&T risks.

Since education is one of the fundamental strategies to address most global challenges, it is important to identify the most effective educational materials, curricula, and distribution media for global education as well as institutional arrangements to accelerate learning.

The lack of ethical behavior and moral underpinnings has given rise to a new hunger for global ethics and the need to identify common ethical norms. Coupled with this is the extraordinary growth of global standards and those who seek to meet them through mechanisms such as the International Organization for Standardization.

Although many people criticize globalization's potential cultural impacts, it is increasingly clear that cultural change is necessary to address global challenges. The development of genuine democracy requires cultural change, preventing AIDS requires cultural change, sustainable development requires cultural change, ending violence against women requires cultural change, and ending ethnic violence requires cultural change. The tools of globalization, such as the Internet and global trade, should be used to help cultures adapt in a way that preserves their unique contributions to humanity while improving the human condition.