

# **GLOBAL POVERTY, HUNGER, DEATH, AND DISEASE**

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Poverty, hunger, death, and disease have been cruel realities of the human condition for centuries. Horrific examples abound: Charles Dickens' credible accounts of English workhouses, the great famines in Ireland and India, the Black Death, and the scourge of AIDS/HIV notably in subSaharan Africa.

Our paper presents current information on these subjects in three main sections. In section I we are most concerned about six infectious diseases, infant mortality and life expectancy, and in very general terms the global causes of disease and death. In section II, our interest centers on poverty and hunger. Section III speaks to the four revolutions that influence poverty, hunger, death, and diseases: biological, intellectual, political, and scientific-technological.

## I. DEATH AND DISEASE

Our attention in the following is drawn to six infectious diseases: pneumonia, diarrheal diseases, HIV/AIDS, tuberculosis, malaria, and hepatitis. Upwards of 10.453 million persons die of infectious and parasitic diseases (see Table 1) making those diseases one of the leading causes of death worldwide. The most recent estimates from the World Health Organization put the death toll from cardiovascular diseases -- the leading cause of death around the world -- at 17.1 million. (WHO,2009a). Another 7.4 million died of cancer. (WHO,2009b).

### Pneumonia

Pneumonia worldwide strikes down roughly 1.8 million children under age five every year, more than all the deaths from AIDS, malaria, and measles. About 75 percent of all deaths occur among children in the first year of life. An estimated 155 million children are infected every year but only 20 percent are treated with antibiotics. With proper treatment 600,000 of the 1.8 million who die could be saved. A combination of prevention and treatment could keep one million children from succumbing. This disease is most prevalent in South Asia and sub-Saharan Africa. (WHO,2009c; CDC,2010).

Pneumonia is an acute respiratory infection that is caused by viruses, bacteria, and fungi. *Streptococcus pneumoniae* are a group of bacteria that live in the nose and throats of persons of all ages. The symptoms of viral and bacterial pneumonia are similar. When a person becomes infected, small sacs in the lungs called alveoli are filled with pus and fluid that limit oxygen intake and make breathing difficult. In roughly 30 percent of persons infected with bacterial pneumonia the bacteria invade the bloodstream causing a very serious complication known as bacteremia. Vaccines to prevent the onset of strep pneumonia are safe and effective. However, the spread of antibiotic resistance is a major challenge for researchers and health care providers. (WHO,2009c; NIAID,2006; NNii,2010).

In addition to children, the elderly, persons with HIV/AIDS or with such long-term conditions as heart disease, sickle cell anemia, alcoholism, diabetes, and liver cirrhosis are at risk. As a preventive measure, the Centers for Disease Control and Prevention recommends that these persons and others at risk get vaccinated. PCV13 vaccine that contains the 13 most common

pneumococcal serotypes causing invasive infections in North American children has been approved for routine use in infants. (NIAID,2007; NNii,2010).

### **Diarrheal Diseases**

Included among these diseases are three major killers: cholera, dysentery, and typhoid. Contaminated water and food are the chief means by which these diseases are spread. An estimated 2 billion children are newly infected every year. The worldwide death toll for children is 1.5 million. (WHO,2009d).

Cholera kills one percent of infected persons in communities with well-established diarrheal disease control programs. In developing countries, however, it remains a serious threat where the fatality rate can run as high as 50 percent when the disease is untreated. An internationally licensed oral cholera vaccine is available and is known to be safe and effective. (WHO,2008a).

About 120 million cases of Shigellosis or severe dysentery occur every year worldwide. Of that number, 1.1 million die each year mainly children under five years of age in developing countries. In addition to water and food transmission, Shigellosis is passed through person-to-person contact. The disease is characterized by a short period of watery diarrhea with intestinal cramps followed by permanent discharge of bloody stools. In acute cases, renal failure takes place. There is no existing effective vaccine. (WHO,2009e).

Salmonellosis is a bacterial infection deriving from salmonella. Persons infected with salmonella often develop diarrhea but recover in four to seven days without treatment. However, some may require hospitalization. The elderly, infants, and persons with impaired immune systems are more likely to get a severe infection. (CDC,2009c).

Typhoid fever is characterized by an onset of sustained fever, severe headache, nausea, abdominal pains, loss of appetite, constipation or sometimes diarrhea. The disease is transmitted by ingestion of food, including dairy products, water that is contaminated or handled by infected persons. It has disappeared from industrialized countries but still plagues Asian regions in the former USSR, parts of South and Southeast Asia, Africa, and South America. An injectable vaccine that dates from 1896 and two new vaccines are licensed and used today to treat typhoid fever. Only one to four percent of those with typhoid fever die when properly treated. (WHO,2009f).

### **Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome**

HIV was first identified in the early 1980s. HIV destroys the immune system, exposing the victim to multiple opportunistic infections and certain types of cancers. AIDS, the disease that results from HIV, is fatal and at present there is no vaccine available. Unprotected heterosexual intercourse is the principal mode of transmission. Other modes include unprotected penetrative intercourse between men, intravenous drug injection, unsterile needles shared by drug users, blood transfusion, and transfer from infected mother to her

**baby during pregnancy, labor and delivery, or breastfeeding. (CDC,2009a; WHO,2008-09; WHO,2004).**

**Estimates of the number of persons who died of AIDS in 2008 ranged from 1.7 to 2.4 million. HIV/AIDS is the leading cause of death for 15 to 44 year old women. Approximately 2.4 - 3.0 million persons are newly infected every year of whom 240,000 - 610,000 are children under age 15. As many as 31.1 - 35.8 million persons worldwide are actively infected with the virus; 1.4 million of them are co-infected with tuberculosis and HIV. Tuberculosis is the leading cause of death among persons infected with HIV. (UNAIDS,2009; WHO,2008-09).**

**Sub-Saharan Africa bears a disproportionate burden of new HIV infection and death from AIDS. Life expectancy is 49.1 years in sub-Saharan Africa – lowest in the entire world (see Table 2). In this region, there are more than 14 million children under age 15 who have lost one or both parents to AIDS. (WHO,2008-09).**

**Advances in medications used in combination – highly active antiretroviral therapy (HAART) – have been successful in reducing the replication of HIV in infected persons even to the point where the HIV level in the bloodstream known as plasma viral load is undetectable. This does not mean, however, that HIV has been eradicated. Evidence from observational studies of both male-female sex and male-to-male sex indicate the potential for the sexual transmission of the virus persists even when the infected partner is on effective HAART regime where the viral load is undetectable. (CDC,2009a).**

**Among the economic consequences of the HIV/AIDS epidemic are reduced GDP growth, increased incidence of poverty, wasted investment in human capital, and a long-term decline in investment and savings. There is some evidence that institutional breakdown in Africa has affected agricultural services, judiciaries, police forces, educational systems, and health services. (WHO,2004; WHO,2008b).**

### **Tuberculosis**

**Tuberculosis is a bacterial disease that is transmitted by tiny particles suspended in the air and that affect the lungs but can trigger disease in every organ of the body. A person with TB if not treated will infect 10 - 15 other persons every year. Roughly 1.3 million persons worldwide died from tuberculosis in 2008. Another 9.4 million persons were infected that year notably in Africa, the Eastern Mediterranean, and Southeast Asia. Estimates put the number of persons actively infected worldwide at 11.1 million. As indicated previously, about 1.4 million persons worldwide are co-infected with HIV and TB. The leading cause of death among HIV-infected persons is TB. (WHO,2010a; WHO,2008-09).**

**Strains of TB resistant to a single drug have been documented in every country surveyed. Further, resistance to all major anti-TB drugs has surfaced. Resistance is attributable to inconsistent and partial treatment, treatment mistakes made by health care providers, and an unreliable supply of drugs. (WHO,2010).**

Multidrug resistant TB (MDR-TB) that cannot be treated successfully with the two most powerful anti-TB drugs available is a major challenge for TB control especially in the former Soviet Union. Even more so, extensively drug-resistant TB (XDR-TB) poses a very serious threat for patients co-infected with HIV and TB. Drug-resistant TB is treatable but involves chemotherapy for up to two years with second-line anti-TB drugs that are more costly than first-line drugs and are known to produce adverse drug reactions. (WHO,2010a).

### Malaria

Malaria is caused by four kinds of *Plasmodium* parasites and is transmitted to humans through the bites of infected *Anopheles* mosquitoes. *Plasmodium falciparum* and *Plasmodium vivax* are the most common parasites; *Plasmodium falciparum* is the most deadly. Most recently *Plasmodium knowlesi* that is common in monkeys has been identified in humans. The *Anopheles* species breed in freshwater that is collected in puddles, ricefields, and hoofprints. (WHO,2010b).

The number of persons actively infected with malaria is estimated at 247 million worldwide. About one million fell victim to malaria in 2008. Most of the deaths occur in sub-Saharan Africa. An African child dies every 45 seconds from malaria in part because children do not develop the immunity that comes from years of exposure. However, this immunity which is found in adults does not provide complete protection. The following population groups are at risk of developing malaria: young children, pregnant women who are non-immune, semi-immune, or semi-immune HIV-infected women, persons with HIV/AIDS, international travelers from non-endemic areas, and immigrants and their children from non-endemic areas. In areas where malaria is endemic, persons afflicted with sickle cell anemia are more likely to survive the onset of *Plasmodium falciparum*. (WHO,2010b; Malaria & Red Cell,2002).

Malaria is resistant to chloroquine and sulfadoxine-pyrimethamine. If resistance develops to artemisinin there will be dire consequences because that drug represents the only antimalarial drug available at the moment. The key to preventing this resistance is using artemisinin in combination with another drug. (WHO,2010b).

There are two forms of control that have proven effective: insecticide-treated mosquito nets and indoor spraying with residual insecticides. As with antimalarial drugs, however, resistance to insecticides is a serious problem in part because developing new, alternative insecticides is expensive and time-consuming. (WHO,2010b; WHO,2009g).

Based on comparisons between countries according to the severity of malaria transmission, it has been estimated that malaria can reduce GDP by as much as 1.3 percent in countries. In some countries where malaria is a serious problem, prevention and treatment account for upwards of 40 percent of public health expenditures, 30 to 50 percent of inpatient hospital admissions, and 60 percent of outpatient health clinic visits. (WHO,2010b).

## Hepatitis

Hepatitis B(HBV) and C(HCV) are transmitted from person to person by means of contaminated blood and injection drug use. Additionally, HBV and HCV are contracted through sexual intercourse and other close contact. Both types attack the liver. Until 1992 when blood supplies in the United States were not carefully screened, HCV was spread through blood transfusions and organ transplants. (CDC,2009b; WHO,2008c).

An estimated 350 million persons worldwide are infected with HBV and approximately 600,000 die every year from HBV complications. HBV is not spread by contaminated food or water or through casual contact in the workplace. It is endemic to China and other parts of Asia. (WHO,2008c).

There is a long-lasting HBV vaccine available that should be administered to everyone below age 18. In the United States this vaccine is administered to every newborn at birth and with other vaccines in the first year of life. Protection with vaccination exceeds 90 percent until age 40 after which it tends to drop off. Vaccination is recommended for: persons with high-risk sexual behavior; partners and household contacts of HBV infected persons; injection drug users; persons who frequently require blood or blood products; recipients of solid organ transplants; those at risk of HBV infection including health workers; international travelers to countries with high rates of HBV; and newborn infants of an infected mothers. (WHO,2008c).

A vaccine has been available since 1982 that is 95 percent effective in preventing HBV infection. While there is no *specific* treatment for acute HBV, the chronic form of the disease can be treated with interferon and anti-viral agents. However, treating HBV is expensive and out of reach for many in developing countries, and chronic HBV is known to cause 80 percent of all primary liver cancer worldwide. Even so, about 90 percent of healthy adults with HBV develop antibodies and recover and will be completely rid of the virus in six months. (WHO,2008c; HBF,2009; HFI,nodate).

Worldwide an estimated 130 to 170 million persons are actively infected with HCV and more than 350 thousand die each year from HCV (see Table 1). There is no vaccine available for HCV. In the United States about 50 percent of all liver transplants are performed on persons with end-stage HCV. (CDC,2009b; HFI,nodate).

Prevention depends on avoiding behaviors that spread the disease including injection drug use, sharing straws for snorting cocaine, and drinking alcohol. Infected persons are advised to avoid tasks that draw down energy levels. HCV ranges from a mild infection that lasts a few weeks to a serious, lifelong infection. An acute infection has been known to kill. (CDC,2009b; HFI,nodate).

Table 1 summarizes the most recently available information on the estimated number of persons newly infected, actively infected, and killed worldwide by these six infectious diseases.

### **Infant Mortality and Life Expectancy**

**Infant mortality and life expectancy are two significant indicators of the human toll taken by disease (see Table 2). Across the world, infant mortality has fallen from 96 deaths per 1,000 live births in 1970 to 52 deaths per 1,000 live births in 2005. In the least developed countries, the rate has fallen from 152 to 97. In high-income countries there were 6 deaths per 1,000 live births in 2005 compared to 24 per 1,000 in 1970. In low-income countries the death rate in 2005 was roughly 12 times higher than in high-income countries. For a baby born in Sierra Leone, the country with the highest infant mortality in 2005, the risk of dying in infancy was 27 times greater than for a baby born in high-income countries.**

**For all humankind, life expectancy at birth has improved from 58.3 years in 1970-75 to 66.0 years in 2000-05 (see Table 2). As with infant mortality there are vast differences from place to place, especially when income level is taken into consideration. In high-income countries, life expectancy increased to 78.7 years in 2000-05 from 71.5 years in 1970-75. At the same time, life expectancy in low-income countries also improved, increasing to 59.2 years from 49.1 years.**

**Among least developed countries, life expectancy stood at 52.7 years in 2000-05, up from 44.6 years in the early 1970s. Several countries, almost exclusively in Africa, have experienced actual *declines* in life expectancy: Ukraine, South Africa, Botswana, Namibia, Lesotho, Swaziland, Uganda, Zimbabwe, Kenya, Rwanda, Ivory Coast, Zambia, Congo, Central African Republic, and Democratic Republic of Congo. Life expectancy in 2000-2005 ranged from 81.9 years in Japan to 39.2 years in Zambia. In the case of Zambia, life expectancy between 1970-75 and 2000-05 fell by 10.9 years. (HDR,2007/2008).**

### **Fundamental Causes**

**Several factors account for the disease and death around the world. Some are natural phenomena and more or less uncontrollable: drought, hurricanes, earthquakes, monsoons, volcanic eruptions, floods, and tsunamis. Others relate to economic globalization including most importantly the development and widespread utilization of modern transportation and delivery systems that allow the overnight transmission of a disease from one part of the world to another via human and animal carriers and parcel and freight traffic.**

**Still other factors relate to human failure or frailty in prescribing the correct medication or dosage, continuing a drug regimen as directed, remaining faithful to one's spouse, supporting one's children, turning away from the huge but often illicit financial rewards of the present in order to pursue long-term personal development and the dividends that follow from that development in the future.**

**Three other factors contribute powerfully to disease and death. The first is the unfortunate, though at times inevitable, consequences of using powerful drugs to fight infectious disease. Resistance to life-saving drugs is a natural and unstoppable biological process wherein the exposure of certain microbes to an antibiotic leads to a mutation and the emergence of microbes that are resistant to that antibiotic. Second, the very same hospital wards that offer**

hope for successful treatment of injury and disease have become the breeding ground and transmission system for “super infections” that now are regarded as a major health care crisis. In the United States alone, two hospital-acquired infections – sepsis and pneumonia – accounted for an estimated 48,000 deaths adding \$8.1 billion to health care costs in 2006. (Eber *et.al.*,2010). Third, and as a consequence of antimicrobial resistance, pharmaceutical companies are called upon to discover, develop, and manufacture new antimicrobials, but every new compound brought to market in the United States costs more than \$1 billion for research and development and takes seven years from the start of clinical trials until it is approved for use in humans. (Tufts,2010). In this regard, the Drug Resistance Working Group of the Center for Global Development in 2010 sounded this warning:

The most common childhood diseases in developing countries – malaria, pneumonia, other respiratory infections, and dysentery – are no longer curable by many of the older antibiotics or other drugs available in poor countries. The consequences are devastating: bacterial acute respiratory infections, for example, kill more than three million children every year and malaria kills two million children. Many cases of these illnesses are caused by strains now resistant to common drugs.

Resistance to drugs also has a startling impact on the cost of curing patients. In many poor countries, expenditures for drugs represent a large proportion of overall health-care costs, ranging from 20 to 60 percent of total expenditures on health... it costs as much to cure one patient of extensively drug-resistant TB as it does to cure 200 patients of susceptible TB... (CGD,2010).

## II. POVERTY AND HUNGER

There are two standards by which poverty is defined and measured: the absolute (minimal-living) standard and the relative (income-distribution). The minimal-living standard addresses the question: ‘How much does one need to live at a minimally acceptable level?’. The income-distribution standard addresses the question ‘How much does one have relative to others?’. In the following we use “minimal-living” and “income-distribution” because they differentiate between these two standards with greater clarity.

Students of poverty are divided as to which standard to use. In the United States, the official definition of poverty from the very beginning has incorporated minimal-living, dismissing out of hand income-distribution. Some countries have opted for the income-distribution, rejecting minimal-living.

This divide, which gives the impression that how one defines and measures poverty in the end is entirely arbitrary, is unfortunate and unnecessary. There is nothing fundamentally arbitrary in this matter. The minimal-living standard originates in human individuality whereas the income-distribution standard originates in human sociality.

**An income-distribution standard makes sense only in the developed world where it should be used alongside the minimal-living standard but never as a replacement for that standard. Employing both concepts allows us to incorporate both dimensions of human nature into the definition and measurement of poverty.**

**However, common sense alone tells us that outside the developed world where hundreds of millions of humans struggle to survive from one day to the next, poverty must be defined and measured first in terms of minimal living. It is meaningless to set the official poverty threshold at, say, one-half the median income for all persons when large numbers of persons above that threshold cannot afford the bare essentials for human survival.**

**In the following we focus on the numbers and proportions of persons who are poor and changes in poverty with the passage of time. A World Bank report published in 2009 is the source of the information in Tables 3A and 3B on the cost of a common basket of goods and services consistent with the Bank's concept of *extreme* poverty. In preparing its estimates of global poverty, the Bank set the poverty threshold at US\$ 1.25 a day -- the average of the poverty thresholds of the 15 poorest countries in the world for which there are data. It is appropriately a minimal-living standard. (World Bank,2009).**

#### **Estimating Poverty**

**There are three noteworthy trends in global poverty between 1990 and 2005. First, there has been a dramatic reduction in the numbers and rates of persons in extreme poverty in the East Asia and Pacific region. Second, poverty rates remained high in the South Asia region and in sub-Saharan Africa over the 1990-2005 where more persons fell below the \$1.25 per day poverty threshold in 2005 than 15 years earlier. Third, elsewhere in the developing world, the rate of extreme poverty was quite low in both 1990 and 2005 (see Table 3A).**

**Table 3B identifies the countries where in 2000-2007 fewer than 2 percent of all persons are living below the \$1.25 poverty threshold. This table also identifies those countries where more than 50 percent are impoverished at that standard. Most the countries where extreme poverty is most severe are in sub-Sahara Africa. The worst are Tanzania, Liberia, and Burundi where more than 80 percent of the population somehow survive on less than \$1.25 a day.**

#### **Hunger**

**The United Nations Food and Agriculture Organization considers a person as undernourished when caloric intake is below the minimum dietary energy required for light activity and a minimum acceptable weight for attained height. This minimum varies from country to country and year to year depending on the gender and age structure of the population. FAO uses "undernourished" and "hungry" interchangeably. (FAO,2009).**

**The FAO estimates that in 2009 a total of 1.02 billion persons worldwide are undernourished -- a substantial increase from its estimate of 915 million in 2008. In the 1970s and 1980s the**

number of hungry persons worldwide actually declined for two major reasons: investments in agriculture and a combination of better grain yields and declining grain prices. However, this trend has been reversed for the past 20 years.

Table 4 indicates that overall in the *developing* world the percentage of hungry persons actually declined between 1990-92 and 2004-06. There is, however, a very serious hunger problem in the Democratic Republic of Congo and to a lesser extent in Eritrea and Ethiopia. Over the period 1990-92 to 2004-06 the percent of the population that is undernourished has increased in North Korea, Pakistan, Uzbekistan, El Salvador, Guatemala, Venezuela, Tanzania, Madagascar, Swaziland, Zambia, Gambia, Liberia, and Sierra Leone, There is no information on hunger in most of the Near East and North African countries or Somalia. (FAO,2009).

Every day, the World Food Programme operates 60 planes,40 ships, and 5,000 trucks. Even so, this program in 2009 reached fewer than 1 in 10 of the world's undernourished population. (WFP,nodate; WFP,2010).

### III. FOUR REVOLUTIONS

Nearly 50 years ago, Barbara Ward identified four factors, which she identified as revolutions, that probe more deeply into the nature and causes of poverty, hunger, death, and disease. These four revolutions, she asserted, have swept over the Western world since the 1850s but are not widely evidenced in the poor countries of the world.

The four are the *biological* revolution that broke through the cycle of peaceful population growth and violent diminution, the *intellectual* revolution of materialism and this-worldliness, the *political* revolution of equality, and the *scientific and technological* revolution that involves the application of savings and the scientific method and insight to everyday business affairs. (Ward,1962).

Before the biological revolution of modern medicine and sanitation, populations grew until the limits of economic resources had been reached, and then declined due to malnutrition and starvation or war with a neighboring tribe over control of resources. Until this revolution, tribal war, and with it disease and hunger, were revisited in every generation.

By the intellectual revolution, Ward means that archaic civilizations, notably tribal in nature, are backward-looking, tend to hold on to the old ways, to mystery and magic rather than hard work and reason.

The political revolution of equality breaks down the hierarchical nature of traditional societies, and the backward-looking ways that dominate such societies and subordinate merchants to warlords and landlords.

**In tribal societies there is little or no science. Mystery and magic predominate, effectively putting the exercise of the human will before the use of the human intellect in the manipulation of the physical matter of the universe for human ends. And there is no sustained saving in traditional societies, blocking investment in infrastructure and thereby holding back economic development. (Ward,1962).**

### **Remedies**

**As to the biological revolution, spraying homes and the breeding sites of mosquitoes with DDT reduced the incidence of malaria significantly in the post-WWII period. (Bate,2000). But even though Bate asserts that there is no scientific study that demonstrates the harmful effects of DDT on human health, a paper published in 2001 suggests the danger inherent in the use of DDT that is “still highly persistent in the environment and [is] uniformly present in the lipid-containing tissues of humans and in breast milk samples.” (Reigart and Roberts,2001). The authors’ first recommendation is to “*limit* as much as possible the use of pesticides in the home.” (Reigart and Roberts, 2001; emphasis added).**

**The intellectual revolution of materialism and this-worldliness is necessary for better provisioning human material needs. Even so, there are other human needs -- the needs of the human spirit for truth, goodness, and beauty -- which cannot be disregarded in the implementation of an economic development remedy. As with Galileo and the Church centuries ago, and creationism and evolution much more recently, faith and reason must be reconciled lest the one dominate or destroy the other. Failing to achieve that reconciliation can impoverish the human body, the human spirit, or both. If truth is one, and if faith and reason are two authentic pathways to the one truth, reconciliation is possible.**

**The political revolution of equality too is necessary for economic development, in particular in relation to tribal, class, or caste societies that operate on the practice of systematically including some and excluding others. However, the pursuit of equality encounters the constraint of individual freedom that is necessary to unleash competitive energies.**

**In a system of markets, both freedom and equality are necessary for economic development. The key to a proper balancing of the two is in the administration of the exclusionary rule. Groups should be free to exclude as long as exclusion is not discrimination by intent or effect. Thus, equality can be achieved without sacrificing freedom.**

**As for the revolution that Ward identified as the most important of all, it is clear that human well-being depends critically on science and technology in ways that are obvious even to the casual observer. For example, entrepreneurial ideas and schemes often originate in the scientific method and are technologically expressed in the form of new products and services, new materials, and new processes of production.**

**Two limits apply to this revolution. The first is the destructive impact on human beings from the implementation of new technologies: loss of employment, loss of work that is creative and**

meaningful, loss of a sense of oneness with others in the workplace. The second limit is the pernicious consequences for natural resources and the environment: depletion of renewable and nonrenewable resources, contamination of the air, soil, and water upon which all living creatures depend.

There is one remedy linked to the scientific/technological revolution that seems to offer great promise. Distance learning facilitated by the internet and other innovations in telecommunications make it possible to bring science and technology to developing countries at a fraction of the cost of building a traditional brick and mortar campus and hiring a faculty. It is encouraging to see so many mainstream colleges and universities in developed countries moving in this direction, not to mention the “virtual universities” that are reaching students without massive investments. In this regard, closing the “digital gap” between rich and poor nations is critically important. Besides, distance learning offers reasonably safe personal access to this revolution and the intellectual revolution in those nations where religion dominates reason.

Bringing a complete end to poverty, hunger, death, and disease is not possible. However, reining them in is possible, and the vast experience of developed countries over more than 150 years points the way. The very heart of the problem lies in helping developing countries embrace the scientific/technological revolution. Developed countries should be under no illusion: this task will take many more years and much greater and smarter human effort.

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**Table 1. Persons Newly Infected, Actively Infected, and Killed: Six Infectious Diseases**

	<i>Newly Infected per Year</i>	<i>Actively Infected</i>	<i>Deaths per Year</i>
<b>Pneumonia in children <sup>a</sup></b>	<b>155 million</b> (latest estimate)		<b>1.8 million</b> (latest estimate)
<b>Diarrheal diseases in children <sup>b</sup></b>	<b>2.0 billion</b> (latest estimate)		<b>1.5 million</b> (latest estimate)
<b>HIV/AIDS <sup>c</sup></b>	<b>2.4 - 3.0 million</b> (2008)	<b>31.1 - 35.8 million</b> (2008)	<b>1.7 - 2.4 million</b> (2008)
<b>Tuberculosis <sup>d</sup></b>	<b>9.4 million</b> (2008)	<b>11.1 million</b> (2008)	<b>1.3 million</b> (2008)
<b>Malaria <sup>e</sup></b>		<b>247 million</b> (2008)	<b>~ 1.0 million</b> (2008)
<b>Hepatitis C <sup>f</sup></b>		<b>130 - 170 million</b> (latest estimate)	<b>&gt;350,000</b> (latest estimate)
<b>Hepatitis B <sup>g</sup></b>		<b>350 million</b> (latest estimate)	<b>600,000</b> (latest estimate)

Sources: <sup>a</sup> WHO, *Pneumonia Fact Sheet 331*, August 2009.

<sup>b</sup> WHO, *Diarrhoeal Disease Fact Sheet 330*, August 2009.

<sup>c</sup> UNAIDS, *Aids Epidemic Update*, 2009.

<sup>d</sup> WHO, *Tuberculosis Fact Sheet 104*, March 2010.

<sup>e</sup> WHO, *Malaria Report*, April 2010.

<sup>f</sup> WHO, *Hepatitis C Fact Sheet* in revision;  
estimates from WHO's Melinda Henry via email, April 29, 2010.

<sup>g</sup> WHO, *Hepatitis B Fact Sheet 204*, August 2008.

**Table 2. Infant Mortality and Life Expectancy by Region and Development Status**

	<i>Infant Mortality Per 1,000 Live Births</i>		<i>Life Expectancy at Birth Years</i>	
	<i>1970</i>	<i>2005</i>	<i>1970-75</i>	<i>2000-05</i>
<b>Entire World</b>	<b>96</b>	<b>52</b>	<b>58.3</b>	<b>66.0</b>
<b>All developing countries</b>	<b>109</b>	<b>57</b>	<b>55.8</b>	<b>65.5</b>
<b>Least developed countries</b>	<b>152</b>	<b>97</b>	<b>44.6</b>	<b>52.7</b>
<b>Arab States</b>	<b>129</b>	<b>46</b>	<b>51.9</b>	<b>66.7</b>
<b>East Asia &amp; Pacific</b>	<b>84</b>	<b>25</b>	<b>60.6</b>	<b>71.1</b>
<b>Latin America &amp; Caribbean</b>	<b>86</b>	<b>26</b>	<b>61.2</b>	<b>72.2</b>
<b>South Asia</b>	<b>130</b>	<b>60</b>	<b>50.3</b>	<b>62.9</b>
<b>Sub-Saharan Africa</b>	<b>144</b>	<b>102</b>	<b>46.0</b>	<b>49.1</b>
<b>Central-Eastern Europe&amp;CIS</b>	<b>39</b>	<b>22</b>	<b>68.7</b>	<b>68.2</b>
<b>High Income</b>	<b>24</b>	<b>6</b>	<b>71.5</b>	<b>78.7</b>
<b>Middle Income</b>	<b>87</b>	<b>28</b>	<b>61.8</b>	<b>70.3</b>
<b>Low Income</b>	<b>130</b>	<b>75</b>	<b>49.1</b>	<b>59.2</b>
<b>Sierra Leone</b>	<b>206</b>	<b>165 **</b>	<b>35.4</b>	<b>41.0</b>
<b>Zambia</b>	<b>109</b>	<b>102</b>	<b>50.1</b>	<b>39.2 *</b>

**\*: shortest life expectancy.**

**\*\* : highest infant mortality.**

**Sources: Human Development Report 2007/2008.**

**Table 3A. Persons Living below Minimal Living Standard of \$1.25 a day by World Region**

	<i>Number of Persons Millions</i>		<i>Percent</i>	
	<i>1990</i>	<i>2005</i>	<i>1990</i>	<i>2005</i>
<b>East Asia and Pacific</b>	<b>873.3</b>	<b>316.2</b>	<b>54.7</b>	<b>16.8</b>
<b>Europe and Central Asia</b>	<b>9.1</b>	<b>17.3</b>	<b>2.0</b>	<b>3.7</b>
<b>Latin America and Caribbean</b>	<b>49.6</b>	<b>45.1</b>	<b>11.3</b>	<b>8.2</b>
<b>Middle East and North Africa</b>	<b>9.7</b>	<b>11.0</b>	<b>4.3</b>	<b>3.6</b>
<b>South Asia</b>	<b>579.2</b>	<b>595.6</b>	<b>51.7</b>	<b>40.3</b>
<b>Sub-Saharan Africa</b>	<b>297.5</b>	<b>388.4</b>	<b>57.6</b>	<b>50.0</b>

Source: *Global Economic Prospects: Commodities at the Crossroads*, 2009.

**Table 3B. Persons Living on Less than \$1.25 a day by Country**

*Countries where fewer than 2 percent are living below \$1.25 a day*  
**Albania, Azerbaijan, Belarus, Bosnia-Herzegovina, Bulgaria, Chile, Croatia, Czech Republic, Egypt, Estonia, Hungary, Iran, Jamaica, Jordan, Korea, Latvia, Lithuania, Macedonia, Malaysia, Mexico, Poland, Romania, Russian Federation, Slovakia, Slovenia, Thailand, Ukraine, Uruguay**

*Countries where more than 50 percent are living below \$1.25 a day*  
**Angola, Burkina Faso, Burundi, Central African Republic, Congo, Guinea, Haiti, Liberia, Madagascar, Malawi, Mali, Mozambique, Nepal, Niger, Nigeria, Rwanda, Sierra Leone, Swaziland, Tanzania, Timor-Leste, Uganda, Zambia**

Source: *Human Development Report 2009*. Data not available for some countries including United States.

**Table 4. Percent of Population Undernourished by Region and Development Status**

	<i>1990/92</i>	<i>1995/97</i>	<i>2000/02</i>	<i>2004/06</i>
<b>Developing World</b>	<b>20</b>	<b>18</b>	<b>17</b>	<b>16</b>
<b>Asia &amp; Pacific</b>	<b>20</b>	<b>17</b>	<b>16</b>	<b>16</b>
<b>East Asia</b>	<b>15</b>	<b>12</b>	<b>10</b>	<b>10</b>
<b>Southeast Asia</b>	<b>24</b>	<b>18</b>	<b>18</b>	<b>15</b>
<b>South Asia</b>	<b>25</b>	<b>22</b>	<b>22</b>	<b>23</b>
<b>Latin Amer&amp;Caribbean</b>	<b>12</b>	<b>11</b>	<b>9</b>	<b>8</b>
<b>Near East&amp;North Africa</b>	<b>6</b>	<b>8</b>	<b>8</b>	<b>8</b>
<b>Near East</b>	<b>7</b>	<b>11</b>	<b>11</b>	<b>11</b>
<b>North Africa</b>	--	--	--	--
<b>Sub-Saharan Africa</b>	<b>34</b>	<b>34</b>	<b>32</b>	<b>30</b>
<b>Central Africa</b>	<b>34</b>	<b>51</b>	<b>55</b>	<b>57</b>
<b>Dem. Repub. Congo</b>	<b>29</b>	<b>57</b>	<b>70 *</b>	<b>75 *</b>
<b>East Africa</b>	<b>45</b>	<b>44</b>	<b>37</b>	<b>35</b>
<b>Eritrea</b>	<b>67</b>	<b>64 *</b>	<b>70*</b>	<b>66</b>
<b>Ethiopia</b>	<b>71 *</b>	<b>64 *</b>	<b>50</b>	<b>44</b>
<b>Southern Africa</b>	<b>45</b>	<b>43</b>	<b>39</b>	<b>36</b>
<b>West Africa</b>	<b>20</b>	<b>16</b>	<b>15</b>	<b>13</b>

**\*: highest incidence of undernourishment.**

Source: FAO, *The State of Food Insecurity in the World 2009*.