

The Downside of Development: Pollution at What Cost?

An Analysis of China's Boom Region

By

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Abstract:

This thesis will examine the environmental politics of China and argue that the Yangtze River Delta is the most important region for developing new pollution control policies for China that will resonate domestically and internationally. The historical development of the environmental protection regime is first investigated, followed by a scrutinizing of the Yangtze River Delta's importance to the rest of the country. Next, the specific issues of air and water pollution are revealed as the most significant environmental issues, and a discussion of some of the progress and solutions for combating the issues ensues. China's international involvement in relation to the environment is also crucial, as is the need for sustainable development. A last look at some of the health costs associated with pollution is observed at the end before final conclusions and recommendations are made.

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Part I: Introduction

The 21st century has ushered in a new global feeling to “go green”. The effects can be felt everywhere, from supermarkets that offer reusable canvas bags, to hybrid vehicles that no longer rely purely on gasoline to power their engines. The revolution to protect the environment has no larger spotlight country than China. This thesis will examine the environmental politics of China. The research will focus on the developments of environmental protection in China, and more specifically in the Yangtze River Delta (YRD) region. I spent seven months in this area both working and studying and was taken aback by the lack of clear skies. This was not only due to the subtropical climate, but to the heavy industrialization that has flourished in the area over the last thirty years. Unfortunately, this geographic area is one of the most polluted in the world. Both air and water pollution are rampant, but how is this problem to be combated? Can China combat its national pollution problem? This thesis will argue that the Yangtze River Delta is the most important region for developing new pollution control policies for China that will resonate domestically and internationally.

The research begins with an examination of the historical outlook of the environment and then move on to environmental protection. Next is a look at how China’s State Environmental Protection Agency (SEPA) has recently been promoted to a higher status in the hierarchy of government agencies. It is now the Ministry of Environmental Protection (MEP). How will this affect the future power of the MEP to enforce regulations? The MEP sets standards for businesses and cities regarding pollution and issues levies on polluters, but whether central government standards trickle down to local enforcers is another question. This thesis will explore the diverse ways

various kinds of businesses are levied, ranging from corporations that are privately-owned, state-owned, and multinational in character that have invested in the YRD, and why this region is significant.

This thesis will also explore what the current policies of China say with regards to environmental regulations. Furthermore, it will be questioned what role world politics play in China's policies, especially those from the United States, who also is condemned by the international community for its lack of environmental regulations. This thesis will be written from an objective political – economic perspective that seeks to evaluate the costs of successful industries in the Yangtze River Delta on the environment, and how the pollution problem is not just an issue for China, but a concern for the world. More specifically, I will examine the effects of pollution, both air and water on the economy and how this is dealt with politically. Sustainable development is also a key issue to be addressed.

The thesis will be concluded with an analysis at how water and air pollution can become a national security issue from both domestic and international sources. For example, the health costs resulting from environmental degradation should be investigated as a national security issue. Polluted rivers that flow into oceans that affect fishing industries from countries other than China is one example of how the issue transcends borders. How China's environmental issues are affecting the international community is important to recognize. In 2002, emissions from Chinese smelting plants were discovered in Hawaii.¹ It is difficult to fathom how this is possible, yet it expresses just how global the pollution problem is.

¹ Kristen Day, ed., *China's Environment and the Challenge of Sustainable Development* (Armonk, NY: M.E. Sharp, 2005), 68.

My research methods will encompass reading detailed reports and original research on air and water pollution in China. Personal experiences from the region will also be utilized to describe the current situation faced by the Yangtze River Delta.

Part II. Historical Development

In most developed Western countries, environmental awareness and policy has been in place for many decades. For example, in the United States, pollution control legislation for water and air began in the late 1940s. Although the U.S. is not a shining example of pollution control, the government has been involved in the legal process for some time. For China however, environmental consciousness has been slower to develop. China's first Chairman, Mao Zedong united a very fragmented China in 1949 when he established the People's Republic of China. At this time concerns for environmental protection were very far from the minds of the people who had just recently suffered such strife under civil war. Communist China efforts for environmental protection were limited, much like Western countries during their development. Forests were cut down, rivers and lakes were polluted and the air was filled with toxic substances without any regard for the long term effects and future consequences.

China's myriad environmental issues such as pollution, deforestation, and biodiversity loss are essentially the same for most other developing and developed nations.² What sets China apart from the U.S. which is roughly the same geographical size, is the scale of degradation. China's massive population puts a strain on the country's resources. During the Mao period, there were some water conservation efforts taken, but unfortunately many of these failed, or were not effective enough to make a big difference. Mao's vision to mold China into a great world power had negative consequences for the environment. Factories were established during the Great Leap

² Elizabeth Economy, *The River Runs Black: The Environmental Challenge to China's Future* (Ithaca, NY: Cornell University Press, 2004), 28-47.

Forward (1954-1958) to produce steel. These factories dumped industrial waste into rivers without any regard for the consequences. In many of his speeches and writings, Mao sought to conquer nature rather than protect it. In a 1940 speech, Mao stated, “For the purpose of attaining freedom in the world of nature, man must use natural science to understand, conquer, and change nature and thus attain freedom from nature.”³ This is one example of how Mao’s philosophy affected the national policy for the environment.

The main point of the Mao era is that there was no national environmental regulation of any kind that was enforced. There were some scattered examples throughout China’s history of efforts to protect the environment, such as Mao’s limited water conservation efforts, but nothing on a large scale, therefore this did not set up a good foundation for future environmental protection post-Mao.

³ Economy, *The River Runs Black*, 48.

Part III. Development of Environmental Protection Systems

The first inklings of environmental management began at the end of the Mao era with the “*San Tong Shi*” or “Three Simultaneous Steps System” in 1973.⁴ This system was set forth at the First National Conference on the Environment.⁵ The system applied to new or expanding industrial plants (not existing ones) to include environmental protection measures in the following three steps: design, construction, and operation. This was only applied to large and medium sized enterprises allowing smaller businesses to survive without costly pollution controls. Despite the fact that the system was not very comprehensive, this was a positive first step towards more comprehensive regulation.

After the death of Mao Zedong in 1976, there was a great reshuffling of government infrastructure in China. This included creating a bureau for Environmental Protection in 1978. The first environmental policy was implemented in 1979 with China’s air pollution charge system.⁶ The government decided to target the enterprises of Suzhou, one of the Yangtze River Delta’s most historically significant and affluent cities. At this point in history China already had recognized the YRD as the vital site for developing pollution controls. Initially, fifteen businesses were fined for exceeding the limits set under the new system. One motive for selecting Suzhou could be that the government wanted to first try to clean up one of its most cherished cities. Suzhou is an ancient canal city located on the Yangtze River, just West of Shanghai, commonly known as the “Venice of China”. The city soon evolved into a center of industrialization and commerce with the establishment of the Suzhou-Singapore Industrial Park Special

⁴ Applying Market-Based Instruments to Environmental Policies in China and OECD Countries (Paris, France: Organization for Economic Co-operation and Development, 1997), 71.

⁵ Day, *China’s Environment*, 50.

⁶ *Applying Market-Based Instruments*, 67.

Economic Zone (SEZ). It is logical that the government would want to bring Suzhou to the forefront for future pollution controls in all of China.

In order to fully comprehend the environmental protection system in China, it is essential to know some of the government structure and legal system. The National People's Congress (NPC) is the aggregate law making body of the Communist government. Within the Congress are the twelve members of the Standing Committee or Politburo that possess most of the power in the government. The Standing Committee is headed by the president and the premier. Unlike America's system of government, the lines between the executive and legislative branches of government are more blurred, and no direct elections take place. The General Office of the Standing Committee compiles the soviet-imported model of Five Year Plans (FYP) that dictates the direction of the country that the government wishes to take. The FYP is where environmental law is promulgated and amended.⁷

The government has traditionally employed a command and control approach for pollution control in enterprises.⁸ A command and control approach is also known as applying an "end of the pipe solution". This means that there are punitive measures taken against businesses for polluting. These punitive actions include restricting certain pollutants and imposing fines, but these actions have fallen short. Recently, in 2002, China created the Cleaner Production Promotion Law, that intended to "move up the pipe" in pollution control. The law discouraged the use and production of hazardous substances, and by creating a tax incentive for recycling. China was actually the first nation to implement such a law as a national policy.

⁷ Day, *China's Environment*, 70-72.

⁸ Day, *China's Environment*, 20-22.

This is a definite improvement to the pollution control regime, but the system is still essentially top-down. This has been one of China's biggest problems when combating pollution. Local Environmental Protection Bureaus (EPBs) lack enforcement power from the top level of the government to compel city government officials to hold polluting enterprises responsible. The top-down system really doesn't give much power to local enforcers who must carry out the standards set by the Ministry of Environmental Protection. According to Ross, China has employed three different strategies at various times in its policies for environmental protection. The first is the Bureaucratic-Authoritative Implementation Strategy, which is a complicated term for central planning, or a top-down approach.⁹ This strategy involves controlling the economy through material means rather than financial ones. This method is difficult to implement in a country where environmental degradation is being caused by the consumption of raw materials, such as coal.

There is also a great deal of corruption where officials are simply paid off by polluters in order to escape being reported to the national government. In John Pomfret's memoir, *Chinese Lessons: Five Classmates and the Story of a New China*, a prime example of corruption describes how one of Pomfret's friends acted as a bagman and cut deals with the local EPB in Changzhou, Jiangsu to escape charges on his business of producing parts for a railroad.¹⁰ Changzhou is one of the Yangtze River Delta's rapidly developing cities that unfortunately is another victim of enforcement failure.

⁹ Lester Ross, *Environmental Policy in China*, (Bloomington, IN: Indiana University Press, 1988), 12.

¹⁰ John Pomfret, *Chinese Lessons: Five Classmates and the Story of the New China*. (New York, NY: Holt Paperbacks, 2007), 220.

Yet for all the negatives, there have been positive steps taken for improving China's environment. One recent positive change has seen the breaking down of the top-down approach, and has instead revealed that local governments and grassroots organizations are increasingly the trendsetters for national law. Elizabeth Economy cited one such example where a Chinese television producer went to Germany to produce a program on battery recycling.

She came back, ran the program in China, and a doctor in Dalian saw the program and decided that, in fact, she was concerned that her three-year old daughter, that the fruit that she was eating was probably being polluted by a local battery dump. So she decided to start up her own battery recycling program. She went to the local environment protection bureau, which said it couldn't help because there were no regulations dealing with battery recycling, but it would support her in whatever she decided to do. And so then she went to a number of department stores and asked them whether they'd be willing to put out some boxes so that people could dump their batteries in them. Three of them agreed to do it, and soon in Dalian and in many other cities in China there were so many batteries being turned in to be recycled that the EPB officials began to complain of "battery phobia" They didn't want to take any more phone calls asking where people could recycle their batteries, because the EPB's simply didn't have the capacity to recycle them. So this is part of the excitement that's being generated at the grassroots level when it comes to environmental protection and ways in which the media and the people are working together to make a change.¹¹

This is one such example of how an individual contribution can start a chain reaction to affect the aggregate pollution control effort. The cities and people of the Yangtze River Delta can learn from this extraordinary example from Dalian.

¹¹ Economy, Elizabeth C. "China's Transition at a Turning Point: Session II." (Council on Foreign Relations Think Tank, 2003).

Another change has been in the area of the law. Hundreds of legal documents have been enacted both nationally and locally in the effort to increase environmental protection. For example, one local law is the 2000 Jiangsu Province Management Measure on the Prevention of Pollution from Single-Use Plastic Food Utensils and Plastic Bags.¹² Local laws to protect the environment can be great trendsetters for future national laws in working from a bottom-up approach. These local laws and legal documents have been initiated by the concerned citizens of highly polluted areas. For example, in Nanjing an initiative was undertaken to clean up the city's largest lake, Xuanwu.¹³ In the 1990s, the water quality was too poor for even a grade, so Nanjing started the "contract responsibility system" to assist in the effort. Contracts are still a rare form of legal exercise, so this system was very progressive. By 2001, it was a grade V, the worst class of water, but improved from its previous state (See Table 1 for water classes).

Table #1		
Classes of Water Use in China		
Class	Description of Use	Description of Quality
I	Water that flows through national nature reserves	Best
II	Sources of municipal drinking water (first grade conservation area), conservation areas for rare aquatic species, and areas for fish spawning	Better
III	Sources of municipal drinking water (first grade conservation area), conservation areas for rare aquatic species, and areas for fish spawning	Useable
IV	source of industrial water supply and recreational use other than swimming (boating, fishing)	Worse
V	source of industrial cooling water, irrigation water, and ordinary landscape	Worst
source: Day, <i>China's Environment</i> , 7.		

¹² Day, *China's Environment*, 81.

¹³ Day, *China's Environment*, 107.

Part IV: Evolution of the Ministry of Environmental Protection

The Ministry of Environmental Protection (MEP) has evolved into an extensive and complex government bureaucracy. Today's MEP is divided into twelve departments, including the Department of Pollution Control, and the Department of International Cooperation. Within the Department of Pollution Control are eight divisions including: Division of Water Environmental Management and the Division of Air and Noise Pollution Control. Within the Department of International Cooperation are five divisions including: Division of Regional Environmental Cooperation and the Secretariat of China Council for International Cooperation on Environment and Development.¹⁴ All of the divisions must work together to effectively combat pollution. Sometimes in Chinese bureaucracies there is a tendency to follow the hierarchy and not coordinate across horizontal divisions. This could be the case for the MEP.

The current minister of MEP is Zhou Shengxian, and he was appointed in March of 2008 with the creation of the new ministry. Thus far, it appears Minister Zhou and his vice ministers are actively trying to extend protection measures, especially in the area of air and water pollution, but it is still early to discern if the organization's promotion has resulted in a significant increase in environmental protection regulations.

¹⁴ "Ministry of Environmental Protection." 2008. http://english.sepa.gov.cn/About_SEPA/Institutional_structure/200707/P020080318428876879466.pdf (accessed March 19, 2009).

Part V: Importance of Region

Three of the Yangtze River Delta's largest cities are Shanghai, Nanjing, and Hangzhou. Shanghai is a municipality that is an international center for commerce, finance and culture and is home to over 14 million people. Nanjing is the capital of Jiangsu province and has a population of over 8 million people. Hangzhou is the capital of Zhejiang Province and houses over 6 million people. These cities are three of the largest and most developed in China. The Yangtze River Delta is of the utmost importance to China because it has been the most successful economically with the highest GDP per capita in the nation. The environmental issues faced by the Yangtze Delta Region are numerous indeed, but its issues differ from other areas of the country. For example, Northern China has been experiencing rapid desertification and Western China has been maligned by deforestation. The YRD's most severe problem is air and water pollution.

There are many reasons why the Yangtze River Delta Region is of the greatest importance to China. The YRD has optimal access to both the domestic and foreign markets. The region is also home to many cultural and historical landmarks. Figure 1 shows the area that encompasses the delta. This includes the major cities of Jiangsu and Zhejiang Provinces as well as the Shanghai municipality.

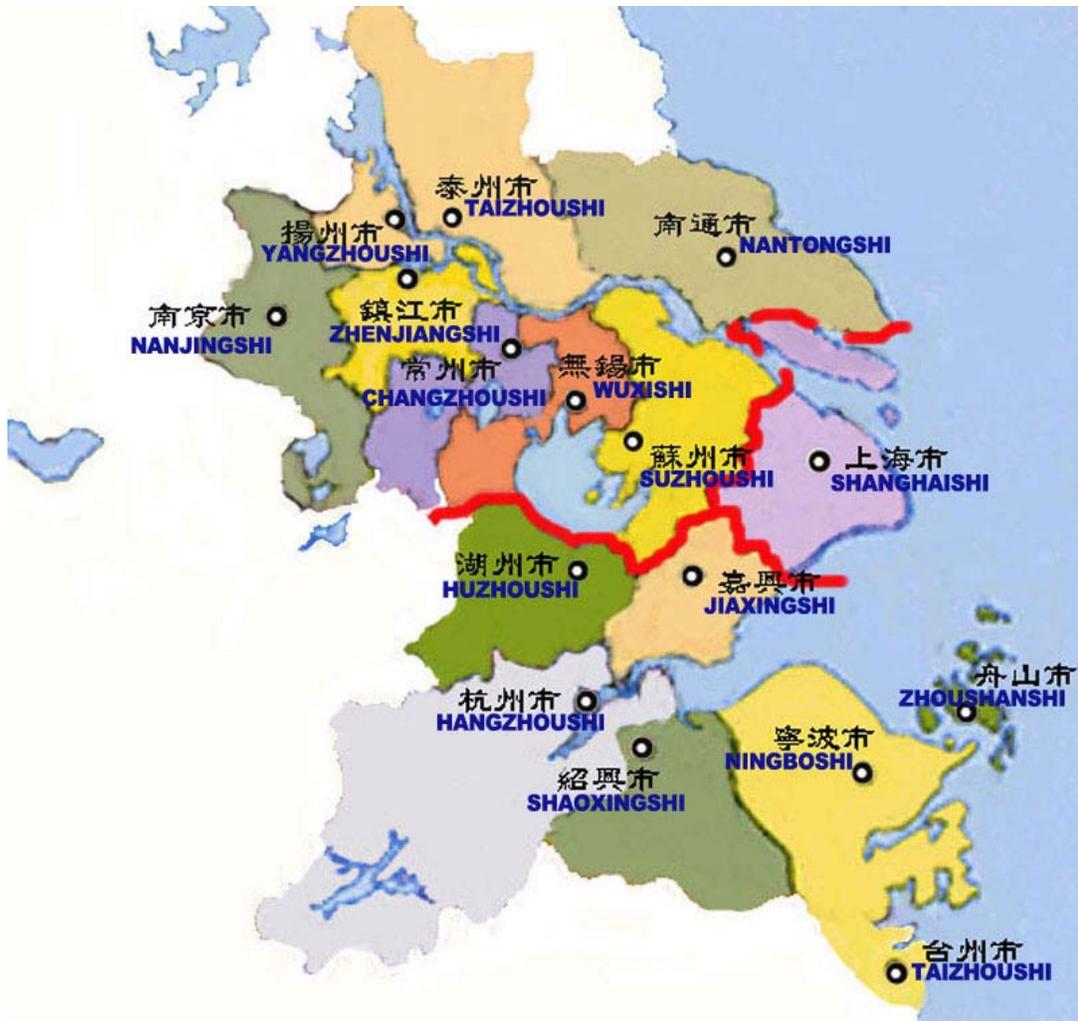


Figure 1: Map of Yangtze River Delta Major Cities¹⁵

The Yangtze River Delta has competed against the Pearl River Delta in Southern China for dominance in Gross Domestic Product (GDP) per capita, Foreign Direct Investment (FDI), and technological superiority. The Pearl River Delta was a main focus of the initial reforms and openings when Shenzhen, a city strategically near Hong Kong was one of the first Special Economic Zones (SEZ) to be created in the late 1970s. Guangdong Province as part of the Pearl River Delta has seen its exports double in the

¹⁵ “The American Chamber of Commerce Shanghai,” <http://www.amcham-shanghai.org/AmChamPortal/> (accessed April 18, 2009).

past five years to reach \$153 billion United States Dollars (USD) in 2003; those of the Greater Shanghai region (including the nearby provinces of Zhejiang and Jiangsu) have almost quadrupled to catch up.¹⁶ As of 2007, exports from the Yangtze Delta region totaled \$450.7USD billion.¹⁷ In another comparison in terms of FDI, Shanghai is already more attractive than Guangdong, drawing \$21USD billion last year, versus \$7.8 USD billion for Guangdong. Shanghai has become the preferred site for technology firms and heavy industry.¹⁸

When China is described as an “economic dragon”, Shanghai has been referred to as the “dragon head”. This indicates that Shanghai controls China’s economic progress, or at least is the best indicator of what direction the economy will go. The sixteen major cities of the Yangtze Delta region total population is over 93 million people and have an average GDP per capita of ¥47, 513 Renminbi (RMB) or about \$6800 dollars as of 2007. According to the Organization for Economic Co-Operation and Development (OECD) in 2005, the national GDP per capita was only a little over \$4000 dollars, which is about ¥28,000 RMB.¹⁹ The YRD GDP per capita was almost twice national average, discounting the two year difference. This data shows how the YRD is more economically developed than the rest of China, and how it elevated the national GDP per capita.

Elizabeth Economy estimates that 80% of funding for environmental protection measure comes from foreign organizations and governments.²⁰ As Shanghai and the

¹⁶ "String of Pearls: China’s Vibrant South," *The Economist*, November 18, 2004, 39-40.

¹⁷ "Market Profiles on Chinese Cities and Provinces," November, 2008, <http://info.hktdc.com/mktprof/china/yrtd.htm> (accessed April, 4, 2009).

¹⁸ "String of Pearls," *The Economist*, 39-40.

¹⁹ "Market Profiles," (accessed April, 4, 2009).

²⁰ Jerry McBeath and Bo Wang, "China's Environmental Diplomacy," *American Journal of Chinese Studies* 15, no. 1 (April 2008): 7.

other cities of the Yangtze River Delta become the preferred site for FDI, it is fair to assume that they are receiving more funding for environmental protection. Because of this, China should look to this region to invest in new science and technology for green purposes. If the national government can target the YRD as ground zero for environmental progress, successful experiments can be applied to other polluted or environmentally maligned areas of China.

According to the National Bureau of Statistics in 2004, 48 out of 100 counties that have presented the most impressive economic indices and growth potential are from Zhejiang and Jiangsu Province. Eight of these counties are on the top ten list of the National Bureau of Statistics survey, which gives further evidence of the Yangtze River Delta's economic importance. The average annual growth rate for these eight cities was 18 percent, double the national average.²¹ This is exceedingly impressive for any economy, but it just additionally proves the economic might of the YRD cities. This kind of economic power is a pivotal requirement for abating pollution.

²¹ "Yangtze River Delta Faces Pollution Crisis." *China Daily*, September 26, 2005. 4. http://www.chinadaily.com.cn/english/doc/2005-09/26/content_480714.htm (accessed March 28, 2009).

Part VI: Air and Water Pollution



Figure 2: Pollution of the Yangtze River and the air in Chongqing Municipality²²

Pollution hurts the economy in many ways by desiccating cropland, forcing large and expensive river diversion projects, clean up efforts, and growing social tensions. (See Figure 2 for a visible example of the Yangtze River's pollution.) This is why a multitude of intergovernmental and non-governmental organizations have taken an interest in the effect of such environmental degradation. One such intergovernmental group is the Organization for Economic Co-Operation and Development (OECD), which published a report in 1997, that discussed applying market-based instruments to environmental policy in China. This report was very insightful into the current practices

²² Photograph by Author

of the Chinese government as well as future goals the organization would like to see China achieve. Although China is not currently a member of the OECD, it has been observed for some time as an “enhanced engagement country” along with other major emerging nations such as Brazil and India. The OECD believes that a strong environmental policy would compel the price of goods to reflect environmental costs fully. For example, fresh water is still very cheap in China despite huge scarcities, particularly in the North where desertification is drying up what used to be fertile lands. If the real price of fresh water was reflected by its scarcity, then water pollution abatement efforts would be intensified to protect the limited resource.

Another insight in the report was a review of the current pollution levy system. The levy system was priced too low to make a significant reduction in pollution. For example, Chemical Oxygen Demand (COD) is a measurement for chemical particles in waste water. The charge rate for COD is 50% less than the average treatment cost. This means that there are insufficient funds to combat the problem, therefore allowing the problem to escalate and escalate.²³

The polluter pays principle (PPP) has been adopted by the UN in the form of international law, and is the recognized as the most fair and legally responsible method of appointing responsibility for the pollution problem. The PPP system has been inconsistent with China’s planned economy system of pay back principle and loan forgiveness provisions. This is also reflected in the current levy system which only applies to large and medium state-owned enterprises (SOEs), but not private and township and village enterprises (TVEs). TVEs were popularized with Deng Xiaoping’s economic reforms starting in the late 1970s, and they have been wildly successful for

²³ *Applying Market-Based Instruments*, 30-40.

driving China's boom. In Jiangsu Province, total revenue from township and village enterprises increased from ¥35 billion RMB in 1985 to ¥385 billion RMB in 1994. In fact, TVEs in Jiangsu province have been much more successful than the national averages in terms of sales revenue per employee. As given by the following table:²⁴

		Town	Village
Sales Revenue per employee (RMB)	Jiangsu	48, 143	43, 137
	China	31, 505	28,500

TVEs have been an economically successful alternative to purely government-owned facilities, but they have had detrimental consequences for the environment because of the old technology they employ and their high rate of raw material consumption. SOEs on the other hand do pay fees, but this is often pointless because the money is recycled back to the companies in the form of subsidies for pollution treatment. This means there is a lack of incentive for enterprises to treat or prevent pollution in the first place if they are just going to receive money from the government anyways. SOEs also frequently delay paying their fines, because they are hard pressed financially, and the government is more likely to encourage development than enforce fees. Also, since TVEs are not under the direct control of the government, they are harder to oversee, and consequently fly under the radar from pollution control. The polluter pays principle system in China has far too many exceptions; when it comes down to short term

²⁴ Tan Teck Meng, Low Aik Meng, John J. Williams, Cao Yong, and Shi Yuwei, eds., *Business Opportunities in the Yangtze River Delta, China* (Singapore: Prentice Hall, Simon and Schuster, 1996), 229-257.

economic development, or long term pollution crises, thus far China has opted for the former.

China has not just dealt with its own domestic enterprises. SEPA has issued regulation with foreign economic developing regions in SEZs, such as those in Suzhou and Shanghai in the Yangtze River Delta.²⁵ This implies that foreign businesses who establish plants in China to escape more strict regulations in their home countries do not enjoy a total exemption from environmental protection measures. In fact, foreign businesses often bring superior technology to China that is less polluting and more energy efficient than the multitude of the older technology used by TVEs. This practice of multinationals has also led to some increased international tensions. In the late 1990s SEPA accused South Korea and Taiwan of allowing their companies to come to China to avoid more costly environmental regulations. Other countries also use China as a giant landfill to dump their wastes that are unwanted at home.²⁶

In a study conducted by the World Bank entitled “Incomplete Enforcement of Pollution Regulation”, pollution levies in actual practice were observed in the Yangtze River Delta city of Zhenjiang from 1993-1997. Zhenjiang has a population of around 3 million people and is a historically important city in the region because it is the site where the Yangtze River meets the Grand Canal, making it a central port for commerce between the North and South and East and West (see Figure 3). Zhenjiang is another city, like Suzhou, in the delta where industrialization has flourished and tourism is important to the city. Thus, the pollution problem is a key issue. The study sought to show the

²⁵ Day, *China's Environment*, 82.

²⁶ Economy, *The River Runs Black*, 89.

relationship between the bargaining power of enterprises with the local Environmental Protection Bureau (EPB) and their various financial circumstances.

In 1997, 640 industrial plants were observed in the study, and they were subjugated to 5,287 inspections by the Zhenjiang Environmental Protection Bureau. There were 78 water related complaints and 163 air related complaints by the concerned citizens of Zhenjiang. An enterprise was inspected eight times a year on average, and the highest number of inspections was sixty-one times in one year! These high numbers are quite significant for showing the level of involvement for both the local protection bureau and the public interest.



Figure 3: The Grand Canal route from Hangzhou to Beijing with Zhenjiang at the crossroads of the Yangtze River and the Grand Canal²⁷

The results drew several conclusions. First, it was revealed that SOEs have more bargaining power than privately owned companies. This is mainly due to the fact that

²⁷ Ian Kiu, "Grand Canal of China."

government agencies enjoy preferential treatment. Second, firms which employed more workers had stronger negotiating power. Businesses viewed as suppliers of jobs rather than just profiteers are more favorable. Third, firms with lower profits had more bargaining power. If the firm was fined so badly as to put the firm out of business, the EPB official would think twice before condemning it. Fourth, companies which demonstrated more effort to abate their pollutants had more bargaining power. Basically, this is a reward for positive business practices. Fifth, enterprises that had a negative public image had less bargaining power. This was reflected by the amount of complaints received by the EPB. Sixth, firms that received levy refunds were less likely to bargain when they forecasted they would continue to receive the refund. Why bother fighting a fine when they would just be compensated with a refund? Lastly, there was a relationship that showed the more times a firm was inspected, the less likely it would pay a levy.²⁸ These conclusions revealed how limited environmental policies are without proper implementation. When bargaining power exists between firms and EPBs, the environment is always at the disadvantage.

Some national trends of certain air pollutants were inspected by the OECD report for the years of 1989-1995. Industrial powder dust discharge was fairly stable, but smoke dust and SO₂ increased greatly with the economic boom and the use of coal. Also, CO₂ levels skyrocketed during this period, most likely as a result of the increase in personal vehicle use and gasoline. In 1994, the industry emission discharge treatment rate was

²⁸ Wang, Hua, Nlandu Mamingi, Benoit Laplante, and Susmita Dasgupta. "Incomplete Enforcement of Pollution Regulation: Bargaining Power of Chinese Factories," *The World Bank Research Development Group* (2002), [4-19], http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2002/02/16/000094946_02020604052946/Rendered/INDEX/multi0page.txt. (accessed March 19, 2008).

only 71.8% of the total volume. This is better than no treatment at all, but still nearly 30% of emissions were left to pollute the air.

Early charge rates for polluters were not enough to make a positive economic impact. In 1982, the polluter would pay their fee, according to the density, not volume of the pollutants discharged by his enterprise, and sometimes would be fined again for clean up charges. The charges covered over 20 different pollutants. Some later efforts were focused specifically on SO₂ emissions. SO₂ emissions are particularly harmful because they produce acid rain, which is transboundary in nature and effective in contaminating soil and corroding infrastructure. The first trial charge system was implemented in 1992-1994 in Hangzhou, the capital of Zhejiang Province. Polluters were charged 0.2 Yuan/kg of SO₂. In this case, the charge system had a positive effect on changing the practices of Hangzhou factories. In the Hangzhou government's sixth FYP, 90% of 1,026 boilers were converted to mechanical burning, which is a less polluting system, and dust removal in the industrial process increased to 76%. These positive results contributed to cleaning up the famous West Lake (*Xi Hu*) of Hangzhou, virtually making it smoke free.²⁹ This is a photograph of West Lake taken in 2007. It exhibits the improvement of the water quality due to the government's influence.

²⁹ *Applying Market-Based Instruments*, 68-97.



Figure 4: The West Lake in Hangzhou³⁰

The OECD has recommended that the Chinese government reform the pollution levy system to use both total volume of emissions and non-compliance charges as means of environmental regulation enforcement. This falls in line with the polluter pays principle and the developed countries goals for global pollution abatement. These are market based incentives, which have been advocated by many experts discussed in this thesis. The abatement of air and water pollution is reviewed further in the next section.

³⁰ Photograph by Author

Part VII: Progress and Solutions

Despite the tremendous burden placed on the Chinese society from air and water pollution, there have been solutions reached and progress made in many areas. Recall the discussion earlier of Ross's three different strategies for environmental protection which China has utilized. The first was the Bureaucratic-Authoritative Implementation Strategy, and the second was the Campaign Exhortative Strategy. This strategy involved using massive national campaigns to change the public's attitude toward an issue and then sometimes force compliance with the campaign's ultimate goal. Campaigns are still evident today. At the APEC conference in 2007, President Hu Jintao proclaimed, "We will launch a nation-wide publicity campaign on climate change to raise public awareness of energy efficiency and emission reduction, and encourage everyone to take action to help mitigate and adapt to climate change."³¹ This shows that the Chinese tradition of mass campaign is still alive and well, and an important tool in environmental protection.

It is obvious that the environment has become more important to the Chinese people and its leadership. Beginning with the reign of Mao Zedong, every chairman has contributed his own personal ideology to the national constitution. Mao Zedong thought, Deng Xiaoping theory, and Jiang Zemin's Three Represents have all been incorporated into the policies and practices of the Communist party. Most recently in 2006, President Hu Jintao's Scientific Development Concept has highlighted sustainable development as a goal for China's continued progress and development of "socialism with Chinese

³¹ "Hu Expounds China's Stance on Climate Change." *China Daily*, September, 9, 2007, http://www.chinadaily.com.cn/china/2007-09/09/content_6091855.htm (assessed April 4, 2009).

characteristics”. Sustainable development is discussed later in this thesis. For now, this reflects the importance that the Communist party has placed on developing responsibly.

China no longer talks about a revolutionary movement, but instead focuses on a “harmonious society”. A harmonious society is increasingly becoming a green society. Recent examples of this include the 2008 summer Olympics in Beijing where massive efforts were taken to reduce the ambient air pollution in the city. Roads and factories were temporarily shut down by government edicts to help contribute to pollution abatement. In the coastal city of Qingdao, sailing events were to be hosted for the Games, but was almost prohibited due to an algae invasion that was blocking the sailing routes.³² The city government mobilized soldiers and volunteers to clear more than 1 million tons of algae, and built barriers and fences to keep it out of the sailing venue. The algae was completely cleared in just one month, on August 1, just a week before the start of the Olympics. This example shows how the government can activate an environmental protection effort when they feel it is a crucial need.

Officials in the Yangtze River Delta have followed the example of Beijing’s Olympic reforms and have begun to coordinate policies for the 2010 World Expo. Environmental Protection Bureaus from Jiangsu, Zhejiang, and Shanghai have begun to form mechanisms to share air pollution data by the end of 2009 as a first step toward developing regional air pollution treatment standards. The director of the Shanghai Environmental Protection Bureau explained that removing administrative barriers was

³² Deng Shasha, ed., “Report: Over 80% of China's sea areas suffer from pollution.” *Xinhua*, January, 16, 2009, http://news.xinhuanet.com/english/2009-01/16/content_10671241.htm (Accessed April 15, 2009).

crucial to reaching a regional consensus on environmental protection.³³ The Yangtze River Delta has recognized that pollution is spread regardless of boundaries, and cooperation is needed to combat it. China's emergence onto the world stage has yielded positive results in improving environmental protection. Both examples of the Summer Olympics and the World Expo reflect how China is trying to gain the respect of the international community. China should continue to promote itself as a willing and able host for international events, and the international community should accept China's invitation with all eagerness in order to promote environmental protection.

This is quite a change from some of the rhetoric previously stated by officials that China should be allowed to develop without accounting for the environmental costs of such rapid industrialization. China even initiated a research project to find the real GDP reflecting environmental costs of pollution. This so called "Green GDP" was a nasty wake up call for some party members. Green GDP in some areas of China revealed almost zero growth. The results were so startling that the party ended the project.³⁴ This project is a good example of the party's two faced attitude toward the problem. On one hand, the party would love to be the great conqueror of pollution, but on the other hand, the party is deeply fearful of social unrest and the loss of economic development.

It is possible that if the public was made fully aware of the severity of the pollution crisis, they could easily be turned against the government. In one survey by SEPA and the Ministry of Education conducted at the end of the 1990s, the people's

³³ "Environmental Cooperation Urged," *China Daily*, March 13, 2009, <http://english.people.com.cn/90001/6613137.html#> (accessed April 3, 2009).

³⁴ Joseph Kahn and Jim Yardley. "As China Roars, Pollution Reaches Deadly Extremes." *New York Times*, August 26, 2007, <http://www.nytimes.com/2007/08/26/world/asia/26china.html> (assessed April 4, 2009).

attitude toward environmental protection and economic growth was not very encouraging. The surveys' results are expressed in Figure 5.

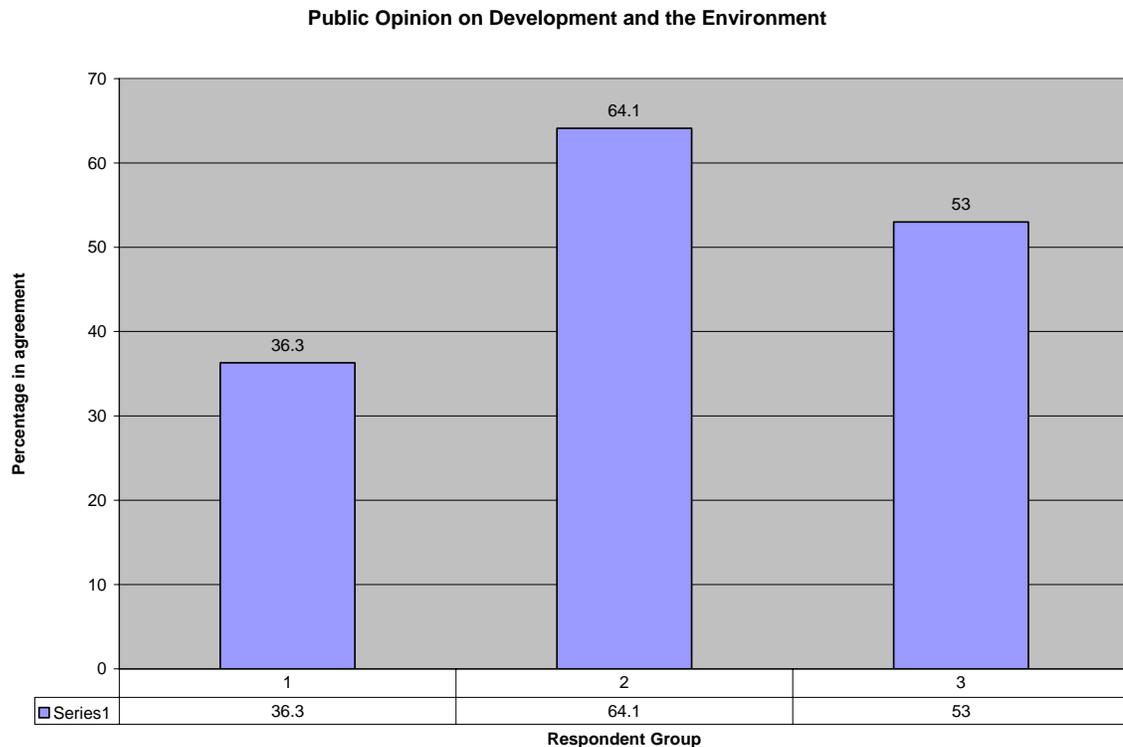


Figure 5

36.3 percent of respondents in Group 1 strongly agreed or agreed with the statement “Economic development should slow down to help protect the environment”. In two other studies at the same time 64.1 percent of Group 2 respondents and 53 percent of Group 3 respondents strongly agreed with the statement: “Environment should be given higher priority, even if economic development has to slow down”.³⁵ These mixed results make it very difficult for the government to predict what the public’s sincere attitude toward the environment will bring. However, these are significant numbers,

³⁵ Day, *China’s Environment*, 37-52.

much higher than one would expect given the party's "development first" attitude. The communist party most certainly does not wish to experience another event like the Tiananmen Square protests of 1989. They should be wary for mass anti-pollution protests if this situation continues to deteriorate.

The SEPA survey results are echoed by some party leaders as well. In 1990 at the International Conference on the Integration of Economic Development and Environment in China, Song Jian, the then chairman of the State Environmental Protection Commission stated that, "As we develop the economy, we must guarantee a balanced ecological environment and maintain in good order our natural resources so that future generations will have their rightful heritage. To this end we should be ready to pay more or, if necessary, slow down the economic development."³⁶ This is quite a change from an earlier illustration in a 1984 publication from the Director General of the Environmental Protection Bureau, Qu Geping, who said, "We are in favor of economic development and protecting and improving the environment within this development. We do not agree with the pessimistic view which calls for stopping or slowing down the tempo of economic development so as to protect and improve the environment."³⁷ These examples expose how perceptions about the importance of the environment versus development are changing, but the process is a gradual one.

One economic instrument for helping China's environmental problem is looking to the "soft effects". These soft effects are what cause a change in people's attitude or awareness towards environmental policy, capacity building, and information gathering

³⁶ Economy, *The River Runs Black*, 187.

³⁷ Qu Geping and Woyen Lee, eds., *Managing the Environment in China*, (Dublin, Ireland: Tycoon International Publishing, 1984), 7.

and sharing.³⁸ The environment in general is regarded as a soft area of international relations. Governments can exert their influence through soft power by engaging in international agreements and exporting their culture, traditions and philosophies.

Another positive change in public perception is the planned development of a Chinese eco-city called Dongtan off the coast of Shanghai. The planned city is supposed to be a low carbon emitting alternative to the urban sprawl that has plagued Shanghai. The city will house 500,000 people on just a little over 21,000 acres of land. However, the project began with a joint venture between a British firm and a Chinese state-owned enterprise (SOE) in 2005, but the construction has yet to commence. The project had hoped to house 50,000 residents by the time the World Expo arrived in Shanghai in 2010, but this is no longer a reality.³⁹ Still, it is a very promising sign for future investment in environmentally friendly design for communities. If any city in China is able to support an eco-city, Shanghai is definitely the best candidate.

³⁸ *Applying Market-Based Instruments*, 43.

³⁹ "A Planned Chinese Eco-City." *The Economist*, March 21, 2009, 43-44.

Part VIII: International Involvement

In the recent decades, China has become more and more interested in integrating itself into the international community. When China was in self-initiated exile to the international community during the revolutionary era, there was little opportunity for China to become involved in international conventions, treaties and organizations. In fact, there was little involvement in general by the developing nations during the Cold War period, unless they were linked to a superpower directly. During this time, China did not have a membership in the United Nations due to the United States preference for Taiwan's government. Taipei was recognized as the head governing body of China, not Beijing. However, in 1971, circumstances changed dramatically when the United States withdrew the recognition of Taiwan as the legitimate government of China. Consequently, the People's Republic of China (PRC) replaced Taiwan in the UN and subsequently attained an important Security Council veto. China was now poised to begin participation in international affairs.

In 1972, China entered its first international meeting on the environment at the United Nations Convention on the Human Environment (UNCHE).⁴⁰ Here China joined the other developing nations in criticizing the developed states for their pollution contributions from industrialization. China also joined others in defending their right to exploit their own resources for development purposes without interference from other countries. It was not until China's first National Environmental Protection Conference in Beijing in 1973 that China recognized its pollution problem and subsequently developed its "*San Tong Shi*" Policy.

⁴⁰ McBeath, "China's Environmental Diplomacy," 4.

The next big environmental agreement for China was the Montreal Protocol in 1987, which dealt with substances that deplete the ozone layer. The ozone layer has been damaged due to various pollutants that have been emitted from industrialized countries. China agreed to the treaty under liberal terms to phase out its production and consumption of ozone depleting substances (ODS) by 2010. China received over \$100 million dollars from the Multilateral Fund established by the Montreal Protocol in order to develop new substitutes for ODS. China executed this task very well by meeting the goal ahead of schedule in 2007.⁴¹

China again joined another summit in 1992 at the United Nations Conference on Economic Development (UNCED) in Rio de Janeiro, Brazil. The conference resulted in a new set of guidelines for the developing nations to follow. China was very much recognized as one of the most important nations in terms of future economic growth. Here, China took a more active role when it chaired a session of 41 other developing countries and declared the need for international cooperation on the environment, yet also sustaining the right to develop, seek financial assistance, and deter interference from other countries in their internal affairs. China maintained that there existed “common but differentiated responsibility” between the developed and developing world in terms of environmental practices. However, the Rio Conference is when China adopted Agenda 21. Agenda 21 was a white paper presented at the conference regarding sustainable development practices, and how they can be developed and implemented at international, national regional and local levels. Including China, 178 states agreed to support the Agenda 21 program.

⁴¹ McBeath, "China's Environmental Diplomacy," 5.

China has joined many international organizations that recognize the pollution problem and have issued reports and advice accordingly. Some of the most important organizations include: Asian Development Bank (ADB), Asian Pacific Economic Conference (APEC), Association of South Eastern Asian Nations plus China, Japan, and South Korea (ASEAN+3), International Monetary Fund (IMF), World Health Organization (WHO), and World Trade Organization (WTO). All of these organizations identify China as a top priority in maintaining a stable international environment. China is also a party to these several international environmental agreements relating to pollution: Antarctic-Environmental Protocol, Climate Change, Climate Change-Kyoto Protocol, Hazardous Wastes, Law of the Sea, Marine Dumping, Ozone Layer Protection, and Ship Pollution.⁴² Membership in such organizations and treaties is further evidence that the world has recognized the need for China's participation in global affairs and that China's environmental impact on the rest of the world is critical.

⁴² "China." March 15, 2009. <https://www.cia.gov/library/publications/the-world-factbook/geos/ch.html> (accessed March 16, 2009).

Part IX: Sustainable Development

Sustainable development is the term given to the idea that mankind should recognize the limited natural resources available, and that due to this scarcity, measures should be taken to reduce consumption to a sustainable level so that future generations may enjoy such resources and prosper. This is not an easy feat to accomplish, especially with air and water pollution slowly destroying these resources. When discussing ambient air pollution, a few cities might be pictured immediately. Los Angeles is a prime example for many Americans, but awareness of polluted Chinese cities has increased dramatically. Some reports say that 7 out of 10 of the world's most polluted cities are in China, however, the World Health Organization (WHO) has disputed this fact that no real accurate measurement can take place due to the fact that many cities with ambient air pollution have no monitoring system in place to provide such data.⁴³ However, given the current amount of collective data for cities, it can not be denied that China definitely ranks number one in sheer amount of polluted cities. It is hard to refute when observing the population level and aggregate output. Air pollution is difficult to avoid in such an emerging economy with over 1.3 billion people producing a GDP of \$7.8 USD trillion for 2008.

Economy discusses three different arguments pertaining to economic development and the environment. First, free markets allow for the exploitation of natural resources which leads inevitably to environmental degradation. Second, population growth and integration into the world economy intensifies environmental degradation. Third, free markets, population growth, and globalization are all in fact, positive for

⁴³ World Health Organization, "Air Quality & Health Questions and Answer." http://www.who.int/phe/air_quality_q&a.pdf (accessed April 9, 2009).

environmental protection. Economy describes these arguments in detail in her book. It seems Ross would agree with the third argument that free markets do not exacerbate pollution, but rather create markets of efficiency, that actually help abate pollution.⁴⁴ When market based approaches to pollution control are applied, the most positive results are produced. Businesses that are self-interested will avoid a significant pollution tax.

In China, no codified system of laws existed until after Mao due to the traditional Chinese stigma against legal remedies. The campaign mentality is deeply rooted in China and this can lead to unrealistic expectations. Protests over polluted water and air worry the party. The environment is one of the four most important sources of social unrest in China. China is the largest recipient of environment related aid from the World Bank, the Asian Development Bank, the Global Environmental Facility and Japan. The cost of Pollution in China has been estimated to be between 8-12 percent of GDP.⁴⁵ This is very startling when a monetary figure can be estimated between \$624 billion and \$936 billion dollars for 2008. If these figures are realized, China will not be able to sustain its current path of development.

Another interesting part of sustainable development is the role of TVEs. TVEs were meant to keep farmers from migrating to cities, therefore reducing the strain on city's infrastructure and resources. TVEs were 30.4% of China's GDP in 2000 which equaled 128,000,000 employees. GDP in Shanghai was \$300 in 1978 versus \$4,950 in 2002 due to foreign investment. Xie Zhenhua the head of SEPA from 1998 to 2005, revealed the two faced approach to environmental concerns in China. At the beginning of the 21st century, he announced that pollution controls would be set on TVEs and

⁴⁴ Ross, Ch. 4

⁴⁵ Economy, *The River Runs Black*, 18-25.

SOEs, while simultaneously saying that environmental protection would not hamper economic development, and consequently the agency granted more than 500 reprieves to companies to meet standards who failed in 2000.

Water scarcity has been one of biggest problems in Shanghai, Guangzhou, and Taiyuan. The World Bank qualifies China as a water scarce country because demand does not equal supply in the majority of cities and provinces. This should not be the case since China is home to some of the most extensive water ways in the world.

Unfortunately, what were once clean, ample source of fresh water have been contaminated by animal and human wastes. In 2002, over 70% of water in the Huai, Songhua, Hai, Yellow, and Liao rivers was grade IV or worse (See Table 1 for Water Classes). The volume of contaminated water in the Yangtze River by comparison was 48.5%, but despite the less severe percentage, this was disturbing because the number had doubled from the previous year. The Pearl River in Southern China was a bit better by comparison, with 70% of its water producing a grade III or better. The “*San He San Hu*” campaign was ineffective over all: 60% of the monitoring stations for Tai Lake (*Taihu*) in the YRD reported grade V or worse. Even more disconcerting, all monitoring stations for the Hu and Dianchi lakes were grade V or worsen.⁴⁶

Today, Tai Lake water quality has been improved according to a report in China Daily. This is due to Shanghai joining Jiangsu in treating Tai Lake by participating in the environmental compensation mechanism. The environmental compensation mechanism is a cooperative agreement now enforced within Jiangsu that compels cities in the water system's upper reaches to pay neighbors for excessive pollution discharges. Shanghai's Environmental Protection Bureau director Zhang Quan has said, “Jiangsu has been doing

⁴⁶ Economy, *The River Runs Black*, 62-69.

that since the second half of last year (2008), and we can see it has yielded good results, significantly improving Tai Lake's water quality. Now, Shanghai wants to join in sharing the responsibility and will hopefully contribute to the water quality's improvement."⁴⁷ This is evidence that the governments of the YRD wish to sustain their precious water resources.

The ratio of environmental inspectors to the number of factories they must inspect is daunting. Elizabeth Economy remarked,

When I was in Shanghai not long ago I met with an environmental protection bureau official and he told me in Shanghai, which is one of the sort of star cities for environmental protection, they have 100 environmental inspectors just to go out and monitor factories, and I thought that was incredibly impressive until he told me they had more than 20,000 factories that they needed to investigate on an annual basis, at which point you begin to get a sense for the real nature of the problem.⁴⁸

It has also been reported that Jiangsu, where the area of the province is 102,600 square kilometers, has roughly one TVE per every square kilometer.⁴⁹ These considerable numbers make it difficult to determine exactly how many of these enterprises contribute to water and air pollution.

Air Pollution statistics are staggering for China. Two-thirds of 300 tested cities surpassed acceptable WHO Total Suspended Particle (TSP) levels. TSPs are responsible for respiratory and pulmonary diseases. Acid rain causes tensions with Japan and Korea.

⁴⁷ "Environmental Cooperation Urged," *China Daily*, March 13, 2009, <http://english.people.com.cn/90001/6613137.html#> (accessed April 3, 2009).

⁴⁸ Economy, Elizabeth C. "China's Transition at a Turning Point: Session II."

⁴⁹ Economy, *The River Runs Black*, 70.

The main culprit for air pollution is the burning of coal. Two-thirds of energy in China is produced by coal whereas the figures for other countries are not nearly so high. Coal consumption as a percentage of all energy consumption for a given country accounts for 17%, 23%, and 51% in Japan, the U.S. and India, respectively. The economic boom is responsible for China's great consumption of coal. It is much cheaper for China's development in the short run to use coal as a source of energy than gas, oil, or renewable sources. However, with the completion of the Three Gorges Dam project, China has greatly increased its production of hydro powered energy, which is more sustainable than coal.

Security concerns are also important to recognize for China. Increased grain production to avoid dependence on foreign nations led to pollution from increased pesticides used. However, international security concerns are not a dominant source of environmental degradation.⁵⁰ Sustainable use of farmland is an essential requirement to feed China's burgeoning population.

When discussing climate change, President Hu Jintao has espoused the need for sustainable development. As one of the 21 member countries in the Asian Pacific Economic Cooperation (APEC), China has been committed to developing stronger regional ties. At the APEC forum in Sydney in 2007, President Hu put forward a new proposal for tackling climate change that included four points (Hu article China daily). First, he declared that global cooperation is essential. Second, President Hu said climate change is ultimately a development issue, and that this issue can only be addressed in the way of sustainable development. Third, he proclaimed that the United Nations Framework Convention on Climate Change should be supported as the main mechanism

⁵⁰ Economy, *The River Runs Black*, 77.

for addressing climate change issues. Fourth, the best means to tackle climate change are science and technology, therefore innovation should be encouraged, President Hu proclaimed.⁵¹ These four points show that China wants to take climate change seriously, and that it recognizes the crucial need for sustainable development. When such a proposition comes from the head of state, it is a very visible sign that the issue should be addressed with much attention.

⁵¹ "Hu Expounds China's Stance on Climate Change."

Part X: Economic Costs from Health Impact:

Health problems arising from air and water pollution in China have been a significant detriment to the Chinese people. Pomfret noted that 60 percent of his classmates' children in Nanjing were asthmatic. The parents often wished for their children to go abroad to escape the severe pollution.⁵² It is possible this could lead to future economic loss as incomes rise and more and more Chinese travel and live in other more environmentally friendly countries. By comparison, only 14 percent of children in Los Angeles are affected by asthma.⁵³ This is just one illustration of the health impact from pollution.

During the Mao period, lung cancer became more prevalent in Shanghai. In 1960, 5.25 people out of 100,000 were affected by lung cancer, but in 1976 the rate of this devastating disease increased substantially to 35 cases per 100,000 people. The Cultural Revolution was launched in 1966 and lasted until 1976 and Ross argues that this detrimental event was one cause for the rise in lung cancer. This is because the Cultural Revolution campaign created a backlash against education and this kept the Chinese people ignorant of the state of the environment.⁵⁴ A counter argument could be made that the rise in lung cancer was not just due to the rise in pollution, but any other number of factors such as a rise in smoking or a more comprehensive reporting of lung cancer statistics.

Migration and health effects of pollution are also important indicators. People movements were strictly controlled under Mao Zedong, but today there is a significant

⁵² Pomfret, *Chinese Lessons*, 247.

⁵³ "Controlling Asthma in Los Angeles County: A Call to Action," The Asthma & Allergy Foundation of America, California Chapter, 2005, http://www.aafasocal.com/advocacy_more.php (accessed May 4, 2009).

⁵⁴ Ross, *Environmental Policy in China*, 136.

“floating” population that ranges anywhere between 10-33% of the total population. This has increased the strain on resources and the environment. In the Chinese Preventative Medicine Journal, a survey on drinking water pollution in Zhejiang was shown to be significantly high in 2000. Zhejiang draws a significant migrant population as one of the highly progressive provinces on China’s Eastern coast. Microcystin toxins in the water caused people to be 5-8 times more likely to die from intestinal cancer than those with clean drinking. The World Bank reports that more than 300,000 people die from air pollution per year. In one study by Jun, urban dwellers may be more willing to engage in “blockades, sabotage, and even collective violence” over environmental concerns.⁵⁵ This again, can become a security issue.

Citizens whose health is affected by pollution can appeal directly to polluting factories for monetary compensation. If they are stonewalled at the enterprise, then they may turn to a local EPB.⁵⁶ This is different from what most Americans do. Americans tend to turn to the government to compel businesses to pay for their pollution. In China however, there is a traditional disdain for legal or administrative arbitration.

Red tides in Hangzhou Bay of the YRD have also had an adverse health impact. Red tides are formed by excess nutrient levels from agriculture run-off in rivers and oceans to form large free floating red plants. They can poison fish and consequently poison humans who consume seafood. According to a report from the State Oceanic Administration, marine disasters resulted in 152 people dead or missing in China in 2008, with direct economic losses of 20.61 billion Yuan (\$3.03 billion US dollars). The figure in 2007 was 8.84 billion Yuan. This is a huge economic loss on China.

⁵⁵ Economy, *The Rive Runs Black*, 84-85.

⁵⁶ *China 2020: Clear Water, Blue Skies; China's Environment in the New Century*. 2 ed. Washington, DC: The World Bank, 1998, 8.

Lead poisoning from pollution in Shanghai has been exposed as a cause of crippling development in children. The U.S. standard for blood-lead levels is 10 micrograms per deciliter, but in one report in Shanghai, levels were significantly higher, ranging from 21.8 to 67.9 micrograms per deciliter. Reports like these have turned politicians' attention to removing lead from gasoline to try and clean up the air. Leaded gasoline was phased out by 2002.⁵⁷ The economic impact of unhealthy citizens is very substantial for the Chinese people.

⁵⁷ *China 2020: Clear Water, Blue Skies; China's Environment in the New Century*, 14-16.

Part XI. Conclusion

Clearly, China's environmental issues are not just China's concerns. These problems affect the entire international community at large. The Yangtze River Delta has the ability and support from the government to lead the nation in environmental protection. By setting an example in this region, the international community can see the hope and commitment for a sustainable future. Many experts identify that what China does for its environment is important to all. Klaus Toepfer, the executive director of the United Nations Environment Program (UNEP) has acknowledged, "China's environmental performance...will have consequences for the whole planet."⁵⁸ In 2003, China entered into an agreement with the European Union (EU) to strengthen environmental cooperation. China has tried to cooperate with its East Asian sisters Japan and Korea in discussing a broad range of environmental issues with the Tripartite Environment Ministers Meeting (TEMM). Assistance from these more highly developed nations should be critical to the Chinese government. China will need all help available especially since in 2008, China surpassed the United States and became the largest contributor of greenhouse gases. This has dire consequences for the global community. In these coming years during the economic slowdown, the environment will be a primary issue for all countries to mutually develop new protections. The environment reform movement can not be delayed simply because world economies are in a downturn; however, there is a real possibility that this crucial reform will be hindered due to the high expenses of investing in green technologies.

⁵⁸ Day, *China's Environment*, 67.

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