The nearly simultaneous arrival of China and India to places of prominence on the world stage represents a tectonic shift in global affairs with few parallels. These two giants, with 40 percent of the world’s people between them—as much as the populations of the next 20 largest countries combined—have long slumbered in the shadows of Europe, Japan, and the United States, which dominated world affairs during most of the nineteenth and twentieth centuries.¹

No longer! From the price of steel in Hamburg to the quality of software in Silicon Valley or the balance of power in Khartoum, the emergence of China and India is being felt around the world. While commentators have compared their rise to the end of the cold war, the more apt analogies are less recent: civilization-changing events such as the rise of the Roman Empire or the discovery of the New World. And even those are pale historical comparisons since they touched only a fraction of the human populations of their day.

The pace of economic change in China and India is breathtaking. Since embarking on economic reforms two decades ago, China’s economy has averaged a remarkable 9.5 percent growth rate, doubling in the last decade alone. The evidence of growth is everywhere, from the construction cranes dotting urban skylines to the home appliances that are fast becoming ubiquitous. India’s economic transformation is at an earlier stage, with income of roughly $2,500 per person, compared with $4,600 in China. But India’s economy is accelerating. Deutsche Bank in Germany projects economic reforms and a growing work force will lead India to overtake China as the world’s fastest-growing major economy over the next 15 years.²

China and India are on the verge of becoming far more than economic powers, however. These two countries are now also planetary powers that are shaping the global biosphere and are therefore central to

¹ Units of measure throughout this book are metric unless common usage dictates otherwise.
whether the world succeeds in building a healthy, prosperous, environmentally sustainable future for the next generation. As China and India become world-class economies, they are set to join already industrialized nations as major consumers of resources and polluters of local and global ecosystems. And while the largest burden of these developments will fall on China and India themselves, the global impact is clear.

Over the past two years, the world has seen a preview of this future. Soaring prices for oil and other commodities symbolize the strains being added to the world’s resource base—on top of the still-growing resource needs of already industrialized countries. Even the world’s poorest nations are being affected by the rise of India and China—as seen recently in riots over rising oil prices in Indonesia, growing pressure on Africa’s forests and fisheries, booming export markets in soybeans and mineral ores from South America, and the loss of low-skilled manufacturing jobs in Central America and Southeast Asia.

Global ecosystems and resources are simply not sufficient to sustain the current economies of the industrial West and at the same time bring more than 2 billion people into the global middle class through the same resource-intensive development model pioneered by North America and Europe. Limits on the ability to increase oil production, shortages of fresh water, and the economic impacts of damaged ecosystems and rapid climate change are among the factors that make it impossible to continue current patterns on such a vastly larger scale. Humanity is now on a collision course with the world’s ecosystems and resources. In the coming decades, we will either find ways of meeting human needs based on new technologies, policies, and cultural values, or the global economy will begin to collapse.

The New World Order

When the captains of the oil industry gathered in Johannesburg in September 2005 for the World Petroleum Congress, the largest, most prominent exhibition spaces were not occupied by ExxonMobil or Royal Dutch Shell. Instead, the massive, gleaming red pavilions that impressed visitors were those of three Chinese oil companies, one of which had grabbed world attention just a few months earlier with its attempted acquisition of a rival U.S. oil company. And it’s not just old traditional industries that are being shaken up these days. A year earlier, at the annual gathering of the American Wind Energy Association in Chicago, General Electric’s huge exhibition space was nearly overwhelmed by that of Suzlon, an Indian wind company that many delegates had never heard of.

With their very different histories, cultures, and political systems, India and China are following two distinct development paths—but ones that increasingly intersect, often compete, sometimes cooperate, and in many cases learn from the other’s successes and failures. The result is economic change compounded, with effects that are felt around the world.

Consider, for example, the southern Indian city of Bangalore, widely seen as the epicenter of India’s economic transformation. Bangalore is now a hub of the global information economy, with young, well-educated Indians operating call centers for multinational corporations, running the internal operations of those companies, and designing sophisticated software needed to run so many features of today’s global economy. In a country in which human misery has long been one of the most distinctive features, today’s Bangalore presents a sharply contrasting image—an extension of Silicon Valley, with glass and steel office towers in the Indian sub-tropics.
Bangalore’s emergence was led by U.S.-based companies and their expatriate Indian executives. But today Indian companies are developing their own ultra-competitive business models, taking advantage of relatively low Indian wages, the country’s widespread use of English, the large pool of scientific and engineering talent, and a time difference that lets Indian companies offer California-based firms the ability to develop software 24 hours a day. And India’s high-tech miracle is still gathering momentum. Increasingly, Indian technology is at the cutting edge—not only “cheaper” than western models, but better as well.⁵

China’s economic success has been built on its booming manufacturing sector—from the simplest garments to some of the world’s most sophisticated electronic equipment. Over the past decade, most of the world’s multinational manufacturing companies have relocated portions of their businesses to China to cut costs. With a massive pool of laborers continually streaming into China’s east coast cities, low wages are a powerful magnet. But the skills and discipline of these workers are at least as important, as are the quality of the infrastructure and the sheer scale of operations possible in China. Some 80 percent of the companies in Wal-Mart’s database of suppliers are now Chinese; as recently as the mid-1990s, only 6 percent of Wal-Mart’s products came from outside the United States.⁶

Consumers in many countries are benefitting from low-cost Chinese production, which has helped keep inflation nearly nonexistent as the global economy has picked up steam in recent years. And though it may seem as if China is little more than a workshop for U.S. and Japanese multinationals, that is at best a passing phase of the country’s economic emergence. One sign of the times was Chinese computer company Lenovo’s purchase of IBM’s personal computer division and its globally branded “think pad” laptops in 2005. Another is the fact that in the last year, China’s large trade deficit with Germany suddenly disappeared and will soon be replaced with an even larger surplus. The reason: China had been buying machine tools and other high-tech manufacturing equipment from Germany, but as these devices start operating, China is now producing and exporting a range of sophisticated products to German and other markets.⁷

In 2005, China used 26 percent of the world’s crude steel, 32 percent of the rice, 37 percent of the cotton, and 47 percent of the cement.

China is also starting to build one of the world’s largest automobile industries. Annual production rose from 320,000 in 1995 to 2.6 million in 2005, and China could overtake Japan and the United States, which each produce about 8 million cars annually, to become the world’s largest auto producer by 2015. Although many of China’s cars are made by Volkswagen, General Motors, and other multinationals, numerous domestic car companies have also emerged, and analysts believe that it is just a matter of time before this country becomes a major automobile exporter. China already leads the world in a far more recent consumer device. By 2005, China had over 350 million mobile phone subscribers, up from just 7 million in 1996 and double the number in the United States.⁸

China’s manufacturing-based economy has helped turn it into a world-class consumer. In 2005, China used 26 percent of the world’s crude steel, 32 percent of the rice, 37 percent of the cotton, and 47 percent of the cement. Some of those raw materials are going into products that are exported to
other parts of the world, but a good deal is going into building Chinese infrastructure—the factories, roads, and buildings that are transforming the landscape. Only U.S. consumption has a larger impact on the environmental and social health of the planet, and China is gaining rapidly on that record, as its resource consumption entered a period of hyper-growth beginning in 2001.9

The economic successes of China and India are based not on the richness of their natural resources, which are modest in per capita terms, but on decades of investment in their people—particularly at the upper end of the educational spectrum. Both have top-flight universities, which between them graduate a half-million scientists and engineers each year, compared with 60,000 in the United States. India now has 2.4 million young finance and accounting professionals, compared with fewer than 1.8 million in the United States, and China has 1.7 million recent engineering graduates, compared with 700,000 in the United States.10

The economic successes of China and India are based not on the richness of their natural resources but on decades of investment in their people.

These trends have given the two countries the fastest-growing middle classes in the world and have allowed them to lift hundreds of millions of people out of poverty in the past two decades. It is a remarkable achievement that the share of their populations living on less than $1 a day—the semi-official definition of extreme poverty—fell from two-thirds in China and over half in India in 1980 to 17 percent and 35 percent respectively in 2001.11

Yet this still leaves large numbers of disadvantaged people. According to the U.N. Development Programme's Human Development Index, which rates countries based on indicators such as life expectancy and adult literacy, China now ranks eighty-fifth among 177 nations while India is one hundred and twenty-seventh. (See Table 1-1.) Far from the gleaming towers of Bangalore and Shanghai, some 800 million Indians and 600 million Chinese still live on less than $2 a day. Amid growing economic inequality, an estimated 140 million Chinese are malnourished, while in India, 250 million people suffer from malnutrition. In contrast to the PhD's emerging from their world-class universities, the average Chinese adult has had just six years of schooling, and the average Indian just five. On average, girls get a year less schooling in each country than boys do.12

Nearly two thirds of Indians and Chinese still live in rural areas with per capita incomes averaging less than $1,000 per year. But both countries are experiencing some of the most rapid rural-to-urban migrations in history. India already has 35 cities with populations over 1 million, and that number is projected to reach 70 by 2026.13

Greater Delhi and Mumbai (formerly Bombay) already have populations of 30 million each—a combined total that equals that of the United Kingdom. In China, 45 cities already have more than a million residents.14

This unprecedented mass movement of people is causing enormous social strains in both countries, not to mention the need for massive infrastructure investments. China has attempted to stem the flow by controlling city residency permits while encouraging the creation of village and township enterprises to create jobs in the countryside. Today, urban slums are surprisingly rare in China; in contrast, large areas of Indian cities such as Calcutta have long been known for their horrific living conditions. In October 2005, the Central Committee of
China’s Communist Party recognized growing inequity as the country’s central economic problem, and issued a statement calling on the country to “pay more attention to social fairness.”

The economic “miracles” of China and India are also clouded by some of the world’s most severe environmental problems, which are already taking a large toll on the countries’ human and ecological health. China, for example, has just 8 percent of the world’s fresh water to meet the needs of 22 percent of the world’s population—and virtually the entire northern half of the country is drying out. Extreme pollution exacerbates water scarcity by rendering some water virtually useless. Of the 412 sites on China’s seven main rivers that were monitored for water quality in 2004, 58 percent were found to be too dirty for human consumption. In India, only about 10 percent of sewage is treated, and both urban and industrial pollutants are commonly dumped directly into waterways. “Many rivers—even larger ones—have turned into fetid sewers,” according to a recent World Bank report. Emissions from textile factories in the Noyyal basin of Tamil Nadu in India have created a “dead river” whose water is so contaminated that nearly 4,500 hectares of irrigated area are now unproductive.

The quality of the air in the major cities of China and India is another casualty of rapid growth and dependence on coal. In Beijing, nearby mountains are rarely seen these days, and flight delays due to air pollution are not uncommon. Of the 20 cities worldwide with the most polluted air, 16 are in China. Some 200 Chinese cities are estimated by the State Environmental Protection Administration to fall short of World Health Organization standards for the airborne particulates that are responsible for many respiratory diseases. China’s air is also filled with sulfur dioxide, which has given it some of the world’s worst acid rain. An estimated 30 percent of China’s cropland is suffering from acidification, and the resulting damage to farms, forests, and human health is projected at $13 billion. In coming decades, the health and ecological burdens of polluted air are likely to grow steadily, as coal-fired air pollution is complemented by a growing brew of automotive emissions.

Rapid economic growth is increasing both countries’ environmental problems to the point that it has fueled the creation of hundreds of grassroots environmental organizations. (See Chapter 9.) In some cases, environmental concerns have led to violent confrontations with local officials. If not reversed, environmental deterioration threatens to become a major impediment to the economic development of China and India.
Choosing an Energy Future

China and India have gotten by with surprisingly spare energy systems so far. Their per capita use of modern liquid fuels and electricity are less than one tenth those found even in relatively frugal Japan. What these countries have relied on instead is direct combustion of large quantities of coal (see Table 1–2) and solid biomass such as fuelwood and agricultural wastes, both of which tend to be burned inefficiently and with large amounts of pollution. Coal alone provides more than two thirds of China’s energy and half of India’s.19

That common dependence gives the two energy systems many of the characteristics of nineteenth-century Great Britain. In large areas of China, coal briquettes are used for heating and cooking in homes and small businesses. This small-scale coal burning is inefficient and emits sulfur dioxide, particulates, and other dangerous pollutants directly at ground level. Moreover, many of China’s coal deposits, and most of India’s, are either high in ash or sulfur or have a low energy value, which heightens the environmental toll. Although both countries are expanding their use of coal, it is mainly for power generation. Coal is neither flexible enough nor clean enough to fully fuel a twenty-first century economy.

Even in terms of power generation, most of which is fueled by coal, China and India face growing challenges in generating sufficient electricity for their booming economies. In the summers of 2004 and 2005, China’s power demand exceeded supply, forcing electric grid managers to subject most of the country’s cities to rolling blackouts, disrupting home and office life and forcing factories to curtail operations. Many companies responded by buying inefficient diesel generators, adding further pressure to oil supplies.20

In India, where electricity use per person is less than half that in China—and where rural electricity use per capita is 75 percent lower still—peak demand exceeded supply by 12 percent in 2004. This imbalance has damaged the economy and forced Indian plant managers, like their Chinese counterparts, to install their own oil-fueled generators. Since 44 percent of Indian households are not connected to the electricity grid, the country’s State Electricity Boards—government-owned power companies—are under enormous pressure to expand their service. Part of the problem lies in the politically difficult challenge of reforming these state-

<table>
<thead>
<tr>
<th>Country or Region</th>
<th>Coal Use</th>
<th>Oil Use</th>
<th>Oil Use per Person</th>
<th>Net Oil Imports</th>
<th>Share of Oil Imported</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(million tons of oil equivalent)</td>
<td>(million barrels per day)</td>
<td>(barrels per year)</td>
<td>(million barrels per day)</td>
<td>(percent)</td>
</tr>
<tr>
<td>China</td>
<td>957</td>
<td>6.7</td>
<td>1.9</td>
<td>3.2</td>
<td>48</td>
</tr>
<tr>
<td>India</td>
<td>205</td>
<td>2.6</td>
<td>0.9</td>
<td>1.7</td>
<td>65</td>
</tr>
<tr>
<td>Germany</td>
<td>86</td>
<td>2.6</td>
<td>11.9</td>
<td>2.6</td>
<td>100</td>
</tr>
<tr>
<td>Japan</td>
<td>121</td>
<td>5.3</td>
<td>15.2</td>
<td>5.3</td>
<td>100</td>
</tr>
<tr>
<td>United States</td>
<td>564</td>
<td>20.5</td>
<td>25.3</td>
<td>13.3</td>
<td>65</td>
</tr>
</tbody>
</table>

SOURCE: See endnote 19.
owned monopolies and building more robust local distribution systems.21 Perhaps the biggest energy questions facing India and China are how much higher their coal use will go, and what other energy sources they will use to power their futures. (See Box 1–1.) The answers will have a big impact on the quality of life in China and India, but since these will almost certainly be the world’s two biggest markets for new energy technologies, their decisions will help set the twenty-first-century energy course for the world as a whole.22

Until recently, the direction was clear: toward oil, the world’s leading energy source and largest commodity market—widely available via supertanker for countries that do not have sufficient supplies at home. India’s consumption of oil has doubled since 1992—to 2.6 million barrels a day in 2004—while China’s has doubled since 1994, reaching 6.7 million barrels a day in 2004. As these fig-

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**BOX 1–1. CARBON DIOXIDE: THE LENGTHENING SHADOW OF COAL AND OIL**

Coal and oil are carbon-based fuels that are the major contributors to the 7.2 billion tons of carbon that were released to the atmosphere as a result of industrial activities worldwide in 2004. China is already the world’s second largest emitter of this climate-altering carbon at 1.0 billion tons annually or 14 percent of the world total, while India ranks fourth. (See Table.) Measured in per capita terms, China’s carbon emissions are still only one seventh the U.S. level, while India’s are one eighteenth as high.

Compared with Europe, Japan, and the United States, China and India have contributed far less to the heightened carbon dioxide concentrations now in the atmosphere. But their emissions have increased by 67 percent and 88 percent respectively since 1990, and their shares are projected to grow steadily in the decades to come, making it clear that no serious solution to the world’s climate problem is possible without their active participation.

Neither China nor India is covered by the greenhouse gas emissions restrictions included in the Kyoto Protocol. But with the international community now working on the next round of limits, pressure is mounting on these two nations—as well as on the United States—to limit their emissions. Some of that pressure is internal, since both countries are vulnerable to rising sea levels and the more violent weather fluctuations that are likely to accompany climate change.


<table>
<thead>
<tr>
<th>Country or Region</th>
<th>Carbon Emissions (million tons)</th>
<th>Carbon Emissions per Person (tons)</th>
<th>Carbon Emissions per Unit of GDP, PPP (tons per million dollars)</th>
<th>Increase in Carbon Emissions, 1990–2004 (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>1,021</td>
<td>0.8</td>
<td>158</td>
<td>+ 67</td>
</tr>
<tr>
<td>India</td>
<td>301</td>
<td>0.3</td>
<td>99</td>
<td>+ 88</td>
</tr>
<tr>
<td>Europe</td>
<td>955</td>
<td>2.5</td>
<td>94</td>
<td>+ 6</td>
</tr>
<tr>
<td>Japan</td>
<td>338</td>
<td>2.7</td>
<td>95</td>
<td>+ 23</td>
</tr>
<tr>
<td>United States</td>
<td>1,616</td>
<td>5.5</td>
<td>147</td>
<td>+ 19</td>
</tr>
</tbody>
</table>

**SOURCE:** See endnote 22.
ures suggest, India is not yet a major player in the world energy market, but China already is, having gone from near self-sufficiency in the mid-1990s to overtake Japan as the world's second largest oil importer—3.2 million barrels a day in 2004. (See Figure 1–1.) China's oil imports are still far behind those of the United States, but recent developments make it clear that China will have a huge impact on global oil markets in the decades ahead.23

These dramatic increases in oil consumption come at an awkward time, with global spare production and refining capacities both at near-record tight levels and prices skyrocketing to as high as $70 per barrel in 2005. In China, where office salaries average less than $300 per month, soaring gasoline prices have already cut into automobile sales. Ironically, many analysts have blamed soaring demand in China for the high oil prices, but this is at best part of the story. In past years, similar demand surges have not led to comparable price increases. Although many oil executives view these developments as temporary glitches that will soon be corrected by market forces, a growing number of analysts have concluded that world oil production is unlikely to rise for more than another decade and will probably decline gradually from then on.24

For countries that are just now entering the oil market in a big way, as well as for those that are already mass consumers, the prospect is a daunting one. Statistics reveal the challenge. China currently uses one fifteenth as much oil per person as the United States does, while India uses one thirtyieth as much. If over the next several decades both countries were to reach even half of U.S. levels of consumption—about the current level in Japan—they alone would be using 100 million barrels per day. In 2005, total global consumption was just 85 million barrels per day. That would imply total worldwide oil consumption in 2050 of well over 200 million barrels per day. Few geologists believe that output will reach even half those levels before beginning to decline.25

Growing dependence on oil presents clear economic and security risks for China and India. Already, much of the oil used in these two countries comes from the Middle East. Their governments have responded by directing their state-owned petroleum companies to invest heavily in distant corners of the world, from Siberia to Sudan. But the remaining unexplored regions

Figure 1–1. Oil Imports in China, India, and the United States, 1985–2004

Source: BP
are remote and frequently unstable. Moreover, the long distances the oil must travel to reach China or India introduces additional vulnerabilities, whether the oil travels in tankers owned by Indian companies or Panamanian ones.²⁶

China is sufficiently nervous about the security of these long shipping lanes—currently patrolled by the U.S. Navy—that it is making sizable investments in its own naval forces. Security experts recall with concern that it was Japan’s inability to secure its oil supply lines to Southeast Asia that was the final straw that led to Pearl Harbor and the entry of Japan and the United States into World War II. From a global perspective, the prospect of countries ranging from the United States and China to Japan and Saudi Arabia—together with many of the world’s terrorists—vying for physical control of the world’s oil does not sound like a prescription for global security.²⁷

One alternative to oil that is receiving attention from the Chinese and Indian governments is nuclear power. Defying the fact that the atom has lost favor in most industrial countries in recent decades and has yet to recover from a quarter-century recession, both nations have recently announced the most ambitious nuclear construction plans that the world has seen in decades. Up to 30 plants are planned in each country over the next two decades, which sounds impressive until you do the math. Even if their nuclear dreams are realized—which given recent international experience appears unlikely—neither country will be getting even 5 percent of its electricity or 2 percent of its total energy from nuclear power in 2020.²⁸

Renewable energy resources such as solar, wind, and biomass are far more practical energy options for China and India. Both countries have vast land areas that contain a large dispersed and diverse portfolio of renewable energy sources that are attracting foreign and domestic investment as well as political interest.

China’s National People’s Congress passed an ambitious renewable energy law in February 2005 that is slated to go into force in January 2006. Drawing on the successful policies adopted by governments from California to Germany, China’s new energy law stands a good chance of jumpstarting wind power, biofuels, and other new energy options. The country has already successfully pioneered the use of small wind turbines, hydro generators, and biogas plants for power generation in remote rural areas. And it has recently cornered the market on solar hot water for residential buildings, with 75 percent of total world capacity serving 35 million buildings, providing 10 percent of the country’s hot water.²⁹

India, too, has a long tradition of promoting the use of renewable energy, including its own rural biogas digesters and solar cells used to power village homes and workshops. More recently, India has built the world’s fourth largest wind power industry and the largest in the developing world. In an August 2005 Independence Day speech—just a month after the Prime Minister had sworn allegiance to nuclear power in a speech to the U.S. Congress—Indian President A. P. J. Abdul Kalam laid out the goal of increasing renewable energy’s share of India’s power generation from 5 percent to between 20 and 25 percent.³⁰

As the Indian president suggests, renewable energy, together with major investments in energy efficiency, could be a centerpiece of an energy system that is capable of fueling a twenty-first-century economy while minimizing domestic and global environmental burdens. The plans unfolding in these two nations may make them world leaders in renewable energy development within the
next 5–10 years—leapfrogging the twentieth-century energy systems that dominate the economies of today’s rich countries.

Turning to World Grain Markets

In contrast to their heavy dependence on foreign oil, China and India are largely self-sufficient in food today—and they are proud of this achievement. (See Figure 1–2.) Both have histories of devastating famines that no one wants to repeat. Since 1985, China has never imported more than 6 percent of the grain that it has consumed, while India has not imported more than 3 percent. (See Table 1–3.) But whether these two giants can avoid turning to world markets for grain—mainly wheat, rice, corn, and other foods that are the foundation of most societies’ diets—in the decades ahead is an open question that is of great importance to them and to the global community. The reason: the world grain market, like the market for oil, is now producing surpluses much less reliably than it did in the twentieth century.31

In part because the number of people on the planet is rising, and in part because the consumption of animal products is increasing, together with incomes, global demand for grains has grown steadily for decades. The average Chinese consumes twice as much grain directly or in the form of livestock products today as in 1980, although consumption appears to have plateaued in recent years. Demand could turn up again if the country’s prosperity spreads to its poorest citizens, a goal explicitly articulated by the Communist Party leadership in 2005. If extended prosperity were to double Chinese grain consumption per person to roughly the European level, the equivalent of nearly 40 percent of today’s global grain harvest would be needed in China. At the same time, some 350 million people in India were living on less than $1 per day in 2003, and virtually all of them will increase their food intake with even slightly higher incomes. The growing use of biofuels as a substitute for oil also is likely to increase demands on farmers in India, China, and around the globe. (See Chapter 4.)32

Recent trends suggest that grain production increases are becoming more difficult to achieve. Between 1996 and 2003, production was essentially flat—the longest string of mediocre harvests since 1960. The result is a growing gap between farm output and consumer demand in some countries, notably in China, where grain
Table 1-3. Grain Consumption in China, India, Europe, Japan, and the United States, 2005

<table>
<thead>
<tr>
<th>Country or Region</th>
<th>Grain Consumption (million tons)</th>
<th>Grain Consumption per Person (kilograms)</th>
<th>Share of Grain Consumption That Is Exported (+) or Imported (−) (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>381</td>
<td>292</td>
<td>+ 2</td>
</tr>
<tr>
<td>India</td>
<td>187</td>
<td>173</td>
<td>+ 4</td>
</tr>
<tr>
<td>Europe</td>
<td>256</td>
<td>561</td>
<td>+ 3</td>
</tr>
<tr>
<td>Japan</td>
<td>45</td>
<td>354</td>
<td>−50</td>
</tr>
<tr>
<td>United States</td>
<td>271</td>
<td>918</td>
<td>+31</td>
</tr>
</tbody>
</table>

SOURCE: See endnote 31.

consumption outpaced production every year between 2000 and 2005. As a result, the government has dug heavily into its once-massive grain reserves, and India has had to do the same. In fact, the world’s grain stocks fell rapidly in five of the six years between 1999 and 2005—the most serious deterioration of stocks since 1960. (See Figure 1–3.)

The situation may be temporary, given the topsy-turvy nature of crop harvests, which are highly contingent on the weather. In fact, farmers around the world in 2004 produced some 9.5 percent more grain than in 2003, ending seven years of sputtering production. Favorable weather is credited in part, but so are higher prices. The fact that farmers responded so quickly to economic incentives suggests that there is slack in the global food system, but taking up that slack may come at a price.

The record-breaking 2004 crop may not be sustainable, either environmentally, if farmers planted marginal lands to reap quick additional revenues, or economically, if markets or governments cannot maintain high crop prices for farmers indefinitely. And if producer prices remain high and this leads to higher prices at food markets, the poorest consumers could suffer and middle-class consumers could become disenchanted, a potentially volatile combination. High food prices, with their historical propensity to stoke political instability, are one of the wildcards that government leaders most fear. In sum, whether global grain production is nearing a peak remains an open question. But the signs of faltering output and the potential for sharp increases in demand appear to be serious enough that prudence argues for husbanding the world’s agricultural endowments.

One of the keys to the agricultural futures of China and India is their ability to preserve farmland. Grain area in the two countries is very small relative to their populations—just one-and-a-half basketball courts per person, or some 600 square meters in China and 650 in India, compared with about 1,900 square meters in the United States. With most available farmland already in cultivation, grain area per person will inevitably shrink as the populations of China and India increase and as cities grow ever larger. By 2025, assuming no more loss of today’s farmland—a big assumption—grain area per person will fall to 530 square meters in China and to 520 square meters in India simply due to population growth.

These small grain areas are barely enough to meet the countries’ domestic grain needs. Indeed, by historical standards, keeping grain imports to under 1 percent of consumption with such limited agricultural space is a major achievement. Japan and Taiwan were importing 20 percent of their grain when their per capita grain areas were roughly the size of those in China and India today. And when those areas were roughly the size projected for China and India in 2025, Taiwan was importing some 40 percent of its grain and Japan,
somewhat less. From the perspective of farm-
land availability alone, the pressures in China
and India to turn heavily to world markets for
grain in the future are likely to be intense.37

But other pressures loom as well. The
water situation in India was described by a
World Bank analyst in 2005 as “extremely
grave.” The introduction of small, inexpen-
sive pumps in the 1990s prompted the
drilling of some 21 million tubewells across
the country that have allowed farmers to
exploit groundwater far faster than was pos-
sible even a generation ago—and much faster
than the wells can be recharged by rainfall.
Tushaar Shah, a researcher at the Interna-
tional Water Management Institute, esti-
mates that Indian farmers pump out some
200 cubic kilometers of groundwater each
year—about one sixth of the country’s inter-
nal renewable water resources and only a
fraction of what is replaced by rainfall. Shah
estimates that a quarter or more of India’s
farms are irrigated from overpumped aquifers.
This unsustainable use, he notes, could affect
to the rapidly declining groundwater resources
in arid northern provinces, where most of
the wheat is grown. Consistent with this anal-
ysis, U.S. Department of Agriculture officials
note that farmers in the region without secure
access to groundwater are abandoning wheat
production because surface water supplies are
not reliable.39

Cities and industries are competing heav-
ily for water as well. In India, urban water
demand is expected to double, and industrial
demand to triple, by 2025. In China, where
agriculture’s share of water has fallen from 97
percent at independence in 1949 to only 67
percent today, farmers’ losses have already
affected production in some locales. Farmers
in a large irrigation district in Hubei, China,
for example, saw their share of water from the
district reservoir decline by roughly half
in a 31-percent reduction in irrigated rice
area in the district. Despite the ongoing diver-
sions to cities and industry, these sectors are
not getting enough water. China’s deputy
minister of construction said in 2005 that more than 100 of the country’s biggest cities could soon face a water crisis as they struggle to supply people and industry.\textsuperscript{40}

In addition, urbanization is devouring cropland. China’s intention to increase the number and size of cities as a way to combat rural poverty is likely to claim agricultural land, because cities are most economically established on the same flat, valley-bottom terrain that is prized by farmers. Since economic reforms that were put in place in 1979, China has been losing roughly a half-million hectares annually—about one third of 1 percent of its farmland. Over 25 years, this loss amounts to some 7 percent of the country’s agricultural area—a good deal of land for a nation pushing the boundaries of its food production capacity.\textsuperscript{41}

At the same time, cropland in China and India is becoming less productive because of erosion, waterlogging, desertification, and other forms of degradation. A groundbreaking 1997 study of land degradation in Asia found that 44 percent of the land in China and 50 percent of India’s land was degraded to at least a light degree because of human activities. Most of the harm was attributed to activities undertaken on farmland. If lightly degraded lands are eliminated from the analysis, the remaining, more seriously degraded area still amounted to 17 percent of the territory of China and 28 percent of India.\textsuperscript{42}

Land degradation, depleting aquifers, water pollution, and urban claims on land and water are thus all nibbling away at China’s and India’s agricultural foundations—and may soon make it impossible for them to meet their rapidly expanding food needs. Farmers in other countries may have limited capacity to help. If current trends in China and India continue, and if global stocks of grain continue to be drawn down, a year or two of poor harvests could be enough to bring higher prices to consumers. And because production shortfalls in China and India could drive prices higher on global markets, virtually the entire global community could be affected. All nations therefore have an interest in seeing that Chinese and Indian agriculture is productive and sustainable.

Ecological Capacity: Enough for Everyone?

Beyond possible limits to energy and food output, the global community will need to grapple with a more fundamental constraint: the ability of Earth’s ecological systems to support a continually growing global economy while absorbing the vast quantities of pollution it produces. As China and India add their surging consumption to that of the United States, Europe, and Japan, the most important question is this: Can the world’s ecosystems withstand the damage—the increase in carbon emissions, the loss of forests, the extinction of species—that are now in prospect?

The answer is no, according to the 2005 Millennium Ecosystem Assessment. This pioneering comprehensive examination of the health of the world’s ecosystems concluded that their ability to provide free ecological services, from erosion control to climate stabilization to flood control, has been seriously undermined—even as the world’s two most populous nations were just arriving at the center of the global economic stage.\textsuperscript{43}

In order to estimate the amount of “ecological space” currently occupied by humanity, both at the global and at national levels, environmental analyst Mathis Wackernagel has developed a concept known as an ecological footprint. Footprint analysis measures what an economy needs from nature: the inputs that fuel it and the wastes that emerge from it. It does so using a single metric—the
number of global hectares of land and water—which allows analysts to compare the ecological burdens created by various economies.44

This analysis shows whether a country is living within its ecological means by comparing a nation’s footprint to its biocapacity—its total area of biologically productive land. Where a nation’s footprint is larger than its biocapacity, its economy is consuming more forests, cropland, and other resources than the country can supply and is overtaxing the domestic environment’s capacity to absorb wastes. By importing resources and exporting wastes, particularly carbon dioxide, the United States, Europe, Japan, India, and China all live well beyond their ecological means, with footprints ranging from 200 percent to nearly 600 percent of their domestic biocapacities. (See Table 1–4.)45

Together, these four countries and the nations in the European Union claim some 75 percent of Earth’s biocapacity, effectively leaving just 25 percent for the rest of the world. This is possible in part because Africa and other poor areas are using only a fraction of their own biocapacities.46

To a large extent, the appetites of these countries and Europe are responsible for the doubling of the world’s ecological footprint since the 1960s. According to Wackernagel, the global footprint now exceeds global biocapacity by 20 percent, a gap that has grown steadily since the mid-1980s. (See Figure 1–4.) The world’s largest and most industrialized economies are essentially consuming their ecological capital by cutting forests faster than they can regenerate, pumping groundwater faster than it is recharged, and filling the atmosphere with carbon that cannot be safely absorbed.47

The unequal claims on biocapacity become clear when they are analyzed on a per person basis. (See Figure 1–5.) The average Indian or Chinese footprint is well under the world average of 2.3 global hectares. In contrast, the average Japanese and European each required roughly 4.5 global hectares to support their lifestyles. And the average American is in a separate league entirely, with a footprint of 9.7 global hectares.48

Footprints tend to grow larger as countries industrialize, but the bulk of footprint growth typically comes from a single source: the increase in area needed to absorb carbon dioxide. With per capita carbon emissions

<table>
<thead>
<tr>
<th>Country or Region</th>
<th>Total Footprint (million global hectares)¹</th>
<th>Footprint per Person (global hectares)¹</th>
<th>Footprint as Share of Country’s Biocapacity (percent)</th>
<th>Footprint as Share of Global Biocapacity (percent)</th>
<th>Growth in Footprint, 1992–2002 (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>2,049</td>
<td>1.6</td>
<td>201</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>India</td>
<td>784</td>
<td>0.8</td>
<td>210</td>
<td>7</td>
<td>17</td>
</tr>
<tr>
<td>Europe</td>
<td>2,164</td>
<td>4.7</td>
<td>207</td>
<td>19</td>
<td>14</td>
</tr>
<tr>
<td>Japan</td>
<td>544</td>
<td>4.8</td>
<td>569</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>United States</td>
<td>2,810</td>
<td>9.7</td>
<td>205</td>
<td>25</td>
<td>21</td>
</tr>
</tbody>
</table>

¹ Global hectares are the area of biologically productive space (land or water with significant photosynthetic activity and biomass accumulation) with world-average productivity.

SOURCE: See endnote 45.

16
still modest compared with Japan and the western industrial nations, the carbon component of China and India’s footprints is likely to grow dramatically. In fact, once China’s footprint is updated to reflect 2005 rather than 2002 figures, it could be at least 20 percent larger, given the more than 40 percent rise in coal use since 2002. The rise in carbon emissions is a troubling prospect for countries already buffeted by the more powerful storms and higher sea levels associated with carbon-driven climate change.49

Growth in the lower-profile components of the Chinese and Indian footprints could have a substantial ecological impact as well. Timberland, for example—the forested area that supplies each country’s wood and paper—accounted for less than 5 percent of the total footprints per person in China and India in 2002. But if wood and paper use in Japan, Europe, and the United States is any guide, average Indian and Chinese usage could rise dramatically. The average timberland footprint in Japan, for instance, is 4.6 times greater today than in China and 24 times greater than in India. Substantial increases in wood and paper consumption, and in the timberland component of the two countries’ footprints, seem likely in the next few decades.50

Such growth will entail substantial ecological costs. Deforestation is already a major problem in China and India—to the extent that the Chinese government prohibited forest cutting in 1998 after denuded hills were blamed for flooding that displaced millions of people. So both countries have turned to overseas sources of supply—often to countries like Indonesia, Myanmar, and others that are already seriously deforested.51

The dilemma facing the world can be seen in the very different forces behind the footprints of the newer global powers and the older ones. India, with over 1 billion people, and Japan, with one ninth as many people, use similar shares of the earth’s biocapacity: 7 and 5 percent, respectively. Similarly, highly populous China and high-consumption Europe have similar footprints, about one fifth of global biocapacity each. Standing alone is the United States, a country with 4.5 percent of the world’s people living at very high levels of consumption and requiring a remarkable 25 percent of total global biocapacity to support them.52

Population growth, though still unsustainable in scores of countries, is beginning to level off in most nations. But consumption continues to rise unabated in a world with
Global Hectares per Person

Source: Global Footprint Network

Figure 1–5. Footprint per Person in China, India, Europe, Japan, and the United States, 2002

four times as many people as in 1900. Of particular concern is the United States, whose enormous ecological footprint continues to expand rapidly—by 21 percent between 1992 and 2002. The U.S. share of the global footprint shows no sign of declining, a tendency that is exacerbated by the fact that, unlike Europe and Japan, U.S. population continues to grow at a rate only slightly below that in China.53

This cannot go on indefinitely. As the emergence of China and India accelerates growth of the global footprint, the day of reckoning is approaching rapidly. The world’s ecological capacity is simply insufficient to satisfy the ambitions of China, India, Japan, Europe, and the United States as well as the aspirations of the rest of the world in a sustainable way. Indeed, if by 2030 China and India alone were to achieve a per capita footprint equivalent to that of Japan today, together they would require a full planet Earth to meet their needs. While the ecological footprint is an accounting device and does not imply particular policies, such figures suggest that the twentieth-century resource-intensive development path is a dead end. The challenge for the global community is how to provide prosperity and opportunity for all, but within the limits that are laid down by nature.54

Making Choices

A review of the official development plans of China and India indicates little recognition of the ecological realities now facing them—or the world. Like political leaders everywhere, Chinese and Indian leaders are primarily focused on basic economic and national security goals: reducing poverty, creating jobs, and investing in military defense. And like their counterparts elsewhere, they believe that rapid economic growth is central to meeting those goals.

In contrast to official plans, a growing number of opinion leaders in China and India now question efforts to replicate western models of development in the very different economic, environmental, and social conditions of the twenty-first century. One of the most articulate advocates of this view is China’s Vice-Minister of the Environment, Pan Yue. In an interview in March 2005, he said, “This [Chinese economic] miracle will end soon because the environment can no longer keep pace.... The faster the economy grows, the more quickly we will run the risk of a political crisis if the political reforms can-
not keep pace. If the gap between the poor and the rich widens, then regions within China and the society as a whole will become unstable."  

Vice-Minister Pan is among those who believe that China and India will need to find their own development paths—"leapfrogging" the technologies, policies, and even the cultures that now prevail in many western countries. In both nations, vigorous discussions are under way at every level about the right path to follow. Divergent views and priorities are evident in China’s new renewable energy law—in a country heavily dependent on coal—and in the President of India’s proposal for a major commitment to renewable energy just one month after the Prime Minister announced an agreement with the United States to advance nuclear energy.

Four emerging successes—of buses and bicycles in China and of water and governance in India—demonstrate how creative ideas for sustainable development have the potential to leapfrog these countries past the mistakes of those that industrialized earlier.

In the early 1990s, the Chinese government declared in its Eighth Five-Year Plan (1991–95) that the automobile industry would be one of the five economic engines of national development. The strategy has attracted large amounts of foreign investment and generated substantial revenues as legions of Chinese purchase their first autos, leading many analysts to conclude that soon China will have one of the world’s largest automobile industries. But the toll has been high: air pollution has worsened, while buses are now fighting for road space and bicycles have been outlawed on many roadways.

A growing number of people in China now argue that an automobile-based transportation system simply is not capable of providing mass mobility to over a billion people without destroying resources that are required to meet other human needs. In response, the Ministry of Construction has recently declared that public transport is a national priority and is promoting Bus Rapid Transit (BRT), an ingenious system that combines the speed of a subway with the affordability of a bus. First developed in Curitiba, Brazil in the 1990s, the idea is simple: dedicate selected lanes or roadways to bus traffic, have passengers prepay their fares for quick boarding (as on a subway), and give bus drivers control of stoplights so that the bus has a green light along its route. The result is the virtual equivalent of a subway system at a fraction of the capital cost.

Kunming, capital of the southwestern province of Yunnan, was the first city to try BRT, and the experiment has been a success. Car traffic has fallen by 20 percent, and buses’ share of all transport modes has risen from 6 to 13 percent. Bus ridership during rush hour has jumped fivefold. Bus speeds at peak hours have increased from 9.6 kilometers per hour to 15.2 kilometers, while waiting times at bus stops have dropped by 59 percent. This inexpensive, effective, and environmentally responsible system may prove contagious. Already, planners in Beijing and Chongqing are designing and building their own BRT systems.

In contrast to BRT, which is championed by municipal authorities, bicycle use in China has been spearheaded largely by bike manufacturers, who are energized by the popularity of electric bicycles, a new technology on the market in the last decade. Domestic sales of these doubled between 2002 and 2003 and were projected to reach 10 million in 2005—at least three times the projected sales of cars. But the bike makers have a formidable foe in the country’s automakers, who over the last decade have helped persuade city officials from Shanghai to Beijing to restrict bicycle use
in order to make room for automobiles.\textsuperscript{59}

The bike companies are counting on the popularity of electric bikes to help them reclaim city streets. The new technology extends the range and carrying capacity of the traditional bicycle, and buyers report that it makes cycling fun. And compared with cars or buses, electric bikes have obvious environment advantages (although human-powered bikes are even better). They are estimated to carry a single driver with 15–20 times the efficiency of a small car.\textsuperscript{60}

The idea of “leapfrogging” western countries appears far more practical than it did a few years ago.

The fight between bicycle manufacturers and city authorities was carried to the Chinese National People’s Congress in 1994—with an ambiguous outcome that reflects the struggle between old and new visions of urban transport. Signaling support for bicycles, the Congress enacted legislation that gave electrics the same rights to use the streets as other vehicles. But in a nod to cities, it also included a provision that allows municipalities the final say in the matter.\textsuperscript{61}

In India, meanwhile, conflicting approaches to development can be seen in water management. As in many countries, the standard approach is to build large, state-owned dams and pipelines that draw water from rivers and aquifers. These projects convey huge volumes of water but often displace masses of people and cause extensive environmental damage. And the water they deliver frequently undermines the ability to provide water sustainably for the country as a whole, particularly the poorest communities. Conflicts over dam construction and other large projects in India are legion, yet the government maintains a strong commitment to the approach, as seen in its current embrace of the Interlinking of Rivers project. This proposal would use a series of canals to connect a network of Indian rivers in order to reduce flooding in some regions while alleviating drought in others.\textsuperscript{62}

But some engineers and environmentalists look at supplying water from a different angle. They have championed an approach known as water harvesting that starts from the premise that rainfall, rather than rivers or groundwater, is the primary but neglected source of supply. Water harvesting taps ancient technologies—from household cisterns to village water tanks—as well as nature’s underground aquifers to capture and store rainwater on farms and in cities before it can flow away. According to the Centre for Science and Environment (CSE) in India, some 43 percent of the country’s annual rainfall and snowfall does not reach its rivers and groundwater. Harvesting just a small share of this water could make a huge difference, especially for the country’s poorest people.\textsuperscript{63}

The idea is catching on. In Chennai (formerly Madras), India’s fourth-largest city, some 70,000 buildings harvest rainwater, typically by channeling rooftop rainwater to kitchens and bathrooms and into the ground to replenish the city’s groundwater supply. The city government has mandated that rainwater harvesting be a standard feature of all new buildings in the city, a policy also adopted in Bangalore in July 2004. And the Delhi Metro Rail Corporation, which runs mass transit in the city, announced in September 2005 that it is installing rain harvesting structures atop most of the stations of one of its metro lines. Such successes are gaining international attention: CSE was awarded the prestigious Stockholm Water Prize in 2005 for its work in rainwater harvesting.\textsuperscript{64}

The Indian state of Kerala has experimented with innovative ideas for sustainable approaches to governance and human
advancement. The state has long been known for its achievements in meeting human needs despite very low levels of income. It generally leads India and compares favorably with much richer countries on indicators of well-being such as literacy and life expectancy, while rates of poverty and infant mortality are substantially lower than in the rest of the country. Despite these achievements, Kerala’s annual economic growth was among the lowest in the nation in the 1980s, at only 2.2 percent. This weak performance was not enough to sustain the relatively high levels of social spending that were the foundation of the state’s impressive achievements in human development.65

Faced with mounting budget deficits and high unemployment, Kerala’s leaders decided to invest more in productive activities such as fisheries, animal husbandry, and small-scale industry in order to boost economic growth. This focus on growth might have worsened inequality in the state. But government officials decided to balance the growth strategy with a greater commitment to participatory decisionmaking in the state’s development planning. Project priorities were determined from the ground up, starting with more than 14,000 citizens’ meetings at the neighborhood level. Local jurisdictions were also given power to direct spending: in 1996, some 35–40 percent of the state’s annual budget for new development projects went to those designed by local bodies.66

Since then, economic growth increased to 3.6 percent a year in the 1990s, while health and social indicators continued to improve, in many cases faster than in the 1980s. The experiment exposed new challenges as well. Citizens tended to opt for more investment in projects that benefited particular interests—such as subsidized seeds for farmers—and less in projects for the common good. And the projects chosen did not reflect a strong environmental consciousness among Keralans. Despite these caveats, the new model offers important lessons for governance and development.67

Though still in a minority, those who are advocating bus rapid transit, bicycles, commonsense water use, and decentralized governance appear to have momentum on their side. The idea of “leapfrogging” western countries appears far more practical than it did a few years ago. China, for example, has become the world leader in producing essential new technologies—super-efficient compact fluorescent light bulbs as well as solar water heaters, which have been installed on 35 million buildings. Armed with creative solutions to critical problems and with evidence of the futility of current development paths and the superiority of the alternatives, Chinese and Indian pioneers are providing models for a new and sustainable economy. Both countries have rich cultures and philosophies that provide a strong basis for pursuing this kind of future. As Confucius said well over 2,000 years ago, “He who takes no thought about what is distant shall find sorrow near at hand.”68

Rethinking the Global Agenda

The rise of China and India illustrates more clearly than any development in recent memory that the western, resource-intensive economic model is simply not capable of meeting the growing needs of more than 8 billion people in the twenty-first century. Major shifts in resource use, technologies, policies, and even basic values are needed. The political ambivalence toward today’s development models that now characterizes China, India, the United States, and most other countries will need to give way to a full-fledged commitment to prosper within the limits imposed by nature.
With their growing economies, expanding ecological footprints, and rising political influence, China and India will need to be a part of any plausible global effort to build a sustainable world economy. But the call for wholesale change in policies needs to sound just as loudly in the United States, whose footprint is the largest of all. Indeed, the prospects for success in this venture are greatest if these three planetary powers pull together to forge a new vision for sustainable economic development in the twenty-first century.

**The global community needs to recognize the pivotal roles that China and India will play in this century and to welcome both nations as leading global players.**

Other countries, South and North, must also be involved, but China, India, and the United States have a special responsibility to avoid a new round of self-defeating great-power competition and to instead cooperate on creating a better future. Four concrete steps would help mobilize this effort.

First, the global community needs to recognize the pivotal roles that China and India will play in this century and to welcome both nations as leading global players. Prime Minister Tony Blair took a step in this direction when he invited President Hu and Prime Minister Singh to the G-8 summit in Gleneagles, Scotland, in June 2005. The two countries should be at all future summits as well—as full members. Their presence would add the perspective not only of two important rising powers, but of two countries that still grapple with issues common to many developing countries. In addition, China should be a member of the Organisation for Economic Co-operation and Development, while India needs to hold a permanent seat on the United Nations Security Council.

Second, China, India, and the United States should act collectively to ensure adequate energy supplies for all, even as they work together to move away from fossil fuels. It is clear that efforts by individual countries to lock up their own foreign oil supplies cannot protect any of them from the risk of disruption in a globally connected petroleum market. A grand bargain is needed in which the global community commits to energy efficiency investments and to the development and financing of renewable energy technologies, with the goal of steadily reducing world oil use and carbon emissions.

The principle is simple: all nations need to wean themselves from fossil fuels sooner or later, both because of the impact on the climate and because some of these fuels are in short supply. And western nations, especially the United States, have ample slack in their energy systems to ease the transition to a fossil-fuel-free world with little economic pain. Fuel savings from conservation measures could help ensure that development in China, India, and other industrializing nations is not hampered by lack of energy, even as these nations, too, work to reap the economic and employment benefits of booming new industries in solar energy, wind power, and biofuels. Such collaboration would not only help prevent economic and environmental chaos. It would also reduce the military tensions associated with the scramble to secure oil supplies.

Third, the global community should commit to developing a new model for agriculture in India and China, as well as in the rest of the world. The current mixed system of commodity price subsidies and partially opened food markets is pushing down the cost of food for the global middle class while at the same time undermining the ecological health of the world and driving hundreds of millions of farmers off the land and into urban slums. Agricultural subsidies should be redirected so
Chapter 2

as to promote ecologically healthy and economically strong rural economies.

China and India would do well to discourage people from going too far toward a meat-centered diet that is unhealthy for them and their ecosystems. And people in the United States and Europe need at the same time to reduce their currently unhealthy levels of meat consumption. Doing so would also help to create reserves of grain or of grainland that could be used to meet growing global demand if needed. The long-run goal should be a new generation of environmentally sustainable farms that are modest in size, have low energy and chemical inputs, rely heavily on perennial plants and ecologically sensible crop rotations, and carefully integrate biofuels into the mix of agricultural products.

Fourth, countries around the world should embrace China and India more fully by helping their citizens better understand the people and cultures of these two important nations. Cultural exchanges would help create broad public support for constructive collaboration with the two nations. While many students from India and China are already attending U.S. and European universities, India and China also have top-notch universities that could receive greater numbers of western students.

Professional exchanges, too, could be beneficial, both for cross-cultural understanding and to promote a two-way flow of information. Western professionals could learn a great deal from their Chinese and Indian counterparts about sustainable technologies such as BRT and water harvesting. Asian solutions may not fit the capital-intensive development models that westerners are accustomed to. But therein lies the value—sometimes less complicated solutions are superior ones. Los Angeles has shown this kind of openness with its development of a bus rapid transit system—an idea imported from Brazil.  

Advocates of these new approaches are beginning to be heard at many levels. Zjeng Bijian, who is Chair of China Economic Reform and is close to the country’s leaders, wrote recently in Foreign Affairs that the key to China’s future is to transcend old models of industrialization and great power relations, forging “a new path of industrialization based on technology, low consumption of natural resources, low environmental pollution, and the optimal allocation of human resources.” Such ambitious goals may seem contradictory in the face of simultaneous Chinese investment in a massive automobile industry and military infrastructure. But they cannot be dismissed as merely optimistic dreams, since they are grounded in growing recognition that the old ways will not work.  

The rise of China and India is the wake-up call that should prompt people in the United States and around the world to take seriously the need for strong commitments to build sustainable economies. Viewing this colossal shift in global geopolitics as an opportunity rather than a challenge appears to hold the greatest prospect for ensuring a stable and peaceful twenty-first century. It is an opportunity that the world’s nations would miss at great risk to themselves and to coming generations.