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Ending Hunger for the Second Billion

by

Robert W. Kates

ROBERT W. KATES is Director of the Alan Shawn Feinstein World Hunger Program at Brown University. In addition, he is a Professor in the Graduate School of Geography at Clark University and Research Professor at its Center for Technology, Environment, and Development.

Dr. Kates received his graduate degrees from the University of Chicago and is a Fellow of the American Association for the Advancement of Science. Though his publications address a broad spectrum of scientific and societal issues, he is particularly noted for his basic research on applied questions of natural resource development and hazard management and for methodological research on environmental perception, risk management and climate impact assessment.

The Alan Shawn Feinstein World Hunger Program addresses the long-term persistence of hunger in a world of plenty through research, the development of unique resources, and through public recognition by its annual Feinstein awards.

Its research program emphasizes fundamental understanding of the prevalence, persistence, and prevention of hunger. It examines its history and the complex local and global linkages that determine who goes hungry. It focuses on long-term trends in climatology, demographics, economics, sustainable resources, technology and values.

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The Hunger Project

Ending Hunger: An Idea Whose Time Has Come is a powerful slogan, an inspirational goal, and the title of an attractive, informative, cocktail-table sized book (The Hunger Project, 1985). All are the creative products of The Hunger Project, a worldwide movement, with over 4 million members, dedicated to ending hunger before the end of the century. The project, whose roots lie in the therapeutic programs of Werner Erhard (of EST fame), attempts three important tasks in the volume: it seeks to make the subject of hunger accessible to the sensibilities of those much more fortunate than the hungry; it seeks to inform a broad public about major issues related to hunger; and it seeks to convince them that if enough people commit themselves to ending hunger, it will end, and by the turn of the century.

Thus, there is much hope in the volume, color galore, and no pictures of starving children. There are chapters devoted to balanced presentations of five selected issues: population, food, foreign aid, national security, and the new international economic order. There is the use of a single, simple, surrogate measure of hunger, an infant mortality rate (IMR) greater than 50 per thousand, and the success to date in reducing it, is given as a way of convincing us that ending hunger is feasible. There are selected quotations from recent inter-

national reports that state the possibility of making great progress in ending hunger before the end of the century if the critical political and collective will or commitment can be found.

When I discuss The Hunger Project with professionals, I encounter a deep scepticism concerning it, often more related to its origins than to its activities. But as a newcomer to hunger research, I find myself sympathetic to the goal and to the basic approach. "Ending hunger" is an extraordinary aspiration and it is one that I am happy to adopt.

The Hunger Project's approach has worthy elements. The attempt to make the issue of hunger accessible, conforms well to a social-psychological literature on behavioral change that suggests that frightening or threatening people, while perhaps effective over the short-term, does not lead to lasting change. I suspect that pictures of starving children or dying cattle, no matter how moving, may have a similar effect. Thus, *Ending Hunger* seeks to go beyond episodic pity toward long-term commitment.

The Hunger Project also does not try to avoid the deep polarized conflicts over the causes of hunger and ways to end it. The book creates a forum for these, buttressed with ample quotes from leading proponents of opposing views.

The notion that somehow hunger could end if enough of us believed and acted as if it could, also resonates well. After all, the persistence of hunger in a world of plenty is a painful paradox of our time. Hunger is unnecessary. It should end!

Nonetheless, I find myself much less sanguine than The Hunger Project about ending hunger before the turn of the century. I think the question of why hunger persists in a world of plenty is still partly unanswered, as is the question of how to end hunger—not just in today's world, but in the more crowded, complex, warmer world of the future.

Today, the world of the hungry is the everyday world of about one billion people. It is a world where, for some, there is not enough food; for many, there is plenty of food and not the means to obtain it; and for some, even though there is plenty to eat, little is absorbed and retained. Thus, the world of hunger includes the crescent of famine in Africa, chronic undernutrition in south Asia, homelessness in America, cholera and diarrhea in the third world, and anorexia and bulemia in the developed, wealthier nations.

Despite our best intentions, the world of the hungry will expand over the face of the earth during the next 100 years. I suggest this time horizon of concern with hunger because within it, two major trends affecting hunger—population and environment—will converge. There is a consensus among demographers that over the next century, and perhaps sooner, barring a major catastrophe such as nuclear war or a global pandemic, population will level off at somewhere between 8-12 billion people. Within the same period, most biosphere scientists expect significant transformation in the environment including a major enrichment of atmospheric CO_2 with the subsequent warming of the earth.

Thus *Ending Hunger* should concern itself not just with the five-billion world of today, but with a world twice as crowded and undergoing great change. It should concern itself, not only with the billion hungry of today, but with the potential second billion of the next century. In a sense, it is this second billion that is the central focus of the research of the Alan Shawn Feinstein World Hunger Program at Brown University.

In our desire to end hunger, we make common cause with The Hunger Project and the many groups that share their concern. However, we use the more reflective setting of the university to fill an important and unmet need, that of probing and anticipating the future, searching for ways to end hunger, not only in the present, but in that changing, more crowded world. In asking when can hunger end, not just for the current billion, but for the next as well, we hope to offer some unique insights and new directions.

Tonight, on the occasion of this Ninth Annual Malthus Lecture, I would like to discuss our studies of how change in certain major trends will affect the hunger of both the first and second billion. But to study the future, we are often reminded, one should know the past. Thus, 25 Brown University faculty members, drawn from 10 departments, are in the midst of a seminar and public lecture series on the history of hunger, examining what can be learned about hunger at different time scales of analysis: decades, centuries, millennia, and even ages. It is still too early to share with you what we still only hope to learn, but I can share one hypothesis and some initial observations. The hypothesis suggests a long-term sequence of human effort to end hunger.

Three Types of Hunger

The hunger history hypothesis draws upon a causal classification of hunger. We can describe three types of hunger based on proximate causes:

1. *Food-short hunger*, caused by absolute shortage, the unavailability of food within a bounded region because of crop failures, market or transport breakdowns, blockades, or other catastrophes;

2. *Food-poor hunger*, caused by poverty, with food generally available within the bounded region, but with affected households unable to pay for food and/or have access to resources needed for self-provisioning; and,

3. *Food-deprived hunger*, caused by being denied food generally available to the household, but either intentionally withheld from individuals, by custom, abuse, self-denial or incidentally malabsorbed because of neglect or disease.

The first type, *food-short* hunger, focuses on a larger region or societal grouping; the second, *food-poor* hunger, upon the household, and the third, *food-deprived* hunger, upon the individual. These types, however, are not mutually exclusive. In most famines, food shortage, poverty and deprivation occur simultaneously. Societies, as well as households, can be poor or deprived of food. Defining the boundaries of a society or region is difficult in an increasingly interdependent world, since, on a global scale, in a world of overflowing granaries and mountains of butter, there is never any shortage.

As we continue our studies, food shortage, poverty, and deprivation may prove to be helpful simplifications. They also serve as an hypothesis of sequential coping with hunger. Across time, in prehistory and history, societies seem to grapple first with the prevention of absolute shortage, more slowly with food poverty, and have barely begun to cope successfully with problems of deprivation.

Ending Hunger in History

The struggle to eliminate the extreme food shortages of famine is as old as history. Periods of plenty and shortage are described in whatever written records remain of the earliest civilizations. A recent analysis of climatic disasters in China records 203 events, each of which killed a minimum of 10,000 persons (with actual deaths being larger by far) between 180 B.C. and 1949 A.D., mainly through hunger. (By comparison, no single disaster in the U.S. has killed that many people.) Further, only now are the facts emerging about one of the greatest disasters of all time, a famine that may have led to the demise of between 15 and 30 million people in China during 1959-61.

The emerging history of hunger also demonstrates considerable success in coping with famine through the intensification of agriculture and the development of widespread grain trade, transport and storage. The great ancient empires conquered and virtually eliminated famine in their centers. Although we know little as yet of what occurred in their peripheries, inscriptions throughout the Roman empire testify to the generosity of the wealthy for gifts of food in time of need.

Still, absolute shortages of food over large regions seems to have been endemic in the world up to 1800. Post tells us in his book entitled *The Last Great Subsistence Crisis of the Western World* (1977) of the "year without summer"–1816–following the eruption of Mt. Tambora in Indonesia, when much of North America and Western Europe experienced a food crisis. Then, cities and nations, for the first time, successfully undertook extensive organization of food relief and transport of grain from the Baltic States and Russia. Only beyond the pale of empire, in Ireland and Transylvania, were people callously allowed to starve.

It was after the Irish Famine, perhaps 1850, before Europe had coped successfully with the Malthusian shortage of food and had enough food everywhere to feed all of its people (Grigg, 1986). Still, it would take 100 years, until after WWII, for the available food in Europe to be reasonably well-distributed. Even today, pockets of poverty, various forms of abuse and neglect, and some disease, is associated with a low level of hunger within Europe.

In south Asia, successful coping with famine begins in the 1870s with the expansion of the capacity to raise and move food and the adoption of the famine codes that enabled those affected to earn or borrow money for grain (McAlpin, 1983). With the exception of the Bengal famine of 1943, India seems to have dealt effectively with famine. Nonetheless, chronic malnutrition affects as many as forty percent of the Indian population and may be increasing (Sen, 1981).

Overall, there is progress in reducing chronic hunger. The estimates of 1950 are now thought to be inflated: Lord Boyd-Orr, the first director of FAO, attributed "a lifetime of malnutrition and actual hunger" to two-thirds of the world's people. Grigg (1985) would place the hungry fraction at around a third of the world in 1950, and estimates that in the 30-year period since then, the proportion of undernourished has decreased from 34 percent to 17 percent of the population, despite an enormous increase in world population. The fifth in a series of recurrent FAO evaluations found that the undernourished population of developing market economies decreased in the periods 1969-71 to 1979-81 from 19 percent to 15 percent and from 28 percent to 23 percent depending on the choice of threshold (1.2 percent or 1.4 times the basal metabolism rate for adolescents and adults: FAO, 1985).

Using a more exacting threshold for hunger, the World Bank finds about twice as many hungry as the FAO does. Nonetheless, their study of hunger (World Bank, 1986) in

87 developing countries also records a drop from 1970 to 1980 in the proportion with diets deficient in energy from 40 percent to 34 percent and 18 percent to 16 percent for growth-limiting hunger. At the same time, the actual numbers of people with energy deficient diets in these countries rose by 10 percent and 14 percent respectively for the two criteria of deficiency. Regionally, the major declines in hunger were in East Asia and the Middle East, with rises estimated over the decade for South Asia and Africa.

A major new effort is underway as part of the child survival efforts of UNICEF/WHO for the largest group of the food-deprived children denied food by virtue of diarrheal disease or inadequate substitutes for mother's milk. There is also a growing effort to curb their rich-country equivalent, the food-denial diseases of anorexia and bulemia. But hunger persists in the form of abuse and self-abuse in situations all around the world.

History is full of discontinuities and surprises. The Dutch who had conquered hunger for 200 years, experienced massive hunger in WWII. China, which steadily improved its food supply in the years following the revolution, suffered, nevertheless, the massive famine of 1959-61.

The emerging history, then, projects the end of food-short hunger, a decline in the proportions of the food-poor hungry, but an increase in their number, and a major effort to curb food-deprived hunger among young children. The glass of progress in ending hunger is half-full or half-empty and how the glass of progress is perceived may relate to the role of the observer – critic or apologist. But empty or full, hunger will persist, I am sad to state, beyond the end of this century.

Ending Hunger

What must be done to end hunger for the second billion? What must be done to accelerate this pattern of hesitant progress with its smaller proportions but larger numbers of the hungry? And what must be done to identify and to avoid the catastrophes and discontinuities that could even reverse the progress of the last three decades? We think the answers lie, in part, in understanding five major trends that will affect the capacity to end hunger over the next century. These are changes in: population, resources, economy, technology, and the nexus of values, policies and institutions, as they affect worldwide food production, distribution and consumption.

Population Growth

Depending on specific sets of assumptions, demographers project a global increase in population somewhere between 8-12 billion people before leveling off to a steady or diminishing state within the next century. Taking a median projection, the world population may double, but that of Africa may increase fivefold and of south Asia, threefold. These are the regions where currently the bulk of the world's hungry are found. With a projection of a fivefold increase over this time period, the population of the largest African country, Nigeria, could be greater than the population of North America or Europe today.

These enormous population increases all assume a lowering of the rate of growth to a stable or lower reproduction rate relatively early in the next century, even in Africa where the rate is still growing. Thus, it is the inertia of a youthful population in the prime reproductive ages that carries world population growth forward until it stabilizes well after the year 2050.

In population, as in all the trends we study, there are possibilities of great discontinuities. China, by a remarkable choice of will, has brought down its population growth at a rate never before experienced in human history. The emergence of the AIDS pandemic threatens an unprecedented increase in mortality, particularly in Central Africa. Conversely, success in the current efforts to curb the great parasitic diseases, coupled with an effective campaign to drastically reduce infant mortality, could provide for an even faster rate of increase in population, especially in Africa.

These uneven growth rates will impinge on hunger in ways still to be determined. Population increases make more difficult the task of feeding all, but in some cases spur peoples and nations toward needed intensification of agriculture. It is difficult to see how population growth can help densely settled Bangladesh, but its impact on Africa may have a much more mixed effect.

Growth takes place differentially among the vulnerable groups of the hungry. Who the hungry are differs markedly by regions, environment, economic development, ethnicity, social class, life cycle, and gender. Thus a central, early, study of our program is an examination of the implications of standard national projections, (available from the UN or the World Bank), for their differential hunger vulnerability. In Asia, the rural landless in Africa, the self-provisioning smallholder or pastoralist, and in Latin America, the urban poor,

may constitute the households most vulnerable to hunger. Within these households, small children and pregnant women exhibit the highest vulnerability. On larger scales, within continents, regions such as the semi-arid hunger crescent of Africa are subject to recurrent stress. Within nations, vulnerability shifts by migration, by location, and by urbanization. The second billion can become larger or smaller, directly as a function of the demographic changes underway.

Resource Sustainability

Since 1798, it has fallen unto each generation to look anew at the adequacy of the resource base to support a growing population. Within my professional career, I have witnessed two great swings in neo-Malthusian and anti-Malthusian thought. This lecture is surely part of that continuing appraisal.

That the global resource base is large enough to support a population of ten or more billion is not, for me, seriously in doubt, but that it can do so on a sustainable basis is a current concern of our joint program with the Vienna-based International Institute for Applied Systems Analysis. Specifically, we are undertaking a searching examination of the sustainability of agriculture.

A twofold increase in world population will require a three- to fourfold increase in agriculture. This would allow for meeting the dietary improvements to end hunger, for moving higher on the food chain, and for coping with the inevitable increases in the demand for specialty crops and organic industrial materials. Such an increase by itself may threaten the sustainability of the resource base, while additional threats emerge from the worldwide processes of urbanization and industrialization that have been underway since Malthus' day.

In our study, we assume that an agriculture of the future will still rely on basic photosynthetic processes and require the natural resources of light, water, air, nutrients, and biota in combination with human-organized inputs of energy, chemicals and knowledge. Unfortunately, a variety of potential or ongoing environmental and socioeconomic changes could seriously degrade these natural resources on regional or global scales, thereby threatening the long-term sustainability of agriculture. Climatic changes resulting from increases in carbon dioxide and trace gas emissions, deforestation, deterioration of the ozone layer, or volcanic eruptions could seriously affect weather extremes, water supplies, and growing seasons. Problems of soil erosion, desertification, heavy metal contamination, acidic deposition, and groundwater depletion are growing in prevalence. Biotic resources may become increasingly vulnerable to predators and disease as chemical resistance increases and genetic diversity decreases. Competition for high quality land with settlement, transportation, energy production and other uses is likely to severely limit growth in, or even decrease, the amount of agricultural land in many regions of the world.

In all, we have some twenty-one threats under study. A characteristic that most share is that they are low-probability, high-consequence threats. If you assess the risk of losing the foodlands of Europe to heavy metal accumulation, or the rice crop of Asia to a nuclear winter, or the drying of mid-America through a CO_2 induced warming, then the possibility of each of these events appears quite small. But if you take into account that many of these events are not independent, that some have common causes (as in energy production induced changes in CO_2, heavy metals, acid deposition), and that some of them are slow but cumulative hazards with unknown toxic thresholds, then what is unlikely when considered in isolation, becomes a credible concern of the future.

Global Economy

Since 1950, the world trade in grain has grown more than fivefold, along with the international market for industrially produced agricultural inputs. A massive industrial restructuring is underway as jobs and industries move from location to location. This growing, global, interdependence and restructuring determines much of hunger and its alleviation through food availability, through the capacity to raise food, and through the ability to purchase it. Coping with the increased linkages is a central issue in strategies to reduce and prevent hunger.

For example, one of the persistent differences within the community concerned with hunger, is the attitude taken toward food aid and trade and national or local food self-sufficiency. On the one hand, the enormous growth in food trade has taken advantage of the persistent decline in food prices that has been going on for over a century, much to the discouragement of the surplus producers in the developed world. Conventional economic theory values this trend. Food should be produced by the most efficient means and traded to others for what they have comparative advantage to produce.

On the other hand, in some nations where this has been done, investment in agriculture either has fallen, lagged behind, or been concentrated in traded, rather than consumed, crops. This has undermined the capacity of many countries for self-provisioning and left its people dependent on purchased food and the nation burdened with an increasing debt for imports or a dependence on an irregular international generosity. The poorest of the poor appear to possess little comparative advantage.

In the lives of the potential second billion of hungry people, these trends may only accelerate and the contradictions increase. Global linkages will grow, agricultural production will increase, and local sufficiency will decrease. If one takes the perspective and needs of the hungry, how might we study the issue?

An Economic Theory of Famine

Since 1981, we have had an economic theory of famine, and perhaps of chronic hunger, that has the potential to illuminate this polarized issue in a new and original way. Amartya Sen (1981) has addressed an old but forgotten problem in economics, in an old-new way: why do people go hungry even when food is available? The answer, by most who study this question, is that they are poor. But Sen asked, poor in what? His theory is that they are poor in entitlement. These entitlements include those that we conventionally use in our society, e.g., welfare payments or social security, but include, as well, a household's access to resources, the food it raises, the cost of the food they may buy as compared to what they have to trade for it—labor power, other crops, livestock, money, jewelry, property, or the land itself. All these terms of trade can turn against an individual household or a group of households and make food as inaccessible as if an enormous drought or flood had occurred.

Similarly, nations can find themselves not merely short of food raised within their boundaries but unable to buy it for lack of foreign exchange or unable to receive gifts of it because of politics or because the donor countries suffer hard times or experiment with different agricultural policies as President Nixon did in 1972. Over the long-term, national entitlements will surely change as a more interdependent world economy, with long waves of changing industrial prosperity and location, shifts the terms of trade and comparative advantage. The remarkable drop in the price of traded grains on the world market, has favored, in theory, the hungry. But the terms of entitlement for nations loaded with debt have also shifted. As producers and sellers of goods, many have suffered net losses in entitlement. The newly organized World Institute for Development Economics Research (WIDER), a branch of the United Nations University located in Helsinki, has begun, under Sen's guidance, to explore this question and we would hope to pursue it further with them.

New Technologies

The emerging "green gene" revolution of biotechnology will surely lead to increased agricultural production but not necessarily to less hunger. Indeed, depending on how the technology develops and is used, it could increase the number of rural poor.

The Green Revolution of higher-yielding varieties of rice, wheat, and maize, combined with intensive inputs of water, fertilizer, and initial labor, has surely contributed to impressive growth in grain yields. These were estimated, in the early 1980s, to be on an annual basis between 10-27 million tons of rice, 7-20 million tons of wheat, and 3-5 million tons of sorghum, just from the effect of varietal selection. Perhaps half again as much increase should be added from the effects of the associated fertilizer use (Lipton and Longhurst, 1975).

The Green Revolution has been frequently criticized for increasing inequality within the favored regions where the varieties have been found suitable and the extensive areas where they are unsuitable. Nonetheless, Asia, and to a lesser extent, Latin America, are clearly more self-reliant today in rice and wheat. Rural employment in south Asia has risen somewhat and food prices have generally fallen. None of this is applicable to Africa—essentially bypassed by the Green Revolution.

But surprisingly, we still know little about the nutritional aspects at the household and individual level and the overall impact of the revolution on hunger. There are no "before and after" nutritional studies; nonetheless, the frequent assumption that more production will mean more food for the hungry is demonstrably not true.

The emerging green gene revolution has the capacity for even greater technological transformation. The new biotechnologies exploiting gene recombination, cell and tissue culture, microorganism development, and the like, have the potential for not merely selecting a superior germplasm but for changing fundamental plant-environment interactions and for the creation of plants and animals with novel characteristics.

Also unlike the Green Revolution, the green gene revolution reflects a different pattern of investment and priorities (Buttel, Kenney and Kloppenburg, 1985). Basically, the Green Revolution was modeled on the successful land-grant college cooperative research program, although initially funded by private philanthropy. It was public-interest centered, although one might not notice that, given the harshness of its critics. It was strongly oriented toward increasing the production of food grains, and more recently roots and tubers, in the Third World. The green gene revolution is currently led by private corporate investment with strong and generally private university relationships. Its emphasis is much removed from the earlier public-interest focus and is strongly profit-centered.

Early choices are already being made that determine which species to manipulate, what kinds of techniques to employ, and what types of organizations will produce and disseminate the new innovations. At the same time, latent opportunities exist to develop technological approaches and products that could significantly reduce hunger and improve nutrition. Decisions to take advantage of these opportunities, despite the pulls of the marketplace, will require conscious effort and perhaps new and different institutional mechanisms. They will also require careful scrutiny of early research choices, ostensibly being made solely on scientific and technological grounds. These often conceal critical moves towards or away from the goal of alleviating hunger.

We have, underway, an appraisal of the Green Revolution from the perspective of hunger and nutrition. With this appraisal as an instructive background, we plan to assemble a working group drawn from those making the early choices in the green-gene revolution: industry, universities, the new third-world biotechnology institutions, foundations and funding agencies, to consider the match between the early choices, the latent opportunities, and the needs of the second billion.

Emerging Values, Policies, and Institutions

The right to food and freedom from hunger is a slowly emerging human right, currently legitimatized in the International Covenant on Economic, Social and Cultural rights, ratified by some 81 countries, but not, as yet, by the United States. Underlying this legalization are public attitudes and support and these are difficult to judge.

It has been a year since Hands Across America, and two years since the world rocked together. Public attention spans are limited and fluctuate. The enormous outpouring of sympathy towards Africa has not been sustained. Perhaps the world's empathy will prove ephemeral. Nonetheless, over the long run, there are surely signs of a deep, growing, and sustained value change, affirming that freedom from hunger is the birthright of all human beings.

No similar consensus is emerging as to what needs to be done. There are deep ideological, disciplinary, and national cleavages in the prescriptions for ending hunger. These persist and undermine efforts to end hunger, despite the best intentions of groups such as The Hunger Project. A spirit of tolerance, although I value it highly, does not necessarily provide answers to the many valid questions: does growing global interdependence provides new opportunities for moving food from surplus regions to needy regions or does it undermine the development of local self-sustaining agriculture? Do current relief efforts provide a band-aid to cover over the festering sores of global inequality and national inefficiency and thus make people more vulnerable in the future? Does improved technology exacerbate the plight of the urban poor and the rural landless? And so the debate goes. The debate needs to continue; but even more needed is serious study.

Whatever the policies that emerge to end hunger for the second billion, they will be implemented by new and emerging institutions. At the global level, policy studies have become equated with the activities of governments and the international organizations to which they belong. But two very significant groups of organizations are emerging in every field of global concern. The new international voluntary organizations give promise for the first time of creating a global constituency for ending hunger. The transnational corporations offering services-for-profit provide new avenues for service delivery and innovation. Within our own country, these institutions now clearly equal government's role in many human services and a similar development will emerge, globally over time.

Conclusion

Ending *famine* is well within sight, with the exception of its intentional creation or perpetuation as a weapon of war or genocide. Even in Africa, where famine will surely return again before the end of this century, there are welcome signs. In Kenya and Zimbabwe, there was real success in coping with the famine induced by the continuing drought.

Hunger, though, will persist, since it is rooted in the overall poverty of the third world, in the special vulnerability of

pregnant women and children, in the economic marginality of the unemployed and the landless, and in the stresses imposed on our life support systems. But this we already know and understand. What will complicate the task further, and make it both easier and more difficult, will be the many changes in people, environments, economies, technologies, and values, that we can only dimly perceive.

It is here, where despair sets in at the prospect of a second poor and hungry billion, that history can cheer. We actually are at a unique moment in time, a great climacteric, a "critical period in human life," when the enormous stresses of the great period of exponential population growth are coming to an end. The challenge is to negotiate this period of the next and final doubling of the population, to achieve a just and sustainable human environment, and for my granddaughter Sara, who will be 70 in the year 2050, to look forward to a more stable and tranquil world.

It is not at all certain that this will be done. It is indeed a dangerous time. But it is truly a unique and special time to be able to glimpse what may be. And here the lesson of history is clear. If we successfully negotiate this difficult, even terrifying time, such is the sequence of progress that hunger will have ended, not merely for the second billion, but for their children's children as well.

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