

HIV/AIDS And The Future Of The Poor, Illiterate And Marginalized Populations

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Introduction:

Today, of the global population of 6.5 billion people about 2 billion have access to modern facilities (food, water, shelter, sanitation, health care, education, jobs), who I characterize as the “haves”. Of these 2 billion, roughly 1 billion live in the developed (industrialized) world and the second billion consist of the top 15-20% of the remaining world population. About 3 billion are poor (living under \$2 Purchasing Power Parity (PPP) per day) and do not have access to modern facilities.¹ Of these, roughly 1 billion people live on less than \$1 PPP per day and constitute the extremely poor. The remaining 1.5 of the 6.5 billion are in transition between the poor and the haves, i.e., they have access to some but not enough of the modern facilities. These ratios are unprecedented in human history and there are many recent success stories of development at the national level – Taiwan, South Korea, Singapore and Ireland being the most obvious – nevertheless, there remains a much larger global need.

The central message of this article is that we must act with a sense of urgency to accelerate the transition from poverty to developed modern societies. The reasons are both humanitarian and strategic – to preserve global peace, security and prosperity.

In this article² I would like to first summarize the status of the global burden of HIV/AIDS and then use the fast spread of HIV as an example to draw attention to a much deeper and more fundamental problem – the very future of the poor – the 3 billion people living on less than \$2 PPP per day. I then discuss the interconnected cycle of threats to the development of the poor and end with a prioritized list of urgently needed interventions and argue that we, for the first time in history, have the resources and the understanding (that it can be done, that it will benefit all, and that it will not decrease the wealth of the “haves”) to implement the necessary and needed programs that can remove extreme poverty, if not poverty, by 2025. The purpose of this article is not to apportion blame or point fingers but to highlight the possibility that we can create a global society in which no child is denied the opportunity to develop and be part of the 21st century. If the discussion appears one-sided it is because the developed world has the most to offer and is developing most of the technology while the poor need help.

HIV/AIDS:

In 1981 the world first came face to face with a new virus that destroys the human immune system when five young males checked into hospitals in Los Angeles and other major metropolises in the US with highly compromised immune systems – the AIDS (Acquired Immune Deficiency Syndrome) patients. Over the next three years researchers worked very hard to decipher the etiology of AIDS, means of transmission, and develop tests for detecting the virus. By April 1984, the teams of Dr. Robert Gallo of the National Cancer Institute, Dr. Luc Montagnier at the

Pasteur Institute in Paris, and Dr. Jay Levy at the University of California, San Francisco, had identified the cause as a new retrovirus, subsequently named Human Immunodeficiency Virus, or HIV. The first HIV/AIDS antibody test, an ELISA-type test, became available in March 1985. Unfortunately, by that time the CDC had already reported 10,000 cases of HIV/AIDS in the United States, 4,942 deaths and many more were estimated to have been infected. For a timeline of the spread from 1981-88 see <http://aidshistory.nih.gov/timeline/index.html>

The impact of HIV/AIDS over the next ten year period (1985-95) was devastating. Even though the means of transmission, mainly through unprotected anal and vaginal sex and shared needles by IV drug users, were known very early on, the number of HIV infections grew exponentially. In US alone the numbers grew from about 1000 cases in 1983 to 10,000 cases in 1985 to 100,000 cases in 1989 to 500,000 cases in 1995. Relatives and friends watched loved ones die and the medical community struggled without hope. Doctors could diagnose but could not treat and make whole those infected. Once the ELISA test was discovered they were able to make the blood supply safe, thus stopping the accidental spread in the developed world, but their initial hope of the quick discovery of a vaccine proved unjustified. The number of people dying annually in the developed world due to AIDS continued to rise until 1995 (reaching about 42,000 per year in the US) when triple cocktails of protease inhibitors combined with [non-]nucleoside reverse transcriptase inhibitors proved effective in bringing viral loads to negligible numbers in most patients. These drug cocktails changed the face of HIV/AIDS – a diagnosis of HIV/AIDS no longer meant imminent death. Unfortunately, these drugs were extremely expensive and toxic and the anti-retroviral therapy (ART), the aggressive form of ART is called HAART for Highly Active Anti-Retroviral Therapy, was available only in the developed world. Tragically, the burden of HIV/AIDS in the developing world has, by and large, continued to mount as if no therapy is known and in many Asian and Sub-Saharan African countries as if even the means of spread and prevention are still unknown. Even though generic manufacturers have brought down the cost of drugs to roughly \$150 per person per year, nevertheless, access to ART by the poor remains very limited. The uncontrolled spread of HIV/AIDS amongst the poor continues to highlight the divide in access to health care, education, and empowerment to make safe choices between the haves and the have-nots.

By the end of 2004, roughly 40 million people were estimated to be living with HIV and 30 million had died (<http://www.UNAIDS.org>). In 2004 alone approximately 5 million new infections and 3 million deaths took place. Large parts of Sub-Saharan Africa are being devastated. In many regions an entire generation has been wiped out leaving grandparents to look after AIDS orphans, many of whom are HIV positive. School, hospital, security and government services are collapsing as trained staff are dying faster than new people can be trained. This need not be the case. HAART has been shown to extend the life of people in both the industrialized and developing world. Even the poorest and totally illiterate people have shown amazing fortitude in dealing with the stigma of coming forward to receive treatment, in tolerating the toxic side effects of the drugs and adhering to the demanding drug regimen. Generic manufacturers in Brazil, India and Thailand have brought down the prices to where we can provide therapy to all those diagnosed and in need (about 10 million) for about \$2 billion per year. The major impediments to large-scale administration of HAART continue to be the lack of infrastructure to deliver the medicines and the lack of financial resources (by nations and individuals) to buy the drugs in the first place. Programs in many developing countries

(Botswana, Brazil, Cambodia, South Africa and Thailand) have shown that the infrastructure and delivery of drugs can be scaled up rapidly if and when drugs are made available. Unfortunately, large pharmaceutical companies holding drug patents, with the support of their governments, continue to delay access to generic versions by the poor by invoking WTO laws on patents and intellectual property rights.

Behavioral changes that would end risky sex and sharing of needles by IV drug users have been very slow. In the US the number of infections crossed the one million mark in June 2005. There continue to be 40-45 thousand new infections annually and most of the spread is in poor minorities (especially black and Hispanic women) and marginalized communities – gay men and IV drug users. This is an unacceptable burden for the richest and most developed country but dwarfs in comparison to what is happening in the developing world where roughly 90% of the infections (roughly 5 million each year) and 95% of the deaths (roughly 3 million each year) globally due to HIV/AIDS are taking place. It has increasingly become clear that poverty is a major factor in the spread.³ The poor and the marginalized lack information, means and empowerment to protect themselves, and day to day survival (or anonymity in the case of men having sex with men and IV drug users) very often trumps safe behaviors.

Allowing people to suffer and die when medicines are available is undermining attempts to help their communities develop. Knowledge that should be handed down from parent to child is being lost, and children are growing up hungry and without supervision. The demographic impact of HIV/AIDS, killing people in the most productive stages of their lives, makes it unique in its impact on development. The long-term problems posed by AIDS orphans, already numbering 15-20 million, will need more resources to address than those needed to keep their parents alive and productive. The continued fast spread of HIV/AIDS and its devastating impact on families very clearly illustrates how hard it is to break the cycle of poverty for those living without basic provisions of health care, education, and nutrition.

The question I have repeatedly asked myself is – if we know the means of transmission of HIV (unprotected anal or vaginal sex, infected blood entering one's body mainly through reuse of needles, and from mother to child) and none of these are casual contacts, then why is HIV still spreading? Within the haves the answer is that many people continue to indulge in risky sexual behavior or are slaves to their drug addiction in spite of adequate knowledge of HIV/AIDS. Within the have-nots, poverty, despondency, day to day survival and lack of knowledge, means of protection and empowerment, make behavior change very difficult to achieve. The situation, in a much broader context, was captured amazingly succinctly by Gro Harlem Brundtland, who in 2002 as the Director-General of the WHO said⁴

The world is living dangerously, either because it has little choice or because it is making wrong choices. On the one side are the millions who are dangerously short of the food, water and security they need to live. On the other side are the millions who suffer because they use too much [or are too indulgent]. All of them face high risks of ill-health.

To this I will only add one thing which I elaborate on later. The haves, by not helping half the global population that lives on less than \$2 (PPP) per day to break the cycle of poverty, are creating dangerous breeding grounds in which exploitation, violence, criminal behavior, terrorism, civil wars, and diseases will continue to fester. Even though the scale of the many problems and their solutions are large and daunting, my contention is that we have the

knowledge and resources to address them^{5 6} and, furthermore, I add that we have no choice if we desire global peace, stability and prosperity. What we need is political and social will based on the principle of shared fate.

The first wave of HIV/AIDS has devastated Sub-Saharan Africa. This devastation did not elicit (until after 2000) much response from most people in power or policymakers sensitive to geopolitics. The cynical view was that none of these countries are important geopolitically except for their natural resources, and tapping these does not need large numbers of people. The slightly less cynical view was – yes we need to help but there is no local infrastructure through which to intervene. Past attempts at infrastructure creation have been failures and since the governments of these countries are corrupt or ineffective or both any help that is provided is abused. So how does one act to help? Fortunately, it is becoming increasingly clear that if the haves intervene at the requisite levels and holistically (as discussed at the end of this article) then the have-nots are able to rise to the challenge, work hard as partners, and are capable of breaking the cycle of poverty within a generation.

The second wave of HIV/AIDS threatens many populous, strategic and militarily powerful nations – China, India, Russia, Ethiopia and Nigeria – as cautioned by the US National Intelligence Council and the CIA in its 2001 report⁷. Recognizing that each of these countries has large populations of have-nots and marginalized people, it becomes clear that under business as usual approach HIV/AIDS will grow rapidly in these countries and if it grows to anything like the scale in Sub-Saharan Africa, that could lead to global instability. So challenges like the Millennium Development Goals, Global Fund for HIV/AIDS, Tuberculosis and Malaria, and I would like to add Kyoto protocol on climate change because natural disasters and climate change affect the poor disproportionately (the New Orleans hurricane Katrina tragedy is a glaring example), have been developed and are increasingly being supported. Assuming that the haves are willing to help the poor stand up so that they can, in time, learn to walk on their own (develop into modern societies) what I would like to do in the rest of the article is provide, based on my work in India, a list of key common threats to this development, and in light of these threats discuss what is the minimum holistic package needed to seed the transition.

It is important to stress, while making the connection between HIV/AIDS and poverty, that poverty is not the only factor. Removing poverty may not be enough to solve the HIV/AIDS problem since risky sexual behavior and IV drug use are prevalent in all socio-economic sectors. Nevertheless, experience from the developed world shows that addressing issues of poverty makes pandemics, at the very least, manageable, i.e., stabilization followed by a decline in the number of yearly infections versus uncontrolled growth. Thus, our primary concern should be to help all people achieve basic human rights and freedoms and simultaneously work to help those prone to making unhealthy choices reduce risk to themselves.

Challenges The Poor Face:

The challenge we face is to provide resources and skills to the poor to jump start their transition to the 21st century. Unfortunately, there are many “sharks and barracudas” that profit from keeping them poor, exploit them, and undermine even the best attempts of very committed and

innovative people to provide skills and resources to the poor. Principal amongst these sharks and barracudas are

- Despotic and/or corrupt governments
- National and transnational criminals
- Fanatics and terrorists
- Exploitative multinationals

The important question is how and why do these sharks and barracudas persist in the modern world? The answers are age old – through control and ruthless use of military power, through exploiting religious and ethnic differences, and through co-opting unscrupulous governments and influential individuals.

In this article I will not have the time to even begin to discuss bad policies by governments and the control and ruthless use of military power by them for their own self-centered purposes instead of focusing on alleviating poverty. Most people would contend that poor governance, bad policies and lack of security are the key primary factors that have to be addressed and without which nothing else will have long-term impact. This may very well be true, however, I believe that individuals can do a lot on the ground, especially facilitate the creation of a civil society. The issue I wish to highlight is that, today, non-state actors can be equally effective and important agents of destabilization or progress because they have access to significant resources, and some individuals control resources that are larger than the economies of many nations. To discuss the positive possibilities I start by highlighting the need to eliminate a major global problem that severely impacts the poor. This is the control exerted by criminal and exploitative individuals and organizations who amass vast fortunes through what I call rogue economies.

These include

- Narcotics
- Alcohol
- Tobacco
- Trafficking in arms, people and human organs
- Trafficking in ill gotten goods (blood diamonds, illegal timber, counterfeit and pirated goods and medicines, banned animals and their products, etc.)

I refer to these activities using a politically loaded term “rogue economies” because they are large enough to qualify as economies and, while not all are illegal, they have illegal components. They are all insidious, are a health hazard, undermine development, undermine law and order, create mafias, warlords and drug-lords, promote corruption and prevent the formation of a civil society. I contend that as long as these rogue economies persist there will be sharks and barracudas that thrive. Today these sharks and barracudas have global reach and in some cases are richer and more powerful than governments and, in some cases, are the government.

Production and trafficking of narcotics is the prime example of a rogue economy. Even conservative estimates put the money involved at over \$500 billion per year.⁸ The economies, security and development of many nations (the most significant being Columbia, Peru, Bolivia, Mexico, Nigeria, Ukraine, Russia, Tajikistan, Afghanistan, Pakistan, Myanmar, Laos and Thailand) are overwhelmed by the drug trade. Industrialized nations spend hundreds of billions of dollars yearly to try and confront the menace but have had very limited success. Each of the countries mentioned above also illustrates the connection between drug trade, private militias,

money laundering, lack of development, civil wars and terrorism. In both the industrialized and developing worlds IV drug use is a major factor in the rapid spread of HIV/AIDS. I do not believe that anyone, having given even a moment's thought to this problem, would argue that the illegal drug trade is not a global problem that needs to be addressed with a sense of urgency.

A significant fraction of the adult population (10% is a typical estimate) of many developed nations has a serious alcohol abuse problem. Nevertheless, alcoholism and its consequences for health care, lost productivity, domestic violence, crime and road accidents are treated as an acceptable burden because of the overall prosperity. Social drinking is considered a safety valve against stress and thus a lesser of social evils. Promotion is accepted because it involves an individual's lifestyle regarding a legal activity. In the developing world alcohol abuse has become a nightmarish problem. Anyone with first hand experience of India understands that alcohol is a major impediment to development, especially in rural India. I have not visited any rural community in India where women have not listed it as the number one problem. It is the major cause of domestic violence and financial hardship. Children growing up in alcoholic homes do not have safety nets that can compensate for the stressed and unhealthy home environment and very often grow up without adequate health care, nutrition and education. A detailed analysis of the nexus between narcotics, alcohol abuse and sexually transmitted infections including HIV/AIDS in India and their implication for development and security has been presented in reference⁹.

The laws on international trade in tobacco baffle me. How is it possible that the US and most of Europe have declared smoking as hazardous to health, banned smoking in public buildings, and are enacting ever more stringent laws against it and yet feel no obligation to ban export of cigarettes? What I would like to advocate is that if Americans (or citizens of any other country) wish to smoke then so be it, but we should not allow export of a health hazard (in the form of finished products like cigarettes, chewing tobacco, and cigars) to continue just because it is profitable. The case against trafficking in arms, people, human organs, exotic species and ill gotten goods is so obvious that I hope it needs no discussion.

The problem we face is that these rogue economies are so entrenched and pervasive and the profit margin is so high that they have defied control. Unfortunately, their impact on the poor continues to be devastating.

What do the poor need to develop? Generalizing from what parents offer to children, I consider the three most important things to be:

- **Opportunities and Skills:** These require access to health care, nutrition, education, an environment that fosters a love for learning, job training, and activities like sports that provide healthy use of leisure time.
- **Direction:** This requires there be enough role models that lead by example and exemplify the virtues and payback of hard work and goal oriented focus.
- **Stable, loving and nurturing environment** that provides physical, mental and emotional health and leads to the development of safe behaviors.

Rogue economies undermine each of these three. Easily seduced by the possibility of instant and easy gratification and/or money people fail to learn skills valued in the 21st century. The interdependencies between these three developmental goals highlights the need for synergy

between physical and social sciences in addressing these issues, i.e., between technology and an understanding of human behavior. In this context a question I have often asked myself is why are the poor targeted by the sharks and barracudas and not by multinationals?

A simple answer is that the three billion poor are, to first approximation, not viewed by multinationals as a significant market for day-to-day commodities in the short term and for luxury goods for a long time because they do not have adequate buying power. They are, however, prime targets of national and multinational mafias and criminal organizations. These organizations are ruthless in their pursuit of profit and bring alcohol, tobacco, drugs, sex and trafficking in people, to the doorsteps of even the poorest people. Since the margin of profit in most of these activities is very large and the cost of the “quantum of indulgence” (cost of a glass of alcohol, pouch of tobacco or marijuana, price charged per sex-act, etc.) can be made arbitrarily small, criminal organizations mercilessly and ruthlessly target the poor, making them captive end users and often willing promoters and producers. To understand which economies penetrate the rural sector faster one only needs to compare the growth in these to other items that I have heard mentioned most frequently like soap, shampoo, and cosmetics that can be packaged and sold in small quantities. Therefore, if we wish human development and nation building to succeed, we need to confront the specter of rogue economies. Such focus is in the joint interest of both developed and developing nations as both pay a very high direct and indirect long-term price.

Even if we accept the depressing verdict that most of today’s poor will not make the transition, what about the next generation? Unfortunately, of the 3 billion poor, roughly one billion are children under 15 who also will not get the health care, nutrition, education, skills or family support needed to develop and access 21st century jobs. My estimate of the 2005 distribution of these vulnerable children is roughly as follows: about 350 million in South and Central Asia (60% of children under 15); 30 million in West Asia (40%); 90 million in Southeast Asia (50%); 110 million in East Asia (33%); 25 million in central America (50%); 50 million in South America (45%); 290 million in Africa (80%); and 11 million in Eastern Europe (20%). These children are growing up aware of what they are missing (through TV and tourism) but will not have the skills to reach a decent standard of living themselves. Growing up with ever increasing but unfulfilled expectations, being repeatedly exploited, and without hope for betterment they could become a significant negative force. The sharks and barracudas can easily exploit and manipulate them. They can easily be recruited to serve as foot soldiers in civil wars (there are numerous recent examples in Africa, particularly in Liberia, Sierra Leone, Angola, Congo, Sudan, Rwanda, Zimbabwe, etc.) or for carrying out acts of terrorism (Middle East, Southeast Asia). It is therefore very important that the haves provide the have-nots with hope, means for steady improvement and enable them to climb the steps that will allow them to escape poverty.

The poor in different parts of the world face a number of challenges – some are specific to a region and many are common to all. I would like to focus on seven that are common.

- **Population growth:** Almost all the population growth is amongst the poor. With continued population growth and mechanization, each generation of the poor starts with fewer assets (particularly land) and increasing needs. Children born in poor households face a steep uphill battle for survival, are at tremendous economic and social disadvantage from birth and the norm is a life marked by neglect, deprivation, despondency, and abuse. The poor need

free and easy access to modern methods of disease and pregnancy prevention and counseling to help them realize planned families as a choice.

- **Lack of health care:** In spite of astonishing developments in medicine and medical processes over the last 50 years and continued efforts to provide universal coverage, the poor face many impediments in accessing even basic and essential modern medicine. Starting with birth outside of registered medical facilities, partial or no immunizations, poor and inadequate nutrition throughout childhood, and constant exposure to food-, water- and mosquito-borne parasites leaves them underdeveloped. In those that survive, the largest impact is on their mental abilities – precisely the abilities needed to be successful in the 21st century. The resulting mental deficiency is the hardest (if not impossible) to undo in later years even with the best resources. In addition, today’s job markets place high value on emotional intelligence whose development requires a stable, loving and nurturing childhood. It is, therefore, unlikely that a significant fraction of the poor can make the transition to white collar jobs. Our best hope is to work with them, raise their ability to access basic health care and provide the basics so that their children can make the transition.
- **Education:** Many of the poor have not had any formal education so they, on their own, cannot help their children learn or provide an adequate environment for learning at home. Many of the rural schools are dysfunctional or provide very poor instruction. Thus, even when the poor make incredible sacrifices for years to send their children to school they find that the returns are very small. The children have learned very little and cannot access jobs outside menial labor. The investment of time and money leads to high expectations which are often dashed. Such children end up in no-man’s land – they are aware of and know what 21st century promises and what they are missing but cannot be part of it.
- **Energy:** At the very minimum energy is needed in the form of light to study by at night, as kerosene to cook with so that a significant part of the day is not spent collecting firewood, for making water potable and for transportation. With increasing mechanization and reliance on technology the need for, and dependence on, energy increases in every aspect of life. Thus, easy access to inexpensive energy is essential for development. There is steady progress in connecting the poor to the energy grid, however, as discussed later there is a looming global energy crisis that needs to be addressed with a sense of urgency.
- **Water, Land and Food:** Access to water (irrigation and ground water to supplement rainwater) was key to the green revolution along with better seeds, fertilizers and pesticides. The majority of the poor live in rural areas and subsist on what they can grow on small patches of land. Most of this land has poor depleted soil and the output is low. Without electric power the poor cannot access groundwater. The adoption of treadle pumps, that work where the water table is close to the surface (2-5 meters), has been slow. They cannot afford good seeds or chemical fertilizers or pesticides and have few reserves to survive even one bad harvest without taking out loans. Lack of easy access to markets and mounting debts increase their vulnerability to takeover by large farmers or moneylenders. The general trend is that more and more subsistence farmers are losing their land and are being forced to migrate to towns and cities in search of menial jobs. This migration creates a set of very difficult challenges of health care, urban sprawl, pollution and exploitation as well as many new opportunities for development.¹⁰ Migration, in general, is a tide that cannot be stopped and, as I will argue later, essential for development. However, there is urgent need for better tools and planning to manage it both at the level of rural to urban and international migration.

Similarly, there is urgent need for better tools and planning to manage rural and urban water resources.

- **Environment:** The poorer a person is the more she/he feels the full force of the extremes of nature. In the agrarian sector the poor are almost totally dependent on nature for survival. Lacking adequate shelter, clothing and nutrition they are ill-equipped to survive harsh winters (air-conditioning during summer and heating during winter need connection to the energy grid and are expensive and, therefore, still distant dreams). It is therefore not surprising that poverty, and especially extreme poverty, is mostly restricted to within the tropics, i.e., areas with mild winters that are conducive to all life – of humans and pathogens. The poor do not have financial reserves to absorb the impact of untimely rains, extreme droughts or storms. Furthermore, air and water pollution continues to pose very severe health problems. On top of all these impediments, reduction in land holdings with every passing generation and degradation of the soil accelerates the process of forcing the poor to sell their lands and migrate to urban areas in search of menial jobs as they lack other skills.
- **Poor governance, lack of modern institutions and missing civil society:** Regions of poverty often have poor governance. Corruption and abuses of power become a way of life. Usually, a small minority controls most of the resources and shows little interest in developing the infrastructure (health care, education, jobs, communications, transport, etc) needed for broad-based development. All these problems are exasperated by civil unrest. Lacking modern institutions, the few people capable of bringing about change are not able to. Many of them migrate to industrialized countries or, over time, get co-opted into the corrupt system or lose their drive or are eliminated.

These seven drivers are highly interconnected and mutually reinforcing. In complex systems with highly non-linear behaviors (large couplings and feedback mechanisms) it is very hard to know in time when the threshold for runaway solutions is reached. One is often fooled by the slow initial linear rise in spread and burden and therefore reacts too late and too slowly. Such worrisome conditions exist in most, if not all, struggling countries. It is, therefore, very important to address them in an integrated holistic manner. Unfortunately, the problems are astronomical and tangled up with religious, cultural, tribal or ethnic sentiments. Thus, large-scale intervention with the commitment to build, over decades, the infrastructure and a large enough pool of dedicated and trained people to implement programs has not happened.

Why is funding so important to seed development? Historically, the poor have relied, to a very large extent, on both a formal and informal barter system for subsistence existence. To access modern amenities like education, health care, energy, sanitation and clean water requires hard currency. Accumulating adequate savings or having a regular source of income to pay for these facilities is a significant new threshold that the poor have to cross before they can start to develop. Having steady income and enough left over after paying for basics like food are major problems for the poor and not just the extremely poor. Very often despondency, especially under the pervasive pressure of rogue economies, undermines attempts at developing sound fiscal behaviors. As a result they fail to access these amenities and cannot cross the threshold. The majority of the poor live in rural areas where the infrastructure for providing the basics is harder to develop and maintain as rural areas lack the economy of scale provided by urban areas. Since most migration to cities begins with the adult male, with the rest of the family staying in the village due to lack of housing and higher cost of urban living, villages must provide better

facilities for the children. So in one way or another (through indigenous or external funding) the greatest need of the poor is access to modern basics and this requires money, people, and institutions. The obvious question is where will these funds come from if not from the haves?

Why Business As Usual Is Not Enough:

Given all the recent attention on reducing poverty (see, for example, the United Nations Millennium Development Goals¹¹) why should one be concerned that under business-as-usual scenarios these seven enablers will not be in place for the poor by 2025? There are many reasons:

Consider, for example, the issue of energy which is essential for modern technological societies. Assuming that by 2025 the global population is 8 billion people and the long-term desired standard of living is that of Europe (currently the per capita usage of power by Germany, France, the U.K and Japan is roughly 5.5 kilowatts, which is half that of the US), we would need three times the current primary energy used. Unfortunately, there are no proposals or plans to provide such an increase. The energy future is actually precarious as we remain dependent on fossil fuels whose reserves are dwindling and the share of solar and wind energy is small and not yet cost effective. The recent increase in oil prices and the possibility of “peak production” of conventional crude oil within this decade, followed by a global decline in production, will have major repercussions for even the industrialized world. The situation with respect to natural gas is similar but with a time delay of about 20 years¹². Anticipating increasing competition for dwindling resources between the developed countries and growing economies like China and India, the prices of oil and gas have almost doubled in the last two years. Such fast rise in prices could easily slow the process of connecting poor households to the power grid or, worse, derail development in many parts of the world. For example, India’s 2005 bill for imported oil (1.6 million barrels of crude oil per day) at \$60 per barrel was \$35 billion. Thus, crude oil imports alone soak up 46% of the total export revenue of \$76 billion. This increasing expense, when there is a significant federal budget deficit (about 9-10% of GDP), does not bode well. It is, therefore, not clear whether even India can continue to grow and address the needs of its poor if energy prices do not stabilize. (China, for the time being, has much deeper pockets to withstand such price increases due to its large positive annual balance of trade.) The global energy infrastructure and needs are so large that we desperately need new R&D and bold thinking to ensure a stable global energy future.

History is full of examples of societies overexploiting land and water resources.¹³ The results have usually been devastating – change in rain patterns, desertification, loss of biodiversity and pollution.¹⁴ Governments find it almost impossible to advocate and enforce conservation and managed use of resources once people start viewing the resources as an entitlement to survive or make a profit. Take India as an example. To help the farmers sustain the green revolution the government provided cheap electricity to pump groundwater and highly subsidized irrigational water. Today in large parts of the country the water table is falling 3-5 feet per year and now the government finds it impossible to deny farmers their “right” to electricity and to continue pumping groundwater. Similarly, subsidized irrigation continues to support inefficient and harmful practices (untimely and over watering by flooding the fields without means to deal with the salt buildup). There is talk of looming scarcity of ground water and increasing soil salinity

due to irrigation that threaten many prime agricultural areas but there are no plans and little action to address the issues. For example, implementation of drip irrigation by farmers who cannot afford the capital cost requires funding (low risk loans) and training. In rural communities this requires mobilizing a very large fraction of the population which is best achieved if they understand what is at stake and how they can benefit from the investment. Thus, along with stabilization of population, it is very important to develop scientific tools that allow a comprehensive monitoring of watersheds and ecosystems so that stakeholders can be helped to understand, in time, the consequences and the cost of restitution, and based on this information are willing to put into place interventions before large-scale damage is done. Such systems monitoring and analyses is in its infancy and needs to be developed further to help poor communities manage their resources.

Compared to 50 years ago, the infrastructure for education has been very significantly enhanced but we have a long way to go both in numbers and quality. In the job market the premium today is on quality, versatility and novelty. Even a high school degree is insufficient to get a white collar job. Again, I will use India as an example of where we stand.¹⁵ Of the roughly 25 million children born in India every year (this was the number in the 1990s; by 2004 it had decreased slightly to about 24 million) only about 30% study beyond eighth grade and only about 15% graduate from high school (grade XII). Of the roughly 4 million that graduate from high school yearly, less than 0.5 million receive education of sufficient quality that allows them to be competitive in various college entrance examinations. Of these, only about 25,000 students get university education in sciences, engineering and medicine that is of international standards, whereas more than 10 times this number have the potential for excelling.

While India is still struggling to achieve the goal it set for itself at independence in 1947 (primary education for all), the threshold for entry into the 21st century job market has been raised to a college degree from a reputed university. This requires that families provide children with a stable and nurturing environment, nutrition, health care and education for at least 22 years. The silver lining is that there are more families willing to make the sacrifice than there are seats in good schools and colleges. As a result there continues to be a tremendous growth in the number of educational institutes but there are serious questions regarding the quality of education they provide. The major limitation, which is now a global phenomenon, is the small pool of good teachers, especially for mathematics and physical sciences.

With globalization, those who can afford to do so send their children to good universities in the industrialized English speaking world. This migration has many consequences, both positive and negative, that would be very illuminating to discuss in detail. For lack of time I will focus on one long-term benefit of this migration that I believe has played a very important role in seeding development in most of the success stories. It makes the case why American universities should continue to educate the world's best and why America should encourage migrant communities to invest in their countries of origin.

Successful, engaged, migrant communities that have large pools of entrepreneurs with skills, capital and networks have been key enablers in rapidly transforming their land of origin. Ethnic Chinese, dispersed over much of South-East Asia and North America, have been a major factor in the development of South-East Asia in general but Taiwan, Singapore, and now mainland

China in particular. South Korea benefited from its special relationship with the US. More recently, migrants from India have invested in India and helped seed its very rapid growth in information technology (IT). Ireland is another recent success story. Needless to say, in each case, in addition to such an empowering migrant community, a large well trained and educated labor force at home, usually under-employed, and a government willing to create an environment that encourages and protects investment and is willing to develop the infrastructure that facilitates trade and industry was necessary. Sub-Saharan Africa is a prime example of a region in which all these factors are missing and I contend that this lack of investment by the expatriates is one very important reason why there seems to be no end to the continued economic, social, political and environmental devastation. Instead of an educated but underemployed workforce that can be tapped, investors see large HIV/AIDS infected populations that need help to survive.

Even with the many success stories but under business-as-usual investment and intervention scenarios I can foresee only eight regions of about 400 million people each that will have access to 21st century opportunities in the next 50 years. These are North America, Western Europe, East Asia and Australia (including Japan, New Zealand, Taiwan, South Korea and Singapore), Eastern Europe and Russia, China, India, oil rich Middle East, and South America. This is a very encouraging and hopeful situation but it is not clear whether these regions will be able to lift the remaining five billion out of poverty (optimistically assuming that the global population stabilizes at roughly 8 billion). Not being an economist it is not clear to me whether there will be enough new technologies and services in place that will provide an ever growing market and meaningful employment to 8 billion people when most mechanization reduces the number of people needed to perform a task. Furthermore, as I have discussed briefly, it is also not clear whether under business as usual scenarios and without major technological breakthroughs there will be adequate resources (energy, water, biodiversity, healthy ecosystems, etc.) to sustain even 4 billion people at the standard of living of Western Europe in the next 2-3 decades.

Path Forward:

With ever growing mechanization in all aspects of our lives and the very large investment needed to nurture and educate a person with technical skills valued in the 21st century, what niche or comparative advantage will the poor have to offer to investors. On the other hand, it is hard to imagine that a world in which about 3 billion people live in industrialized societies geographically isolated from the remaining 5 billion people will be stable. Free societies will find it increasingly hard to stop large-scale migration, both illegal and legal, to fulfill needs in certain sectors of employment, and because people are willing to risk everything to move to where a better life is possible and, today, they know where to go to get it. Even if the skilled and unskilled were geographically meshed and integrated together, will there be enough natural resources so that everyone has a high enough standard of living such that no child with talent is denied the opportunity to rise to the top.

So what needs to be done? Should one concentrate on technological solutions or on social transformations and behavioral changes (conservation and sustainable management of resources, cooperation, reducing risky behaviors, etc.) or a judicious combination of the two? Technology is the much easier solution if it exists, but the poor are poor precisely because on their own they cannot access what technology exists. Also, as we are increasingly finding out, especially in

environmental issues, technological solutions have been partial and often deployed before adequate understanding of their long-term consequences is in hand. Behavior change involves little or no cost but requires the thinking and maturity that comes with enlightened long-term planning and empowerment – again the poor don't often have the training or these skills. (A pressing example is HIV/AIDS – an effective vaccine would be a god send but its development may need decades of further research and is a big if for at least the next 10-20 years whereas behavior change leading to safe sexual practices would cost an individual nothing but has been hard to achieve within the poor and marginalized populations.) Thus the poor need help incorporating both – technology and behavior change. In this context I will briefly outline the four areas I am most passionate about.

Reproductive Health and Family Planning: Providing each person with education on safe sex and reproductive health and free and easy access to modern methods of birth control and disease prevention, i.e., condoms, microbicides and contraceptive pills. I cannot describe the joy shown by even the poorest of rural women in India once they begin to understand their reproductive system and realize the power to have planned families. Assuming that the delivery of a condom costs 5 cents and each sexually active male requires, on average, 100 condoms a year, the total resources required to supply 1.5 billion men would be \$7.5 billion. Assuming 1.5 billion women need help buying contraceptive pills at \$5.00 per year (price for generics), providing them free would require another \$7.5 billion. Thus, including education and infrastructure costs, a \$20 billion per year program in reproductive health would address issues of women's empowerment, planned families, population growth, and sexually transmitted diseases including HIV/AIDS. In this case adequate technology exists and what is needed is the political will in the industrialized countries to provide funding.

Confronting Rogue Economies: This requires well established and working law and order systems within nations, education and awareness programs, and global cooperation between nations. Even though the industrialized nations are the end destinations of trafficking in narcotics and contraband and ill-gotten goods, they have not considered confronting rogue economies a priority. Post 9/11, more and more politicians and policymakers are understanding the nexus between terrorism, rogue economies and money laundering and it remains to be seen if this realization, coupled with an understanding of the widespread impact of these economies on development, leads to a global effort that addresses issues underlying the lure, the demand and the supply. In short, both the developed and developing world stand to benefit by bringing these economies under control. It is hard to estimate what additional resources are required to effectively confront rogue economies. Since their impact is global and controlling them is in everyone's direct interest I would not like to call money spent on them aid. So I will restrain from putting a dollar figure and simply say that we need to win this fight which requires education and social activism and functioning and responsible governments.

Enabling Resources – Energy, Water, Proper Nutrition, Vaccines and Medicines: With dwindling or even constant supplies, access to oil and gas will be dominated by countries that hold the reserves and those that can afford to pay for them. Most of the poverty is concentrated within the tropics and this belt is rich in solar power but not in oil, gas or coal except for the Persian Gulf and North and Western African countries. An advantage of solar (photovoltaic) and wind turbine systems is they are easy to install and maintain. Another advantage is that they are

local solutions that can be implemented without requiring a national energy grid. Significant investment in these systems has been lacking because fossil fuels have been cheap and energy from wind and solar is intermittent and therefore unacceptable as a source of base load in developed countries used to uninterrupted supply. Today, wind power is cost-competitive with fossil fuels while solar at \$0.20-0.30 per kilowatt hour is still too expensive by roughly a factor of 3-4. The poor would, therefore, benefit tremendously if the industrialized world invested very heavily in reducing the cost of these systems and developing the remote monitoring and systems integration capability for making them less intermittent. Moreover, providing even 4-8 hours a day of electric power would change the lives of the poor, and they would not need any fancy system to tell them when to expect solar power.

Water is a more complicated problem with far larger regional variations. We should put priority on developing simple ways of improving water quality, better water management and preventing pollution. Teaching farmers better irrigation methods has to be coupled with guarantee of timely access to water and help with the initial capital cost of say drip irrigation systems. Such information and capability needs to be disseminated through a global education campaign and incorporated in school curricula so that there is public awareness and participation at all levels.

For the development of vaccines and medicines there should be a large global effort. I propose the creation of a Global Jackpot Fund. The organization or individual developing a successful and essential drug or vaccine should be adequately compensated from this fund which should then hold the patent and allow anyone to mass produce and market it as long as they can meet the standards.

Based on this simplistic analysis I estimate an investment of \$80 billion a year (\$40 billion for energy, \$20 billion for water, and \$20 billion for essential medicines and vaccines) would significantly accelerate the discovery of essential drugs and vaccines, bring down the cost of renewable energy and potable water systems and make them accessible to the poor.

Enabling Services – Basic Health Care, Immunization and Education: These services require an army of trained people, long-term financial commitment, and well developed institutions to deliver and maintain quality. Developing all these simultaneously poses the largest challenge and there does not seem to be any alternative to stable long-term commitment and support. The good news is that individuals can make tremendous contributions through local action – an individual can start a primary school or a health care clinic. In the long run a collaborative public-private partnership is necessary along with long-term national (and, in the case of poor regions, external) funding. I estimate that a \$100 billion per year program targeting the 1 billion vulnerable children (at \$100 per child per year) would help provide them with the required basic foundation and skills with which they can compete in the 21st century.

Thus, a 200 billion dollar a year program would make a very significant impact. This is a very large sum but roughly what the world is spending post 9/11 on confronting terrorism and also very close to the 0.7% of the GDP number for development aid that industrialized donor countries and the UN arrived at as the target. This emerging consensus in what is needed is what gives me hope that we today have the resources and the understanding to help the poor make the transition. There is, unfortunately, a fly in this argument. My estimate of \$200 billion is the

amount that needs to reach the poor. If current estimates, that only 10-20% of the aid actually reaches the poor, are correct and a fact of life then it is easy to understand why many experts and policy makers are pessimistic that the required resources are, or will be, available.

It is worth highlighting the similarities and differences between my priorities and, say, those stated in the Millennium Development Goals.¹¹ Both emphasize poverty reduction, nutrition, health care and education, especially for children. I prefer to put HIV/AIDS education and control within the context of reproductive health, family planning and STI control. I find it far easier to effectively engage men and women (rural and urban) in discussion on reproductive health that empowers them to plan when and how many children to have and how to protect themselves from STIs and other infections of the reproductive system compared to a HIV/AIDS specific discussion. People respond favorably to a frank discussion on reproductive health as they see it applicable to all, find it in everyone's interest, and do not feel bad or guilty as it does not invoke the stigma and social taboos associated with HIV/AIDS. Also, the benefits (population and STI control and women's empowerment) of providing the means and knowledge for improving reproductive health in general are much more comprehensive, bigger and longer-term. Free and easy access to HAART and medicines for opportunistic infections, TB and malaria control should be made part of the public health care systems.

I put very high priority on targeting rogue economies for they undermine law and order, impede development, undermine health, and help sustain communal violence and civil wars. I wish to focus on them in totality rather than follow a case by case approach, for example, dealing with the vulnerability of IDUs to HIV/AIDS. The consequences of the associated activities are severe for both developing and developed nations and the moral arguments against them are also, I hope, self-evident.

Next, I put a strong emphasis on energy and water as critical resources for which we need low cost solutions. Clean water and energy are essential for development and a healthy environment. They are increasingly becoming value added products whose prices are, without subsidies and discounting taxes, roughly the same globally. To satisfy the growing demand for them by the haves, preventing environmental and climate related catastrophes, and simultaneously providing access to the poor requires major technological breakthroughs. Simple small-scale solutions, just like developing vaccines against malaria and tuberculosis, may not have been a priority in the developed world, but recognizing that long-term peace, prosperity and security depends on accepting the principle of shared fate demands that we now think globally. Development of the poor can only happen if the developed world makes very significant investment with the goal of providing low cost and environmentally sound solutions that satisfy the needs of both the haves and the have-nots.

In suggesting the above areas of priority and focus, it is important to re-stress that I believe money is necessary but it is not sufficient unless there is an unlimited supply. Money provides resources but we also need enough talented, caring and dedicated people to turn these resources into programs. And finally, even if we demonstrate success of a program we need stable institutions and civil societies to sustain these programs and to scale up the good ones to national levels. Money, people, and institutions are all important (developing and sustaining the latter two

needs money, thus creating a chicken and egg problem), which is why the commitment has to be holistic and long-term.

In closing I would like to return briefly to the underlying premise of this article – that ordinary individuals can make a very significant difference. The easiest way is to donate money. There are a growing number of NGOs that today meet international standards of transparency and accountability and are carrying out excellent projects that make even small donations effective and worthwhile. (One reason for my optimism regarding India is the large number of good and innovative NGOs it has.) The problem can be identifying the good ones. This can be done through personal engagement or tapping into a growing network of involved people and organizations. The most effective contribution is through active involvement. Since change for the poor begins with a little better education, a little more health care, a little help getting a job and a little more civic involvement, each of us can contribute enormously. A doctor could donate one day a month to work in a village or slum; sports enthusiasts can help organize training sessions and tournaments for teams from neighboring villages once a week; an educationist could teach evening classes once a week; a caring person could monitor midday meals for children, etc.. More and more NGOs are willing to, and should be encouraged to, facilitate such part-time involvement. Furthermore, such engagement would lead to the creation of a civil society which could then partner with the government to create hope and opportunities for all.

Even the rosiest picture of development is predicated on the lack of any major wars or terrorism or international strife in the coming decades. Post 9/11 we have already seen that it takes hundreds of billions of dollars to deal with terrorism alone. Such large sums spent on development could transform the world but this will not happen as long as there is threat of war or terrorism. It is, therefore, very important that we, as scientists interested and active in development, work towards creating new technology, reducing strife and increasing global cooperation and global security. Physical and social science and scientists have a unique collaborative role to play in making this happen. There is an old saying that *the best time for planting the tree was twenty years ago and the second best time is today*. It is with this thought and intent that this conference was convoked and I thank the organizers for making this happen and for initiating this debate.

¹ Population Reference Bureau, Washington D.C., <http://www.prb.org/>

² This article is based on a talk given at the Symposium “The Future of Life and the Future of our Civilization” held at Goethe University, Frankfurt, Germany during 2-6 May, 2005. A PDF version of the Powerpoint presentation of the talk is available at http://t8web.lanl.gov/people/rajan/HIV_Poor_rg_05.pdf.

³ See the United Nations Human Development Report 2005 at <http://hdr.undp.org/reports/global/2005/>

⁴ Address by Gro Harlem Brundtland to the 55th World Health Assembly. Available at http://www.who.int/director-general/speeches/2002/english/20020513_addresstothe55WHA.html.

⁵ Commission on Macroeconomics and Health chaired by Prof. Jeffrey Sachs. World Health Organization 2001 report available at <http://www.who.int/whosis/cmh/>.

⁶ Jeffrey Sachs, *The End of Poverty: Economic Possibilities of Our Time*, Penguin Press 2005.

⁷ National Intelligence Council report “The Next wave of HIV/AIDS: Nigeria, Ethiopia, Russia, India, and China”, September 2002. Available at <http://www.odci.gov/nic>.

⁸ See reports on production, trafficking and control by the United Nations Office on Drugs and Crime at <http://www.unodc.org/unodc/index.html>

⁹ Rajan Gupta, “Risky Sex, Addictions, and Communicable Diseases in India: Implications for Health, Development, and Security”, Special Report 8 in the Health and Security Series by the Chemical and Biological Arms Control Institute (CBACI), Washington D.C., September 2004. Available at http://t8web.lanl.gov/people/rajan/AIDS-india/MYWORK/Gupta_HIV_India.pdf

¹⁰ For a very insightful discussion on the connection between migration and development see Hernando de Soto, *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else*, Basic Books, 2000.

¹¹ United Nations Millennium Development Goals at <http://www.un.org/millenniumgoals/>, and the 2005 report at <http://unstats.un.org/unsd/mi/pdf/MDG%20Book.pdf>.

¹² See <http://www.eia.doe.gov> and http://t8web.lanl.gov/people/rajan/energy_RG_6_15_05.pdf

¹³ Sandra Postel, *Pillar of Sand: Can the Irrigation Miracle Last?*, W.W. Norton, 1999.

¹⁴ Jared Diamond, *Collapse: How Societies Choose to Fail or Succeed*, Penguin Group, 2005.

¹⁵ Rajan Gupta, “Education, the Key to Development: Lessons from India”. Available at http://t8web.lanl.gov/people/rajan/AIDS-india/MYWORK/education_India_Arab.pdf.