



State of the Planet 04

Mobilizing the Sciences to Fight Global Poverty

STATEMENT OF THE STATE OF THE PLANET 2004

Science to Build a Prosperous and Sustainable Future for All

For two days, scientists from around the world gathered at Columbia University to examine the relationship between the human condition and the condition of the Earth. Focusing on four essential determinants of human well-being – energy, food, health and water – these leading experts assessed how science and technology can best be mobilized to achieve sustainable development. The development challenge is to enable the poor to meet their basic needs for energy, food, health, and water, recognizing that these needs are also human rights under international law and long-standing international commitments of both the rich and poor nations. The Millennium Development Goals, agreed on by all of the world's governments, are critically important poverty reduction targets to be met by the year 2015. The sustainability challenge is to achieve development while protecting the world's ecosystems, ensuring that economic activity does not undermine the biodiversity, climate, and other natural processes on which our security, well-being, and life itself depend. These scientists have identified areas for priority action as well as new research initiatives.

The recommendations that follow are based on consensus achieved among a broad cross-section of these experts, and are meant to help policy makers and the public understand the scientific underpinnings in several critical areas of sustainable development. In addressing these issues, the conference participants recognized the stark contrasts of the challenges facing the rich and poor. In the poorest countries, where an estimated 800 million people are chronically hungry and where extreme poverty leads to some 20,000 avoidable deaths per day, meeting basic human needs has first priority. Providing safe energy for cooking, clean water for drinking and sanitation, sufficient food for basic nourishment, and systems for disease control and prevention are paramount and urgent global challenges, in which the high-income countries will need to help the poorest. Environmental degradation in these places is often both a direct cause and consequence of the struggle to meet basic needs on a daily basis, as when poor rural households cut down forests to clear land for farming or to harvest fuel wood for cooking. Women typically face the greatest burdens of this daily struggle for survival, and often suffer the added hardships of legal and social discrimination.

In the rich countries, where basic human needs are exceeded by a very wide margin, the pursuit of increasingly affluent lifestyles also has broad and pervasive impacts on Earth. By loading the atmosphere with greenhouse gases, the high-income countries are making a dangerous contribution to long-term climate change, with potentially dire risks for societies both rich and poor in all parts of the world. Maintaining and indeed improving the standard of living in the developed world without irreversibly depleting global resources and altering natural systems is the rich world's sustainability challenge.

The world therefore faces multiple and complex challenges: extreme poverty and the environmental degradation causing and resulting from poverty, as well as pervasive environmental consequences of affluence that must be brought under control. Ecosystem resilience and stability, which sustains healthy human communities, must be maintained through environmentally sustainable practices in energy, food, water and health management. The scientists have therefore aimed to identify paths of sustainable development, which will permit the poorest of the poor to improve their lot decisively, while permitting the rich to enjoy improvements in living standards as well, but in both cases in a manner that protects the environment and the vital services of the Earth's ecosystems.

These problems are amenable to human solutions, but only under four circumstances, which constitute over-arching recommendations of the scientists.

Monday, March 29th, 2004

Conference Moderator

John C. Mutter

Speakers

Jeffrey D. Sachs
Wallace S. Broecker
Edward O. Wilson
Vice Admiral Conrad Lautenbacher
Dr. William Foege
Robert Watson
Pedro Sanchez
Daniel Schrag
Mary Robinson

Tuesday, March 30th, 2004

Conference Moderator

John C. Mutter

Energy

Moderator

Lisa Anderson

Chair

Klaus S. Lackner

Panelists

John Ashton
David Hawkins
Susan McDade
Vijay Modi
David Nissen
James Sawyer
Robert Williams

Food

Moderator and Chair

William Masters

Panelists

Simeon Ehui
Robert E. Evenson
Claire Kremen
Bonnie McCay
Robert L. Paariberg
Ellen K. Pikitch
Prabhu Pingali
Sara J. Scherr

Water

Moderator

Jan P. Pronk

Chair

Upmanu Lall

Panelists

Margaret Catley-Carlson
Wolfgang Kinzelbach
Roberto Lenton
Eugene Z. Stakhiv

Health

Moderator

Dr. Allan Rosenfield

Chair

Dr. Ronald Waldman

Panelists

Dr. Gerald T. Keusch
Dr. W. Ian Lipkin
Dr. Alfred Sommer
Awash Teklehaimanot
Dr. Derek Yach



Over-Arching Recommendations

1. The rich countries must help the poor countries to escape from the trap of poverty, consistent with international obligations of international assistance and cooperation. The first step in this effort should be to meet the Millennium Development Goals, the internationally agreed targets for poverty reduction by the year 2015. The needed financial assistance from the rich countries is of crucial importance for poverty reduction but is modest in size relative to the income of the rich countries, within the international target of 0.7 percent of rich-world GNP in official development assistance.
2. Both rich and poor countries must heed the lessons of science and foster the benefits of under-utilized and yet-to-be developed technologies. We must support increased national and international scientific and technological efforts to achieve technological breakthroughs in energy systems, food production, health care, and water management. Not only must we make a special effort to address the technological needs of the poorest, as these are often neglected, but also to build and sustain scientific capacity in the poorest countries.
3. All key stakeholders must have a voice in approaching these problems in a cooperative and respectful political environment, mindful of international commitments and legal obligations concerning human rights, poverty reduction, and the environment. Free-market, profit-driven solutions alone will not be sufficient. Sustainable development will also require governmental leadership; new forms of taxation of social 'bads' such as pollution, and budget subsidies of social 'goods' such as research and development of new technologies, in order to align social costs and benefits; inter-governmental cooperation; participation by civil society; and greater corporate social responsibility.
4. These problems will require multilateral approaches, and a strong United Nations system, since the scale and nature of problems necessarily transcend national boundaries and require global solutions.

Energy

What energy strategies would allow all countries to pursue improvements in living standards while avoiding the negative impacts on climate and ecology associated with the use of fossil fuels?

In the energy field, the challenges of sustainable development differ drastically for three broad groups of countries: the rich countries; the middle-income countries that are in the midst of rapid development; and the low-income countries where populations are struggling, and often failing, to provide for their most basic needs.

Providing affordable and environmentally sustainable energy to a future world population of up to ten billion is a major challenge. Current energy technology would be unable to satisfy the energy demand of the planet at a state of future development that could only be sustained by per capita energy service levels typical of today's industrialized nations. Current technology would either be too expensive or too damaging environmentally to operate on such scale. Resistance to the necessary change is to a large extent driven by the notion that the required changes would be economically devastating. For energy more than for any other field, progress could be made by developing affordable and practical technologies. Needed are technologies with new improved end use energy efficiency like hybrid electric cars, renewable energy supplies like photovoltaics and bio-fuels, and carbon capture and storage technologies that can make it possible to continue the use of fossil fuels in a carbon constrained world. While the emphasis may vary in the different regions of the world, the goal is ultimately the same.

In rich countries with a high standard of living and high per capita energy service levels, the major challenge is the transition to an environmentally sustainable energy system. While further reductions in conventional pollutants are still necessary, that problem is well on its way to being solved. The most difficult challenge is to find ways to provide plentiful and affordable energy without emitting vast amounts of carbon dioxide into the atmosphere.

To head off the potentially extremely dangerous consequences of human-made climate change, the rich world must affect drastic reductions in carbon dioxide emissions over the next few decades. Additional energy consumption must be effectively carbon neutral, and after 2050 the energy infrastructure must move to near zero net carbon emissions. Stopping the destruction of forests, while in itself an important goal would only marginally change the required reductions in carbon dioxide emissions. The problem is urgent, as the time available for a transition to a carbon-neutral economy is short when compared to the natural lifetime of energy infrastructures; the scale of emission reductions required over the next 20 to 50 years is very large. Maintaining access to energy will require new technologies, in some combination of renewable and nuclear energy, energy conservation and industrial carbon sequestration. Carbon capture and storage technology is important, as alternative forms of energy by themselves are unlikely to achieve the necessary scale of operation in the time available. Political and economic structures and institutions that can promote this process are still lacking or are in their infancy. Considering the large per capita share of carbon dioxide emissions that emanate from the rich nations, global fairness warrants that these countries should take the lead in the transition to a carbon-neutral energy infrastructure. This could be done by supporting emission reductions in the developing nations.



In rapidly developing countries such as China and India, the first order of business is to provide sufficient and environmentally clean energy. Large-scale electrification and industrialization causes pollution problems similar to those of industrialized countries in the past, but they are even more severe because of higher population densities. The most important and pressing need is for advances in the energy infrastructure while reducing conventional pollutants drastically. However, the developing nations cannot remain on the sidelines when it comes to managing carbon dioxide emissions as their contributions are beginning to dominate the total world carbon budget. As a result, rapidly developing countries need to assure that their development is compatible with future reductions in carbon dioxide emissions. For the transition period, opportunities abound for cooperation between developed and developing nations. Areas of common interest include international carbon trading, which would allow industrial nations to purchase carbon dioxide reductions associated with energy conversion facilities, like power plants, built in growing economies as well as efforts to reduce particulate pollution from power generation, and even more importantly from small industrial and domestic use of coal and biomass fuels. By eliminating soot emissions one can address radiative forcing of climate change as well as regional pollution issues in a single problem. Replacing coal and biomass fuels with cleaner burning fuels is an area where the interests of industrialized countries and developing countries meet.

While it might be tempting to encourage poor countries like those in sub-Saharan Africa to suppress their progress toward a lifestyle exemplified in the developed nations, the developed nations cannot hold the poor world's progress hostage to their own concerns over climate change. People in the poorest countries often lack access to the most basic energy resources for which access should be an entitlement as human health and life depend on it. The poorest countries in the world do not significantly contribute to greenhouse gas problems, and an accelerated transition from the burning of firewood and dung to commercial hydrocarbons would reduce, rather than increase, local ecological impacts. Not insisting on leapfrog technologies makes it possible to consider liquified petroleum gas (LPG), kerosene and diesel oil on an equal footing with wind, solar energy or biomass energy. In many cases, these conventional energy carriers would prove to be more cost-effective and less damaging to health and environment than current practice. Giving people access to better cooking fuels, electric power and fuels for machinery and transportation needs would not materially affect the greenhouse gas balance of the world, but it could make a huge difference in the quality of life and economic prospects of poor nations. Raising the cost of access to energy by insisting on leapfrog technologies (e.g. renewables to avoid greenhouse gas emissions) would likely hamper the economic development in the poorest regions.

Immediate needs center on minimum electricity for lighting in low population density rural areas most cheaply provided by distributed generation and clean cooking fuels. A transition to LPG or a synthetic alternative like dimethyl ether could form the basis of broad energy infrastructure. Eliminating indoor biomass and coal combustion because of the severe health impact has to be a major goal. The biomass saved, e.g. from agricultural residues could instead be used to provide one source for clean synthetic fuels like dimethyl ether for cooking and heating and/or electricity for lighting and other basic uses.

Recommendations of the Energy Panel

1. In the industrialized countries, accelerate introduction of energy infrastructures that will lead the global transition to carbon-neutrality. Without caps on carbon emissions, probably managed by carbon trading, it will be extremely difficult to make the necessary reductions in CO₂ emissions. Safe and publicly acceptable carbon capture and storage will be an essential part of the response and will have to be developed and implemented soon.

2. In the rapidly developing economies, provide clean and plentiful energy in ways that align today's energy infrastructure investments with progress towards long-term carbon neutrality. This will include commercialization of gasification technologies for electricity and synthetic fuels production, deploying carbon capture and storage technologies in safe and publicly acceptable ways where cost effective. Support from the industrialized countries will be necessary.

For areas with physical and institutional infrastructures that are adequate to support a market economy for energy inputs and productive outputs, the development of efficient energy markets, in which prices reflect costs, including environmental and social costs, is a prerequisite for efficient consumer choice and for attracting the necessary energy system investment.

3. In the poor countries of the world, access to greatly increased quantity and quality of energy services is a prerequisite to poverty reduction and economic growth, giving particular emphasis to ensure access to clean liquid or gaseous fuels and electricity at levels adequate to satisfy basic human needs. Immediate growth of energy services should not be constrained by avoidance of fossil fuels or caps on global carbon emissions. Emphasis on short-term economic benefits can, under the right circumstances, lay a foundation for environmental sustainability. Increased access to clean fuels has particularly significant impact on women's lives. In very poor areas with low demographic density and agricultural productivity, concessionary funding will be required to begin to provide energy with appropriate technologies (decentralized or centralized) adequate to satisfy basic human needs.



State of the Planet 04

4. To drive the development and application of low-carbon and eventually carbon-neutral technologies, it will be necessary to mobilize investment on scales far in excess of present levels. Most of the capital for this investment will initially need to come from industrialized countries, but the investment should take place within a framework that can leverage the transition elsewhere to carbon neutrality, especially in rapidly developing countries. Because a stable climate is a public good, public policy instruments will be necessary to drive this investment. There is an important place for innovative mechanisms that link public and private interests.

5. Enhanced energy efficiency measures are often the most cost-effective options in making clean and reliable energy services affordable for all, while facilitating realization of a low carbon energy future. But in order to accelerate diffusion of such options clearer signals and incentives will be necessary, including removal of the substantial market and non-market barriers.

Food

What action is needed to ensure that agriculture meets the needs of the world's hungry, that agroecosystems and fisheries remain viable, and that ecosystem loss does not threaten Earth's ability to feed its population?

The right to adequate food is a fundamental right recognized in international law. Food availability is improving for the world as a whole, but under-nutrition remains the single most important cause of human mortality, directly or indirectly causing roughly 8 million deaths per year or 30 percent of the total. The Earth is failing to feed its population particularly in Asia, where most deaths related to under-nutrition occur, and in Africa, which is the only major region where the prevalence of malnutrition is increasing. Obesity, the other side of malnutrition, is also increasing throughout the world, but is not a direct focus of this panel's work.

The causes of under-nutrition derive from inequitable political, social, and economic conditions as well as unfavorable ecological circumstances, and these all combine to influence both productivity and distribution. Science-based technological innovations together with community-based indigenous knowledge are both necessary but not sufficient to eliminate hunger from the world. Enabling policies and political action must work hand in hand with increasing productivity and access to healthy food. The world's agro-ecosystems will require substantially higher investments in new ecoagricultural technologies and also a wide range of changes in natural-resource management, the development of institutions and infrastructure, and innovations in government policies around the world. Increasing the productivity of existing cropland will reduce the degree to which many of the world's poorest people rely on forests, rangelands, and natural fisheries – either as primary sources of food or as an important supplement and food 'safety net' when crops fail or emergencies arise – while changes in the management of those natural systems are also important in themselves.

Recommendations of the Food Panel

The world's food shortages are geographically concentrated in South Asia, where access to food rather than total food production is the main constraint, and Africa, where region-wide lack of food is the primary issue. Approximately half of the world's hungry people are in small-scale farms in marginal areas that were bypassed by the Green Revolution. An additional 22 percent are rural landless people, 8 percent are people dependent on natural resources – the pastoralists, fishers and forest dwellers and the remaining 20 percent are the urban hungry. The rural poor are driven further into poverty by local population growth against a relatively fixed land base, giving them little choice but to exploit their limited natural resources in an increasingly unsustainable manner. To help impoverished people escape such ecological poverty traps, the high-income countries need to help these regions to:

4

1. Increase investment in the development and dissemination of new and existing technologies adapted to the needs of farmers of the poorest areas, most notably replenishing soil fertility and improving small-scale water management in Africa, as well as new crop and tree varieties or livestock breeds, developed through both conventional breeding and biotechnology, and other management practices appropriate for local ecological conditions, such as conservation tillage and integrated pest management. Innovations are needed especially for areas where nutrients have been depleted and must be replenished through inorganic fertilizers, agro-forestry, green manures and other techniques; where moisture stress must be alleviated by water harvesting, mulching, or irrigation; and where crop losses from burgeoning pest problems need to be controlled by appropriate integrated pest management strategies. In all of these places, local investments and innovations can be complemented by the introduction of seed varieties that have locally-appropriate growth habits, stress tolerance, and product characteristics. Furthermore, much more interdisciplinary research is needed on the interactions of agricultural production systems and landscape ecology, to facilitate innovations in field and landscape management that enable local people to both increase agricultural productivity and enhance and restore biodiversity and ecosystem services ("ecoagriculture").

2. Expand efforts to build local institutions and infrastructure for collective action and market development for vulnerable regions and fragile resources, to increase the relative profitability of more ecologically sustainable ways to obtain crops, livestock, wild game, fish and forest products, and to reduce the labor burden especially on women and children. These



State of the Planet 04

investments include property and inheritance rights for women, improved roads and other transport and communications infrastructure, local procurement for school meals programs and food-for-work programs, capacity building for collective action and rural institutions for credit and savings, market development and household security. Food systems should be oriented, in addition to overall productivity, towards meeting nutritional requirements. Improvements in the food system should be complemented by direct nutritional programs to meet needs of vulnerable populations.

3. Renew momentum towards trade reform of global markets, to improve low-income farmers' terms of trade with the rest of the world, especially through increased access of tropical farmers and fishers to the markets of the high-income countries, as well as international policy coordination to protect marine fisheries and encourage sustainable aquaculture.

4. Restore degraded lands, forests, fisheries and rangelands, to improve food security, reduce risks, diversify food sources and generate new sources of rural livelihoods. In particular, it is important to eliminate the most destructive practices, encourage development of more selective and sustainable harvest methodologies, and establish protected areas of sufficient size and connectivity. This will be facilitated by securing local ownership and management rights, supporting local investment in resource rehabilitation, developing effective governance and management systems and encouraging the development of local resource-based enterprises. Encourage transformation of crop, livestock and fish production systems and landscapes to produce both food and ecosystem services such as watershed protection, wildlife habitat and biodiversity.

Water

How can regional and local water resources be best developed and managed to meet rural and urban needs for safe drinking water, food, ecosystems services and economic development, while contributing to the reduction of poverty, disease and the impacts of natural and environmental hazards?

Water is often cited as the emergent global resource crisis of the 21st century. Water is central to managing agriculture, ecosystem services, sanitation, human health, and natural disasters, and hence it is key to meeting the Millennium Development Goals. Nearly a billion people in poor countries lack access to safe drinking water. Globally, the dominant water use is for agriculture, and the pre-eminent concern has been the dramatic variability of natural supply in space, time and quality. Changes in climate, soils, watershed drainage systems, and the use of chemicals aggravate these concerns, with consequent threats to human and ecological health. One of the major problems is that water development is a means to different and competing ends. Each sector develops its own priorities and policies, considering water only as a factor of production. Because water development (hydropower, navigation and agricultural irrigation, municipal and industrial water supply and sanitation) also directly affects ecological sustainability, it has come under intensive scrutiny. Subsidized development of water, particularly for agriculture, combined with weak efforts to protect resource quantity and quality, has led to inefficient use of water resources and a general neglect of maintenance of that infrastructure, along with unreliable access for other uses. Human health impacts can be closely correlated with degradation of source water quality and to lack of access to safe water supplies, especially at the rural, village level.

The combination of management, policy, regulatory, legal and economic incentives that serves as the impetus for integrated water resources management (IWRM), is a key factor that will determine the success or failure of improving water management in the developing world. Proper governance objectives that would stimulate adoption of technologies and adaptive management principles that would promote sustainable use are urgent goals. Historically, water management has dealt with risk and uncertainty and reduction of vulnerability in an infrastructure intensive and centralized manner. Developing water storage and distribution infrastructure is still a vitally important component of water management, in that it provides the buffering capacity for the uncertainties associated with climate variability and ultimately climate change, and contributes to system robustness, resilience and reliability. This is especially true for developing nations, where each flood and drought results in substantial declines of 10 to 50 percent of GDP. Nevertheless, an important part of the new IWRM paradigm is an emphasis on the 'soft path' or adaptive management component that relies on an entirely different set of management measures for risk bearing and risk sharing under uncertainty. In this context, the introduction of rational water pricing policies with judicious subsidies to the poor to provide access, while enabling water producers to enter the market, tap a variety of water and wastewater streams as inputs, and develop effective distribution strategies is needed. Innovations in property rights systems that lead to equitable, compensated water transfers and improved water use efficiencies are also needed.

In the semi-arid to arid tropics and sub-tropics, where the vast majority of the world's poorest people live, water may be the most constraining influence on improving the livelihoods of people. The dramatic seasonal and inter-annual variation in rainfall poses a significant supply challenge, particularly in areas in Asia, Africa and South America, where population densities are high. It is clear that clever water storage strategies that are environmentally friendly are needed, consisting of both necessary infrastructure and non-structural options. Given limited land, displacement of populations or their economic migration due to water scarcity becomes an important issue. The combination of local versus central storage and delivery systems that is most effective from the perspective of regional sustainability is not always clear. Analyses that expose the key issues in making such a choice are needed. The role of seasonal to interannual climate



State of the Planet 04

forecasting in facilitating more efficient supply and demand management in such regions may be important. Predictability may be relatively high, and if adaptive management strategies contingent on probabilistic forecasts can be employed, estimates of storage needed may decrease, water use efficiencies could increase, and environmental indices may improve.

Economic progress in rapidly developing countries leads to extensive modification to watercourses. These modifications aim to reduce flood and drought impacts. Pollution, i.e. the introduction of novel chemicals (including antibiotics, hormonal agents, and other pharmaceuticals) and its chronic impacts are a major concern. Flood control works provide a sense of security that promotes increased floodway development and exposure to potentially larger floods, but at the same time enhance the economic productivity of those lands. A better understanding of the long-term risks of such developments is needed to avert potential environmental degradation and catastrophic losses of life and property.

We have to focus our attention on the developing world with strategies that fall into four basic categories: 1) Develop large scale water infrastructure that will provide the needed buffering capacity, robustness and resilience to withstand the vagaries of climate variability and change; 2) Focus on 'small is beautiful (and inexpensive)' strategies for villages and remote rural areas; 3) Concentrate on upgrading technical and institutional management capacities at all levels; and 4) Continue to focus on developing and transferring technological innovations that, hopefully, will compensate for the myriad difficulties associated with IWRM. Improved forecasting techniques will undoubtedly improve operation and management of existing water delivery systems, and open up possibilities for the trading of water rights and other risk-sharing programs. But forecasting requires much more investment in scientific research, as well as installing and maintaining a hydroclimatic monitoring system in each river basin. Advances in modeling and data collection technologies need to be translated into practical use through appropriate investments. Recent advances in genetic engineering and biotechnology are expected to have the greatest impact on food security and agriculture, alleviating some of the stresses on fresh water supply, as the vast reservoirs of brackish groundwater might be used for certain forage crops. Advances in fusion energy and cheaper solar power would alleviate water supply problems for the large urban areas on the coasts, making desalination an economically competitive option. Cheap solar energy would do the same for small villages and remote rural areas, making subsistence much easier by making available groundwater sources for water supply and small-farm irrigation water for livestock, while reducing the costs of water treatment and sanitation.

Recommendations of the Water Panel

1. Reform water pricing, property rights, and water trading systems to promote increased water use efficiency and sustainability, while enhancing access to safe drinking water and to irrigation water for the poor through judicious subsidies. International financial and technical assistance is vitally needed for the poorest countries. Water rights re-allocation must be accompanied by compensation. Develop and adopt mechanisms for shifting from agricultural water subsidies to financial support for the adoption of technology and policy measures that promote water and environmental conservation. Promote the testing and adoption of biotechnological advances that enhance food production in water deficient conditions.
2. Develop and apply seasonal to inter-annual hydrologic forecasts for regional water allocation and economic planning to promote integrated multi-objective surface and ground water management. Invest in installing and maintaining hydrometeorological and water quality monitoring networks as the precursor to effective forecasting. Focus research on projects that characterize and predict long-term anthropogenic changes in global and regional hydrologic cycles and their effects on climate, on carbon, nitrogen and phosphorous cycles, and hence on the sustainability of life.
3. Develop new storage systems (e.g. subsurface) to meet water needs and simultaneously investigate ways to implement measures for water quality and ecological protection, increased conservation, local water harvesting and re-use needs.
4. Evaluate and promote the development of local, point-of-use solutions for meeting safe drinking water and sanitation goals, particularly in poverty-stricken areas where access is poorest. Develop and market locally appropriate technology and delivery systems. Promote regulated decentralization of water supply development and management.
5. Develop cost-effective mechanisms for restoring degraded aquatic habitats and ecosystems, and protecting these rehabilitated systems, by sustaining their basic hydrologic inputs (minimal environmental flows).
6. Focus on multi-sectoral integrated water management (navigation, hydropower, irrigated agriculture and municipal and industrial water supply) and the necessary institutional policy reforms that are required for more effective management. Treat equity and human well-being on a par with economic efficiency and environmental sustainability, mindful of international and legal obligations concerning human rights and the environment.
7. Develop emergency preparedness and disaster response plans for floods, droughts and related infrastructure failures (dam safety, pipeline ruptures, sewage treatment failures or toxic chemical spills).



Health

What actions are needed to address the world's preventable diseases, emerging diseases and problems that disproportionately affect the health of the world's poor?

The state of human health on the planet is precarious. Despite the scientific and technical advances of the past fifty years, from the discovery of DNA as the molecule of heredity to the sequencing of the human genome, important and potentially devastating public health problems affect nearly all the world's populations. Most affected are the poor. Gross disparities in rates of illness, disability, and premature death exist between rich and poor in all countries, as well as between rich and poor countries.

The current health needs of the world's population cannot be adequately addressed with the resources that have been made available to date. Studies suggest that the minimum spending level required to have an appreciable impact on the major causes of morbidity and mortality in developing countries – to reach the health-related Millennium Development Goals – is about \$40 per capita per year. Yet in today's world it is rare for health budgets in the poorest countries to exceed \$10 per capita per year. To make matters worse, much of this is devoted to administrative costs and to hospital maintenance, and only a portion funds programs that reach the majority of the population. Very little money is allocated to strengthening the weak health systems that are characteristic of today's world. Health systems are further rendered ineffective by political instability and by poor management – including skewed priorities, corruption, and lack of incentives. As a result, poor people pay out of pocket for health care of dubious quality, often having to choose between health and food or other essentials.

Despite the remarkable gains made in much of the world during the course of the twentieth century, it is frustrating to those who work in the field of public health, and surprising to many of those who do not, that safe and cost-effective interventions are available for the prevention and treatment of many of today's most important diseases. The implementation of these interventions, however, is grossly inequitable. The risk of a woman dying from pregnancy-related causes in the least developed countries is more than 10 and as high as 100 times that in the industrialized world. This unacceptably high maternal mortality, combined with inadequate family planning programs that would give women greater control over their reproductive health, has had important consequences on the health of both women and children. So, for children, mortality rates also vary widely – five of every 1000 children born alive will die in Japan before reaching their first birthday, compared to more than 100 in a large number of countries in sub-Saharan Africa and many in Asia – and most of these deaths are from common diseases such as diarrhea and pneumonia.

These disparities are the rule, not the exception. A significant portion of these deaths can be averted by the application of existing knowledge and technology; however, ineffective and unjust political, social, and economic policies severely constrain efforts to do so. Further investment in the generation of new knowledge is also required – a failure to invest in appropriate research will result in the application of yesterday's solutions to tomorrow's health problems.

For example, advances in medicine, specifically the development of highly-active antiretroviral treatment, have transformed HIV/AIDS from a debilitating disease that resulted in death in the prime of life to a manageable chronic disease in most of the industrialized world. But it continues to kill millions each year in Africa, where 40 million people remain infected and where access to effective treatment remains available for only the privileged few. As a result, health care costs for HIV-associated conditions, for futile hospitalizations, and for funeral expenses, combined with the loss of income generated by heads of households have thrown families into abject poverty. The expected life span of a child born in southern Africa today has fallen to less than 40 years in some countries. Modern medical technology must be made available where it is needed most.

It must be added that in spite of the current emphasis on the provision of antiretroviral drugs to people with AIDS in developing countries, treatment alone will not solve the problem. Much stronger and more vigorous prevention strategies need to be implemented in order to stop HIV transmission in the first place. Countries like Uganda and Thailand have shown that this can be done.

Malaria, for which both preventive and curative strategies are available, continues to exact a severe toll. Up to a billion clinical cases and a death toll of an estimated 2.7 million occur every year, most of them in Africa. Children and pregnant women are particularly most vulnerable to malaria, making them more susceptible to infection, severe anemia and death. Over 30 million women living in malaria endemic African countries become pregnant every year exposed to significant threats to themselves and to their babies.

Like malaria, tuberculosis is spreading rapidly and threatening to cause serious problems throughout the world. Both infections are increasingly resistant to the relatively inexpensive drugs that have been used to treat them but, although newer safe and effective treatments are available, their deployment is inhibited by the notion that they are "too expensive." Other emerging and re-emerging diseases, including BSE, SARS, and avian influenza, progressive degradation of existing ecosystems, and the threat of biological terrorism, all make the world a more dangerous place in which to live.



Human health is intimately related to the environment. Ecological and hydrological systems should be monitored in order to forecast disease emergence. Furthermore, we must improve our understanding of pathogen transmission within and between wildlife, domestic animals, and human populations.

Chronic conditions, including cardiovascular diseases, cancer and diabetes, clinical depression and other mental health conditions, as well as injuries and intentional violence (especially towards women and children), are increasingly important causes of premature death, morbidity and economic hardship in developing countries. Tobacco use, sub-optimal dietary practices leading to both under-nutrition and obesity, low levels of physical activity, and environmental pollution related to unchecked urban sprawl, are changing the epidemiological profile for the worse and have remained essentially unaddressed in much of the world.

Recommendations of the Health Panel

1. Political will to invest in improving health care systems must be developed through strong and maintained advocacy efforts. Public health is an essential component of poverty reduction strategies. Governments in both the industrialized and developing worlds must recognize that health is not only a fundamental right recognized in international law, and at the center of human and social development itself, but is also a crucial factor for economic growth.

2. The prevention of commonly occurring diseases, both acute and chronic, must be recognized as the essence of public health. Access to safe water and appropriate sanitation, adequate nutrition and healthy food consumption behaviors, and appropriate use of less polluting energy sources, along with other prevention efforts such as tobacco control and family planning can make enormous contributions to reducing preventable morbidity and mortality.

3. Health spending must be massively increased for both prevention and treatment. As essential as prevention is, when people fall ill, they have a right to effective and affordable care. For the foreseeable future, most low-income countries will require large and sustained infusions of external aid, combined with greater allocations of national budgets to the health sector. This aid must be coupled with effective governance and oversight. Stringent limits on health spending currently imposed in many financial programs supervised by the international financial institutions need to be relaxed or abolished. Policies regarding intellectual property rights and trade agreements, including affordable drug pricing for all, should be crafted so that it is more likely that medical technology, drugs and vaccines will be developed for and made available to the poor. In particular, the poor should be protected against excessive personal expenditures on basic health care that push them toward or over the poverty threshold. In most middle-income and some high-income countries, notably the United States, more efforts are required to ensure that everyone within these societies has affordable access to necessary preventive and curative health services.

4. Health systems must be strengthened: they are a core social institution, to which every individual should have access. The lack of a functional, regulated health system is more than a result of poverty – it is a characteristic of it. Indeed, in order to achieve the health-related Millennium Development Goals and to ensure that further progress can be made in the future, strong health systems, characterized by appropriate policies formulated on the basis of sound scientific evidence and not ideology, enforceable legal support, public trust, and effective management, are a sine qua non.

5. Targeted programs, such as those that address the AIDS crisis and the preventable burden of death and disease affecting women and children, are urgently needed. But unlike the disease-specific eradication programs of the past, these programs address more chronic conditions and will have to be maintained in perpetuity. Accordingly, public health initiatives with relatively narrow objectives should be designed in ways that ensure that they contribute to the strengthening of sustainable health systems and they should be held accountable for doing so.

8

6. Human resources for health are in crisis. Both national health system staffing policies and international immigration and labor policies are partly to blame. Chronic conditions, both communicable and non-communicable, have been responsible for the premature deaths of many health professionals and teachers. In developing countries, opportunities for increasing the number and the competence of health staff at all levels of the health system should be created and appropriate incentives offered to retain the services of health staff in whom significant investments have been made. Richer countries also need to train more health professionals and deploy them effectively.

7. There is a need for further investment in knowledge generation, dissemination, and application. In addition to the application of current knowledge, North/South partnerships that contribute to the development of public health and medical leadership in research, policy formulation, management, and service delivery are essential.