

Environmental Pollution, Cancer Villages and the State's Response

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Presented to the annual meeting of the American Association for Chinese Studies,
meeting in Arlington, VA, October 10-12, 2014

Overview

Since the late 1990s, observers have noted that a large and growing number (now estimated at more than 500) of villages have unusually high rates of mortalities, and the causes of death are different forms of cancer. Although no systematic research has been done yet, it appears to be the case that the cancers are the product of environmental degradation and disasters. The first two parts of the paper explore these points.

Our interest is to chronicle the responses of the Chinese state at multiple scales, and then to analyze what this represents in terms of the large number of environmental disasters China has encountered in the past—and which seem likely to continue into the near and mid-term. The second two parts of the paper treat these two areas of discourse.

What are Cancer Villages?

In brief, a cancer village¹ is a community where rates of cancer are considerably in excess (at least twice that) of China's normal death rate of 6 per 1,000/year. The number of such villages is in dispute. A recent estimate suggests, based on accounts in Chinese media, academics and NGOs, that China is home to 459 cancer villages, reaching into every province except for Qinhai and Tibet.²

In 2010, Chinese journalist Deng Fei published a map focusing on a number of cancer villages. He listed 48, linking the kind of environmental pollution with the type of cancer afflicting village residents.³

We believe that even 459 understates the number of villages in China meeting terms of the definition, and think there are at least 500 such locales.

Descriptions. We describe several examples of the human costs of environmental pollution in this section.

Apparently, the first Chinese report⁴ linking cancers to environmental pollution was in 1987. Then, investigators in Liaoning province reported that mortality rates for all cancer, stomach cancer and lung cancer in 1970 to 1978 were higher in villages with hexavalent chromium-contaminated drinking water than in the general population.⁵ A larger number of reports began to appear early this century of abnormally high rates of cancer, attributable to environmental pollution of land, water and air. Most of the incidents reported concern water

¹ The term had become common by the second decade of the 21st century. See, for example, Lee Liu, "Made in China: Cancer villages," *Environment: Science and Policy for Sustainable Development*. Vol. 52, 2, 2010, 21.

² Jonathan Kaiman, "Inside China's 'cancer villages'," *The Guardian*, June 4, 2013.

³ The original map is at:

<https://maps.google.com/maps/ms?ie=UTF8&oe=UTF8&=O&msid=1043407559778441088496.000469611a28a0d8a22dd> accessed 4/28/2014.

⁴ A Taiwan report linking high-arsenic artesian well water and malignant neoplasms appeared in 1985. See CJ Chen, YC Chuang, TM Lin and HY Wu, "Malignant Neoplasms among Residents of a Blackfoot Disease-endemic Area in Taiwan: High-arsenic Artesian Well Water and Cancers," *Cancer Research*, vol. 45, November 1985, 5895.

⁵ James J. Beaumont, Richard Sedman, Stephen Reynolds, Claire Sherman, LH Li, Robert Howd, Martha Sandy, Lauren Zeise and George Alexeeff, "Cancer mortality in a Chinese population exposed to Hexavalent Chromium in drinking water," *Epidemiology*, Vol. 18, no.1, 2008, 12-23.

pollution. An early example was Liukuaizhuang village in Tianjing municipality about 75 miles from Beijing. Scores of chemical factories moved into the village bringing economic success, but also increased incidences of diseases such as bone, lung, liver and breast cancer, and an increasing number of children suffer from leukemia.⁶ Scientist Chen Nengchang, who has studied the cause and effects of pollution in the village of Shangba (in the northern reaches of Guangdong province), has found high levels of poisonous heavy metals in the water dumped from upstream mines. He believes there is a direct connection between the incidences of cancer in the village (250 people in this village of 3,000 have died of cancer since 1987) and mining in the area.⁷

Greenpeace China reports on changing conditions in the fishing village of Liujiagang in Fuqiao township, Taicang, Jiangsu province. In the last 15 years, the water source for this village, the Liu River (a tributary of the Yangtze river) has become increasingly polluted.⁸ Villagers noticed that water quality began deteriorating around 2000. By this time, the Taicang Port Economic Development had succeeded in attracting more than 30 petrochemical, textile, pharmaceutical and metal-processing plants. Insufficiently cleaned wastewater from the development zone's treatment facility enters the Liu River and the drinking water of village residents.⁹ In the first year of the plants' dumping wastewater, villagers reported: "We all got poisoned. Everyone in the village had diarrhea."¹⁰ Then within a year, residents noted that the number of cancer patients began to rise, especially since 2002 and 2003, with most of the reported cases being stomach, esophageal and breast cancer.¹¹

The broader Yangtze River has been the recipient of highly increased loads of pollutants, adversely affecting the health of water users. The World Wide Fund for Nature (WWF) reports a 73 percent increase in pollution levels from hundreds of cities in the main stem of the river. The annual discharge of sewage and industrial waste has reached about 25 billion tons, which is 42 percent of the country's total sewage discharge and 45 percent of its total industrial discharge.¹² The pollution includes that from chemical and other heavy-metals industries, wastewater, and agricultural runoff, which results in suspended substances in the water, oxidizing organic and inorganic compounds, and ammonia nitrogen.¹³ Health effects include increased levels of intestinal infectious diseases such as hepatitis A, dysentery, and of course various types of cancers.

Air pollution and its relationship to pulmonary diseases has been covered for a somewhat longer period, as it affects people in populous cities. For example the residents of Linfen in Shanxi province wear masks to protect themselves from a heavy haze of pollutants, attributable to use of coal. The mortality rate from cancers in this village is among China's highest; for those

⁶ Verna Yu, "China's 'Cancer Villages' pay heavy price for economic progress, May 9, 2006, Agence France Press

⁷ Dan Griffiths, "China's 'cancer villages' pay price," January 17, 2007, BBC News, Beijing.

⁸ Greenpeace, China, "The story of fishing villages in Jiangsu province, China"

<http://www.greenpeace.org/international/en/news/features/Chinese-ri...> Accessed 6/6/2014.

⁹ Ibid.

¹⁰ Ibid., p. 2 of 3

¹¹ Ibid.

¹² WWF, China, "Threat of pollution in the Yangtze,"

http://wwf.panda.org/about_out_earth/about_freshwater/freshwater... Accessed 6/6/2014.

¹³ Ibid., page 2 of 4.

aged 55 years and older, it has risen to 61 per 1,000 (compared to the normal rate of 6 per 1,000).¹⁴

In many cases, both air and water pollution are involved in increasing health risks. For example, the village of Zhangzhuang in Yongqiao township (northern Anhui province) suffers from both forms of pollution. Noxious fumes from a pesticide factory make villagers' eyes smart. Ground wells near the Kui river is invested with family and municipal waste and factory chemical effluents. Since 1974 lung cancer rates in the village have increased eight-fold,¹⁵ and other forms of cancer have increased as well.

Symbolically. As we emphasize in this paper, the term "cancer village" is a potent symbol of the lack in efficacy of the Chinese state. For villages with extraordinarily high rates of carcinogens to continue without plans for sufficient relief by governments at all levels is an obvious indictment of the state's failure to provide for the general health of its population.

Explanations

Scientific Explanations.¹⁶ We should point out that notwithstanding the considerable scientific evidence of the causal relationship between environmental contamination, especially by heavy-metal, human waste and agricultural pesticide runoff, a number of careful researchers suggest other factors still need to be taken into account. For example, writing in 1997, JD Zhang and SK Li remark that lifestyle or other environmental factors might have a bearing on rates of cancer previously associated only with hexavalent chromium pollution.¹⁷

Other studies too have begun the longer-term effort to tease out contributing and accelerating factors. For example Hu et al. have studied family histories of patients with esophageal cancer, and they report evidence of increased rates of those with family histories of this type of cancer.¹⁸ In a related report, Li et al. indicate that a family history of human papillomavirus type 16 (HPV-16) plays a role in high incidence areas of esophageal cancer in the Anyang region of China, as compared to low incidence areas.¹⁹

Too, dietary factors have been considered in a growing number of studies. Wang et al. in 2001 reported a causal relationship between exposure in foods to aflatoxin B1 (AFB1) and liver

¹⁴ Louise Lim, "Air pollution grows in tandem with China's economy," May 22, 2007, NPR.

¹⁵ Jean-Francois Tremblay, "China's cancer villages," *Chemical & Engineering News*, Vol. 85, 44, October 2007, 21. Also see William Alford, P. Weller, L.Hall, K. Polenske, YY Shen and. Zweig, "the human dimension of pollution policy implementation: Air quality in rural China," *Journal of Contemporary China*, Vol. 11, 32, 2002, 495.

¹⁶ For background on environmental conditions and health, see Jennifer Holdaway, "Environment and Health in China: An introduction to an emerging research field," *Journal of Contemporary China*, Vol. 19, 63, January 2010, 3.

¹⁷ JinDong Zhang and ShuKun Li, "Cancer mortality in a Chinese population exposed to hexavalent chromium in water," *Journal of Occupational & Environmental Medicine*, Vol.39, 4, April 1997, 315.

¹⁸ N. Hu, SM Dawkey, M. Wu, GE Bonney, LJ He, XY Han, M. Fu and PR Taylor, "Family aggregation of oesophageal cancer in Yangcheng county, Shanxi province, China," *The International Journal of Epidemiology*, Vol. 21, 5, 1992, 877. For a report on lifestyle factors, including smoking, see Abnet et al., "Tooth loss is associated with increased total death and death from upper gastrointestinal cancer, heart disease, and stroke in a Chinese population-based cohort," *International Journal of Epidemiology*, Vpol. 34,2, April 2005, 474.

¹⁹ T. Li, ZM Lu, KN Chen, M. Guo, HP Xing, Q Mei, HH Yang, JF Lechner and Y. Ke, "Human papillomavirus type 16 is an important infectious factor in the high incidence of esophageal cancer in Anyang area of China," *Carcinogenesis*, vol. 15kl 22, 2001, 934.

cancer.²⁰ These studies of dietary contributions to cancer have a history dating to 1990 in China.²¹

Finally, two additional factors get in the way of establishing scientific knowledge on pollution sources and effects. Tremblay recounts the analysis of a Chinese professor of environmental engineering regarding the costs of environmental surveys:

For well water, it costs about \$250 per sample to conduct the full battery of about 100 different tests that measure concentrations of the most common contaminants. When officials discover extreme industrial pollution in a particular area, China's current practice of simply ordering the closure of suspicious local factories makes economic sense, the professor says. In China's countryside, low-tech industrial production facilities are often built for less than \$1 million.²²

Second, there are too many specific chemicals involved in environmental pollution and too many types of cancer to make diagnosis easy, and the outcomes of pollution develop slowly over time, requiring diagnoses spread over many years. And third, China does not welcome foreign organizations which seek to conduct health and environmental surveys or dig wells in its countryside.

Local Legends. Anthropologists maintain that people in afflicted villages develop congenial ways of understanding the development of cancer; they try to explain in their own terms how it spreads and why it affects particular individuals. In her study of rural Sichuan villages, Lora-Wainwright discussions with farmers revealed that they typically identified repressed anger (or enduring hardship in general) as causes of cancer, along with smoking, drinking and eating preserved vegetables and use of farm chemicals.²³ She argues that villagers adopted these explanations "when they do not contradict people's sense of normal, caring and moral behavior."²⁴

Initial State Responses

Denial. Not only did the regime deny that large cases of environmental degradation led to adverse health effects, but also governments at all levels worked to ensure that information about cancer villages did not spread. Local governments prevented outsiders from learning more about village environmental risks, and they banned foreign reporters from visiting. Local government officials pressured doctors to remain silent on the link between pollution and high cancer rates. They also harassed local residents who complained. For example, a 60-year old resident of Zhejiang province who called on environmental officials to swim in a creek they were supposed to keep clean near his home was allegedly severely beaten.²⁵ Finally, the courts declined to hear cases suing factories for pollution.

²⁰ JS Wang, T. Huang, JJ Su, F. Liang, ZL Wei, YQ Liang, HT Luo, SY Kuang, GS Qian, GJ Sun, X He, TW Kensler and JD Groopman, "Hepatocellular Carcinoma and Aflatoxin Exposure in Zhuqing Village, Fusui County, People's Republic of China," *Cancer Epidemiology Biomarkers & Prevention*, Vol. 10, February 2001, 143.

²¹ JS Chen, BQ Liu, WH Pan, C. Campbell and R. Peto, *Diet, Lifestyle and mortality in China*, Oxford: Oxford University Press, 1990.

²² Tremblay, op cit., page 2 of 4.

²³ Anna Lori-Wainwright, "An anthropology of 'cancer villages': Villagers' perspectives and the politics of responsibility," *Journal of Contemporary China*, vol. 19, January 2010, 84.

²⁴ Ibid., p. 85. Also see Bryan Tilt, "Perceptions of risk from industrial pollution in China: A comparison of occupational groups," *Human Organization*, vol. 65, 2006, 115-27, and Bryan Tilt, "The political ecology of pollution enforcement in China: A case from Sichuan," *The China Quarterly*, 192, 2007, 915-32.

²⁵ See: <http://www.telegraph.co.uk/news/worldnews/asia/china/9896761/Ch...> accessed 4/28/2014.

As one can infer from the above, government denial implies a degree of censorship over information, typical of authoritarian state systems. In the case of environmental pollution, the health effects concern inanimate objects—China’s food supply—as well as people. One of the sources we consulted for this paper, *Marketplace*, discussed how the regime handled reports that rice samples had excessive amounts of the heavy-metal cadmium (which causes bone and kidney damage). Scientists whom the medium sought out for interviews declined because late in 2012, “China’s communist party declared national soil samples ‘state secrets’.”²⁶

Blaming the Victims. A common response to industrial pollution incidents is to blame those who suffer. In the anthropological case cited above, some villagers blamed those who were afflicted—because of their bad temper, preference for strong alcohol and cigarettes.²⁷

Ignoring the Problems. An explanation of the lack in response of government officials at all levels is that the solution might lead to shutting down manufacturing facilities providing jobs and tax revenues. In 2007 the outspoken vice minister of the environment, Pan Yue, told media that local officials in parts of China colluded with businesspeople to allow the operation of polluting plants that his agency had ordered shut down.²⁸

In 2011 a Yunnan blogger revealed that a local factory had dumped 5,000 tons of toxic chromium tailings on a hillside, endangering the drinking water of tens of millions and attracting widespread media attention. Two months earlier district environmental supervisors had notified the county environmental protection bureau (EPB) about the chromium waste, asking officials to inspect storage at the chemical plant. Later, investigators learned that company staff had signed an agreement with a transport firm to dispose of the tailings without knowledge or approval of the bureau. The EPD was out of the loop.²⁹

Interjurisdictional Problems. Another factor explaining the lack of state environmental response, particularly at the provincial level and below, is one province’s lacking jurisdiction to engage in environmental cleanup in another province. This was mentioned by Anhui officials who sought to clean up the Kui river, when they realized that the primary source of river pollution was in Jiangsu province, where they lacked authority.³⁰ In the chromium example mentioned above, Yunnan’s environmental authorities failed to inform downstream provinces of Guangxi and Guangdong, arguing that when water left the province it was of good quality.³¹ Related to this, polluting factories may move to poorer western regions where their potential to spur local growth clouds knowledge of their adverse environmental impact.

A second factor is of greater significance, and that is the tendency of provincial and local government officials to pursue economic development even when they are directly contradicted by central environmental protection mandates.

Recent Changes in China’s Handling of Environmental Disasters

Problem Recognition; Moving the Issue to the Government’s Agenda. Last year, in 2013, the government of China acknowledged that indeed environmental degradation had serious

²⁶ See: <http://marketplace.org/topics/world/chinas-toxic-harvest-growing-tainted-food-cancer...> accessed 4/28/2014.

²⁷ Lori-Wainwright, op cit.

²⁸ Tremblay, op cit., page 2 of 4

²⁹ Si Meng, “On Yunnan’s chromium trail,” *chinadialogue*: <https://www.chinadialogue.net/article/show/single/cn/4493-On-Yunn...>, accessed 4/29/2014.

³⁰ Recounted in Tremblay, op cit.

³¹ Meng, op cit., page 4 of 5.

health effects. In a report issued by the Chinese Center for Disease Control and Prevention, Yang Gonghuan who directed the study said there were “cancer villages” along the Huai river. The report mentioned that water surveillance data along the river since the 1980s indicated that cancer incidence in affected areas was 50 percent higher than the national average; lung cancer mortality rates, particularly for local women, had increased 20 fold.³²

At about the same time, the *Weibo* account of *Global Times* printed the map of cancer villages discussed above, accompanied by a weeping emoticon.³³ Several months later Zhou Shengxian, China’s environmental minister, was quoted by state media as saying: “I’ve heard that there are four major embarrassing departments in the world and that China’s ministry of environmental protection is one of them.”³⁴

Helping China come to terms with gross instances of environmental pollution has been a vigorous foreign press, which first brought information on cancer villages in China to global attention. For example, in 2004 the *New York Times* reported that 13 of 17 deaths in 2003 had been caused by cancer in the village of Huangmengying of Henan province.³⁵

Adoption of New Approaches. The significant new approach was to embed response to environmental degradation in the latest Five-year plan. It stated:

In recent years, toxic and hazardous chemical pollution has caused many environmental disasters, cutting off drinking water supplies, and even leading to severe health and social problems such as “cancer villages.”³⁶

The plan outlined a crackdown on the use and production of 58 types of toxic chemicals; it criticized enterprises for inadequate pollution risk control and the government itself for insufficient pollution monitoring and supervision capabilities.³⁷ Ma Jun, author of *China’s Water Crises* and probably China’s most authoritative critic of national water policies, said the acknowledgement reflected greater environmental transparency, instead of its traditional claim that scientific evidence was insufficient to link “cancer clusters” and pollution.³⁸

The estimated cost of these additions to the Fifth Five-Year plan would be \$290 billion, the largest amount ever expended on a Chinese environmental program.³⁹

Implementation. One can hope that statements in the Twelfth Five-Year Plan will be taken to heart in the administration of government policy. In one recent case, it appears that they have. When tests of water quality in the eastern Chinese city of Jingjiang several months ago indicated abnormalities, city officials shut off the water to city residents and initiated an emergency response plan.⁴⁰ This contrasts with the tardy response of both local and national officials to an oil spill on the Songhua river in 2005.

Lower-governments? The most serious test of implementation, however, will be the capacity of the national state to integrate policy and programs with the local states, often

³² Juan Shan and Baijie An, “Study affirms ‘cancer villages,’” *China Daily*, August 8, 2013.

³³ Caitlin Dewey, “Chinese state media release a map showing the spread of ‘cancer villages,’” *Washington Post*, February 22, 2013.

³⁴ Tom Phillips, “China’s environment ministry ‘one of four worst departments in world,’” *Daily Telegraph*, July 9, 2013.

³⁵ Tremblay, op cit.

³⁶ Tom Phillips, “China admits pollution has caused ‘cancer villages,’” *Daily Telegraph*, February 22, 2013.

³⁷ Ibid.

³⁸ See: <http://www.telegraph.co.uk/news/worldnews/asia/china/9887413/Ch..> accessed 4/28/2014.

³⁹ Phillips, op cit.

⁴⁰ Reuters, “Chinese city suspends water supplies over ‘quality abnormalities,’” <http://www.reuters.com/assets/print?aid=USL3NONV2AV20140509> accessed 6/6/2014.

following different missions and goals. Since devolution of power to provinces and cities/townships after China's marketizing reforms, conflicts between national and provincial/county authorities have increased, as noted above.

However, environmental protests have focused on local factories, plants and local government officials who seem powerless to constrain private actions that clearly violate the law.⁴¹

Local authorities and institutions clearly are the major wild cards in the implementation of new national policy on environmental protection.

Conclusion

Environmental degradation and its health effects is a global problem. *Love Canal* in the United States is a compelling example of how gaps in legislation and systemic flaws in political processes led to unnecessary illness and deaths. Similar stories can be recounted for virtually every other economically developed country.

Health problems resulting from environmental degradation typically are more common in lesser-developing countries (LDCs). China is not alone in the significance of its cancer villages. Excessive use of pesticides that contaminated ground water in the Malwa area of Pakistan led to cancer villages in this region.⁴² Neighboring India also has a large proportion of cancer villages.⁴³

⁴¹ See Jun Jing, "Environmental protests in China," in E. Perry and M. Selden, eds., *Chinese Society: Change, Conflict and Resistance*, London: Routledge, 2004. Also see Kevin O'Brien and Lianjing Li, *Rightful Resistance in Rural China*, Cambridge: Cambridge University Press, 2006.

⁴² Punjab Foundation, "Cancer belt of Punjab," <http://www.punjabfoundation.org/belt.html> accessed 4/29/2014.

⁴³ A. Singh and M. Kaur, "A health surveillance of pesticide sprayers in Talwandi Sabo area of Punjab, North-West India," *Journal of Human Ecology*, Vol. 37, 2, 2012, 137.