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China's Water Challenges: A Quick Q & A with Environmental Historian Kenneth Pomeranz

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Ken Pomeranz, Kate Merkel-Hess and I had various reasons for launching this blog at the start of 2008. One thing that led us to start the venture, at a time when Kate was the only one of us with any blogging experience, was simply a sense that some of the things that we were saying to one another over lunch and in the hallways at UC Irvine might be of interest to people in other places who were working on, living in, or just curious about China. As much as the venture has developed since then (adding new contributors continually, undergoing a change of editors, as Kate, who started out in that role, went from being a UCI doctoral student to beginning a career as an Assistant Professor at Penn State, and Maura Cunningham took over from her, etc.), some posts still have their roots in local conversations. This is definitely the case with this one. Over the years, Ken and I have talked a lot about China's "water woes" (to invoke the title of [one of his earlier posts](#)), and I also had the good fortune to be able to hear him give an excellent illustrated presentation on hydraulic concerns (well, he made some comments about dry land, too) when he accepted our campus' [top research award](#) a while back. It seemed only natural, with water issues grabbing headlines yet again, to find a way to make his insights onto the topic more widely available. So I put some questions to Ken (who incidentally is [one of two candidates up for the presidency of the American Historical Association](#)) that I thought would be of interest to anyone who has read his previous writings on water, for venues such as *The Asia-Pacific Journal: Japan Focus*, *New Left Review*, the *Huffington Post*, and, of course, *China Beat*.

JW: *Water is figuring centrally right now in a lot of reporting on China. Do you see this as due to a change in the situation or just increased awareness of the kinds of dilemmas and issues you flagged more than two years ago in the "China's Water Woes" post you did for this blog?*

KP: Most of this story has been out there in bits and pieces for a while, and people could see most of the long-term trends. North China water usage has been at unsustainable levels since at least the early 60s, when deep wells with electric or gas-powered pumps really took off; the problems with climate change and glaciers have been visible for a while, though we keep learning more about them; and the risks of the South-North water diversion project are not a surprise, either – though, of course, the thing about risks is that we don't know which ones will or won't come to pass. (Will much of the water arrive in North China too polluted to be useful? Will they be taking more water out of the Yangzi Valley than it can afford to give? How vulnerable is the western leg – which they haven't started yet – to seismic disaster?) And most of the reasons why the government wants to build a lot more hydrodams have long been pretty obvious. They need lots of energy; increasing fossil fuel consumption is terrible for the climate, for air quality, and for the frighteningly large number of coal miners it kills every year; nuclear carries big risks (as Fukushima reminded us) as well as high costs; and solar, wind, etc., alternatives are not yet available on a sufficient scale or at the right price. (There are also some less obvious reasons, tied to the financial interests of well-connected people, but the Chinese government would probably be pushing hydro pretty hard even without those elements.)

But all that said, nobody could have predicted for certain the precise set of issues we've seen this spring and summer. Yes, drought risk is increasing, but we didn't know we'd have a very bad drought in the North this year, and (until a couple of weeks ago) a really unusual drought in the Yangzi Valley, too. Nor did anyone know for sure that this would coincide with a continuing spike in global food prices (though there, too, unfavorable basic trends have been visible for a while). Perhaps the most surprising element has been the increased openness of discussion in China about problems with both big dams (notably Three Gorges) and the water diversion project, in a period that has not generally been a good one for increased openness. We know there's often a lot of debate going on about some of these projects, but we don't get to overhear much of it; right now, we're hearing more than usual.

JW: *You've been interviewed a lot lately by journalists. Do you feel you get asked the right kinds of questions about the water situation? Or, to put it another way, is there a question you wish you'd be asked—or asked more often?*

KP: I think journalists have generally asked me the right questions, but of course they almost never have space to print the whole interview (if “print” is even the right verb these days), and I’m sometimes surprised by which parts of it they think are most worth using. If it were up to me, I think I’d focus more on the link between water problems and rural/urban issues, the connections between water shortages and poor enforcement of environmental regulations, and the ways that both of these are related to tensions between different levels of government. Probably most of the water savings that you could achieve without greatly reducing economic output are in agriculture, where a lot of irrigation is very inefficient (and not just in China); in fact, I think there’s a good case to be made that if you put anything like the cost of the South-North water diversion project into fixing a million leaky faucets, lining a million unlined irrigation ditches, enforcing existing wastewater treatment standards (allowing more water to be re-used), etc., etc., you could do more to alleviate the problem (and more safely) than the diversion project will do. But for Beijing there are at least two problems with that.

First, a huge construction project like the diversion is something they can oversee directly; making sure a million pipes get fixed and rules get enforced requires a lot more reliance on local government, and they can’t necessarily count on that. You really see that with the wastewater treatment issue – on paper, China has pretty good water treatment standards, but their equivalent of the EPA has a miniscule number of inspectors: something like 300. So they depend on local officials to handle the enforcement, and they often have no interest in doing so: the polluting industry may be government-owned or otherwise vital to their budget; their careers depend much more on hitting growth targets than environmental ones; the people most affected may be downstream and outside their jurisdiction, and so on. Second, one way to strongly encourage local compliance in saving water is to make water more expensive – but this would hit farmers hardest, and the government is genuinely concerned about how far farmers’ incomes lag behind most other people’s already. Do you really want to increase that gap further? Accelerate the already very rapid movement of people to the cities? How high could water prices go without people abandoning certain crops, like winter wheat in Hebei, altogether? There are some pretty tough choices to be made there, though I’d argue that the benefits of reducing water demand are big enough to outweigh those costs (which could be offset by boosting farmers’ incomes in some other way).

Good journalists certainly know that China’s central government is much more limited than most Westerners realize, but I think they don’t emphasize that often enough – it’s a hard idea for people to shake, so maybe you have to push the point even harder than a particular individual story really requires. But if the cumulative effect of emphasizing that again and again were to break more people of the idea that Beijing is an all-powerful juggernaut, this would be of tremendous benefit to public understanding of China. Focusing on the mega-projects themselves, on the other hand, tends to reinforce the idea of an enormous concentration of power at the center. Just the size of the proposal – the biggest construction project in history, which would divert, even at the low end estimate, considerably more water each year than there is in the annual flow of the Colorado River – makes you think that whoever is even thinking about such a project must be awfully powerful. And in some sense, they clearly are – Beijing can do a lot, and is free of certain kinds of checks that other governments face. And I certainly don’t mean to say that the mega-projects aren’t a vital story, well worth covering. On the contrary – it would be wildly irresponsible not to cover them. But as somebody who is more in the business of educating people about big structures and long-term processes than about “news” per se, I guess it’s natural that I wish the big picture and the long run got a little more attention, and one not very dramatic but extremely significant part of the big picture are all the ways in which people at lower levels pursue their own agendas and quietly limit Beijing’s power, day after day. For the same reason, it would be nice to see more written in the press about another long-range, big picture aspect of the story: namely, the western leg of the diversion project. Nothing dramatic is happening on that

project yet – there is no construction activity or local protest, at least as far as we know – but if it goes forward, it will have by far the biggest costs, risks, and potential benefits. And, also in the “big picture” category, I’d love to see more written about slowly unfolding stories like the retreat of glaciers, what’s happening to the permafrost layer on the Tibetan plateau (a major disaster if it melts, which people some think might be beginning), and so on. But I understand that it’s hard to do a news story about stuff that changes so little from day to day. I guess that’s why we have newspapers, magazines, and scholarly journals (electronic or otherwise) – and why we need people to try to synthesize material across those different outlets.

JW: *I like your allusion to the “Rube Goldberg Machine” aspect of the water transfer scheme, which was mentioned in a [recent AP report](#). Can you elaborate just a bit more on what you had in mind?*

KP: The “Rube Goldberg” allusion isn’t meant to be very deep. All it really means is that the diversion has a huge number of moving parts, both literally and figuratively, which makes predicting its success or failure really hard. Let’s leave the engineering aside for a moment, and start with just the socio-economic stuff. We know that water usage is still rising, in both the south and the North (though they’ve made some real progress in curbing it – definitely doing much better on this front than, say, India), but how fast it keeps rising will depend on all sorts of imponderables: how quickly will new, more water-efficient technologies be adopted, in both agriculture and industry? How much will Chinese demand for meat (which requires a lot of water to produce) increase, and how much of that are they willing to import? What will happen with the geography of various kinds of economic production?

Rice, for instance is a very thirsty crop, but China’s rice production has been moving steadily North for many years for a number of reasons: expensive land in the South being taken out of agriculture, pollution, climate change (rice needs warm days, but also benefits from cool evenings), new varieties that are a bit less thirsty, etc. How much more of that will happen? Where are the limits? What are the prospects for a real breakthrough with drought-resistant GMOs? Or an environmental disaster with them? To what extent will very water-intensive industries, such as chemicals, relocate in response to actual or feared water shortages? What about the effects of electrical blackouts (partly due to low water levels in dams’ reservoirs) on industrial location decisions?

Then add politics – how much discontent over higher water prices is the government willing to risk? How much will there be? What about protests over relocations of people for this and other projects? Is there any realistic prospect of better enforcement of waste treatment standards?

And then you get to the physical moving parts – both the ones being moved by nature and the ones being moved by people. (Not that those are completely distinct, especially these days.) Global warming is accelerating glacial melting in Tibet, though people disagree about how fast – that melting should produce an interlude of heavy river flow, and then a frightening reduction. But nobody knows the scale and timetable for either. Similarly, we know climate change will shift the geographic distribution of rainfall, but nobody knows exactly how – if the south has less water, then the diversion project may be a big mistake. One thing we are pretty certain of is that it will increase the variability of rainfall, both over the course of the year and between wet and dry years. In some sense, that’s an argument for human-made infrastructure that can even these variations out by moving water around, but extreme events also create risks for that infrastructure – and could lead to an increased number of years in which the Yangzi Valley has no surplus water to give. Short of an absolute shortage of water, there are questions of water quality. The plan for the middle leg of the diversion – the one now being built – would reduce the flow of the Han River below the Danjiangkou reservoir (In Hubei, a bit before it joins the Yangzi) by a bit over $\frac{1}{4}$: and with its flow reduced that much, the river may not be able to flush its pollutants very effectively. (Meanwhile, Shaanxi is planning another diversion of Han River water further upstream – yet another moving part.)

The Han is an important river in its own right, and one of the Yangzi's biggest tributaries, so anything affecting its water quality has huge implications.

And then you get to the design of the project itself – it's just a staggering number of pumps, filters, gates, you name it: they all have to work right, and, as we've seen, there's a lot that's not known about the flow rates, silt and pollution burdens, and so on that they will be dealing with even in a "typical year." Add unusual events – floods, earthquakes, whatever—and the number of variables is immense.

Lastly, remember that many of these variable are inter-dependent: the location of industries, water demand and pollution discharges will respond to prices, climate trends and glacial melting, political protests, etc; political protests will depend in part on pollution levels and water scarcity, but also on changes in the court system, center-local relations, the "space" allowed (or not) to NGOs, and so on. The results of any project thus become way too complicated to model or anticipate – which makes it all pretty scary, but also makes it a really fascinating set of processes to follow as they unfold.

JW: *Any suggestions on the best websites to go to or books or articles to read, if someone wants to keep up with or learn more about the drought, the disappearing glaciers, or Chinese water issues in general?*

KP: For websites, China Dialogue [is excellent on Chinese environmental issues](#). International Rivers is very good on water specifically, and does a lot on China. The Asia Society has some very good stuff on glacial melting in the Himalayas on their website, under the title "[On thinner Ice](#)" and a useful general report on Asian water security that's [online](#) as a PDF. For climate and water on a global level, the [Pacific Institute](#) is good, but there are lots of others, too.

Books tend to lag behind a bit on issues like this, but for Chinese environmental issues generally Jonathan Watts' recent book, [When a Billion Chinese Jump](#) is an excellent introduction. He writes for the *Guardian*, and is always worth reading. Ma Jun's [China's Water Crisis](#) is now a bit dated, but still well worth reading. Andrew Mertha, a political scientist, has a book called [China's Water Warriors](#) which uses three case studies to look into when water-related protests can and can't be effective: it's quite good for fleshing out the point I made quickly above about how fragmented political authority can be in China, and what that means for these issues.

For somebody who was looking for a long-term historical perspective, I would recommend Mark Elvin's "Water in China's Past and Present: Cooperation and Competition," *Nouveaux Mondes* 12 (2003) or, immodestly, my own "The Transformation of China's Environment, 1500-2000," in Edmund Burke III and Kenneth Pomeranz, eds. [The Environment and World History 1500-2000](#), a book published in 2009 by the University of California Press.

I could go on and on, but this should be enough for anyone who wants to get started – after a while, of course, one source leads to another.