Conservation Biology

Editorial

China Shakes the World—and Then What?

As conservation biologists from around the globe travel to Beijing for the 2009 annual meeting of the Society for Conservation Biology (SCB) hosted by the Chinese Academy of Sciences, they bring with them basic knowledge about biodiversity and environmental issues in the People's Republic of China (PRC). China is a megadiversity country, harboring about 12% of the flowering plants, 10% of mammals, and 14% of birds living on Earth. The PRC is one of the few countries that contain two global biodiversity hotspots; many species in these hotspots and throughout the country are Chinese endemics. China is also the homeland for rice and soybeans, agricultural staples on which billions of humans depend. Since 1956 the central government has acted on behalf of China's natural ecosystems, designating over 2500 protected areas across 15% of the country's land. In comparison with the United States, China has reserved more lands in considerably less time.

Attendees of the SCB meeting are also aware of the tremendous environmental problems facing the PRC. Symbolized by the giant panda (*Ailuropeda melanoleuca*), the tiger (*Panthera tigris*), and the Asian elephant (*Elaphus maximus*), a host of China's unique species are endangered. Many of the PRC's protected areas do not function well because of inadequate staffing and funding and often amount to mere paper parks. Conservation problems in China are exacerbated by the still-developing rule of law, and decentralized political authority, in which strong national environmental policies butt up against weak local implementation. There is a general disconnect between conservation science and management.

China's rapid economic rise has not helped conservation much. The country faces severe environmental challenges as the largest human population in history builds highways, factories, and housing to fully join the modern industrial world. The PRC, however, remains relatively poor. Per capita income in 2007 was a mere one-fifth of the U.S. average; a typical American teenager has more discretionary income than the total annual salary of the average Chinese citizen.

Despite the importance of biodiversity issues, we want to draw attention to less-discussed environmental concerns that involve China at regional and global scales and which will likely transform life for all of us over the rest of the 21st century.

China's overarching development goal is laudable: "to build a well-off society in an all-round way" to transform the PRC into a modern, developed nation. From 1980 to 2000, China expanded its economy by a factor of 4, while only doubling energy use. For the midterm out to 2020, Beijing wants to repeat this impressive feat. To grasp the consequences of this scale of projected growth, consider that China's spectacular rise is but halfway completed. Projections out to 2020 for just two sectors—automobile ownership and urban expansion—portray the magnitude of what is coming next. In 2000 there were only 8 million cars on China's roads. At the end of 2008, there were some 48 million, a per capita rate of ownership matching the U.S. level in 1915. For 2020 projections of auto ownership range from 100 to 130 million.

The rate of urban expansion surpasses the spectacular growth in automobiles. Today, one of every two buildings in the world is being constructed in the PRC. By 2020 China's cities will need to accommodate some 300 million new residents, the current population of the United States, so construction must proceed at a blistering pace to erect—in 11 years—as many new square meters of buildings as currently exist in America. Much of this construction will pave over arable lands, which are already in short supply in China, and few projects are guided by environmental planning.

The challenge is that China simply does not have the domestic natural resources and energy supplies to quadruple the size of its economy, build megacities, satisfy the burgeoning middle class, and provide hundreds of millions of its poor people with a developed-world standard of living. Some 40% of all consumer goods bought in the United States are imported from China, but to comprehend potential environmental impacts of China's planned development trajectory, one must follow the flow of raw materials *imported* into the PRC.

To relieve its growing oil and natural gas deficit, China is negotiating with multiple neighbors—Russia, Kazakhstan, Pakistan, India, and Myanmar—to build at least eight Alaska-pipeline-scale projects across some of the least-developed lands in the world, including several national parks and one World Heritage Site, all with little to no environmental impact analyses.

To the south, in the Greater Mekong Basin, China is seeking to electrify southeast Asia by investing in 85 dams in Laos PDR, Myanmar, and Cambodia. Many

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of these projects will flood national parks and existing biodiversity-conservation corridors and displace hundreds of thousands of rural people. None of these host countries feature strong environmental impact assessment, although some attempts are being made to change this.

Scaling up beyond the region, China is using the immense profits generated by being the low-cost factory to the world to finance some 200 dams in over 48 countries across four continents. These include a project in Borneo slated to become the largest dam in south Asia and a dam in the Democratic Republic of Congo that would cost US$80 billion and surpass the size of Three Gorges Dam to become the single largest hydropower project in the world. Details on most of these projects are not available due to lack of government and private-sector transparency, but the cumulative impacts will be immense.

Some perspective on China's international dam-building efforts is warranted. After all, before 2000, the hydropower track record of the United States and other countries was poor. In that year, however, the World Commission on Dams released a comprehensive critique that most observers expected would change the rules of hydropower development forever. But a short decade later, Chinese investors are stepping in to fill the open niche of global dam developer with few strings attached. There is no international protocol in place to ensure best environmental practices.

Of course, the carbon footprint of China's ongoing development out to 2020 and beyond is the most problematic aspect of China's rise. China, like India, depends on burning coal to fuel its incredible growth. Despite the Kyoto Protocol, since 2000 global growth in carbon dioxide emissions has increased. Although China adds the equivalent of France's entire energy grid each year, it is not just power production that contributes to the country's rising emissions. Of all the billions of square meters of buildings under construction today that will serve the citizens of China tomorrow, 95% do not meet Beijing's codes for energy efficiency. Even if the European Union and the United States magically reduced their greenhouse gas emissions to zero while you are reading this sentence, China's current pace by itself may keep global emissions rising through 2020.

China should not be blamed for the world's runaway greenhouse gas emissions; the United States never even ratified the Kyoto Protocol. And we emphasize that China's development dream is not a vision exclusive to the PRC. Beyond the Middle Kingdom, there are at least 1.2 billion people desiring cars, a decent house attached to a sewer system, potable water, and a fair measure of education and health care.

Last year Jared Diamond distilled reams of data into one simple ratio—32:1 (Diamond 2008). That is the average annual amount of oil, electricity, and just plain stuff that an advertising executive in Los Angeles or a postal clerk in Sydney consumes compared with a dryland farmer in Henan Province or a Tibetan guesthouse manager in northwest Yunnan. Diamond assigned the developed world rate to everyone living in China and the United States and found that this level of consumption was equivalent to a total human population of 13 billion. Diamond then added in all Indians; this bumped humanity's ecological footprint up to 19.5 billion. When Diamond included every poor person on Earth as if they ate steak, drove sedans, and used electricity to read at night like Americans, Japanese, and Germans, he discovered that the planet would need to support 72 billion humans.

Which planet do we want to live on? We are aware that most people today do not own cars or credit cards or have indoor flush toilets. We cannot conceive of Earth supporting Diamond's low-end 13 billion people, twice the current population.

The ultimate importance of the PRC's growing economic and ecological footprint is this: China and the rest of the less-developed world are driving wealthy countries toward a global reckoning with the fossil-fuel-powered, high-consumption, industrial way of life. A well-known Chinese proverb cautions that an opportunity may provide a blessing or a curse. The potential boon here is that the scramble to make room at the table for developing world citizens may wean all of us off coal and oil with utmost haste. The darker portent is that the already-wealthy world is not willing to share, inadequately prepared to do so, or simply unable to act in time.

China may appear an unlikely catalyst for promoting sustainable alternatives to business as usual. But China is different. Even as its astounding growth has brought global environmental issues to a boil, the PRC is poised to assume a leadership role in solving international problems. Since 2004 President Hu Jintao and Premier Wen Jiabao have promoted *hexie shehui* (harmonious society) spotlighting an "environment-friendly" culture featuring energy efficiency. Beijing is pushing the world's most aggressive increases in all forms of renewable energy. The Party has committed to a national target of 20% of energy from nonfossil fuel sources by 2020. Next year China will have tripled its wind-energy capacity in just 3 years. The country has under construction or approved enough nuclear power plants to double this source of energy from current levels. Within the government bureaucracy, energy-saving performance standards are already in place that will influence job promotions.

We are aware that harmonious society rhetoric has mostly been offered to maintain domestic social stability, but the central government still has room to project *hexie shehui* out beyond the PRC. In the Mekong basin, for example, upstream China could partner with neighboring countries downstream to create a hydropower system that would not deplete water and food resources.

Some of the world's most rapid and steep temperature increases due to climate change are projected to occur in the Greater Himalayas region. The projected loss of glacial ice and snow from the world's "third pole" is alarming; 1.5 billion people are sustained by Asia's "water tower," the rivers that flow down from the world's highest mountains (e.g., the Mekong, Yangze, Ganges, Indus, and Tarim rivers). Of all the lands in the Greater Himalayas, some 75% are within the PRC, and Chinese scientists have done the best work defining regional water issues. Yet neither Beijing nor New Delhi have acted to convene a summit of Himalayan nations to deal with this issue. If these two nations do not lead the way, who will? And as China continues to invest in dams and other infrastructure around the world, there is no reason why it cannot bring best international practices to environmental planning and increase its stature in the world by serving as a role model for responsible development.

China might also benefit from combining its traditional Confucian vision of *tuanjie* (unity) with its political objective of an international order influenced by multiple countries, not just a few. After all, even conservative Chinese policy analysts note that "a Harmonious Society cannot be built in just one country." A TV or toy made in China bound for a mall in Minneapolis leaves its carbon footprint in the PRC, but with no foreign consumer, there is no demand for the product. The Tyndall Centre for Climate Change Research in the United Kingdom has estimated that some 23% of China's total emissions result from net exports to the developed world. The Earth's atmosphere bears a message: we are all in this together. China and climate change have collapsed *us* and *them* into *we*.

In the United States President Barak Obama was elected as a candidate of change; global warming will see to that. With the United States and PRC together responsible for 40% of current greenhouse gas emissions, President Obama and President Hu Jintao should meet in China well before the Copenhagen climate meeting in December 2009 to jump-start what will doubtless be some of the most important negotiations in history.

Economic recession makes none of these steps easy. But perhaps the global slowdown has a silver lining—world leaders can shape a response that begins to build a carbon-neutral world out of the shell of the old. After all, when the recession recedes, we cannot return to blindly pumping CO_2 out of tailpipes and smokestacks.

As conservation biologists converge on Beijing, we encourage visitors to reach out to international peers, soak up alternative perspectives, and create new professional connections. We invite colleagues to think holistically about the global context of specific research projects in the light of imminent environmental perturbations.

Like a 500-year-old Ming porcelain vase, brittle with a hundred hairline fractures yet still in one piece, China, although doing its best, still lacks the resilience to withstand additional ecological shocks to the system. Nevertheless, we believe that although China is shaking the world today, it will shape the world tomorrow. The questions are, when will China exert new environmental leadership and how will the rest of the world respond?

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