

CHAPTER 5: ENDING EXTREME POVERTY

I. The Reasons to Believe that Extreme Poverty Can Be Ended

We have studied the process of modern economic growth, and seen how a persistent rise in Gross Domestic Product (GDP) per person has occurred and spread throughout almost all the world, while a few remaining regions of the world have not yet taken off. Where growth has occurred, extreme poverty has declined, often to negligible levels. There is reason to believe that sustained economic growth can spread to the remaining regions – especially to tropical Africa – and thereby eliminate the remaining pockets of extreme poverty. Yet for reasons that I will discuss, the favorable prospect is by no means guaranteed. It will have to be achieved through deliberate effort – local, national, and global – not simply happen on its own.

We will analyze the possible pathways to ending extreme poverty in the next 15-20 years. Yet to do so, we first need a working definition of extreme poverty. The World Bank's poverty line is certainly the most widely used. The World Bank defines extreme poverty as an income below a poverty line of \$US 1.25 per day, measured at international prices of 2005. By this measure, there were an estimated 1.2 billion people below the extreme poverty line as of 2010, the year of the most recent data.

The World Bank's definition is surely too narrow. It would be better to define the extreme poverty line according to the ability of individuals to meet basic material needs. These material needs include: food, clean water, sanitation, shelter, clothing, access to health care, access to basic education, and access to essential services such as transport, energy, and connectivity. These basic needs are the minimum needed for survival and human dignity. We could define those living in poverty as individuals that by lack of household income or public services are unable to meet their basic needs. By this broader definition, the proportion of those in poverty would surely rise above 1 billion, and perhaps could reach 2 billion people. Unfortunately, as of now, there is no comprehensive, worldwide data on this broader sense of extreme poverty. We therefore tend to fall back on the more limited World Bank definition. Perhaps by the time of the Sustainable Development Goals (SDGs), a broader and sounder definition will be practicable and measured globally.

The World Bank also measures other threshold lines above the \$1.25-per-day mark. Another common line is drawn at \$2-per-day, also at international 2005 prices. Naturally, a higher proportion of the world falls under the \$2-per-day mark, an estimated 2.4 billion people as of 2010.

The "Headcount Poverty Rate" measures the share of the population under a given poverty line. The recent trend from 1981 to 2010 is shown in Figure 5.1. Note how steeply it has come down: from 52 percent of the developing world population in 1981 to 43 percent in 1990, 34 percent in 1999, and 21 percent in 2010. Note that the poverty rate has declined by half between 1990 and 2010. The first Millennium Development Goal has thereby been achieved, if we consider the developing countries as a

single entity. This gives us hope that extreme poverty can be reduced in those places where it remains high till today, most importantly in Sub-Saharan Africa.

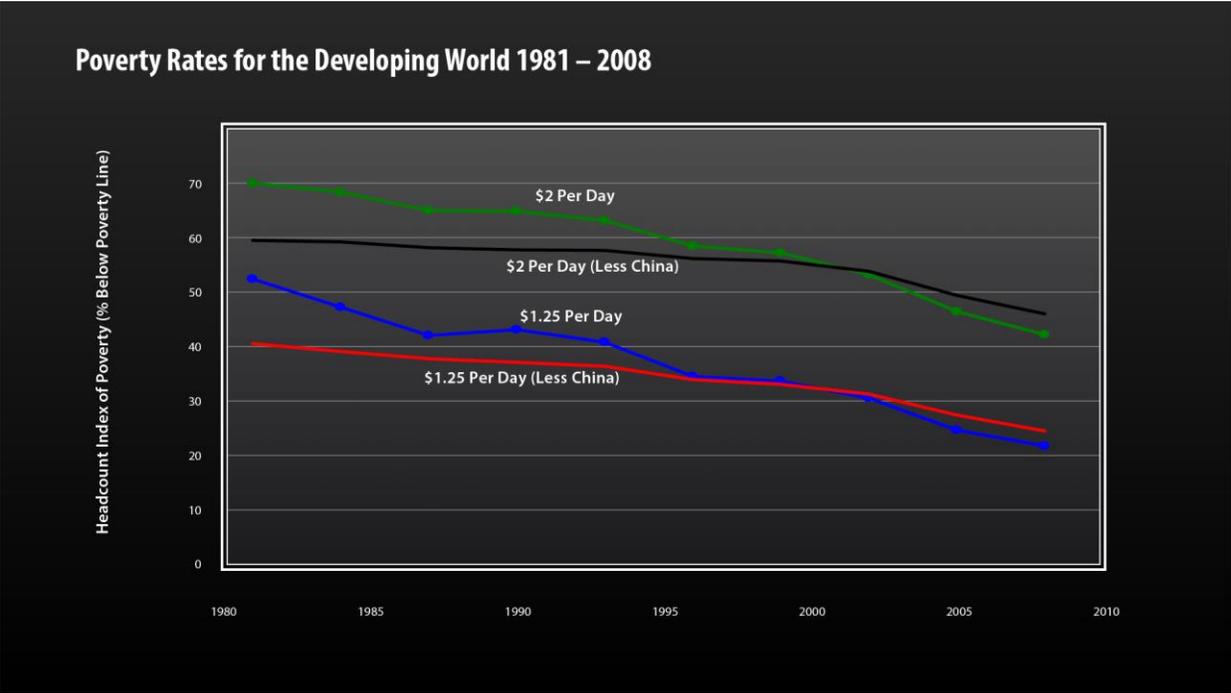
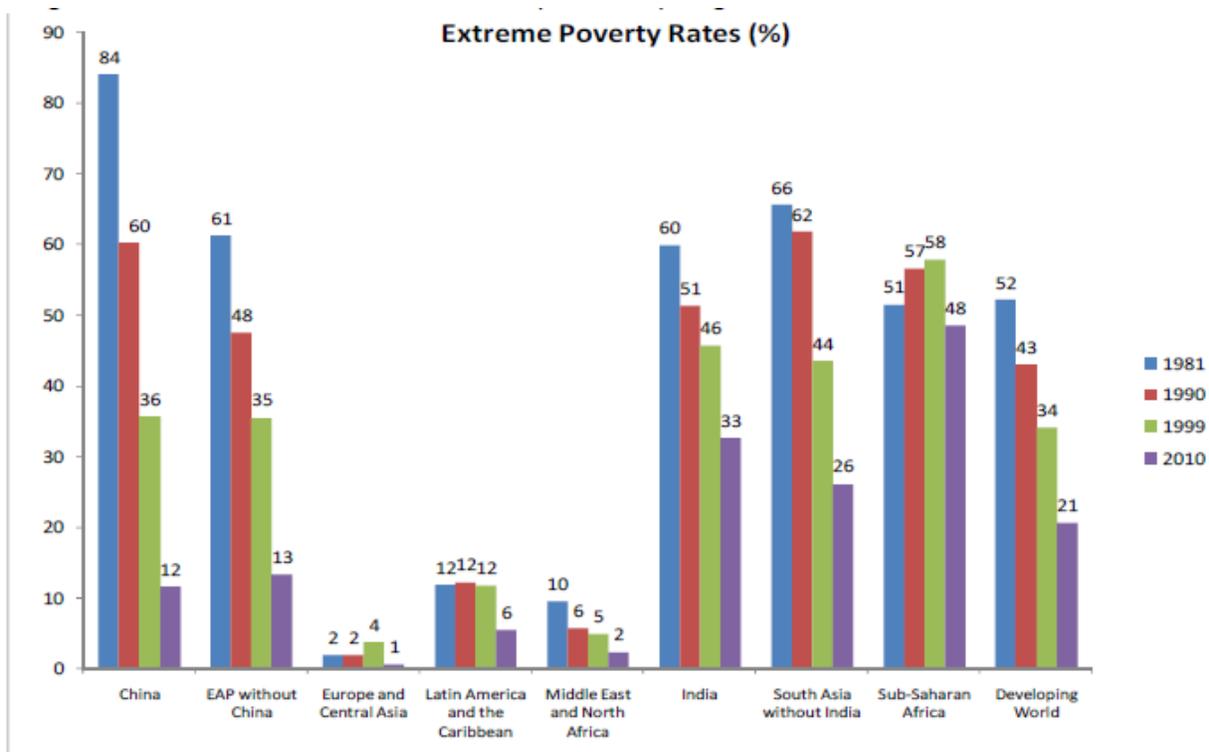


Figure 5.1. Poverty Rates for the Developing World (1981-2008)

The headcount poverty rate by major region is shown in Figure 5.2, for the years 1981, 1990, 1999 and 2010. We see that China has achieved the most remarkable poverty reduction in history, with extreme poverty falling from 84 percent in 1981 to just 12 percent in 2010. This remarkable progress has of course been accompanied by an equally remarkable rate of economic growth, roughly 10 percent per year during these three decades. On the other extreme is sub-Saharan Africa. The poverty rate actually rose between 1981 and 1999, from 51 percent to 58 percent. It was only after the adoption of the Millennium Development Goals in 2000 (discussed below), that the rate of extreme poverty began to fall. South Asia is the region in between. In India, the poverty rate declined from 60 percent in 1981 to 33 percent in 2010. In the rest of South Asia, the poverty rate went from 66 percent to 26 percent in that time interval.



Source: World Bank staff estimates.

Figure 5.2. Extreme Poverty Rates by Region

By adopting the methods of differential diagnosis, we can help regions still stuck in poverty to overcome the chronic low growth that has kept poverty rates high throughout modern history. Indeed, with sound policies in today's high-poverty regions, it is possible to realistically foresee the end of extreme poverty on the planet within this generation, perhaps by 2030 or 2035. The idea that humanity could actually put behind it the ancient scourge of extreme poverty is a thrilling idea. It may seem fanciful or utopian, but it is actually very practical. It is based on strong evidence and the experiences of recent years.

Those parts of the world still stuck in extreme poverty can get out of the poverty trap if they pursue policies aimed at overcoming the specific barriers to growth that now hold them back. Indeed, sub-Saharan Africa has already embarked on that effort, and growth rates have recently risen to around 6 percent per annum. They can go even higher. Success though will require not only sound domestic policies but also the partnership of other parts of the world.

It is our job to understand how the end of poverty can be achieved, and then act to make it happen. It is extraordinarily important to take note of and appreciate the progress that has already been made, as well as recognize that setting of a global goal to end extreme poverty is, by itself, one of the most important tools that we have.

The great British economist John Maynard Keynes raised the idea of ending poverty back in 1930, though he was certainly referring at that stage to the industrialized countries, not to the entire world. In

his famous essay, “Economic Possibilities for Our Grandchildren,” Keynes begins by noting that from the time of the Roman Empire until the early 18th century, the rate of technological progress remained extraordinarily low. It was so low, Keynes notes, that a peasant from the Roman Empire would have felt relatively at home in rural England in the early 1700s. Keynes then goes on to describe the explosion of technological advance from the Industrial Revolution onward, and draws the lessons that soon enough, productivity would rise to the point where poverty in Britain and other high-income countries would actually be brought to zero. Here is how he puts it:

I would predict that the standard of life in progressive countries one hundred years hence will be between four and eight times as high as it is to-day. There would be nothing surprising in this even in the light of our present knowledge. It would not be foolish to contemplate the possibility of a far greater progress still... I draw the conclusion that, assuming no important wars and no important increase in population, the economic problem may be solved, or be at least within sight of solution, within a hundred years. This means that the economic problem is not - if we look into the future - the permanent problem of the human race.¹

When Keynes refers to “the economic problem,” he means poverty; thus, he is stating that poverty could be a thing of the past within one century, by 2030. In fact, Keynes was proved right roughly a half-century from the writing of his essay. By around 1980, extreme poverty was a thing of the past in the high-income world, consigned to the “dustbin of history.”

What is interesting is that Keynes’ 100-year forecast might prove to be correct for the entire world, not just the “progressive countries,” as he termed the industrialized countries of his day. Even more remarkable, perhaps, is that when Keynes made his forecast, the world population was just 2 billion. The world population is now 7.2 billion, more than three times 1930’s population, and by the middle of this century it will be likely be more than 9 billion. Keynes also added another condition that barred further world wars. However, there was another major war – World War II. Despite both of these conditions, the massive increase of world population and the continuing tragedies and destruction of war, Keynes’s basic insight that technological progress can bring about the end of poverty remains true and prescient, and now within reach of the entire world.

The Millennium Development Goals

We will spare no effort to free our fellow men, women and children from the abject and dehumanizing conditions of extreme poverty, to which more than a billion of them are currently subjected. We are committed to making the right to development a reality for everyone and to freeing the entire human race from want. We resolve therefore to create an environment – at the national and global levels alike – which is conducive to development and to the elimination of poverty. (UN Millennium Declaration, 2000)

¹ John Maynard Keynes, “Economic Possibilities for Our Grandchildren” (1930).

In September 2000, a remarkable thing happened. More than 160 heads of state and government gathered at the United Nations to usher in and convey the world's hope for the new millennium. The Secretary General of the United Nations at that time, Kofi Annan, put forward to the world leaders a path-breaking *Millennium Declaration*. The Declaration called on the world to honor the new millennium by committing to great global goals: universal human rights, peace and security, economic development, environmental sustainability, and the drastic reduction of extreme poverty. As part of the Millennium Declaration, the world leaders adopted eight specific development goals that quickly became known as the Millennium Development Goals (MDGs), shown in Figure 5.3.

THE MILLENNIUM DEVELOPMENT GOALS



FOR THE SPECIFIC GOALS, TARGETS, AND INDICATORS, SEE:
<http://mdgs.un.org/unsd/mdg/host.aspx?Content=indicators/officialist.htm>

Figure 5.3. The Eight Millennium Development Goals

Why a cartoon drawing for each goal? The goals are meant for the average person in the street, not for high theorists. This is important to appreciate. The goals are phrased in a way that they can be understood in the villages; the slums; the places where poor people live and work and fight for their survival. The goals serve to orient humanity around a great moral challenge: to improve the life conditions of the most vulnerable people on the planet. They exist to spur action across the society: by governments, businesses, communities, families, faith groups, academicians, and individuals. They are meant to spur broad social change, not just a few technical fixes here and there.

Goal number 1 calls for eradicating extreme poverty and hunger. Goal number 2 is to achieve universal primary education. Goal number 3 is to promote gender equality so that women, like men, have rights and access for economic progress. Goal number 4 is to sharply reduce child mortality. Goal number 5 is to sharply reduce maternal mortality and ensure a healthy childbirth process for mothers and their children. Goal number 6 is to fight the raging pandemic diseases of AIDS, TB, malaria and other mass killers. Goal number 7 is to promote environmental sustainability. Finally, Goal number 8 is to promote a global partnership whereby rich countries help poor countries to achieve the first seven goals.

Beneath this general description are some specific quantitative targets and many dozen indicators, which are described in Figure 5.4. For the eight MDGs there are 21 specific quantified targets, as well as approximately 60 detailed indicators to measure the progress. It has been my great honor to serve as Special Advisor to the UN Secretary General on the MDGs, first for UN Secretary General Kofi Annan (during 2001-6), and now for UN Secretary General Ban Ki-moon (2007 to the present). My responsibility has been to help analyze and design strategies to support countries in achieving the MDGs, and to work with the UN agencies and donor governments as well to help implement those strategies.

Official list of MDG indicators

All indicators should be disaggregated by sex and urban/rural as far as possible.

Effective 15 January 2008

Millennium Development Goals (MDGs)	
Goals and Targets (from the Millennium Declaration)	Indicators for monitoring progress
Goal 1: Eradicate extreme poverty and hunger	
Target 1.A: Halve, between 1990 and 2015, the proportion of people whose income is less than one dollar a day	1.1 Proportion of population below \$1 (PPP) per day ^a 1.2 Poverty gap ratio 1.3 Share of poorest quintile in national consumption
Target 1.B: Achieve full and productive employment and decent work for all, including women and young people	1.4 Growth rate of GDP per person employed 1.5 Employment-to-population ratio 1.6 Proportion of employed people living below \$1 (PPP) per day 1.7 Proportion of own-account and contributing family workers in total employment
Target 1.C: Halve, between 1990 and 2015, the proportion of people who suffer from hunger	1.8 Prevalence of underweight children under-five years of age 1.9 Proportion of population below minimum level of dietary energy consumption
Goal 2: Achieve universal primary education	
Target 2.A: Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling	2.1 Net enrolment ratio in primary education 2.2 Proportion of pupils starting grade 1 who reach last grade of primary 2.3 Literacy rate of 15-24 year-olds, women and men
Goal 3: Promote gender equality and empower women	
Target 3.A: Eliminate gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015	3.1 Ratios of girls to boys in primary, secondary and tertiary education 3.2 Share of women in wage employment in the non-agricultural sector 3.3 Proportion of seats held by women in national parliament
Goal 4: Reduce child mortality	
Target 4.A: Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate	4.1 Under-five mortality rate 4.2 Infant mortality rate 4.3 Proportion of 1 year-old children immunised against measles

Goal 5: Improve maternal health	
Target 5.A: Reduce by three quarters, between 1990 and 2015, the maternal mortality ratio	5.1 Maternal mortality ratio 5.2 Proportion of births attended by skilled health personnel
Target 5.B: Achieve, by 2015, universal access to reproductive health	5.3 Contraceptive prevalence rate 5.4 Adolescent birth rate 5.5 Antenatal care coverage (at least one visit and at least four visits) 5.6 Unmet need for family planning
Goal 6: Combat HIV/AIDS, malaria and other diseases	
Target 6.A: Have halted by 2015 and begun to reverse the spread of HIV/AIDS	6.1 HIV prevalence among population aged 15-24 years 6.2 Condom use at last high-risk sex 6.3 Proportion of population aged 15-24 years with comprehensive correct knowledge of HIV/AIDS 6.4 Ratio of school attendance of orphans to school attendance of non-orphans aged 10-14 years
Target 6.B: Achieve, by 2010, universal access to treatment for HIV/AIDS for all those who need it	6.5 Proportion of population with advanced HIV infection with access to antiretroviral drugs
Target 6.C: Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases	6.6 Incidence and death rates associated with malaria 6.7 Proportion of children under 5 sleeping under insecticide-treated bednets 6.8 Proportion of children under 5 with fever who are treated with appropriate anti-malarial drugs 6.9 Incidence, prevalence and death rates associated with tuberculosis 6.10 Proportion of tuberculosis cases detected and cured under directly observed treatment short course
Goal 7: Ensure environmental sustainability	
Target 7.A: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources	7.1 Proportion of land area covered by forest 7.2 CO2 emissions, total, per capita and per \$1 GDP (PPP) 7.3 Consumption of ozone-depleting substances 7.4 Proportion of fish stocks within safe biological limits 7.5 Proportion of total water resources used 7.6 Proportion of terrestrial and marine areas protected 7.7 Proportion of species threatened with extinction
Target 7.B: Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss	
Target 7.C: Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation	7.8 Proportion of population using an improved drinking water source 7.9 Proportion of population using an improved sanitation facility
Target 7.D: By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers	7.10 Proportion of urban population living in slums ^b
Goal 8: Develop a global partnership for development	
Target 8.A: Develop further an open, rule-based, predictable, non-discriminatory trading and financial system Includes a commitment to good governance, development and poverty reduction – both nationally and internationally	Some of the indicators listed below are monitored separately for the least developed countries (LDCs), Africa, landlocked developing countries and small island developing States. <u>Official development assistance (ODA)</u> 8.1 Net ODA, total and to the least developed countries, as percentage of OECD/DAC donors' gross national income 8.2 Proportion of total bilateral, sector-allocable ODA of OECD/DAC donors to basic social services (basic education, primary health care, nutrition, safe water and sanitation) 8.3 Proportion of bilateral official development assistance of OECD/DAC donors that is untied 8.4 ODA received in landlocked developing countries as a proportion of their gross national incomes 8.5 ODA received in small island developing States as a proportion of their gross national incomes
Target 8.B: Address the special needs of the least developed countries Includes: tariff and quota free access for the least developed countries' exports; enhanced programme of debt relief for heavily indebted poor countries (HIPC) and cancellation of official bilateral debt; and more generous ODA for countries committed to poverty reduction	<u>Market access</u> 8.6 Proportion of total developed country imports (by value and excluding arms) from developing countries and least developed countries, admitted free of duty 8.7 Average tariffs imposed by developed countries on agricultural products and textiles and clothing from developing countries 8.8 Agricultural support estimate for OECD countries as a percentage of their gross domestic product 8.9 Proportion of ODA provided to help build trade capacity
Target 8.C: Address the special needs of landlocked developing countries and small island developing States (through the Programme of Action for the Sustainable Development of Small Island Developing States and the outcome of the twenty-second special session of the General Assembly)	<u>Debt sustainability</u> 8.10 Total number of countries that have reached their HIPC decision points and number that have reached their HIPC completion points (cumulative) 8.11 Debt relief committed under HIPC and MDRI Initiatives 8.12 Debt service as a percentage of exports of goods and services
Target 8.D: Deal comprehensively with the debt problems of developing countries through national and international measures in order to make debt sustainable in the long term	
Target 8.E: In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries	8.13 Proportion of population with access to affordable essential drugs on a sustainable basis
Target 8.F: In cooperation with the private sector, make available the benefits of new technologies, especially information and communications	8.14 Fixed telephone lines per 100 inhabitants 8.15 Mobile cellular subscriptions per 100 inhabitants 8.16 Internet users per 100 inhabitants

Figure 5.4. Official list of MDG indicators

It has been a wondrous process to see how the MDG goal setting has energized civil society and helped to orient governments that otherwise might have neglected the challenges of extreme poverty. The MDGs have drawn global attention to the plight of the poor and also have helped to motivate problem solving around the world to overcome the remaining extreme poverty. Of course, as economic history shows, and as Keynes emphasized, the long-term fundamental forces driving poverty down are technological. Yet the MDGs have been important in encouraging governments, experts, and civil society, to undertake the “differential diagnoses” necessary to overcome remaining obstacles.

Progress has been quite notable, and breakthroughs have occurred in some of the poorest countries and regions of the world. The overall decline of the rate of extreme poverty, as we have noted, has been dramatic: down by more than half since 1990. Of course the MDGs were not the main factor in the biggest success of all: China. However, in Africa, the MDGs have played a far more significant role in helping to end a long period of stagnation and rising poverty, and to begin a period of falling poverty, improving public health, and more rapid economic growth.

The gains have been made not only in reducing poverty, but in many of the other MDGs. Consider the fight against disease for example. Figure 5.5 shows the rapid increase in the number of HIV-infected people kept alive by anti-retroviral medicines (ARVs), shown by the blue curve. If not controlled by anti-retroviral medicines, the HIV virus causes AIDS and almost-certain death. Now, with the spur of the MDGs and the health programs that they have promoted, millions of people in low-income countries are now alive today because they have been given free access to life-saving antiretroviral medicines.

**MDG 6
Control
HIV/AIDS,
Malaria, and
Other Diseases**

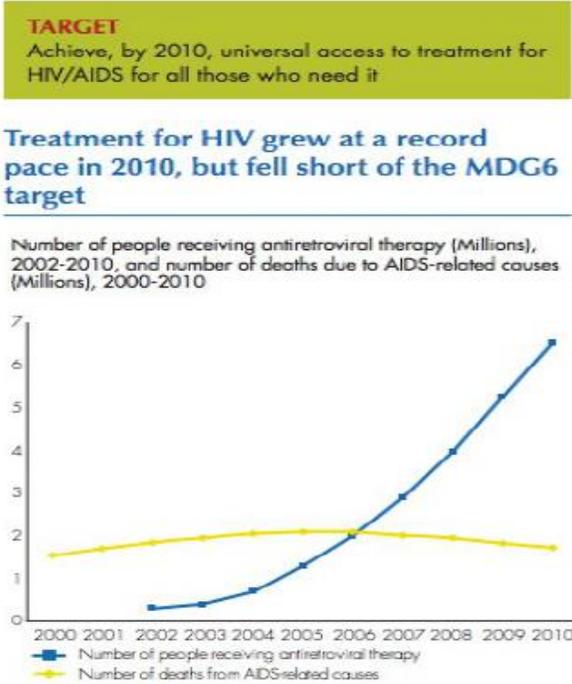


Figure 5.5. AIDS Treatment Recipients (2002-2010) and AIDS deaths (2000-2010)

Figure 5.6 demonstrates another public-health triumph that I would ascribe to the public awareness and problem solving promoted by the MDGs: the reduction of the malaria burden and malaria deaths. Note how malaria deaths in Africa peaked around 2005, and then began to decline markedly. This was achieved through the scaling up of malaria-control programs based on a number of cutting-edge technologies, including long-lasting insecticide treated bed nets; a new generation of anti-malaria medicines; and various other advances (such as rapid diagnostic tests) enabled by scientific progress. The MDGs encouraged the creation of several special programs to fight malaria, and these programs have by now led to a remarkable decline of malaria prevalence and malaria deaths, especially in sub-Saharan Africa.

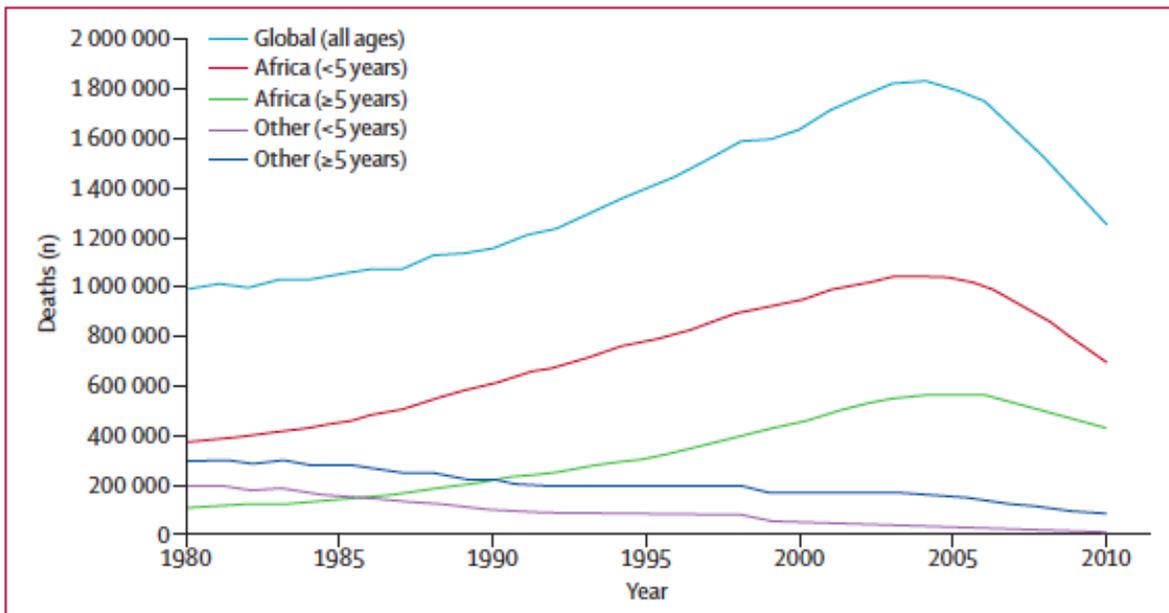


Figure 2: Trends in global malaria deaths by age and geographical region, 1980 to 2010

Figure 5.6. Malaria Deaths by Age and Region (1980-2010)

The combination of continued rapid technological change and a good “differential diagnosis” to identify priority needs of each low-income region can thereby direct investments towards high-return anti-poverty programs, whether for infrastructure (such as roads, rail, power, connectivity, and ports); health care; safe drinking water and sanitation; or improved access to schooling. Just as public health has improved with the scale up of programs to fight AIDS and malaria, similar breakthroughs can be made in other areas: more productive farming; new industrial development; and greatly improved educational attainments.

II. Strategies to End Extreme Poverty

The end of extreme poverty is within reach. As we've noted, there are roughly 1.2 billion people still living below the World Bank's current poverty line of \$1.25 per person per day. Thankfully, this number has been sharply reduced from 1.9 billion people in 1990. So where are those remaining areas of extreme poverty?

There are two main regions of the world still stuck in a poverty trap. The most poverty-stricken region of the world is tropical sub-Saharan Africa. In 2010, an estimated 48.5 percent of the population of tropical sub-Saharan Africa remained below the poverty line. Fortunately that rate is declining now, and has been declining since the start of the new millennium. Some estimates put the poverty rate even lower today, though the data are much debated. The other place with remaining extreme poverty in large numbers is South Asia, where the poverty rate in 2010 was estimated to be 31 percent of the population. In raw numbers, in 2010, around 413 million people lived in extreme poverty in tropical sub-Saharan Africa, and 507 million people lived in extreme poverty in South Asia. Just these two regions constitute around 76 percent of all of the world's extreme poverty.

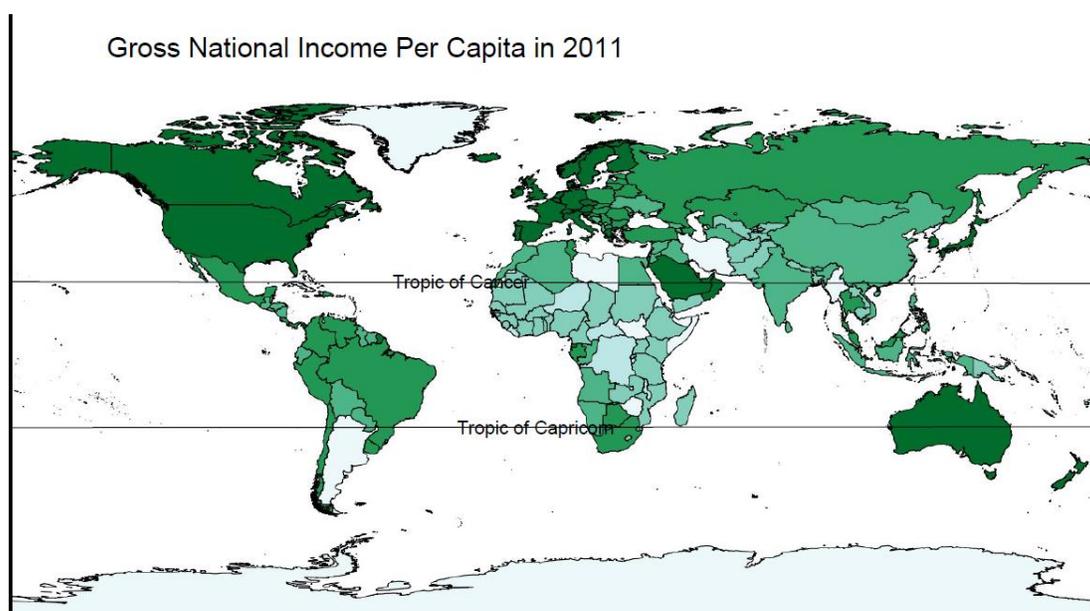


Figure 5.7. Gross National Income Per Capita (2011)

In East Asia, around 20 percent of the total population, or 250 million people, are still in extreme poverty, even though East Asia has enjoyed by far the fastest decline of extreme poverty of any region, in conjunction with its remarkably high rate of economic growth. In the Middle East and North Africa (MENA), around 10 percent of the total population lives in extreme poverty, around 100 million people. The remaining 100 million or so of the world's poor are scattered in the other regions of the developing world (Latin America and the Caribbean, Europe, Central Asia, small island states).

The two big regions needing future breakthroughs are therefore sub-Saharan Africa and South Asia. Let us first make a differential diagnosis for sub-Saharan Africa, to see what can be done to accelerate Africa’s economic growth and poverty reduction. We will then turn to South Asia.

Ending extreme poverty in sub-Saharan Africa

There is definitely good news in Africa. Figure 5.8 shows the year-to-year growth rates of the world economy and of sub-Saharan Africa. The average growth rate in sub-Saharan Africa picked up significantly after the year 2000. Indeed, sub-Saharan Africa has been growing faster than the average of the world economies, at around 5 percent per year and even faster in certain years. For 2014, the IMF forecasts annual growth of around 6 percent. This growth rate implies a doubling time of around 12 years ($=70/6$). With population growth at around 2.5 percent per annum, however, the growth of GDP per capita is considerably lower, around 3.5 percent per year, with a doubling time therefore of around 20 years ($=70/3.5$).

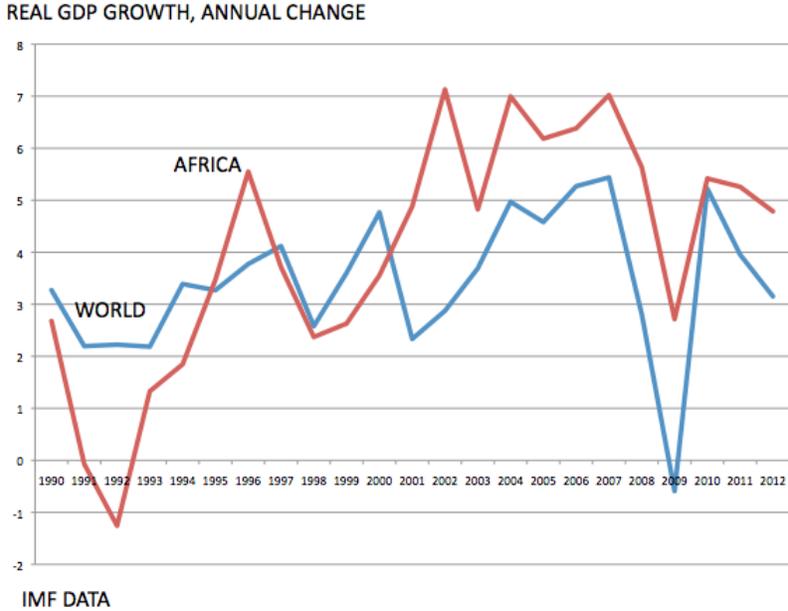
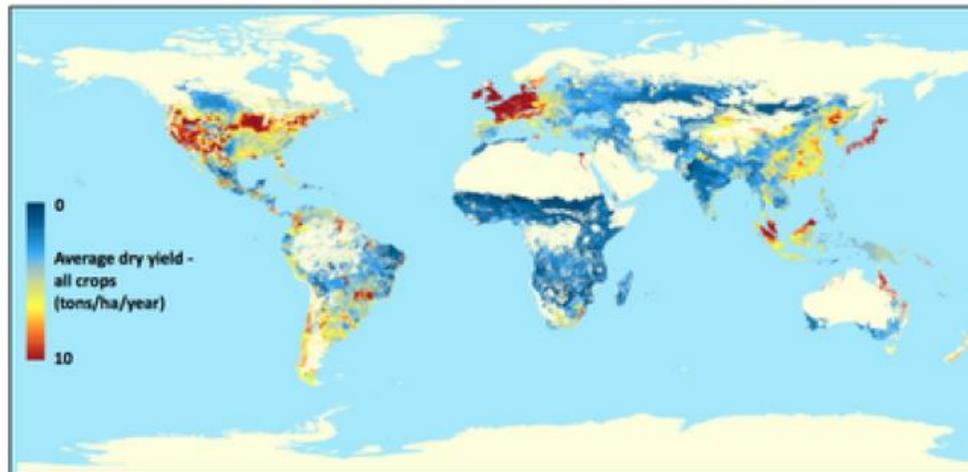


Figure 5.8. GDP Growth Annual Change (1990-2012)

Something is beginning to go right, and it is possible for sub-Saharan Africa to achieve even faster progress. A differential diagnosis of Africa’s problems shows that there are challenges in nearly all of the seven big categories of differential diagnosis: poverty trap, economic policy framework, fiscal framework, physical geography, governance patterns and failures, cultural barriers, geopolitics. To organize a complex discussion, I will focus on four particular areas where Africa can achieve rapid breakthroughs: farm productivity, urban productivity, national infrastructure, and human capital investment.

Figure 5.9 shows the crop productivity (tons of grain per hectare) in different parts of the world. Africa is almost solid blue, which in this map means that it achieves very low farm yields. On average, smallholder farmers in sub-Saharan Africa have produced a yield between half a ton and one ton of grain per hectare. This is very poor in international comparative terms. Many other parts of the developing world achieve four or five times that yield. In the most productive grain belts of the world, for example in the US, Western Europe, and Japan, yields often rise to 10 times Africa's yield.

LOW FARM PRODUCTIVITY IN SUB-SAHARAN AFRICA



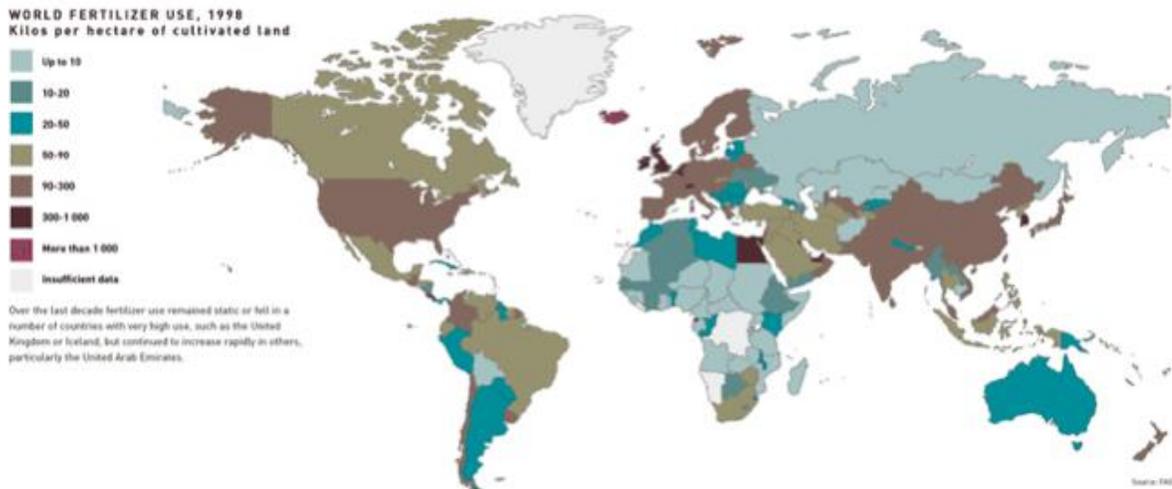
PNAS, Trading Carbon for Food, 2010

Figure 5.9. Average Crop Yields

What is the cause of Africa's low farm yields? In fact, African farms face many obstacles. One key challenge is soil-nutrient depletion. Africa's farmers have generally been too poor to keep their farms' soils replenished with nitrogen, potassium and phosphorous necessary for decent crop yields. Just as with under-nourished human beings, under-nourished crops also fail to grow and thrive. In Africa, with farmers unable to use fertilizers to replenish their soils, the farmlands have been exhausted of the nutrients needed for high yields.

The next map in Figure 5.10 shows the details.

WORLD FERTILIZER USE



<http://atlas.aas.org/index.php?part=2&sec=waste&sub=agchem>

Figure 5.10. World Fertilizer Use (1998)

Farmers in almost all other parts of the world use extensive fertilizers, both organic and chemical, to replenish the key nutrients that are removed with each harvest. When a crop is harvested, the nitrogen and other nutrients leave with it. Somehow those nutrients have to be put back in the soil, whether through green manures, chemical fertilizers such as DAP and urea, or long fallow periods, in which nitrogen is replenished through natural processes.

Yet most of Africa's peasant farmers have been so poor that they have been farming without the advantages of those added nutrients, and the resultant low yields trap the farmers in a poverty trap. They get low yields year after year. Since the farmers are too poor to buy the fertilizers that they need, their soils continue to be depleted of key nutrients. The yields remain low, and every year the farmers get a very meager income that does not help their families' struggles with hunger, or give them the income necessary to buy inputs that would enable higher production.

In addition to fertilizer, other inputs are also necessary for high yields, such as good water management and irrigation where possible. This typically requires wells and pumps. Additionally, good seed varieties are needed to contribute to high yields. All of these improved inputs are beyond the means of Africa's peasant farmers. In the same way that African farmers have lacked the means to replenish the soil nutrients, they have also lacked the means to invest in irrigation and high yield seeds.

The problem adds up an agricultural poverty trap. A high priority for Africa is to invest in its smallholder farmers, with government programs that enable even the poorest farmers to get the inputs that they need, whether on credit or as a grant, so that they can enjoy higher farm yields, higher incomes and thereby start investing in these crucial inputs on their own. Over time, these farm households will build up their capital and their creditworthiness. The government programs needed to help them at the start

can then gradually be withdrawn, allowing banks rather than government aid to do the same job of financing inputs.

To end extreme poverty in Africa will also require a major build up of infrastructure, including roads, rail, power, ports, and communications networks. As in many other areas, Africa's colonial rulers left the newly independent African nations with a poor start in infrastructure upon independence. This can be illustrated by comparing India's rail grid with Africa's rail grid, as shown in Figure 4.17. Remember that India had just one imperial ruler, Great Britain. Britain constructed a full rail network in part to be able to bring India's cash crops such as cotton to the coastal ports. In Africa, by contrast, there were several European imperial powers (Great Britain, France, Italy briefly, Spain, Portugal, Germany until World War I). They did not connect their separate investments, and indeed never built much of a rail system at all. Africa's rail system was mainly single lines running from ports to particular mines and plantations. Until today, Africa faces extremely high over-land transport costs, in part because of the weakness of the rail network, combined with a wholly insufficient highway system. And until today, the fact that the African continent hosts 54 countries, including 49 in the sub-Saharan region, makes the creation of a modern, continent-wide transport network a continuing unmet challenge.

Other aspects of infrastructure are also especially important in the 21st century. There can be no economic development on a sustained basis without mass electrification. Figure 5.11 is a well-known satellite photo of the Earth at night, indicating the places with nighttime electrification and illumination. It shows the bright lights of the United States (especially in the populous Eastern half of the country), Europe, coastal China, Japan, coastal South America, India, Southeast Asia, and the Arabian Peninsula. But in sub-Saharan Africa, the lights are out at night. To this day, a large part of rural Africa still lacks access to electricity. In addition to not having access to lights at night or electricity for home activities, there is a critical lack of power for pumping water for irrigation; for refrigeration; for preservation of agricultural outputs; for industrial processing of food, textiles and apparel; as well as every other kind of industrial activity.

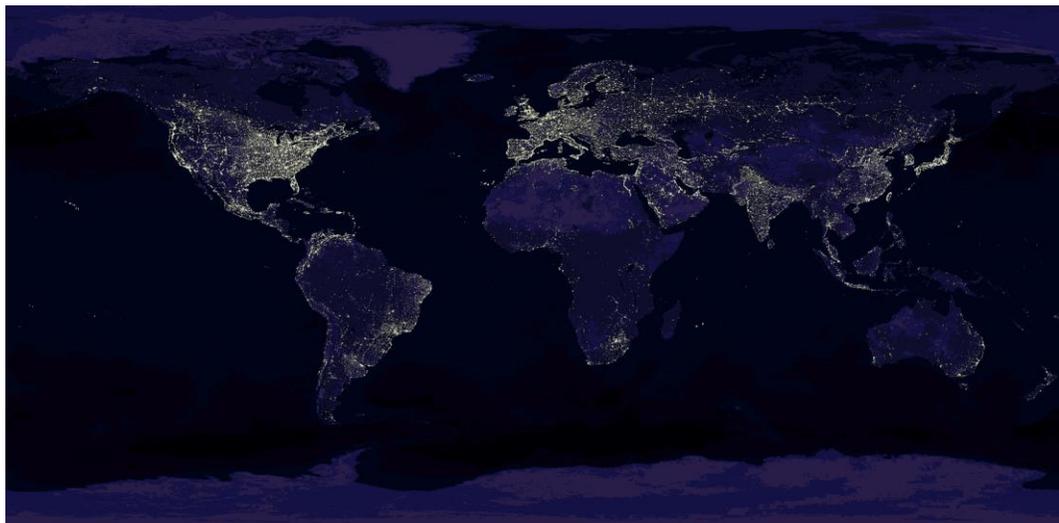


Figure 5.11. Lights at Night (NASA Satellite)

The absence of electrification has been a huge chronic barrier to Africa's development and another aspect of Africa's poverty trap. Without electricity, productivity is very low. Low productivity means very low output per person, which in turn means low income and thus poverty. Poverty means low tax collections by government, and therefore the inability of the government to invest in the electricity needed to lift the region out of poverty. Once again, we see the vicious circle of poverty. African governments know very well they need to build the power capacity; yet they lack the resources to do so out of their own revenues, and the creditworthiness to do so through borrowing. They are stuck, trapped, and in need of a temporary boost of grants and low-interest loans to move out of the rut.

Another critical dimension of infrastructure in the 21st century is information technology. The good news is that because these technologies are so powerful and their costs have fallen so far, Africa is already on its way to mass coverage by mobile telephony, which already reaches even the most remote villages. Private investors have already laid, or will soon lay, submarine fiber-optic cables that will slash Internet prices and facilitate the spread of broadband throughout the continent. Since these investments are being made by the private sector, with favorable profitability and lower fixed costs than power generation, the Internet grid and mobile telephony are spreading without the need for public financing or foreign aid. ICT has already given a huge boost to Africa's development, and the boost will be even larger in the years ahead when mobile broadband dramatically improves access to health care, education, banking, and other services.

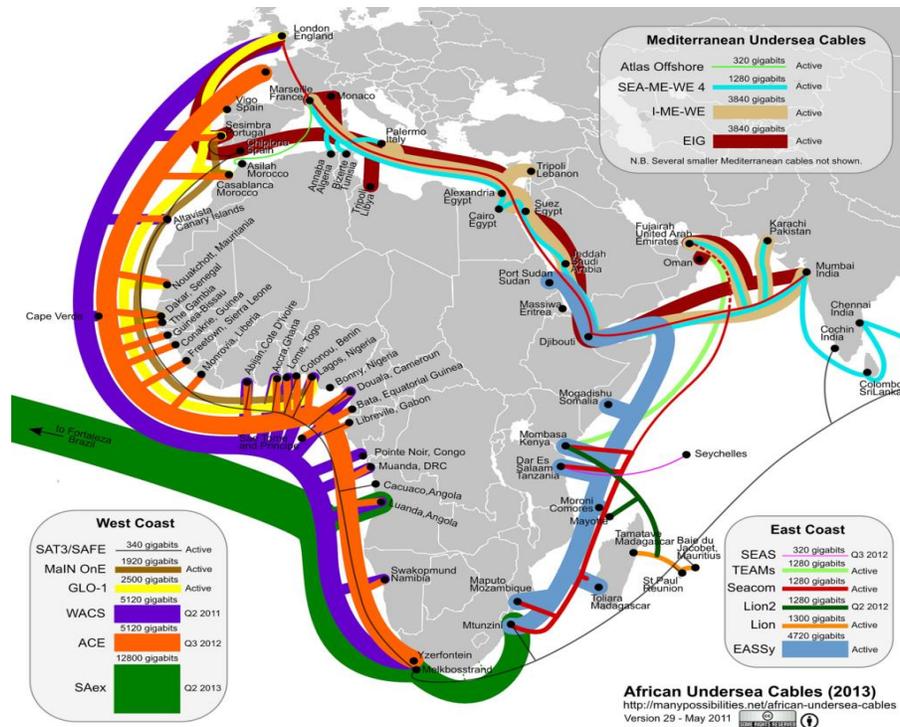


Figure 5.12. African Undersea Cables (2013)

The moral of the story is that Africa, like the rest of the world, is now poised for a breakthrough – if it can mobilize targeted investments in agricultural productivity, in health care, and in continent-wide infrastructure. In my view, Africa will be able to make the breakthrough in long-term economic growth that has so far eluded it throughout its modern history.

However, there is one final challenge that Africa must surmount. Africa still has a very high fertility rate, meaning that family sizes are very large on average, and the population is growing remarkably rapidly. The fertility rate for 2010-15 is estimated to be 5.1 children, meaning that each woman on average is having more than two daughters to replace her in the next generation. Not surprisingly, the population is growing rapidly.

Note in Figure 5.13 that in 1950, sub-Saharan Africa's population was a mere 180 million people. Just 60 years later, sub-Saharan Africa's population is now around 900 million, an increase of five times. And the UN projects further rapid growth of the population during the 21st century, unless Africa is able to make a transition to a lower fertility rate faster than on the current trend. Based on a *moderately rapid* decline in the high fertility rate, Africa's population is projected to reach an astounding 3.8 billion people as of 2100, roughly four times larger than now. (This is the so-called medium-fertility variant of the UN Population Division.) If the decline in the fertility rate is slower than in the medium-variant, the UN "high-fertility" variant finds that Africa's population would be even larger, roughly 5.3 billion people. On the other hand, if the fertility rate falls more rapidly than the UN now projects as likely, the population in 2100 in the "low-fertility" variant would be 2.6 billion people, lower by more than 1 billion persons compared with the medium-fertility variant.

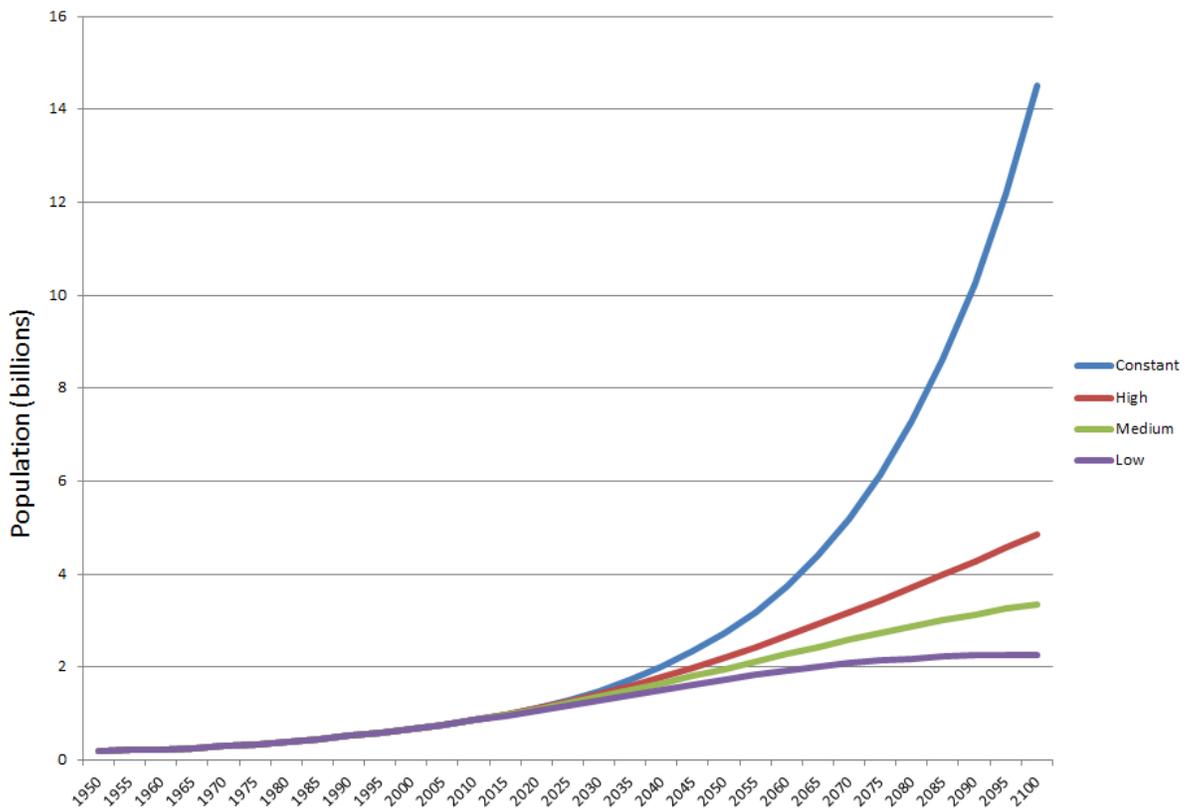


Figure 5.13. UN Population Scenarios for sub-Saharan Africa (1950-2100)

Africa will reap many development benefits if it keeps the population on the “low-fertility” variant. First, there would be a lower population, and therefore more land, oil, timber, water, and other natural resources per person. Second, families would be smaller, so that each family could invest more per child in education, health, and nutrition. Third, the population age would be higher on average, as there would be a better balance between parents and children in each generation. Fourth, the population would grow less rapidly, so a smaller fraction of saving and investment would be used simply to keep up with the growing population. More of the saving and investment could be used to raise the amount of capital (such as roads, infrastructure, vehicles, and machinery) available to each person. In short, there are great benefits for Africa is fostering a lower fertility rate, and thereby faster economic development.

In summary, in addition to the vital investments in agriculture, health, education, physical infrastructure, fiber optics, and electrification, Africa will benefit by investing more in the rapid voluntary reduction of today’s high fertility rates. How does a government “invest” in voluntary fertility reduction? First, the government ensures that girls are enabled to stay in school at least through a high-school diploma, in order to discourage child marriages. Second, the government should invest in child survival, to convince each family that having fewer children is “safe” in terms of their ultimate survival. Families do not need large families simply to ensure the survival of a few of the children. Third, the government should make

sure that family planning and modern contraceptives are available for free or low cost for those households that voluntarily decide to reduce their fertility rate.

III. South Asia – The Continuing Challenge of Food Supply

We have seen earlier that there are two main regions in the world where there is still extensive extreme poverty: sub-Saharan Africa and South Asia. With the necessary investments, Africa can break free of extreme poverty. So too can South Asia, comprised of India, Bangladesh, Bhutan, India, Nepal, and Pakistan. South Asia is already making notable progress in poverty reduction, but still has around 500 million poor people out of the region's total population of around 1.6 billion people. There are still major challenges of poverty in both the rural and the urban areas of South Asia.

What distinguishes South Asia from other regions? There are, of course, various aspects of wondrous culture, traditions, and the many remarkable dimensions of the physical environment. But the one distinguishing aspect to underscore is the extraordinary population density of South Asia.

Consider India with its 1.2 billion people, equaling roughly 16 percent of the world's population. Yet India has just 2.5 percent of the world's land area, and many parts of that landmass of India are very dry or even desert. Figure 5.14 shows countries shaded according to their population density, and India and its next-door neighbor, Bangladesh, are shaded as two of the most densely populated parts of the world. The numbers indeed are quite staggering. Bangladesh has on average 1,200 people per square kilometer. India has about 410 people per square kilometer, but remembering that many of those square kilometers are nearly empty desert regions, the populated regions are even denser. The United States, by contrast, has about 32 people per square kilometer. The population density in India is more than 10 times higher than in the United States.

World Map: Population Density (2013 Estimate)

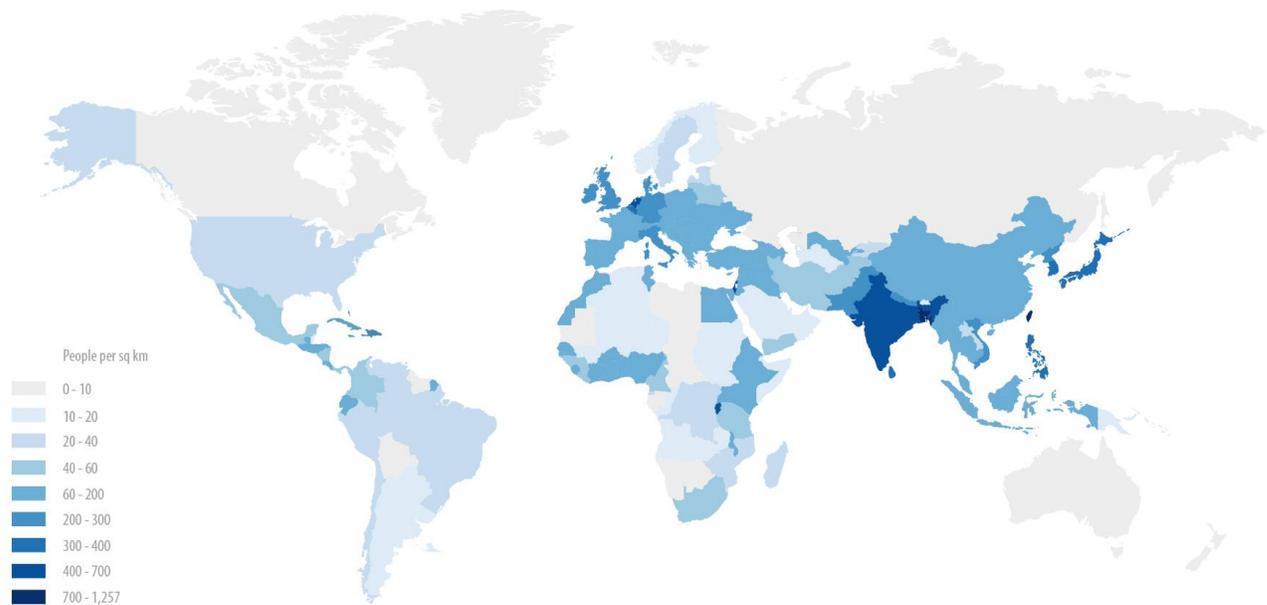


Figure 5.14. World Population Density (2013)

The implications of this very high density throughout India's history have been adverse. Indian farms are very small, and its farmers traditionally have been able to grow only a small amount of food. The cities are extraordinarily dense and crowded, and India's and South Asia's cities more generally have dramatically increased in population in recent decades.

Many people in the 1950s and 1960s thought the situation was hopeless for South Asia. They thought that the population was so large (and increasing so rapidly) that India and its neighbors would not be able to feed themselves. These observers forecasted mass deaths from famine. When Bangladesh gained its independence from Pakistan in the early 1970s, Henry Kissinger notoriously called it a "basket case." Thankfully, the forecasts of mass famine have proven to be off the mark. Indeed, India not only has avoided famine, but it has grown reasonably rapidly over the past 20 years. It takes pride in being one of the world leaders of the information technology (IT) revolution, with wonderful engineering and innovation in using IT for economic development. Through IT, India has become integrated into the world economy, often in cutting-edge industries, using creative programming and IT systems developed by India's top-notch engineers.

How did India avoid the fate that was so widely predicted for it? India's success begins naturally with agriculture, because India was overwhelmingly a smallholder peasant society deeply challenged with food insecurity. It was a great breakthrough in agricultural technology in the 1950s and 1960s that enabled India to overcome chronic famines of the past and to begin the liftoff into sustained economic

growth. That breakthrough in agricultural technology has been famously dubbed the “Green Revolution.”

What is the Green Revolution? It started with the individual pictured below on the left, Norman Borlaug. Borlaug was a highly skilled agronomist who used his great ingenuity and determination to develop high-yield seed varieties for wheat while working in Mexico in the 1940s and the 1950s. (He later won the Nobel Peace Prize for these accomplishments.) Borlaug was invited to India in the early 1960s to see whether his high-yield seed varieties might help India to raise farm yields. His counterpart was yet another great agronomist pictured in the middle, Dr. M.S. Swaminathan.



Figure 5.15 Norman Borlaug (left); M.S. Swaminathan (middle); Chidambaram Subramaniam (right)

Borlaug and Swaminathan took the special seeds that Borlaug had developed for Mexican conditions and planted them in Indian soils in Indian conditions. The first year did not work out well. They looked again and decided on a different approach. The second year proved that, lo and behold, the varieties developed by Borlaug for Mexican conditions worked beautifully in the Indian conditions if planted in the right way. Borlaug and Swaminathan quickly realized that a Green Revolution for India was within technological reach. To make it happen, they had to add a third partner to form a historic triumvirate. He is on the right, Mr. Chidambaram Subramaniam, who was the dynamic Minister of Agriculture of India in the early-to-mid-1960s. The core idea of the new Green Revolution was to multiply Borlaug’s Mexico seeds for use in India, and then to plant them with added fertilizer, irrigation and transport facilitation in order to jumpstart a major takeoff of crop yields.

The results were spectacular. India’s yields soared, and then the concept of high-yield varieties began to spread around the world. A true Green Revolution began to unfold worldwide by the end of the 1960s. Figure 5.17 shows the consequences on yields for the developing countries as a whole. Up to the mid-1960s, average yields were still less than 1,000 kilograms per hectare of arable land, that is, less than 1

ton per hectare. But then, with improved seed varieties and greater use of fertilizers and irrigation, yields began to rise significantly. By 1980, yields averaged 1.5 tons per hectare. By the year 2000, they were above 2.5 tons per hectare. In many parts of the developing world, yields routinely exceed 3 tons per hectare, for instance in Mexican wheat as shown in Figure 5.17. India and Pakistan have not reached Mexican productivity levels, but they have increased their yields by three-four times since the mid-1960s.

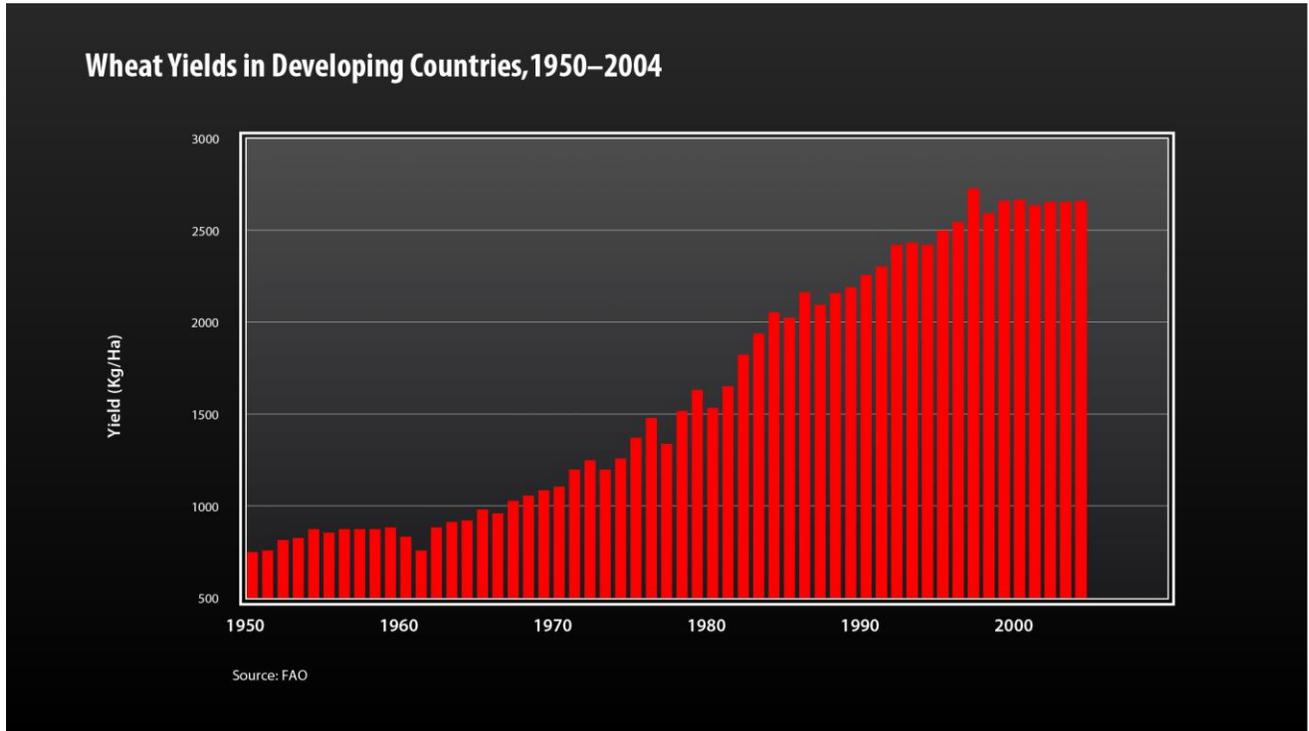


Figure 5.16. Wheat Yields in Developing Countries (1950-2004)

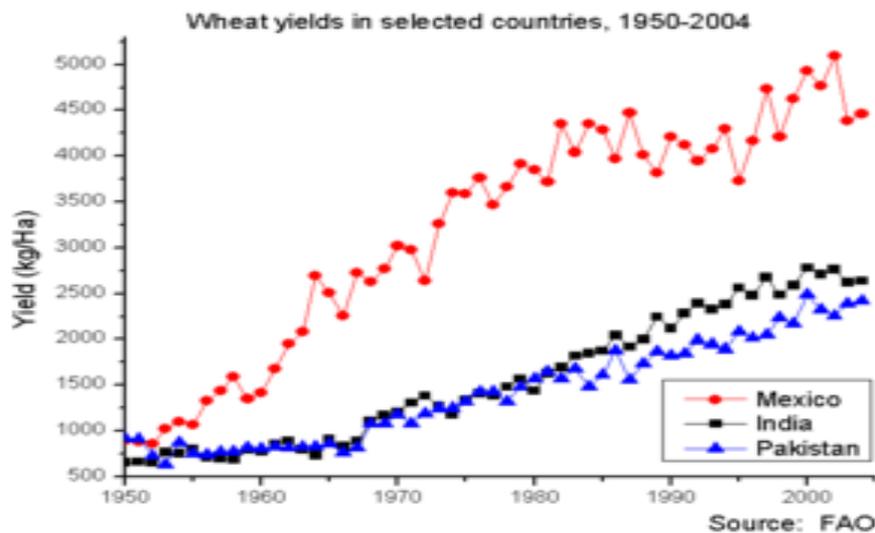


Figure 5.17. Wheat Yields in Mexico, India, Pakistan (1950-2000)

However, there is still a problem: India's population growth remained rapid as well after 1965. The population did not grow so rapidly that it literally and figuratively ate up all the gains in grain yields, but it did grow rapidly enough so that many of the agricultural gains, when measured in per capita terms, eventually diminished and by now have created a renewed food crisis in some parts of India and South Asia.

Figure 5.18 shows India's population growth. In 1950, India's population was about 400 million; India was already a huge and densely populated country. Yet by 2014, that population has roughly tripled. So while grain production has roughly increased fourfold, population has tripled, unfortunately undoing most of the gains in production per person.

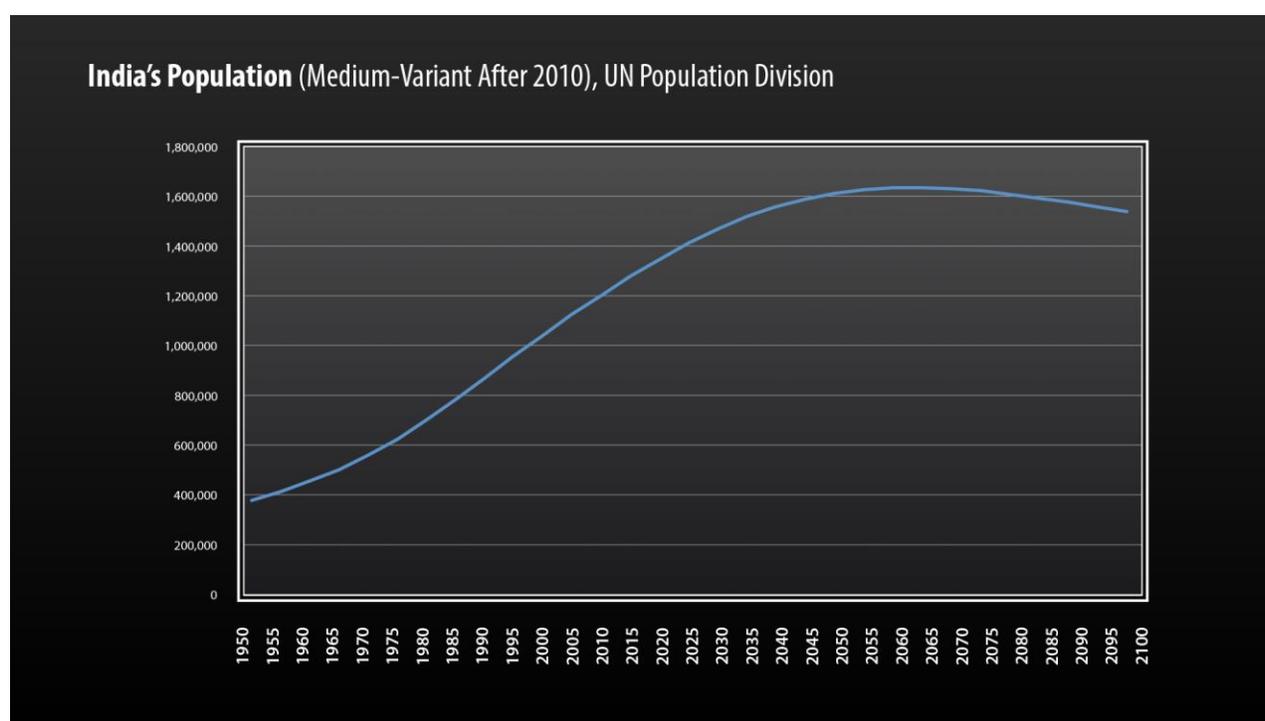


Figure 5.18. India's Population (Medium-Variant after 2010)

Figure 5.19 shows the feed grains per capita from the beginning of the 1950s to today. The curve was rather significantly rising up until around 1990. The spikes in the curve come from the fact that some years were favorable monsoon years while others were bad monsoon years, which strongly impacts the yields. Yet from the early 1990s onward, India's continued population increase meant that the increase of grain output per Indian essentially stopped. India is now actually producing less feed grain per person than it did 20 years ago.

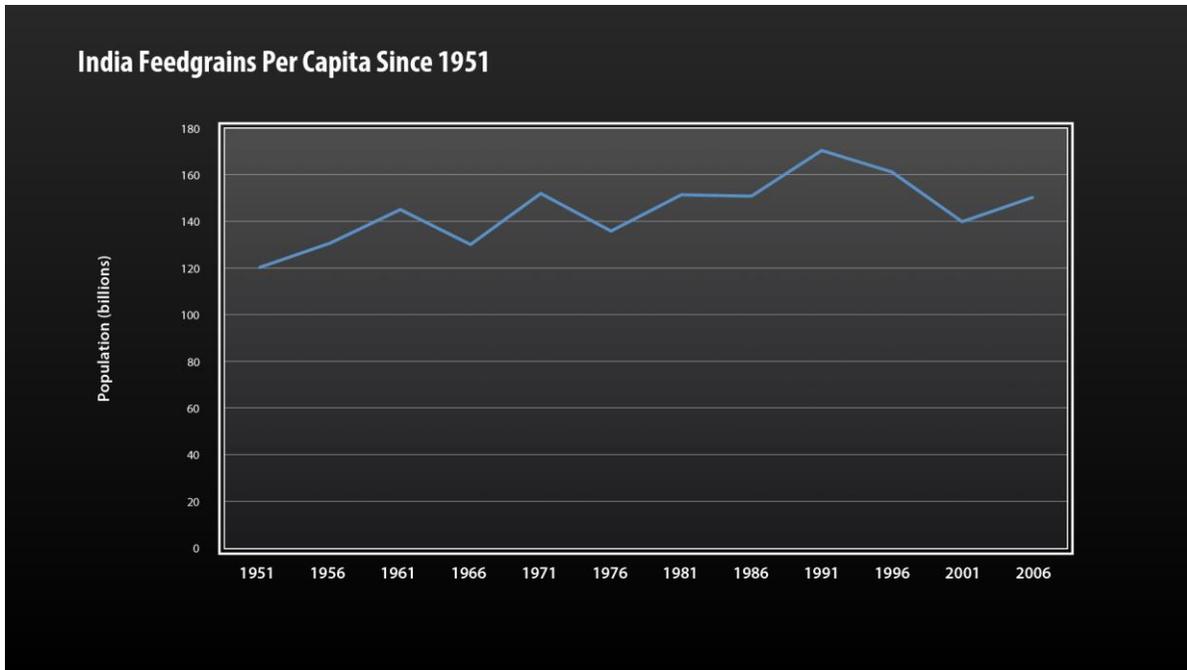


Figure 5.19. India's Feedgrains Per Capita (1951-2006)

The stagnation, even decline, of grain output per person has created a new round of troubling hunger issues and stresses in the Indian countryside. India's recent rapid economic development, while very real, is still burdened and held back by problems of hunger and poverty in the countryside. One stark condition, childhood stunting, exemplifies the problem. Childhood stunting is an indication of chronic under-nutrition of young children. When young children do not get the nutrients they need, they do not achieve their potential height for age. Stunting signifies a significant reduction of height for age relative to the potential of the population at each age. Figure 5.20 shows where childhood stunting is highest in the world today. As with extreme poverty, stunting is highest in tropical Africa and South Asia. India is the country with the largest number of stunted children. While there are many wondrous aspects of India's development – its rapid growth in information technology and manufacturing, its leadership in global engineering, and its potential to grow in the future – there remains the worry over food security and decent nutrition, especially among poor farmers.

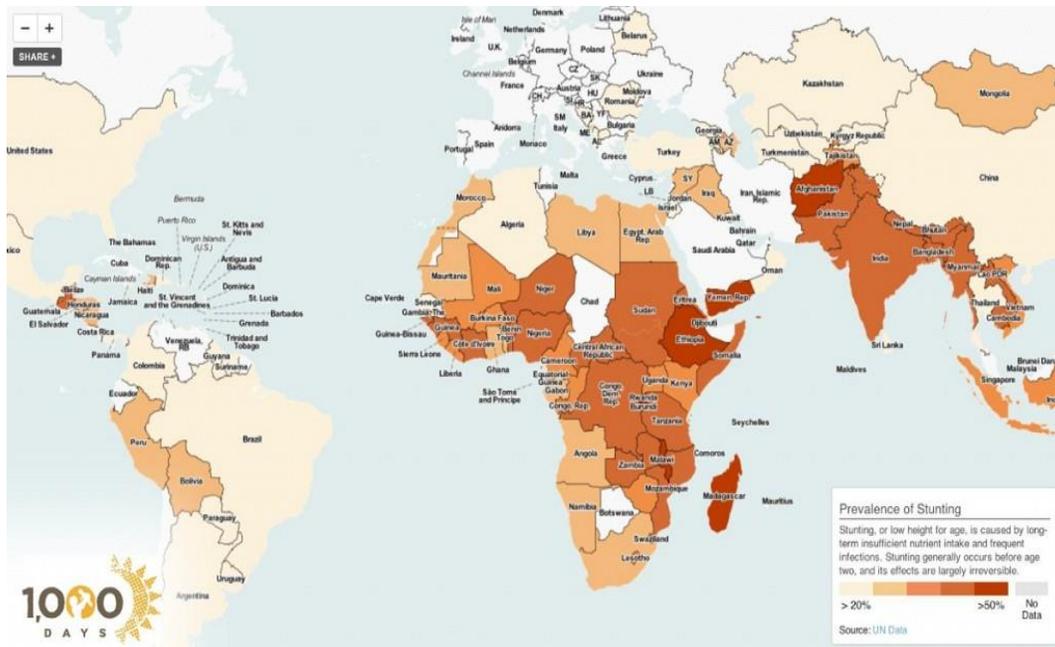


Figure 5.20. Global Prevalence of Stunting

It is also true to say, as M.S. Swaminathan has emphasized repeatedly in recent years, that India needs a *Second Green Revolution*. The Second Green Revolution would not be exactly like the first one. In view of the rising environmental threats faced by India and the world, the Second Green Revolution must emphasize not only crop yields (tons per hectare) but increased crop efficiency in the low use of water, fertilizers, and other inputs. The first Green Revolution used massive amounts of groundwater, but that groundwater is now close to depletion in many sites. The first Green Revolution called for a massive increase in fertilizer use, and some of that fertilizer has polluted India's rivers and coastlines. The first Green Revolution did not pay heed to long-term climate change, which was not yet recognized. The Second Green Revolution will need to develop crop varieties that are resilient to heat waves, droughts, floods, and other shocks that will rise in the future as part of the consequence of human-induced climate change.

India and South Asia also face the continuing challenge represented by MDG 3 on gender equality. In many traditional South Asian cultures, women face massive burdens. Many are not allowed to be in the labor force and are not allowed to own or inherit property. They may not be allowed to manage money. Girls are often left with insufficient nutrition, healthcare, and access even to basic education. The burdens of gender inequality are passed from mother to daughter. One of the recent breakthroughs in South Asia has been the empowerment of women and girls, but there are still major areas of discrimination to overcome.

One of the noteworthy ways that rural women have been empowered in recent decades has been through microfinance institutions, a new method of small-scale lending that is well adapted to the needs of impoverished rural women. The key innovations were pioneered in Bangladesh by two NGOs that are

now rightly world renowned, Grameen Bank (founded by Peace Prize Nobel Laureate Muhammad Yunus) and BRAC (founded by social entrepreneur and innovator Sir Fazle Hasan Abed).

Both NGOs pioneered women's empowerment in the villages through self-help groups, and undertook a massive expansion of microfinance through a group lending process. In "group lending," an entire group of women jointly guarantees the repayment of loans made to a single member of the group, thereby lowering the risk of default and enabling the loan to take place. Figure 5.21 shows a self-help group of BRAC in Bangladesh with women allocating the funds to the group members and managing the loan repayments. Each borrower might receive a few dozen dollars in a month, which provides working capital such as the inventory for a small retail shop or the inputs for a bakery. The repayment rates of Grameen and BRAC and other such microfinance providers have generally been very strong, except when the national economy has been hit by macro-scale shocks. Because of these successful results, both in managing small loans and in empowering rural women, microfinance has spread throughout the world as a powerful tool for grassroots empowerment, for gender equality, and income generation.



Figure 5.21. BRAC Women's Microfinance group

One of the notable features of female empowerment, sometimes in the context of the self-help groups, is that it has given young women the incentive to marry later and reduce their total fertility. A mother in the labor force who earns her own income knows through experience and through knowledge from her peers that having fewer children will not only enable her to spend more time at work to earn a higher income, but will also enable the household to invest more in each of her children so that they have a chance for a better life.

Bangladesh has seen a significant decline of the fertility rate, as shown in Figure 5.22. Back at the time of independence in 1971, Bangladesh's total fertility rate was around seven. For every 1,000 women there would be 7,000 children, of whom 3,500 would be girls. In one generation, therefore, every 1,000 mothers would be raising 3,500 future mothers, signifying a dramatic expansion in population from one generation to the next. Yet through the movement for women's empowerment – backed by microfinance, expanded educational opportunities, and less onerous cultural and legal barriers for

women – the total fertility rate began to decline very rapidly on a voluntary basis. By now, the TFR is at the so-called replacement level of two. Each woman, on average, has two children, and therefore one daughter. Each woman, on average, replaces herself with a daughter in the next generation. Over time, the population will tend to stabilize, thereby improving the overall prospects for economic development.

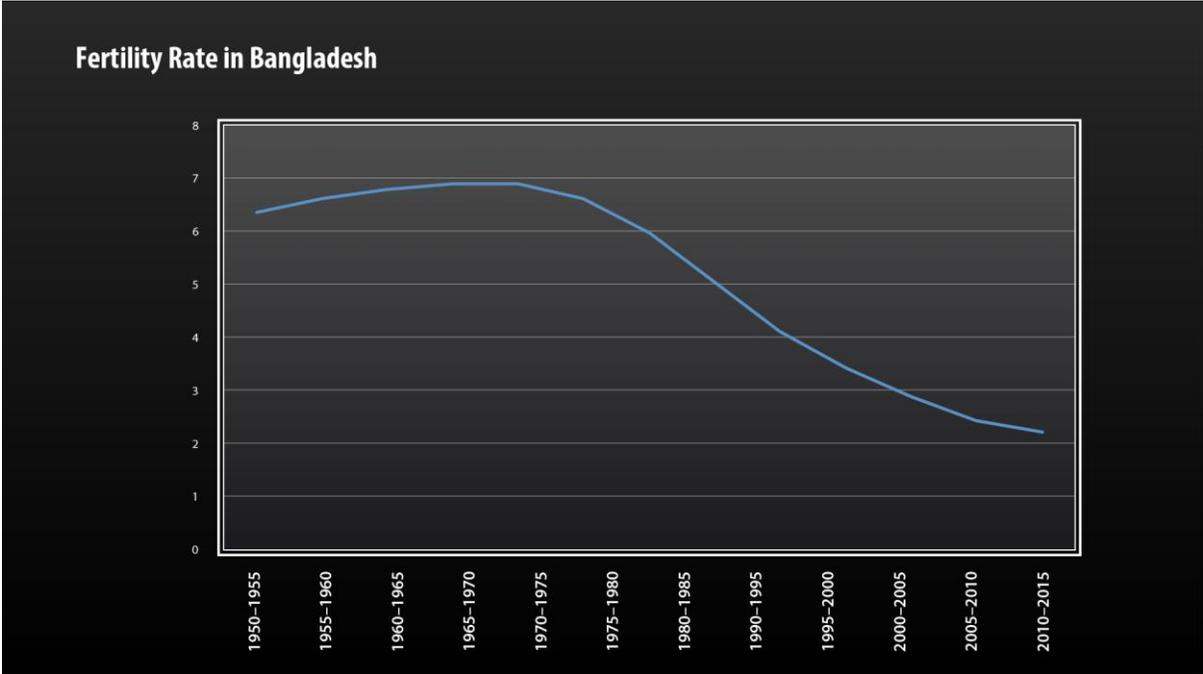


Figure 5.22. Total Fertility Rate in Bangladesh (1950-2015)

South Asia, like sub-Saharan Africa, therefore has the end of extreme poverty within reach. But South Asia will require major efforts to achieve another Green Revolution, as well as focused investments in infrastructure, and in the empowerment of girls and women to complete the demographic transition and to raise the skill levels of the population. By mobilizing its great skills in information technology and other areas of high-tech knowledge, India is especially well poised to achieve a sustainable development breakthrough. It will need leadership and good governance for success.

IV. A Closer Look at Official Development Assistance

Our differential diagnoses of sub-Saharan Africa and South Asia have shown how targeted investments in agriculture, health, education, infrastructure, and women’s empowerment can help these regions to free themselves from the ancient scourges of extreme poverty. I have often described these targeted investments as getting onto the “first rung of the development ladder.” By that I mean that key investments in basic education, health, infrastructure and farming can enable a poor household, or indeed a poor region, to earn enough added income and garner enough wealth to be able to finance the next stage of development. By getting on the first rung of the ladder, the household (or region) is able

to ascend to the second rung, then the third rung, and so forth, thereby enjoying self-sustaining growth that eventually will lead to the end of extreme poverty.

The problem with the poverty trap, however, is that a country may be too poor to get on the ladder by itself. The country's leaders may be visionary; they may have an excellent idea of how to carry out the needed investments. Yet they simply lack the cash flow – whether out of government revenues or new borrowing – to do so. In short, the impoverished country (and the individual impoverished households within it) needs a “hand up” to get onto the development ladder. This is the main argument for foreign development assistance.

The idea of Official Development Assistance (ODA), meaning development aid from governments or international agencies, has been around since just after World War II, when the US launched the famous Marshall Plan to help postwar Europe to rebuild and recover after the devastation of the war. The Marshall Plan offered a temporary injection of funds, given mostly not as a loan but as a grant, to help jumpstart a renewal of economic life and self-sustaining growth. The Marshall Plan lasted for about four years, from 1948-1952, and did wonders in helping Western Europe to get back on its feet. It provided an inspiration for a growing system of grants and low-interest loans not only for postwar reconstruction, but for jump-starting long-term economic growth, for example in the poor, newly independent countries of Africa and Asia.

It is important to understand that from the very start, few people advocated the use of ODA as a long-term way of life. Advocates of foreign assistance, including myself, believe that aid is a *temporary* measure to help a poor country make the crucial early investments needed so that the economy can soon stand on its own and begin climbing the development ladder. Aid is not a permanent need or solution. Countries that receive aid can reach a level of income through economic growth whereby they soon “graduate” from the need for aid entirely. Roughly speaking, graduation from aid can occur when a country passes from low-income to middle-income status. This occurs at a GDP per capita of around \$1,200 per year (measured at the market exchange rate), or roughly \$3,000 per person per year when GDP is measured at international (PPP) prices.

Official Development Aid became a basic pillar of the global community around 1970. A Commission on International Development headed by a former Prime Minister of Canada and Nobel Peace Prize laureate, Lester Pearson, recommended a global commitment to ODA. The Commission's report, *Partners in Development*, called on high-income countries to become donors to poor countries. The report suggested that the high-income countries donate around 1 percent of their GDP to help the low-income countries to overcome poverty. Of that 1 percent of national income, around two-thirds, specifically 0.7 percent of national income, should come through official channels, mainly government-to-government grants and low-interest loans. The remaining 0.3 percent of GDP should come through private contributions, mainly from corporations, foundations, individual philanthropists, and charitable organizations. Based on this Commission report, the United Nations General Assembly in 1971 formally adopted the goal that high-income countries should provide 0.7 percent of their national income in Official Development Assistance.

Consider the United States, today a \$16-trillion dollar economy. The 0.7 percent of GDP standard would lead to ODA equal to \$112 billion dollars of ODA each year. Alas, the United States is not close to that standard. The official development assistance given by the United States is around \$30 billion dollars per year, closer to 0.18 of 1 percent of the US national income, and therefore less than one-third of the international standard.

Figure 5.23 shows the official development assistance given by high-income countries. Only five countries among the donors typically reach the targeted threshold of 0.7 percent of national income: Sweden, Norway, Denmark, Luxembourg, and the Netherlands. Sweden and Luxembourg indeed are at 1 percent of national income. At the other end of the spectrum are countries that give quite low proportions of national income, including the United States. Since the US is such a large economy, it still gives a lot of money in absolute terms, and indeed is the largest single donor.

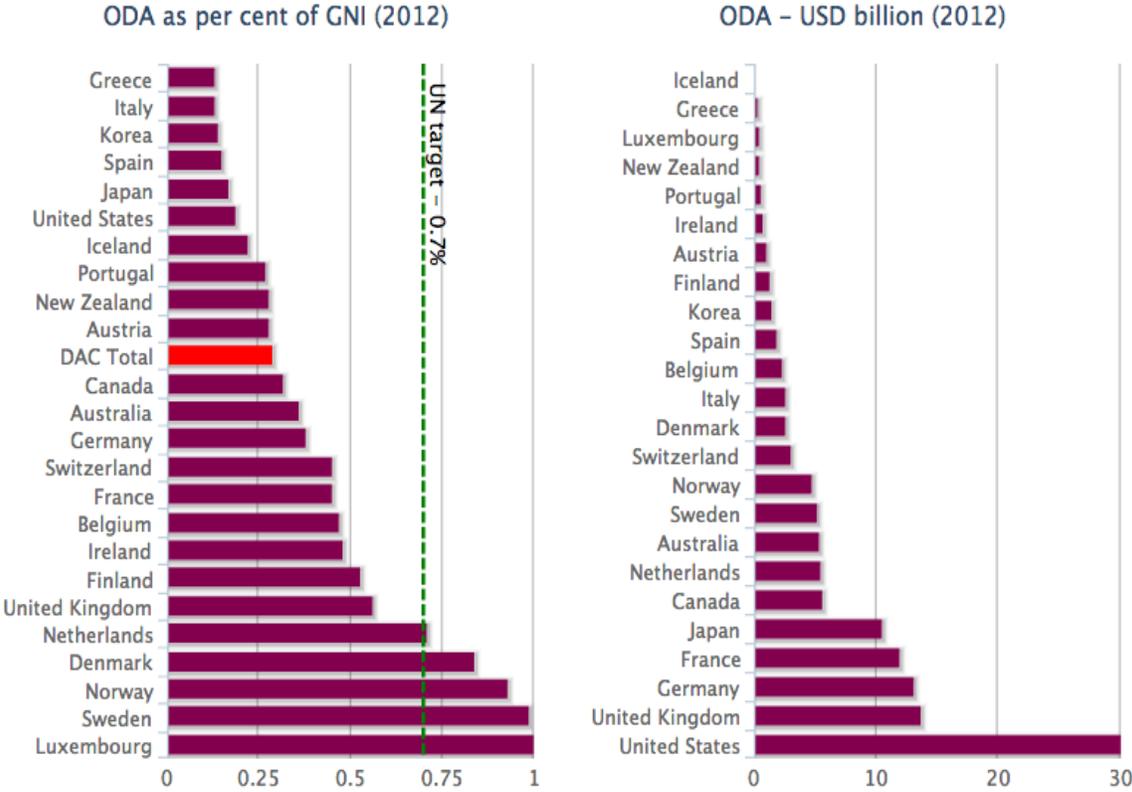


Figure 5.23. Official Development Assistance (2012)

The combined income of the donor countries is around \$40 trillion per year. At the official aid target level of 0.7 percent of national income, total donor aid for the poor countries would be about \$280 billion dollars per year of aid. In fact, the aid is around \$120 billion per year, or just 0.3 percent of Gross National Income. What kind of spending does the ODA support? Official development assistance has to

fit the following criteria. First, the money must go to poor countries. Second, the money must be provided by an official agency of the donor country. Third, the money has to be used for economic development in the recipient country. It cannot be used, for example, for arms sales, or to support troops, sports games or cultural events.

There is another important distinction to make between types of aid. Aid given as emergency relief, for instance food aid in the middle of a famine, is called humanitarian relief. Similarly, emergency help after a natural disaster is also counted as aid, but it typically it will save lives rather than promote long-term development. The kind of development aid that can help a country make a breakthrough out of poverty is something quite different. The most effective kinds of development assistance build capital – such as paved roads, an expanded power grid, and more clinics and schools – or capacity, such as training and salaries for teachers and health workers, or social investments such as health care delivery.

There is a lot of confusion about whether aid works or not, because not all aid is the same. If a donor agency rather cynically gives boxes of cash to warlords because they think that such bribes will be good for a war effort, or gives money to governments for corrupt reasons (such as to secure an arms deal), then such “donations” may be called aid but will do nothing to foster economic development. The kind of official development assistance that works for long-term development and poverty reduction is used to support investments in the critical areas I have discussed in this chapter. When *that* kind of aid is given, the evidence is very strong that it can have a large and important effect. Make no mistake about it – aid that is poorly directed or used can be wasted. But aid that is well targeted to urgent needs can be crucial to help countries achieve the MDGs and to get on to the ladder of economic development.

During the MDG period, the most effective scale-up of ODA was in the area of public health. After the year 2000, there was a major increase of ODA for health. That increased assistance played an enormous role in helping poor countries to control AIDS, malaria, and tuberculosis, and in helping to ensure that mothers are safe in childbirth and newborns can survive the difficult first days of life. That kind of aid helps to ensure that young children get adequate nutrition and are protected against childhood scourges for which vaccines exist. That kind of aid can help to ensure that children can attend school, and thereby reach their full individual potential. We have already noted the big breakthroughs that have come after the year 2000 in lower mortality rates of children and of mothers during pregnancy and childbirth. We have already noted the large gains in fighting AIDS and malaria. We have seen the increased economic growth of sub-Saharan Africa. In all of those cases, ODA played a positive role alongside other factors.

Official development assistance, in other words, can make a huge difference when it is operated for the real purpose of development and on a professional basis grounded in an accurate differential diagnosis of the needs of a low-income country. ODA can be the difference between success and failure in breaking free of the poverty trap. It comes at very low cost, less than 1 percent of the national income of the donor countries. If the rich world makes that effort, and if the funds are well used, they indeed can help to ensure that we are the generation that ends extreme poverty.

V. Designing Practical Interventions—The Case of the Millennium Villages

After you as a clinical development specialist have made the correct differential diagnosis; mobilized the development aid; and understood the key concepts of targeted investments in basic needs; then the real-life problem of implementation of development programs becomes the key. Real-life implementation of targeted investments is a major operational challenge. When the MDGs were first enunciated and I was asked by then-UN Secretary General Kofi Annan to advise the UN system on how the MDGs could be achieved, I called on colleagues and professionals from around the world to suggest the most effective approaches for implementing the needed investments, in a four-year project called the UN Millennium Project (2002-6).

The expert advice came from many different disciplines: agronomy, education, public health, urban and rural engineering, and community development, among others. In 2005, the UN Millennium Project presented a long synthesis report (*Investing in Development: A Practical Approach to Achieve the MDGs*) and many supporting volumes of detailed information to the member states of the UN. In a special session of the General Assembly in the fall of 2005, the UN member states adopted a number of the key ideas on how to proceed in a practical way to achieve the Millennium Development Goals.

My colleagues and I then undertook to implement these ideas in a few selected places in rural Africa, to learn how our recommendations could best work on the ground. That is how the 10-year Millennium Villages Project (MVP) got started. The recommendations from the UN Millennium Project became the basis for village-level work in 10 countries across sub-Saharan Africa. The goal was to demonstrate pathways to achieve the MDGs.

The map in Figure 5.24 shows the locations of the Millennium Villages. It also shows Africa in a brightly colored depiction, based on the distinctive farm systems in Africa. The yellow areas along the east coast of Africa, for example, covering parts of Kenya, Tanzania, and Malawi, are maize producing regions. The beige area of Northern Ethiopia is a highland region where the main staple crop is a grain called teff, which is used for wonderful bread traditional in the Ethiopian diet but not widely known in the rest of the world. The brown shaded region stretching east to west from West Africa are regions of cereal crop production in dry regions. And the orange area just above it, known as the Sahel, is an even drier region of crops mixed with pastoralist livestock management.

Millennium Villages

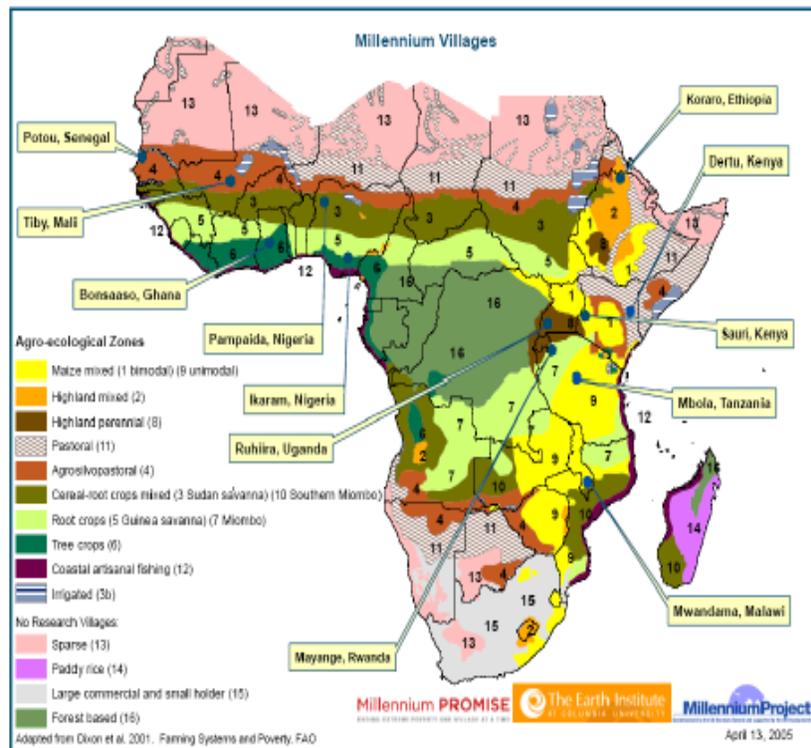


Figure 5.24. Millennium Villages and Africa's Agro-ecological Zones

We wanted to see how the Millennium Development Goals could be approached in each of these distinctive “agro-ecological zones,” because each eco-zone poses specific challenges. How can farmers best grow each type of crop? How can pastoralists best manage their livestock, especially in the face of repeated droughts? The disease burdens are also quite different across these eco-zones. In the highlands, for example, malaria is not a crushing problem, while in the tropical lowlands, malaria can be holoendemic, meaning that it infects just about everybody year round unless it is brought under control. With the help of the host governments, in 2005-06, the Millennium Villages Project identified 10 very poor rural villages as the base of the project. Each of these Millennium Villages was initially a “hunger hotspot,” meaning that there was chronic undernourishment of at least 20 percent of the population. In other words, not only were the villages in poor countries; they were also very poor parts of these poor countries. The idea was to use all the eight Millennium Development Goals as the guiding principle to promote the long-term development of these villages.

Applying the MDGs meant designing programs to achieve all eight of the MDG goals. There are two big reasons for that holistic approach. One is that each of the eight MDGs is meritorious in its own right. But another reason for the holistic approach is that the goals are synergistic. Providing safe water in a community can not only rid the community of part of the disease burden, but also can help the children

be healthy enough to go to school. Similarly, fighting malaria not only protects the lives of the community, but also helps protect its productivity. Malaria control helps to ensure that people are not sick when it is planting or harvest season, and that the children are not too sick to go to school. Not only do we want to achieve the eight Millennium Development Goals because they are each important, but because achieving each of the MDGs helps to achieve the others as well.

The Millennium Villages Project used development assistance of \$60 per person per year during the first five years of the project (roughly 2006-2010). The local government and local NGO partners provided an additional \$60 or so. Total spending therefore amounted to around \$120 dollars per villager per year to address the MDG challenges. This development assistance made it possible to build schools, clinics, water points, road, power grids, and other infrastructure. The project has shown that even a very small amount of money, if properly directed and based on a proper differential diagnosis, can have a big impact in improving health, education, and infrastructure. The holistic approach seems to be working, though the final evaluation of the project will take place in 2015 and 2016, at the conclusion of the MDG period.

One of the most exciting developments in the Millennium Villages has been the development of the local health system. We are witnessing a major improvement in public health, including sharp reductions in child and maternal mortality. The project has helped to spur innovations in healthcare delivery, for example by empowering Community Health Workers (CHWs) to reach even the poorest households in the villages.

The new CHW system is one of my own favorite developments of the Millennium Villages Project. People from the poor communities are becoming effective guardians of their own good health. A Community Health Worker is typically a young woman from the community, maybe with 10-12 years of schooling in total. They have no medical degree or nursing degree. Yet with a little bit of training over a few months, the local worker with a backpack with the right kinds of medical supplies can transform, improve, and save lives of their community.

Each CHW carries in the backpack the tools to fight malaria. First, they will have a rapid diagnostic test to test for malaria with just a drop of blood from the child. There is no longer the need to get to a laboratory at a clinic many kilometers away. Second, they will have the necessary medicines to fight malaria if the diagnostic test comes back positive. Again, the parent does not have to carry the very sick and feverish child to a clinic, but rather the CHW can effectively treat the child at home. Third, the CHW will have a mobile phone. It will be possible to call an ambulance, or to call the clinic for advice from the nurse or doctor on duty. More and more, these smartphones are also being programmed with expert information systems to receive needed advice and information automatically by phone and to track information about the patient.



Figure 5.25. CHW with a Backpack of Supplies

I am happy to say that the Millennium Villages have already inspired many of the host governments to scale up large national programs in malaria control, AIDS treatment, help for smallholder farmers, and electrification with off-grid solar based systems. Many other innovations have been tested, demonstrated and pioneered in the Millennium Villages. The successful projects are now spreading. The project began in 10 countries, but has already expanded to more than 20 countries. Many of the ideas tested in the individual villages are now applied countrywide. It is very exciting to see this kind of progress on the ground. It is especially thrilling to see what is now possible through improved technologies: information systems that work at very low cost for better health, for better education, and for improved access to infrastructure. These are the technological and systems advances that encourage us to envision the end of extreme poverty in this generation.