

THE U.S. ASIA-PACIFIC REBALANCE, NATIONAL SECURITY AND CLIMATE CHANGE

A Climate and Security Correlations Series

Edited by Caitlin E. Werrell and Francesco Femia

November 2015

THE CENTER FOR
CLIMATE AND
SECURITY

in
partnership
with

Carnegie Mellon University
Civil and Environmental Engineering



Center for a
New American
Security



ENVIRONMENTAL INSTABILITY, CLIMATE CHANGE AND CHINESE SECURITY

Troy Sternberg
Oxford University

China's environment will present a major security challenge in the 21st century. The physical landscape, affected by climate, pollution, population and development, will drive the nation's, and indirectly Asia's, viability, volatility and vulnerability in an era of climate change and increasing globalization. The country's water supply, arable land, livestock production and food supply are challenged by scarcity, contamination, desertification, urbanization, competition for resources and governance based on fiat rather than fact. This matters because of China's economic might, consumption of resources, borders with fourteen countries and conflict with East Asian neighbours, particularly Japan. China's actions will have regional implications and are likely to redefine U.S. roles and relationships in the Asia-Pacific sphere.

Climate and environments are intricately linked as both depend on geography.¹ This is particularly relevant in China; it is Asia's largest dryland country, most populous nation and the source of major rivers serving two billion people.² When climate varies, drought, floods and extreme temperature events occur;³ anthropogenic impacts manipulate the environment and affect human exposure with changes in consumption, pollution, degradation and development transforming productivity, natural resources, adaptation and social stability. Security in China will be determined by a combination of these social and environmental forces. Evolving domestic pressures will affect international dynamics and geopolitics, challenge longstanding U.S. preconceptions and present security implication that reverberate throughout Asia and the world.

“Man's ability to change Nature is unlimited.” - Mao Tse Tung

The first task is to accord China its unique perspective and its approach that both engages with

the international community yet chooses to maintain distance, and apartness, based on China-centric themes and premises.⁴ Inherent cultural values, including nationalism and Confucian-style reverence of elders, and thus authority, are emphasized by the ruling Communist Party. Whilst emperors and dynasties were past ruling paradigms, a one-party state is not novel nor a necessary prerequisite for governance. The non-democratic political system's survival requires a high level of unquestioned public support, or at least acquiescence. This has become the Communist Party's main focus – the system is set up to perpetuate the ruling elite, the world's richest plutocracy. Social stability, and the system that perpetuates it, including economics and the environment, is paramount as the main, perhaps only, check on the government's absolute power. In the hierarchical bureaucracy the deal is economic growth, greater consumption and perceived increase in wealth, or reduction in poverty, for the public in exchange for enduring state control at multiple levels.

Against this background the physical world is a secondary player, important only in how it can contribute to stated objectives, or in how the environment acts to the detriment of the government. The ethos is to produce and take advantage of nature to satisfy immediate goals, disregarding future costs and implications. Climate exacerbates natural conditions: when the weather is benign all is well, but too often climate disrupts plans and causes headaches for the government. Floods, droughts, landslides, heatwaves and extreme cold have resulted in great economic damage and millions of deaths in China in the last century.⁵ The direct concern is in how climate change, fluctuations or hydro-meteorological events upset a highly regimented, densely populated system.

Climate

China's location places the country at the confluence centre of several climatic forces and geographical realities. It is Asia's largest dryland country as deserts and semi-deserts cover 4.7 million km², more than 52 percent of the territory, an extent second only to Australia. This exacerbates water supply, reduces agricultural yield, intensifies the impact of degradation, restricts productivity and limits habitable land. The northern China plains are home to 60 percent of the nation's agricultural harvest yet have just 12 percent of the water resources. Similarly, central, south and eastern China includes temperate, tropical and humid regions where floods rather than droughts are major climate events. Monsoons, storms from the Pacific and El Niño events threaten households and communities (and consequently social stability and thus the Communist Party). Within the vast range of landscapes and climates, maintaining adequate livelihoods is critical for 1.3 billion residents.

In China El Niño, La Niña and East Asian summer monsoons contribute to climate uncertainty. Seasonal harvest fluctuation rates of about 15 percent annually have been identified in central China with El Niño events intensifying drought/flood patterns.⁶ Winter droughts in northern

China are also influenced by La Niña conditions where temperature differences and atmospheric pressure between the continent and Indo-Pacific Oceans affect the East Asian winter monsoon flow. In 2008 and 2009 a southward shift of the Intertropical Convergence Zone reduced wet and warm flow to northern China and contributed to drought north of the Yangtze River valley.⁷ A strong East Asian Winter Monsoon can lead to cold surges, drops in air temperature and often precipitation decreases whilst warming in the Pacific contributes to weakened summer monsoons that lead to drier conditions in East China.⁸

Water

The relationship between water, climate and humans is the basis of civilization. The Babylonians, Nabateans, Angkor Wat and Anasazi cultures rose and fell with changing climate and water regimes. In China water may well be the crucible in which the Communist Party and society are tested. Nationally, China has one-third the water availability per capita of the global average; in Beijing this falls to 120 m³ per person annually, one-quarter of the United Nation's level for 'absolute water scarcity'. The capital has a water shortfall of 1.5 billion m³ per year (about 400 billion gallons).⁹ Location and natural distribution of water resources are unequal and concentrated in the south; though the Tibetan plateau (aka Asia's Water Tower) is the source of the Indus, Ganges, Brahmaputra, Irrawaddy, Salween and Mekong rivers, the water flows to neighbouring countries.¹⁰ The Yangtze and Yellow rivers are the main surface water sources and are heavily exploited, some years not reaching the ocean.¹¹ Much of the water for rapid urbanization, irrigation and industry comes from groundwater that is often not renewable; Beijing's water table falls 2 to 3 meters per year. Human distribution of water is telling – one-sixth of all water in China is used in coal extraction for power generation.

Changing climate patterns directly impact water resources through precipitation, seasonality, evapotranspiration and fluctuation over time. This includes surplus (floods), scarcity (drought), intensity and volatility (use/availability of water, disaster episodes) and change in resources (glacial melt, springs, river courses). Natural capacity and conditions are exacerbated by human action – where cities are situated; how water is allocated (i.e. water flows to money); and evolving work, food and lifestyle choices. Thus changes in global weather patterns, changes in demand or use, and changing social dynamics (urbanization, food consumption patterns, aging population) all have potentially significant impacts in China, as part of the rapid development decisions are based on immediate factors – housing, jobs, transport – rather than longer-term climate patterns and consideration of environmental implications.

Pollution and Degradation

No responsible discussion on the Chinese environment can ignore pollution and degradation. This is a multi-headed hydra in China with seemingly no end. The obvious starting point is air pollution in Beijing that is so poor as to be “unindexable” with pollutant particulates of 755 on the United Nation’s 500-point scale.¹² Equally, it could be that 70 percent of northern Chinese water sources are undrinkable; the 16,000 dead pigs contaminating the Shanghai water supply in 2013; the excessive pollution-related mortality rate in Guangzhou; and smog in Harbin that closed schools and airports and made it impossible to drive buses.¹³ The topic moves on to food safety, from the well-known contaminated baby milk to carcinogens, exploding watermelons and agrochemicals in the food supply and water — the South-to-North water canal project’s first delivery was too polluted to drink and 300 million Chinese drink contaminated water every day.^{14 15} The essence is that industrial development at all costs, economic growth, expanding consumption and a lack of transparency in governance have led to severe environmental consequences across China.

Each case, each example becomes a threat multiplier where a change in circumstances, inadequate rainfall, unexpected frost, a polluted water source or disappearing glaciers have potentially significant consequences. The damage may be domestic, as with an extreme cold and ice disaster in 2008, drought in the southwest in 2009 and flooding in Yunnan in 2010, or have international ramifications as was the case with the 2011 drought.¹⁶ Similar conditions are found with land, water and resource degradation and desertification, which now affect 2.62 million km², 27 percent of China’s territory.¹⁷ Consider the limits of productive land, that half of the country are drylands, the population pressure, the high water demand for industry and agriculture – where will the water and physical resources come from to limit degradation, much less ameliorate environmental conditions. Again, decisions based on political exigencies (power, control) can have detrimental consequences in both rural and urban environments.

Smog in Beijing at high humidity and temperature. August 2006. [WIKIMEDIA COMMONS / BERSERKERUS](#)



Greater Implications – Security, the U.S. and the Future

The short tour through the Chinese climate and environment serves to frame discussion on the impending security role of China. Like all countries, China's security perspective is based on nation concerns and perceptions. Today the lens is that of the Communist Party with their stated goal of social stability through development and the unstated goal of maintaining state control.¹⁸ Thus security concerns are as likely to be driven by the domestic audience, even pandering to it, as they are by a perceived external threat: note that the internal security budget is greater than the external.¹⁹ The ongoing Diaoyu/Senkaku Islands conflict may appear to be an international conflict yet could equally reflect the government's portrayal of Japan as the eternal enemy and their action as a show of national strength. This is also a distraction from water, food, education, corruption, inequality and similar pressing concerns. Should a slowing economy, job losses or climate disaster lead to civil protest or unrest, foreign encounters could increase.

The U.S. has its own powerful domestic audience that often sees China as a threat. Action taken vis-à-vis an ally – Japan, Korea or Taiwan – may trigger responses based on domestic perceptions and fears. New threats abound – China's interest in the Arctic region, business and resource extraction in Africa, competition for energy, transborder water and pollution issues are on the table. Plans to divert the Brahmaputra to the Yangtze has infuriated India, as physical modifications to the Mekong have upset downstream nations, whilst discussion for a water pipeline from Lake Baikal, Russia is less controversial. Such events may be driven by the very real need for resources for a vast society but can equally be construed as threats to the global status quo that serves the U.S.'s perceived interests and role in Asia. China's expanded military investment and capacity will necessitate re-evaluation of America's role in the Asian-Pacific region. Recent events in Crimea show the security limits of western alliances and may persuade China that for all the words, security is most important at home. After wars in Afghanistan and Iraq, and political change in the Middle East and Crimea, the U.S. may conclude the same.

The question will be both how actions are framed by the Chinese, and how they are interpreted by the global community. The role of climate and the environment is a cause and instigator of shifting internal Chinese dynamics. Climate change, lack of water for agriculture and drinking, a failed harvest or polluted environment can spur mass action as evidenced in numerous local protests. The Communist Party has paid attention to the disintegration of the Soviet Union and the Arab uprisings. Are they prepared for security challenges created by the "Chinese characteristics" of a damaged environment in an era of climate change? Asia and the world await the outcome.

Troy Sternberg is a British Academy Post-doctoral Research Fellow in the School of Geography, Oxford University.

Notes

- 1 UN Intergovernmental Panel on Climate Change, *Climate Change 2014; Impacts, Adaptation, and Vulnerability*, 2014, available at <http://www.ipcc.ch/report/ar5/wg2/>
- 2 Walter W. Immerzeel, Ludovicus P.H. van Beek, and Marc F.P. Bierkens, "Climate change will affect the Asian water towers," *Science* 328 (2010): 1382-1385, doi:10.1126/science.1183188; Fred Pearce, "China is taking control of Asia's water tower," *New Scientist* 214 (2012): 8-9.
- 3 Centre for Research on the Epidemiology of Disasters (CRED), "EM-DAT, The OFDA/CRED International Disaster Database", (Brussels, Belgium: Université catholique de Louvain, 2014), available at <http://www.emdat.be>; Troy Sternberg, "Chinese drought, bread and the Arab Spring," *Applied Geography* 34, 2012, 519-524, doi:10.1016/j.apgeog.2012.02.004.
- 4 Timothy Garton Ash, "Welcome to China's political gamble of the century," *The Guardian*, March 30, 2014, available at <http://www.theguardian.com/commentisfree/2014/mar/30/china-political-gamble-of-century-president-xi-jinping>
- 5 CRED, "EM-DAT."
- 6 Fulu Tao, Zhao Zhang and Masayuki Yokozawa, "Dangerous levels of climate change for agricultural production in China," *Regional Environmental Change* 11 (2011): 41-48, doi:10.1007/s10113-010-0159-8.
- 7 Dunxian She and Jun Xia, "The spatial and temporal analysis of dry spells in the Yellow River basin, China," *Stochastic Environmental Research and Risk Assessment* 214 (2013): 29-42, doi:10.1007/s00477-011-0553-x.
- 8 Aiguo Dai, "Drought under global warming: a review," *WIREs Climate Change* 2, 2010, 45-65, doi:10.1002/wcc.81.
- 9 Lily Kuo, "China Has Launched the Largest Water-Pipeline Project in History," *The Atlantic*, March 7, 2014, available at <http://www.theatlantic.com/international/archive/2014/03/china-has-launched-the-largest-water-pipeline-project-in-history/284300/>
- 10 Pearce, "China is taking control of Asia's water tower."
- 11 Kuo, "China Has Launched the Largest Water-Pipeline Project in History."
- 12 David Wogan, "Beijing's air pollution as seen from space," *Scientific American*, December 10, 2013, available at <http://blogs.scientificamerican.com/plugged-in/2013/01/15/beijings-air-pollution-as-seen-from-space>
- 13 "Ministry of Land and Resources 2013," China Water Risk, 2013, available at <http://www.china.waterrisk.org>; "Overcrowding on farms behind mystery of China's floating pigs," *Reuters*, April 24, 2013, available at <http://www.reuters.com/article/2013/04/24/us-china-farming-pigs-idUSBRE93N1C720130424>; Lewis Watt, "Dense smog in Harbin, China reduces visibility to less than 50 metres," *Associated Press*, October 21, 2013, available at <http://www.ctvnews.ca/world/dense-smog-in-harbin-china-reduces-visibility-to-less-than-50-metres-1.1505856#ixzz2xkJL43cr>; Ignatius Tak Sun Yu et al., "Effect of ambient air pollution on daily mortality rates in Guangzhou, China," *Atmospheric Environment* 46, 2013, 528-535, doi:10.1016/j.atmosenv.2011.07.055.
- 14 Peter Foster, "Top 10 Chinese Food Scandals," *The Telegraph*, April 27, 2011, available at <http://www.telegraph.co.uk/news/worldnews/asia/china/8476080/Top-10-Chinese-Food-Scandals.html>
- 15 Kuo, "China Has Launched the Largest Water-Pipeline Project in History."
- 16 CRED, "EM-DAT."; Sternberg, "Chinese Drought."
- 17 Don Koo Lee et al., "Keep Asia Green Volume II - Northeast Asia," *International Union of Forest Research Organizations World Series*, vol.20-II (Vienna: IUFRO Headquarters, 2007), available at <http://www.iufro.org/science/special/spdc/actpro/keep/ws20-ii/>
- 18 Ash, "Welcome to China's political gamble."
- 19 "The dragon's new teeth: A rare look inside the world's biggest military expansion," *The Economist*, April 7, 2012, available at www.economist.com/node/21552193