INFORMATIONAL ENVIRONMENTAL REGULATION IN PRACTICE

A Comparative Case Study of the Environmental Performance Information Disclosure Pilot Programs in Zhenjiang and Hohhot, China

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ABSTRACT

Environmental degradation limits the prospects of sustainable economic development and the pursuit of a life of better quality. An informational approach to environmental regulation, a policy innovation implemented after direct regulation and economic incentive mechanism, has exhibited its positive results on pollution reduction. Since 1995, this approach has been exported from the developed world to more than ten developing countries by international policy advisors.

China experimented with environmental performance information disclosure (EPID) pilot programs in Zhenjiang, Jiangsu province and Hohhot, Inner Mongolia between 1999 and 2000. Mixed results have been found. The disclosure program was sustained in Zhenjiang but was stopped in Hohhot only after the pilot phase. Furthermore, there has been no extensive research on how an informational approach to environmental regulation worked in a developing country context such as China, where private environmental enforcement by civil society and markets are lacking.

This comparative case study advances our knowledge of the informational approach to environmental regulation by examining its implementation and impact. The following factors are found to be critical for policy implementation: perceptions of the policy innovation by local leadership and implementers, capacity of local environmental protection agencies, and the contexts in which the policy was carried out. Disclosed environmental information was able to induce better industrial environmental performance and incorporated the environment into development decision making by local government officials. However, environmental performance information disclosure alone was not sufficient to involve the public in environmental protection in China. For administrative, legal, market, and public forces to converge in environmental compliance and enforcement in China, building better institutional infrastructure is in order.

To the beautiful years that have passed and that are yet to come.

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It was such a privilege that I was able to sit in Professor Anne Khademian's class and obtain her advice shortly after she joined CPAP in 2003. Her book, *Working with Culture*, lays a foundation for my intellectual pursuit. And her influence is easily seen in my dissertation. I look forward to more advice and exchange of ideas in the future as I grow in academia.

During my pilot fieldwork, Jennifer Turner provided me with her contacts in the U.S. and China. Through Jun Bi, a professor at Nanjing University, I was connected with Professor Genfa Lu – my serious data collection work took off. I hope I can become a useful nod in her network.

By working with Hua Wang at the World Bank, I was exposed to the exciting environmental regulatory experiments in China. As a student of public administration and policy, the industrial environmental performance information disclosure made an excellent dissertation topic. My dissertation could prove that I have learned so much from the cutting edge practices. Certainly I look forward to keeping up with new developments and contributing to the generation of new knowledge about alternative regulatory approaches in practice.

For his curiosity about China and to recruit a "Mellon Scholar" for Bowdoin College, Professor DeWitt John read the first draft of my dissertation and several other papers. Moreover, he made himself available for discussions every time when he came to Washington in the past five months. To him, I owe intellectual stimulation and the mentoring that he provided. It is such a great honor that he will continue advising me and being my mentor.

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1 Introduction

China is a country with severe environmental problems but limited resources for environmental protection. The weak enforcement of environmental regulations in China has been identified to be a major reason for environmental degradation by scholars, practitioners, and the public alike. Although environmental regulations are mainly enacted at a central level, the local environmental protection bureaus (EPBs) are the parties which are mainly responsible for policy implementation and law enforcement. To understand how environmental law works and if it works in China, one has to look into how a policy is carried out by local EPBs and its impact on stakeholder environmental behaviors.

The quest for cost-effective environmental regulation has brought disclosure of industrial environmental performance to prominence. An informal environmental regulation is less costly than formal regulations. There are 37 countries in the world, including 10 developing countries that have adopted disclosure programs. The effect of an informational approach to environmental regulation, such as the Toxic Release Inventory (TRI) of the US, on pollution reduction has been well documented. Empirical evidence showed that the capital market did respond to disclosed environmental information and favored environmentally friendly enterprises. Political scientists suggested its instrumental and normative value for democratic environmental governance.

Starting from 1995, the World Bank has been working with developing countries to develop environmental performance information disclosure (EPID) programs. In 1998, Hua Wang, a senior environmental economist of the World Bank, became the policy missionary to introduce the idea of EPID to China. Two municipalities, Zhenjiang,

Jiangsu Province and Hohhot, Inner Mongolia were selected to experiment with EPID pilot programs between 1999 and 2000. The Zhenjiang EPID pilot was sustained and was expanded to a provincial mandatory program by Jiangsu provincial EPB in 2002. In contrast, the Hohhot EPID pilot program was stopped after only the pilot phase. The first experiment on EPID in the developing world, Indonesia's Program for Pollution Control, Evaluation and Rating (PROPER) started in 1995 but was stopped in 1997 because of the financial crisis in East Asia and the turnover of the Soeharto regime.

Current research on an informational approach to pollution control mainly focused on the following relationships: disclosure vs. pollutant discharge, disclosure vs. stock market value, and disclosure vs. democracy. Unfortunately, no existing studies have examined the implementation process and the dynamics that EPID programs generated in environmental regulatory enforcement in a developing country context. The State Environmental Protection Administration (SEPA) of China has been promoting EPID and issued a national implementation guideline for EPID in 2005. As EPID will proliferate in more regions in China, it is important to have a better understanding of why the Zhenjiang and Hohhot EPID pilot programs were so different and what dynamics in interactions among program stakeholders were generated.

More specifically, this dissertation seeks to answer the following questions:

How did EPID implementers and local public officials in Zhenjiang and Hohhot perceive, respond to, and implement the disclosure of environmental performance information?

Did the implementation of EPID pilot programs impact the dynamics of environmental monitoring and enforcement in Zhenjiang and Hohhot? If yes, through what channels?

What implications do the Zhenjiang and Hohhot EPID pilot programs have for the environmental monitoring and enforcement work in a developing country context?

This dissertation fills in the literature gap by comparing the implementation and impact of the Zhenjiang and Hohhot EPID pilot programs in a Chinese context. According to existing literature, the following seven factors have stood out in environmental regulatory enforcement, especially in a developing country context: (1) severity of environmental problems, (2) level of economic development and hunger for economic prosperity, (3) commitment to protecting the environment by different levels of government, (4) capacity of environmental protection agencies to execute environmental policies and to innovate, (5) rule of law and a public spirit of law abiding, (6) public involvement in environmental matters, and (7) diffusion of ideas and technical assistance from innovators to followers. Zhenjiang and Hohhot are different in terms of their levels of economic development, level of commitment to protecting the environment by the city government, and capacity of their EPBs to carry out environmental policies. But they both similarly have severe environmental problems and limited public involvement in environmental matters. The above factors shaped and were shaped by the interactions between the program stakeholders and the interactions further determined the implementation and impact of the Zhenjiang and Hohhot EPID pilot programs.

A better understanding of the Zhenjiang and Hohhot experiences will inform the design and implementation of an informational approach to environmental regulation in

other regions in China as well as in other developing countries. This study will facilitate and inform the policy learning by SEPA and local EPBs in China and environmental protection agencies in the developing world at large.

Analytic narratives (Chapter 4) will tell the story of how the EPID was introduced into China and how the EPID pilot programs were carried out in Zhenjiang and Hohhot. A "cultural roots" framework complemented by a “webs of dialogue” framework was adopted in Chapter 5 to analyze program implementation by looking at (1) perception of the disclosure program by advocates and implementers, (2) resources at their disposal for implementation, and (3) context in which the programs were implemented.

Perception means the understanding of the task of the EPID pilot program by implementers and how they made sense of it and related it to their regular work. “Resources” refers to the administrative capacity of the Zhenjiang and Hohhot EPB, financial and human capital at disposal of the implementers, their professional competency and working relationships, the match between their authority and responsibility for carrying out the EPID programs, and technical support available. Contexts in which the EPID pilot programs were carried out include the following important participants and institutions relevant to EPID but not given the job of performing it: city government and relevant economic and industrial agencies of the same level as the Zhenjiang and Hohhot EPB, SEPA, provincial EPB, industry, and the public including environmental NGOs.

Complemented by a “webs of dialogue” framework, the “cultural roots” framework was able to capture the evolvement of perceptions, resources, and contexts of

the Zhenjiang and Hohhot EPID pilot programs. The three cultural roots shaped and were shaped by the interactions between EPID program stakeholders.

As an innovative environmental regulatory instrument introduced by the policy missionary, it took time and effort for Chinese officials to understand why and how implementing the EPID program is of benefit to their current work and thus accept it. For example, the "Midnight Action" environmental campaign in Zhenjiang carried out by SEPA aimed to target flagrant industrial polluters. This campaign drew attention of the leadership of the city government, and the dialogue on EPID revealed its value for improving industrial environmental compliance. As a result, the city government supported the Zhenjiang EPB to carry out the EPID pilot program. Thus the dialogues on the EPID pilot programs between the policy missionary, domestic policy entrepreneurs, and city government as well as relevant economic and industrial agencies were critical for reaching consensus, mobilizing resources, and gaining support for EPID.

The three cultural roots, task, resources, and context, and their integration helped make sense of the differences in the implementation and outcomes of the Zhenjiang and Hohhot EPID pilot programs.

To fully understand the effect of the EPID pilot programs on involving the public in environmental monitoring and enforcement, a web of dialogue framework was then applied in chapter 6. According to environmental communications analysis, for the public to participate in environmental monitoring and enforcement in a meaningful way, they have to go through the following six steps: awareness, interest, knowledge, attitude, legitimization, and practice. To walk the public through the six steps, dialogues on EPID must be built between government, industry, and the public.

Putting EPID in perspective, it is a policy instrument to extend local environmental monitoring and enforcement systems beyond EPBs to engage more stakeholders. It can potentially build dialogues among them, align their interests, change their environmental behaviors, and eventually achieve better environmental results.

The impact of EPID on the webs of dialogue among stakeholders, their incentives, and their environmental behaviors is compared between Zhenjiang and Hohhot. This analysis reveals that the stand-alone EPID programs in both Zhenjiang and Hohhot only had limited effect regarding the following aspects: translating disclosed environmental information into knowledge, aligning stakeholder interests, transforming their attitude and sense of legitimization toward private environmental enforcement, and changing stakeholder environmental behaviors. In short, the two EPID pilots in Zhenjiang and Hohhot are similar in terms of their effect on changing the dynamics of environmental monitoring and enforcement, although the two cases seem to be dramatically different at first glance.

In Zhenjiang, although not in a systematic way, dialogues between the government, industry, and the public on EPID have sparked here and there. The public did respond spontaneously to the EPID program and pressured a flagrant polluter to improve its environmental performance. The Zhenjiang EPB and economic development and reform commission (DRC) attempted to incorporate the EPID program into their environmental management work and development decision making. This illustrated the potential an EPID program could have to bring about behavioral change among government officials, industry people, and the public in a developing country context.

Even so, the pilot EPID programs in Zhenjiang and Hohhot share common limitations. First, the political force behind the EPID initiative has been a relatively small group of insiders, including employees of the Zhenjiang and Hohhot EPBs, intellectuals, and some SEPA and Jiangsu provincial EPB officials. These people are linked by ties of friendship and long-term collaboration and by a common commitment to environmental values. And second, regular EPB officials, the public, and industry are not adequately informed of EPID and further engaged in dialogues on EPID in a more meaningful way.

For a fuller comparison between Zhenijang nd Hohhot, this dissertation proceeds as follows. Chapter 2 — the literature review will ground the comparative case study in the empirical work on China's environment and environmental regulatory enforcement. Research design and analytical frameworks adopted in case analysis will be presented in Chapter 3. Chapter 4, analytic narratives will tell the story of how EPID was introduced into China and how the EPID pilot programs were established and carried out in Zhenjiang and Hohhot. Followed by case analysis I and II — Chapter 5 and 6, the cultural roots and webs of dialogue frameworks were adopted respectively. Finally, this dissertation ends with Chapter 7, conclusions drawn from the comparative case study, policy recommendations, implications of the Zhenjiang and Hohhot EPID pilot programs for environmental monitoring and enforcement in a developing country context, and questions that remain to be answered and directions for future research and action.

This dissertation speaks to researchers, practitioners, and students of environmental regulatory enforcement in general and of China environmental studies more specifically. The author expects to see more work along this line to make

environmental law work more efficiently and effectively in China and in the developing world at large.

2 Context of the Research and Literature review

This chapter grounds the comparative case study of the Zhenjiang and Hohhot EPID pilot programs in the empirical work on China's environment and research on environmental regulatory enforcement. The severe environmental degradation and weak implementation of environmental regulations in China call for more stringent environmental regulatory enforcement. EPID, an informational approach to environmental regulation is an innovative measure in the mix of pollution control instruments adopted in China.

Current research on environmental enforcement is mainly economic analysis of compliance or analysis of the interaction between the regulator and the regulated from a sociological perspective mostly in a developed country context. Existing research specifically on the informational approach to environmental regulation mainly focused on the following relationships: disclosure vs. pollution discharge, disclosure vs. stock market value, or disclosure vs. democracy. However, the research community only has limited understanding of how environmental information disclosure programs were implemented and how disclosed environmental information could change stakeholder environmental behaviors, especially in a developing country context. This dissertation fills in the literature gap by looking into the implementation processes and the interactions between stakeholders of an informational approach to environmental regulation in Zhenjiang and Hohhot, China.

This chapter starts with an overview of China's environment. Second, current research on environmental compliance and enforcement will be presented. Third, focusing specifically on the informational approach of environmental regulation, relevant

research will be reviewed. Finally how this intellectual exercise would contribute to the literature concludes this chapter.

2.1 China's environment

This section will briefly review environmental issues and challenges facing China. More specifically, it will cover the following topics: severe environmental degradation in China, comprehensive environmental regulations, weak environmental monitoring and enforcement, current state of public environmental awareness and public involvement in environmental matters, and how EPID — an informational approach to environmental regulation fits in the Chinese environmental regulatory system.

China's environmental challenges

China's environment has become a significant issue both domestically and internationally. In her testimony to the Congress of the United States, Economy (2004) said, "… Yet this (rapid) economic development, coupled with a weak enforcement apparatus for environmental protection, has also resulted in a range of devastating consequences for the environment."[1] The following reasons were identified to justify why the Chinese leadership places economic development at the top of national development priorities: to provide subsistence for oversized population, industrialize to compete in the global market, and urbanize to raise the quality of life.[2] However, the long overlooked environment has revealed problems to the world that can no longer be ignored.

Air and water quality degradation, deforestation, and soil erosion are only a few items on a long list of environmental challenges facing China today.[3] Economy (2004)

reported China had 16 of the 20 most polluted cities in the world in 2000.[4] The health damage and economic loss from air pollution is the worst in the world.[5]

The most serious problem facing China probably is access to water. In north China where 46% of the country's population lives, annual water supply is only 770 m^3 per capita. Nationwide per capita water supply is about 2300 m^3 per year, which is only a quarter of the world average. China is among the top 13 countries in the world facing a drastic shortage of water resources. Already, about 60 million people in China find it difficult to get enough water for their daily needs. By 2030, the per capita supply is expected to fall from 2200 m^3 to below 1700 m^3, the World Bank's definition of a water scarce country. During that same period, water demand is expected to jump from 120 billion tons to 400 billion tons annually. Water pollution from various sources (e.g., industrial, domestic, agricultural runoff, etc.) exacerbated the already limited water resources.[6]

Approximately 700 million people drink contaminated water on a daily basis. More than three-quarters of the water flowing through China's urban areas is considered unsuitable for drinking or fishing. Almost one fourth of China's land including one third of the agricultural land is affected by acid rain.[7] If accounting for environmental and ecological loss, the acclaimed over 8% annual GDP growth of China is totally offset by environmental pollution and degradation.[8]

China's State Environmental Protection Administration (SEPA) estimates that industrial pollution accounts for over 70% of the national total.[9] For this reason, SEPA has declared control of industrial pollution to be a top priority for Chinese regulators.

Moreover, as China is undergoing social transformation accompanied with industrialization and urbanization processes, new environmental challenges have been posed by more mobile and diffuse sources, such as motor vehicles and individual households. By 2020, conservative estimates suggest that China will have 110 million cars which will account for over 60% of the air pollution in cities.[10] Furthermore, since the urban population increased by 4.2% annually between 1990 and 2003, it was reported municipal wastewater discharge in Chinese cities has been increasing by 5% annually.[11] In 2000 municipal wastewater discharge was 22.1 billion tons which outnumbered industrial wastewater discharge by 2.7 billion tons and this gap is expected to increase.[12] However, compared with over 70% of industrial wastewater treated, only less than 20% of municipal wastewater discharge received primary treatment in 2002.[13] In one sentence, China's environment is under stress on almost every front.

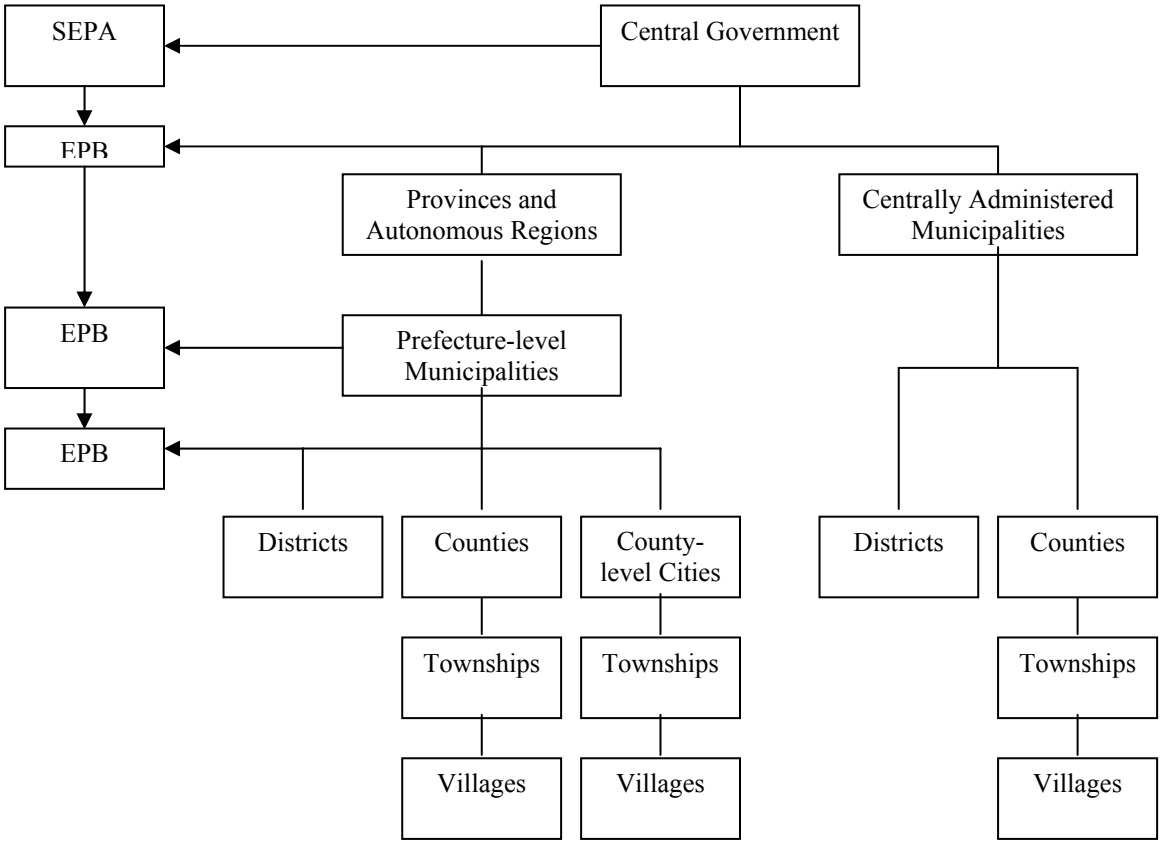
Starting from the mid 1970s, after China participated in the 1972 United Nations Conference on Human Environment held in Stockholm, the leadership of China has begun to realize the importance of the environment for economic and social development. During the last thirty years, China has established from scratch comprehensive environmental standards and regulations, built up administrative institutions, trained professionals in environmental policymaking, law enforcement, and scientific research and development, and worked in collaboration with international organizations, intellectuals, and foreign governments to combat environmental problems in China.[14]

Comprehensive environmental regulatory system

The architecture of environmental governance in China is of a grid structure. In terms of environmental lawmaking and policymaking, at a central level, both the

legislative branch — National People's Congress (NPC) and the administrative branch — the State Council and functional ministries below it promulgate laws, regulations, and administrative directives. At a local level, the People's Congress and local governments from the provincial down to county level pass regulations and issue administrative directives as long as they are in line with national regulations (see Figure 2-1).

Figure 2-1. Structure of Government Administration in China



To translate regulatory mandates on pollution prevention and control into environmental results, China has employed a web of environmental policy instruments including direct regulation, incentive based and voluntary approaches (see Table 2-1). Local EPBs are the major parties responsible for policy implementation. Local EPBs depend on local governments of the same level for funding and personnel. But they

receive policy mandates from SEPA and higher level EPBs (see Figure 2-1). As domestic and international observers have correctly pointed out, the subnational structure of the implementation of environmental policies, a dual leadership over local EPBs, and their weak institutional capacity have limited the real impact of environmental regulations and policies.

In terms of environmental regulation, China has a rather comprehensive system. On paper, the Constitution specifies a positive role of the state in protecting the public from pollution and other hazards.[15] The Chinese government promulgated its first trial version environmental protection legislation, PRC Environmental Protection Law in 1979. At present, this framework includes roughly twenty-two statutes, more than forty regulations, approximately five hundred standards, and more than six hundred other legal norm-creating documents primarily addressing pollution control, natural resource conservation, and management of the environmental stewardship aspects of consumer products ("product stewardship"). At the local-government level, one senior environmental official indicated that environmental measures at the provincial and municipal levels alone likely total more than one thousand.[16] Of the nationally binding statues, there are five on media specific pollution prevention and control: air, water, solid waste, noise, and maritime environment; twelve on natural resources conservation: forestry, mining, fishery, land, water, wild animals, coal, etc.; two on natural disaster prevention and relief: flood and earthquake; and two most recent ones on specific pollution prevention measures: environmental impact assessment and cleaner production (see Appendix 3 for a compilation of environmental regulations in China).[17]

To give teeth of the standards and environmental regulations in China, SEPA has adopted a comprehensive system of policy instruments to prevent and control pollution (see Table 2-1). More specifically, there are four major policies aimed at preventing pollution: three simultaneous, environmental impact assessment, cleaner production, and circular economy. Three different types of pollution control instruments have been adopted: direct regulation, incentive mechanisms, and voluntary approaches. Within the category of direct regulation, three policy instruments are included: limited time treatment, discharge permit, and pollution levy/pollution discharge fee. With less government direct intervention, incentive mechanisms motivate government officials and industry people to pursue better environmental results which are in their self interests as well. Three incentive mechanisms are at work: economic, informational, and political. More specifically, tradable emissions permits work through calculations of economic gains/losses by polluters. Color rating and disclosure of environmental performance of firms or disclosure of important polluting sources align stakeholder interests through making environmental information publicly available. Comprehensive evaluation of city's environmental protection, environmental responsibility system, or environmental protection model city motivates government officials, partially because it may affect advancements in their political careers. Voluntary approaches are relatively less developed in China with only two instruments in the tool kit: the naming of nationally environmentally friendly enterprises by SEPA and certifying with the ISO 14000 of individual enterprises. Appendix 4 briefly describes the statutory basis and institutional set up of the existing environmental regulatory instruments in China.

Table 2-1. Environmental protection policy instruments in China

Category	Environmental protection policy instruments
Preventive	Three simultaneous; Environmental impact assessment; Cleaner production; Circular economy.
Direct regulation I (administrative)	Limited time treatment; Discharge permit.
Direct regulation II (economic)	Pollution levy/Pollution discharge fee.
Incentive mechanism I (economic)	Tradable emissions permit.
Incentive mechanism II (information)	Color rating & disclosure of environmental performance of firms; Disclosure of important pollution sources.
Incentive mechanisms III (political)	Comprehensive evaluation of city environmental protection; Environmental responsibility system; Environmental protection model city/township/village; National model eco-park; Eco-village.
Voluntary approaches	Nationally environmental friendly enterprises; ISO14000.

Environmental monitoring and enforcement in a Chinese context

Although China has adopted a full range of pollution prevention and control policies, regulatory promise has often fallen short of environmental progress in China. Weak monitoring and enforcement of environmental regulations has been recognized as a major reason for unsatisfactory environmental outcomes.[18] One needs to look no further for causes of this shortfall than China's environmental protection bureaus (EPBs) (difang huanbaoju), the agencies chiefly responsible for regulatory enforcement. EPBs, though nominally affiliated with SEPA, are first and foremost subordinate to local governments. As such, they must compete with other government agencies for funding and influence (see Figure 2-1). Because local government officials are generally compensated and rewarded for the rate of GDP growth of their jurisdictions, they typically place economic advancement before regulating industry. EPBs frequently lack the resources and leverage

needed to translate regulatory promise into environmental progress. Regulatory enforcement consequently suffers.

Administrative discretion by local EPBs

In implementing environmental regulations and policies, discretion by local EPBs is inevitable. For example, "limited time treatment," a command-and-control policy instrument, does not clearly specify triggers. Thus, the will to act and the capacity to pick up "bad apples" of local EPBs are essential for enforcement. Defining the environmental assimilative capacity of a total air pollution control zone is another good example of administrative discretion. To implement SO_2 emissions trading, local EPBs have to first specify the total amount of sulfur dioxide dischargeable to an area in the upcoming five years, then allocate it to coal-fired power plants and other SO_2 producers, and further keep track of SO_2 emissions and transactions among polluters. Defining an allowable total emission is more an art than a scientific issue especially as SO_2 travels across regions and the monitoring of sulfur dioxide emissions even within regional boundaries is far from accurate.

Moreover, local governments will intervene in the work of their EPBs when there is a conflict of interest and the will of the local governments generally prevail. The discretion by local governments sometimes hinders their EPBs from exercising their discretional authority in a good way. For example, some local governments would protect industry which was profitable but highly polluting and did not allow information on its environmental performance to go public. [19] If local governments support the disclosure of industrial environmental performance information, the local EPBs have to decide through which channels and at what time interval to disclose. The discretion of local EPBs largely

shaped the implementation and outcomes of environmental information disclosure programs.

In short, although environmental regulations are enacted by the central government and are uniform across the country, the discretion by local EPBs in practice made them numerous idiosyncratic working programs in China.

Weak administrative capacity of local EPBs

Assuming the good will of local EPB officials, administrative discretion can be good and necessary if they can accurately target "bad guys" especially since local EPBs only have limited regulatory resources. Otherwise, wide administrative discretion introduces capricious government actions, favoritism to special interests, and corruption.[20] In practice, it is widely acknowledged that administrative capacity of local EPBs is insufficient.[21]

Besides insufficient technology and equipment, the quality and quantity of the human capital owned by local EPBs pose another constraint on accurate monitoring and aggressive enforcement. Provincial average percentages of professional employees of local EPBs are generally low across China in 2002, ranging from the lowest 16.3% in Tibet to the highest 74.7% in Beijing with a national mean of 53.3%. An average local EPB in China employed 13.3 staff members in 2002, with the least of 6.4 in Qinghai and the most of 24.1 in Henan. [22]

Moreover, subordinate to local EPBs, monitoring stations are alike under-funded and lack competent professional staff. Generally they carry out three types of monitoring tasks: regular monitoring of important pollution sources, commissioned monitoring by industry, and special monitoring facilitating environmental campaigns or taskforce

activities. Both regular and special monitoring tasks are assigned by local EPBs and thus monitoring stations do not charge fee for service. Instead, because most enterprises lack self-monitoring capacity, to be able to report pollution discharge to their local EPBs, they hire monitoring stations to do the work. Some monitoring stations prefer contracts from industry to assignments from EPBs because they earn revenue from the former which can supplement their income. However, professional impartiality is sometimes at stake and consequently the accuracy of environmental information is sacrificed.[23]

A significant proportion of pollution is discharged unnoticed. For example, air pollution or wastewater discharge by enterprises of the service sector such as restaurants, hotels, and hospitals have been blind spots to local EPBs or even the public. Small and medium enterprises (SMEs) are a fast growing and significant sector in the economy but there is not much checks on their environmental behavior. This is especially true for SMEs in rural areas.[24]

Overall, the capacity of local EPBs to pick up signals is lacking because of a shortage of administrative stock (financial and human capital, technology and equipment) and sometimes conflicts of interest. To cope, local EPBs have adopted a targeted enforcement strategy following up on citizen complaints. Unfortunately, the enforcement is sometimes biased because citizens usually do not have the technical knowledge to assess environmental harm and risks and regulatory resources tend to be allocated more to issues which are more visible.[25]

Weak enforcement of environmental policies

Even when EPB officials have identified the right target for aggressive enforcement, taking actions against polluters is sometimes impeded by local

governments.[26] Local governments generally show special leniency toward big contributors to local tax revenue, or big employers or enterprises in financial hardships within their jurisdiction even if they violate environmental standards or regulations. Jahiel (1997) reported local governments sometimes will reduce or waive water pollution discharge fees based on economic considerations.[27] Economy (2004) and Chen and Uitto (2002) reported sometimes local governments even help their enterprises circumvent environmental regulations.[28] Even worse, sometimes local governments will hold back information on poor environmental performance of enterprises within their jurisdiction. For example, in Hohhot, Inner Mongolia and Tongling, Anhui Province, city governments would not let their EPBs make public the color rating results of some big polluting enterprises in their core industries. [29]

So in China, it is generally the case that local governments and their EPBs do not share the same utility function and pursue the same policy goals regarding environment protection. More commonly, their interests divert. Thus, enforcement officers of local EPBs face a difficult task: they have not only to negotiate with polluters but also to work hard to gain support from local governments before taking an enforcement action.

Originally, an informational approach to environmental regulation was intended to conciliate this problem by bringing public pressure in environmental compliance and enforcement. Public pressure was expected to give EPBs more leverage in dealing with other government agencies to gain common ground more easily. However, as a country full of administrative secrecy and businesses supremacy, the government is unwilling to put the environmental performance of either the government or industry under public scrutiny. It has curbed several policy innovations to realize their promises. For example,

procedures to involve the public in environmental impact assessment have been instituted in the EIA Law 2002. However, the public has raised doubts and complained about possible negative environmental impacts of several construction projects because the EIAs were rather a matter of formality but failed to reach out aggressively to the public and take public comments into consideration.[30]

Besides the institutional constraints on local EPBs, an instrumental view towards the environment by the leadership permeates Chinese government at all levels across time. This might be a root cause of why environmental protection is perceived to be in rivalry with other development goals. During Mao Zedong's leadership in 1950s and 1960s, according to China scholar Rhoads Murphey, Mao's conception of nature was: "Nature is explicitly seen as an enemy, against which man must fight an unending war, with more conviction and fervor and with a brighter vision of the ultimate results than even the Darwinian-Spencerian West held."[31] The belief of the environment being at the disposal of humans held by Chinese leaders, gives a subordinate status to the environment. This has been used to justify campaigns against nature.

Fortunately, the past a few years have seen rising public environmental awareness and change in the attitude toward the environment by the top leadership in China. Measures have been employed to add the environment to the mainstream in decision making from top-down. Sustainable development and a harmonious society which infers a harmony between the human and nature have become national development goals.[32] Specific measures include the accounting of environmental and ecological losses to come up with a green GDP by the State Bureau of Statistics and SEPA of China, assessing the

environmental impact of development plans, and including environmental indicators in the evaluation and reward system of government officials.[33]

The following section will briefly review the current state of public environmental awareness and public involvement in environmental matters in China. Since the enforcement of environmental regulations by the government is weak and China is going through a rapid urbanization process, individual and household environmental behavior is expected to become critical to achieving better environmental results.

The current state of public environmental awareness and public involvement in environmental matters in China

In China where formal enforcement of environmental regulations is weak, individuals could participate in environmental protection and pick up the slack. This section reports findings from four environmental surveys in China as shown in Table 2-2.[34] The Research Center for Contemporary China of Peking University conducted a national survey on environmental awareness between 1998 and 1999 (Survey I). The All China Environmental Federation (ACEF) administered a national survey in 2005 especially for the Eleventh Five-Year Environmental Protection National Plan (Survey II). The Center for Environmental Management and Policy surveyed the residents of Wujin District, Jiangsu Province in 2004 of their level of environmental awareness (Survey III). This author conducted a semi-structured survey of government officials, intellectuals, and industry people involved in EPID implementation in China (Survey IV).

The four surveys, although not all of them, covered the following questions: what are the major environmental problems in China and how serious they are, how should economic development and environmental protection be balanced, specific knowledge on the environment, perception of responsibilities/influence of different social actors, the

intention to take individual actions against pollution, and the expectation for actions by the government to address environmental challenges.[35] Drawing upon results from the four surveys, the current state of public involvement in environmental enforcement is analyzed along the sequence of awareness, interest, knowledge, attitude, legitimization, and action.[36]

Table 2-2. Basic Information about the Surveys on Public Environmental Awareness

	Survey I	Survey II	Survey III	Survey IV
Who	Research Center for Contemporary China	All China Environmental Federation	Center for Environmental Management and Policy	Wanxin Li
Affiliation	Peking University	NGO	Nanjing University	Virginia Tech
When	1998-1999	2005	2004	2005
Where	China nation-wide	China nation-wide	Wujin District, Jiangsu Province	Zhenjiang, Nanjing, Beijing, Hohhot
Population	Families with one adult aged 16-65 & a youth aged 10-15	People living in China when the survey was conducted	Residents of Wujin district	Government officials, intellectuals, and industry people involved in EPID implementation
Sample size	9,202 households with 9,016 adults & 2,436 youth surveyed	14,061 individuals	482 individuals	50 individuals

Awareness

The Chinese public is well aware of environmental problems. Survey II found 94.9% of the public thought environmental problems in China are very serious and urgent.[37] The other three surveys reported that about 70% of the public was unsatisfied with their local environmental quality (see Table 2-3). About 26% of the public thought in 2005 the quality of their local environments was worse than it was five years ago, compared with about 22.5% of the public in 1999 (Survey II & I).[38] This means the public has recognized pollution to be a serious problem in their daily life.

Table 2-3. Are You Satisfied with the Local Environmental Quality?

	Survey I*	Survey III	Survey IV
Very satisfied	2.9	3.1	0
Somewhat satisfied	19.9	15.5	31.8
OK	41.4	47.6	22.7
Dissatisfied		28.8	45.5
Very unsatisfied	15.3	5.0	0
	N=8,973	N=458	N=50

*Survey I asked the interviewees to comment on the seriousness of their local pollution. They were given the choices of "very serious, somewhat serious, some pollution, no pollution, do not know." In this analysis, the answer of "somewhat serious" in Survey I was equivalent to the answers of "OK" or "dissatisfied" in Survey III and IV. There was 20.5 percent of survey respondents answered "Don't know."

Source: (Yang, Ming, 2002). Chart 6, P. 83.

As to what are the most urgent environmental problems, Survey II reported that 80.5% and 79% of the public listed air pollution control and drinking water security to be the top priorities for the Chinese government to address in the eleventh five-year plan. The following environmental problems are listed in an order of perceived importance by the public from the most to the least: drinking water security, air pollution, domestic solid waste discharge, industrial solid waste discharge, desertification, water supply shortage, noise, and exhausts from motor vehicles.[39]

In 1999, Survey I reported over 1/3 of the government officials and entrepreneurs thought agriculture was not a major cause for environmental degradation in China.[40] In contrast, in 2005, pollution in rural areas caused by agriculture and township and village enterprises (TVEs) was recognized to a serious problem by both experts and the rural people. The experts identified treatment of pollution from diffuse sources to be the fourth priority after industrial pollution, municipal wastewater, and pollution by TVEs. A higher percentage of rural people than urban residents felt their local environmental quality has degraded.[41]

It is clear that the Chinese people are well aware of environmental problems and the level of awareness has been rising.

Interest

How interested the Chinese public is in the environment can best be illustrated by choices made by the public when the environment is in competition with other development goals. The interviewees of Survey I were asked to choose three development priorities from five and list them in an order of perceived importance. The three groups, the public, government officials, and business elites, all agreed economic development to be the top priority but showed much less interest in environmental protection (see Table 2-4). In contrast, Survey II reported in 2005 the Chinese people were ready to mainstream the environment in development decision making. Over 97.5% of the public agreed to include environmental indicators in the evaluation and reward system of government officials that used to place a major focus on the GDP growth rate.[42]

Table 2-4. Choose Three Most Important Development Goals to China and List Them in An Order of Perceived Importance

	The Public*	**Government officials****	**Entrepreneurs*****
1	Economic development	Economic development	Economic development
2	Science & technology	Science & technology	Science & technology
3	Population control	Environmental protection	Environmental protection
4	Social justice	Population control	Population control
5	Environmental protection	Social justice	Social justice
N	8,973	1,595	770

Source: (Yang, Ming, 2002), * P.122; ** Chart 4.1.2-3, P.123; *** Chart 4.1.2-3, P.123.

In 1999, 45.3% of the public did not agree to slow down economic development to protect the environment.[43] And more than half of the government officials and

entrepreneurs did not choose to close a highly polluting plant if it is highly profitable (see Table 2-5. Case 1: high profit; Case 2: medium profit; and Case 3: low profit.).

Table 2-5. Choose to Close or not to Close a Highly Polluting Plant with Different Level of Profitability

Profit Level of Plant	Close: Government Officials	Close: Entrepreneurs
Case 1: high	50.4	39.1
Case 2: medium	65.3	55.5
Case 3: low	91.5	81.6

Source: (Tong, Yanqi, 2002). Chart 5, P.68.

Although no systematic studies have been done, anecdotes have indicated that government officials, industry people and the public have shown an increasing interest in the environment in China. For example, in some developed regions, officials would reject highly polluting plants to locate in their industrial parks even though they could generate a large amount of tax revenue for the local governments. Some industry people indicated that they were not satisfied with the local environmental quality and have been trying to reduce pollution generated by their firms. [44] The public is willing to take up more individual responsibilities for protecting the environment by either volunteering their labor or contributing money to environmental NGOs.

Knowledge

Survey I included 13 questions to test how much the public knew about the environment. The average score that the public got was 2.8 out of a total of 13, with the rural population averaging 2.4 and their urban counterpart averaging 4.5. Of the three simplest questions, the grand average score was 1.4 with a rural average 1.2 and an urban average 2.0. [45] Survey I revealed in 1999 more than 20 percent of the people were not aware of local environmental issues such as hazardous waste, desertification, wildlife

reduction, and acid rain.[46] That reflected the Chinese people generally had a low environmental literacy and the rural population especially lagged behind.

Unfortunately, Survey II did not ask the same questions which did not allow a comparison between the level of public environmental literacy in 1999 and 2005. However, Survey II did report that 57% of the experts thought China does not have enough environmental professionals and the technology of environmental protection was 5 years behind developed countries.[47] Although not perfect, it can be inferred from Survey II that China still lacks the literacy, expertise, and technology for environmental protection.

Attitude

The public attitude towards the environment can be inferred from their perception of nature, science and technology, national priorities, causes of environmental degradation and responsibility for environmental protection. Survey I asked how the public perceived the following relationships: nature vs. human activities and the environment vs. science and technology. Overall, the public had a reasonable doubt about the ability of nature to recover itself from human intervention and the potential of science and technology to address environmental problems (see Table 2-6 & 2-7). But the general public had a more optimistic view on nature and science & technology.

Table 2-6. The nature has its own self-recovery ability. No matter what the humans do, it would not break the balance of the eco-system

	Strongly disagree	Disagree	Somewhat agree + Strongly agree	No not know
Government official*	82.9	13.9	3.1	0
Entrepreneur**	76.6	14.5	8.9	0
The public***	25.2	24.1	21.2	29.5

Source: (Yang, Ming, 2002), *Table 4.1.5-3; P.153; **Table 4.1.5-4, P.154; ***Chart D4-2.1, P.269.

Table 2-7. Science and technology will be able to solve all the environmental problems

	Strongly disagree	Disagree	Somewhat agree	Strongly agree	Do not know
Government official*	8.0	44.9	36.1	11	0
Entrepreneur**	7.9	36.2	34.5	21.3	0
The public***	4.5	14.5	28.8	28.6	23.6

Source: (Yang, Ming, 2002), *Table 4.1.5-5, P.154; **Table 4.1.5-6, P.155; ***Chart D4-4, P.270.

Survey I asked interviewees to rank the challenges that China was facing by the level of perceived importance. The public, government officials, and business elites came up with different orderings (see Table 2-8). Environmental issues were the fifth on the public's list. Their ordering coincides with Maslow's hierarchy of needs.[48] In contrast, both government officials and entrepreneurs identified environmental issues to be the most important.[49]

Table 2-8. How Important are the Following Issues to China? Order Them by Their Importance

	The Public*	**Government officials****	**Entrepreneurs*****
1	Social safety	Environmental issues	Environmental issues
2	Education	Population	Population
3	Population	Employment	Employment
4	Employment	Education	Social safety
5	Environmental issues	Social safety	Education
6	Social security	Social security	Social security
N	8,973	1,595	770

Source: (Yang, Ming, 2002). * Table 2, P.85; ** Chart 4.1.2-2, P.122; *** Chart 4.1.2-2, P.122.

The difference in the ranking by different groups of people reflected the public attitude towards industry and the government. The public thought industrial development damaged the environment and the government should take the responsibility to protect it. Survey I found almost 80% of the public in 1999 thought the central and local governments and industry should take the major responsibility to protect the environment but almost 30% of the public thought individuals are not responsible (see Table 2-9).

Similarly, in 2005, the public agreed that the government should take up most of the responsibility for environmental protection and Survey II found 97.5% of the public agreed to include environmental indicators in the evaluating and rewarding system of government officials.[50]

Table 2-9. How Responsible the Following Parties Should Be to Protect the Environment in China? (Level of responsibility is measured on a 0-10 scale with 0 none and 10 the highest)

	10	6-9	0-5	
Central government	27.2	57.7	15.0	N=8,414
Local government	22.3	63.2	14.5	N=8,446
Industry	19.4	60.7	20.0	N=8,243
Individuals	16.5	55.1	28.4	N=8,415
Social organizations	11.2	54.4	34.4	N=8,074

Source: (Yang, Ming, 2002), Chart C3, P.286.

However, Survey I found the public listed the following four major reasons which were accountable for the degradation of local environment: (1) a lacking of public environmental awareness; (2) the government did not pay enough attention to environmental protection; (3) a lacking of a public spirit of law abiding; and (4) industry values its profit more than pollution prevention and control (see Table 2-10).

Table 2-10. Choose the Three Most Important Reasons for the Degradation of Local Environment

		Government officials	Entrepreneur	The public
1	A lacking of public environmental awareness	87.9	84.5	67
2	The government did not pay enough attention to environmental protection	52.5	51.8	59.6
3	A lacking of public spirit of law abiding	85.3	82.9	59.2
4	Industry values its profit more than pollution prevention and control	91.2	80.2	54.5
5	Too large a population	70.4	72.7	53.3
6	Fast expanding consumption	51.7	52.8	41.9
7	Environmental pollution and destruction of eco-system	69.0	69.6	40.7
8	Fast economic development	38.2	43.7	32.9

Source: (Yang, Ming, 2002), Chart 4.2.1-3, P.168.

Obviously, the public attitude towards environmental protection is somewhat mixed. People thought individuals and their level of environmental awareness and their spirit of law abiding matter. However, the public relies on the government and industry for taking the responsibility and initiative to strive for a better environment. The mixed public attitude reflects the public good nature of the environment and the collective action problems in protecting the environment.

Overall, the public preferred a more pragmatic approach toward environmental protection. Survey II found, as to environmental goals, the public would welcome reasonable and doable plans but did not want the government to set unrealistic targets. Furthermore, the public and experts alike agreed flexibility to be a virtue in setting environmental goals. It is necessary to take into consideration the local conditions given the vast regional disparities across China. The public supported an economic approach of pollution control such as environmental tax, tradable emissions permit, and ecological compensation.[51] About 80% of the interviewees of Survey I and 56% of the experts interviewed in Survey II agreed the weak enforcement of environmental regulations and noncompliance are the major reasons for the degradation of environmental quality. [52] And the public expected the government to enforce environmental regulations more stringently.

In short, the Chinese public thinks the economic activities of humans have bad environmental implications and science and technology are not able to fix all the environmental problems. Individuals' lack of environmental awareness and the lack of a spirit of law abiding are a major cause of environmental degradation. However, the government and industry are held mainly responsible for protecting the environment.

Besides more stringent enforcement of environmental regulations, the public takes a pragmatic and flexible approach towards pollution control in terms of goal setting and instrument choice.

Legitimization

A sense of legitimacy enables actions. Survey II found, to the public, it is legitimate for the government and individual citizens to do the following. First, the government is held accountable for protecting the environment. Second, to protect the environment more investment is necessary. About 97% of the public agreed the government should increase the share of GDP of environmental expenses in the eleventh five-year plan. Third, individuals should take more responsibilities for solving environmental problems. About 99% of the public agreed to collect environmental tax and 37.8% of the public thought all the people in society should pay the tax. Fourth, the public should be granted the right to participate in decisionmaking on environmental matters. As high as 97.2% of the public thought the government should consult the public on development plans. And 94% of the experts thought SEPA should hold public hearings on the eleventh five-year environmental protection plan. Lastly, when violations or environmental conflicts arise, 71.2% of the public agreed a legal approach is the most effective and should be adopted. Furthermore, 99% of the public thought they have the right to take legal actions against polluters.[53]

There is no single standard for legitimacy. Rather, what environmental actions are legitimate is upon definition by different people in different times. In 1999, most government officials and business elites would support for the public to complain to government agencies than they would accept other approaches when an environmental

problem arises (see Table 2-11). Obviously, 6 years have passed and the public (maybe government officials and entrepreneurs included) has become more open to the option of taking legal actions against pollution.

Table 2-11. Which One of the Following Public Actions Would You Agree the Most When There Is An Environmental Problem? (Single Choice)

	Complain to government agencies	Complain to the mass media	Complain to the CPC/CPPCC	Co-sign complaint letters	Protest on streets	Let it/do nothing
Government official	51.9	37.1	7.9	2.2	0.6	0.4
Entrepreneur	55.4	29.8	11.0	3.1	0.7	0

Source: (Yang, Ming, 2002), Table 4.1.6-3 & Table 4.1.6-4, P.157.

Action

Unless the public, government officials, and industry people are more environmentally friendly in their daily life, the goal of harmony between humans and nature can never be achieved. In this section, the inclination to take individual actions to fight pollution will first be examined; then pubic expectations for future actions by other parties follow.

Survey I reported three quarters of the public would not consider the environmental implications of a product when making purchasing decisions (see Table 2-12). About 65% of the public were not willing to pay more for environmentally friendly products. In contrast, only about 35% of the government officials and business elites were not willing to do so (see Table 2-13).[54] However, because no estimate on willingness to pay or market research on "green" products has been conducted, no tentative conclusions on consumer preference could be drawn at this point.

Table 2-12. Besides Quality, Price, and Brand, Would You Consider Environmental Friendliness When You Are Purchasing A Product?

	YES	NO	
The public	23	75	N=8,821
Rural	22	77	
Urban	34	68	

Source: (Yang, Ming, 2002), Chart D8, P.266.

Table 2-13. Would You Like to Pay More for Environmentally Friendly Product?

	Very willing	Somewhat willing	Neutral	Somewhat not willing + Not willing
Government official*	13.4	53.7	20.5	12.4
Entrepreneur**	12.6	49.6	18.4	19.3
The public*** N=9,016	34.8		28.7	36.4
Rural***	31.9		29.8	38.3
Urban***	46.6		24.3	29.0

Source: (Yang, Ming, 2002), *Table 4.1.6-1 & **Table 4.1.6-2, P.156; ***Chart E3, P.266.

Although the public might not be ready to pay more for green products, they are willing to take efforts to sort and recycle domestic wastes. Survey II reported 73% of the public thought it is necessary to have garbage recycled. However, the garbage collection services in some cities mixed back together the garbage that was sorted by the residents. This has discouraged the public to continue doing it.[55]

When a hypothetical environmental conflict arises or a violation is found, 47.7% of the Survey I respondents would choose to let it be and 43.9 percent would complain directly to the plant.[56] Survey II found 53.4% of the public reported environmental problems in their neighborhoods to the mass media or government agencies.[57] However, 20.4% of the public chose to do nothing about it because they did not think their opinions would be taken seriously. Survey III found about 80 percent of the people would complain to government agencies and almost 2/3 of the people chose to take legal actions if they find a violation.[58] Generally, the Chinese people are becoming more expressive on environmental problems.

The public has become more strategic in choosing the venue to report environmental harms as well. Survey II found 48.3% of the public reported to the mass media and 39.8% reported to government agencies. In 1999, Survey I found the public thought a complaint to government agencies was less effective than a report to the mass media. [59] So there were more people who chose the mass media as the venue for complaints than the government agencies in 2005.

Although Survey II & III were conducted a couple of years after Survey I, it seems that citizen complaints to government agencies are still a more popular means than citizen law suits in dealing with environmental conflicts. Although less people chose to do nothing about pollution in 2005 than in 1999, there was still 1/5 of the public who felt their voice would not be heard so it was useless to report.

Finally, Survey II indicated 93% of the public were willing to do volunteer work for environmental protection. Moreover, half of the public were willing to donate money to environmental volunteer activities or environmental NGOs.[60] This reflects that the civil society which is pro environmental protection is growing in China.

Also Survey I revealed the public thought the government has done a poor job in writing and enforcing environmental regulations, carrying out public environmental awareness and education programs, investing in environmental protection, and facilitating the public to participate in environmental matters (see Table 2-14).

Table 2-14. Has the Government Done a Good Job in the Following Measures?

	Good	Bad	Do not know
Writing environmental regulations	37.8	31.6	30.6
Public environmental awareness and education programs	38.1	27.2	24.9
Investment in environmental protection	44.6	27.0	28.4
More stringent enforcement	37.3	24.3	38.4
Facilitate the public to participate in environmental matters	40.2	22.7	37.1
Compel industry to comply	37.8	19.7	42.5
Better technology for solving environmental problems	38.7	18.9	42.4
Mobilize social organizations	36.7	17.5	45.9

Source: (Yang, Ming, 2002), Chart C5, P.278.

In conclusion, the public is willing to take actions against pollution and expects the government to work on almost every front of environmental challenges that China is facing: industrial pollution, pollution from mobile and diffuse sources, writing better environmental laws and enforcement of environmental regulations, investing more in environmental protection, and institutionalizing the procedures to involve the public in decision making on environmental matters.

Conclusion

Inconsistency existed between the public environmental awareness, interest, knowledge, attitude, legitimization, and practice. For example, although the level of public environmental awareness was high, the interest in environmental protection generally failed to prevail in the balancing test of economic development vs. environmental protection. The public only has a limited knowledge about the environment. The public attitude towards environmental protection is favorable and they prefer a pragmatic approach in pollution control instrument choice. The Chinese people think the government is mainly responsible for protecting the environment and it is legitimate for it to invest more in environmental protection and to involve the public in environmental decision making.

A plausible explanation for this inconsistency is that the public interest in the environment is not well organized and thus much less manifest than other organized interests such as industry and government. Environmental NGOs in China face political and financial obstacles. Promisingly, the public is more willing to take individual responsibility for protecting the environment by volunteering their labor, donating money, or complaining to the mass media or government agencies when there is a conflict or violation. Although the level of public environmental awareness is on rise, because institutions that represent public interest are weak, the Chinese public relies on the government for the responsibility and capability to solve environmental problems in China.

China Experiments with Environmental Performance Information Disclosure — an informational approach to environmental regulation

The Chinese government, like others, has been searching for cost-effective environmental regulatory instruments. Pubic disclosure of firms' environmental performance has been characterized as the "third wave" of environmental regulation after direct regulation and economic incentive mechanisms.[61] Information disclosure is of special appeal to developing countries because this informal regulation approach is less costly than formal regulations. Empirical evidence in North America, Korea, and Southeast Asia has supported its significantly positive effects on pollution reduction.[62]

Disclosing and revealing environmental performance of industry aim to acknowledge good performers and pressure bad performers to make progress because they are assumed to be concerned about their economic gains and reputation. Upon receiving the disclosed information, residents in the same neighborhood as polluters and consumers/investors/business partners in a marketplace react and their reactions have

economic or reputation implications for polluters. In China, given that environmental protection agencies rank low in the government hierarchy, more public attention to the environment would strengthen the position of EPBs in dealing with relevant economic and industrial agencies.

Supported by the World Bank's InfoDev Program, Hua Wang and his team have been working with SEPA to establish environmental performance information disclosure (EPID) programs since 1998. Firms are rated according to their environmental performance from best to worst using five colors — green, blue, yellow, red, and black — and the ratings are disseminated to the public through the news media.[63] Two municipalities, Zhenjiang, Jiangsu Province and Hohhot, Inner Mongolia were chosen to experiment with the EPID pilot programs between 1999 and 2000.

After five years implementing China's EPID programs, Wang suggested they have had positive impacts on pollution reduction. First, EPID provides polluting firms with incentives to improve their environmental performance through impacting their public image and leaving room for continuous improvement. Second, EPID facilitates conscious environmental management by firms through feedback from the government and the public. Third, regulatory institutions themselves are strengthened. Fourth, EPID encourages public participation in environmental regulation process. Finally, the balance between the stakeholders (e.g., government, citizens, industry) participating in this disclosure process has been changed.[64]

Wang et al's paper reported a dramatic increase in the percentage of firms rated as superior performers between 1998 and 2000 from 31% to 62% in Zhenjiang. Even more

dramatically, the percentage of good or better performers in Hohhot increased from 24% in 1999 to 62% in 2000.[65]

Although the Hohhot EPID pilot program was stopped after the first year's pilot, the Zhenjiang EPID program was sustained and became a provincial mandatory program in 2002 in Jiangsu province. By 2005, there were six regions that have adopted an EPID program in China. [66] Based of the preliminary positive outcomes, SEPA provided national implementation guideline on how to rate and disclose industrial environmental performance in 2005 and individual municipalities are encouraged to develop EPID programs tailored to their local conditions.[67]

Along the same line, efforts have been made to institutionalize disclosure of industrial environmental performance. For example, Article 17 of the Cleaner Production Promotion Law 2002 encourages provincial governments to publicize at regular time intervals significantly polluting enterprises with pollution discharge exceeding national standards. Although specifically for promoting cleaner production, making important pollution sources publicly known may potentially lead to better industrial environmental compliance because of increased public scrutiny.

In short, the Chinese experiment with the informational approach of environmental regulation by disclosing industrial environmental performance to the public in Zhenjiang and Hohhot has planted the seeds of more transparent and inclusive environmental monitoring and enforcement in China. So far, six regions have developed EPID programs in China. In promoting EPID, SEPA officials found it is especially difficult to get EPBs of less developed regions on board. Beyond a handful of EPID experiments, new environmental regulations have formally instituted information

disclosure which potentially has a far reaching effect on environmental monitoring and enforcement in China.

Unfortunately, even though SEPA staff and other advocates for EPID have noticed different EPBs responded differently to the call for adopting EPID programs, no studies have reported why or how to improve the design of an EPID program to overcome the resistance.[68] In fact, the two first EPID pilot programs revealed mixed results, the Zhenjiang one was sustained while the Hohhot one was stopped after only the pilot phase. The Chinese experience with the EPID programs calls for a better understanding of their implementation processes and impact on environmental monitoring and enforcement in a developing country context.

2.2 Environment and Enforcement

Overall, two approaches have been adopted to analyze the enforcement of environmental regulations: economic analysis and sociological analysis of compliance and enforcement. This section will briefly review existing research on environmental compliance and enforcement from both perspectives, and then focus on research specifically on an informational approach of environmental regulation in the next section.

The economic theory of compliance assumes firms maximize profit or minimize cost. Compliance cost is balanced against expected penalties from noncompliance. Based on the calculation, firms choose to comply or not to comply.[69] Furthermore, the extent of noncompliance depends on the marginal expected penalty in comparison with the marginal cost of pollution abatement.[70]

This analysis does not explain the Harrington Paradox: Based on self-reported pollution emission, given infrequent inspection and lenient or no fine on violation,

sources of pollution are still thought to be in compliance a large part of the time rather than betting on not to comply and not being caught. A number of enforcement surveys found that regular sources can expect to be inspected once or twice a year and the inspections can hardly become evidence of continuous noncompliance against firms.[71] In the U.S., a Notice of Violation (NOV) will be sent to a violator by the Environmental Protection Agency (EPA) ordering it to return in compliance if a source is found not in compliance. The EPA only levied fines on less than five percent of the violators which received a NOV, and the fines tended to be small.[72]

Studies have found that roughly 50 percent of sources which claimed to be in compliance were in actual compliance 20 years ago in the US.[73] Even so, the compliance rate is still relatively high given the expected small penalties on false reporting and thus the Harrington Paradox is still valid. Researchers have tried to explain the seemingly inconsistent observation from two different aspects: the interplay between the regulator and the regulated firms and the private enforcement by the public including investors and consumers in the market.[74] The following three paragraphs will explain in more detail the relationships — the regulator vs. the regulated and the public vs. polluters.[75]

The regulator in general practices a targeted enforcement strategy. Since it is not feasible to set the fine at a very high level, the regulator tends to relate its enforcement actions to the compliance history of a firm. Harrington and others divide firms into two groups based on their compliance history: stringently enforced and otherwise. Only the threat of being assigned to the stringent enforcement group would induce some firms to comply.[76] Moreover, Heyes (2002) proposes a theory of filtered enforcement, besides following environmental standards, whereby the regulator only ever audits firms whose

performances during regulatory inspections exceed a certain trigger value.[77] Hentschel & Randall (2000) construct a continuous reputation indicator cumulatively reflecting a firm's past violations. They modeled the monitoring probability on the reputation indicator and found the social cost of targeted enforcement is lower than the random or equal treatment enforcement.[78]

There has been well documented empirical evidence of private enforcement in pollution prevention and control. Citizens (including investors and consumers) can take legal actions against direct harm or violations by specific polluters or complain to public authorities. Successful citizen suits can lead to penalties, or injunctions, or compliance orders to bring violators back in compliance. To encourage citizen suits, in the US, the attorney fee can be recovered by the government for successful or partially successful claims.[79] Thus environmental NGOs actively engage in compelling noncompliant firms into compliance.[80] In societies where the civil society is capable of punishing bad environmental performers such as the US, Canada, Korea, Mexico, Chile, Argentina, and the Philippines, the capital markets were found to value disclosed environmental performance information. The stock prices were found to fluctuate responding to disclosed firm-specific information on its environmental performance or relevant environmental lawsuits. Good performers were rewarded by increased stock market prices and noncompliant ones were punished by declined stock market value.[81]

Besides an economic analysis of environmental compliance and enforcement, Hawkins and others examined environmental compliance and enforcement from a sociological perspective.

Pollution is not self-evident. It does not define itself, enforcement agents do. Enforcement agents in the field have to evaluate the capacity, including technological and economic, and intention of polluters to negotiate standards and determines the reach of law.

Overall, enforcement officers commonly use two strategies — compliance and sanctioning. From Table 2-16, one can see clearly the compliance strategy is more appropriate in environmental protection than sanctioning. Most discharges do not have a direct harm but accumulate environmental damage. Pollution control normally deals with a state of affair rather than an act. Monitoring is extremely important but enforcement agents value a friendly relationship with dischargers because the enforcers depend on polluters for voluntarily reported information.

Table 2-15. Environmental regulatory enforcement systems

	Compliance	Sanctioning
Objective	Prevent a harm rather than punish an evil	Apply punishment for breaking a rule and doing harm
Basis for judgment	Moral evaluation	Harm created + moral evaluation
Style	Conciliatory (bargaining and negotiating future conformity)	Penal (accusatory and adversarial)
Concern	Detection and monitoring	Proof of violation
Operational philosophy	Pragmatic	Binary response
Application	State of affair (continuing, repetitive, or episodic deviance)	Acts (unpredictable deviance, or direct harm)
Pattern	Serial, incremental, continuing process	Once-and-for-all response with the binary outcomes

Source: author compiled from Hawkins (1984).

The ultimate goal of environmental enforcement is compliance. Compliance is negotiable. Negotiating tactics of enforcement officers include: (1) appeal to social responsibility of firms, (2) portray compliance as ultimately inevitable and the enforcement process as inexorably moving to that end, (3) put the polluter on the

defensive by constantly monitoring, and (4) rely on the internal sanctioning system of polluting firms. Besides negotiation, deterrence or bluffing is important because the field officer perceives the polluter as rational and responsive to deterrence by abating pollution if sufficient threat is made.

Enforcement staff of environmental protection agencies work in a complex environment trying to please stakeholders with sometime incompatible interests such as their senior staff, the public, and polluters. Their job is not an easy one; their arguments have to be backed up by law and a grasp of the art of monitoring and negotiation is essential. This indicates that the relationships the environmental protection agencies have with other players are decisive in regard to how the law on paper is made to work in a real world.[82]

In short, the actions by enforcement officers of environmental protection agencies and numerous investors and consumers will impact the expected penalty from noncompliance and thus influence the environmental behaviors of the regulated firms accordingly. However, China has long mainly relied on pollution discharge fee and administrative measures such as to close a plant. Both enforcement tools only have limited results in bringing violators into compliance because the level of the pollution discharge fee has been set too low and it is usually impractical to close a plant. An informational approach of environmental regulation is intended to complement the existing enforcement tools. The following section examines specifically existing research on the informational approach of environmental regulation.

2.3 An informational approach to environmental regulation

Public disclosure of firms' environmental performance information has been characterized as the "third wave" of environmental regulation, after direct regulation and economic incentive mechanisms.[83] This informal environmental regulation, as opposed to formal environmental regulation and the market approach of "pay as you pollute," has been supported by the empirical evidences of reduced emissions in North America, Southeast Asia, and China.[84]

Public disclosure is not only justified by its effect on emission reduction and cost-effectiveness but also on theoretical ground. According to neo-institutionalism theories, the party which owns the residual property rights (not explicitly stated in contracts, assuming all contracts can never be complete) should have the control on information and decision-making.[85] In the case of environmental pollution, it is the general public who incurs the damage on their health as a form of residual costs caused by pollution (beyond the costs covered by polluters such as pollution fee, fines, factory closure, etc.). Thus, they should be informed of pollution information and make decisions on environmental regulatory enforcement.

A global trend has emerged to provide the public with open access to environmental information and further involve them in environmental decisionmaking (see Appendix 5 for the global trend in EPID).

- Responding to devastating environmental accidents, the US passed the Emergency Response and Community Right to Know Act of 1986 followed by the implementation of the Toxic Release Inventory (TRI) in 1989.[86]

- The Council Directive 90/313/EEC on the freedom of access to information on the environment first formally requested the European Community member governments to provide the public with adequate access to environmental information.[87]
- The principle 10 of the Rio Declaration on Environment and Development in 1992 by the General Assembly of the United Nations prescribed the right of the public to have appropriate access to environmental information held by public authorities and to participate in decisionmaking on environmental matters.[88]
- The Aarhus Convention (1998) goes one step further to require the European Union member countries which ratified the convention to provide public access to environmental information, which is legally binding and the public can sue their governments if they find violations.[89]

Justified on both an empirical and theoretical ground, Graham summarized succinctly in her 2002 book *Democracy by Disclosure* why and how an informational approach of environmental regulation is effective and different from direct regulation or financial incentive mechanisms. [90]

> Disclosure strategies differ from traditional government standards and financial incentives in at least three fundamental ways. First, they *aim to establish levels of acceptable risk by means of public pressure rather than deliberation*. Government standards specify acceptable design or performance by legislative and regulatory processes. Economic incentives specify a legislated price or quantity of acceptable risk. Disclosure, however, influences risk through the countless actions of consumers, suppliers, employees, investors, community residents, and voters that alter organizations' decisions. Only the scope and character of information about pollution or errors are set legislatively. Gaining prominence during the 1990s, when public distrust of political processes was high, these systems, like the financial disclosure mechanism adopted in the 1930s, reflected a desire to skirt legislative processes to empower ordinary citizens.
>
> Second, they *employ communication as a regulatory mechanism*. Government standards rely on rules and the threat of sanctions to encourage organizations to reduce risks. Taxes, subsidies, and

> other economic incentives rely on the prospect of financial loss or gain. Information strategies, by contrast, depend on improving understanding in ways that lead to changed purchasing, investing, or employment, or collective action. Placing new data in the public domain is itself intended to produce changes in markets or politics in ways that ultimately reduce risks.
>
> Finally, most of these systems *extend the reach of government*. They generally seek to influence activities beyond those that are the targets of government rules, taxes, and subsidies and they create the potential for impacts that are not circumscribed by state or national boundaries. Information required in one jurisdiction becomes available everywhere, unimpeded by political or geographical barriers.

In conclusion, an informational approach of environmental regulation promotes democratic values in society. It gives the public access to environmental information which will enable them to participate in environmental decision making in a meaningful way. So to disclose environmental information helps promote transparency, inclusiveness, and democracy.[91] From an economic perspective, information-based approaches affect the expected penalty for noncompliance through empowering different actors (regulators, the public, or the regulated themselves) to engage in monitoring and enforcement actions. Thus the probability of a violation being caught and the consequences of a violation are modified accordingly. Mary Graham looks deeper into it and proposed that an informational approach of regulation works through relational and communicative mechanisms. Better environmental compliance can be achieved among stakeholders through interactions that are by nature evolving and flexible.

It is worth mentioning for an informational approach of environmental regulation to work, the following conditions are necessary: (1) the regulator has to set up the infrastructure for collecting, processing and disclosing environmental information; (2) citizens are explicitly granted the right to bring citizen law suits and complaints to redress environmental conflicts and harm; and (3) products and enterprises can be differentiated by their environmental friendliness in the consumer and capital markets.

2.4 Contribution to the literature

As the "third wave" of environmental regulation, environmental performance information disclosure has been extensively studied by environmental economists and political scientists. Environmental economists showed strong empirical evidence of the positive effects of information disclosure on emissions reduction.[92] Political scientists analyzed the costs and benefits and the policy formation process of information disclosure and suggested its instrumental and normative value for democratic environmental governance.[93] Given the practical and political appeal, since 1995, more than ten developing countries have been experimenting with information disclosure to control pollution. China as a country with severe pollution but weak environmental monitoring and enforcement adopted information disclosure in 1999. The Chinese experiments have shown mixed results. However, no empirical research has been done to investigate the implementation process of the EPID pilot programs to understand why it can be transplanted and localized in one place but not in another.

As empirical evidence shows that information disclosure is able to change firms' behavior, the research community has been trying to identify the underlying functioning mechanisms. Environmental economists see firms respond to monetary incentives in the product and capital markets, and to increased public scrutiny and concern for their reputation.[94]

In developing countries where product labeling and capital markets are not well developed, consumers or investors rarely take environmental friendliness into account when making investment or purchasing decisions. Even so, as what happened in industrialized countries, positive effects of information disclosure on firms'

environmental performance have been reported in developing countries.[95] What are the incentive mechanisms at work? The research community has not yet explored alternative explanations.

The Zhenjiang and Hohhot EPID pilot programs in China provide a good opportunity to gain a better understanding of how an informational approach of environmental regulation works in a developing country context. Specifically, this dissertation seeks to answer the following three research questions:

How did EPID implementers and local public officials in Zhenjiang and Hohhot perceive, respond to and implement the disclosure of environmental performance information?

Did the implementation of EPID pilot programs impact the dynamics of environmental monitoring and enforcement in Zhenjiang and Hohhot? If yes, through what channels?

What implications do the Zhenjiang and Hohhot EPID pilot programs have for the environmental monitoring and enforcement work in a developing country context?

This dissertation will fill in the literature gap by investigating the dynamics and nuances of the implementation processes and the impact of the Zhenjiang and Hohhot EPID pilot programs on environmental monitoring and enforcement. Two special contributions to the literature made by this dissertation are:

First, the implementation of the Zhenjiang and Hohhot EPID pilot programs was not static but a constantly evolving process featured by dialogues between program stakeholders who were embedded in different contexts. Their perceptions of EPID,

resources at their disposal for EPID implementation, and contexts in which the EPID programs were carried out shaped and were shaped by dialogues between them. To capture the program dynamics is important for understanding past experience and informing policy design in the future.

Second, the effect of the Zhenjiang and Hohhot EPID pilot program is not evaluated by improved ambient environmental quality. Instead, by looking deeper into the underlying functioning mechanisms, this study examines how the Zhenjiang and Hohhot EPID pilot programs changed or otherwise failed to change the environmental awareness, interest, knowledge, attitude, legitimization, and action of program stakeholders. Thus this dissertation reveals what the gap is between the potential and actual effect of the EPID pilot programs, and how such a gap could be filled to achieve better environmental monitoring and enforcement in a Chinese context.

Chapter 3 will first briefly describe the analytical frameworks adopted in the case analysis. Then the research design and limitations of this study follow.

3 An institutional analysis of environmental performance information disclosure (methodology)

This dissertation seeks to elucidate the implementation processes of information disclosure programs and their impact on environmental monitoring and enforcement. As such, it is a comparative case study of the Zhenjiang and Hohhot EPID pilot programs in China. This dissertation, thus, focuses on how the EPID concept was accepted (or failed to be accepted) and executed in Zhenjiang and Hohhot in China, and how the implementation of the Zhenjiang and Hohhot EPID pilot programs have impacted stakeholder environmental behaviors.

The EPID concept originated in the World Bank and was first tested in Indonesia. Later it was introduced into China by Hua Wang, the policy missionary. Domestic policy entrepreneurs in China adapted it to a Chinese context and carried it out in two localities. Unfortunately, because of the difficulty in getting information on the implementation of PROPER in Indonesia, which took place between 1995 and 1997, it is beyond the scope of this dissertation to make comparison between the Indonesia model and the Chinese experiments. Thus this dissertation only compares the pilot EPID programs executed in Zhenjiang and Hohhot.

One of the purposes of this work is to get a better understanding of the EPID program dynamics to help make sense of past experience. The EPID pilot programs are, by nature, still evolving, particularly because Chinese society has been undergoing a rapid transformation. Perceptions of EPID, resources available for program implementation, and contexts in which the EPID pilot programs were carried out were not static. Rather, they were shaped by the dialogues between EPID program stakeholders

over time. The EPID stakeholder dialogues were shaped by factors in a broader context, such as the level of economic development, rule of law, and public involvement in environmental matters. Second, the effects of the Zhenjiang and Hohhot EPID pilot programs cannot be evaluated by observing improvements or declines in ambient environmental quality. Instead, by looking deeper into the underlying functioning mechanisms, this study examines whether the Zhenjiang and Hohhot EPID pilot programs impacted the environmental awareness, interests, knowledge, attitudes, legitimization, and actions of program stakeholders. Thus this dissertation will be able to reveal the gaps between the potential and actual effects of an environmental regulatory instrument on the environmental behaviors of the stakeholders. It is hoped that a better understanding of how the informational approach toward environmental regulation worked in Zhenjiang and Hohhot will inform policy learning to achieve more efficient and effective environmental monitoring and enforcement in a Chinese context.

The implementation of the Zhenjiang and Hohhot EPID pilot programs and their impact on environmental monitoring and enforcement will be seen through two theoretical lens, the "cultural roots" framework and "webs of dialogue" framework. This section will first present the research questions, followed by a description of each of the theoretical frameworks and how they were combined for this study, the research design, the data collection procedures, and the limitation of the study.

3.1 Research questions and propositions

This study seeks to answer the following three questions and to examine the listed propositions:

Research question 1: How do the factors described in the cultural roots (tasks, resources, and context) and the webs of dialogue frameworks contribute to understanding the implementation processes of information disclosure programs and their impact on environmental monitoring and enforcement in a developing country? Specifically, how can we understand the combining of factors that resulted in the Zhenjiang EPID pilot program being expanded and sustained and the Hohhot EPID program stopped only after the pilot phase in China during the years 1998 and on?

Proposition 1: According to the cultural roots framework, implementation of the Zhenjiang and Hohhot EPID pilot programs is largely determined by the way EPID was perceived by EPID implementers and how it related to their regular work (tasks), the resources that were at their disposal, and the contexts in which the EPID programs were carried out.

Proposition 2: According to the webs of dialogue framework, the perceptions of EPID, the resources used to carry out the EPID pilot programs, and the contexts in which EPID programs were implemented were not static. Rather, they defined and were defined by the webs of dialogues between EPID program stakeholders, including advocates, implementers, the mass media, industry, and the public.

Research question 2: Did the implementation of EPID pilot programs impact the dynamics of environmental monitoring and enforcement in Zhenjiang and Hohhot? If yes, through what channels?

Proposition 3: EPID programs are potentially able to involve the public, industry, and government in environmental monitoring and enforcement and change their

environmental behaviors. The programs may work through webs of dialogues on EPID among program stakeholders.

Research question 3: What implications do the Zhenjiang and Hohhot EPID pilot programs have for environmental monitoring and enforcement work in a developing country context?

3.2 Analytical frameworks

Two analytical frameworks were adopted in the comparative case analysis: Anne Khademian's "cultural roots" framework and a "webs of dialogue" framework synthesized from John Braithwaite & Peter Drahos' *Global Business Regulation* and Emanuele Santi & Lucia Grenna's Environmental Communications Assessment.[96] The two analytical frameworks are applied strategically to make sense of the implementation and impact of the Zhenjiang and Hohhot EPID pilot programs.

The Cultural Roots Framework

According to Anne Khademian (2002), three elements — an organization's task, resources, and environment — are the "roots" of that organization's culture, and public managers influence and help shape commitments by managing the process of integration — the way the organization's cultural roots weave together to influence the resulting commitments and program outcomes. The term "task" refers to a function to be performed or a goal to be achieved by an institution, whether it is a legislative mandate or a vision of the institution's leader. "Resources" are the human capital, financial resources, and political support available to the people who are in charge of carrying out the above task. "Environment" refers to the context in which the institution is embedded, including both internal and external players, organizations, and factors relevant to the above task

but beyond what is specifically required to perform the job. This framework will help to clarify complex program implementation processes and will draw clear connections between institutional change and program outcomes.

In her book *Working with Culture*, Khademian mainly draws upon the experiences of three leaders who changed the culture of their public programs. She first describes Professor Kenneth Reardon, who made the East St. Louis Action Research Project (ESLARP), a community assistance and development project, a joint effort between the community of East St. Louis and the University of Illinois. This was a dramatic change from the ivory-tower approach toward community development that had been more common in academia, and it opened a new era of participatory community development planning. Khademian also describes how James Lee Witt transformed the way the Federal Emergency Management Agency (FEMA) responded to victims of natural and non-natural disasters and made it a well-prepared and responsive federal agency: During his tenure from 1993 to 2001, Witt was able to effect fundamental change in how the job was perceived and how the job got done. Finally, she explains how the New Haven, Connecticut police chief Nicholas Pastore transformed his workforce in such a way that officers were able to attend to the psychological needs of children after they had witnessed or had been victims of violence. Pastore accomplished this through training, recruitment, and working closely with the Child Studies Center at Yale University.

These three leaders faced different environments, worked on different tasks, and had different resources at their disposal. However, a common thread is that they were all successful in transforming their organizations and programs and did so in similar ways:

They all diagnosed the organizational culture when they first took their jobs, found out what needed to be changed, integrated the three elements of cultural roots in a different way from before, and then capitalized and institutionalized the changes persistently throughout their tenure.

Task, resources, and context (replacing the term “environment” to avoid confusion in this dissertation) are universal elements of program implementation. Thus the "cultural roots" framework was adopted to analyze the implementation of the Zhenjiang and Hohhot EPID pilot programs in a Chinese context by looking at (1) tasks: perceptions of the disclosure program by advocates and implementers, (2) resources at their disposal for program implementation, and (3) contexts in which the programs were implemented.

“Perception” here means the way in which the EPID program implementers understood their task (the EPID pilot program) and how they made sense of it and related it to their regular work. “Resources” refers to the administrative capacity of the Zhenjiang and Hohhot EPB, the financial and human capital at the disposal of the implementers, the implementers’ professional competency and working relationships, the match between their authority and responsibility for carrying out the EPID programs, and the availability of technical support.

Contexts in which the EPID pilot programs were carried out include the following important players and institutions: city government and relevant economic and industrial agencies of the same level as the Zhenjiang and Hohhot EPB, SEPA, provincial EPB, industry, and the public, including environmental NGOs.

A closer look at the three cultural roots (task, resources, and context) and their integration will help make sense of the differences in the implementation and outcomes of the Zhenjiang and Hohhot EPID pilot programs.

Webs of dialogue Framework

John Braithwaite and Peter Drahos discuss how global business is regulated in their book *Global Business Regulation*. More specifically, they talk about the formation of global regimes, major actors involved, mechanisms of globalization, and principles embodied in the global regimes. This section will only focus on their discussion on the environment.

Epistemic communities play an important role in disseminating scientific knowledge, standards, and regulatory instruments on the environment and in forming international environmental issue networks. Epistemic communities are understood as in international anthropology and studies of global governance, transnational networks of knowledge-based experts who define for decision-makers what the problems they face are, and what they should do about them.[97] The members of the epistemic communities can be industry representatives, academics, and government officials as long as they have a substantial understanding of the subject at issue. Their interactions — both cooperative and contentious — and their connections with other actors usually make international standards or regulations possible.

A common mechanism of globalization as described by Braithwaite and Drahos is "modeling": observational learning with a cognitive content that goes beyond simple imitation (P.580). The pattern of modeling worldwide shows that human actors seize models that help them to display and discover who they are or accept models that are

backed up by money or military might (P.582-584). There are five types of actors involved in the diffusion of models. Model missionaries are promoters of models who, motivated by belief in a model sourced in their part of the world, travel abroad to spread the word about the model. The other four types of actors include model mercenaries, who promote and exploit the models for economic gain; model mongers, who experiment with a variety of models for advancing their political agenda; model misers, who adopt models but prefer copying to innovating and can marshal political support for models; and model modernizers, who adopt models because of the legitimacy of the models and because, by adopting such models, they can be perceived as modern, civilized, or progressive (P.585).

Braithwaite and Drahos' analysis of epistemic communities and the diffusion of models help to illuminate the introduction of EPID into China by Dr. Hua Wang, a senior economist with the World Bank. He was exposed to the idea of EPID in the Environment and Infrastructure unit of the Development Research Group when his colleagues developed the first industrial environmental performance information disclosure program, Indonesia's Program for Pollution Control Evaluation and Rating (PROPER). Believing in democratic environmental governance and the positive effect of disclosure on pollution reduction, Hua Wang initiated the EPID experiment in China. In this case, Hua Wang was the policy missionary.

Epistemic communities were formed around the issue of EPID at both an international and a domestic level. Dr. Hua Wang bridged the two epistemic communities together. At the international level, academics such as Thomas Tietenberg, Shakeb Afsah, and Benoît Laplante, and researchers at the World Bank such as David Wheeler, Hua Wang, Susmita Dasgupta, and others directed the experiments on the informational

approach of environmental regulation in the field and published papers and books to document efforts made, effects exhibited, and lessons learned.

At the domestic level, academics at Nanjing University, the Chinese Research Academy of Environmental Sciences (CRAES), and the Hohhot Research Academy of Environmental Sciences (HRAES), and government officials at SEPA, Jiangsu provincial EPB, the Zhenjiang EPB, and the Hohhot EPB worked with Hua Wang to develop the Zhenjiang and Hohhot EPID pilot programs. They accepted the idea of EPID neither for economic gain nor to advance their political agenda by experimenting with a variety of models — thus they were neither model mercenaries nor model misers. Rather, they adapted Indonesia's model to a Chinese context and made it a modern and progressive environmental regulatory instrument in China. Thus, as model modernizers, they were the forerunners of the informational approach to environmental regulation in China.[98] In terms of their influence on the adoption of the idea of EPID in China, people of the domestic EPID epistemic community were policy entrepreneurs who promoted EPID and tried to gain political support from their local governments.

However, the analysis by Braithwaite and Drahos does not cover how the global regimes impacted the behaviors of actors within individual nation-states. This requires a detailed analysis of the sequence of events, from adopting a model or accepting an innovative idea, to getting stakeholders on board to carry out the program, and finally to generating an impact on stakeholder environmental behaviors through interactive and communicative implementation processes. Emanuele Santi and Lucia Grenna present a six-step analytical tool to assess the impact of environmental communications on behavioral changes: awareness, interest, knowledge, attitude, legitimization, and practice.

This communicative analysis nicely captures the development of a human action and thus can be adopted to examine the impact of the Zhenjiang and Hohhot EPID pilot programs on stakeholder environmental behaviors as well as how far the EPID pilot programs have walked the stakeholders through the six steps.

3.3 The integration of the "cultural roots," "webs of dialogue," and communication analysis framework

The three cultural roots of the Zhenjiang and Hohhot EPID pilot programs — perception of the task, resources, and context — shaped and were shaped by the dialogues on EPID among program stakeholders. Embedded in their existing work and working relationships, EPB officials, local government officials, and experts of environmental research institutions had different perceptions of EPID and made different resources available to carry out the program. More importantly, the perceptions, resources, and the working environments were not static but constantly evolving with the dialogues on EPID between the stakeholders. The following paragraphs illustrate the interconnectedness of the three elements of cultural roots and the dialogues on EPID among program stakeholders. As an innovative environmental regulatory instrument introduced by an intellectual of an international organization, it took time and effort for Chinese officials to understand the concept of EPID and why and how implementing an EPID program would be in line with their current goals.

An informational approach toward environmental regulation, the intent of EPID is to involve the public in environmental monitoring and enforcement by providing them with industrial environmental performance information. The ultimate goal is to change environmental behaviors of the government, industry, and the public to achieve better compliance. In order to go from the drawing-board, using the concepts Hua Wang

devised as policy advisor — to actual behavioral changes among EPID stakeholders, three levels of dialogues on EPID must be established.

Dialogue Level 1: policy missionary — domestic policy entrepreneurs;

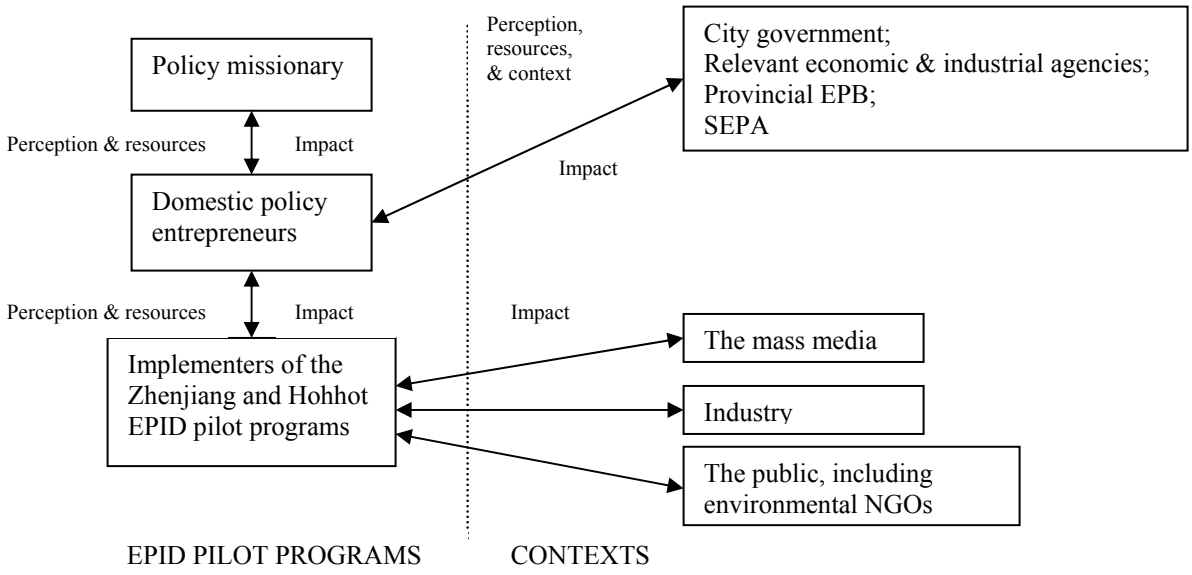
Dialogue Level 2: domestic policy entrepreneurs of the epistemic community on EPID — city government and relevant economic and industrial agencies; and

Dialogue Level 3: government — industry, the public, and the mass media.

Graham (2002) proposed that disclosure works through relational and communicative mechanisms. A "webs of dialogue" framework is thus synthesized from the works by Braithwaite & Drahos and Santi & Grenna to make sense of how the Zhenjiang and Hohhot EPID pilot programs changed or otherwise failed to change stakeholder environmental behaviors through dialogues.

Figure 3-1 illustrates how the "cultural roots" and "webs of dialogue" framework are integrated together to make sense of the implementation and impact of the Zhenjiang and Hohhot EPID pilot programs. The double-ended arrows represent dialogues between the EPID program stakeholders; the text appearing next to the arrows indicates whether the dialogues have impacted the perceptions, resources, and contexts of the EPID program implementation and program outcomes.

Figure 3-1. How "cultural roots" and "webs of dialogue" frameworks are woven together in the case analysis



3.4 Research design

Compared with other research methods, case studies are appropriate when a "how" or "why" question is asked about a contemporary set of events over which the investigator has little or no control.[99] This study is aimed to make sense of how and why the implementation of the Zhenjiang and Hohhot EPID pilot programs were different and how the implementation impacted the dynamics of environmental compliance and enforcement. The two pilot programs were events occurred between 1998 and 2000, over which I do not have any control. So case study method is appropriate.

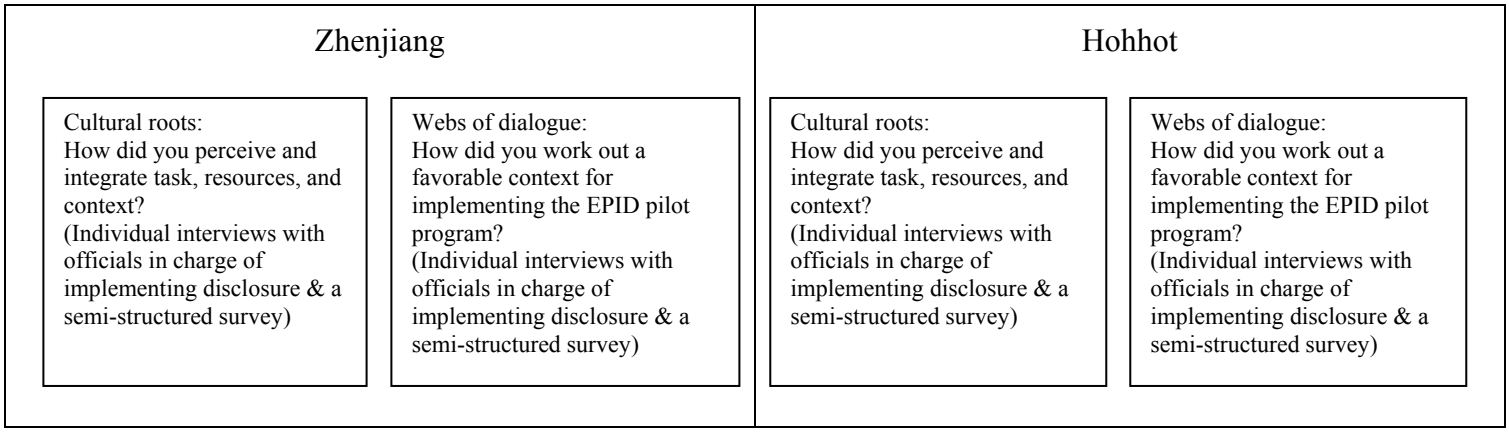
Also Robert Yin recommended, "You would use the case study method because you *deliberately wanted to cover contextual conditions* — believing that they might be highly pertinent to your phenomenon of study" (Yin, Robert K., 2003). The phenomenon of study is the implementation and impact of the Zhenjiang and Hohhot EPID pilot programs. As illustrated in the section on analytical frameworks, the key variables that

are believed to be highly pertinent to the key phenomenon are: perceptions of tasks, resources, and contexts by major implementers and dialogues among program stakeholders. Both perceptions and dialogues are embedded in contexts such as local economy, societal movements, and institutional set up of the Chinese environmental governance system.

Given that Zhenjiang and Hohhot were the first two cities in China piloting environmental information disclosure programs at the same time, in different locations, and with different outcomes, a comparative analysis of the two case studies is a suitable methodology in searching for a better understanding of how and why this difference came about (see Figure 3-2 for the task of data collection and the logic of reasoning with collected information). Two cases selected offered contrasting situations. In this design, if the subsequent findings support the hypothesized contrast, the results represent a strong start toward theoretical replication — again vastly strengthening the external validity of the findings compared to those from a single case alone.[100]

Government agencies and individuals involved in environmental decisionmaking are the embedded units of analysis in both cities.

Figure 3-2. Two-case Embedded Case Studies of Zhenjiang and Hohhot's Implementation of Information Disclosure and Its Institutional Impact



Based on the information collected, analytic narratives in the following chapter tell the story of the implementation processes of the Zhenjiang and Hohhot EPID pilot programs — interactions between the EPID advocates (including the "policy missionary" Dr. Hua Wang, who introduced the EPID concept to China and domestic policy entrepreneurs), EPB staff, officials of the city government and relevant economic and industrial agencies, industry representatives, and the public.

3.5 Data collection

Data were collected through individual interviews and with a review of official documents and newspaper articles between October 2004 and December 2005. Interviewees include: SEPA officials, officials of the Zhenjiang and Hohhot EPBs, officials of city government and relevant economic and industrial agencies, academics, and industry representatives who were involved in the EPID programs. Both open-ended and structured questions were asked. Altogether 53 individuals have been interviewed (see APPENDIX 6 for the list of interviewees and their affiliations). See APPENDIX 7 for the cover letter and interview questions.

In the Acknowledgements of the book, *Environmental Information Disclosure: Theory and Practice*, Hua Wang identified major players in the Zhenjiang and Hohhot EPID pilot programs. This name list provided the starting point for my fieldwork.

Through Jennifer Turner, I was introduced to Professor Jun Bi of Nanjing University in October 2004. He introduced me to Professor Genfa Lu and the Jiangsu Provincial EPB staff involved in the Zhenjiang EPID pilot program. Professor Genfa Lu introduced to major implementers of the Zhenjiang EPB. Based on the color rating results of industrial enterprises in Zhenjiang in 2000, a total of 8 companies, with 2 greens, 4

blues and 2 blacks, were selected. Xinhua Qu of the Zhenjiang EPB provided their contact information. The heads of the safety and environment department and two environmental specialists of the two green companies were invited by Xinhua Qu to the Zhenjiang EPB for a focus group interview. After this, I paid visits to all the companies selected and conducted interviews on site.

Jinnan Wang of the Chinese Research Academy of Environmental Sciences was listed in the Acknowledgements. Professor Genfa Lu provided me with his contact information. In May 2005, after making a cold call, I was able to meet him and his colleague, Dong Cao who was the major actor in the Hohhot EPID pilot program, in their offices in Beijing. Dong Cao introduced me to Director Fan of the Hohhot Research Academy of Environmental Sciences. In June 2005, I went to Hohhot and was further introduced to the Hohhot EPB staff and representatives of 4 companies. Altogether, 53 people who directly participated in the Zhenjiang and Hohhot EPID pilot programs were interviewed between October 2004 and December 2006.

These interviewees answered questions either in person or by phone (see APPENDIX 6 for the list of interviewees). A semi-structured questionnaire was administered during the interviews to obtain quantitative information on both programs (see APPENDIX 7 for interview questions). The questions that were asked can be grouped into the following five categories: (1) basic information, (2) evaluation of resources available for EPID pilot program implementation, (3) evaluation of working relationships with relevant parties in implementing EPID pilot programs, (4) difficulties and/or obstacles incurred in program implementation, and (5) evaluation of the impact of

EPID pilot programs on their business as usual and on public participation in environmental protection.

Comparisons in task, resources, context, and stakeholder dialogues on EPID along two dimensions — time (before and after disclosure) and location (Zhenjiang and Hohhot) — have been conducted.

3.6 Limitations of this study

This study has three major limitations. First, because the scope of this study is limited to government agencies with a focus on local EPBs, important players in the arena of environmental protection – the general public and industry stakeholders – are not broadly surveyed in this study. The environmental behavior of these stakeholders in relation to EPID programs is seen partially from the standpoints of government officials. However, this angle is of special value in the design and implementation of environmental protection policies because EPBs officials only function in the context according to their perceptions.

Second, this study does not attempt to draw causal relationships between environmental policy intervention and emissions reduction. Pollution reduction is attributed to many factors, such as the perceived environmental problems, the characteristics of the regulated community, the public attitude toward environmental protection, and the institutional capacity of EPBs. To address this issue rigorously requires a large sample of polluters to disentangle the impact of EPID programs on environmental behavior, a task that is beyond the scope of this study.

Finally, any effort to apply the results obtained from this study in a generalized way to other localities must proceed with caution. Although the analytical models utilized

in this study are general in scope and can be replicated with other EPBs, the results from this study can only reveal what questions might be worth asking and which factors might be worth probing. The results obtained from Zhenjiang and Hohhot cannot be generalized to other locations without examining the various contexts in which these places function.

4 Analytic Narratives — Environmental Performance Information Disclosure Pilot Programs in Zhenjiang and Hohhot

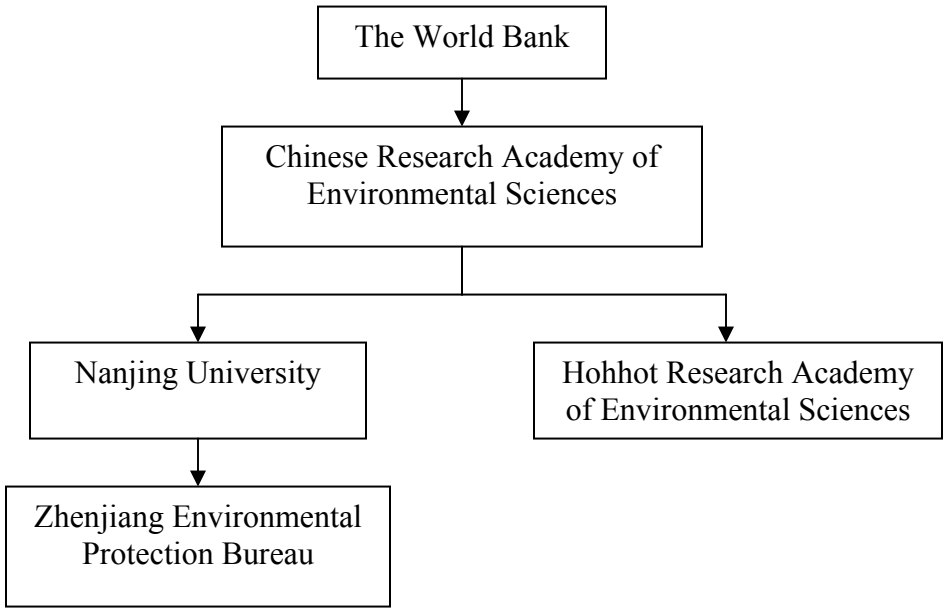
In this section two separate analytic narratives will sketch the events that happened between 1999 and 2000 in Zhenjiang and Hohhot regarding the conception, planning and preparation, implementation, scaling up, and impact of EPID.[101] Before telling the stories of the two EPID pilot programs, it is useful to put them in context with an overview of the socio-economic conditions and environmental challenges in Zhenjiang and Hohhot. This context shows some important differences in the two cities, but these differences do not wholly account for the different outcomes of the EPID programs, a fact that motivates the central research question, what factors besides the level of economic development account for the differences between the Zhenjiang and Hohhot EPID pilot programs? A brief introduction follows to describe how EPID was introduced into China by Hua Wang, a senior economist with the Infrastructure and Environment Unit (IE) of the Development Research Group (DECRG) of the World Bank whose role as the key instigator for EPID in China earns him the descriptor "policy missionary" throughout this dissertation.

4.1 Introduction

Since late 1998, supported by the World Bank's InfoDev Program, a research team headed by Dr. Hua Wang of the World Bank, the State Environmental Protection Administration (SEPA), the Chinese Research Academy of Environmental Sciences (CRAES), and Nanjing University have worked in collaboration to establish a public disclosure program for environmental performance of polluters (see Figure 4-1). Adapted from Indonesia's Program for Pollution Control Evaluation and Rating (PROPER), EPID

in China rates firms' environmental performance from best to worst in five colors — green, blue, yellow, red, and black. The ratings are disseminated to the public through the news media. Two municipalities, Zhenjiang, Jiangsu Province, and Hohhot, Inner Mongolia, were chosen to pilot this program between 1999 and 2000.[102]

Figure 4-1. Contractual Relationship Involved in China's EPID Project



If you ask Xinhua Qu, a Zhenjiang EPB official, to talk about environmental performance information disclosure (EPID), off the top of her head, she will give you a full list of events that occurred, from the conception, planning and preparation, and implementation to the scaling up and evaluation — every stage of the project. She will provide a full list of local EPBs who have come to Zhenjiang to learn what China EPID pioneers has to offer.[103] Obviously, Ms. Qu takes a lot of pride in this project as both a designer and an implementer.

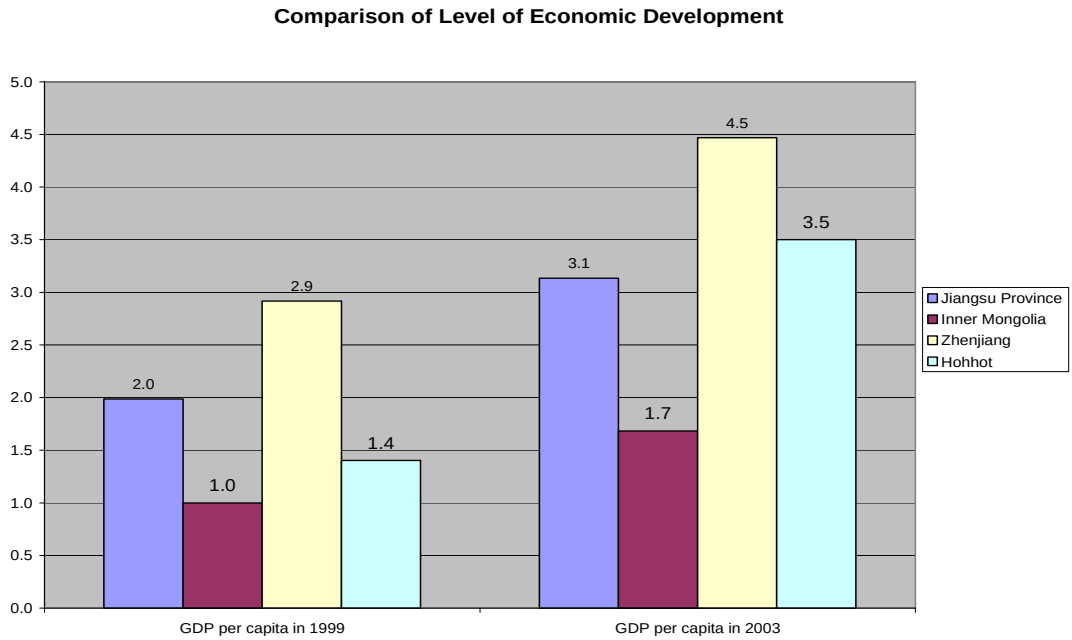
When I called my informant in Hohhot to schedule my fieldwork to learn more about their experiences with EPID, he said, "You may come here for sightseeing. We

have vast grasslands and Mongolian people whose lifestyle is worth experiencing. But I guess you will be disappointed in conducting fieldwork on EPID. We really don't have much to tell you."[104]

Zhenjiang and Hohhot are the first pilot cities that experimented with EPID. Jiangsu Province, where Zhenjiang is located, is on the east coast, adjacent to Shanghai, one of the two global mega-cities in China while Hohhot in Inner Mongolia, is a northern inland region far away from ports or transportation hubs (see Appendix 1 for the map of China).

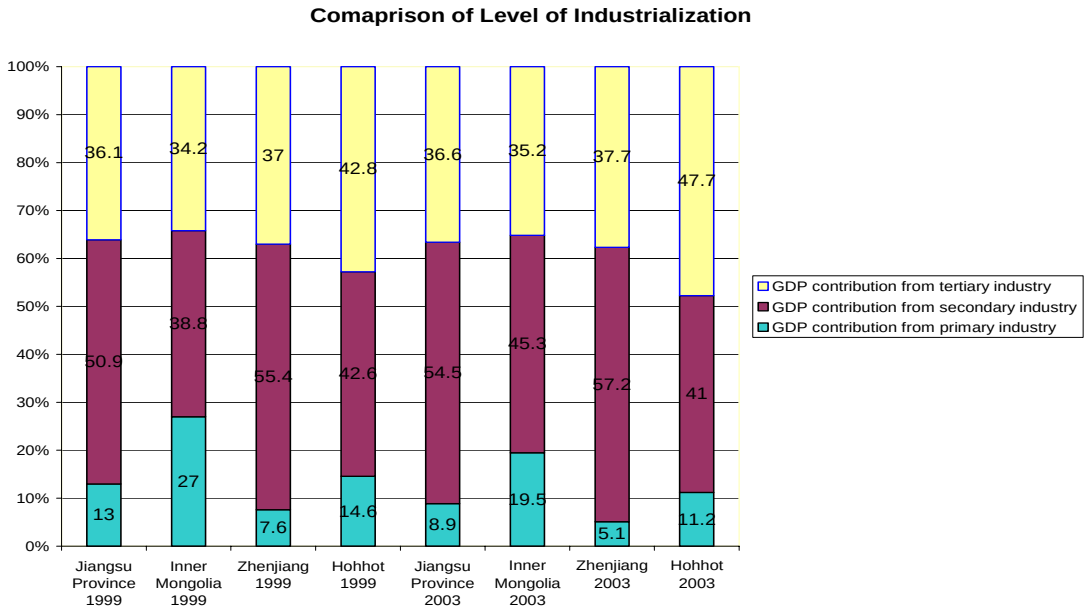
Jiangsu province is more economically advanced than Inner Mongolia. In 1999, Jiangsu had a per capita GDP that was twice as much as that of Inner Mongolia. Although both regions have had double-digit growth rates between 1999 and 2003, the gap in per capita GDP has widened between Jiangsu and Inner Mongolia (see Figure 4-2, per capita GDP of Inner Mongolia in 1999 is the base).

Figure 4-2. Comparison of Per Capita GDP between Jiangsu, Inner Mongolia, Zhenjiang, and Hohhot



The level of industrialization of Jiangsu province was also much higher than that of Inner Mongolia in 1999: primary and secondary industry in Jiangsu contributed 13 and 50.9 percent of provincial GDP respectively, while in Inner Mongolia those figures were 27 and 38.8 percent respectively. As time has passed, both Jiangsu and Inner Mongolia have become more industrialized, but the disparity between them is still large (see Figure 4-3).[105]

Figure 4-3. Comparison of GDP Composition between Jiangsu, Inner Mongolia, Zhenjiang, and Hohhot



Both Zhenjiang and Hohhot are highly developed municipalities within their regions. In terms of per capita GDP, both cities were about 40 percent higher than their provincial averages in 1999, and both margins became even larger in 2003 (see Figure 4-2). In terms of their levels of industrialization, in 1999, GDP contribution from the secondary industry in both Zhenjiang and Hohhot was about 4 percent higher than provincial averages. In 2003, the contribution from the secondary industry remained higher than provincial average in Zhenjiang, but that of Hohhot became less than the provincial average because its tertiary industry had grown rapidly between 1999 and 2003 (see Figure 4-3).

Although still less developed than Zhenjiang, from 1999 to 2003, Hohhot had been catching up. The per capita GDP of Zhenjiang was almost twice as much as that of Hohhot in 1999 but only 30 percent more than Hohhot in 2003 (see Figure 4-2). The tertiary industry in Hohhot contributed to 47.7 percent of GDP in 2003, which was ten

percentage points higher than that of Zhenjiang. This might imply that Hohhot is transforming into a service-based economy. However, Zhenjiang is more open to the global market than Hohhot. In 2002, foreign direct investment (contract value) in Zhenjiang was 13.18 times as that in Hohhot (see Table 4-1).

In other respects, such as natural resources and environmental protection, Zhenjiang has generally performed better than Hohhot. On average, people in Zhenjiang consumed twice as much water as those in Hohhot in 2002, although electricity consumption was almost the same in both cities. The green area in the developed area was about 36 percent in 2002 in Zhenjiang, while that of Hohhot was only 20.45 percent. The treatment rates of wastewater and solid waste from domestic sources were much higher in 2002 in Zhenjiang than in Hohhot. Also industrial wastewater discharge meeting standards in Zhenjiang was 15 percentage points higher than that of Hohhot (see Table 4-1).

Table 4-1. Socio-economic Conditions in Zhenjiang and Hohhot in 2002

	Zhenjiang	Hohhot
Foreign direct investment (contract value, million US dollars)	1041	79
Percentage of green area in developed areas (%)	35.75	20.45
Water consumption per capita (ton)	57.87	29.99
Electricity consumption per capita (kwh)	285.83	309.59
Industrial wastewater discharge met standards (%)	99	84
Domestic wastewater treatment rate (%)	57	38
Solid waste treatment rate (%)	100	46

Sources: China City Statistical Yearbook 2003.

Among the 31 regions in China, Jiangsu ranked the 6th in 2002 in terms of the potential institutional capacity of its local EPBs and 5th in terms of their realized capacity. In contrast, Inner Mongolia ranked 20th and 21st in these respective categories. On

average, local EPBs of Jiangsu province have more staff members and a larger percentage of them are environmental professionals. In 2002, an average local EPB in Jiangsu Province had 12.3 employees in contrast with only 9.5 in Inner Mongolia; professional staff constituted 60.2 percent of EPB staff in Jiangsu, while that of Inner Mongolia was only 45.7 percent.[106]

Specifically, the Zhenjiang EPB has a total of about 70 staff members, but the Hohhot EPB only has 25. The annual budget of the Zhenjiang EPB had almost doubled from 1999 to 2004.[107] However, the annual budget of the Hohhot EPB has been rather static and the size was only about 1/10 of that of the Zhenjiang EPB in 2004.[108] In terms of facilities owned, the Zhenjiang EPB already was equipped with 4 mobile continuous monitors in 2004, but even now Hohhot does not have one.[109]

Looking specifically at the number of enterprises participating in EPID, Zhenjiang and Jiangsu have steadily expanded their EPID programs between 1999 and 2004 (see Table 4-2). In contrast, the adaptation of EPID in Hohhot and Inner Mongolia became stagnant after 1999. So it is quite understandable that people of Hohhot are rather modest about their pilot program.

Table 4-2. Number of Enterprises Participating in Environmental Performance Information Disclosure 1999—2005

	Jiangsu Province	Inner Mongolia	Zhenjiang	Hohhot
2000	91	107	91	107
2001	1059	0	105	0
2002	2508	0	167	0
2003	3074	0	378	0
2004	5094	0	410	0
2005	8005	0	800	0

Sources: Jiangsu Environmental Quality Report 1999; Jiangsu Environmental Quality Report 2000; Jiangsu Environmental Quality Report 2001; Jiangsu Environmental Quality Report 2002; Jiangsu Environmental

Quality Report 2003; Jiangsu Environmental Quality Report 2004; (Wang, Hua et al., 2002) Zhenjiang Environmental Quality Report 2001; Zhenjiang Environmental Quality Report 2002; Zhenjiang Environmental Quality Report 2003; Zhenjiang Environmental Quality Report 2004.

Do the differences in levels of socio-economic development and administrative capacity of EPBs between Zhenjiang and Hohhot tell the full story of why EPID was sustained and scaled up to be applied province-wide in Jiangsu but was stopped only after the first year's pilot in Hohhot? Can the wide participation in EPID by industry in Jiangsu Province imply a wide acceptance of/support for this program? Or can one simply judge the success/impact of EPID by the number of enterprises color-rated by their environmental performance and the amount of information made publicly available? The short answer to all of these questions is "no." The statistics cited above do not explain the whole issue; therefore, more in-depth research is warranted to explore and make sense of the differences in the perception, implementation, and, consequently, impact of EPID in Zhenjiang and Hohhot.

The two case studies aim to explore and give answers to the above questions from multiple perspectives and through different theoretical lens.

The following two separate analytic narratives place important events in EPID development in Zhenjiang and Hohhot in context and trace critical moments when important decisions were made or milestones generated by EPID decision makers and government officials and industry people involved in the above decision making processes as they reacted to it. These analytical narratives will be followed by chapters 5 and 6, which discuss the cases from the perspectives of the cultural roots and web dialogues frameworks.

4.2 EPID Was Introduced into China by Policy Missionary Hua Wang

As Appendix 5 ("Global Trends in EPID") of this dissertation points out, the 1990s was a period of rising awareness and acceptance of public access to environmental information in both developed and developing countries. Hua Wang caught the wave, and aimed to introduce EPID into China to involve the public in environmental compliance and enforcement and thus achieve cost-effective pollution control.[110] Adapted from PROPER in Indonesia, [111] China's EPID had as its objectives to color rate and disclose via the mass media the environmental performance of polluters, which in turn would encourage the public to get involved in helping to keep industry clean. [112]

Dr. Wang was invited to give a talk at the "Agenda 21 Conference" held by the Department of Science and Technology of the Chinese government in October 1998 in Beijing, China. His speech focused on environmental performance information disclosure. The speech stimulated very positive responses from the audience, which confirmed the wisdom of Dr. Wang's intention to experiment with EPID in China. Dr. Wang knew Professor Genfa Lu of Nanjing University and Jinnan Wang, the chief engineer of the Chinese Research Academy of Environmental Sciences (CRAES), from previous collaborations. Having consulted with them on pilot choices, Dr. Wang gave talks to the Hohhot and Zhenjiang EPB, two tentative pilot sites, to see if the EPB officials were interested in implementing EPID. As hoped, the officials welcomed the idea of EPID and were interested in experimenting with it within their jurisdictions.[113]

In October 1998, the World Bank approved the project, "Chinese Industrial Pollution Predicting and Environmental Management Information System." This project was contracted to the CREAS in Beijing, which is a research organ of SEPA (see Figure

4-1). The purpose of the project is to (1) establish an industrial pollution prediction system; (2) identify cost-effective pollution control instruments in China; and (3) experiment with information-based pollution control instruments and disseminate the results through the Internet or CD-ROMs to promote the system across China.[114]

As an extension of this project, two grants were made separately to the CRAES and Nanjing University for piloting EPID in Hohhot and Zhenjiang (see Figure 4-1). The goals of the pilots were to: (1) facilitate public participation in environmental protection through better access to environmental information; (2) exert public pressure on industry to keep clean by disclosing industrial enterprises' environmental performance information; (3) improve environmental management capacity of EPBs through an informational strategy; and (4) experiment with EPID and share the experiences of the two pilot cities with other localities in China.[115] The two pilots were chosen based on considerations of location (northern vs. southern), level of economic development (developed vs. less developed), and the major environmental protection challenges faced by each city (air pollution in Hohhot vs. water pollution in Zhenjiang).[116]

Since 1998, Dr. Wang has been promoting EPID in numerous municipalities across China. In the meantime, he has been talking to officials of SEPA to solicit an administrative ordinance or legislation on EPID on a national scale. Between 1 and 3 September 2005, a national conference on environmental performance information disclosure was held by SEPA in Beidaihe, Hebei province. SEPA has been promoting EPID and issued a national implementation guideline for EPID in 2005.[117]

The two analytic narratives below will show how the Zhenjiang and Hohhot EPB made the first move to design and implement EPIDs in China.

4.3 EPID in Zhenjiang

As a pilot city for EPID in southern China, Zhenjiang first started experimenting with EPID in 1999. This section gives a full account of the history and background of EPID in Zhenjiang: how it was designed, implemented, and scaled up and institutionalized over the years.

History and Background

Socio-economic conditions

Zhenjiang is located in the southwest of Jiangsu Province in eastern China where it is one of its thirteen prefecture-level cities. Only 81km to the east of Nanjing, the capital city of Jiangsu Province, and 305km to the west of Shanghai (one of the only two global mega-cities in China), Zhenjing is a very important city along the Yangtze River. The State Council named Zhenjiang a designated economically open city in 1978 and in 1988 named it a coastal economic open zone.[118]

Environmental challenges

Because of its rich natural endowment and easy access to both land and water transport, Zhenjiang has attained a high level of economic development. Electronics, paper and pulp, chemical manufacturing, and construction materials manufacturing are the core industries of Zhenjiang. The development of these highly polluting industries has generated tremendous challenges for environmental protection in Zhenjiang.

Table 4-3 lists the statistics of ambient environmental quality of Zhenjiang from 1996 to 2004. Apparently, the environmental quality of Zhenjiang had been constantly improving over the years. Water pollution is a more severe problem than air pollution. Sulfur dioxide and nitrogen oxide emissions have steadily met national air standards. However, the concentration level of total suspended particulates (TSP) has been violating

national standards over the years, although the violation has become less serious. Before 2001, the quality of surface water had been very bad: less than half of it could meet national standards. And the quality of drinking water was sometimes problematic; not until 2003 had all drinking water met national standards. Finally, compared with national standards for noise levels in residential areas (55 dB(A)), it is clear that Zhenjiang was noisy between 1996 and 2001 and could only barely meet the national standard after 2001.[119]

Table 4-3. Ambient Environmental Quality of Zhenjiang between 1996 and 2004

	TSP (mg/m^3)	SO_2 (mg/m^3)	NO_2 (mg/m^3)	Drinking Water Meeting Standards (%)	Surface Water Meeting Standards (%)	Noise (dB(A))
1996	0.28	0.054	0.056	97	52.3	58.1
1997	0.229	0.059	0.049	95.2	31.1	58.3
1998	0.208	0.033	0.039	97.02	33.3	57.8
1999	0.214	0.03	0.052	97.02	34.3	56.6
2000	0.24	0.024	0.049	96.43	50.0	55.8
2001	0.105	0.024	0.038	96.43	88.9	55.5

Note: National standards on ambient environmental quality: TSP<0.10 mg/m^3, SO_2<0.06 mg/m^3, NO_2<0.08 mg/m^3.

Sources: Zhenjiang Environmental Annual Report 1997-2005; Zhenjiang EPB official website http://www.zjshb.gov.cn/hjgb/gongbao4.htm, accessed on 8/15/2005.

Director Chu of the Zhenjiang EPB: make environmental information more public

Industrial pollution poses a major challenge for environmental protection in Zhenjiang. Guiming Chu resumed the leadership of the Zhenjiang EPB in 1994. He has been working for the Zhenjiang EPB since 1981 and became a deputy director in 1985. Director Chu's perspective is that human activities are the driving forces behind pollution but that human beings and their welfare are also the ultimate purpose of environmental protection. So, he believes, it is in the self-interest of every individual to protect the environment, and environmental education and open access to environmental information are both necessary to keep the public involved in environmental protection.[120]

Director Chu thinks government should take a lead in environmental protection efforts including pollution control, public environmental education, and facilitating public participation in environmental decisionmaking. In the past, Chinese government officials were accustomed to only announcing good news because they feared their advancement in political careers would be jeopardized by negative publicity. As a result, the public was not aware of the state of the environment or failures in environmental protection. Director Chu stands against the culture of environmental secrecy. "Environmental issues," Director Chu said, "should be made public no matter whether they convey good news or bad news. There is nothing that can be hidden forever. Air, water, and land are so openly accessible and so indispensable to people's lives. Government should make environmental information publicly available!"[121]

Launching EPID in Zhenjiang: a collaborative effort

Dr. Wang discussed the concept of EPID with Professor Genfa Lu, dean of the School of Environment of Nanjing University. Professor Lu welcomed EPID and suggested Zhenjiang was a good choice for piloting EPID in southern China. Professor Lu contacted Director Chu, asking if he were interested in experimenting with EPID. He answered, "Yes."[122] In October 1998, Dr. Wang came to Zhenjiang to introduce the international practice of EPID. Director Chu thought EPID would be able to provide the public with more environmental information and push the government to play a more active role in environmental protection. So he agreed immediately to carry out the EPID in Zhenjiang.[123]

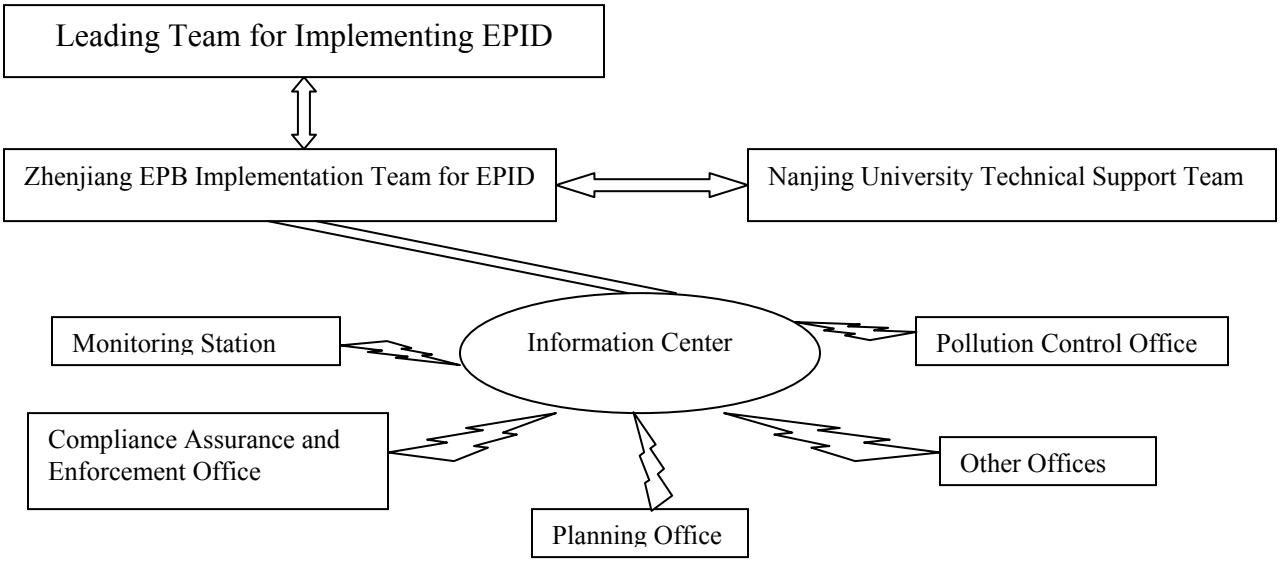
In October 1998, a collaborative research project between the Zhenjiang EPB and Nanjing University, "Environmental Performance Information Disclosure of Industrial

Enterprises in Zhenjiang," was formally launched. The World Bank provided a ten-thousand-dollar grant to Nanjing University for piloting EPID in Zhenjiang. Professor Lu was the principal investigator of this project. This one-year project was scheduled to be finished in October 1999. [124]

The Leading Team for Implementing EPID in Zhenjiang was headed by Director Chu. Under Director Chu, Xinhua Qu, the Zhenjiang EPB official in charge of environmental management and technology, led the EPID implementation team. Professor Lu of Nanjing University led the EPID technical support team. They worked in collaboration to design an EPID program suitable for Zhenjiang. See Figure 4-4 for the organizational set-up of implementing EPID in Zhenjiang.

In April 1999, almost half a year after this research project started, the Zhenjiang EPB submitted a work-in-progress report, "Implementing Environmental Performance Information Disclosure of Polluting Enterprises in Zhenjiang," to the city government. [125] The report documented progress on EPID research, environmental performance indicator choices, and rating mechanisms. Thereafter, the color rating of firms' environmental performance was conducted, more parties and individuals were involved, and a working program of EPID gradually took root in Zhenjiang.[126]

Figure 4-4. Implementing EPID in Zhenjiang: A Collaborative Project



Source: Author translation based on Figure 9-2, (Wang, Hua et al., 2002), p.157.

How to Get Zhenjiang City Government to Say Yes

The Zhenjiang EPB is a functional agency of the Zhenjiang municipal government. APPENDIX 6 shows how environmental protection agencies fit in the structure of government administration in China. The Zhenjiang city government plays a major role in making decisions concerning the whole city. The plan was to implement EPID city-wide in Zhenjiang, so it was necessary to gain support from the Zhenjiang city government. Moreover, the People's Congress (PC) of Zhenjiang oversees the work of all government agencies and can influence policymaking in Zhenjiang. Without the support from the PC, it is impossible to carry out EPID on a city-wide basis. In short, Director Chu realized it is necessary for other government agencies, especially the top leadership of Zhenjiang to agree on EPID, so he worked persistently toward such consensus.[127] Director Chu said,

> "Immediately after Hua Wang talked to us, I thought EPID would be a promising policy tool for us to promote public participation as well as to give the Zhenjiang EPB better means to steer

> environmental protection efforts. I began to spread the word about EPID among officials of the Zhenjiang city government. I talked about EPID every time when I went to meetings with officials of the city government and industrial and economic agencies. They want local industries to make profit and local economy grow. But the key aspect of EPID is that it publicizes the names of businesses whose environmental performance is poor. Such bad publicity could hurt these businesses' profitability and shame directors who are in charge of industry and economic development. So we need to obtain support from the Zhenjiang city government. By keeping talking about EPID, I intended to familiarize them with this idea and begin to understand the long-term benefit of it so that they would later accept it and grant us the authority to carry it out."[128]

Besides advocating for EPID outside of the Zhenjiang EPB, Director Chu asked Ms. Xinhua Qu to work closely with the Nanjing University technical support team to develop a work plan for EPID (see Figure 4-4). In August 1999, the Zhenjiang EPB, together with Nanjing University, prepared an implementation manual based on color rating results using environmental performance data during 1998.[129] By April 2000, when the mayor of Zhenjiang considered officially adopting EPID, the Zhenjiang EPB had finished the trial rating (based on 1999 data), and the implementation manual had been finalized.[130] So it was easy for the Zhenjiang city government to proceed with EPID given the clarity and reliability of the rating system.[131]

The political environment seemed to be in favor of EPID among government agencies in Zhenjiang. However, within the Zhenjiang EPB, some officials were concerned about using red to indicate the second-to-worst environmental performance: "Red is the color of the Communist Party. How could you choose red to stand for something bad?" Director Chu answered,

> "A red traffic light means "STOP." Likewise, it is quite reasonable to use red as a warning for bad performers. There is a conventional Chinese saying "green waters blue skies." It was a convenient choice to use green and blue to indicate good environmental performance. Of course, now it is globally accepted that green implies environmental friendliness. But it was not so then in China.
>
> Even so, I did not care that much about the opposite opinions from the Zhenjiang EPB officials. I believed carrying out EPID is the right thing to do. They were just trying to block the innovation. Xinhua Qu welcomed very much the idea of EPID as I did. She is very capable. I relied on her to lead the implementation team of the Zhenjiang EPB. I mainly worked to gain outside support from the Zhenjiang city government and the Jiangsu provincial EPB." [132]

So Director Chu was determined to carry out the EPID pilot program. The following section reviews the implementation of EPID — including the preparation, design, trial and formal disclosure, and scaling up of EPID in Zhenjiang.

Implementation

Implementing EPID in Zhenjiang was a learning-by-doing process that involved specifying environmental information requirements by constructing a rating mechanism and a computerized color rating system, selecting industrial enterprises, data collection and verification, rating, and finally, disclosing. The leading group for implementing EPID in Zhenjiang was headed by Director Chu and Professor Lu. This leading group guided two teams working in collaboration, an implementation team of the Zhenjiang EPB and a technical support team from Nanjing University (see Figure 4-4).

At the project preparation stage, both teams worked collaboratively to design an indicator system and a computer program for color rating environmental performance of industrial enterprises, taking into consideration the local conditions of Zhenjiang. Because EPID in Zhenjiang is meant to target important sources of pollution, industrial enterprises were selected based on their share of pollutant discharge. Then, information on the above indicators was collected, and the rating mechanism was tested on the data to come up with easily comprehensible five-color ratings. Finally, the rating results were made public through a press conference. Since 2003, the Internet has also been used to disclose rating results.

Project preparation — specifying environmental information requirements: develop an indicator system and a rating mechanism for EPID

Since 1999, Zhenjiang has been implementing EPID and adapting it to local needs. October 1998 saw the start of a cooperative effort between the Zhenjiang EPB (led by

Director Chu) and the research team (led by Professor Genfa Lu of Nanjing University) (see Figure 4-4). Xinhua Qu led the implementation team of the Zhenjiang EPB and their Nanjing University counterpart mainly comprised of Yuan Wang, then one of Professor Lu's doctoral students. The task of the Zhenjiang EPB team was to develop a set of indicators that reflected the priorities of the Zhenjiang EPB and were in line with national standards and regulations. The responsibility of the Nanjing University team was to develop a computerized rating system that would allow the Zhenjiang EPB team to plug in environmental performance data on the chosen indicators, resulting automatically in a color rating for each individual enterprise.[133]

According to Qu and Yuan Wang, they considered the following three possibilities for indicator selection:

(1) To adopt composite measures that incorporate indicators on both economic and environmental performance. The drawback of this is that it would cause inequality among enterprises with different levels of profitability.

(2) To adopt indicators measuring efficiency in energy use and waste generation such as wastewater discharge per 10,000 yuan production. A drawback here would be the difficulty in comparing data from different industries.

(3) To adopt indicators prescribed by national pollutant discharge standards. This option is feasible because it is nationally accepted and comparable across enterprises of different industries.

Besides information on end-of-pipe pollution discharge, it is equally important to acknowledge that industrial enterprises also take positive measures to prevent and control

pollution. So another set of indicators to be included in EPID is on the practice of environmental management and pollution prevention; for example, the indicators should consider whether the "three simultaneous" policy has been implemented.[134] Continual compliance is the policy goal of EPBs, so compliance and enforcement records (such as any administrative sanctions received) are also included in the indicator system. [135]

Because the ultimate goal of EPID is clean industry, EPID proponents found it was better to be forward-looking and anticipate that some enterprises would eventually attain the more stringent international standards. Although ISO14000 and cleaner production were not popular in 1999, they represented (and continue to represent) the future for environmental protection.[136] So the Zhenjiang EPID included both indicators in the rating system to set the bar high enough for outstanding performers.

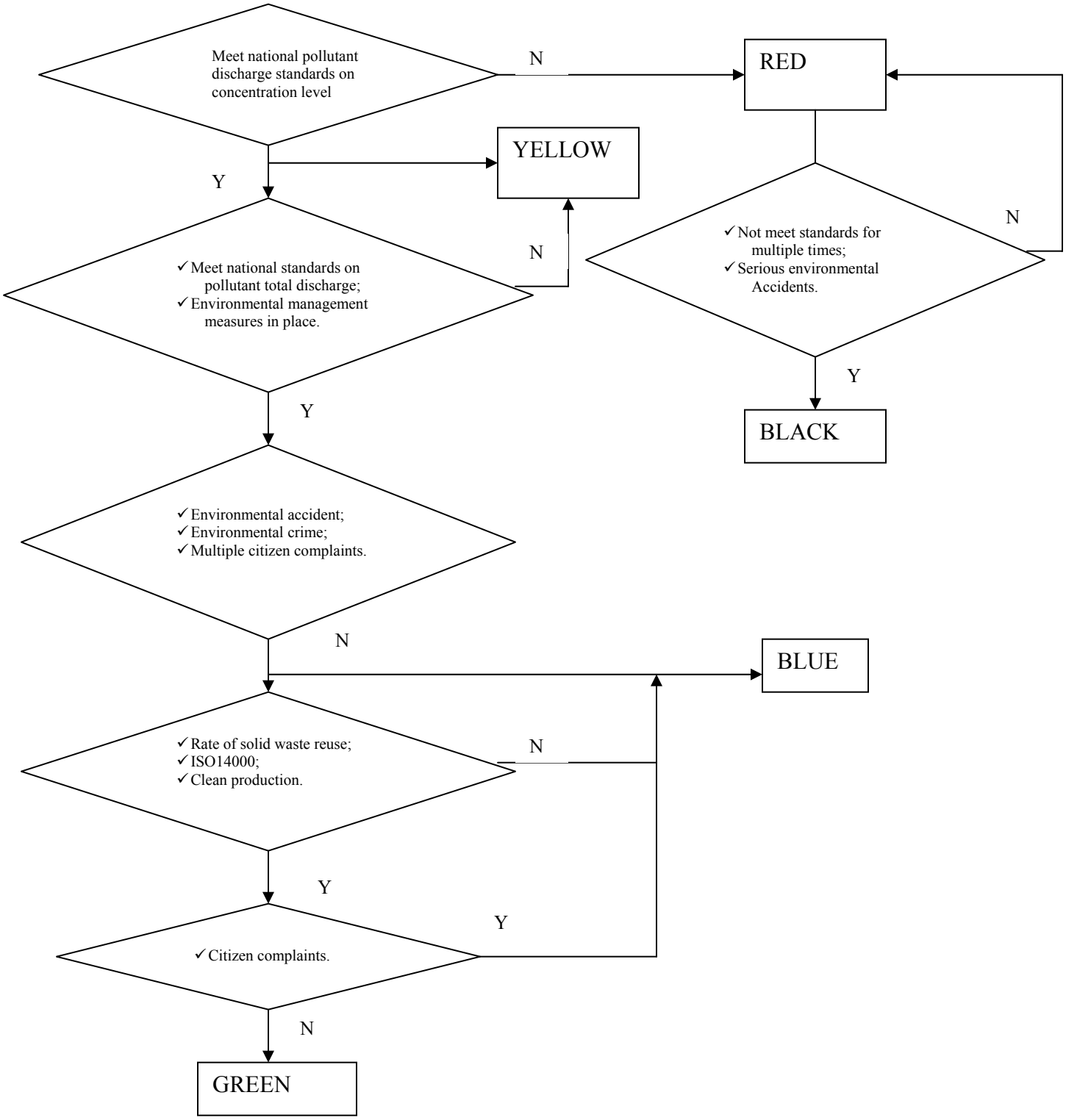
Additionally, in order for firms to achieve the outstanding (green) rating, they were required to recycle solid waste. Zhenjiang's coal-fired power plants generate a large amount of solid waste each year and landfills consume scarce land resources and devastate adjacent areas. Such a requirement would encourage firms to solve the problem. For example, Jianbi Power Plant alone generates 1.5 million tons of coal ash each year. To include the ratio of solid waste reuse would encourage these power plants to search for ways to increase resource efficiency.[137] The indicator system is advanced even now because it covers both end-of-pipe pollution control and proactive pollution prevention.[138]

To come up with the final indicator system, three rounds of group discussions took place. The Zhenjiang EPB officials from more than six offices where environmental performance information is held participated in these discussions (see Figure 4-1).

Figure 4-5 exhibits the indicators and rating mechanism used in the Zhenjiang EPID pilot program. Enterprises are given a color code for their environmental performance — green, blue, yellow, red, and black, from the best to the worst. Green and blue enterprises are in compliance with national standards on both a concentration level and total discharge. Yellow enterprises only meet standards on a concentration level but violate standards on total discharge. Red and black enterprises are out of compliance with both concentration and mass based national pollution standards.[139]

This five-color rating mechanism is meant to make environmental performance of industrial enterprises "visible" to the public and create incentives for industrial enterprises to pursue better environmental performance. After selecting 101 industrial enterprises that constituted 90 percent of total pollution discharge in Zhenjiang, this indicator and rating system was tried on their 1998 environmental performance.[140]

Figure 4-5. Rating Mechanism of Environmental Performance of Industrial Enterprises in Zhenjiang



Source: Author translation and modification based on Figure 9-4, (Wang, Hua et al., 2002), p.161.

Trial rating in 1999

In June 1999, after a preliminary indicator system and rating mechanism had been set up, 101 industrial enterprises were selected for trial color rating of their environmental performance in 1998. Ranking all industrial enterprises by their total amount of pollution discharge from the most to the least, those to be included in EPID are from the biggest polluter to the one where the subtotal of pollution discharge is 90% of the total.

Besides administrative records held by the Zhenjiang EPB, information on characteristics of enterprises such as profitability, product markets, etc. had to be collected directly from EPID participants. An information sheet was then designed and distributed to industrial enterprises for data collection.[141] It took about one month for the EPID implementation team to collect project data.[142]

In October 1999, the trial environmental performance color rating system for industrial enterprises in Zhenjiang was completed. The computerized color rating system had been tested to be successful. However, the rating results were not made public at that time.[143]

In the meantime, the Zhenjiang EPB documented its work, compiling an implementation manual of EPID with detailed descriptions of the indicator system and rating mechanism. The bureau also drafted a memorandum (attaching to it the implementation manual and the 1998 rating results) seeking the Zhenjiang city government's approval to allow the EPB to officially carry out EPID.[144]

The trial disclosure proceeded rather smoothly. Xinhua Qu of the Zhenjiang EPB and the Nanjing University technical support team further worked together to collect

industrial environmental performance information for the year 1999 and aimed to formally disclose the rating results of 1999 to the public in 2000.[145]

Formal rating and disclosing in 2000

Compared with trial disclosure, formal disclosure involved a lot more people, formal discussions and meetings, and paperwork. For a chronicle of the formal disclosure process, see Table 4-4. The Zhenjiang EPB requested the Zhenjiang city government's approval to proceed with the color ratings of the firms and to make the results public. The firms being rated were asked to comment on the rating results. In the meantime, the Zhenjiang EPB reached out to the mass media informing them that they would disclose the color ratings of 91 firms and prepared to answer reporters' questions on the results. The following people were invited to the press conference: officials of Jiangsu provincial EPB and municipal EPBs of the thirteen prefecture-level cities across Jiangsu province, and officials of other Zhenjiang government agencies; representatives from the 91 enterprises being color rated; Professor Lu and Yuan Wang of Nanjing University, Dr. Hua Wang from the World Bank; and reporters from more than 30 local and national news agencies.[146]

The mayor of Zhenjiang gave an opening speech at the press conference on EPID. He talked about the importance of environmental protection, how necessary it is for industry to be environmentally responsible, and what promise EPID could bring to Zhenjiang to better involve the public and industry in environmental protection.[147] Guiming Chu, the director of Zhenjiang EPB, announced the rating results. CEOs of green-rated enterprises were asked to deliver a talk, and the CEOs of black-rated enterprises made public promises to improve their environmental performance.[148]

Table 4-4. Implementation and Scaling up of EPID Pilot Program in Zhenjiang

Date	Who	Action
Oct 1998-Oct 1999	EPB & Nanjing Univ.	EPID research project
April 29, 1999	EPB	Submitted progress report "Implementing Environmental Information Disclosure of Polluting Enterprises in Zhenjiang" to city government
January 1999	EPB & Nanjing Univ.	Started developing an indicator system and rating mechanism
June 1999	EPB & Nanjing Univ.	Started testing color rating using industries' 1998 environmental performance
August 1999	EPB & Nanjing Univ.	Developed an implementation manual for EPID
October 1999	EPB & Nanjing Univ.	Constructed a computerized color rating system and tried it out with 1998 environmental performance data
Jan 6, 2000	EPB	Memorandum to city government on formal implementation of EPID
May 30, 2000	EPB	Revised memorandum to city government on formal implementation of EPID
April 24, 2000	City government	Agreed to formally implement EPID as preconditions are met
April 2000	EPB	Called a meeting to disclose color rating results to industry and solicit comments and feedback
June-July 2000	EPB	Distributed pamphlets on "Background, definition, purpose, and outlook of EPID" to city government, functional agencies and the mass media.
June 19, 2000	City government	Issued a notice to formally carry out EPID in Zhenjiang
June 26, 2000	City government	Called a special meeting on the 26th of June, 2000 to discuss details of public disclosure among government agencies
July 10, 2000	City government	Formed a leading group on EPID
July 10, 2000	EPB	Held an informational meeting on EPID for the mass media
July 13, 2000	City government	Held a warm up meeting on EPID for EPB, government agencies, the mass media, and industry
July 14-20, 2000	EPB	Distributed 1999 color ratings to enterprises for comments
July 21-24, 2000	EPID leading group	Reviewed ratings results & make necessary adjustments
July 24, 2000	City government	Called a meeting within EPID leading group; Reviewed the rating results and comments from enterprises.
July 26, 2000	City government	Press conference to formally disclose environmental performance information of industrial enterprises in 1999
July 26, 2000	Jiangsu Provincial EPB	Held a meeting in Zhenjiang to advocate implementing EPID in Jiangsu Province
Aug 7, 2000	SEPA	Field visit to Zhenjiang on EPID by municipal EPB directors as a part of the EPB Director National Summit
Aug 31-Sept 2, 2000	Jiangsu Provincial EPB	Conference held in Zhenjiang on EPID
Sept 19, 2000	Jiangsu Provincial EPB	Administrative ordinance issued to prefecture-level cities of Jiangsu Province to implement EPID
Sept 27, 2000	Jiangsu Provincial EPB	Field study in Zhenjiang on how to train EPB staff to implement EPID in Jiangsu Province
July 20-Sept 22, 2000	Mass media	News reports on EPID in Zhenjiang (altogether 7 news agencies)

Source: author translation based on APPENDIX 11.1, (Wang, Hua et al., 2002), p.186-187. Table 4-5. Implementation and Scaling up of EPID Pilot Program in Zhenjiang.

Viewing the results in terms of the increase in the percentage of blue-rated firms and the decrease in yellow-, red-, and black-rated firms — changes that occurred between the initial trial and the formal disclosure — it appears that the enterprises made significant improvement in their environmental performance (see Table 4-5). The percentage of enterprises fully in compliance doubled from the time of the trial to the time of formal disclosure, increasing from 31 percent to 62 percent; and the percentage of enterprises out of compliance decreased from 25 percent to 15 percent over the same period. It is not clear why or how this rapid improvement came about, but there is anecdotal evidence indicating that the enterprises did respond to EPID by taking actions to improve their environmental performance.[149]

Table 4-6. Color Rating Results of Environmental Performance of Industrial Enterprises in Trial and Final Disclosure in Zhenjiang

	Trial Disclosure (%)	Rate of Compliance/Noncompliance (%)	Final Disclosure (%)	Rate of Compliance/Noncompliance (%)
Green	3	In full compliance: 31	1	In full compliance: 62
Blue	28		61	
Yellow	44	In partial compliance: 44	23	In partial compliance: 23
Red	14	Out of compliance: 25	12	Out of compliance: 15
Black	11		3	
Total	100	100	100	100

Given the successful implementation of EPID in Zhenjiang, Jiangsu provincial EPB and SEPA capitalized on this pilot and expanded it province-wide in Jiangsu. Moreover, in 2002, the Zhenjiang EPB extended its EPID to include enterprises of the tertiary industry, and thus the scope of EPID was greatly enlarged. The next section tells how EPID was scaled up and institutionalized in Zhenjiang specifically and in the Jiangsu Province generally.

Scaling up: after formal disclosure

The directors of the 13 prefecture-level city EPBs were invited to the press conference held in Zhenjiang. With their memory of the Zhenjiang EPID program still fresh, on the same day as the press conference, Jiangsu provincial EPB called a meeting in Zhenjiang to advocate the implementation of EPID province-wide. On the 19th of September, 2000, Jiangsu provincial EPB issued an administrative ordinance to adopt EPID in all of its prefecture-level cities in Jiangsu. SEPA had joined the effort on 7 August 2000 by sending EPB directors during the EPB Director National Summit to Zhenjiang to learn how EPID was implemented.

Professor Lu, as the principal investigator of the EPID research project, talked to Director Shi of the Jiangsu provincial EPB to urge the Jiangsu provincial EPB to support the EPID pilot in Zhenjiang. [150] [151] Moreover, when the EPB director summit of Jiangsu Province was held in 2000, director Chu gave a talk on how EPID promises to enhance environmental protection and the capacity building of EPBs through public participation.[152] All these efforts paved the way for Jiangsu provincial EPB to support the EPID pilot in Zhenjiang both politically and financially.[153]

Not only was EPID expanded in Jiangsu province to cover larger geographical areas, but it also was extended to include more economic sectors. Besides enterprises of the secondary industry, enterprises of the tertiary industry (service sector) were later color rated and disclosed as well. In 2002, the Zhenjiang EPB and Nanjing University began working together again to develop a set of indicators specifically for evaluating environmental performance of service-sector enterprises such as hotels, restaurants, and hospitals. In Zhenjiang, the tertiary industry contributes a large share to the local

economy: in 2003, tertiary industry comprised 37.7 percent of total GDP. Since tertiary-industry enterprises deal with consumers more directly than the other industries, the Zhenjiang EPB intended to use EPID to generate public pressure in consumer markets, thereby bringing polluters into compliance with environmental standards.[154] In 2005, a total of 800 enterprises in Zhenjiang were rated based on their 2004 environmental performance; about 10 percent of these enterprises were in the tertiary industry.[155]

Summary of Implementation of Zhenjiang EPID

The Zhenjiang EPB first began to experiment with EPID in 1999 and has since successfully transformed it from a pilot program to a regular operation. During this process, research on the international practice of EPID was conducted. An indicator system and a rating mechanism were set up to evaluate environmental performance of firms. Five colors — green, blue, yellow, red, and black represent environmental performance from the best to the worst. After being officially approved by the Zhenjiang city government, the color rating results of industrial enterprises were formally disclosed to the public through a press conference on 26 July 2000 for the first time in China.

Responding to environmental challenges from diffuse pollution sources, EPID in Zhenjiang was expanded to include enterprises of the tertiary industry. In 2004, after two years of research and preparation, enterprises of the service sector were color rated for the first time, and the results were made public. This innovation was adopted by other prefecture-level cities in Jiangsu province, such as the capital city, Nanjing. Beyond Jiangsu Province, 9 municipalities in China have come to Zhenjiang to learn their practice of EPID (see Appendix 1 for a list of municipalities that learned EPID from Zhenjiang EPB).

Immediately after the press conference in 2000, Jiangsu provincial EPB capitalized on the Zhenjiang pilot and issued an administrative ordinance to implement EPID in all the 13 prefecture-level cities throughout Jiangsu province. In 2002, EPID was implemented province-wide in Jiangsu. In 2005, a total of 800 enterprises participated in EPID in Zhenjiang, and, altogether, 8005 enterprises participated in EPID in Jiangsu Province.

4.4 EPID in Hohhot

As a pilot for EPID in northern China, Hohhot first started experimenting with it in 1999. This section gives a full account of the EPID pilot in Hohhot, including history and background, how Hohhot city government responded to this policy innovation, and implementation processes.

History and Background

Hohhot is the capital city of Inner Mongolia Autonomous Region, 669 km northwest of the nation's capital, Beijing. In 2004, it had a population of 2.08 million. Hohhot is Inner Mongolia's second-largest industrial base; core industries are textile, chemical manufacturing, milk and dairy products, construction material manufacturing, machinery manufacturing, and electronics. Between 1999 and 2004, Hohhot had been catching up on economic development (see Figure 4-2). In 1985 and 1992, Hohhot was named "national historical city" and designated an economically open city along a national border by the State Council.[156]

As an inland city in northern China surrounded by mountains on three sides, air pollution has been a long-standing challenge in Hohhot. With emissions from numerous residential heating furnaces, industrial boilers and stacks, and exhausts from automobiles,

during the winter people in Hohhot rarely are able to see clear skies.[157] The annual average concentration level of total suspended particulates has been exceeding national standard for several years [and have only recently gotten close to meeting them] (see Table 4-6).

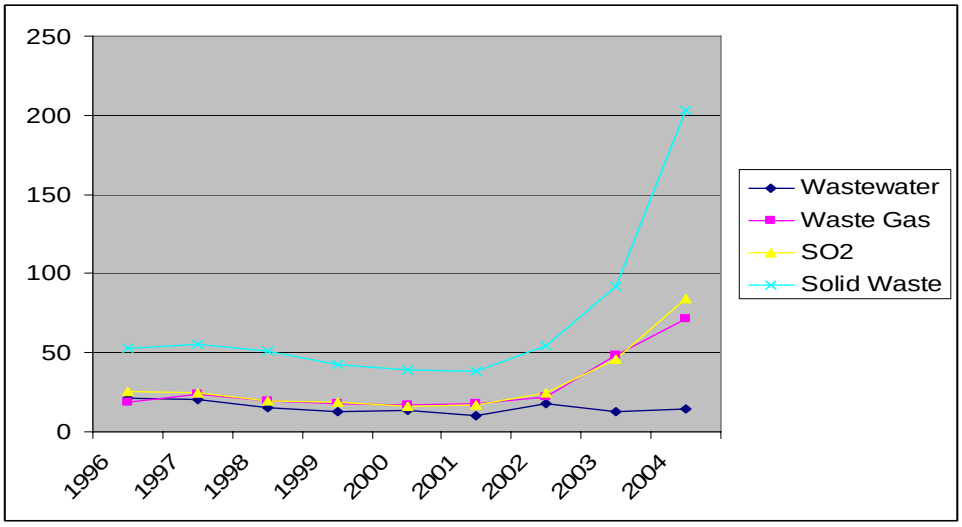
Table 4-7. Ambient Environmental Quality of Hohhot between 1996 and 2004

	TSP (mg/m^3)	SO_2 (mg/m^3)	NO_2 (mg/m^3)
1996	0.445	0.111	0.034
1997	0.45	0.101	0.055
1998	0.462	0.06	0.04
1999	0.505	0.045	0.038
2000	0.451	0.034	0.031
2001	0.448	0.029	0.039
2002	0.122	0.03	0.036
2003	0.116	0.031	0.043
2004	0.101	0.027	0.044

Note: National standards on ambient environmental quality: TSP<0.10 mg/m^3, SO_2<0.06 mg/m^3, NO_2<0.08 mg/m^3.

As Figure 4-6 illustrates, in addition to long-standing environmental problems as air pollution, new challenges have emerged in Hohhot that are associated with industrialization and urbanization processes: solid waste discharge increased almost fourfold between 1996 and 2004, and municipal wastewater discharge has jumped onto the priority list of the Hohhot EPB as well.[158]

Figure 4-6. Trend of Industrial Pollution Discharge in Hohhot between 1996 and 2004



In late 1998, Dr. Hua Wang contacted the chief engineer of the CRAES for collaboration on a research project on industrial pollution control and environmental information disclosure. The chief engineer showed great interest. Since Zhenjiang had been selected to be a pilot, Dr. Wang thought it was important to have another pilot that served as a contrast to Zhenjiang. During the follow-up discussions on site selection, the chief engineer suggested Hohhot because it is located in northern China, it is relatively less developed, and its severe air pollution is representative of cities in northern China. Since the CRAES has worked with the Hohhot Research Academy of Environmental Sciences (HRAES) on a United Nations Environmental Programme (UNEP) project in 1996, the chief engineer thought the HRAES would be a good collaborator.[159]

In late 1998, the director of the HRAES was called up by the chief engineer of the CRAES and asked if he would be interested in conducting a pilot EPID program in Hohhot. As expected, the answer was positive, "Yes, we would be happy to be a part of the World Bank project." At that time, a ten-thousand dollar fund was provided to the CRAES for piloting EPID in Hohhot. [160]

The World Bank, to most Chinese people, stands for money, authority and knowledge. Participating in a World Bank research project improves a research institute's standing and further enhances its credentials. Moreover, the embedded capacity-building component, which would bring major project participants to Washington, D.C. for a one-week workshop, was rather attractive.[161] Furthermore, EPID encourages local ownership of project design and implementation. Given all these tangible and intangible benefits, the HRAES was willing to take charge and assume the leadership in the Hohhot EPID pilot.[162]

In November 1998, Dr. Hua Wang of the World Bank and Jinnan Wang, the chief engineer of the CRAES, went to Hohhot for a site visit and decided to include Hohhot in EPID as a pilot.

How to Get the City Government to Say Yes

As the above review reveals, the HRAES alone decided that Hohhot would become China's EPID pilot. The workshop that would launch the Hohhot EPID project was held in February 1999. This was the first time Hohhot city government officials were made aware of EPID or the fact that Hohhot would become a pilot of it — almost half a year after the official agreement on the "Industrial Pollution Control and Predicting System" project between the World Bank and SEPA, China; and almost 3 months after the HRAES decided that Hohhot would become a pilot in the project. [163] In August 1999, three leading groups were formed to move the EPID project forward: Leading Group (LG), Administrative Group (AG), and Expert Advisory Group (EAG). Of the eight people who headed these leading groups, there were only two who were informed of

EPID before the EPID launch workshop. They were both from the Hohhot EPB; one was the head of the AG, and the other was in charge of EAG (p. 2).[164]

The HRAES had to ask for help from the Hohhot EPB on pollution information as well as dealing with the Hohhot city government, other government agencies, and enterprises. It was very difficult to move things forward, the director of the HRAES recalled. Directors of the Hohhot EPB held different opinions on EPID. Some welcomed it, some rejected it.[165]

The officials of city government were only asked to show up at the project launch workshop. Other than that, they did not engage in EPID in any substantial manner.[166]

The HRAES selected and color-rated 100 important sources of pollution in Hohhot and reported the rating results to the Hohhot city government. Because the Hohhot city government did not want to make bad publicity for the Yili Corporation, which was rated black but was also one of its biggest tax revenue contributors, officials insisted that the results not be publicly disclosed. Later, the question of disclosure was escalated to a political issue by officials at the Hohhot Communications Department. This implied that there was not much room for negotiation on EPID, and disclosing the color rating results of polluters was thus prohibited. Only an internal meeting on EPID was held in March 2000 by the Hohhot city government. At the meeting, the color rating results of industrial enterprises in 1999 were disclosed only to government officials and selected local news agencies.

Implementation

After Hohhot was chosen to be a pilot site of EPID in northern China in November 1998, a project launch workshop was held on 10 February 1999 by the Hohhot

EPB. Experts of the CRAES as well as officials from the Hohhot EPB, city government, and other relevant government agencies participated in the workshop. At the workshop, the following topics on EPID were discussed: purpose, prerequisites, organizational set up, what to disclose, to whom to disclose, and strategies for disclosing ratings. Since the launch of the project, EPID in Hohhot has gone through the following four phases: (I) preparation, (II) design, (III) data collection & color rating, and (IV) disclosing. Activities carried out in implementing EPID are listed in Table 4-7.

Three leading groups were formed in August 1999 to direct the implementation of EPID in Hohhot:

- Leading Group for EPID (LG): responsible for program coordination, headed by the Deputy Mayor of Hohhot, comprised of 6 team members including directors of EPB, an economic commission, and presidents of *Hohhot Daily* (a leading local news agency) and Hohhot TV Station;
- Administrative Group (AG): a standing organ of this EPID project, responsible for organizational issues and public relations, headed by the director and party secretary of Hohhot EPB, comprised of 9 team members, including officials of Hohhot EPB, the director of HRAES, and people from news agencies; and
- Expert Advisory Group (EAG): responsible for establishing an indicator system and a computerized color rating system and carrying out EPID, headed by a deputy director of Hohhot EPB, comprised of thirteen team members, including the director of HRAES, experts from CRAES, and Hohhot EPB.[167]

After the three leading groups of EPID were formed, experts from the CRAES and HRAES (in the Expert Advisory Group) selected preliminary indicators for EPID and drafted a color rating mechanism in August (for the flowchart, see Figure 4-7). The indicators were chosen to capture the following four aspects of industrial environmental behavior: (1) pollution discharge, (2) pollution treatment, (3) internal environmental management, and (4) social impact of pollution. Then the experts of the CRAES started developing a computerized color rating system in Beijing.

Together with the AG, the EAG selected 52 industrial enterprises and 48 public organizations to be color rated to make up a large enough sample. Principles of targeting included the requirements that the businesses were legal citizens and important sources of pollution in Hohhot.[168]

The collection of environmental performance information on the preliminary indicators of the 100 target organizations started in September 1999 and was finished in October 1999. Even though the Hohhot EPB and the monitoring station did not hold back information that they had, not all information on selected indicators was available.[169]

Table 4-8. Implementation of EPID Pilot Program in Hohhot

Time	Phase	Task	Who Responsible	Where
Feb 10, 1999	I	EPID Project Launch Workshop	EPB	Hohhot
Aug 1999	I	Form three project leading groups	EPB	Hohhot
Aug 1999	II	Implementation Manual (Draft)	EAG*	Hohhot
Aug 1999	II	Target industrial enterprises and other organizations for EPID and come up with a preliminary name list	EAG* & AG*	Hohhot
Aug 1999	II	Select EPID indicators	EAG*	Hohhot & Beijing
Sept 1999-Oct 1999	III	Data collection; Refine EPID indicators.	EAG* EAG*	Hohhot Beijing
Nov 1999-Dec 1999	III	Data verification; Color rating of environmental performance; Refine color rating procedures and the computer program.	EAG* EAG* & AG* EAG*	Hohhot Beijing Beijing
Dec 1999	IV	Choose mass media to disclose rating results		
Jan 13, 2000	IV	Disclose preliminary color rating results to Hohhot EPB, Bureau of economic affairs, and EPID participants.	AG*	Hohhot
Feb 2000-March 2000	IV	Follow-up and adjust color rating results	EAG* & AG*	Hohhot
March 24, 2000	IV	Formal disclosure of color rating results	AG* & EAG*	Hohhot
March-May 2000		News reports on EPID in Hohhot (altogether 5 news agencies)	Mass media	Hohhot

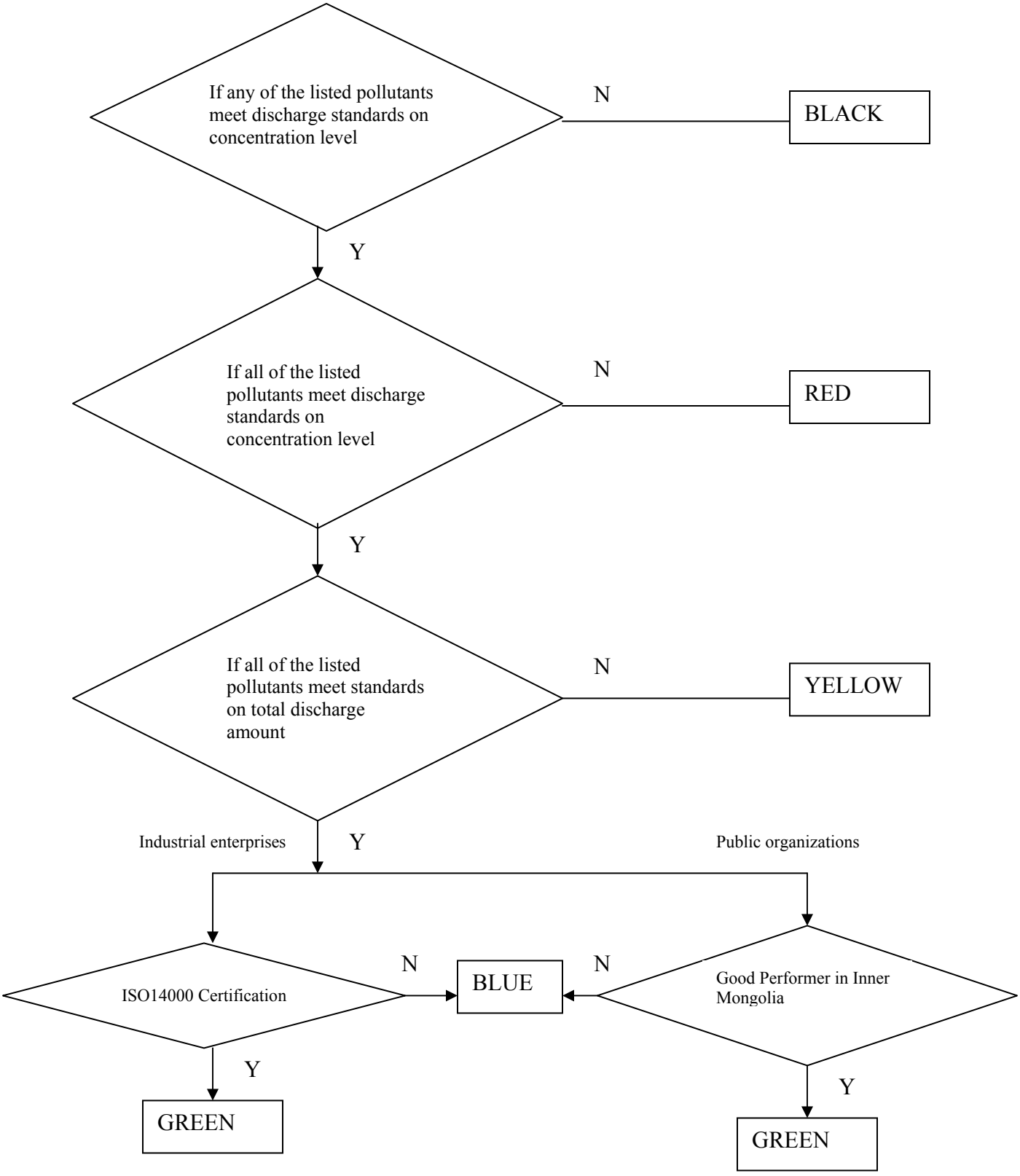
Note: PLG: Project Leading Group; AG: Administrative Group; EAG: Expert Advisory Group
Source: (CRAES, Chinese Research Academy of Environmental Science & HRAES, Hohhot Research Academy of Environmental Science, 2000; Wang, Hua et al., 2002), p. 197.

Given the data constraints, experts of the CRAES and HRAES short-listed the preliminary indicators. Accordingly, the experts of the CRAES in Beijing modified the computer program.[170]

The computerized color rating system was tried out in October 1999, using available environmental performance information of the 100 target organizations. The results were astonishing — black almost across the board! This meant that, for 1999, a very large percentage of enterprises failed to meet national standards on concentration levels of their indicator pollutant discharge. [171]

Such a high percentage of black was totally unacceptable. Experts of the CRAES and the director of the HRAES became frustrated. There had to be a way to work out normally distributed five-color rating results.[172]

Figure 4-7. Flowchart of Color Rating of Environmental Performance in Hohhot



Source: (Wang, Hua, Cao, Dong, Wang, Jinnan & Lu, Genfa, 2002) pp.141.

At that time, the Hohhot EPB was conducting the environmental campaign "Control One, Meet Two Standards" required by SEPA.[173] According to the State Council Directive [1996]31, the total amount of pollution discharge and air and surface water quality in functional areas of Hohhot have to meet national standards by 2000. The Hohhot EPB targeted 445 industrial enterprises, aiming to bring them into compliance by 2000. The years 1998 and 1999 were the critical period of this "Control One, Meet Two Standards" campaign in Hohhot.[174]

Then the Hohhot EPID pilot program was connected to the "Control One, Meet Two Standards." It targeted the same indicator pollutants of the campaign. Then, the official notice of implementing EPID, issued by the Hohhot EPB on 13 January 2000, listed as the top purpose of EPID to facilitate the "Control One, Meet Two Standards" campaign (see Appendix 10 for details).

After the adjustments on indicator pollutants of EPID were made, the color rating results as of January 2000, although still skewed toward black, showed most organizations were yellow or red (see Table 4-8). Between 6 and 10 January 2000, the color rating results were distributed by the Hohhot city government through internal mailing services to EPID participants, the Hohhot EPB, and other government agencies for comments. On 12 January 2000, the Hohhot EPB responded to the comments and adjustments on the ratings results.[175]

Table 4-9. Color Ratings of Environmental Performance in 1999 in Hohhot (Trial)

	Industrial Enterprises		Public Service Units		Total	
Color	Amount	Percent	Amount	Percent	Amount	Percent
Green*	0	0	0	0	0	0
Blue*	1	1.9	0	0	1	1
Yellow**	11	21.2	38	79.2	49	49
Red***	31	59.6	10	20.8	41	41
Black***	9	17.3	0	0	9	9
Total	52	100	48	100	100	100

Source: Table 8-2, (Wang, Hua et al., 2002).

Note: * In full compliance;
** In partial compliance;
*** Out of compliance.

After seeing their color ratings, some EPID participants (especially those who hoped to have better ratings) came to the Hohhot EPB to ask for advice on how to improve their environmental performance, to request data verification, or to try to get their emissions re-tested. As a result, the color rating results were changed. Comparing Table 4-9 (final color rating results in March 2000) with Table 4-8 (trial color rating results in January 2000), overall, the rate of compliance had increased from 1 percent to 10.3 percent. The noncompliance rate of industrial enterprises remained unchanged but that of public service units doubled. The rate of partial compliance (in compliance with concentration level standards but out of compliance with total pollution discharge) of industrial enterprises remained almost unchanged, but that of public service units was reduced by 50 percent (see Table 4-8 and 4-9).

Table 4-10. Color Ratings of Environmental Performance in 1999 in Hohhot (Final)

	Industrial Enterprises		Public Service Units		Total	
Color	Amount	Percent	Amount	Percent	Amount	Percent
Green*	0	0	0	0	0	0
Blue*	2	3.6	9	17.6	11	10.3
Yellow**	11	19.6	20	39.2	31	29.0
Red***	37	66.1	19	37.3	56	52.3
Black***	6	10.7	3	5.9	9	8.4
Total	56	100	51	100	100	100

Source: Table 8-3, (Wang, Hua et al., 2002).

Note: * In full compliance;
** In partial compliance;
*** Out of compliance.

On 21 March 2000, the deputy mayor of Hohhot called a meeting asking for comments on disclosing color rating results.[176] At this meeting, directors of the economic commission, the industrial bureau, and the department of communications at the communist party expressed concerns about the Yili Corp's environmental performance. Although it was upgraded to "red" in the final rating, officials of the Hohhot city government and the above directors feared possible negative impact on the Yili's image and its stock price if the rating went public. Some even said that disclosing the Yili's color rating was a political issue with no room for negotiation.[177]

As a result, the Hohhot city government prohibited disclosing the Yili's color rating to the public. Rather, the Hohhot city government approved a small meeting on 24 March 2000 in a conference room in the office building of the Hohhot city government. The 30 or so invitees were: representatives of organizations whose environmental performance was color-rated; officials from SEPA, Inner Mongolia Autonomous Regional EPB, the Hohhot city government, and other functional government agencies of Hohhot; citizen representatives; and reporters from selected local news agencies. The

purpose of this meeting was for the government to generate enough pressure on firms so that they would improve their environmental performance — but no economic hardship could be caused.[178]

Summary of Implementation of EPID in Hohhot

EPID in Hohhot was a research project contracted by the HRAES to build a computerized environmental information management system for the Hohhot EPB to utilize. This project was guided by the CRAES in Beijing. Experts of the CRAES and HRAES together designed a rating mechanism and selected indicator pollutants. Experts of the CRAES wrote computer programs to color rate environmental performance of target organizations of EPID. The Hohhot EPB provided firm level environmental information and administrative support when the HRAES needed to work with the Hohhot city government, other government agencies, and enterprises.

Between August 1999 when the program started, and March 2000 when the internal disclosure meeting was held, EPID in Hohhot went through a trial-and-error process. Because of limited pollution data, unsatisfying trial rating results (black almost across the board), and the top priority of meeting goals set by the "Control One, Meet Two Standards" environmental campaign, the number of indicator pollutants in the original EPID plan were reduced so that only the campaign's target pollutants would be addressed.

Fearful of the possible negative impacts of disclosure on major local employers and tax revenue contributors, the Hohhot city government decided not to disclose any final color rating results. Instead, they held an internal meeting on 24 March 2000 in a conference room in a Hohhot city government office building.

Although Hohhot's EPID program didn't hold a formal press conference to publicize the environmental performance of local enterprises, the color rating itself did draw the attention of some industry people. Some industry representatives came to the Hohhot EPB for help on improving their color ratings after they were informed of them. The compliance rate did increase in the final rating. Even though it is indefinite how much improvement in industrial environmental behavior was generated by color rating and proposed disclosure, anecdotal evidence supports the association between color rating and improvement in environmental performance.

4.5 Summary of Analytic Narratives

Supported by the World Bank "InfoDev" program, a research project "Industrial Pollution Predicting and Environmental Information Management System" was established in collaboration with China's State Environmental Protection Administration (SEPA) in 1998. The Chinese Research Academy of Environmental Sciences (CRAES) was responsible for carrying it out. As an extension of this project, environmental performance information disclosure (EPID) — a pollution control policy innovation — was tested in two municipalities in 1999 in China.

The two pilots — Zhenjiang, Jiangsu Province, and Hohhot, Inner Mongolia — were selected based on considerations of geographical location, level of economic development, and the major environmental challenges that they were facing. Under the CRAES, Nanjing University was contracted to design an information system in Zhenjiang and the Hohhot Research Academy of Environmental Sciences (HRAES) to implement EPID in Hohhot.

Given the success of PROPER (of the same nature as EPID), which was tested 1995 in Indonesia, EPID pilots in China were intended to (1) provide better public access to environmental performance information of industrial enterprises, (2) further involve the public in environmental protection and to pressure industry to keep it clean, and (3) provide a five-color rating system with industry incentive for continuous improvement in their environmental performance.

Zhenjiang

In Zhenjiang, the Zhenjiang environmental protection bureau (EPB) took the leadership in the EPID experiment. Nanjing University provided technical support in indicator selection and designing a computerized color rating system.

Then-Director Chu of the Zhenjiang EPB perceived EPID to be a good policy tool to (1) push the government to assume a leading role in environmental protection, (2) provide the public with more environmental information, and (3) further engage the public in protecting the environment. He advocated aggressively for EPID, using all available channels: regular work-in-progress meetings held by the city government, field visits to Zhenjiang EPB by PC representatives, and personal communications. Besides working persistently toward a favorable environment for EPID implementation, Director Chu trusted and relied on an EPB official who also believed in EPID to work closely with a (then-) Nanjing University doctoral student to, in turn, develop an EPID work program suitable for local conditions in Zhenjiang.

The EPID pilot program in Zhenjiang was carried out between October 1998 and 26 July 2000, when a highly publicized media conference was held. In between, an indicator system and a computerized color rating system were successfully established,

environmental performance information of 91 industrial enterprises were color rated, and the results were disclosed to the public through a press conference. In 1999, the environmental performance of 100 industrial enterprises was trial color rated, and only the participant enterprises were informed of the rating results. Between then and July 2000, when the rating results went public, the percentage of enterprises fully in compliance increased from 31 percent at the time of the initial trial to 62 percent at the time of formal disclosure; and the percentage of enterprises out of compliance declined from 25 percent at trial to 15 percent at the time of disclosure.

Altogether, 7 news agencies picked up on the Zhenjiang EPID program, and it made ten headlines between 20 July and 22 September 2000. These news agencies included local newspapers and TV stations such as the *Zhenjiang Daily* and Zhenjiang TV Station, and national newspapers such as *China Environment Newspaper*.

Jiangsu provincial EPB capitalized on the success of the Zhenjiang experiment, holding a EPB director's meeting in August 2000 to share the Zhenjiang experience with other 12 prefecture-level cities in Jiangsu. In the same month, an administrative ordinance was issued requiring EPBs of all prefecture-level cities of Jiangsu Province to implement EPID. In 2002, EPID was expanded province-wide in Jiangsu. In August 2000, SEPA led a field trip to Zhenjiang during the EPB director's national summit introducing to them the idea and practice of EPID.

Since 1999, the Zhenjiang EPB has transformed EPID into a standard operation and adapted it to facilitate its environmental management practice. Since 2002, the Zhenjiang EPB and Nanjing University, have partnered together to explore an indicator system to color rate the environmental performance of the tertiary industry. In 2004, the

color rating results of the service sector were made public. In 2005, a total of 800 enterprises were color rated and the results were made public, of which about 10 percent was enterprises of the tertiary industry. Both the size and scope of EPID in Zhenjiang have been expanded. Now, new explorations are under way to make use of the color rating results to target bad performers and push them to take pollution control measures. Over the years, EPB officials from 24 municipalities across China have come to Zhenjiang to learn their experience.

Hohhot

EPID in Hohhot was perceived to be a research project aimed to establish an environmental management information system by the HRAES and CRAES and then to hand it over to the Hohhot EPB for utilization. The HRAES took the lead in carrying out EPID in Hohhot. Experts of the CRAES in Beijing provided technical support in indicator selection and designing a computerized color rating system. The Hohhot EPB coordinated collection of firm level environmental performance information and provided administrative support in HRAES's dealing with the Hohhot city government, other government agencies, and enterprises.

The HRAES decided in November 1998 that Hohhot would pilot the EPID program. A project launch workshop was held in February 1999, and officials from the Hohhot city government and other government agencies were invited. After this workshop, until August 1999 when three project-leading groups were formed, the HRAES and CRAES worked out a preliminary indicator and computerized color rating system. Collecting environmental performance information was conducted between September and October 1999 with the help from the Hohhot EPB. Between November

and December 1999, environmental performance of 100 organizations was color rated with black rating almost across the board, which was unacceptable. A Hohhot EPB official suggested adopting target pollutants of the environmental campaign required by SEPA, "Control One, Meet Two Standards." This campaign was of high priority for the Hohhot EPB in 1999 because by the end of 2000, the final benchmark was that total pollution discharges had to meet national standards, and ambient environmental quality had to meet standards in functional areas.

After limiting indicator pollutants of EPID to target pollutants of the environmental campaign, the distribution of color rating results, although skewed to black, became acceptable. The trial rating was completed in January 2000. The HRAES and Hohhot EPB planned to formally disclose these results to the public through a well-publicized press conference in March.

The Yili Corporation, a leading, publicly traded Hohhot dairy producer, which contributed almost one-third of the city's total tax revenue, was originally rated black but later upgraded to red. The Hohhot city government did not want to risk negatively impacting Yili's image, stock price, or profitability. And thus publicly disclosing color rating results of 1998 was prohibited. On 24 March 2000, a meeting was held in a conference room in a Hohhot city government office building. Officials of relevant government agencies, selected news agencies, and representatives of EPID participant organizations were invited to the meeting.

Between the trial rating in January 2000 and the final rating in March 2000, the color rating results of EPID participant organizations changed. Overall, the rate of compliance had increased from 1 percent to 10.3 percent, noncompliance increased from

50 percent to 60.7 percent, and partial compliance decreased from 49 percent to 29 percent. Reasons for these changes are unclear.

Altogether 5 news agencies picked up on EPID in Hohhot, and it made 5 headlines between March and May 2000. These news agencies included local newspapers and TV stations such as *Hohhot Daily* and Hohhot TV Station, and national newspapers such as *China Environment Newspaper*.

Unfortunately, EPID in Hohhot was stopped after the pilot phase.

5 Comparative Case Analysis I — A "Cultural Roots" Framework Applied

The above analytic narratives documented the implementation of the two EPID pilots in Zhenjiang and Hohhot between 1999 and 2000. The Zhenjiang EPB transformed its EPID pilot into a standardized operation and its size and scope have been greatly expanded since its inception. Now, Zhenjiang EPB officials are exploring ways of making use of color rating results for environmental compliance assurance and enforcement. In contrast, EPID in Hohhot was stopped only after its first year's pilot. This motivates the following research question: what factors may account for the dramatic difference between the outcomes of the Zhenjiang and Hohhot EPID pilot programs?

As specified in Chapter 3, for this section, the "cultural roots" framework by Khademian (2002), complemented by the "webs of dialogue" framework, have been adopted to compare Zhenjiang with Hohhot on: (1) how EPID was perceived by its implementers, (2) what resources were at their disposal for implementing EPID, (3) the context in which EPID was carried out and the efforts that were taken resulting in a favorable (or unfavorable) environment for EPID, and (4) how the webs of dialogue on EPID between program stakeholders impacted and were impacted by the above three elements — task, resources, and context and their integration. This analysis aims to make sense of why EPID in Zhenjiang was sustained but only barely survived the pilot phase in Hohhot.

5.1 Task: How EPID was perceived by its implementers

EPID in China originated from a 1995 World Bank research project in collaboration with Indonesia's Environmental Impact and Management Agency

(BAPEDAL), Program for Pollution Control, Evaluation and Rating (PROPER). PROPER was to overcome pervasive institutional barriers to environmental enforcement. The idea was to "create incentives for compliance through honor and shame" (Afsah and Ratunanda 2000, p.7-8).[179]

Wanting to test an informational approach toward pollution control in a Chinese context, after obtaining approval from SEPA, Dr. Hua Wang and the chief engineer of the CRAES worked together to establish EPID pilot programs in China (see Figure 4-1). Rating environmental performance of individual enterprises using five colors — from the best to the worst: green, blue, yellow, red, and black — and making rating results publicly available, Dr. Hua Wang intended EPID to: (1) establish an environmental management information system, (2) experiment with an information-based pollution control instrument in two pilot cities, and (3) disseminate the results through the Internet or CD-ROMs to promote EPID across China.

By 1998, the literature had provided ample evidence that improved environmental performance could be derived from disclosing pollution information to the public. Channels of influence on polluters include market pressure exerted by investors, consumers, business partners, or competitors; public pressure from residents of neighborhoods where polluters reside; or a sense of honor or a fear of losing face from CEOs of the enterprises.[180] The most extensively studied public disclosure mechanism is the Toxic Release Inventory (TRI) of the United States, which was first implemented in 1989. The practice of an informational approach toward pollution control in developing countries started relatively late, with very limited knowledge generated on its implementation, functioning mechanisms, or impact.

However, given limited regulatory resources for environmental compliance and enforcement in China, EPID was thought to be of special appeal because it does not require additional investments but has a potential to generate public pressure on industry to bring it into better compliance. Dr. Hua Wang stated his strong belief that EPID is of value to local environmental protection bureaus in our ongoing conversations.

Zhenjiang

Professor Genfa Lu of Nanjing University is the person who signed the contract with the CREAS and was supposed to be officially responsible for the Zhenjiang EPID pilot program. However, he said he felt EPID would serve as a new policy instrument to control pollution, and thus the Zhenjiang EPB should take the lead.

Director Chu of the Zhenjiang EPB has said that he does not buy into the idea of holding back environmental information from the public at all. Everybody breathes the air and drinks the water in their daily lives, he said. It is so obvious to Director Chu that every person in society has a stake in the environment. According to him, environmental information should be made publicly available: only in this way can the public participate in environmental protection, which is to the benefit of everyone.

Looking at the issue from the standpoint of a director of a local environmental protection bureau, Director Chu said that by disclosing environmental performance information to the public, the administrative capacity of the Zhenjiang EPB could be lifted up to a higher level. Carrying out EPID implies the following exercises: collecting firm-level environmental performance information, assuring its accuracy, and processing and analyzing the information collected. The process requires the Zhenjiang EPB to synthesize the work of the line offices because pollution information is dispersed among

them. Thus EPID could potentially streamline the work of the Zhenjiang EPB, enhance its environmental management capacity, and eventually achieve better environmental results. Furthermore, EPID creates the demand to establish a good working relationship with other government agencies, the mass media, and the public. In short, he said, EPID could be used as a management tool for the Zhenjiang EPB to test and improve its administrative capacity.

In addition to its positive impacts on the administrative capacity of the Zhenjiang EPB, EPID could induce the Zhenjiang government agencies to make a more credible commitment to environmental protection. By making industrial environmental performance visible, EPID would make the public become more aware of local environmental problems and push for a cleaner industry and better environmental quality. This would make it more difficult for the Zhenjiang city government and other government agencies to ignore environmental protection when making development decisions. Thus local EPBs could harness the increased public environmental awareness and gain more leverage when environmental considerations are competing with other development objectives.

As stated in the memorandum to the Zhenjiang city government from the Zhenjiang EPB, EPID is an environmental policy innovation for achieving cost-effective environmental protection by harnessing the forces of the market and community and further stimulating better industrial environmental behavior. This innovation will better enable a harmonious development featured by advancements in both economic growth and environmental protection (see APPENDIX 10).

Hohhot

The Hohhot Research Academy of Environmental Sciences (HRAES) signed the contract with the CRAES and was officially responsible for the EPID pilot in Hohhot. The officially stated purpose of the Hohhot EPID pilot was to establish an environmental management information system tailored to local conditions of Hohhot.[181] The HRAES understood EPID to be a research project and the final product to be an environmental management information system to be used by the Hohhot EPB. It was conducted in a way similar to their other research projects — acquiring data from the field, conducting analysis by the HRAES staff, and presenting results to clients.

The deputy director of the Hohhot EPB who headed the EAG and tried his best to help with EPID recalled:

> "EPID is a research project contracted to HRAES. I was invited to participate in this project to coordinate data issues. EPID needs firm level pollution data but HRAES doesn't have it. Our offices have self-reported pollution by industry, pollution discharge reported by the monitoring station, and records on administrative sanctions and fines. I was also asked to comment on the color rating mechanism proposed by HRAES. Except that, Hohhot EPB didn't get involved in any project details.
>
> We were already overloaded with regular and urgent work which seemed to have more substantial effects on solving environmental problems in Hohhot. For example, we were negotiating a Geneva environmental loan project to build centralized heating system aiming to reduce air pollution in Hohhot. And we were doing an environmental campaign required by SEPA, 'control one, meet two standards.' The final benchmark for this campaign was the year of 2000. In 1998 and 1999 the work was the most demanding. We were working with individual enterprises to help them meet environmental standards.
>
> As for Hohhot city government, no, it was not really involved. I won't say they did not support EPID. First of all, nobody with the EPID research team reached out to the city government. Secondly, in 1999, we had a newly established big company which didn't have time to build its pollution treatment facility. If it was given a bad rating, the image of this company will be damaged since the public only looked at the rating results but didn't necessarily know the reasons behind. This would do bad for the local economy of Hohhot."

To the Hohhot EPB, EPID was officially contracted to the HRAES as a research project — not a management tool to advance their capacity of pollution control. The Hohhot EPB was responsible for environmental management but not research. Already swamped with regular and urgent tasks, the Hohhot EPB assisted the HRAES with

readily available resources such as pollution information, prioritizing pollutants that need to be included, and administrative approval whenever required. In general, the Hohhot EPB viewed EPID as an extra — and unimportant — task.

For the Hohhot EPB, the EPID pilot program was not able to stand alone as a meaningful project; to make sense of EPID in Hohhot, the implementers connected it to the environmental campaign — "Control One, Meet Two Standards." This environmental campaign was a policy priority to the Hohhot EPB at that time. When this campaign was ended in 2000, the EPID became redundant. As a result, the Hohhot EPB discontinued the EPID program after its first year's pilot.

5.2 Resources: What resources were at disposal of EPID implementers

One key component needed to implement EPID is firm level-pollution information. To develop a computerized color rating system aimed to facilitate environmental management of a local EPB, working knowledge of priorities and challenges in environmental compliance and enforcement and technical knowledge of computer programming have to be combined. This section will compare the resources at the disposal of EPID implementers in Zhenjiang and Hohhot. "Resources" refers to the administrative capacity of an EPB to gather and process pollution information, the competency of EPID implementers, the level of technical support available for establishing a computerized color rating system, and the match-up of authority and responsibility to implement EPID.

Environmental information

Generally, environmental information is divided into the following three categories: information on ambient environmental quality (air, water, land, and noise),

pollution information (air and water pollutant discharge, solid waste, and noise), and information on environmental management. Pollution information refers to pollutant discharge from industrial, domestic, and agricultural sources. Information on environmental management includes records of administrative penalties and fines and positive measures taken by both the government and industry to prevent and treat pollution.

The monitoring station of a local EPB is responsible for monitoring both the ambient environmental quality and pollution discharge. A monitoring station carries out four types of tasks: (1) regular monitoring of general pollution sources once a year, assigned by the planning office and pollution control office of the EPB; (2) targeted monitoring of important pollution sources, usually 3-4 times a year, assigned by the same offices; (3) monitoring specifically for environmental campaigns or investigations by the compliance and enforcement office or the People's Congress or others; and (4) contracted monitoring by industry for it to self-report pollution information to the government.[182] Because industry generally lacks the capacity to self-monitor its environmental performance, and although it is required by EPBs to self-report pollution information once a year, it had to rely on monitoring stations run by the government for help.

Of a local EPB, the compliance and enforcement office conducts regular and surprise inspections as well as investigates violations reported by citizens. Preventive pollution control measures such as "Three simultaneous" are enforced by the planning office. Other pollution control instruments targeted at existing pollution sources are enforced by the pollution control office. Once evidence of violation is found, the legal office decides whether fines are warranted (and if so how much should be levied) or if

administrative penalties should be exerted on violators. Records of violations and penalties are kept in relevant offices.

Table 5-1. Administrative capacity of the Zhenjiang and Hohhot EPBs in 2004

	Zhenjiang	Hohhot
Total budget (10,000 yuan)	1400	219.5
EPB		
Annual budget (10,000 yuan)	500	57.5
Staff: total amount	70	25
Staff: percentage of professional staff (%)	90	50
Continuous mobile monitor	4	0
Monitoring station		
Annual budget (10,000 yuan)	900	162
Staff: total amount	60	81
Staff: percentage of professional staff (%)	>90	70

Source: Interview 06082005-07; 06092005-02; 07172005-01; 07182005-01.

Monitoring station

Zhenjiang

With the Zhenjiang EPB experimenting with more sophisticated pollution control instruments, the Zhenjiang monitoring station had to learn new approaches to its work. For example, in 1999, when EPID was first piloted, pollution information was mainly acquired through regular monitoring once a year for general pollution sources and three to four times a year for important pollution sources. However, given the large fluctuations in pollutant discharge, the accuracy and reliability of pollution information greatly depended on the timing and frequency of monitoring activities. Obviously, accurate and reliable pollution information requires more frequent monitoring.

In 2002, as the Zhenjiang EPB considered including the service sector in EPID, the Zhenjiang monitoring station expanded its services accordingly. Traditionally, only industrial pollution sources are monitored, and pollution discharge from the service sector

is mainly domestic wastewater, cooking smoke, or noise. Such discharges are mostly diffuse — small in individual amounts but large in aggregate — and occur in immediate proximity to the population being affected. All these characteristics are different from industrial pollution. Thus, monitoring pollution from the service sector presented a special challenge for the Zhenjiang monitoring station. In the first quarter in 2003, for the first time, the Zhenjiang monitoring station conducted a general survey of pollution by the service sector in downtown Zhenjiang. With more enterprises of the tertiary industry expected to participate in EPID, the capacity of the Zhenjiang monitoring station had to be greatly enhanced.

The monitoring station of the Zhenjiang EPB currently has 60 staff members, and 90% of them are environmental professionals (see Table 5-1). Between 1994 and 2002, its annual budget had stayed at a 4-million-yuan level. The Zhenjiang EPB could only meet the daily operational needs of its monitoring station and had no money left over for upgrading monitoring equipments or expanding monitoring services. Since 2003, the budget of the Zhenjiang monitoring station has been greatly increased. The 2003 budget was 4.8 million yuan; the 2004 budget was 7 million yuan, with 4 million set aside for purchasing new monitoring equipment; and the 2005 budget was further increased to 9 million yuan, with 5 million for conducting special environmental surveys. In 2004, the Zhenjiang monitoring station purchased 4 mobile continuous monitors.

Besides upgrading equipment, the Zhenjiang EPB also conducted staff training. Currently, it is considering sending some laboratory staff overseas to learn how to use the best available technology.

In the meantime, the Zhenjiang monitoring station has made efforts to build up industry's self-monitoring capacity. Before, industry was required to self-report pollutant discharge annually. Because of a lack of self-monitoring capacity and a concern for the validity of self-monitored data, industrial enterprises were hiring monitoring stations run by the city and county government to take measurements and to report the data to the Zhenjiang EPB. However, the once-a-year reporting was inadequate for the Zhenjiang EPB to be able to manage industry or for enterprises to be able to understand their own environmental performances and take measures to control pollution. To remedy the insufficiency, the Zhenjiang EPB increased the frequency of industry self-reporting to once a quarter and took measures to enhance industry's self-monitoring capacity.

Based on the affordability of monitoring equipment and environmental specialists at individual enterprises, the Zhenjiang monitoring station helps install continuous monitors or other monitoring facilities as they see fit. The monitoring equipment is licensed (verified) every year by the Zhenjiang monitoring station to ensure they function properly. Once a firm's environmental specialist is licensed by the Jiangsu provincial EPB, he or she can endorse the company's self-reporting forms, and these forms will be honored by the government. A monitoring service network will be established to serve firms that cannot afford self-monitoring facilities or personnel. All monitoring stations/facilities of the government, trade associations, and individual enterprises can become monitoring service providers as long as their facilities and environmental specialists are certified. The Zhenjiang monitoring station conducts regular and surprise inspections on these monitoring service providers for quality assurance.

The goal of the Zhenjiang monitoring station is to support the environmental management work of the Zhenjiang EPB by providing accurate, reliable, and, ideally, real-time pollution information. Since the Zhenjiang EPB began implementing several pollution control policies at once —including total pollution control, EPID, and tradable emissions permits — the capacity of the Zhenjiang monitoring station has continuously improved.

Hohhot

The Hohhot monitoring station lacks competent environmental professionals and state-of-art monitoring facilities. This has constrained its ability to serve environmental policy goals in Hohhot. In 1999, when the first version of the EPID indicator system was tried out in Hohhot, a lot of information was unavailable. As a result, the EPID implementers had to simplify the indicators based on data availability. Furthermore, pollution information is collected from regular monitoring, which is at most 3-4 times a year. Such infrequent data collection is insufficient to serve the policy goal of EPID of tracking and comparing industrial environmental performance and stimulating continuous improvement.

The Hohhot monitoring station has a total of 81 staff members, 70 percent of whom are environmental professionals. The operating budget of the Hohhot monitoring station is at a level of 20,000 yuan per staff member, which translates to a total budget of 1.6 million yuan per year (see Table 5-1). Consequently, the Hohhot monitoring station cannot replace or upgrade their monitoring equipment, which has become obsolete. For example, although continuous monitors have clear advantages, especially for surprise

inspection purposes, funds have been allocated to other priority areas and the Hohhot monitoring station has not yet purchased one.

Because industry has very limited self-monitoring capacity, on top of its mandatory assignments, the Hohhot monitoring station is often contracted by enterprises to help fill out their self-reporting forms. The Hohhot monitoring station charges enterprises for such services and this revenue can be used for employee compensation. As a result, there is a tendency to prefer contract work over mandatory assignments. And sometimes the reliability and accuracy of pollution information could be compromised because business interests can prevail in this contractual relationship.[183]

With SEPA requiring a broader range of pollution sources to be monitored and more sophisticated policy tools to be adopted, the Hohhot monitoring station faces an increased workload, which in turn creates a demand for a competent workforce to get the work done.[184] The Hohhot monitoring station needs specialists on staff who understand physics, chemistry, ecology/biology, precision instruments, and statistics. Unfortunately, the Hohhot monitoring station does not have the authority to make hiring decisions but has to accept military veterans or others assigned by the Hohhot EPB and the human resources department of the Hohhot city government. As a result, there are over 20 veterans, most of whom are high school graduates, working at the Hohhot monitoring station.

To enhance the technical competency of its workforce, the Hohhot monitoring station has been carrying out its own staff training up to a maximum of 15 days a year. However, its effect is very limited. Although well aware of this limitation, the Hohhot

monitoring station cannot afford sending its employees to full-time or part-time college education, which would be more helpful.

As a consequence of insufficient environmental monitoring services provided by the government, private environmental monitoring service providers are emerging in Hohhot. As long as the equipment and staff of a private monitoring station are licensed by the bureau of quality and technology supervision, their monitoring reports are honored by the Hohhot EPB. Although there is a possibility that these private monitoring stations could collude with industry — which would jeopardize the neutrality and quality of environmental information — with checks and balances, they can serve as a complement to the Hohhot monitoring station.

Designated financial and human resources for implementing the EPID pilot programs

Zhenjiang

Director Chu of the Zhenjiang EPB oversaw the Zhenjiang EPID project. Another Zhenjinag EPB staff member, Xinhua Qu, was in charge of the nitty-gritty details of the Zhenjiang EPID implementation plan. Both Chu and Qu started working for the Zhenjiang EPB in 1981 when it was first established. They are both college graduates who majored in chemistry and were able to quickly pick up on environmental engineering (which did not become a subject of research and study until 1977 in China). Director Chu became the deputy director of the Zhenjiang EPB in 1985 and director in 1994. He retired from this position in 2000.

Qu was the head of the environmental management office of the Zhenjiang EPB between 1987 and 1989. Since 1989, she has been the head of the office of environmental

science and technology. She is very well versed with policies, procedures, and priorities of environmental management in Zhenjiang and the most up-to-date international practice of industrial environmental management. Qu devised a way to speed up the approval process of EIA reports concerning new construction projects with capital investments less than 100,000 yuan.[185] Later, this innovation was formally adopted by the Jiangsu provincial EPB and was replicated province-wide.

Jiangsu is one of the leading provinces regarding industry self-reporting in the country, and Zhenjiang was the best among the 13 prefecture-level cities in Jiangsu province. The first national conference on industry self-reporting of pollution was held in Zhenjiang when Qu was in charge of it.

By 1999, when Zhenjiang started experimenting with EPID, Chu and Qu had worked together for the Zhenjiang EPB for 19 years. This gave them the competency and good working relationships within the Zhenjiang EPB, with other relevant government agencies in Zhenjiang, and with the Jiangsu provincial EPB. This professional competency and connectedness have proven indispensable for implementing the EPID pilot program. Xinhua Qu said,

> "I have been working in the Zhenjiang EPB since it was first established. I know everyone and where to find data. It was not difficult to get the line offices together. Of course, I had to sort out most of the things myself -- draft official documents, organize meetings, circulate meeting minutes, and make revisions. During the pilot phase, I and other colleagues invested roughly a total of 122 man-days for the EPID implementation.
>
> The problem is that I was not allocated assistants from the Director as the size and scope of EPID have been expanded. People thought implementing EPID is my job and it has become a standardized operation thus no attention from the Zhenjiang EPB is required. I had to work long hours to get job done."[186]

The sequence of an EPID program in Zhenjiang goes as follows:

Every year in March, the Zhenjiang EPB surveys pollution sources, obtains information on their contribution to local pollution, and selects enterprises to participate in the EPID program.

In April, the Zhenjiang EPB collects environmental performance information on the EPID program participants. By the end of April, the Zhenjiang EPB delivers preliminary color rating results to relevant enterprises to call for comments.

Between 1and 15 May, comments from enterprises participated in EPID are collected. Between 16 and 24 May, their comments are considered by the Zhenjiang EPB. On 25 May, the color rating results are submitted to the leading group for EPID implementation for approval. On 30 May, the Zhenjiang city government issues an official notice of the color ratings of the environmental performance of firms participating in EPID.

On 5 June, World Environment Day, the *Zhenjiang City Daily News* publishes the rating results on its cover page.

To make EPID more dynamic, firms may resubmit their environmental performance data in November if they think they have made some improvement. Then the Zhenjiang EPB verifies their updated information, re-evaluates their environmental performance, and makes necessary adjustments accordingly.

In 2005, there were altogether 800 enterprises of both the secondary and tertiary industries participating in EPID in Zhenjiang. Two industry-specific indicator systems were adopted. The increased workload required 304.5 man-days in 2005. Because the

Zhenjiang EPB did not allocate more personnel to the EPID, Qu had to put in long hours to get the work done.

Implementing EPID did not require additional financial resources as long as the work was carried out by the Zhenjiang EPB staff members. Getting the color rating results into the headlines of local newspapers cost the Zhenjiang EPB about 100,000 yuan in 2005. It cost the Zhenjiang EPB 24,000 yuan to participate in EPID training held by the Jiangsu provincial EPB in 2003. The Zhenjiang EPB could easily provide the funds needed for carrying out its EPID program every year.

Hohhot

The major implementer of the Hohhot EPID pilot program was Director Fan of the HRAES. Since 1984 he has been working on environmental protection. Between 1984 and 1994, he worked at the HRAES, then transferred to the Hohhot monitoring station and had worked there for two years. In 1996, he became the director of the HRAES. An engineering physics major, Director Fan was able to very quickly pick up on environmental science and engineering after it became a subject of study and research in China. Because the HRAES is the research organ of the Hohhot EPB, Director Fan had to rely on the Hohhot EPB for pollution information and intergovernmental agency cooperation in implementing EPID.

In 1999, when Hohhot first experimented with EPID, Director Yang of the Hohhot EPB was very supportive. He took the civil servants' examination in 1993 and was selected to the director position based on merit. However, he was promoted to the deputy secretary general position of the Hohhot city government in early 2000. The new director who came in early 2000 doesn't hold an advanced degree. Although he was still

supportive of EPID, he didn't have a passion for it and was not very knowledgeable about the program. Moreover, this director left in early 2001 and became the mayor of the Yuquan district of Hohhot. The third Hohhot EPB director didn't know anything about EPID nor did he support continuing the program. Thus, between 1999 and 2001, during the critical period of the program implementation, the Hohhot EPB had three different directors, and the Hohhot EPID pilot program suffered from diminishing support from the Hohhot EPB.

However, a bright spot in all this was the fact that the deputy director of the Hohhot EPB, Yingfeng Yang, was the major contact point between the HRAES and the Hohhot EPB. A college graduate who majored in chemistry, Yang is very well versed with pollution control technology, environmental regulations and policies, and policy priorities in Hohhot. Between 1976 and 1993, he worked at the HRAES. He became the deputy director of the Hohhot EPB in 1993 and remained in that position until his retirement in 2004. He coordinated the line offices of the Hohhot EPB to provide pollution information to the HRAES for EPID implementation, commented on the indicator system and rating mechanism, and issued notices on EPID in the name of the Hohhot EPB. In short, he supported EPID in whatever way that he could. However, he was under excessive demand at the Hohhot EPB. Other priorities demanded a lot of his time and attention. So, on a practical level, his support for EPID was limited.

In Hohhot, EPID fell almost solely on the shoulders of Director Fan of the HRAES. No doubt he had the technical competency needed for EPID implementation. The EPID pilot program in Hohhot was positioned to be a research project on industrial pollution predicting and environmental management information systems. As a result, a

lot of resources were allocated to simulate the ecological environment of Hohhot, which was of little value to the implementation of EPID. Furthermore, as the director of the HRAES, he had other competing priorities as well. So the HRAES and Hohhot EPB were able to commit a very limited amount of staff time to implementing the EPID pilot program.

Similar to Zhenjiang, EPID in Hohhot didn't require any extra investment in monetary terms. So, even though the Hohhot EPB was not as well funded as the Zhenjiang EPB, Hohhot had sufficient financial resources for implementing EPID.

Technical support

Zhenjiang

The Zhenjiang EPB implemented EPID in partnership with Nanjing University. Then a doctoral student of Professor Genfa Lu, Yuan Wang was responsible for developing the computerized color rating system for the Zhenjiang EPB. This system creates the five-color rating results out of industrial enterprises' environmental performance data. Nanjing University is only 81km away from Zhenjiang, and in 1998, Yuan Wang came to the Zhenjiang EPB 2-3 times a week attending meetings and discussions, writing and testing computer programs on industrial environmental performance information. Between early 1999 and July 2000, Yuan Wang had spent about 80 workdays on EPID in Zhenjiang. Later, in 2002, when the Zhenjiang EPB was considering expanding EPID to include the service sector, Yuan Wang again provided technical support and followed through the whole discussion, design, and color rating processes. Color rating results of 80 service-sector enterprises were disclosed for the first time in 2005.

Hohhot

The HRAES implemented EPID in partnership with the CRAES in Beijing, 669 km away from Hohhot. The CRAES is the research organ of SEPA, the State Environmental Protection Administration. CREAS experts are always fully loaded with urgent work of national or regional importance. Because of the travel time involved and the already heavy workload of the CRAES experts, it was difficult for them to go frequently to Hohhot for meetings or discussions on EPID. Between February 1999 and March 2000, the experts of the CRAES paid less than ten visits to Hohhot. The computerized color rating system was mainly developed in Beijing and tested with pollution data provided by the Hohhot EPB through the HRAES. As a consequence, the HRAES failed to fully take advantage of the experimental and evolving nature of the pilot EPID program. Opportunities for striving for better results were lost.

Delegation of authority and trust

Zhenjiang

Director Chu relied on Qu for implementing the EPID pilot program in Zhenjiang. Qu recalled there were occasions when urgent decisions on EPID needed to be made but Director Chu was not available. For example, the Zhenjiang EPB had to prepare a memorandum on EPID implementation and an implementation manual for official approval consideration by the Zhenjiang city government. To expedite the process, Qu drafted the memo and submitted it to the legal office of the Zhenjiang city government when Director Chu was overseas. After director Chu came back from the trip, he praised Qu for taking the initiative. This is relatively rare in China, where asking for advice from and reporting to officials of a higher level before you act is absolutely necessary in the

government hierarchy. So the trust between Director Chu and Qu that had developed over the years of working together made Qu the de facto EPID decision-maker and helped make the EPID implementation in Zhenjiang smooth and productive.

Hohhot

By 1999, when EPID was started in Hohhot, the director of the HRAES and the deputy director of the Hohhot EPB had been working together for 6 years. The Hohhot EPB officials thought implementing the EPID pilot program in Hohhot would generate extra work for the Hohhot EPB. Thus, the HRAES director tried his best not to bother the Hohhot EPB too much and took up as much of the implementation work as he could. However, he had to work through the Hohhot EPB to reach the Hohhot city government, other government agencies, and industry. The good working relationship between the two directors did not solve the problem in the project set up. So there was a mismatch between authority and responsibility. The HRAES was assigned the responsibility to carry out the EPID pilot program but was not given the authority to do so. Throughout the whole implementation process, the administrative authority remained with the Hohhot EPB, but it was not delegated to the HRAES to implement the EPID pilot program.

Summary of resources at disposal of EPID implementers

This section compared the resources at the disposal of EPID implementers for carrying out EPID in Zhenjiang and Hohhot. The following factors are analyzed: environmental information, professional competency and commitment of implementers, technical support, and trust and delegation of authority of implementing EPID (see Table 5-2). Environmental information is the key to success for EPID programs. The administrative capacity of the Zhenjiang and Hohhot EPB to gather and process pollution

information is different. Their monitoring stations are/were challenged by different policy mandates. The budget size, percentage of environmental professionals, and monitoring facilities of the Zhenjiang monitoring station are superior to that of Hohhot. Consequently, environmental information available for EPID implementation in Zhenjiang was perceived to be much more comprehensive and of better quality than that in Hohhot.

Table 5-2. Comparing resources at the disposal of EPID implementers in Zhenjiang and Hohhot

	Zhenjiang	Hohhot
Quantity: environmental information (self-perception)*	Sufficient	Insufficient
Quality: environmental information (self-perception)*	Rather good	Not good
Staff time commitment (man-days)	122	40
Professional competency of major implementers	Competent	Competent
Technical support time commitment (man-days)	80	40
History of cooperation between major implementers (years)	19	6
Match between authority and responsibility	Match	Mismatch

* Author administered a semi-structured survey. Interviewees were asked to evaluate the quantity & quality of environmental information for implementing the EPID pilot programs on a 1-5 scale with 1 the best and 5 the worst. The self-perceived quantity of environmental information of Zhenjiang and Hohhot was 1.4 vs. 3.3; self-perceived quality was 2.3 vs. 3.5.

All the key EPID implementers in both Zhenjiang and Hohhot are college graduates. They all have been working in environmental protection since the early 1980s. So they all understand their jobs and the operation of their EPBs very well. However, the Zhenjiang EPB committed two times the amount of staff time as did the HRAES and the Hohhot EPB in implementing the EPID pilot program. In addition, the distance between the HRAES and its counterpart technical support team is about 7 times farther than the distance between the Zhenjiang EPB and its technical support team. As a result, the experts of the Zhenjiang technical support team were able to be more involved in the

Zhenjiang EPID pilot program than were the experts of the CRAES in the Hohhot EPID pilot program.

Finally, the way the authority and responsibility to implement EPID matched up differed from Zhenjiang to Hohhot. The trust built over a long-term working relationship between Director Chu and Xinhua Qu of the Zhenjiang EPB made Qu the de facto EPID decision-maker. As a result, Qu took initiatives as she saw fit, which made the implementation of the Zhenjiang EPID pilot program smooth and productive. In Hohhot, the administrative authority required to implement EPID resided with the Hohhot EPB but was not delegated to the HRAES, which was responsible for implementing the Hohhot EPID pilot program. Consequently, the EPID in Hohhot was implemented in a way that minimized its reliance on the Hohhot EPB. Not being able to participate in the live discussions on EPID caused the Hohhot EPB to lose the opportunity of integrating EPID into its regular work.

Table 5-3. Performance of the Zhenjiang and Hohhot EPB in Implementing the EPID Pilot Programs

	Enough human resources?	Enough financial resources?	Quantity of environmental information?	Quality of environmental information?	Difficulty in coordination within the EPB	Interaction with enterprises per week	Difficulty in working with industry
Zhenjiang	2.45	1.24	1.38	2.3	4	1.79	4.2
Hohhot	2.33	4	3.33	3.5	4	2.06	4.01
Grand mean	2.44	1.73	1.96	2.69	4	1.95	3.89

Note: see APPENDIX 13 for the scale used in evaluating the environmental performance of the Zhenjiang and Hohhot EPB. All answers are on a 1-5 scale. Generally the smaller a number the closer the answer to the question is YES.

From Table 5-3 one can see clearly that overall, the self-perceived capacity to implement the EPID pilot program of the Zhenjiang EPB was superior to that of the Hohhot EPB.[187] The Zhenjiang EPB was perceived by officials of the Hohhot EPB to own much more resources than their agency. In implementing the EPID pilot programs,

the personnel were sufficiently competent in both Zhenjiang and Hohhot. The Zhenjiang EPID implementers were not short of financial resources at their disposal. In contrast, funding was perceived to be insufficient for the Hohhot EPID pilot program. Moreover, the self-perception of the quality and quantity of environmental information for the EPID pilot program was much more positive for the Zhenjiang EPB officials than it was for the Hohhot EPB officials. Neither the Zhenjiang nor the Hohhot EPB had any problems with coordinating among EPB line offices. Moreover, both the Zhenjiang and Hohhot EPB worked closely with industry, and the cooperation was fairly easy.

With all these factors playing together, it is clear that the implementers of the Zhenjiang EPID pilot program had better resources at their disposal than did their counterparts in Hohhot.

5.3 Context in which the EPID pilot programs were carried out

Figure 5-1 illustrates how the EPID implementers of the Zhenjiang EPB, HRAES, and their respective technical support team worked in a web of actors and shows the relationships needed to carry out EPID.

Zhenjiang

In 1999, SEPA carried out the "Midnight Action" environmental campaign aiming to bring industrial enterprises located along Yangtze River into compliance by conducting surprise inspections at midnight. If SEPA found a significant number of industrial enterprises that were out of compliance, the Zhenjiang EPB as well as the Zhenjiang city government would be put to shame. So the Zhenjiang city government was very concerned about industrial environmental performance. Director Chu recalled,

> "Although I did not directly brief the directors of the relevant economic and industrial agencies on the Zhenjiang EPID program, they looked up to the Zhenjiang city government for directions. So as long as the Zhenjiang city government supported EPID, it was rather easy for the heads of other agencies to agree on the EPID program."[188]

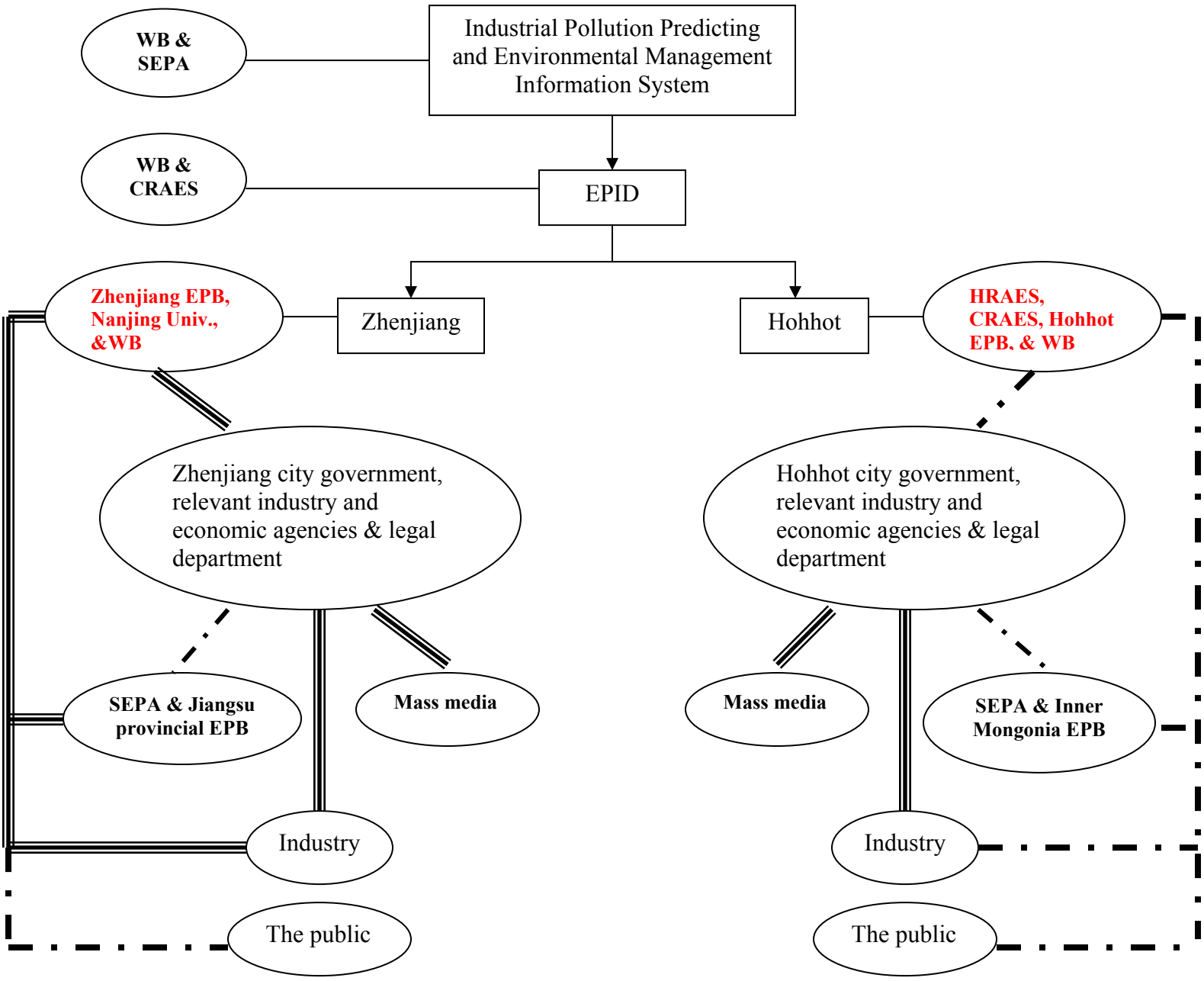
Interviews with industry people revealed that they did not quite understand what EPID was about (Qu recalled that the Zhenjiang EPB had distributed pamphlets on EPID to the business community when the program first started). They were not consulted by the Zhenjiang EPB before they became EPID participants. Even so, they did not act against the Zhenjiang EPID program. Although they were most concerned with their profit margins, they did not want to stir up trouble with the government by rejecting the idea of making their environmental performance public. So the majority of the industry people interviewed only hoped that the color ratings of their firms would not make them lose face.

As to the implementation of the Zhenjiang EPID pilot program, industries were rather cooperative. Officials of the Zhenjiang EPB and Jiangsu provincial EPB who were interviewed said that the Zhenjiang public did not actively participate in the implementation of the EPID program. So they did not play a significant role.

The mass media were invited to participate in the press conference and write news reports on the Zhenjiang EPID pilot program. Later, when the EPID program in Zhenjiang had become a standard task, the *Zhenjiang City Daily News* published the color rating results on the cover page of its 5 June (World Environment Day) issue.

SEPA and the Jiangsu provincial EPB welcomed and supported the Zhenjiang EPID pilot program and made it a model for the rest of the regions in China.

Figure 5-1. Major Actors and Their Working Relationship in Implementing the EPID Pilot Programs



Note:

_____ stands for connections between the international policy advisor and domestic policy entrepreneurs;

═══ stands for strong ties;

– – – stands for weak ties.

Red highlights the team responsible for implementing the EPID pilot programs.

Hohhot

The HRAES did not work closely with the Hohhot EPB on the EPID program because of its concern that it would create extra work for the Hohhot EPB. The EPID program was connected to the work of the Hohhot EPB only through sharing common indicator pollutants of the SEPA-initiated "Control One, Meet Two Standards" environmental campaign. Because the Hohhot EPB did not pay much attention to the Hohhot EPID pilot program, it did not actively reach out to the Hohhot city government to advocate for EPID.

Interviews with Hohhot EPB officials and HRAES researchers revealed that the pursuit of economic development was the Hohhot city government's top priority. It feared the disclosure of the color ratings of bad polluters might affect these firms' profitability. As a result, the Hohhot city government, together with the relevant economic and industrial agencies, voted against making industrial environmental performance public through a press conference. Unfortunately, because of the government hierarchy, the HRAES was not able to adequately communicate with the Hohhot city government to advocate for EPID.

Interviewees in Hohhot all agreed that unlike the industries in Zhenjiang, those in Hohhot were rather powerful. After they were aware of their black ratings, CEOs of powerful corporations mobilized the Hohhot city government in an attempt to block EPID, even though they did not know what implications the black rating would have on the profitability of their companies.

The Hohhot city government had a tight control over the mass media. They selected and invited a couple of news agencies to attend the internal meeting on EPID held in the Hohhot city government office building.

Similar to Zhenjiang, the Hohhot EPB officials and HRAES researchers who were interviewed said that the public in Hohhot did not actively participate in the implementation of the EPID program. So they did not play a significant role.

Given that the Hohhot EPB was not mobilized in the implementation of the EPID program, neither the Inner Mongolia Autonomous Region EPB nor SEPA was actively involved in the Hohhot EPID pilot program.

Summary of the context in which EPID was implemented

Table 5-4. The Web of Working Relationship among Parties Involved in EPID

Tie	Zhenjiang	Hohhot
Implementation team-City government	Strong	Weak
Implementation team-Industry	Strong	Weak
Implementation team-Public	Weak	Weak
Implementation team- provincial EPB & SEPA	Strong	Weak
City government-Mass media	Strong	Strong

Table 5-4 summaries the ties — illustrated in Figure5-1— between the implementation team and other parties involved in the EPID pilot programs in both Zhenjiang and Hohhot. In Zhenjiang, a key feature of the favorable context within which the EPID pilot program was successfully carried out were the strong ties between the implementation team and the Zhenjiang city government, industry, Jiangsu provincial EPB and SEPA. In contrast, the EPID implementation team of Hohhot didn't establish strong ties with other actors. Thus the external environment for implementing the Hohhot EPID pilot was not favorable for the color rating results to be made public.

5.4 Webs of dialogue between EPID program stakeholders were shaped by and shaped the three cultural roots — perception, resources, and context

For the EPID pilot programs in Zhenjiang and Hohhot to be successfully carried out, three levels of dialogue needed to be built. First, the dialogue between the international policy advisor and domestic policy entrepreneurs must occur to make the project possible. Second, the dialogue between domestic policy entrepreneurs (in this case, Zhenjiang and Hohhot EPB officials and academics at Nanjing University, the CRAES, and the HRAES) and city government and relevant industrial and economic agencies must take place to clear up doubts and gain support for EPID. Finally, the dialogue between the government, industry, and the public (the mass media included) makes the project viable and enables real changes in environmental behavior of industry and the public to ultimately achieve better environmental compliance and enforcement (Chapter 6, which evaluates the impact of the Zhenjiang and Hohhot EPID pilot programs, will get to this point).

China has long had a reputation of government secrecy. Disclosing the environmental performance of industrial enterprises inevitably brings to light business as well as government environmental conduct and exposes them to public scrutiny. Moreover, as economic development has become the top priority for China, environmental considerations are sometimes compromised. Sometimes, government agencies have even helped enterprises circumvent environmental regulations.[189] Thus inevitably, the dialogue on EPID between an EPB and relevant government agencies had to deal with competing development goals: environmental protection and the development of a local economy. Importantly, for EPID to be implemented city-wide, it

was of the utmost importance that the Zhenjiang and Hohhot city governments accept and support the EPID programs.

Zhenjiang

A clear message was conveyed through the dialogue between Dr. Hua Wang, Professor Lu of Nanjing University, and Director Chu of the Zhenjiang EPB: EPID is an innovative policy instrument for improving industrial environmental performance through public participation, and it is a worthwhile experiment for the Zhenjiang EPB.

Director Chu of the Zhenjiang EPB knew, from his years of work experience at a local EPB, how urgent it was to streamline the work and further enhance its administrative capacity. He recalled,

> "I expected EPID to integrate the environmental management work of the Zhenjiang EPB which was dispersed in different line offices. However, the work of a local EPB is ultimately evaluated by environmental results, for example, ambient air and water quality, or environmental performance of industrial enterprises. EPID can make forces converge — the internal management of the Zhenjiang EPB, management of industry, and public environmental awareness — and thus better environmental results could potentially be achieved. Especially, as we were developing the EPID indicator system it was clear that EPID has the potential to enhance the environmental management capacity of the Zhenjiang EPB. First of all, information on all the indicators has to be collected and compiled from different offices. Secondly, we have to make sure the information is accurate. Thirdly, it is almost impossible to play favoritism in color rating industrial enterprises because the rating results are to be made public and the enterprises have a general sense of how well they are doing. So EPID can promote rule of law and facilitate to formalize both the internal management and environmental management of industry by the Zhenjiang EPB."

In short, the international policy advisor (Dr. Hua Wang) and domestic policy entrepreneurs (Director Chu of the Zhenjiang EPB and Professor Lu of Nanjing University) in Zhenjiang reached consensus on the EPID pilot through dialogues that it would be an innovative policy tool to involve the public in environmental monitoring and enforcement and to enhance the environmental management capacity of the Zhenjiang EPB.

Director Chu of the Zhenjiang EPB actively reached out to the Zhenjiang city government and relevant government agencies and initiated the dialogue on EPID. Concerned about the environmental quality of Zhenjiang, the Zhenjiang city government was ready to put teeth in environmental regulatory enforcement. Director Chu articulated what hope EPID could bring to the environmental monitoring and enforcement in Zhenjiang. In practice, it would complement the formal monitoring and enforcement of environmental regulations by the Zhenjiang EPB, especially as the Zhenjiang EPB did not have sufficient resources for continuous monitoring and enforcement.

Having been convinced that EPID would be very valuable to the environmental protection work in Zhenjiang and it was worth the experiment, as hoped, the Zhenjiang city government said "yes." The Zhenjiang city government acted with caution but supported the EPID pilot program.

The leading group for EPID implementation was headed by the deputy mayor of Zhenjiang. The official notices on EPID and the color rating results disclosed were all issued in the name of the Zhenjiang city government. Furthermore, the Zhenjiang city government held a high-profile press conference to officially disclose the color rating results.

Besides working with the Zhenjiang city government and other government agencies, Director Chu worked closely with the Jiangsu provincial EPB to establish a province-wide program. Moreover, Jiangsu provincial EPB actively involved SEPA to scale up and institutionalize the EPID program. SEPA's effort to organize a field visit to Zhenjiang for local EPB directors in 2000 and the adoption of EPID by the Jiangsu province in 2002 reinforced the institutionalization of the EPID program in Zhenjiang.

Moreover, the Zhenjiang EPB actively reached out to the business community and the mass media, distributing pamphlets and other materials to educate them on EPID.

The dialogues on EPID between program stakeholders intertwined with their perceptions of EPID, resources at their disposal, and the context in which the Zhenjiang EPID pilot program was carried out. The webs of dialogue generated a favorable environment for the Zhenjiang EPB to implement EPID. Unfortunately, as EPID has become a standardized task, the limited efforts to reach out to industry and the public were further reduced.

Hohhot

To implement the Hohhot EPID pilot, Dr. Hua Wang communicated first with the chief engineer of the CRAES; through him, Wang reached director Fan of the HRAES; through director Fan, the deputy director of the Hohhot EPB was involved. So for the policy missionary (Dr. Hua Wang) to reach potential domestic policy entrepreneurs, three steps of communication had to take place.

The dialogue between Dr. Hua Wang and the chief engineer of the CRAES made it clear that the Hohhot EPID pilot program was to color rate and disclose the environmental performance of industrial enterprises in 1999.

Then the dialogue was extended to another domestic policy entrepreneur, Director Fan of the HRAES. He was the person who was mainly responsible for carrying out the EPID program in Hohhot. Director Fan said he understood EPID was to develop a computerized industrial pollution predicting and color rating system, and to experiment

with publicly disclosing the rating results. The EPID pilot program was assumed to be a research project similar to other projects undertaken by the HRAES.

The director of the HRAES was supposed to engage the deputy director of the Hohhot EPB to implement the EPID pilot program. However, because the EPID pilot program was officially contracted to the HRAES, the dialogue between them was curbed by the concern of generating extra work for the Hohhot EPB. Unfortunately, the HRAES had to work through the Hohhot EPB to reach the Hohhot city government and industries. Nobody at the HRAES or the Hohhot EPB took on the job of actively building a dialogue on EPID with the city government or industry. Although the HRAES had direct access to the public, no education programs on EPID were carried out.

To involve the Hohhot city government and relevant industrial and economic agencies in the EPID pilot, the program was conducted in a format following a standard World Bank project. The project launch workshop was held in February 1999, and officials of the Hohhot city government and relevant government agencies were invited. Unfortunately, this one-time workshop did not establish a dialogue on EPID among the workshop participants.

The Hohhot city government was not actively involved in the EPID pilot until January 2000, when the final color rating results were ready to be made public. On 4 and 5 January and 21 March 2000, the deputy mayor of Hohhot called meetings to discuss whether the color rating results should be made public. This was the first time dialogues on EPID between the policy entrepreneurs and the Hohhot city government had been established.

The dialogues dealt with the competing interests of environmental protection and local economic development. Discussion was divided on the question of whether the color rating results of Yili Corp. should be made public. Some officials even said disclosing Yili's performance was a political issue. Their line of thinking went as follows: Disclosure could possibly cause economic loss to Yili. Then Yili might have to lay off some of its workers. Laid off workers might cause social unrest. Thus it was a political issue. No government officials wanted to risk being politically wrong.

The dialogues on EPID failed to convey to the Hohhot city government that the EPID pilot program was beneficial to their work. The Hohhot city government said "no" to the disclosure of industrial environmental performance information. The color rating results were disclosed only internally to government officials and selected news agencies. Moreover, because no public education programs on EPID were in place, the public was not aware of the Hohhot EPID pilot program, not to mention the idea of pushing for results.

5.5 Integration of Task, Resources, and Context

The above analysis has shown that the three elements of "cultural roots" — perceptions of EPID by the implementers of the EPID pilots programs, resources at their disposal, and dialogues on EPID and ties between stakeholders established — were different between Zhenjiang and Hohhot. This section examines how the three elements were integrated together in the implementation of the EPID pilot programs in Zhenjiang and Hohhot.

Zhenjiang

The Zhenjiang EPB was assigned the responsibility and the administrative authority to carry out the EPID pilot program. The implementers perceived EPID as an innovative pollution control instrument for achieving better environmental compliance and enforcement by empowering the public by providing them with easily understandable environmental information. They also saw EPID as a tool to enhance the internal management of the Zhenjiang EPB and its capacity to manage industry.

Through Director Chu of the Zhenjiang EPB, this message was disseminated to officials of the Zhenjiang city government and relevant economic and industrial agencies. Given that EPID has the potential to bring public in to help achieve the standards set by the "Midnight Action" environmental campaign, officials of the Zhenjiang city government welcomed EPID and supported its implementation. The consensus on EPID among government officials made the context favorable for carrying out the EPID pilot program.

Director Chu of the Zhenjiang EPB delegated the authority of implementing the EPID pilot program to Qu, a Zhenjiang EPB staff member who shared the same environmental values. Her competence in both work and human relations from her nineteen-year work experience with the Zhenjiang EPB made Qu the de facto leader of the Zhenjiang EPID implementation team. Qu involved the line offices of the Zhenjiang EPB in developing the indicator system and in gathering environmental information. Dr. Yuan Wang of Nanjing University came to the Zhenjiang EPB two to three times a week between 1999 and 2000 to provide technical support.

In conclusion, weaving together the following factors made the Zhenjiang EPID pilot program successful: the value and relevance of EPID to the current work in

Zhenjiang, well-matched authority and responsibility, sufficient environmental information of good quality, collaborative efforts by the line offices of the Zhenjiang EPB, readily available technical support, committed EPID implementers and mutual trust based on shared values and personal ties, and a favorable context constructed by policy entrepreneurs through dialogues. The Zhenjiang EPID pilot program was later institutionalized and scaled up.

Hohhot

The EPID pilot program was contracted to the HRAES, the research organ of the Hohhot EPB. The HRAES was responsible for carrying it out but was not given the administrative authority needed. It had to work through the Hohhot EPB to reach industry, the Hohhot city government, and relevant industrial and economic agencies. Because of the concern of generating extra work for the Hohhot EPB, the HRAES tried to minimize the reliance of the Hohhot EPID pilot program on the Hohhot EPB. As a result, a dialogue on EPID was not established between the director of the HRAES, the deputy director of the Hohhot EPB, and line offices of the Hohhot EPB. Thus it lost the opportunity of using EPID as a tool to improve the capacity of the Hohhot EPB to manage itself and industry.

Furthermore, officials of the Hohhot EPB perceived the EPID pilot program to be a research project rather than an action plan. Nobody in the implementation team actively reached out to the Hohhot city government advocating for EPID. Moreover, the biggest tax revenue contributor in Hohhot at the time, Yili Corp., did not have wastewater treatment facilities in place in 1999. EPID failed to pass the balancing test by the Hohhot

city government between the need to develop local economy and the need to protect the environment. The context in Hohhot was not in favor of the EPID pilot program.

Although the Hohhot EPB provided the HRAES with full access to environmental information that they held, the information itself was not comprehensive, nor was it of good quality. As a result, the indicator system was simplified to accommodate available data.

To give meaning and importance to the EPID pilot program, it was connected to a then-urgent environmental campaign "Control One, Meet Two Standards." After the environmental campaign ended in 2000, the Hohhot EPB did not see any relevance of the EPID program to their work, so they did not pick it up to make it their own program.

In conclusion, the failure to establish dialogues on EPID between program stakeholders to reach consensus, insufficient resources, and unfavorable context resulted in the color rating results not being made public at all in Hohhot. Only an internal meeting was held in a conference room in the Hohhot city government office building. Meeting attendees included news reporters from selected news agencies, representatives of enterprises that participated in the EPID pilot, and officials of the HRAES, the Hohhot EPB, and relevant industrial and economic agencies in March 2000. After this, the EPID program in Hohhot was stopped at the end of the pilot phase.

5.6 Conclusion

The same idea introduced by the same policy missionary, EPID took root in Zhenjiang and Hohhot in 1999. However, from the program's conception to the public disclosure event in Zhenjiang — or the failure to hold such an event in Hohhot — the Zhenjiang and Hohhot EPID pilot programs took vastly different routes. The "cultural

roots" framework complemented by the "webs of dialogue" framework was adopted to analyze the implementation of the Zhenjiang and Hohhot EPID pilot programs. Their differences are attributed to the perceptions of EPID by key implementers, resources at their disposal, the context in which the EPID pilot programs were carried out, and the dialogues on EPID between program stakeholders that were able to transform the perceptions, resources, and contexts.

The personal value orientation of the implementers and the socioeconomic conditions intertwine with the perceptions, resources, and context. However, to a large extent, the dialogues on EPID between the policy missionary, domestic policy entrepreneurs, and officials of the Zhenjiang and Hohhot city government impacted the perceptions, mobilized the resources, and shaped the contexts. Dialogues on EPID between government, industry, and the public proved to be not only valuable for implementing EPID programs, they are themselves part of the policy goal for an EPID program to realize its potential in transforming environmental monitoring and enforcement.

In the next chapter, comparative case analysis II, the effect of the Zhenjiang and Hohhot EPID programs will be analyzed by identifying how the webs of dialogue on EPID have impacted the EPID stakeholders along their environmental awareness, interest, knowledge, attitude, legitimization, and, eventually, action on environmental monitoring and enforcement.

6 Comparative Case Analysis II — Webs of Dialogue, Incentives, and Environmental Monitoring and Enforcement

In the last section, the "cultural roots" framework complemented by the "webs of dialogue" framework was adopted to compare and contrast the implementation of the EPID pilot programs in Zhenjiang and Hohhot. Specifically, it focused on the implementers, examining their perception of EPID and the resources at their disposal and delineating the dialogues among them that helped them reach a common understanding on EPID and gain support for its implementation.

Moreover, EPID, an informational approach toward environmental regulation, was expected to transform stakeholders into enforcers and to integrate the environmental management work of local EPBs through dialogues stimulated by implementing their EPID programs. In theory, having received information on the environmental performance of individual enterprises, consumers/investors/residents could target bad polluters and, if necessary, take legal and/or private enforcement actions against them. For local EPBs, to label an individual enterprise with one single color makes it necessary for the line offices to communicate and synthesize scattered environmental information. Ideally, this should, then, enhance an EPB's environmental management capacity.

So, as an informational environmental regulatory enforcement approach, did EPID work in practice? As specified in Chapter 3, this section has examined whether the EPID pilot programs stimulated or facilitated webs of dialogues within the Zhenjiang and Hohhot EPB as well as between the government, industry, and the public. To the extent possible, how dialogues revealed and aligned stakeholder interests and further enabled real changes in their environmental attitude and behaviors will be explored. This analysis

points out similarities between the two EPID pilot programs in Zhenjiang and Hohhot — although at first glance the two cases seem to be dramatically different.

6.1 Dialogue on EPID within an EPB

For the EPID pilot programs to have effect on the environmental management of the Zhenjiang and Hohhot EPB, the EPB staff members have to be involved in the dialogue on EPID from the beginning. This being said, the dialogue on EPID between the policy missionary and domestic policy entrepreneurs must be extended EPB-wide.

Zhenjiang

During the pilot phase of EPID program implementation, the line offices of the Zhenjiang EPB were involved in designing the indicator system. However, their discussion was focused on how to sort out and present existing environmental information in a way that could best reflect the environmental performance of industrial enterprises.

Even with environmental information scattered in more than six offices, the EPID pilot program was successfully executed. Implementing the EPID program later has become a standardized task of the Zhenjiang EPB. Unfortunately, the need to integrate environmental information held in different offices by the EPID program did not translate into action. Two examples that would accomplish this include streamlining the internal management structure of the Zhenjiang EPB or creating an environmental information warehouse to standardize information collected by and exchanged between different offices.

After the pilot phase, the EPID program became a standard operation. The Zhenjiang EPB has been using the same protocol to collect and color-rate environmental performance of industrial firms except the scope has been expanded in both quantity and the coverage of economic sectors: by 2005, the number of participating enterprises has increased nine-fold, and by that time there were 80 service-sector enterprises in the program. Because Xinhua Qu did the vast majority of the work implementing EPID by herself, the program failed to connect EPID to the daily work of the Zhenjiang EPB and thus left the routine unchanged.

Director Chu identified two possible reasons for this inertia: one is a lack of attention to the EPID program from the leadership of the Zhenjiang EPB; the other is that the Zhenjiang EPB is not capable enough to be able to appreciate the need to streamline its internal management.[190] This implies that there is a threshold level of administrative capacity for a local EPB, above which it can take advantage of its EPID program to further enhance its environmental management capacity. Thus the capacity of the Zhenjiang EPB must be improved before the EPID program can have a real effect on its internal management. And the attention to the EPID program by the leadership will help the Zhenjiang EPB to meet or pass the threshold level.

The dialogue on EPID within the Zhenjiang EPB was not active after Director Chu retired in 2000. EPID became a standard task performed by Ms. Qu of the Zhenjiang EPB alone. And the EPID program has been carried out in a way compatible with the existing environmental management practice of the Zhenjiang EPB. The EPID program did not serve as a stimulant as Director Chu expected to bring the line offices together and integrate their work.

Hohhot

In Hohhot, only the deputy director of the Hohhot EPB was involved in the dialogue on EPID. And this dialogue was mainly on the technical details of how to carry out the Hohhot EPID pilot program. The relevance of EPID to the environmental management tasks of the Hohhot EPB was largely ignored. The environmental information was extracted from the line offices of the Hohhot EPB even though their awareness of the Hohhot EPID pilot program was scant (or nonexistent).

The EPID pilot program became relevant to the work of the Hohhot EPB only through the "Control One, Meeting Two Standards" environmental campaign. Unfortunately, the environmental campaign ended in 2000. The Hohhot EPB did not have a sense of ownership over the EPID pilot program, nor was it willing to develop one of its own in 2000. Thus it lost the opportunity to involve the line offices of the Hohhot EPB and to improve its environmental management work.

Five years have passed since 2000, and the circumstances have changed. The Hohhot EPB officials who were interviewed indicated that the Hohhot EPB is now ready to carry out an EPID program on its own.[191] Although the Hohhot EPB got the software for color rating industrial environmental performance from the HRAES in 2000, the officials do not have the know-how to use it, because they were not involved in the dialogues on the design and implementation of the Hohhot EPID pilot program.[192] The HRAES did not carry out any training on EPID for the Hohhot EPB staff when it handed over the software developed in the pilot phase.

In short, neither in Zhenjiang nor in Hohhot has the dialogue on EPID been extended to EPB officials. Neither city's EPB integrated its environmental management

practices as a result of carrying out the EPID program. Thus the EPID programs have fallen short of the promise to enhance the environmental management capacity of local EPBs.

6.2 Dialogues on EPID between the Government, Industry, and the Public

For EPID to have an effect on environmental regulatory monitoring and enforcement, the government, industry, and the public need to respond to EPID and their environmental behaviors need to be adjusted accordingly. More specifically, the government needs to have the capacity to collect accurate and reliable environmental information, get it processed, and disseminate the results to both industry and the public. The public has to come to understand that they are not only passive information receivers, but that EPID also empowers them to take actions. Industries must be brought to realize that their environmental performance is under scrutiny, and those that are poor performers should be informed that without some change in behavior, they may be put to shame or may become targets of private or public enforcement actions.

For the above sequence of responses to happen, the government, the public, and industry have to be involved in the dialogues on EPID. Through the dialogues, the public could become aware of the EPID programs in their municipalities, become knowledgeable in the environmental performance of enterprises that could affect them, and become interested and sensitive to their capability of taking private enforcement actions. Likewise, industry could become sensitive to increased public environmental awareness and fear of punishment that could be derived from their bad environmental performance. To supplement traditional command-and-control environmental regulations, the government could design policies to reward good performers and to punish bad

performers. Furthermore, the process of establishing the dialogues on EPID between the government, industry, and the public reveals, defines, and aligns the interests of parties coming to the dialogue and further transforms their environmental behavior.

The following analysis will examine whether, by implementing the EPID programs in Zhenjiang and Hohhot, the dialogues on EPID between the government, industry, and the public have been established or if processes for establishing such dialogues were in place.

Public dialogue on EPID

Between June and July 2000, the Zhenjiang EPB distributed pamphlets on "Background, definition, purpose, and outlook of EPID" to city government, functional government agencies, and the mass media. However, the general public was left out. As a result, of the 845 survey respondents in 2000, 56 percent were aware of the EPID pilot program in 2000 in Zhenjiang while only 8.3 percent understood what this pilot program was about.[193] The Hohhot EPID pilot program did not include any public education programs on EPID either.

A standard EPID program in China publishes color rating results in local newspapers and/or on the internet. With this set-up, the environmental information flows one-way from the government through the mass media to the public. This means no dialogue with the public on EPID has been initiated by the government. Before the EPID pilot programs were established, the public could complain to local EPBs by phone call or in writing or by paying personal visits to local EPBs. The Zhenjiang and Hohhot EPID pilot programs did not add a feedback loop from the public to local EPBs or make more communication channels available to the public.

However, the biggest breakthrough that the Zhenjiang and Hohhot EPID pilot programs have made is that: (1) the government did make more environmental information publicly accessible, and (2) the five-color coding system makes the environmental information, which is technical in nature, comprehensible to regular citizens. This is a remarkable stride forward in public administration in China because the EPID programs reflect the willingness of the government to share environmental information with the public and to invite public help on government work.

According to environmental communications studies, for disclosure of environmental information to be translated into public action in environmental monitoring and enforcement, it has to walk the public through the following six steps: (1) awareness, (2) interest, (3) knowledge, (4) attitude, (5) legitimization, and finally (6) practice.[194] An evaluation of the effects of the EPID programs on public participation in environmental protection is beyond the scope of this analysis and must be left for future empirical study. However, a national survey on public environmental awareness conducted in 1998-1999 indicates that more public environmental education programs are needed to improve the public understanding of environmental issues, to stimulate more public interest in the environment, to change the public attitude and perception of environmental protection (which was mainly considered to be the government's job), and to catalyze public action toward better environmental monitoring and enforcement.[195] The effect of an EPID program on environmental communications will be examined in more detail when exploring the implications of the Zhenjiang and Hohhot EPID pilot programs for environmental compliance and enforcement in a developing country context.

Dialogues on EPID between the government, industry, and the public

The EPID programs in China are voluntary for municipal governments but mandatory for enterprises within the jurisdictions of the municipalities that have adopted an EPID program. This arrangement does not leave room for industry to negotiate conditions on participating in an EPID program nor does it make necessary for the government to convince industry to join. This means that no dialogue on EPID has been established between the government and industry. The fieldwork found that industries that participated in an EPID program did not necessarily understand what EPID was about or whether it was relevant to their businesses.[196]

An informational approach toward environmental regulatory enforcement leaves firms with the choice to comply or not to comply with environmental regulations. It also leaves open the question of how they achieve compliance. For an informational approach to work, industry has to be able to see the benefits of compliance and costs of noncompliance that could be derived from their environmental performance being made public.[197]

The CEOs of the "greens" and "blues" in Zhenjiang were asking for substantial benefits for their good performance beyond positive publicity in local newspapers. For example, they desired favorable treatment by the Zhenjiang EPB when issuing government loans to help with their internal environmental management or in labeling their product as green. Most of these "greens" and "blues" are multinational companies or domestic firms competing in the global market. These enterprises are willing to invest in pollution control and maintain good environmental performance because it is not only socially desirable to do so but also necessary for wining the market competition. However, they were frustrated because they did not see any comparative advantage of

being a good performer over being a bad performer in terms of their treatment by the government.[198]

Of course, there were stories that good performers probably did not hear about the costs that bad performers had to pay resulting from the implementation of the EPID programs. For example, in 2002, the CEO of a "black" construction materials manufacturing company decided to invest in wastewater treatment because he could not stand his friends at dinner parties asking why his company was "black." In 2003, this company became "blue."[199]

The Zhenjiang EPB officials are exploring ways to build dialogues on EPID with industry and to make use of the EPID program to improve environmental monitoring and enforcement work. For example, Xinhua Qu, with the deputy director of the Zhenjiang EPB, planned to target "yellow" enterprises, which are in partial compliance, and to require them to adopt cleaner production mechanisms that could potentially bring them into full compliance. The Zhenjiang EPB asked the CEOs of the "blacks" to publicly announce their resolution to become better environmental performers in local newspapers.[200]

Furthermore, the color rating results have been factored by officials of industrial and economic agencies into their development decisionmaking. For example, the development and reform commission (DRC) of Zhenjiang would target "black" and "red" enterprises when they decide which plants to inspect or to move or close.[201]

However, the Zhenjiang EPB assumed the "greens" and "blues" would be adequately motivated by their positive publicity to sustain their good performance. Thus, no special policy measures are currently under consideration to establish a dialogue on

EPID between the government and these good performers. However, the CEOs of these enterprises who were interviewed are expecting to be rewarded by the government for their good environmental performance.[202]

In contrast, because there have been no EPID programs in place in Hohhot, good environmental performers there expressed their frustration with not being subject to same standards as the "bad guys." In industrial parks in Hohhot, the "Three Simultaneous" program was not adequately enforced. The "Three Simultaneous" program is a national mandatory pollution prevention policy required by the Environmental Protection Law of 1979. It requires pollution treatment facilities to be designed, installed, and operated along with the design, construction, and operation of construction projects.[203] The Hohhot EPB officials and environmental professionals working in industries complained that, by assuming autonomous authority over industrial parks, the management offices would approve projects without considering whether they had met the requirements of the "Three Simultaneous" program.[204] Director Yang said that after the projects were approved and started operating, if the Hohhot EPB finds them in violation of environmental standards, the only counter-measure available is to fine them. (Obviously, to close them is not an option for the Hohhot EPB.) Unfortunately, the amount of such a fine is smaller than pollution treatment costs and thus it is an economically rational choice for firms to continue polluting and paying fines.[205] Without an EPID program in place in an area where the enforcement of environmental regulations is loose, the Hohhot EPB has failed to bring violators that are capable of paying fines back into compliance. These polluters' reputations are not at stake and they lack an incentive to clean up. So the

good performers complain that the market is unfairly tilted against them because it is more expensive for them to remain in compliance than to pay the fines.[206]

In sum, in Zhenjiang, the dialogues between the government, industry, and the public on EPID have been sparked here and there, although not in a systematic way. The public responded to the Zhenjiang EPID program spontaneously. The government is experimenting with connecting the EPID program to its environmental management work or development decisionmaking. The spontaneous dialogues did bring about behavioral change among the government, industry, and the public in Zhenjiang.

However, the pilot EPID programs in Zhenjiang and Hohhot share the following common limitations. First, the political force behind the EPID initiative has been a relatively small group of insiders, including employees of the Zhenjiang and Hohhot EPBs, academics, and officials of SEPA and the Jiangsu provincial EPB. These people are linked by ties of friendship and long-term collaboration and by a common commitment to environmental values. Second, EPB staff members are not actively engaged in the EPID programs and thus the potential effect of EPID on the environmental management capacity of the Zhenjiang and Hohhot EPB was not fully explored. Third, industry, especially enterprises with good environmental performance, has concerns about the cost of compliance and the fairness of the environmental enforcement by the government. According to the industry people interviewed, having good environmental performance and becoming publicly known did not imply substantial benefits. In the meantime, bad performers were not adequately punished by the government. Thus industry has doubts about the value of the EPID programs for their businesses. Finally, from environmental awareness to enforcement action, public dialogues on EPID are

needed in both Zhenjiang and Hohhot to help the public participate in environmental monitoring and enforcement in a meaningful way.

6.3 Webs of Dialogue — Communications, Incentives, and Environmental Monitoring and Enforcement

Disclosing industrial environmental performance information makes public dialogue on EPID possible. Dialogues on EPID transmit knowledge, communicate the implications of industrial environmental performance for stakeholders, reveal their interests, and potentially influence their decisions and behaviors. Stakeholders include: the enterprises themselves, consumers, investors, residents, and the government. Thus dialogues on EPID have the potential to influence stakeholder environmental behavior by communicating environmental information and further revealing and aligning their interests. [207]

In the U.S., the EPA provides the public with facility level information on toxic releases and transfers (TRI). Environmental NGOs, such as the Environmental Defense Fund (EDF), picked up on the information and made it relevant to the daily life of the public. EDF's Scorecard website allows the public to search the toxic releases and transfers data by zip code and to locate the worst polluters by zip code and by industry.[208] In this case, it is the environmental NGOs that established dialogues on TRI with the general public via the Internet. As a result, industry expected the level of public awareness of toxics would increase and that they would become more knowledgeable about industrial environmental performance regarding toxics. Fearful of negative publicity and potential liabilities, industry released and transferred less toxic materials.[209]

To encourage the public to take action targeting bad polluters, attorney fees are recovered by environmental NGOs if they can bring a successful or partial successful lawsuit against enterprises that have either violated environmental standards or their permits or caused direct harm to people.[210]

In addition to pursuing legal action, some consumers in well-developed market economies, "vote" by not purchasing products that are not produced in an environmentally friendly manner or that may otherwise cause environmental harm. Or, investors intentionally avoid enterprises whose environmental performance may cause risks of litigation or consumer boycott. In countries where civil society is strong, environmental NGOs and/or public interest groups often advocate for environmentally friendly production and consumption.

So in well-developed market economies like the U.S., it is not disclosure alone that generates public pressure on industry and brings about better industrial environmental compliance. Environmental NGOs and government policies have facilitated dialogues on disclosing environmental information and walked numerous individuals through the following steps: environmental awareness, interest, knowledge, attitude, legitimization, and, eventually, practice.

In China, unfortunately, the NGO sector is not well developed, and existing environmental NGOs do not have the capacity to take on the job of constructing meaningful public dialogues on EPID. Generally, environmental information is not valued or materialized in consumer or capital markets. Thus industry expects the government to be the sole arbiter deciding who gets awarded for good environmental performance and who gets punished for bad environmental performance. The government

is challenged by industry to set up follow-up policies on EPID programs. One official with the Jiangsu provincial EPB coined the phrase "policy fatigue" to describe how the government got tired of EPID but left it as it was and did not follow up to make it a more effective program.[211]

If not seen from a rights perspective (which assumes that access to environmental information is a basic human right and thus is an end itself), disclosing environmental information is a regulatory instrument for environmental compliance and enforcement.[212] Some citizens who are capable of making sense of the information can take actions accordingly. In western countries, generally, the environmental NGOs and public interest lawyers are agents of action. They reveal to the public the relevance of pollution to their lives to draw their attention, build public dialogues on disclosed environmental information, and make private and legal actions feasible.

In contrast, the stand-alone EPID programs in China (to disclose industrial environmental performance information once a year in local newspapers) only have limited contact points connecting the government, industry, and the public. Without environmental NGOs like the EDF, the public has to make sense of the disclosed environmental information and find out by themselves how the information is relevant to their lives. Without public-interest lawyers, complaining to EPBs or individual enterprises is still the only feasible way for the public to target bad polluters. Taking legal actions or consumer boycott are not readily feasible options for the Chinese public at large. A lack of dialogues on EPID resulted in limited public awareness of, understanding about, and interest in the disclosed environmental information. Thus the EPID programs

did not generate a level of public pressure as expected, and industry lacks the incentive to clean up.

Another example from the U.S. shows how “visible emissions,” an innovative environmental monitoring and enforcement instrument, has successfully established the public dialogues on environmental information and has walked the public through awareness, interest, knowledge, attitude, legitimization, and, finally, monitoring and enforcement actions.

“Visible emissions” or “opacity” reading in the U.S. is a technique for monitoring air pollution. Anyone can be trained to stand outside the factory grounds and "read" smokestacks to analyze whether a factory is meeting its emissions standards. EPA institutionalized the smoke-reading techniques by writing regulations specifying testing standards and using the testing results as evidence in courts and enforcement actions. EPA and state EPAs hold “smoke schools” to train citizens to use this technique free of charge.

In this way, dialogues on air pollution have been established between the government, industry, and the public.[213] First, technical assistance and “smoke schools” enhanced public awareness and understanding of air pollution generally and the smoke reading technique specifically. Second, citizens can “read” the smoke stacks, most likely near where they work and live. Third, formal regulations to specify testing standards and to honor testing results as evidence in courts make legal actions against polluters accessible to the public.

Ruth Greenspan Bell of the Resources For Future (RFF), who introduced “visible emissions” to Russia recalled, in contrast, that a similar smoke reading technique

encountered difficulties in Russia. There, the political will and public forces did not converge. Because the political will was not strong, the NGO community did not push for better results, so the dialogue on "visible emissions" was not established in Russia as hoped.[214]

The Zhenjiang and Hohhot EPID pilot programs in China, TRI in the U.S., and the "visible emissions" in the U.S. and Russia drive home the point that, for an informational approach toward environmental compliance and enforcement to have an effect, dialogues on the environmental information have to be established between the government, industry, and the public.

The following factors are important for building the dialogues: the political will and commitment of the government to pursue better environmental results, public awareness and understanding of the disclosed environmental information, public interest in the environment, and the institutional set-up that enables private enforcement actions against polluters. From the U.S. experience it seems that environmental NGOs and public-interest lawyers are agents of change working to achieve better industrial environmental compliance.

It is unreasonable to expect an EPID program to be able to address all these issues. The architecture and context of an environmental governance system matter. Disclosing industrial environmental performance information makes public dialogues on EPID possible. A well-designed EPID program, complemented with public education programs and follow-up incentive mechanisms, has the potential to engage stakeholders in the dialogues on disclosed environmental information, increase their environmental knowledge, reveal and align their interests, and enable private environmental monitoring

and enforcement actions. However, a stand-alone EPID program is incapable of moving the public from environmental awareness to enforcement action.

7 Conclusions, policy recommendations, and implications for environmental compliance and enforcement in developing countries

Since the Environmental Protection Law was enacted in 1979, China has created comprehensive environmental regulations and environmental protection agencies within each level of government. Environmental protection has become a profession that attracts numerous talents and considerable capital investment. Environmental quality in some areas has been improved. Despite the progress made, China is still a developing country with severe environmental problems and risks.[215] A growing body of research attributes China's environmental problems to weak regulatory enforcement.[216]

Given the positive effects on pollution reduction that the TRI had and the evidence that the capital market did respond to environmental information in Mexico, Korea, and the U.S., it is clear that an informational approach toward environmental regulation has exhibited its power. Moreover, informal environmental regulations are less costly than formal regulations. A developing country with limited resources for environmental protection but severe environmental problems, China experimented with EPID in Zhenjiang and Hohhot.

Based on the analytic narratives and case analysis using synthesized cultural roots and webs of dialogue framework, the following broad-brush conclusions could be drawn:

- The Zhenjiang and Hohhot EPID pilot programs are a big step forward in the direction towards civic environmentalism in China;[217]
- Because of the nature of EPID, a broad range of players were involved in the Zhenjiang and Hohhot EPID pilot programs;

- The differences between the implementation and outcomes of the Zhenjiang and Hohhot EPID pilot programs can be attributed to the trade-offs between economic development and the environment made by program stakeholders under different social, institutional, and economic constraints;
- The similarly limited impact of the Zhenjiang and Hohhot EPID pilot programs on involving the public in environmental monitoring and enforcement can be attributed to the inability of the stand-alone EPID programs to move program stakeholders through the following six steps: awareness, interest, knowledge, attitude, legitimization, and action;
- The Zhenjiang and Hohhot EPID pilot programs have showed signs of hope for the environmental protection work in China by facilitating stakeholders to incorporate environmental considerations into their decisionmaking.

In terms of program implementation, the following are more specific conclusions:

1. EPBs of more prosperous regions have a greater potential to make a credible commitment in environmental protection either in the form of regulating industry more stringently or investing more financial resources;
2. The administrative capacity of an EPB is positively correlated with the level of economic development of the region;

3. It is easier to build the dialogues and consensus on EPID in a more economically advanced region than in less developed regions where economic issues dominate development agenda;
4. In addition to the administrative capacity of EPBs and a region's level of economic development, social capital and institutional arrangements are also critical to program implementation (social capital can be connections and trust between implementers; institutional arrangements can be the match between the responsibility and authority of program implementation, or the availability of technical support);
5. Dialogues and consensus on EPID add value to existing social capital held by program implementers.

In terms of program impact on environmental monitoring and enforcement, the following specific conclusions can be drawn:

1. Industry was mandated to participate in EPID programs, but local EPBs, which make decisions on EPID program implementation, did not adequately consult industry leaders;
2. No public education programs on EPID were carried out; thus, public awareness and knowledge of the Zhenjiang and Hohhot EPID pilot programs was limited;
3. China has not yet developed the institutional infrastructure for private environmental enforcement in the form of citizen complaints/legal actions, consumer purchasing power, or investment markets;

4. Given weak private environmental enforcement, the government is still the major enforcer of environmental regulations. However, limited follow-up policies on EPID programs to reward/punish enterprises with good/bad environmental performance fail to equip local EPBs with new enforcement tools and thus the potential of an EPID program is not fully realized;
5. The spontaneous dialogues on and responses to the Zhenjiang and Hohhot EPID programs by government, industry, and the public have shown that there are signs of hope for the convergence of the forces in environmental monitoring and enforcement by various stakeholders.

Put in context, the Zhenjiang and Hohhot EPID pilot programs resemble the environmental regulatory enforcement in a developing country context, where regional disparities are common. Although country conditions vary, the analytical frameworks — "cultural roots" and "webs of dialogue" — focus on generic elements of program implementation and thus can be applied to, at the very least, regions within the same nation-state. So the study of the Zhenjiang and Hohhot EPID pilot programs is of value to other developing countries not only in terms of the conclusions drawn but also the analytical frameworks adopted.

This chapter proceeds as follows: First, to illustrate tradeoffs made under different social, institutional, and economic constraints in a developing country context, Zhenjiang and Hohhot will be compared in their environmental challenges and responses, commitment of local governments to environmental protection, the administrative capacity of the Zhenjiang and Hohhot EPB, and environmental compliance by industry. Second, a review of the current state of public involvement in environmental matters will

illustrate the limited private environmental enforcement in China. Then the impact of the Zhenjiang and Hohhot EPID pilot programs on involving the public in environmental monitoring and enforcement will be assessed. Fourth, an exploration of the promise that an EPID program holds for environmental monitoring and enforcement in a developing country context (like China) will follow. Finally, policy recommendations, implications of the Zhenjiang and Hohhot EPID for countries in the developing world, and remaining questions and directions for future research and action will end this chapter.

7.1 Environmental monitoring and enforcement in a developing country context, where regional disparities permeate

In this section, Zhenjiang and Hohhot will be compared in terms of their environmental challenges and responses, their local governments' commitment to environmental protection, the administrative capacity of the Zhenjiang and Hohhot EPB, and environmental compliance by industry to show tradeoffs made under different social, institutional, and economic constraints.

Environmental challenges and responses

Overall, in terms of pollution treatment, Zhenjiang has been doing better than Hohhot. Although the environmental protection work in both Hohhot and Zhenjiang has been improving over the years (as it has been in China on average), except for dust, the rates of criteria pollutant treatment in Hohhot have been lower than both the national averages and that of Zhenjiang. In particular, the treatment of wastewater and solid waste in Hohhot has largely lagged behind.

Compared to Zhenjiang, Hohhot performs better in air pollution control. Located in northern China, water pollution is less visible in Hohhot than cities in southern China. But Hohhot burns more coal for heating in winters that are colder and longer than they

are in Zhenjiang. Air pollution, especially in winter, has been the most salient environmental problem in Hohhot.[218] Compared with Zhenjiang, the emissions of industrial waste gas and sulfur dioxide in Hohhot had been more serious than the discharge of wastewater and solid waste. However, Hohhot is comparatively more advanced in treating air pollution, its most urgent environmental problem.

Zhenjiang has a much larger industrial output and thus discharges more pollutants than does Hohhot across the board. Zhenjiang discharges relatively more industrial wastewater and solid waste than sulfur dioxide or dust and, compared with Hohhot, performs better in treating water pollution and solid waste.

It is unclear why both Zhenjiang and Hohhot have developed better capacity in their major environmental problem areas (inferred from their rates of pollution treatment). A plausible explanation is that both of the Zhenjiang and Hohhot EPBs have responded to the environmental challenges that were perceived to be the most urgent and have therefore accumulated through experience the "know-how" to address these problems. However, despite these relative successes, to avoid paying too high a price for environmental degradation, proactive measures to deal with emerging environmental problems are necessary for both cities.

More specifically, the process of urbanization is generally coupled by an increase in municipal wastewater and solid waste discharge.[219] This trend poses a special challenge to the Hohhot EPB (the trend of increasing solid waste discharge is illustrated in Figure 4-6). Currently Hohhot discharges daily 150,000 tons of municipal wastewater but the municipal wastewater treatment plant can only handle 100,000 tons per day.[220] The capacity of the Hohhot EPB has to be enhanced to be able to fill the gap.

Commitment of the local government to protecting the environment

The efforts taken by the Zhenjiang and Hohhot EPBs to combat their environmental problems differ considerably.[221] Although the level of socioeconomic development does account for some of the difference, the political will of the local government to protect the environment is an even more important factor. This point can be illustrated from the following two different aspects.

Compared to Hohhot's response, the attitude of the Zhenjiang city government toward their EPID pilot programs was dramatically different. The Zhenjiang city government was ready to strike a better balance between economic development and environmental protection, although part of the pressure came from the midnight raids organized by SEPA in 1999 that held local government and industry more accountable for polluting plants. In contrast, Hohhot was willing to sacrifice the environment for industrial development. To protect the Yili Corp., the Hohhot city government did not allow the color-rating results in 1999 to go public at all. Moreover, there are several industrial parks in Hohhot that are granted an autonomous status by the Hohhot city government. The Hohhot EPB was not able to enforce even nationally mandated pollution prevention measures such as the "Three Simultaneous" campaign if the management committees of the industrial parks did not choose to implement it.[222] The case of the Yili Corp. and the difficulties in enforcing mandatory environmental policies in Hohhot are representative examples of how environmental issues can be ignored and the authority of local EPBs overridden by local governments at the same level.[223]

It seems reasonable to attribute to different socioeconomic conditions the different levels of commitment of the Zhenjiang and Hohhot city governments toward

environmental protection generally or EPID specifically. However, this line of reasoning is not able to explain the dramatic increase in the investment in environmental monitoring after 2002 in Zhenjiang, where socioeconomic conditions have not changed dramatically since 2002.

Up until 2002, the annual budget of the Zhenjiang monitoring station had been maintained at a level of 4 million yuan. In 2002, the Zhenjiang city government decided to compete for the national "model city for protecting the environment" award.[224] In 2003, the budget of the Zhenjiang monitoring station was increased to 4.8 million yuan, then further increased to 7 million in 2004 (4 million set aside for purchasing monitoring equipment) and 9 million in 2005 (5 million set aside for special monitoring tasks).[225] In 2004, SEPA named Zhenjiang the national "model city for protecting the environment."

The Zhenjiang example illustrates how a local government could be motivated to make a credible commitment to protecting the environment. The administrative resources of the Zhenjiang city government are abundant. After the leadership determined that it wanted to be named a national model city, more resources were allocated to the Zhenjiang EPB for the environmental monitoring work. It has to be left for empirical studies to find out a threshold level of economic development beyond which a local government is willing to and able to invest more in environmental protection. However, it is fair not to expect all regions in China to increase investment in the environment in such dramatic terms as what happened in Zhenjiang.

The Zhenjiang and Hohhot examples reveal to us three points that are rather common in a developing country context: (1) the level of commitment to environmental protection by local governments varies across regions; (2) in the same region, it is always

possible to commit more resources protecting the environment if the local government is determined to pursue such a goal; and (3) officials of local governments and local EPBs are likely to be motivated by incentives in the government's official evaluation and reward system, which directly affect their commitment toward environmental monitoring and enforcement (see the examples of the "Control One, Meet Two Goals" and "Midnight Action" environmental campaign and constructing an environmental protection model city).

The capacity of the Zhenjiang and Hohhot EPB

The implementation of the Zhenjiang and Hohhot EPID pilot programs reflects the differences in the capacity of the Zhenjiang and Hohhot EPB. Overall, the self-perceived capacity to implement the EPID pilot program of the Zhenjiang EPB was superior to that of the Hohhot EPB (see Table 5-3 for details on human and financial resources, quality and quantity of environmental information, coordination among line offices of the Zhenjiang and Hohhot EPB, and the working relationships with industry).[226]

Besides the self-evaluation, Table 5-1 also reports the actual financial and human resources owned by the Zhenjiang and Hohhot EPB in 2004. The lack of resources to protect the environment in Hohhot has been attributed to the less developed Hohhot economy and a lack of commitment of the Hohhot city government to environmental protection.[227] And the differences in the resources owned by the Zhenjiang and Hohhot EPB account for the differences in their administrative capacity.[228]

Previous analysis of the environmental challenges and responses shows that, overall, Zhenjiang has done a better job on end-of-pipe pollution control than was Hohhot.

The self-perceived capacity of implementing the EPID pilot program of the Zhenjiang EPB was better than that of the Hohhot EPB. Also officials of the Hohhot EPB agreed that overall, the Zhenjiang EPB has better capacity. In short, information from four different sources — treatment of major pollutants, perception of and the actual implementation of a specific environmental policy (EPID), and statistics on resources at the disposal of the Zhenjiang and Hohhot EPB — leads to the same conclusion: that the Zhenjiang EPB has greater administrative capacity and a better environmental performance record than does the Hohhot EPB.

In addition to environmental protection agencies, industry and the public are also important players in the monitoring and enforcement of environmental policies. Their environmental behavior is critical to achieving better environmental results.

Industrial environmental compliance

The level of industrial environmental compliance in Zhenjiang differs from that in Hohhot. In Hohhot in 1999, only one percent of the enterprises fully complied with national standards. In contrast, 62 percent of enterprises in Zhenjiang were in full compliance. Only 15 percent of enterprises were out of compliance in 1999 in Zhenjiang, while that of Hohhot was 50 percent (see Table 7-1).

Table 7-1. Compare Industrial Environmental Compliance in 1999 between Zhenjiang and Hohhot

	Zhenjiang	Hohhot
In Full Compliance (%)	62	1
In Partial Compliance (%)	23	49
Out of Compliance (%)	15	50

Source: Author compiled from Table 4-5 and Table 4-9.

As one player in the environmental regulatory system, industry — interacting with government, the public, and the courts — chooses to comply or not to comply with

environmental performance standards based on its own utility function and constraints.[229] Aside from its own resources and organizational culture, the constraints include: environmental regulations and policies on paper and in practice, environmental behavior of competitors and business partners in the domestic and/or the global markets, and the level of public environmental awareness.[230]

As the comparative case–study analysis on Zhenjiang and Hohhot has revealed, although environmental regulations and standards are mostly set at a central level, the regulators in China do not carry them out uniformly nation-wide. Although EPBs in China require industry to self-report pollution emission information once a year, no formal procedures are in place to verify the accuracy of the information or to punish false reporting. Thus industry has the incentive to under-report pollution. As some local governments pursue goals that are in conflict with environmental protection, the regulatory enforcement by their counterpart EPBs is stymied and thus is not stringent. According to the economic theory of enforcement, firms in these regions would expect small penalties for noncompliance and thus they lack the incentive to prevent or treat their pollution.

In this respect, China is a special case of weak environmental enforcement in developing countries where frequently the rule of law is lacking and a culture of business supremacy permeates. Mandatory environmental information disclosure programs in other countries such as the PROPER in Indonesia and the EcoWactch program in the Philippines were not able to sustain or achieve real results. Finding the means to align the interests of industry and mobilize its resources to prevent and treat pollution is a continuing challenge facing developing countries.

Killmer (2004) indicates in her dissertation that the U.S. TRI program has had a difficult-to-quantify but very noticeable impact on public awareness regarding toxic substances.[231] It is hoped that the implementation of the EPID pilot programs in Zhenjiang and Hohhot will create better public environmental awareness and thus, in the long run, can generate private pressure on both the government and industry to achieve better results in environmental compliance and enforcement.

Conclusion

China is a special case among developing countries, where regional disparities permeate. The Zhenjiang and Hohhot cases have revealed the regional disparities along the following aspects: environmental challenges and responses, level of commitment to environmental protection by local governments, administrative capacity of local EPBs, and industry environmental compliance. With limited regulatory resources for environmental monitoring and enforcement, the EPID pilot programs aim to involve the public to achieve more cost-effective environmental regulation.

The following section will review the current state of public environmental awareness and public involvement in environmental matters in China and further examine the impact of the EPID pilot programs on it.

7.2 Public involvement in environmental monitoring and enforcement

The level of public environmental awareness and its willingness to participate in environmental matters is on the rise in China. However, the inconsistency between public environmental awareness, interest, knowledge, attitude, legitimization, and practice has impeded private environmental monitoring and enforcement in China. A stand-alone

EPID program without associated public environmental education programs had only a limited effect on involving the public in environmental monitoring and enforcement.

In this section, a brief overview of the current state of the public involvement in environmental matters leads to the discussion of the impact of the EPID pilot programs on public participation in environmental monitoring and enforcement.

The current state of public involvement in environmental matters

Inconsistency between public environmental awareness, interest, knowledge, attitude, legitimization, and practice has impeded private environmental monitoring and enforcement in China. For example, interest in the environment generally failed to prevail in the balancing test of economic development vs. environmental protection. Half of the public did not agree to slow down economic development for environmental protection. If a highly polluting plant is highly profitable, half of the government officials and 60% of entrepreneurs did not want to close it.

The public, especially the rural population, had very limited knowledge about the environment.

The public listed four major reasons that account for local environmental degradation: (1) a lack of public environmental awareness; (2) a lack of government attention regarding environmental protection; (3) a lack of a law-abiding spirit among the public; and (4) the problem of industry valuing its profits more than pollution prevention and control. However, individuals, the tertiary industry, and agriculture were not thought to be responsible for environmental problems. Not surprisingly, almost 80% of the public thought the central and local governments and industry should bear the bulk of the responsibilities involved in protecting the environment. And almost 30% of the public

thought individuals should not be held responsible for protecting the environment. Obviously, the public attitude towards environmental protection is somewhat mixed. People thought individuals, their level of environmental awareness, and their law-abiding spirit all make a difference. However, the public relies on the government and industry to take responsibility for and the initiative to strive for a better environment.

When an environmental conflict arises or a violation is found by the public, over half of the social elites (government officials and entrepreneurs) would support the public in complaining to relevant government agencies. And about 80% of the public would prefer to do so. About 60% of the public would be willing to take legal actions.

As to taking actions against pollution, three quarters of the public would not consider the environmental friendliness of a product when making purchasing decisions. About 65% of the public was not willing to pay more for environmentally friendly products. And the public expected the government to carry out more public environmental education programs, enact more environmental regulations, enforce environmental regulations more stringently, and invest more in environmental protection.

Clearly, the public trust in and reliance on the capacity of the government to solve environmental problems dominate the Chinese society.

The impact of EPID pilot programs on public involvement in environmental monitoring and enforcement

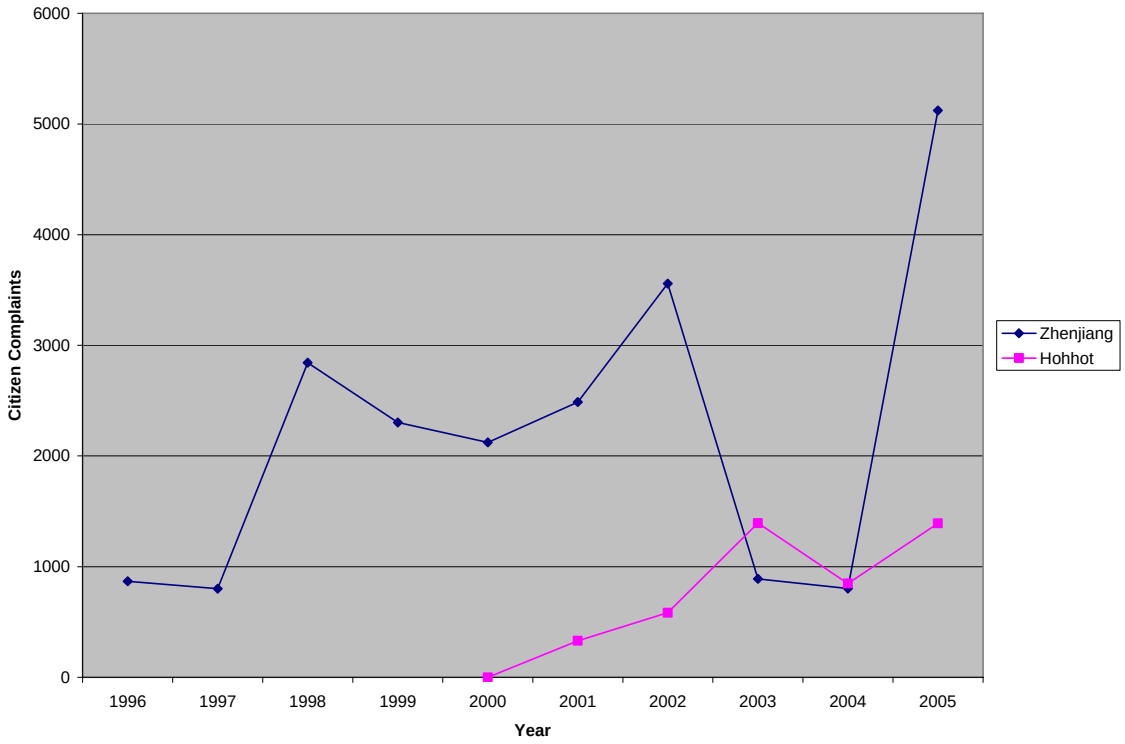
The EPID pilot programs in Zhenjiang and Hohhot were special efforts made by local governments in China to involve the public in environmental monitoring and enforcement by disclosing industrial environmental performance information. Semi-structured interviews with academics and practitioners who participated in program

implementation were conducted to assess its impact on public involvement in environmental matters.

Interviewees identified the following parties as having an interest in the EPID pilot programs: SEPA, provincial and local governments, provincial and local EPBs, the public, and the international community. However, the level of involvement in the EPID pilot program implementation by the above parties varied. Provincial and local EPBs and the provincial and local governments were considered to have the most influence on program implementation. In contrast, SEPA and the public were not actively involved and thus played a very limited role in the EPID pilot programs.[232]

Both Zhenjiang and Hohhot have seen an increasing amount of citizen complaints (see Figure 7-1). The EPID pilot program was stopped in 2000 in Hohhot. However, the Hohhot EPB created a telephone hotline "12369" for the public to report environmental violations or conflicts in 2003. The compliance and enforcement officials at the Hohhot EPB attributed the rapid increase in the amount of citizen complaints to the environmental telephone hotline.[233] In Zhenjiang, where both the EPID program and environmental hotline have been in place, it is difficult to decompose the effect of the EPID program on public involvement in environmental monitoring and enforcement.

Figure 7-1. Trend of Citizen Complaints in Zhenjiang and Hohhot



Unlike other measures to involve the public in environmental matters such as telephone hotline and periodical reports on ambient air and water quality, an EPID program reveals to the public plant-specific environmental performance. It can potentially walk the public through awareness, interest, and knowledge; transform their attitude towards the environment, industry, and government; and invite private enforcement actions. However, for the EPID program to achieve its potential, the public has to first become aware of the program itself. Unfortunately, the survey conducted in 2000 in Zhenjiang found that only 56 percent of the residents were aware of the Zhenjiang EPID pilot program, and only 8.3 percent of the people understood what the pilot program was about. This reflects the fact that the Zhenjiang public was not adequately informed of the EPID pilot program.

In cases where the government has been expected to do too much, social organizations or environmental NGOs can supplement government efforts to carry out public environmental education programs and outreach to the public advocating for EPID.[234]

Anecdotal evidence indicated that the public responded to EPID in a spontaneous way. For example, the "black" manufacturer in Zhenjiang installed wastewater treatment facility and became "blue" the next year because the CEO was shamed by the "black" rating. Moreover, government agencies that regulate the economy, like the development and reform commission (DRC), made use of the list of "black" companies that the Zhenjiang EPB provided to decide which plants would get moved or closed.

It is clear that the level of public environmental awareness and public willingness to participate in environmental matters has been on the rise in China. Public pressure can either work directly on polluters or indirectly through government agencies. It can pick up the slack when command-and-control measures fall short. However, a stand-alone EPID program without associated public environmental education program has only a limited effect on involving the public in environmental monitoring and enforcement.

7.3 Conclusions

The perceptions of and consensus on EPID, the administrative capacity of an EPB, and the social capital and institutional arrangements all made a difference in the implementation and outcomes of the Zhenjiang and Hohhot EPID pilot programs. Although it was an idea introduced from outside, the perception of EPID held by Director Chu — that such a program can help improve the regular work of the Zhenjiang EPB — was crucial for his commitment to EPID. In contrast, the Hohhot EPID was not perceived

to be helpful for the work of either the HRAES or the Hohhot EPB, thus there was a lack of commitment from the leadership.

The implementation of the EPID pilot programs was constrained by the administrative capacity of the Zhenjiang and Hohhot EPB. Relatively, the Zhenjiang EPB has a much higher capacity than that of the Hohhot EPB. Both the statistics and self-perception by EPB officials of funding, equipments and human resources supported the conclusion. Insufficient funding, staff competency, and environmental information in Hohhot have largely made the implementation of the Hohhot EPID program lagged behind the Zhenjiang experiment.

The social capital and institutional arrangements are critical to EPID program implementation. The connection and trust between the major players and the match of authority and responsibility for implementing the EPID programs generate a sense of ownership of the program. Zhenjiang EPB Director Chu entrusted the primary implementer of the Zhenjiang EPID, Xinhua Qu, with the authority to experiment with EPID and all the resources required: authority and responsibility, environmental information, technical support, and funding. Backed up by the smooth implementation of the Zhenjiang EPID pilot program, Director Chu could focus on working out a favorable political environment for the color-rating results to be made public. In contrast, the HRAES was held responsible for implementing the Hohhot EPID program, but the resources and authority for program implementation resided with the Hohhot EPB. Without a sense of ownership, nobody in the implementation team of the Hohhot EPID pilot program advocated for EPID or worked toward a favorable political environment.

As a result, the color rating results were not made public through a media conference as planned in Hohhot.

Environmental protection and economic development were in competition for the attention of the leadership of local governments. The openness of an economy and the level of socioeconomic development of a region impact the local governments' level of commitment to environmental protection. However, as the Zhenjiang example revealed, the commitment to environmental protection can be shaped by the evaluation and reward system of government officials in a broader context. For example, the environment was given more attention after 2002 in Zhenjiang because the Zhenjiang city government wanted to become a nationally recognized model city for environmental protection. Thus a well-designed evaluation and reward system for government officials stimulates a stronger commitment to the environment.

Environmental information disclosure brings the public into the government-industry enforcement dyad, which can compensate for insufficient government resources in environmental monitoring and enforcement and opens up the possibility for private enforcement. As the venue for private enforcement is mainly public complaints, citizen lawsuits, consumer purchasing power, and/or the capital markets, China has not yet developed the necessary institutional infrastructure.

Public-interest groups or public-interest lawsuits are not encouraged in China. A public-interest organization is required to have a sponsor that is either a public organization or a government agency. The requirement has curbed the growth of the NGO sector in China. Public-interest lawsuits are sometimes impractical because, for example, in the case of the Songhua River incident, it was found that China's Civil Code

does not allow individuals legal standing to bring lawsuits on behalf of natural features such as a river.

Similar to other developing countries, China does not have a well-developed NGO sector or mechanisms for attorney fee recovery. It is difficult for the public to take legal actions against pollution. It is rather exceptional that the Center for Legal Assistance to Pollution Victims (CLAPV) of China University of Politics & Law has been helping pollution victims bring lawsuits to courts since it was established in 1998. The CLAPV has to attract funding from oversea to be able to sustain itself because it provides legal services to pollution victims free of charge.[235]

Since there are currently less than 2000 publicly traded companies in the whole country, investors can only exert pressure on a very limited amount of firms. Although customer pressure might compel producers to take into consideration the life-cycle environmental impact of their products, customers in China are not sophisticated enough or willing to favor "green" products or producers.[236] By this standard, the majority of polluters in China are left unattended by both the government and the public. What hope, then, can an informational approach toward environmental regulation bring to a developing country like China?

From a communication/dialogue perspective, an EPID program provides easily understandable environmental information to the public, the mass media, government officials, and industry people. By the six-stage environmental communications model — awareness, interest, knowledge, attitude, legitimization, and practice — an EPID program can help bridge the gaps between awareness and action.

Plant-specific environmental information can draw the attention of the residents in the neighborhoods where the plants are situated. If environmental information is easy to understand, it can easily become public environmental knowledge. If institutional infrastructure is in place in Chinese society — that is, there is a well-developed NGO sector, a legal system or complaint venues more accessible to the public, or products or producers differentiable by their environmental friendliness in the markets — then EPID programs can complement direct regulation or economic/political incentive mechanisms by opening the possibility of private enforcement. Thus, having more knowledge on the environmental performance of specific polluters in their neighborhood, residents can better balance their interests in employment, economic development, the environment, and health. Informed choices between conflicting interests reflect public attitudes toward pollution and legitimize public and private environmental enforcement action. Eventually, they can make informed decisions whether or not to take action against pollution.

In short, a stand-alone EPID program has only a limited effect to move the public from environmental awareness to the wherewithal to take private enforcement actions. A set of institutional infrastructures are required in society for EPID programs to complement direct regulation and/or economic-incentive-based environmental enforcement instruments. In a developing country context, although an EPID program does not necessarily lead to immediate or confrontational public/private enforcement actions, it can get environmental stakeholders closer to pro-environmental actions.

7.4 Policy recommendations

The following policy recommendations can be made based on the Zhenjiang and Hohhot experience with the EPID pilot program implementation:

- Designate an EPB staff member in charge of implementing an EPID program;
- Instead of simply asking for environmental information from EPB line offices, organize EPB staff meetings twice a year brainstorming how to incorporate EPID into their daily work;
- Establish EPID outreach programs targeting industry, the public, and relevant industrial and economic government agencies;
- Create innovative follow-up policies on EPID to reward/punish enterprises with good/bad environmental performance.

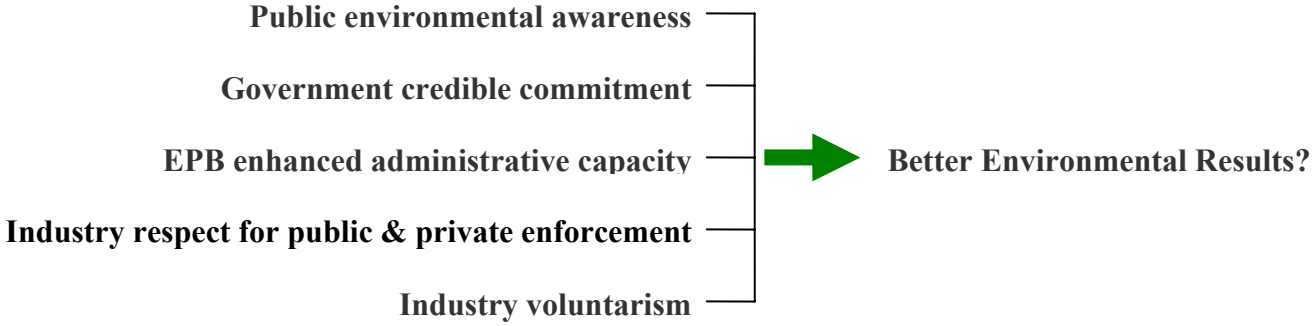
More broadly, China needs to construct better institutional infrastructure that reconciles the goals of economic development and environmental protection:

- To include social and environmental indicators in the evaluation and reward system for government officials so that they look beyond the rate of the GDP growth and are able to better pursue sustainable development.
- To encourage the NGO sector by loosening registration regulations and creating a functioning donation law, which will enable civil society to check on decisions on environmental matters made by industry and the government.
- To reform the legal system so that public interest lawsuits can be brought to the courts.
- To enhance the administrative capacity of SEPA and local EPBs, especially EPBs of less-developed regions, as polluting industries migrate from better-developed to less-developed regions in China.

- To establish public environmental education/communication programs on EPID so that public dialogues on EPID can be built to walk the government, industry, and the public farther along the following six steps: awareness, interest, knowledge, attitude, legitimization, and practice.
- To increase the stringency of environmental enforcement then noncompliance becomes more expensive and the EPID programs can have better deterrent effect on polluters.

Figure 7-2 illustrates how administrative, legal, public, and industrial forces converge to achieve better environmental results. The "visible emissions" program in the U.S. is a good example of how the forces have converged. It is worth experimenting with the "visible emissions" in a Chinese context to see how the government could help the public move from awareness to participation in environmental monitoring and enforcement in a meaningful way.

Figure 7-2. Administrative, Legal, Public, and Industrial Forces Converge to Achieve Better Environmental Results



7.5 Implications of the Zhenjiang and Hohhot EPID Pilot Programs for Environmental Compliance and Enforcement in a Developing Country Context

China is a special case among developing countries, where regional disparities permeate; the rule of law, transparency, and a public law-abiding spirit are lacking; and business interests prevail in society. The lessons learned from the Zhenjiang and Hohhot EPID pilot programs remind international policy advisors and domestic policy entrepreneurs that context matters. The channels of influence of an informational approach toward environmental regulation in developed countries cannot be taken for granted in a developing country context. Expectation for the program and issues that need to be addressed in the implementation processes are case specific.

Moreover, for an informational approach toward environmental regulation to take effect in a developing country context, more attention needs to be paid to the communications of and dialogues on environmental information. The effects of an informational approach toward environmental regulation in developed countries are backed by such institutional infrastructures as environmental NGOs and the public access to address environmental conflicts in the courts. In a developing country context, simply disclosing industrial environmental performance information to the public is not sufficient to stimulate private environmental monitoring and enforcement actions.

When the agents of change such as environmental NGOs are not present in society, governments of developing countries have to reach out and take measures to walk the public through awareness, interest, knowledge, attitude, legitimization, and action. As developing countries go through industrial and urbanization processes, combating pollution, which is caused increasingly by mobile and diffuse sources,

requires individual actions or even lifestyle changes. Only with a citizenry sensitive to environmental issues can a society work to avoid paying an unacceptably high price for environmental degradation and ecological losses.

7.6 Questions unanswered and directions for future research and action

Although there have been speculations on how an informational approach toward regulation could work, empirical evidence has been lacking especially in a developing country context. This study has demonstrated that an EPID program can potentially move stakeholders closer to participating in environmental monitoring and enforcement in a meaningful way. What the actual effects of an EPID program are on stakeholders' environmental behaviors have not been examined. More empirical research on this topic is in order.

As the EPID programs are diffused throughout the developing world, working on the three "cultural roots" to achieve the best possible results given idiosyncratic contexts remains to a challenge. The question no longer, "how and why did the EPID program succeed/fail?" but is rather "how can we make the EPID program a success given the Zhenjiang and Hohhot experience?" Consulting with the program stakeholders and a careful assessment of the elements and institutional arrangements of program implementation beforehand are thus necessary.

Who is in a better position to administer an EPID program in a developing country context? For most EPID programs, processing pollution information and disclosing rating results in developed countries are tasks carried out by environmental NGOs. However, in most developing countries, pollution information is not publicly available and the capacity of environmental NGOs is underdeveloped. These NGOs

generally lack the credibility and capacity necessary for EPID program implementation. Environmental protection agencies are already overburdened. If they only take EPID programs as a matter of formality without complementing them with public awareness/education programs, real changes in stakeholder environmental behaviors can hardly be generated. Are trade associations in a better position to administer an industry-specific EPID program that can attend to the pollution characteristics as well as the reputation of the firms of the industry?

The author of this dissertation anticipates more research along these lines to strive for a better understanding of the informational approach of environmental regulation both in principle and in practice.

ENDNOTES

[1] Economy, Elizabeth. (2004). Congressional Testimony: China's Environmental Challenges. *Subcommittee on Asia and the Pacific; House International Affairs Committee*. Washington, D.C., Council on Foreign Affairs.

[2] Jahiel, Abigail R. (1997). "The Contradictory Impact of Reform on Environmental Protection in China." *The China Quarterly* **149**: 81-103; Palmer, Michael. (1998). "Environmental Regulation in the People's Republic of China: The Face of Domestic Law." *China Quarterly*(156, Special Issue: China's Environment): 788-808; Li, Qijia (2001). "Chapter 20: Environmental Regulations in China." In. Zheng, Yisheng & Wang, Shiwen (Eds.). *China Environment and Development Review* **1: (**309-321).Beijing: Social Sciences Documentation Publishing House. ; Economy, Elizabeth. (2004). *The river runs black : the environmental challenge to China's future*. Ithaca, Cornell University Press.

[3] Responding to the severe environmental pollution and natural resources shortage, National Environmental Protection Agency (NEPA) and the State Planning Commission (SPC) jointly proposed China's Environmental Action Plan for 1991 – 2000. This plan highlights the environmental issues that national officials consider particularly significant. Top three problems deal with pollution: water and air pollution and hazardous waste. The second three involve conservation of natural resources: water, land, and forests and grasslands. The final one centers on the balance and integrity of China's ecosystems. Ma, Xiaoying ; & Ortolano, Leonard. (2000). *Environmental regulation in China : institutions, enforcement, and compliance*. Lanham, Rowman & Littlefield.

[4] Economy, Elizabeth. (2004). *The river runs black : the environmental challenge to China's future*. Ithaca, Cornell University Press.

[5] With over 300,000 premature deaths per year, China accounts for over 40% of the total for the developing world -- more than twice the number for South Asia, which has a comparable population. This health damage caused an economic loss as big as 4 percent of GDP annually, which is over twice the estimate for India and much higher than losses for other major industrial economies in the developing world. Bolt, K.; Dasgupta, Susmita; Pandey, K. ; & Wheeler, David. (2001). "Cleaning the Air in Developing Countries." *Forum For Applied Research and Public Policy* **16**(3).

[6] The World Bank. (2001). China: Air, Land, and Water. Washington, D.C., The World Bank; Mulcahy, Patrick. (2003). "Finance and Legal Developments of Environmentally Friendly Wastewater & Pollution." *The SinoSphere Journal* **6**(2): 24-30; Economy, Elizabeth. (2004). Congressional Testimony: China's Environmental Challenges. *Subcommittee on Asia and the Pacific; House International Affairs Committee*. Washington, D.C., Council on Foreign Affairs.

[7] Economy, Elizabeth. (2004). Congressional Testimony: China's Environmental Challenges. *Subcommittee on Asia and the Pacific; House International Affairs Committee*. Washington, D.C., Council on Foreign Affairs.

[8] Quote Economy (2004) "The World Bank reports that the cost of environmental pollution and degradation in China is equivalent to 8-12% of GDP annually." See Economy, E. (2004). Congressional Testimony: China's Environmental Challenges. Subcommittee on Asia and the Pacific; House International Affairs Committee. Washington, D.C., Council on Foreign Affairs; Lei reported a 3.7% GDP loss in 1995, see Lei, Ming (2001). "Chapter 19: Green GDP." In. Zheng, Yisheng & Wang, Shiwen (Eds.). *China Environment and Development Review* **1: (**297-306).Beijing: Social Sciences Domentation Publishing House. ; Economy, Elizabeth. (2004). Congressional Testimony: China's Environmental Challenges. *Subcommittee on Asia and the Pacific; House International Affairs Committee*. Washington, D.C., Council on Foreign Affairs.

[9] Industrial pollution discharge accounts for 43% for organic water pollution (COD, or chemical oxygen demand); 81% for sulfur dioxide emissions; and 79% for flue dust (a major component of suspended particulates) in 2001. Source: Environmental Yearbook 2002, China Environmental Protection Administration.

[10] Economy, Elizabeth. (2004). Congressional Testimony: China's Environmental Challenges. *Subcommittee on Asia and the Pacific; House International Affairs Committee*. Washington, D.C., Council on Foreign Affairs.

[11] Author calculation based on China Statistical Yearbook 2004. See also at: http://wushuichuli.zj.com.

[12] The World Bank. (2001). China: Air, Land, and Water. Washington, D.C., The World Bank.

[13] Author calculation based on China Environment Publishing House. (2004). *China Environmental Yearbook 2004*. Beijing.

[14] Jahiel, Abigail R. (1998). "The Organization of Environmental Protection in China." *China Quarterly*(156, Special Issue: China's Environment): 757-787; Palmer, Michael. (1998). "Environmental Regulation in the People's Republic of China: The Face of Domestic Law." *China Quarterly*(156, Special Issue: China's Environment): 788-808; Morgenstern, Richard; Anderson, R. ; Bell, Ruth Greenspan ; Krupnick, A. ; & Zhang, Xuehua. (2002). "Demonstrating Emissions Trading in Taiyuan, China." *RFF Discussion Paper;* Economy, Elizabeth. (2004). *The river runs black : the environmental challenge to China's future*. Ithaca, Cornell University Press; Morgenstern, Richard D. ; Abeygunawardena, Piya ; Anderson, Robert ; Bell, Ruth Greenspan ; Krupnick, Alan ; Schreifels, Jeremy ; Dong, Cao ; Wang, Jinan; Wang, Jitian ; & Larsen, Steiner. (2004). "Emissions Trading to Improve Air Quality in an Industrial City in the People's Republic of China." *RFF Discussion Paper*(04-16); Wang, Hua; Bi, Jun; Wheeler, David; Wang, Jinnan; Cao, Dong; Lu, Genfa ; & Wang, Yuan. (2004). "Environmental Performance Rating and Disclosure: China's GreenWatch Program." *Journal of Environmental Management* **71**: 123-133.

[15] Article 11 of the 1978 Constitution states: "The state protects the environment and natural resources, and prevents and eliminates pollution and other hazards to the public." Article 26 of the 1982 and 2004 Constitution states: "The state protects and improves the environment in which people live and the ecological environment. It prevents and controls pollution and other public hazards. The state organizes and encourages afforestation and the protection of forests."

[16] Li, Qijia (2001). "Chapter 20: Environmental Regulations in China." In. Zheng, Yisheng & Wang, Shiwen (Eds.). *China Environment and Development Review* **1: (**309-321).Beijing: Social Sciences Documentation Publishing House. ; Ferris, Richard J. ; & Zhang, Hongjun. (2003). "Reaching out to the Rule of Law: China's Continuing Efforts to Develop An Effective Environmental Law Regime." *William and Mary Bill of Rights Journa* **11**: 568 - 602.

[17] Li, Qijia (2001). "Chapter 20: Environmental Regulations in China." In. Zheng, Yisheng & Wang, Shiwen (Eds.). *China Environment and Development Review* **1: (**309-321).Beijing: Social Sciences Documentation Publishing House. Website of the State Environmental Protection Administration: www.sepa.gov.cn.

[18] Qu, Geping. (1991). *Environmental Management in China*. Beijing, United Nations Environment Programme and China Environmental Science Press; Sinkule, Barbara J. ; & Ortolano, Leonard. (1995). *Implementing environmental policy in China*. Westport, Conn., Praeger; Ma, Xiaoying ; & Ortolano, Leonard. (2000). *Environmental regulation in China : institutions, enforcement, and compliance*. Lanham, Rowman & Littlefield; Bell, Ruth Greenspan. (2002). "Institutional Challenges in Environmental Governance: Moving Beyond General Principles to Achieve Concrete Results." *RFF Issue Brief*(02-12); Bell, Ruth Greenspan (2003). Choosing Environmental Policy Instruments in the Real World. OECD Global Forum on Sustainable Development: Emissions Trading/Concerted Action on Tradable Emissions Permits Country Forum, OECD Headquarters, Paris; Economy, Elizabeth. (2004). *The river runs black : the environmental challenge to China's future*. Ithaca, Cornell University Press.

[19] Interview 06242005-01, with officials of the legal office of SEPA who are in charge of environmental performance information disclosure programs in China. It is much more difficult for SEPA to get the local EPBs of less developed regions in the middle and west of China on board because the EPB officials anticipate their local governments would reject the idea of rating and disclosing the environmental performance of enterprises in their jurisdictions. Examples include, environmental performance information of enterprises was never disclosed in the pilot disclosure program in Hohhot and this program was stopped only after the first year's pilot. However, in other municipalities such as Zhenjiang of Jiangsu

Province and Tongling of Anhui Province, industrial environmental performance information has been successfully disclosed to the public. Interview 07152005-01; 07172005-01.

[20] Davis, Kenneth Culp. (1969). *Discretionary justice; a preliminary inquiry*. Baton Rouge,, Louisiana State University Press; Lowi, Theodore J. (1969). *The end of liberalism; ideology, policy, and the crisis of public authority*. New York,, Norton; Handler, Joel F. (1986). *The conditions of discretion : autonomy, community, bureaucracy*. New York, Russell Sage Foundation; Rohr, John A. (1989). *Ethics for bureaucrats : an essay on law and values*. New York, M. Dekker.

[21] Interview 06072005-07. Field study by author conducted in August 2005 in Jiangsu Province, China. For example, even in a prefecture level city in Jiangsu Province, one of the most economically advanced regions in China, not until 2004 its EPB had been equipped with mobile monitoring trucks. There were no continuous monitors installed in enterprises which are connected to monitoring stations then.

[22] Author calculation based on China Environmental Yearbook 2003.

[23] Interview 06072005-07; 07182005-01.

[24] There are anecdotal stories on how township and village enterprises have devastating effects on local environment in China. But it is not well documented or analyzed. Gunningham, Neil ; & Sinclair, Darren. (2002). *Leaders and Laggards: Next-Generation Environmental Regulation*. Sheffield, Greenleaf Publishing Limited. In this book Gunningham and Sinclair analyzed environmental regulatory enforcement challenges posed by SMEs in well developed countries.

[25] Wang, Hua ; & Wheeler, David. (2000). Endogenous Enforcement and Effectiveness of China's Pollution Levy System. *Policy Research Working Paper 2336*. Washington, D.C., The World Bank; Wang, Hua; Maningi, Nlandu; LaPlante, Benoit ; & Dasgupta, Susmita. (2003). "Incomplete Enforcement of Pollution Regulation: Bargaining Power of Chinese Factories." *Environmental and Resource Economics* **24**: 245-262.

[26] Interview 06072005-06; 06082005-04; 06092005-01; 07152005-01; 07172005-01. Jahiel, Abigail R. (1997). "The Contradictory Impact of Reform on Environmental Protection in China." *The China Quarterly* **149**: 81-103.

[27] Ibid.

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[29] Interview 06022005-01; 06022005-02; 07152005-01; 07152005-02; 07172005-01; 07182005-02.

[30] For example, a news report in China Daily on the controversial environmental impact assessment of a construction project in Yuanmingyuan historical park on May 12th, 2005 identified the moral hazards problem in the institutional set up of EIA accreditation organizations, EIA conductors, and organizations with construction projects to be assessed. Early in 2006, procedures to involve the public in environmental impact assessment were instituted.

[31] Feuerwerker, Albert; Murphey, Rhoads ; & Wright, Mary. (1967). *Approaches to modern Chinese history*. Berkeley,, University of California Press.

[32] In September 2004, President Hu, Jintao set the national development goal for China is to construct a "harmonious society." For more information about president Hu's speech, check the link at http://www.xf.people.com.cn/GB/42468/3202830.html
In September 1995, President Jiang, Zemin set the national development goal for China is to pursue a sustainable development path. For more information about president Jiang's speech, check the link at http://www.people.com.cn/GB/shizheng/252/5089/5106/5181/20010430/456597.html

[33] For more information about the work on Green GDP in China, check the link at http://www.sepa.gov.cn/eic/649096689457561600/20040914/1683.shtml;

For more information about the UNEP integrated environmental and economic accounting, check the link at http://unstats.un.org/unsd/envAccounting/seea.htm;

For more information about the national environmental protection model city, check the link at http://www.sepa.gov.cn/eic/650501865317859328/index.shtml;

For more information about the environmental assessment of development plans, check the link at http://www.sepa.gov.cn/eic/651340792689852416/index.shtml.

[34] Public opinion poll is rather a new phenomenon is China. Before the year of 2000, only research institutions, think tanks and scholars conduct public opinion surveys. Now marketing consulting companies and others collect information through public surveys. But in general, observations in samples that have been surveyed are strongly biased toward urban population.

[35] Yang, Ming. (2002). *Environmental Issues: Awareness and Perceptions*. Beijing, Huaxia Publishing House.

[36] Santi and Grenna proposed an analytical framework for environmental communications analysis (p.13). For the public to take actions to protect the environment, they have to go through the following six steps: awareness, interest, knowledge, attitude, legitimization, and practice. Santi, Emanuele ; & Grenna, Lucia (2003). Environmental communications assessment: A framework of analysis for the environmental governance. the 7Th Biennial Conference on Communication and the Environment (COCE 2003).

[37] All China Environmental Federation. (2005). Public Comments on the Eleventh Five-Year National Plan on Environmental Protection in China. Beijing, State Environmental Protection Administration. **2006**.

[38] Refer to Chart B11, P.259, Yang, Ming. (2002). *Environmental Issues: Awareness and Perceptions*. Beijing, Huaxia Publishing House. All China Environmental Federation. (2005). Public Comments on the Eleventh Five-Year National Plan on Environmental Protection in China. Beijing, State Environmental Protection Administration. **2006**.

[39] All China Environmental Federation. (2005). Public Comments on the Eleventh Five-Year National Plan on Environmental Protection in China. Beijing, State Environmental Protection Administration. **2006**.

[40] Are the Following Parties Responsible for the Environmental Degradation in China?

Responsible parties	Respondent	Mainly responsible	Somewhat responsible	Not responsible
Industry	Government official	58.7	38.5	2.8
Industry	Entrepreneur	53.5	41.6	4.9
Local government	Government official	57.9	33.5	8.6
Local government	Entrepreneur	52.6	36	11.5
Central government	Government official	56.2	30.3	13.5
Central government	Entrepreneur	51.2	30.3	18.6
Individuals	Government official	24.3	45.7	29.9
Individuals	Entrepreneur	22.3	39	38.7
Service industry	Government official	20.5	51.8	27.6
Service industry	Entrepreneur	20.3	46.9	32.8
Agriculture	Government official	16	48.4	35.7
Agriculture	Entrepreneur	16.2	39.6	44.2

Source: Yang, Ming. (2002). *Environmental Issues: Awareness and Perceptions*. Beijing, Huaxia Publishing House., Table 4.2.2-1, P.181.

[41] All China Environmental Federation. (2005). Public Comments on the Eleventh Five-Year National Plan on Environmental Protection in China. Beijing, State Environmental Protection Administration. **2006**.

[42] Ibid.

[43] Do You Agree to Slow Down Economic Development for Protecting the Environment?

	Strongly agree	Somewhat agree	Do not agree
Government official*	24.5	35.2	40.3
Entrepreneur*	25.2	36.5	38.2
The public**	13.1	23.2	45.3

Source: Yang, Ming. (2002). *Environmental Issues: Awareness and Perceptions*. Beijing, Huaxia Publishing House., * Table 4.2.1-2, P.175; ** Chart D4-1, P.285.

[44] Personal conversations with government officials in charge of attracting investment and CEOs of some enterprises.

[45] The simplest three questions are: 1.to recognize the "no smoking" sign; 2. do the "three wastes" refer to waste gas, waste water and solid waste; and 3. what are the results of deforestation. Yang, Ming. (2002). *Environmental Issues: Awareness and Perceptions*. Beijing, Huaxia Publishing House. P.263.

[46]

Do not know (%)		Do not know (%)	
(Worldwide)		(Local)	
1. Air pollution	25.2	1. Vehicle exhausts & industrial waste gas emission	17.2
2. Water and maritime pollution	25.1	2. Dust/total suspended particulates	16.2
3. Soil pollution	31.7	3. Industrial wastewater	15.3
4. Arable land erosion	15.3	4. Municipal wastewater	11.9
5. Animal/plant resources reduction	28.4	5. Water scarcity	9.2
6. Forestry reduction	28.0	6. Noise	15.3
7. Greenhouse gas effect	66.6	7. Hazard solid waste	21.6
8. Ozone layer destruction	66.0	8. Domestic waste discharge	10.6
9. Acid rain	65.1	9. Pesticide/fertilizer pollution	14.1
		10. Desertification	27.6
		11. Wild life reduction	25.7
		12. Acid rain	51.0

(Source: Ibid.Table 4, P.101)

[47] All China Environmental Federation. (2005). Public Comments on the Eleventh Five-Year National Plan on Environmental Protection in China. Beijing, State Environmental Protection Administration. **2006**.

[48] CITATION HERE, MASLOW's HIERARCHY OF NEEDS. Environmental protection was considered to be less important than safety or the ability to work and actual employment (education is an investment in human capital and, among other benefits, results in better ability to work).

[49] Tong (2002) cautioned about the possibility of giving a socially desirable answer by the latter two groups because they knew it is a survey on environmental awareness. Tong, Yanqi (2002). "Evrironmental Awareness and the Orientation of Environmental Protection Policies - A Survey of Governmental Officials and CEOs of Enterprises in Six Cities in China." In. Yang, Ming (Eds.). *Environmental Issues: Awareness and Perceptions* **1: (**56-75).Beijing: Huaxia Publishing House. P.64.

[50] All China Environmental Federation. (2005). Public Comments on the Eleventh Five-Year National Plan on Environmental Protection in China. Beijing, State Environmental Protection Administration. **2006**.

[51] Ibid.

[52] Which of the Following Reasons is the Driving Force for Current Environmental Degradation?

	Environmental regulations are incomprehensive	Weak enforcement	Noncompliance

The public*	14.2	52.0	33.8
Government official**	17.0	60.9	22.2
Entrepreneur***	22.7	48.8	28.5

Source: Yang, Ming. (2002). *Environmental Issues: Awareness and Perceptions*. Beijing, Huaxia Publishing House., *Chart C2, P.264; **Table 4.1.7-1 & ***Table 4.1.7-2, P.162.

All China Environmental Federation. (2005). Public Comments on the Eleventh Five-Year National Plan on Environmental Protection in China. Beijing, State Environmental Protection Administration. **2006**.

[53] All China Environmental Federation. (2005). Public Comments on the Eleventh Five-Year National Plan on Environmental Protection in China. Beijing, State Environmental Protection Administration. **2006**.

[54] Yang, Ming. (2002). *Environmental Issues: Awareness and Perceptions*. Beijing, Huaxia Publishing House. P.156.

[55] All China Environmental Federation. (2005). Public Comments on the Eleventh Five-Year National Plan on Environmental Protection in China. Beijing, State Environmental Protection Administration. **2006**.

[56] What Would You Do If You Are Disturbed by the Noise from a Plant Nearby?

	Let it	Complain to the plant	Move out	Other measures	
The public	47.7	43.9	5.0	3.4	N=7,835

Source: Yang, Ming. (2002). *Environmental Issues: Awareness and Perceptions*. Beijing, Huaxia Publishing House., Chart E5, P.265.

[57] All China Environmental Federation. (2005). Public Comments on the Eleventh Five-Year National Plan on Environmental Protection in China. Beijing, State Environmental Protection Administration. **2006**.

[58] Would You Complain to Relevant Government Agencies about Environmental Accidents?

	Surely will	Surely will not	No answer	
Wujin residents	78.7	21.0	0.2	N=442

Source: Unpublished survey report by the CEMP of Nanjing University, 2005.

Would You Take Legal Actions Against A Polluter Which Broke the Environmental Law?

	Surely will	Will	Not sure	Surely will not	
Wujin residents	14.0	45.7	22.5	17.8	N=449

Source: Unpublished survey report by the CEMP of Nanjing University, 2005.

[59] How Effective the Following Means Were for Solving Local Environmental Problems?

Means	**Respondent**	**Very Effective**	**Effective**	**Ineffective**
Attention from the local government	Government official	71.8	25.6	2.6
Attention from the local government	Entrepreneur	72.3	25.4	2.2
Compulsory enforcement by the central government	Government official	66.3	24.3	9.4
Compulsory enforcement by the central government	Entrepreneur	67.8	25.4	6.8
Policy directions from the central government	Government official	43.9	43.8	12.2

Policy directions from the central government	Entrepreneur	46.1	42.4	11.5
Publicity by the mass media	Government official	40	50	10
Publicity by the mass media	Entrepreneur	47.5	40.9	11.6
Public complaint	Government official	11.9	45.5	42.6
Public complaint	Entrepreneur	18.4	45	36.6
Activities by social organizations	Government official	2.8	25.4	71.8
Activities by social organizations	Entrepreneur	8.8	28.3	62.9

Source: Yang, Ming. (2002). *Environmental Issues: Awareness and Perceptions*. Beijing, Huaxia Publishing House., Table 4.3.1-1, P.232.

[60] All China Environmental Federation. (2005). Public Comments on the Eleventh Five-Year National Plan on Environmental Protection in China. Beijing, State Environmental Protection Administration. **2006**.

[61] Tietenberg, Thomas. (1998). "Disclosure Strategies for Pollution Control." *Environmental and Resource Economics*(11): 587-602.

[62] LaPlante, Benoit ; & Lanoie, P. (1994). "Market Response to Environmental Incidents in Canada." *Southern Economic Journal* **60**: 657-72; Afsah, Shakeb; Laplante, Benoit ; & Makarim, Nabiel. (1996). Program-Based Pollution Control Management: The Indonesia PROKASIH Program. *Policy Research Working Paper 1602*. Washington, D.C., The World Bank; Afsah, Shakeb; LaPlante, Benoit ; & Wheeler, David. (1996). Controlling Industrial Pollution: A New Paradigm. *Policy Research Working Paper 1672*. Washington, D.C., The World Bank; Konar, Shameek ; & Cohen, Mark A. (1997). "Information as Regulation: The Effect of Community Right to Know Laws on Toxic Emissions." *Journal of Environmental Economics and Management* **32**(1): 109-124; Dasgupta, Susmita; Hettige, Hemamala ; & Wheeler, David. (1998). What Improves Environmental Performance? Evidence from Mexican Industry. *Policy Research Working Paper 1877*. Washington, D.C., The World Bank; Dasgupta, Susmita; Laplante, Benoit ; & Mamingi, Nlandu. (1998). Capital Market Responses to Environmental Performance in Developing Countries. *Policy Research Working Paper 1909*. Washington D.C., The World Bank; Tietenberg, Thomas H. ; & Wheeler, David (1998). Empowering the Community: Information Strategies for Pollution Control. Frontiers of Environmental Economics Conference, Airlie House, Virginia; Dasgupta, Susmita; Hong, Jong Ho; Laplante, Benoit ; & Mamingi, Nlandu. (2004). Disclosure of Environmental Violations and the Stock Market in the Republic of Korea. *Policy Research Working Paper 3344*. Washington D.C., The World Bank.

[63] China's EPID programs were adapted from Indonesia's Program for Pollution Control, Evaluation, and Rating (PROPER).

[64] Wang, Hua; Bi, Jun; Wheeler, David; Wang, Jinnan; Cao, Dong; Lu, Genfa ; & Wang, Yuan. (2004). "Environmental Performance Rating and Disclosure: China's GreenWatch Program." *Journal of Environmental Management* **71**: 123-133.

[65] Ibid.

[66] Interview with the director of the legal office of SEPA.

[67] For more information for the SEPA call for a national implementation of disclosing corporate environmental performance information, check the link:

http://www.sepa.gov.cn/eic/649086798147878912/20051124/13170.shtml

[68] Interview 06242005-01; 09282005-01.

[69] Becker, Gary S. (1968). "Crime and Punishment: An Economic Approach." *The Journal of Political Economy* **76**(2): 169-217; Heyes, Anthony. (2000). "Implementing Environmental Regulation: Enforcement and Compliance." *Journal of Regulatory Economics* **17**(2): 107; Killmer (2004) reported in

her Ph.D. dissertation (P.31-32) that the enforcement structure does not support the high compliance rate based on an economic analysis of enforcement. A number of enforcement surveys show, overall, the typical source can expect to be inspected on an order of once or twice each year. A lacking of continuous monitoring makes it difficult to draw any definite conclusions on industry noncompliance. Only about 5 percent of violators are exerted a small amount of fine for noncompliance and even so the fines are not often collected. Harrington, Winston. (1988). "Enforcement leverage when penalties are restricted." *Journal of Public Economics* **37**: 29-53; Killmer, Annette B. (2004). The Effect of Civil Society Involvement on Regulatory Enforcement & Environmental Outcomes under a Mixed Pollution Prevention Policy. Santa Barbara, University of California**:** 389; Killmer, Annette B. (2005). "Designing Mandatory Disclosure to Promote Synergies between Public and Private Enforcement." In. Zaelke, Durwood; Kaniaru, Donald & Kruzikova, Eva (Eds.). *Making Law Work: Environmental Compliance and Sustainable Development* **2: (**49-65).London: Cameron May Ltd.

[70] Stigler, George J. (1970). "The Optimum Enforcement of Laws." *The Journal of Political Economy* **78**(3): 526-536; Shavell, Steven. (1992). "A note on marginal deterrence." *International Review of Law and Economics* **12**(2): 345-355.

[71] Killmer, Annette B. (2004). The Effect of Civil Society Involvement on Regulatory Enforcement & Environmental Outcomes under a Mixed Pollution Prevention Policy. Santa Barbara, University of California**:** 389. P.32.

[72] Ibid. P.33-34. Harrington found in 1998 an average fine by the EPA ranged from $45 to $24,250. Civil court actions tend to be higher, averaging $50,000 in 1990-1991. Moreover, higher penalties do not necessarily lead to commensurate increase in compliance rate.

[73] Ibid. P.37. Studies found about 9 percent (US EPA, 1981), 22 percent (US General Accounting Office, 1982), and 55 percent (US General Accounting Office, 1982) of sources which self-reported to be in compliance were actually in violation.

[74] Ibid. P.38-91.

[75] Analysis of individual polluting enterprises is beyond the scope of this dissertation. Generally, it is perceived that an institutional have cognitive, normative, and regulative processes (Scott, 1995; 2001). Penalties for noncompliance will have punitive effect on institutions. They respond to deterrent environmental policies through the above three different processes to make sense of and become self-motivated to pursue compliance with environmental regulations.

[76] Killmer, Annette B. (2004). The Effect of Civil Society Involvement on Regulatory Enforcement & Environmental Outcomes under a Mixed Pollution Prevention Policy. Santa Barbara, University of California**:** 389. P.38-43. A two-stage or three-stage game model is employed by Harrington (1988), Harford (1991; 1993) and Friesen (2003) to analyze the interplay between the regulator and the regulated firms. Research along this line is grouped in the "state-dependent enforcement" analysis.

[77] Ibid. P.43. Harrington, Winston. (1988). "Enforcement leverage when penalties are restricted." *Journal of Public Economics* **37**: 29-53.

[78] Killmer, Annette B. (2004). The Effect of Civil Society Involvement on Regulatory Enforcement & Environmental Outcomes under a Mixed Pollution Prevention Policy. Santa Barbara, University of California**:** 389. P.43-44. Hentschel, E. ; & Randall, A. (2000). "An integrated strategy to reduce monitoring and enforcement costs." *Environmental and Resource Economics* **15**: 57-74.

[79] Bowman, Margaret. (1992). The Role of the Citizen in Environmental Enforcement. *Environmental Law Institute's Environmental Program for Central and Eastern Europe*. Washington, DC; Naysnerski ; & Tietenberg, Thomas. (1992); Killmer, Annette B. (2004). The Effect of Civil Society Involvement on Regulatory Enforcement & Environmental Outcomes under a Mixed Pollution Prevention Policy. Santa Barbara, University of California**:** 389.

[80] For example, the Scorecard of the Environmental Defense Fund compiled information from the TRI and created a database searchable by zip code to inform the public of community environmental risks and to facilitate them to target serious polluters. Killmer, Annette B. (2004). The Effect of Civil Society

Involvement on Regulatory Enforcement & Environmental Outcomes under a Mixed Pollution Prevention Policy. Santa Barbara, University of California**:** 389. P.59-60. Naysnerski & Tietenberg (1992) use empirical data from 1,205 citizen suits filed with U.S. EPA headquarters to show that more suits are filed under statutes that allow for penalties as well as injunctions, and under statues that allow for attorney fee reimbursement, as well as that citizen involvement was higher in periods of diminished government activity. In fact, several scholars find that public enforcement agencies are increasingly relying on legal actions by private parties to control pollution (Baik & Shogren, 1994; Miller, 1988; Naysnerski & Tietenberg, 1992; Probst & Portney, 1992). Individual cases do indicate that these enforcement actions can be very successful. For example, citizens have used information disclosed through the TRI database to coerce IBM and the defense contractor Raytheon into completely phasing out ozone depleting chemicals, to induce BF Goodrich to reduce its toxic airborne emissions by 70%, to convince companies in Cuyahoga County, Ohio to 'green' their production processes, and to win a pledge from a Northfield, Minnesota company to reduce employee and community exposure to methylene chloride (Wolf, 1996). TRI data has furthermore been used by citizens to pressure the State legislature into passing toxic substances statutes in Louisiana, Massachusetts, North Carolina and Oregon, to improve land-use planning proposals in Contra Costa County, California and chemical accident prevention plans in Richmond, California and Berlin, New Jersey, and to win a protracted legal battle for cleaner air in New York City (Wolf, 1996). Thus, there is a growing body of empirical examples that suggest that the general public (usually in the form of public interest organizations) makes use of the disclosed information – and often successfully so.

[81] Ibid. P.60-61. Scholars have shown that stock market valuations of U.S. and Canadian companies can be significantly negatively impacted by new information about the filing of hazardous waste management law suits (Barth & McNichols, 1994; Muoghalu, Robison, & Glascock, 1990), the settlement of suits or judicial actions that result in a fine (Badrinath & Bolster, 1996; Laplante & Lanoie, 1994), the investment in emission control equipment (Laplante & Lanoie, 1994), and firms' poor environmental performances (Hamilton, 1995; Khanna et al., 1998; Konar & Cohen, 1997, 2001). Alternatively, new information about strong environmental management can significantly increase a firm's financial performance (Klassen & McLaughlin, 1996). (Scholars generally agree that the information provided has to be new in order to produce a measurable stock market effect. For example, Blacconiere & Northcut (1997) show that chemical companies that disclosed fully prior to a spill experience less abnormal returns as a result of the spill. Similarly, Klassen & McLaughlin (1996) find that first-time environmental awards are associated with a larger change in market valuation than subsequent awards.) In developing countries such as Argentina, Chile, Mexico, and the Philippines and an Asian newly developed country, Korea, environmental information disclosure had comparable results on stock market prices to those from the U.S (Dasgupta, Susmita; Laplante, Benoit ; & Mamingi, Nlandu. (1998). Capital Market Responses to Environmental Performance in Developing Countries. *Policy Research Working Paper 1909*. Washington D.C., The World Bank; Dasgupta, Susmita; Laplante, Benoit ; & Mamingi, Nlandu. (2001). "Pollution and Capital Markets in Developing Countries." *Journal of Environmental Economics and Management* **42**(3): 310-335; Dasgupta, Susmita; Hong, Jong Ho; Laplante, Benoit ; & Mamingi, Nlandu. (2004). Disclosure of Environmental Violations and the Stock Market in the Republic of Korea. *Policy Research Working Paper 3344*. Washington D.C., The World Bank.. Moreover, it appears that firms that have been identified as poor performers face a higher cost of capital (Garber & Hammitt, 1998), whereas companies that are dedicated to superior environmental performance may benefit from innovative financing mechanisms offered through socially responsible investments (Social Investment Forum Industry Research Program, 2003) and 'green' venture capital (Randjelovic, O'Rourke, & Orsato, 2003).

The average loss in stock prices varies between studies from 0.3 – 2% (World Bank, 2000). More specifically, the effect of the TRI publication on market values of U.S. companies can be observed on the day following the TRI database publication (Hamilton, James T. (1995). "Pollution as News: Media and Stock market Reactions to the Toxics Release Data." *Journal of Environmental Economics and Management* **28**(1): 98-113; Khanna, Madhu; Quimio, Wilma Rose H. ; & Bojilova, Dora. (1998). "Toxics Release Information: A Policy Tool for Environmental Protection." *Journal of Environmental Economics and Management* **36**: 243-266.) and translates into an average loss of 0.3%, or 4.1 million USD, in equity value (Hamilton, 1995). In a related study that is partially based on TRI data, Konar & Cohen (2001) find that "a 10% reduction in emissions of toxic chemicals results in a $34 million increase in market value" (p. 281).

[82] Hawkins, Keith. (1984). *Environment and enforcement : regulation and the social definition of pollution*. Oxford, Oxford University Press.

[83] Tietenberg, Thomas. (1998). "Disclosure Strategies for Pollution Control." *Environmental and Resource Economics*(11): 587-602.

[84] Magat, Wesley A. ; & Viscusi, W. Kip. (1992). *Informational approaches to regulation*. Cambridge, Mass., MIT Press; LaPlante, Benoit ; & Lanoie, P. (1994). "Market Response to Environmental Incidents in Canada." *Southern Economic Journal* **60**: 657-72; Hamilton, James T. (1995). "Pollution as News: Media and Stock market Reactions to the Toxics Release Data." *Journal of Environmental Economics and Management* **28**(1): 98-113; Konar, Shameek ; & Cohen, Mark A. (1997). "Information as Regulation: The Effect of Community Right to Know Laws on Toxic Emissions." *Journal of Environmental Economics and Management* **32**(1): 109-124; Dasgupta, Susmita; Laplante, Benoit ; & Mamingi, Nlandu. (1998). Capital Market Responses to Environmental Performance in Developing Countries. *Policy Research Working Paper 1909*. Washington D.C., The World Bank; Khanna, Madhu; Quimio, Wilma Rose H. ; & Bojilova, Dora. (1998). "Toxics Release Information: A Policy Tool for Environmental Protection." *Journal of Environmental Economics and Management* **36**: 243-266; Tietenberg, Thomas H. ; & Wheeler, David (1998). Empowering the Community: Information Strategies for Pollution Control. Frontiers of Environmental Economics Conference, Airlie House, Virginia; Khanna, Madhu ; & Damon, Lisa A. (1999). "EPA's Voluntary 33/50 Program: Impact on Toxic Releases and Economic performance of Firms." *Journal of Environmental Economics and Management* **37**: 1-25; Wheeler, David. (2000). Greening Industry: New Roles for Communities, Markets, and Governments. Washington, D.C., The World Bank; Konar, Shameek ; & Cohen, Mark A. (2001). "Does the Market Value Environmental Performance?" *Review of Economics and Statistics* **83**(2): 281-; Dasgupta, Susmita; Hong, Jong Ho; Laplante, Benoit ; & Mamingi, Nlandu. (2004). Disclosure of Environmental Violations and the Stock Market in the Republic of Korea. *Policy Research Working Paper 3344*. Washington D.C., The World Bank; Wang, Hua; Bi, Jun; Wheeler, David; Wang, Jinnan; Cao, Dong; Lu, Genfa ; & Wang, Yuan. (2004). "Environmental Performance Rating and Disclosure: China's GreenWatch Program." *Journal of Environmental Management* **71**: 123-133.

[85] Williamson, Oliver E. (1975). *Markets and hierarchies, analysis and antitrust implications : a study in the economics of internal organization*. New York, Free Press; Barzel, Yoram. (1989). *Economic analysis of property rights*. Cambridge ; New York, Cambridge University Press; Williamson, Oliver E. (1996). *The mechanisms of governance*. New York, Oxford University Press.

[86] Toxics Release Inventory (TRI) was first officially established in 1988 requiring all manufacturing facilities operating under SIC codes 20-39, with 10 or more employees, to submit a report of their annual on-site releases and off-site transfers of each of over 300 specified toxic chemicals to the US EPA. After random check of data accuracy, US EPA made this information available to the general public. It was reported that between 1989 and 1996, the overall reportable emissions of toxic substances have reduced by 46%.

[87] For more information on 90/313/EEC, check the link below:

http://europa.eu.int/smartapi/cgi/sga_doc?smartapi!celexapi!prod!CELEXnumdoc&lg=EN&numdoc=31990L0313&model=guichett

[88] For more information on Rio Declaration on Environment and Development, check the link below:

http://www.unep.org/Documents.multilingual/Default.asp?DocumentID=78&ArticleID=1163

[89] For more information on the Aarhus Convention, check the link below:

http://www.unece.org/env/pp/documents/cep43e.pdf

[90] Graham, Mary. (2002). *Democracy by disclosure : the rise of technopopulism*. Washington, D.C., Governance Institute/Brookings Institution Press. P.10-11.

[91] Esty, Daniel C. (1999). Toward optimal environmental governance., New York University Law Review. **74:** 1495-1574; Graham, Mary. (2002). *Democracy by disclosure : the rise of technopopulism*. Washington,

D.C., Governance Institute/Brookings Institution Press; Beierle, Thomas C. (2003). "Environmental Information Disclosure: Three Cases of Policy and Politics." *RFF Discussion Paper*(03-16); Beierle, Thomas C. (2003). "The Benefits and Costs of Environmental Information Disclosure: What Do We Know About Right-to-Know?" *RFF Discussion Paper*(03-05).

[92] LaPlante, Benoit ; & Lanoie, P. (1994). "Market Response to Environmental Incidents in Canada." *Southern Economic Journal* **60**: 657-72; Afsah, Shakeb; Laplante, Benoit ; & Makarim, Nabiel. (1996). Program-Based Pollution Control Management: The Indonesia PROKASIH Program. *Policy Research Working Paper 1602*. Washington, D.C., The World Bank; Afsah, Shakeb; LaPlante, Benoit ; & Wheeler, David. (1996). Controlling Industrial Pollution: A New Paradigm. *Policy Research Working Paper 1672*. Washington, D.C., The World Bank; Konar, Shameek ; & Cohen, Mark A. (1997). "Information as Regulation: The Effect of Community Right to Know Laws on Toxic Emissions." *Journal of Environmental Economics and Management* **32**(1): 109-124; Dasgupta, Susmita; Hettige, Hemamala ; & Wheeler, David. (1998). What Improves Environmental Performance? Evidence from Mexican Industry. *Policy Research Working Paper 1877*. Washington, D.C., The World Bank; Dasgupta, Susmita; Laplante, Benoit ; & Mamingi, Nlandu. (1998). Capital Market Responses to Environmental Performance in Developing Countries. *Policy Research Working Paper 1909*. Washington D.C., The World Bank; Tietenberg, Thomas H. ; & Wheeler, David (1998). Empowering the Community: Information Strategies for Pollution Control. Frontiers of Environmental Economics Conference, Airlie House, Virginia; Dasgupta, Susmita; Hong, Jong Ho; Laplante, Benoit ; & Mamingi, Nlandu. (2004). Disclosure of Environmental Violations and the Stock Market in the Republic of Korea. *Policy Research Working Paper 3344*. Washington D.C., The World Bank.

[93] Graham, Mary. (2002). "Is Sunshine the Best Disenfectant? The Promise and Problems of Environmental Disclosure." *Brookings Review* **Vol.20**(No.2); Beierle, Thomas C. (2003). "Environmental Information Disclosure: Three Cases of Policy and Politics." *RFF Discussion Paper*(03-16); Beierle, Thomas C. (2003). "The Benefits and Costs of Environmental Information Disclosure: What Do We Know About Right-to-Know?" *RFF Discussion Paper*(03-05); Fung, Archon; Graham, Mary ; & Weil, David (2003). The Political Economy of Transparency What Makes Disclosure Policies Sustainable? The Association for Public Policy Analysis and Management Annual Research Conference, Washington D.C; Harrison, Kathryn; Pacheco-Vega, Raul ; & Winfield, Mark (2003). The Politics of Information Dissemination: The Role of Policy Transfer in the Development of Mexico's Pollutant Release Inventory. The Annual Meeting of the Association for Public Policy Analysis and Management 2003, Washington D.C.

[94] Kennedy, Peter. W.; LaPlante, Benoit ; & Maxwell, John. (1994). "Pollution Policy: The Role for Publicly Provided Information." *Journal of Environmental Economics and Management* **26**(1): 31-43; Hamilton, James T. (1995). "Pollution as News: Media and Stock market Reactions to the Toxics Release Data." *Journal of Environmental Economics and Management* **28**(1): 98-113; Arora, Seema ; & Cason, Timothy N. (1996). "Why do firms volunteer to exceed environmental regulations? Understanding participation in EPA's 33/50 program." *Land Economics* **72**: 413-32; Konar, Shameek ; & Cohen, Mark A. (1997). "Information as Regulation: The Effect of Community Right to Know Laws on Toxic Emissions." *Journal of Environmental Economics and Management* **32**(1): 109-124; Dasgupta, Susmita; Laplante, Benoit ; & Mamingi, Nlandu. (1998). Capital Market Responses to Environmental Performance in Developing Countries. *Policy Research Working Paper 1909*. Washington D.C., The World Bank; Tietenberg, Thomas H. ; & Wheeler, David (1998). Empowering the Community: Information Strategies for Pollution Control. Frontiers of Environmental Economics Conference, Airlie House, Virginia; Khanna, Madhu ; & Damon, Lisa A. (1999). "EPA's Voluntary 33/50 Program: Impact on Toxic Releases and Economic performance of Firms." *Journal of Environmental Economics and Management* **37**: 1-25; Dasgupta, Susmita; Laplante, Benoit ; & Mamingi, Nlandu. (2001). "Pollution and Capital Markets in Developing Countries." *Journal of Environmental Economics and Management* **42**(3): 310-335; Dasgupta, Susmita; Hong, Jong Ho; Laplante, Benoit ; & Mamingi, Nlandu. (2004). Disclosure of Environmental Violations and the Stock Market in the Republic of Korea. *Policy Research Working Paper 3344*. Washington D.C., The World Bank.

[95] Tietenberg, Thomas H. ; & Wheeler, David (1998). Empowering the Community: Information Strategies for Pollution Control. Frontiers of Environmental Economics Conference, Airlie House, Virginia; Dasgupta, Susmita; Laplante, Benoit ; & Mamingi, Nlandu. (2001). "Pollution and Capital Markets in Developing

Countries." *Journal of Environmental Economics and Management* **42**(3): 310-335; Wang, Hua; Bi, Jun; Wheeler, David ; & et al. (2002). Environmental Performance Rating and Disclosure: China's Green-Watch Program. *Policy Research Working Paper*. Washington, D.C., The World Bank; Wang, Hua; Bi, Jun; Wheeler, David; Wang, Jinnan; Cao, Dong; Lu, Genfa ; & Wang, Yuan. (2004). "Environmental Performance Rating and Disclosure: China's GreenWatch Program." *Journal of Environmental Management* **71**: 123-133.

[96] Braithwaite, John ; & Drahos, Peter. (2000). *Global business regulation*. Cambridge [England] ; New York, Cambridge University Press; Khademian, Anne. (2002). *Working with Culture: How the Job Gets Done in Public Programs*. Washington D.C., CQ Press; Santi, Emanuele ; & Grenna, Lucia (2003). Environmental communications assessment: A framework of analysis for the environmental governance. the 7Th Biennial Conference on Communication and the Environment (COCE 2003).

[97] Available at Wikipedia, the free encyclopedia http://en.wikipedia.org/wiki/Epistemic_community. Lastly accessed on 21 May 2006.

[98] The five colors used in the color rating scheme have their social meanings which is culture specific. For example, in Indonesia the color of gold was used to represent the best industrial environmental performance because of their cultural tradition. In China, green is used to represent the best performance, which follows the traditional Chinese saying of "blue skies, green waters."

[99] Yin, Robert K. (2003). *Applications of case study research*. Thousand Oaks, Sage Publications; Yin, Robert K. (2003). *Case study research : design and methods*. Thousand Oaks, Calif., Sage Publications.

[100] Yin, Robert K. (2003). *Case study research : design and methods*. Thousand Oaks, Calif., Sage Publications.

[101] For the origin of this program and how it was introduced into China , please see APPENDIX 3 for a brief overview of the practice of EPID on a global scale.

[102] Wang, Hua; Cao, Dong; Wang, Jinnan ; & Lu, Genfa. (2002). *Environmental Information Disclosure: Theory and Practice 环境信息公开: 理念与实践. Beijing,* Chinese Environmental Science Publisher; Wang, Hua; Bi, Jun; Wheeler, David; Wang, Jinnan; Cao, Dong; Lu, Genfa ; & Wang, Yuan. (2004). "Environmental Performance Rating and Disclosure: China's GreenWatch Program." Journal of *Environmental Management 71: 123-133***.**

[103] Interviewee 06092005-02.

[104] Phone call with interviewee 07152005-01 on 7/12/2005, who is the designer and implementer of EPID in Hohhot.

[105] Author self calculation based on online China Statistical Yearbooks 2000 and 2004, accessed through the China Data Online, the World Bank Intranet.

[106] Li, Wanxin ; & Zusman, Eric (2005). Institutional Capacity of Local EPBs and Its Implications for Pollution Control in China. Urban China Research Network Annual Conference --- Chinese Cities in Transition, Shanghai, China.

[107] The total budget of Zhenjiang EPB was 2,526,830 yuan in 1999 and 5,000,000 yuan in 2004. Source: School of Environment of Nanjing University.

[108] Interview 07172005-01.

[109] Interview 07172005-01; obtained from School of Environment of Nanjing University.

[110] After majoring in astrophysics, and being graduated from Nanjing University in 1983, Hua Wang joined other faculty members to establish the School of Environment in Nanjing University, Nanjing, China. In 1991, Hua Wang came to the University of North Carolina at Chapel Hill to work on his Ph.D. in environmental policy, concentrating on environmental economics, he got his doctorate in 1997. Hua Wang began a career with the World Bank in 1993 as a summer intern in the Infrastructure and Environment Unit

of the Development Research Group (DECRG). He worked with David Wheeler, a lead economist of the unit, and became a senior economist in 2003.

In addition to his achievements in environmental economics scholarship, Dr. Wang is rather ambitious in efforts to generate real changes in developing countries, especially China. In 1995, David Wheeler's team first experimented in Indonesia with color-rating the environmental performance of industrial enterprises and publicizing the rating results. The project — PROPER — has been evaluated as successful.

[111] Program for Pollution Control, Evaluation and Rating (PROPER) is a World Bank research project in collaboration with Indonesia's Environmental Impact and Management Agency (BAPEDAL). This project was to overcome pervasive institutional barriers to environmental enforcement. The idea was to "create incentives for compliance through honor and shame" (Afsah and Ratunanda 1999). PROPER was stopped after 1997 because of the Asian financial crisis and political instability in Indonesia.

[112] Wang, Hua; Dasgupta, Susmita ; & Wheeler, David. (2001). Public Disclosure of Industrial Pollution in China: Assessing the Impact of "Third-Wave" Regulation. Washington, D.C; Wang, Hua; Cao, Dong; Wang, Jinnan ; & Lu, Genfa. (2002). *Environmental Information Disclosure: Theory and Practice 环境信息公开: 理念与实践. Beijing,* Chinese Environmental Science Publisher; Wang, Hua; Bi, Jun; Wheeler, David; Wang, Jinnan; Cao, Dong; Lu, Genfa ; & Wang, Yuan. (2004). "Environmental Performance Rating and Disclosure: China's GreenWatch Program." Journal of *Environmental Management 71: 123-133*.

[113] Interview 09162005-01.

[114] CRAES, Chinese Research Academy of Environmental Science ; & HRAES, Hohhot Research Academy of Environmental Science. (2000). Working Report on Environmental Information Disclosure in Hohhot 呼和浩特市环境信息公开工作报告. Hohhot, Hohhot Research Academy of Environmental Sciences. p.1.

[115] Ibid. p.1.

[116] Interview 09162005-01.

[117] SOURCE OF THIS INFORMATION. INTERVIEW WITH WANG HUA, LING JIANG. NEED THE NAME LIST OF PARTICIPANTS.

[118] Zhenjiang city government official website http://222.186.119.150/gb/zgzj/zjgl/jjfz/zhsl/userobject1ai126.html, accessed on 8/21/2005.

[119] SOURCE OF NATIONAL AMBIENT ENVIRONMENTAL QUALITY STANDARDS HERE. CHECK SEPA WEBSITE.

[120] Interview 06092005-01.

[121] Interview 06092005-01.

[122] INTERVIEW WITH PROFESSOR LU GENFA.

[123] Interview 06092005-01.

[124] Wang, Hua; Cao, Dong; Wang, Jinnan ; & Lu, Genfa. (2002). *Environmental Information Disclosure: Theory and Practice 环境信息公开: 理念与实践. Beijing,* Chinese Environmental Science Publisher., p.186.

[125] Ibid., p.186.

[126] Interview 11242004; Interview 06092005-01; Interview 06092005-02;

[127] Interview 06092005-01; Interview 06092005-02. Government agencies and officials which are critical to adopting EPID include: Jiangsu provincial EPB, Zhenjiang city government, deputy mayor in charge of industry, deputy mayor in charge of environment, people's congress, economic commission, industrial bureau, legal office, and commission on urban and rural development.

[128] Interview 06092005-01.

[129] Interview 06092005-01; Interview 06092005-02.

[130] Interview 06092005-01.

[131] SOURCE OF INFORMATION HERE. INTERVIEW WITH THEN ZHENJIANG DEPUTY MAYOR RESPONSIBLE FOR EPID. ALSO ZHENJIANG MAYOR. ASK DIRECTOR CHU GUIMING FOR NAMES OF MAYORS OF ZHENJIANG.

[132] Interview 06092005-01.

[133] Wang, Hua; Cao, Dong; Wang, Jinnan ; & Lu, Genfa. (2002). *Environmental Information Disclosure: Theory and Practice 环境信息公开: 理念与实践. Beijing,* Chinese Environmental Science Publisher., p.157. Interview 11242004-01; Interview 06092005-02.

[134] "Three Synchronization" finds its statutory basis in the Article 26 of the PRC Environmental Protection Law 1989. It requires facilities for pollution prevention and treatment to be designed and installed along with construction projects in design and construction phases and to be put in operation after construction projects are completed. The design of the above pollution prevention and control facility has to be submitted to local EPBs for approval and documentation. Local EPBs follow through construction projects and finally, without verification and permissions from local EPBs finished constructs cannot be put into use. The implementation rate of the "Three Synchronization" has become a standard item reported in China environment yearbooks.

[135] Wang, Hua; Cao, Dong; Wang, Jinnan ; & Lu, Genfa. (2002). *Environmental Information Disclosure: Theory and Practice 环境信息公开: 理念与实践. Beijing,* Chinese Environmental Science Publisher. p.159, 163.

[136] Cleaner Production Promotion Law was enacted in 2002 by the State Council. Even until now, certification with ISO14000 is still limited to enterprises which are connected to the global market.

[137] In 2004, the concept of "circular economy" started to gain popularity in China. Circular economy aims to promote resource and energy efficiency through circulating materials within an enterprise or among enterprises in economy.

[138] Interview 11242004-01; Interview 06092005-02.

[139] Wang, Hua; Cao, Dong; Wang, Jinnan ; & Lu, Genfa. (2002). *Environmental Information Disclosure: Theory and Practice 环境信息公开: 理念与实践. Beijing,* Chinese Environmental Science Publisher. p.161.

[140] Ibid. p.160.

[141] Ibid. p.164.

[142] Interview 06092005-02.

[143] Interview 11242004-01; Interview 06092005-02.

[144] Wang, Hua; Cao, Dong; Wang, Jinnan ; & Lu, Genfa. (2002). *Environmental Information Disclosure: Theory and Practice 环境信息公开: 理念与实践. Beijing,* Chinese Environmental Science Publisher. p.168.

[145] Interview 11242004-01; Interview 06092005-02.

[146] Wang, Hua; Cao, Dong; Wang, Jinnan ; & Lu, Genfa. (2002). *Environmental Information Disclosure: Theory and Practice 环境信息公开: 理念与实践. Beijing,* Chinese Environmental Science Publisher.. p.187. Interview 11242004-01; Interview 06092005-02.

[147] Interview 06092005-01; 06092005-02.

[148] Interview 06092005-01; 06092005-02.

[149] Wang, Hua; Dasgupta, Susmita ; & Wheeler, David. (2001). Public Disclosure of Industrial Pollution in China: Assessing the Impact of "Third-Wave" Regulation. Washington, D.C; Wang, Hua; Bi, Jun; Wheeler,

David; Wang, Jinnan; Cao, Dong; Lu, Genfa ; & Wang, Yuan. (2004). "Environmental Performance Rating and Disclosure: China's GreenWatch Program." *Journal of Environmental Management* **71**: 123-133. Interview 11232004-02; 06062005-01; 06072005-06; 06082005-04; 06082005-06; 06092005-01; 06092005-02.

[150] Interview 11232004-01; Interview 11232004-02; Interview 06092005-01; Interview 06092005-02.

[151] Professor Lu and director Shi both went to Nanjing University as undergraduate students.

[152] Interview 06092005-01.

[153] Interview 06092005-01; 11232004-02; 09132005-01.

[154] Interview 11242004-01; 11232004-01; 11242004-02; 06092005-02.

[155] Zhenjiang Daily 2005-06-05.

[156] Official website of Hohhot: http://www.chinacity.net/zgcs/neimenggu/huhehaote/page1.htm. accessed on August 25, 2005.

[157] Wang, Hua; Cao, Dong; Wang, Jinnan ; & Lu, Genfa. (2002). *Environmental Information Disclosure: Theory and Practice 环境信息公开: 理念与实践. Beijing,* Chinese Environmental Science Publisher.; Interview 07152005-01; Interview 07152005-02; Interview 07172005-01.

[158] Interview 07172005-01; RATE OF URBAN POPULATION INCREASE; RATE OF INCREASE WATER CONSUMPTION.

[159] Interview 06212005-02; Interview 06212005-02; Interview 07152005-01.

[160] SOURCE OF THIS INFORMATION, BEST FROM HUA WANG, SECOND FROM CAO DONG, THIRD FROM FAN YONGYING, FOURTH FROM WANG JINNAN.

[161] SOURCE OF THIS INFORMATION, BEST FAN YONGYING, ASK HIM WHAT ARE THE MOTIVATIONS BEHIND HIS WILLING TO WORK ON THIS RESEAERCH PROJECT. ASK HIM HOW MANY TIMES HAS FAN YONGYING BEING ABROAD, ESPECIALLY THE US. Interview 06212005-02.

[162] SOURCE OF THIS INFORMATION. BEST FROM FAN YONGYING.

[163] Wang, Hua; Cao, Dong; Wang, Jinnan ; & Lu, Genfa. (2002). *Environmental Information Disclosure: Theory and Practice 环境信息公开: 理念与实践. Beijing,* Chinese Environmental Science Publisher. p.197.

[164] INTERVIEW YANG RENXUAN, DEPUTY MAYOR OF HOHHOT. 杨仁选副市长；市环保局局长云建东；市环保局书记狄瑞明；市环保局副局长杨英葑、李埃厚；市宣传部副部长王万昌；市政府办公厅副主任王雪峰；中国环科院杨金田、曹东。

[165] Interview 07152005-01; 07152005-02; 07172005-01.

[166] Interview 07152005-01; 07172005-01.

[167] CRAES, Chinese Research Academy of Environmental Science ; & HRAES, Hohhot Research Academy of Environmental Science. (2000). Working Report on Environmental Information Disclosure in Hohhot 呼和浩特市环境信息公开工作报告. Hohhot, Hohhot Research Academy of Environmental Sciences., p.2.

[168] Wang, Hua; Cao, Dong; Wang, Jinnan ; & Lu, Genfa. (2002). *Environmental Information Disclosure: Theory and Practice 环境信息公开: 理念与实践. Beijing,* Chinese Environmental Science Publisher., p.134-150.

[169] SOURCE OF INFORMATION HERE. CHECK WITH FAN YONGYING AND CAO DONG.

[170] Interview 06212005-02; 07152005-01; 07152005-02.

[171] Interviews 06212005-02; 07152005-01; 07152005-02.

[172] Interview 07152005-01; Interview 07152005-02.

[173] The State Council Directive [1996]31 requires top leaders of each jurisdiction to be responsible for its environmental quality. By 2000, total pollution discharge has to meet national standards; and air quality and surface water quality have to meet national standards by functional areas in provincial capitals, economic special zones and other important cities.

[174] Interview 07152005-02; 07172005-01.

[175] Wang, Hua; Cao, Dong; Wang, Jinnan ; & Lu, Genfa. (2002). *Environmental Information Disclosure: Theory and Practice 环境信息公开: 理念与实践. Beijing,* Chinese Environmental Science Publisher.

[176] Ibid. p.197.

[177] Interview 07152005-01.

[178] Interview 07152005-01. Wang, Hua; Cao, Dong; Wang, Jinnan ; & Lu, Genfa. (2002). *Environmental Information Disclosure: Theory and Practice 环境信息公开: 理念与实践. Beijing,* Chinese Environmental Science Publisher. p.197.

[179] Afsah, Shabek ; & Ratunanda, Damayanti (1999). "Environmental Performance Measurement and Reporting in Developing Countries: The Case of Indonesia 担 Program for Pollution Control Evaluation and Rating (PROPER)." In. Bennett, M. & James, P. (Eds.). S*ustainable Measures: Evaluation and Reporting of Environmental and Social Performance:* **(1**85-201).Sheffield: Greenleaf Publishing Ltd. ; Afsah, Shakeb; Blackman, Allen ; & Ratunanda, Damayanti. (2000). "How Do Public Disclosure Pollution Control Programs Work? Evidence from Indonesia." R*FF Discussion Paper* 0**0-44:** 24.

[180] Afsah, Shakeb; LaPlante, Benoit ; & Wheeler, David. (1996). Controlling Industrial Pollution: A New Paradigm. *Policy Research Working Paper 1672*. Washington, D.C., The World Bank; Pargal, Sheoli ; & Wheeler, David. (1996). "Informal Regulation and Industrial Pollution in Developing Countries: Evidence from Indonesia." *The Journal of Political Economy* **104**(6): 1314-1327; Dasgupta, Susmita ; & Wheeler, David. (1997). Citizen Complaints as Environmental Indicators: Evidence from China. *Policy Research Working Paper 1704*. Washington D.C., The World Bank; Hamilton, James T. (1997). "Taxes, Torts, and the Toxics Release Inventory: Congressional Voting on Instruments to Control Pollution." *Economic Inquiry* **35**(4): 745-762; Konar, Shameek ; & Cohen, Mark A. (1997). "Information as Regulation: The Effect of Community Right to Know Laws on Toxic Emissions." *Journal of Environmental Economics and Management* **32**(1): 109-124; Afsah, Shakeb. (1998). Environmental Management Through Public Information. Washington, D.C. **2003;** Dasgupta, Susmita; Hettige, Hemamala ; & Wheeler, David. (1998). What Improves Environmental Performance? Evidence from Mexican Industry. *Policy Research Working Paper 1877*. Washington, D.C., The World Bank; Dasgupta, Susmita; Laplante, Benoit ; & Mamingi, Nlandu. (1998). Capital Market Responses to Environmental Performance in Developing Countries. *Policy Research Working Paper 1909*. Washington D.C., The World Bank; Khanna, Madhu; Quimio, Wilma Rose H. ; & Bojilova, Dora. (1998). "Toxics Release Information: A Policy Tool for Environmental Protection." *Journal of Environmental Economics and Management* **36**: 243-266; Tietenberg, Thomas H. ; & Wheeler, David (1998). Empowering the Community: Information Strategies for Pollution Control. Frontiers of Environmental Economics Conference, Airlie House, Virginia.

[181] Hohhot Research Academy of Environmental Sciences. (2000). Working Report on EPID of Hohhot. Hohhot.(p.2).

[182] Interview 07182005-01. There are four types of monitoring of pollution carried out by monitoring stations. In Chinese, they are: (1) 常规监测; (2)重点污染源监测; (3)专项监测; (4)委托监测.

[183] Interview 07182005-01.

[184] For example, SEPA requires local EPBs to collect information on domestic wastewater discharge which was not a standardized item in Environmental Yearbooks before 2003. And EPID is a more sophisticated

pollution control instrument than the ones with longer histories such as Three Synchronization, Environmental Impact Assessment, Pollution Discharge Fees, and others.

[185] Before this procedural innovation, all EIA reports have to go through formal review by city EPB which usually took 30 business days. This long process has generated complaints from business community especially when the economy is booming. This innovation expedited the review process.

[186] Interview 06092005-02.

[187] Because individual interview is the data collection method mainly used in this research, the total sample size is 50 which only allow basic descriptive statistical analysis.

[188] Interview 06092005-01.

[189] Economy, Elizabeth. (1997). *Environmental Scarcities, State Capacity, Civil Violence: The Case of China*. Washington, D.C., American Academy of Arts and Sciences; Chen, Sulan ; & Uitto, Juha I. (2002). "Governing Marine and Coastal Environment in China: Building Local Government Capacity Through International Cooperation." *China Environment Series* **6**: 67-80.

[190] Interview 06092005-01.

[191] From the fieldwork, most EPB officials have acknowledged that the increased public environmental awareness has made the context become favorable for implementing EPID programs. The public is demanding for cleaner environment and better quality of life. Local EPBs in China are facing increasing public pressure for better environmental results. And EPID programs are a strategic response from local EPBs to the public pressures.

[192] Interview 07152005-02.

[193] Wang, Hua; Cao, Dong; Wang, Jinnan ; & Lu, Genfa. (2002). *Environmental Information Disclosure: Theory and Practice 环境信息公开: 理念与实践. Beijing,* Chinese Environmental Science Publisher. P. 173.

[194] Santi, Emanuele ; & Grenna, Lucia (2003). Environmental communications assessment: A framework of analysis for the environmental governance. the 7Th Biennial Conference on Communication and the Environment (COCE 2003). P.13.

[195] Yang, Ming. (2002). *Environmental Issues: Awareness and Perceptions*. Beijing, Huaxia Publishing House.

[196] Interview 06062005-03; 06062005-04; 06072005-01; 06072005-02; 06072005-03; 06072005-04.

[197] Regulatory scholars such as Kenneth Hawkins, Ian Ayres, John Braithwaite, Clarence Davies and others would argue that the command and control approach is necessary for an informational approach of environmental regulation to work. Stringent enforcement of environmental standards and regulations would set the floor of environmental performance of polluters and make the cost of incompliance real. An informational approach of environmental regulation encourages excellence in environmental performance. However, it won't be able to ensure the level of incompliance acceptable to both the society and individual polluters without the command and control approach. See Ayres, Ian ; & Braithwaite, John. (1992). *Responsive regulation : transcending the deregulation debate*. New York, Oxford University Press; Davies, J. Clarence ; & Mazurek, Jan. (1998). *Pollution control in the United States : evaluating the system*. Washington, DC, Resources for the Future.

[198] Interview 06062005-02; 06062005-03; 06062005-04; 06072005-01; 06072005-02; 06082005-01.

[199] Interview 06082005-03.

[200] Interview 06062005-01; 06092005-02.

[201] Interview 06072005-06.

[202] Interview 06062005-01; 06092005-02.

[203] "Three synchronization" finds its statutory basis in Article 6 of the PRC Environmental Protection Law 1979. It requires facilities for pollution prevention and treatment to be designed and installed along with construction projects in design and construction phases and to be put in operation after construction projects are completed. The design of the above pollution prevention and control facility has to be submitted to local EPBs for approval and documentation. Local EPBs follow through construction projects and finally, without verification and permissions from local EPBs finished constructs cannot be put into use. The implementation rate of the "Three Synchronization" has become a standard item reported in China environment yearbooks.

[204] In Hohhot, the industrial parks were somewhat autonomous. The management offices of the industrial parks can decide what projects or enterprises to accommodate on their own without consultation with the relevant Hohhot government agencies. For example, the "Three Synchronization" should be enforced by the Hohhot EPB. But the Hohhot EPB did not have authority over the industrial parks.

[205] Interview 07172005-01; 07182005-02. Also see Jahiel, Abigail R. (1997). "The Contradictory Impact of Reform on Environmental Protection in China." *The China Quarterly* **149**: 81-103. He documented the water pollution discharge fee is so low that it could not motivate firms to reduce pollution.

[206] Interview 07172005-01; 07182005-02.

[207] Tietenberg, Thomas. (1998). "Disclosure Strategies for Pollution Control." *Environmental and Resource Economics*(11): 587-602; Tietenberg, Thomas H. ; & Wheeler, David (1998). Empowering the Community: Information Strategies for Pollution Control. Frontiers of Environmental Economics Conference, Airlie House, Virginia; Graham, Mary. (2002). "Is Sunshine the Best Disenfectant? The Promise and Problems of Environmental Disclosure." *Brookings Review* **Vol.20**(No.2); Graham, Mary. (2002). *Democracy by disclosure : the rise of technopopulism*. Washington, D.C., Governance Institute/Brookings Institution Press; Killmer, Annette B. (2005). "Designing Mandatory Disclosure to Promote Synergies between Public and Private Enforcement." In. Zaelke, Durwood; Kaniaru, Donald & Kruzikova, Eva (Eds.). *Making Law Work: Environmental Compliance and Sustainable Development* **2: (**49-65).London: Cameron May Ltd.

[208] The Toxics Release Inventory (TRI) is a publicly available EPA database that contains information on toxic chemical releases and other waste management activities reported annually by certain covered industry groups as well as federal facilities. This inventory was established under the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) and expanded by the Pollution Prevention Act of 1990. An environmental NGO in the US, the Environmental Defense Fund developed a website "Scorecard" made the information contained in the TRI searchable by zipcode to find pollution in communities.

[209] Khanna, Madhu; Quimio, Wilma Rose H. ; & Bojilova, Dora. (1998). "Toxics Release Information: A Policy Tool for Environmental Protection." *Journal of Environmental Economics and Management* **36**: 243-266; Khanna, Madhu ; & Damon, Lisa A. (1999). "EPA's Voluntary 33/50 Program: Impact on Toxic Releases and Economic performance of Firms." *Journal of Environmental Economics and Management* **37**: 1-25.

[210] Bowman, Margaret. (1992). The Role of the Citizen in Environmental Enforcement. *Environmental Law Institute's Environmental Program for Central and Eastern Europe*. Washington, DC.

[211] Interview 11232004.

[212] The Arhus Convention and the Principle 10 of the Rio Declaration place a focus more on the argument that public access to environmental information is a basic right of citizens of a society.

[213] Conversations with Ruth Bell of the Resources for Future. She was the leader of the legal part of a US EPA team that worked in cooperation with Russian environmental enforcement personnel in an attempt to introduce "visible emissions" into Russia.

[214] Conversations with Ruth Greenspan Bell of the Resources for Future.

[215] The chemical explosion in November 2005 in Harbin is an example of environmental risk in China. Almost four million people in Harbin in northeastern China were without running water until late Nov.26

after a chemical plant explosion on Nov. 13 contaminated the upper reaches of the nearby Songhua River with toxic benzene.

[216] Qu, Geping. (1991). *Environmental Management in China*. Beijing, United Nations Environment Programme and China Environmental Science Press; Sinkule, Barbara J. ; & Ortolano, Leonard. (1995). *Implementing environmental policy in China*. Westport, Conn., Praeger; Dasgupta, Susmita ; & Wheeler, David. (1997). Citizen Complaints as Environmental Indicators: Evidence from China. *Policy Research Working Paper 1704*. Washington D.C., The World Bank; Lieberthal, K. (1997). "China's Governing System and Its Impact on Environmental Policy Implementation." *China Environment Series*(1): 3-8; Ma, Xiaoying ; & Ortolano, Leonard. (2000). *Environmental regulation in China : institutions, enforcement, and compliance*. Lanham, Rowman & Littlefield; Dobridge, Christine L.; Ying, Tam Pui ; & Ying, So Hoi. (2001). Background Paper Emissions Trading in China: Opportunities and Constraints. Hong Kong, Civic Exchange; Shapiro, Judith. (2001). *Mao's war against nature : politics and the environment in Revolutionary China*. Cambridge ; New York, Cambridge University Press; Chen, Sulan ; & Uitto, Juha I. (2002). "Governing Marine and Coastal Environment in China: Building Local Government Capacity Through International Cooperation." *China Environment Series*(6): 67-80; Hopkinson, Lisa ; & Stern, Rachel. (2002). "One Country, Two Systems, One Smog Cross-Boundary Air Pollution Policy Challenges for Hong Kong and Guangdong." *China Environment Series*(6): 19-36; Morgenstern, Richard; Anderson, R. ; Bell, Ruth Greenspan ; Krupnick, A. ; & Zhang, Xuehua. (2002). "Demonstrating Emissions Trading in Taiyuan, China." *RFF Discussion Paper;* Wang, Hua ; & Di, Wenhua. (2002). The Determinants of Government Environmental Performance: An Empirical Analysis of Chinese Townships. *Policy Research Working Paper*. Washington, D.C., The World Bank; Economy, Elizabeth. (2004). *The river runs black : the environmental challenge to China's future*. Ithaca, Cornell University Press; Morgenstern, Richard D. ; Abeygunawardena, Piya ; Anderson, Robert ; Bell, Ruth Greenspan ; Krupnick, Alan ; Schreifels, Jeremy ; Dong, Cao ; Wang, Jinan; Wang, Jitian ; & Larsen, Steiner. (2004). "Emissions Trading to Improve Air Quality in an Industrial City in the People's Republic of China." *RFF Discussion Paper*(04-16).

[217] DeWitt John wrote a book, *Civic environmentalism: Alternatives to Regulation in States and Communities* in 1994. His argues that civic environmentalism is a less confrontational way to protect the environment more effectively by mobilizing communities and individuals within to find solutions to environmental problems together.

[218] Interview 07152005-01; 07152005-02; 07172005-01; 07182005-01; 07182005-02.

[219] In 2000, in China overall, municipal wastewater discharge was 22.1 billion tons which outnumbered industrial wastewater discharge by 2.7 billion tons. Relative to industrial wastewater discharge the significance of municipal flows and COD loads has increased. Moreover, municipal wastewater discharge is expected to grow as the annual urban population growth rate through the 1990s was about 3.1 percent and was expected to be even larger over the next 10 to 20 years. Per capita urban water consumption increase is another factor contributing to urban water pollution. The World Bank. (2001). China: Air, Land, and Water. Washington, D.C., The World Bank.

[220] Interview 07172005-01.

[221] Could be inferred from both the pollution treatment efforts and the administrative capacity of the Zhenjiang and Hohhot EPBs illustrated in Table 12.

[222] Interview 07152005-01; 07152005-01; 07182005-02.

[223] Other examples include the Wuhai city of Inner Mongolia, and many others in western and inland regions in China. Some authors have documented that local governments help their enterprises get around the requirements of preventive or end-of-pipe pollution control measures, see Chen, Sulan ; & Uitto, Juha I. (2002). "Governing Marine and Coastal Environment in China: Building Local Government Capacity Through International Cooperation." *China Environment Series*(6): 67-80; Economy, Elizabeth. (2004). *The river runs black : the environmental challenge to China's future*. Ithaca, Cornell University Press.

[224] SEPA initiated a “national environmental protection model city” program in 1997. Since then, there has altogether 48 cities/districts been named as model cities/districts. More information is available at the following link: http://www.sepa.gov.cn/eic/650501865317859328/index.shtml.

[225] Interview 06072005-07.

[226] Because individual interview is the data collection method mainly used in this research, the total sample size is 50 which only allow basic descriptive statistical analysis.

[227] During the dissertation fieldwork in Hohhot, people in Hohhot thought the EPID pilot program has failed. They attributed the failure to the competing objectives of economic development and environmental protection. Their reasoning is as follows: Hohhot is an underdeveloped region and the desire to develop economy outweighs the need for protecting the environment.

[228] In the analysis of the institutional capacity of local EPBs by Li and Zusman (2005), there are two categories of institutional capacity: potential and realized. Resources, including human and financial resources comprise of potential institutional capacity. Realized institutional capacity includes abilities of the following four categories: to pick up signals, to balance interests, to implement policies, and to learn and adapt. Li, Wanxin ; & Zusman, Eric (2005). Institutional Capacity of Local EPBs and Its Implications for Pollution Control in China. Urban China Research Network Annual Conference --- Chinese Cities in Transition, Shanghai, China. More discussions of administrative capacity of EPBs and government agencies more generally, see Sokolow, Alvin D. (1979). Local Governments in Nonmetropolitan America: Capacity and Will. Washington, D.C., U.S. Department of Agriculture; Honadle, Beth Walter. (1981). "A Capacity-Building Framework: A Search for Concept and Purpose." *Public Administration Review* **41**(5): 575-580; Skocpol, Theda (1990). "Bringing the State Back In: Strategies of Analysis in Current Research." In. Evans, Peter B.; Rueschemeyer, Dietrich & Skocpol, Theda (Eds.). *bringing the State Back In***: (**3-43).New York: Cambridge University Press. ; Schwartz, Jonathan. (2003). "The Impact of State Capacity on Enforcement of Environmental Policies: The Case of China." *Journal of Environment & Development* **12**(1): 50-81.

[229] In theory, an informational approach of pollution control works through affecting (1) publicly perceived reputation of a firm by the consumer and/or investor who choose against or in favor of a certain enterprise or product, and (2) self-perceived reputation of a firm which may adjust its expectation for administrative and civil penalty. Two factors playing together, disclosing industrial environmental performance information may help achieve better industry environmental compliance.

[230] Becker, Gary S. (1968). "Crime and Punishment: An Economic Approach." *The Journal of Political Economy* **76**(2): 169-217; Fiorino, Daniel J. (1990). "Citizen Participation and Environmental Risk: A Survey of Institutional Mechanisms." *Science, Technology, & Human Values* **15**(2): 226-243; Henriques, Irene ; & Sadorsky, Perry. (1996). "The Determinants of an Environmentally Responsive Firm: An Empirical Approach." *Journal of Environmental Economics and Management* **30**: 381-395; Hettige, Hemamala; Huq, Mainul ; Pargal, Sheoli ; & Wheeler, David. (1996). "Determinants of Pollution Abatement In Developing Countries: Evidence From South And Southeast Asia." *World Development* **24**(12): 1891-1904; Dasgupta, Susmita ; & Wheeler, David. (1997). Citizen Complaints as Environmental Indicators: Evidence from China. *Policy Research Working Paper 1704*. Washington D.C., The World Bank; Jahiel, Abigail R. (1997). "The Contradictory Impact of Reform on Environmental Protection in China." *The China Quarterly* **149**: 81-103; Heyes, Anthony. (2000). "Implementing Environmental Regulation: Enforcement and Compliance." *Journal of Regulatory Economics* **17**(2): 107; Wang, Hua ; & Jin, Yanhong. (2002). Industrial Ownership and Environmental Performance: Evidence from China. *Policy Research Working Paper 2936*. Washington, D.C., The World Bank; Wang, Hua; Maningi, Nlandu; LaPlante, Benoit ; & Dasgupta, Susmita. (2003). "Incomplete Enforcement of Pollution Regulation: Bargaining Power of Chinese Factories." *Environmental and Resource Economics* **24**: 245-262; Killmer, Annette B. (2005). "Designing Mandatory Disclosure to Promote Synergies between Public and Private Enforcement." In. Zaelke, Durwood; Kaniaru, Donald & Kruzikova, Eva (Eds.). *Making Law Work: Environmental Compliance and Sustainable Development* **2: (**49-65).London: Cameron May Ltd.

[231] The Working Group on Community Right-to-Know (1994) was able to compile nearly 200 reports by public interest groups on uses of TRI data on the local, state and national level by 1994 alone. This level of increased public awareness is critical to the success of the TRI (Killmer, 2004: P.52-53).

[232] Analysis of interview results by author.

[233] Office of compliance and enforcement, the Hohhot EPB. (2005). Memorandum to the Hohhot EPB management office. Hohhot, The Hohhot EPB**:** 2.

[234] The Professional Association for China Environment (PACE) is currently functioning as a disseminator and educator for the EPID program.

[235] Interview with the director of the CLAPV, Canfa Wang.

[236] Seventy-five percent of the public won't consider environmental factors when making purchasing decisions. About 65 percent of the public was not willing to pay more for environmentally friendly products. Personal conversation with Lois Schiffer, the Assistant Attorney General of the Justice Department's Environment and Natural Resources Division. She does not think consumer markets can reward and/or punish firms based on their environmental performance. Her point is echoed by Eisner, Marc Allen. (2004). "Corporate Environmentalism, Regulatory Reform, and Industry Self-Regulation: Toward Genuine Regulatory Reinvention in the United States." *Governance* **17**(2): 145-167. "Research by Roper Starch Worldwide (see Speer 1997) reveals that the average eco-premium is approximately 4.5 percent in the US. Environmental impact is the primary decision criteria for 6 percent of the population — well behind experience (47%), price (37%), brand recognition (15%), personal recommendation (13%), and convenience (12%)."

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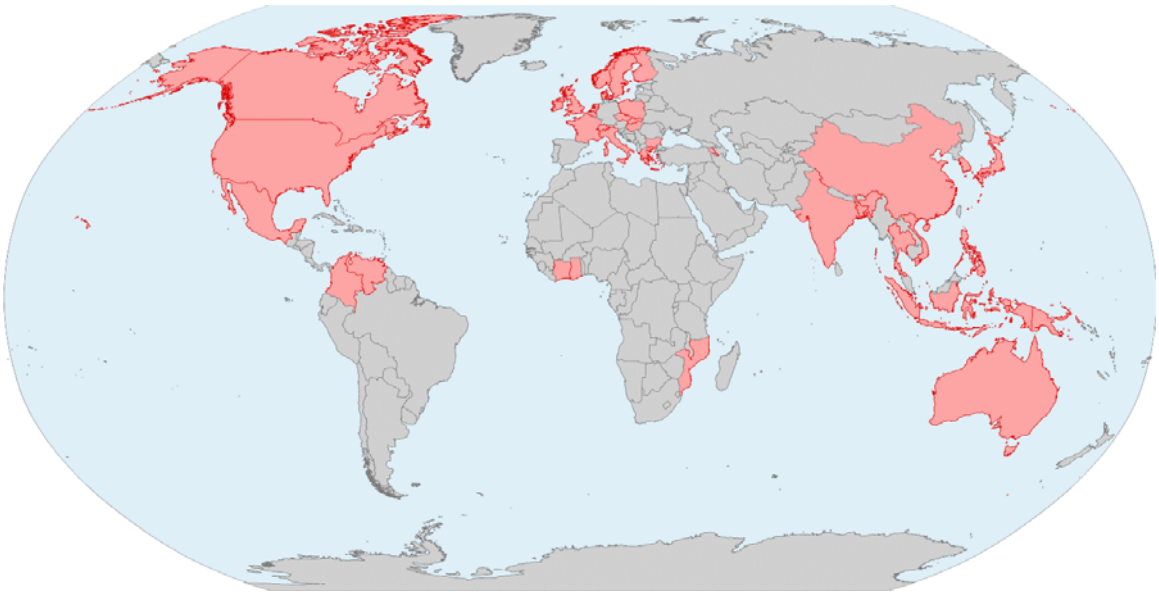
APPENDICES

APPENDIX 1. Map of China with Zhenjiang, Jiangsu Province, and Hohhot, Inner Mongolia Highlighted

APPENDIX 2. Global Map with Countries Adopted EPID Highlighted



APPENDIX 3. Environmental Regulations in China

Year	***Regulations on Pollution Prevention and Control***
1979	PRC Environmental Protection Law (amended 1989)
1982	Marine Environmental Protection Law (amended 1999)
1982	Collection of Pollution Discharge Fees
1984	Water Pollution Prevention and Control Law (amended 1996)
1987	Air Pollution Prevention and Control Law (amended 1995, 2000)
	Solid Waste Pollution Prevention and Control Law (amended 1995)
1995	Provisional Regulations on Huai River Basin Water Pollution Prevention and Control
1996	Environmental Noise Pollution Control Law
2002	Environmental Impact Assessment Law
2002	Cleaner Production Promotion Law
2003	Ordinances on Collecting and Managing Pollution Discharge Fee
	Regulations on Natural Resources and Ecosystem Integrity
1984	Forestry Law (amended, 1998)
1986	Grasslands Law
1986	Land Administration Law (amended, 1998)
1986	Fisheries Law
1986	Mineral Resource Law (amended 1996)
1988	Wildlife Protection Law
1988	Water Law (amended 2002)
1991	Water and Soil Conservation Law
1993	Water and Soil Conservation Law Implementation Regulations
1994	National Park Regulations
1996	Natural Flora Protection Regulations
1997	The Energy Conservation Law
1997	The Flood Prevention Law
2001	Law on Desertification Prevention

APPENDIX 4. Existing Environmental Regulatory Instruments in China

Preventive measures

Three simultaneous

"Three simultaneous" finds its statutory basis in Article 6 of the PRC Environmental Protection Law 1979. It requires facilities for pollution prevention and treatment to be designed and installed along with construction projects in design and construction phases and to be put in operation after construction projects are completed. The design of the above pollution prevention and control facility has to be submitted to local EPBs for approval and documentation. Local EPBs follow through construction projects and finally, without verification and permissions from local EPBs finished constructs cannot be put into use. The implementation rate of the "Three Simultaneous" has become a standard item reported in China environment yearbooks.[1]

Environmental impact assessment (EIA)

Article 13 of the PRC Environmental Protection Law 1989 requires construction projects of potential negative environmental impact to have their EIAs first conducted before approval considerations by development and reform commissions.[2] Later Chinese government promulgated Environmental Impact Assessment Law 2002 which expands to include regional planning on land use or sector-specific development such as industry, agriculture, forestry, infrastructure, etc. beyond construction projects (Article 7 & 8).

Furthermore, EIA Law 2002 specifies the content items to be included in an EIA assessment report for both planning and construction projects: (1) identification, forecasting, analysis, and evaluation of potential environmental damages; (2) alternatives to prevent and/or remedy the negative environmental impacts; (3) feasibility study/cost-benefit analysis of the above preventive and remedial measures; and (4) conclusions on environmental feasibility of the planning or construction projects (Article 10 & 17).

Moreover, EIA Law 2002 gives procedural guidelines on how to conduct, review, and follow up on EIA assessments. For the first time in history of environmental protection in China, it is formally institutionalized in a legal document requiring public authorities to hold public hearings to involve potentially affected parties and experts in EIA (Article 11 & 21). EIAs are conducted by organizations which are accredited by SEPA (Article 19). For approval consideration of regional and sector-specific development plans, governments of relevant levels are required to randomly select experts to independently review submitted EIA reports (Article 13). For construction projects, their EIA reports have to be reviewed by relevant EPBs (Article 22). Although regional and sector-specific plans are not vetoed only based on potentially negative

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[1] PRC Environmental Protection Law 1989; China Environment Publishing House. (2004). *China Environmental Yearbook 2004*. Beijing.

[2] Development and reform commission, before planning commission is the most powerful government agency within the government hierarchy in China. At a central level there is a National Development and Reform Commission (NDRC) and DRCs at each level of local governments. They are responsible for social and economic planning and approving construction projects within their jurisdictions.

environmental impacts, approval of EIA by local EPBs is a prerequisite for construction projects being considered and approved by other government agencies (Article 14 & 25). Owners of EIAs for regional and sector-specific plans are responsible for following up through the implementation of the above plans (Article 15). Local EPBs are responsible for following through and overseeing the construction projects on their environmental impacts (Article 28).

In conclusion, EIA Law 2002 has made environmental impact assessment a concrete pollution preventive measure by specifying scope, content, and procedures of EIAs. Although the honorable attempts, implementation gap has first to be filled before this law takes real effects. Discretion has been left for bureaucrats and other actors in first deciding what plans or construction projects should have EIAs done and then in carrying out and following up on EIAs. Controversies over EIA reports of several construction projects which have attracted a national publicity illustrate challenges in putting EIA Law 2002 to work in China.

Cleaner production[3]

Cleaner Production Promotion Law 2002 aims at preventing and reducing pollution and protecting public health through better resource use/energy efficiency and switching to less polluting raw materials and production technology and processes (Article 1 & 2). While the National Development and Reform Commission (NDRC) and local DRCs are responsible for organizing and coordinating cleaner production in the country, SEPA, local EPBs and other functional line government agencies are in charge of promoting cleaner production (Article 5).

A variety of policy instruments have been employed in this law to promote cleaner production. The state directly intervenes in economic activities through phasing out highly polluting production technology, processes, equipments, and products (Article 12); and incorporating cleaner production in regional and sector-specific planning activities (Article 8 & 9). Less directly, pro-cleaner-production fiscal, tax, industrial and government procurement policies are to be set by the State Council and ministries below it and local governments (Article 7 & 16). Two informational approaches are adopted: labeling of energy and water efficiency and products made of recycled materials (Article 13), and publicizing in local mass media highly polluting enterprises which are out of compliance with national environmental standards and regulations (Article 17).

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[3] Duan, Ning. (2001). "Cleaner Production ,Eco-industry and Circular Economy." *Research of Environmental Sciences* **14**(6). In April 1997 SEPA issued "Comments on the Implementation of Cleaner Production." In May 1999 the National Economic and Trade Commission issued "Notice on Implementing Cleaner Production in Pilot Cities." The UNEP held the 6th International Conference on Cleaner Production in Seoul. The "International Declaration of Cleaner Production" was a product of this conference. The Deputy Minister of SEPA, Xinfang Wang represented the Chinese government and signed on the Declaration. This indicated the commitment to cleaner production of the Chinese government. Over the years, the following provinces and cities, Shaanxi, Liaoning, Jiangsu, Benxi, Taiyuan, and Shenyang have set up and enacted policies and regulations on cleaner production suitable for their local conditions. The statistics on current practice of cleaner production in China are as follows: more than 400 enterprises of over 20 industries in about 20 provinces/autonomous regions/cities have conducted cleaner production audit, more than 20 industrial or local cleaner production centers have been established, and more than 10,000 people have attended trainings on cleaner production.

Additionally, two voluntary approaches have been employed to encourage industry to pursue cleaner production: (1) enterprises which are in compliance with national environmental standards can negotiate agreements with relevant government agencies on further improving resource use efficiency and pollution reduction. And government is responsible for publicly acknowledging the names of the above enterprises and the results of their voluntary efforts (Article 29). And (2) enterprises can voluntarily certify with registered accreditation organizations on national environmental management systems to improve their cleaner production capacity (Article 30).

Moreover, a full range of educational activities are to be carried out to enhance the awareness and capacity of cleaner production among government officials, industry, and the public (Article 15). Furthermore, targeting specifically at building the capacity of industry, the state is responsible for publishing guidelines on and directories of cleaner production technology, processes and products (Article 11); organizing and advocating for provision of technical and informational consulting services by society to industry on cleaner production (Article 10); directing and supporting R&D activities, establishing demo projects, and scaling up of cleaner production technology and products (Article 14).

In short, Cleaner Production Promotion Law 2002 is rather sophisticated and advanced in employing a variety of policy instruments to align the interests of stakeholders and enhance their awareness and capacity. However, it is the NDRCs and DRCs that are in charge of coordinating cleaner production in the country. This institutional set up poses a challenge for SEPA and local EPBs because cleaner production is conventionally understood to be within their jurisdiction. Furthermore, this legal document leaves government agencies the task of promulgating regulations and/or administrative directives to fill in the details of the aforementioned policy instruments such as negotiated agreements with industry. How to carry out the activities prescribed in the law to promote cleaner production through education, training, research and development poses another challenge. As a result there is an implementation gap between the law on paper and the cleaner production action in practice.

Circular economy

Circular economy is a rather new concept in China. It aims at preventing pollution through reducing raw material use, increasing material reuse, and recycling (3R) within an individual enterprise and/or among enterprises of an industry cluster, or in the whole economy.[4] Although China has long been recycling waste, circular economy goes beyond dealing only with end-of-pipe pollution to put emphasis on inputs and production processes and possible connections between enterprises and sectors. Until now, there hasn't had any formal regulation on how to construct a circular economy. But according to intellectuals to fulfill the purpose of circular economy, cleaner production is the core.[5]

Direct regulation

Limited time treatment

[4] Ibid.

[5] Ibid.

Both administrative and economic orders have been directly exerted over industry to control pollution by Chinese government. Governments of different levels command polluters to treat pollution within a limited time period if they have produced significantly negative environmental impacts (Article 29 of PRC Environmental Protection Law 1989). The language itself is vague without specifying what constitutes severe pollution that triggers limited time treatment or sanctions on failing to treat pollution satisfactorily. The above important decisions are left to the discretion of governments of relevant levels.

Emissions permit

Emissions permits on specific pollutants issued to individual enterprises are another regulatory tool for government to directly intervene in pollution behavior of industry. Governments at a provincial level and above can designate certain areas where the air or water quality does not meet standards as total air/water pollution control areas. Enterprises located in these areas are required to obtain emission permits on air/water pollutants from relevant government agencies (Article 15 of Air Pollution Prevention and Control Law 2000; Article 16 of Water Pollution Prevention and Control Law 1996).

Pollution levy/pollution discharge fee

Pollution levy has been a major environmental policy tool intended to stimulate pollution prevention and control efforts by industry since 1981. Polluters pay a fee for a single pollutant discharge which exceeds national standards and is the largest amount relative to other pollutants discharged by a same polluter (Article 28 of PRC Environmental Protection Law 1989). However, the schedule of pollution discharge fee is so low that it is an economically rational choice for polluters to pollute rather than treating pollution.[6] Moreover, EPBs gradually rely on pollution discharge fees for funding to meet their administrative and salary needs. Consequently, the original regulatory goal of preventing and controlling pollution has been displaced.[7]

The 2003 Ordinances on Collecting and Managing Pollution Discharge Fee is thus enacted by the State Council aiming to enhance the deterrence effect of this policy instrument and remedy the above goal displacement. A discharge fee is assessed on any pollution discharge no matter it exceeds national standards or how large it is in comparison with other pollutants. And the rate of pollution discharge fee is indexed to discharge amount with a higher rate assessed on the part of pollutant discharge exceeding national standards (Article 12). Despite pollution has become more expensive, it is still relatively cheaper for polluters to pay for pollution discharge in stead of taking pollution prevention and treatment measures.

Before, EPB officials had to collect door-to-door pollution discharge fees from enterprises where no bank transfer of funds in place. Inevitably, a lot of staff time and

[6] Jahiel (1997: 94) reported that in 1991, clean-up costs for waste water pollutants ranged from 0.30 yuan to 1.00 yuan per ton of water, depending on the type and concentration of the pollutant. But the fee charged on average only about 0.10 yuan. As a result, not only did fee rates fail to encourage firms to purchase pollution control equipment, they actually encouraged those who had such equipment not to operate it.

[7] Jahiel, Abigail R. (1997). "The Contradictory Impact of Reform on Environmental Protection in China." *The China Quarterly* **149**: 81-103.

efforts have been consumed; negotiation with industry, and sometimes corruption are associated with fee collection activities. Specifying bank transfer of pollution discharge fee from industry (Article 14) thus reduces administrative burden and further makes pollution discharge fee more transparent and enforceable. Although local EPBs are responsible for collecting pollution discharge fees, the power to allocate the funds has been turned over to department of finance of a county level and above. And these funds are earmarked for environmental protection usages (Article 18). Bank transfer of pollution discharge fee and the separation of pollution discharge fee collection from appropriation have the potential to correct for misaligned interests. However, to what extent this policy could live up to its potential depends on implementation and enforcement.

Incentive mechanisms

To mobilize resources of industry, the public sector, and civil society, incentive mechanisms including economic, informational, and political are employed for the state to mainstream environment in development agenda and harness market power to achieve better environmental results with less intrusive policy intervention.

Political incentive mechanisms

Table 3 lists all the policies (political incentive mechanisms) targeting at government officials inducing them to take considerations on environment in making regional/local development decisions. For example, environmental protection model city/township/village, national model eco-park, and eco-village aim to honor leader municipalities in mainstreaming environment. However, comprehensive evaluation of city environmental protection and environmental responsibility system work mainly on laggards to ensure minimum consideration has been given to environment. And thus these political incentive mechanisms call for continuous improvement in environmental behavior of governments of different levels.

Economic incentive mechanisms

Targeting at industry to harness market forces in stimulating efforts in environmental protection which are as well in the self-interest of individual enterprises, economic and informational incentive mechanisms have been adopted. Starting in 1998 in Nantong, Jiangsu Province, the Environmental Defense Fund of the U.S. has been working with local EPBs and SEPA to experiment with SO_2 tradable emissions permit in China. Its major policy goal is to reduce SO_2 emissions and occurrences of acid rain in "two-control" zones in China.[8] Now there are 7 provinces in China experimenting with this policy instrument including Jiangsu, Shanxi, Shandong, etc.

Informational incentive mechanisms

Disclosing and revealing environmental performance of industry aim to acknowledge good performers and pressure bad performers to improve because they are assumed to concern about reactions by residents in a same neighborhood, consumers, investors, and business partners in a marketplace. Decisions on how to act on this

[8] Two-control zones aim to control SO_2 emissions and acid rain.

environmental performance information are totally left for enterprises themselves and other players listed above. Color rating and disclosing environmental performance of firms were first experimented in 1999 with mixed results. Now SEPA is considering providing a national implementation guideline on how to rate and disclose industrial environmental performance and individual municipalities are encouraged to make specific policies tailored to their local conditions.[9]

More formally, Article 17 of the Cleaner Production Promotion Law 2002 encourages local governments at a provincial level to publicize at regular time intervals significantly polluting enterprises with pollution discharge exceeding national standards. And this name list is intended to guide the public in targeting specific enterprises in implementing cleaner production. Although specifically for promoting cleaner production, disclosing important pollution sources may potentially lead to improved compliance and enforcement of environmental policies generally because of increased public scrutiny from which derived.

Voluntary approaches

Echoing the Chinese tradition of a positive state and civil society and industry subordinating to it, industry has been playing a rather passive role in environmental protection [NEEDS CITATION HERE]. Voluntary measures taken by industry to improve their environmental performance have been very limited. ISO14000 and associated environmental management systems (EMSs), naming of nationally environmentally friendly enterprises by SEPA starting in 2003, negotiated agreements with public authorities on improving resource/energy efficiency through cleaner production, and voluntarily reporting environmental performance by some publicly traded companies are examples of current practice of voluntary approaches in China. However, certifying with ISO14000 is largely limited to enterprises which have joined the global market; there were only less than 20 enterprises being named by SEPA as nationally environmentally friendly enterprises in the whole country;[10] and there is no documentation on negotiated agreements on resource/energy efficiency between individual enterprises with local EPBs or voluntarily reporting environmental performance by publicly listed companies.[11]

A recent study by Li and Zusman (2005) found that resources available for environmental protection by industry have a statistically significantly positive impact on the institutional capacity of local EPBs in China. A one-point increase in industry capacity leads to a 0.29 point increase in realized capacity of local EPBs. However, the

[9] Interview with the director of the Regulatory Office of SEPA.

[10] The amount of enterprises voluntarily participating in this competition reflects more accurately the popularity of this program. But limited by data availability, only the amount of enterprises honored as nationally environmentally friendly enterprises is cited here.

[11] Chan, Jason Chi-hin ; & Welford, Richard. (2004). Assessing Corporate Environmental Risk in China: An Evaluation of Reporting Activities of Hong Kong Listed Companies. *Corporate Environmental Governance Programme*. Hong Kong. Chan & Welford investigated voluntarily reporting of environmental performance by companies publicly traded in Hong Kong stock market. They found there are very limited substantial facts in reports but reporting companies mainly do it for a public relation purpose.

capacity of industry to protect environment does not help reduce pollutant discharge. Rather, one point increase in the capacity of industry to protect environment increases pollutant discharge by an average of 0.59 point. This means economic development has a double sward effect for environmental protection. It can increase industry capacity to protect environment and become an effective complement to government actions but its effect might not be able to overcome an even faster increase in pollutant discharge in industrial production processes.[12] If more voluntary efforts by industry could be stimulated and they merge with government actions, this study points out the potential benefits that could be gained from voluntary approaches in reducing pollution discharge and complementing government monitoring and enforcement actions.

[12] Li, Wanxin ; & Zusman, Eric (2005). Institutional Capacity of Local EPBs and Its Implications for Pollution Control in China. Urban China Research Network Annual Conference --- Chinese Cities in Transition, Shanghai, China.

APPENDIX 5. Global Trend in EPID

Before telling the specific stories of Zhenjiang and Hohhot, environmental performance information disclosure, as the "third wave" of environmental regulation (Tietenberg, Thomas, 1998), deserves a brief description of its origin and how it was introduced into China. Since the devastating chemical accident at a Union Carbide plant killing at least 2,000 people and injuring 100,000 more in 1984 in Bhopal, India, public access to environmental information has been put into practice at different level of openness in different countries.[13] In 1986, *Emergency Planning and Community Right to Know Act* was endorsed by the US Congress. Consequently, Toxics Release Inventory (TRI) was first officially established in 1988 requiring all manufacturing facilities operating under SIC codes 20-39, with 10 or more employees, to submit a report of their annual on-site releases and off-site transfers of each of over 300 specified toxic chemicals to the US EPA. After random check of data accuracy, US EPA made this information available to the general public. It was reported that between 1989 and 1996, the overall reportable emissions of toxic substances have reduced by 46%. [14] Following the EPA's success with the TRI, the agency and Congress — in an attempt to consolidate environmental information and incorporate environmental risk information beyond simply disclosing the amount of toxic materials released and/or transferred — initiated a number of other disclosure initiatives such as risk management planning, materials accounting, and the Sector Facility Indexing Project (SFIP). But except for SFIP, the rest two failed to be adopted as national programs. [15]

Unlike the United States, most European countries (including Britain, France, and Germany) have had a notorious tradition of secrecy with regard to a broad range of data kept by public authorities.[16] After considerable debate in the European Commission and Parliament, Council Directive No. 313 of 1990 on *Freedom of Access to Information on the Environment* mandated the enactment of transparency legislation in all EU member countries.[17] Going one step further, after the adoption of 1995 *Sofia Guidelines* as the first step towards better access to information at the pan-European level, in 1998 the UN/ECE Convention on *Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters* was adopted (also called *Aarhus*

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[13] Graham, Mary. (200?). Disclosure Of Toxic Releases In The United States. Washington, D.C. **2005;** Sand, Peter H. (2002). The Right to Know: Environmental Information Disclosure by Government and Industry. Human Dimensions of Global Environmental Change: Knowledge for the Sustainability Transition, Berlin.

[14] Khanna, Madhu; Quimio, Wilma Rose H. ; & Bojilova, Dora. (1998). "Toxics Release Information: A Policy Tool for Environmental Protection." *Journal of Environmental Economics and Management* **36**: 243-266. MORE CITES FROM US EPA WEBSITES.

[15] U.S. EPA. (1999). Sector Facility Indexing Project Evaluation. Washington, D.C., Environmental Protection Agency; Beierle, Thomas C. (2003). "Environmental Information Disclosure: Three Cases of Policy and Politics." *RFF Discussion Paper*(03-16); Beierle, Thomas C. (2003). "The Benefits and Costs of Environmental Information Disclosure: What Do We Know About Right-to-Know?" *RFF Discussion Paper*(03-05).

[16] Sand, Peter H. (2002). The Right to Know: Environmental Information Disclosure by Government and Industry. Human Dimensions of Global Environmental Change: Knowledge for the Sustainability Transition, Berlin.

[17] GIVE THE LINK OF ECE/313.

Convention).[18] Then in 2003, European Council and Parliament, Council Directive 2003/4/EC mandated all EU countries to implement Aarhus Convention by 2005.[19]

In June 1995, Indonesia became the first developing country to introduce a public environmental reporting initiative, the Program for Pollution Control, Evaluation, and Rating (PROPER). PROPER was a part of the NAME OF THE PROJECT OF THE WB project, collaborative effort between the Environmental Impact and Management Agency (BAPEDAL), government of Indonesia, and the Infrastructure and Environment (IE) Unit of the Development Research Group (DECRG), the World Bank.[20] Under PROPER, industrial enterprises are evaluated by BAPEDAL, for their environmental performance. The results, in the form of a five-color rating scheme, are reported to the public through press conferences and the Internet. The five colors — gold, green, blue, red and black — reflect performance ranging from excellent to poor.[21]

Dr. Hua Wang, a senior economist of the IE, DECRG of the World Bank planted the seeds and later facilitated the design and implementation of EPID in China. After being informed of international experiences with environmental information disclosure including that of North America, Europe, Australia, and developing countries, the State Environmental Protection Agency (SEPA), Zhenjiang EPB, and Chinese Research Academy of Environmental Sciences (CRAES) became interested in this informal environmental regulation. The rational behind is: (1) pollution in China remains severe despite long-standing efforts to control it with traditional regulatory instruments; (2) a general perception that disclosing environmental performance information incurs very low cost because it does not require formal enforcement procedures; (3) evidence in North America and Southeast Asia has shown EPID could reduce emissions; (4) EPID is spreading in the developing world; and (5) well-developed countries increasingly adopt EPID which further enhances its credibility.[22]

In 1999, "GreenWatch" working program was established under PROJEECT NAME project, in which Zhenjiang, Jiangsu Province and Hohhot, Inner Mongolia were selected as two pilots. Then in 2000 color ratings of industrial enterprises by their environmental performance were first disclosed. Since then, there have been 7 regions experimenting with EPID and SEPA is considering making it a national program in 2005.[23]

In conclusion, the 1990s and early 2000s has seen a global convergence in more open access to and more aggressive discloser of environmental information by government agencies. Altogether, ten developing and/or countries in transition and all the countries in North America and Europe have been implementing EPID.[24] In general,

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[18] GIVE THE LINK OF SOFIA GUIDELINES and AARHUS CONVENTION.
[19] GIVE THE WEB LINK OF EU Council Directive 2003/4/EC???
[20] GIVE THE WEB LINK OF THE DESCRIPTION OF PROPER AND THE TITLE OF THE PROJECT PROPOSAL OF PROPER BY DAVID WHEELER AND BENOIT.
[21] Afsah, Shakeb. (1998). Environmental Management Through Public Information. Washington, D.C. **2003**.
[22] Wang, Hua; Dasgupta, Susmita ; & Wheeler, David. (2001). Public Disclosure of Industrial Pollution in China: Assessing the Impact of "Third-Wave" Regulation. Washington, D.C.
[23] Interview 06242005-01; Ibid.
[24] After Indonesia, the Philippines and Mexico in 1997, China 1998, Thailand, Hungary, and Poland 2000, Ghana and THE COUNTRY ON THE BOARDER OF TURKEY 2004 adopted EPID by their

EPID in developing countries share the following commonalities which are different from that of the U.S. or other developed countries: (1) the information being disclosed is aggregated data at a firm level rather than pollution discharge by facilities; (2) the agents that collect, process, and disseminate environmental information are usually a same government agency, unlike the U.S. where environmental NGOs process disclosed information and disseminate the results;[25] (3) a media conference is usually held when disclose rating results which is often an sensational event; and (4) EPID is relatively under-institutionalized which happens usually once or twice a year.

governments. India is the only developing country in which The Center for Science and Environment (an NGO) has been rating the environmental performance of enterprises of paper and pulp and manufacturing industries since 1996.

[25] India is the only exception.

APPENDIX 6. List of Interviewees

First Name	Last Name	Title and Affiliation
Ruth Greenspan	Bell	Director, International Institutional Development and Environmental Assistance (IIDEA), Resources For Future, Washington, D.C., USA
Dong	Cao	Head, Environmental Planning Office, CRAES, Beijing
Yujun	Chang	Deputy Director, Hohhot Environmental Monitoring Station, Hohhot, Inner Mongolia Autonomous Region
Guiming	Chu	Former director, Zhenjiang EPB, Jiangsu Province
Lu	Dao	Director, New District EPB, Zhenjiang, Jiangsu Province
Guangyuan	Ding	Head, Monitoring Office, Nanjing EPB, Jiangsu Province
	Ding	Head, Resources Office, Economic Commission, Zhenjiang city government, Zhenjiang, Jiangsu Province
	Ding	Head, Pollution Control Office, Zhenjiang EPB, Jiangsu Province
Yongying	Fan	Director, Hohhot Research Academy of Environmental Sciences, Hohhot, Inner Mongolia Autonomous Region
Shunyi	Feng	Deputy Director, Zhenjiang EPB, Zhenjiang, Jiangsu Province
Xun	Ge	Head, Legal Office, Nanjing EPB, Jiangsu Province
Jinlin	Huang	CEO, Quanling Steel Co. Ltd., Zhenjiang, Jiangsu Province
Yunliang	Jia	Deputy Director, Zhenjiang EPB, Jiangsu Province
Wei	Jiang	Head, Legal Office, Jiangsu provincial EPB
Zongna	Kan	Head, Environmental Protection Dept., Hohhot Power Plant, Hohhot, Inner Mongolia Autonomous Region
	Li	Head, Legal Office, Zhenjiang EPB, Jiangsu Province
Xinmin	Li	Deputy Head, Pollution Control Division, SEPA
Xiangdong	Li	Head, Energy and Environmental Protection Dept., Yili Corp., Hohhot, Inner Mongolia Autonomous Region
Yuyong	Lin	Secretary General, Jiangsu Hongtai Steel & Iron Co. Ltd., Jianbi District, Zhenjiang, Jiangsu Province
Jiang	Ling	Head, Policy Research Office, Legal Department, SEPA
Hai	Liu	Chief Engineer, Tongling EPB, Anhui Province
Genfa	Lu	Professor, Nanjing University, Nanjing, Jiangsu Province
Lin	Lv	Head, Public Environmental Education Office, Dantu District EPB, Zhenjiang, Jiangsu Province
Lianzhu	Ma	Head, Energy and Environmental Protection, Yili Corp, Hohhot, Inner Mongolia Autonomous Region
Jieqiu	Mei	Head, Environmental Management Office, Jingkou District EPB, Zhenjiang, Jiangsu Province
Huaping	Mu	Deputy Secretary General, Chongqing city government, Chongqing
Jingzhi	Peng	Head, Planning Office, Zhenjiang EPB, Jiangsu Province
Xinhua	Qu	Head, Industry and Technology Office, Zhenjiang EPB, Jiangsu Province
	Shang	Deputy Head, Legal Office, Zhenjiang EPB, Jiangsu Province
Zigang	Shi	Head, Industrial and Transportation Office, Reform and Development Commission, Zhenjiang city government, Zhenjiang, Jiangsu Province
Yunfei	Sun	CEO, China Force Oil & Grains Industrial Holdings Co. Ltd., Zhenjiang, Jiangsu Province
Yuquan	Tian	Head, Environmental Protection Detp., Sanlian Chemical Plant, Hohhot, Inner Mongolia Autonomous Region

Jinnan	Wang	Chief Engineer, Chinese Research Academy of Environmental Sciences (CRAES), Beijing
Yuan	Wang	Assistant Professor, Nanjing University, Nanjing, Jiangsu Province
Hua	Wang	Senior Economist, Development Research Group, World Bank, Washington, D.C., USA
Gangxi	Xu	Deputy Director, Jiangsu Provincial EPB, Jiangsu Province
Qizhi	Yang	Deputy Head, Industrial Environment Dept., Guoheng Chemical Co. Ltd., Zhenjiang, Jiangsu Province
Yingfeng	Yang	Deputy Director, Hohhot EPB, Hohhot, Inner Mongolia Autonomous Region
Yunfeng	Yang	Former director, Hohhot EPB, Hohhot, Inner Mongolia Autonomous Region
	Yang	呼市电厂前环保科工作人员, 阚推荐对其进行采访
Liang	Yu	Director, Hohhot Environmental Monitoring Station, Hohhot, Inner Mongolia Autonomous Region
Huashan	Yuan	Head, Production Department, Jiangsu Liuzhou Steel Co. Ltd., Zhenjiang, Jiangsu Province
Yuanzhong	Zeng	Director, Runzhou District EPB, Zhenjiang, Jiangsu Province
Jianjun	Zhang	Deputy Director, Zhenjiang Environmental Monitoring Station, Zhenjiang, Jiangsu Province
Jie	Zhang	Head, Industrial Environment Dept., Gold East Paper Co. Ltd., Zhenjiang, Jiangsu Province
Jingyan	Zhang	Head, Planning Office, Hohhot EPB, Hohhot, Inner Mongolia Autonomous Region
Zhuangjing	Zhang	Director, Zhenjiang Agricultural Bureau, Zhenjiang, Jiangsu Province
Yin	Zhang	Deputy Director, Nanjing EPB, Nanjing, Jiangsu Province
Mingjin	Zhao	CEO, Zhenjiang Ge Lan Chun Pu Chemical Company, Zhenjiang, Jiangsu Province
Jiancheng	Zhu	Vice President, Zhenjiang Gold Mountain Cement Company, Zhenjiang, Jiangsu Province
Wenzhong	Zhu	Head, Compliance Assurance and Enforcement Office, Zhenjiang EPB, Jiangsu Province
Jia	Zou	Head, Industrial Environment Dept., Guoheng Chemical Co. Ltd., Zhenjiang, Jiangsu Province
Eric	Zusman	Ph.D. Candidate, Political Science Dept., UCLA, USA

APPENDIX 7. Interview Questions

Cover letter:

尊敬的环保局领导，您好：

我是李万新，在美国弗吉尼亚理工大学公共管理和政策研究中心攻读博士学位。我的博士论文是关于企业环境信息公开化在江苏省的实施情况及其对环保局工作的影响。

企业环境信息公开化在国际上被誉为环境治理的“第三次浪潮，”其实施理念，执行成本和实际效果均不同于以往的政府管制和市场手段。江苏省是实施企业环境信息公开化的排头兵，在全国处于遥遥领先的地位。因为企业环境信息公开化在江苏省取得了很好效果，中国国家环保局计划在全国范围内推广，中国人大环境与资源立法委也在促进相关立法。贵市环保局在企业环境信息公开化方面取得了很大成绩，我相信贵市的实践经验会对我以后的学习和工作大有帮助。

以下的问题涉及了企业环境信息公开化在贵市的实施情况，对环保局工作有何影响，以及您对企业环境信息公开化的看法和建议。您提供的信息对本研究非常重要，并将对本人今后信息公开化的设计和实践产生重要影响。

感谢您同意抽出宝贵的时间接受我的采访并回答以下问题。采访报告写成后，我会首先请您过目，得到您的认可后，采访报告会成为我博士论文的素材。根据您的要求，采访报告和本人论文不公开被采访者的姓名。

再次对您的帮助致以衷心的感谢！

此致

敬礼

李万新

2005 年 5 月 27 日

Interview questions:

- Basic information
  1. Gender
  2. Year of birth
  3. School attainment
  4. Major
  5. Current employer
  6. In which year did you start working for this employer?
  7. In which year did you start working on environmental protection?
  8. In which year did your city start implementing an environmental performance disclosure program?
  9. Did you directly participate in the environmental performance information disclosure program? If yes, what were your responsibilities?
  10. Do you work with industry regarding environmental protection? If yes, what are your responsibilities?
  11. How important is environmental protection?
      (1) Very important; (2) Somewhat important; (3) Neutral; (4) Somewhat unimportant; (5) Very unimportant.
  12. How are you satisfied with the environmental quality of where you live?
      (1) Very satisfied; (2) Somewhat satisfied; (3) Neutral; (4) Somewhat unsatisfied; (5) Very unsatisfied.
  13. In what capacities have you worked in this organization?
  14. Give the names of the two most recent former employers if you had.

- Implementation of Environmental Performance Information Disclosure Programs
  1. What are your major responsibilities in this organization?
  2. What are the major tasks performed by your organization?
  3. How did you relate the environmental performance information disclosure to your regular work?
  4. Do you need to know environmental information to be able to carry your regular work?
     (1) If yes, how do you make use of environmental information?
     (2) How important is environmental information to your work?
  5. What resources did environmental performance information disclosure program demand?
     (1) Personnel
     (2) Funding
     (3) Environmental information from the monitoring station
     (4) Environmental information from the compliance & enforcement office
     (5) How many times every year does your organization make the rating results public? Through what channels?
  6. Does your organization have enough resources for implementing the environmental performance information disclosure program?
     (1) Personnel: Very sufficient; Sufficient; Neutral; Insufficient; Very insufficient.

(2) Funding: Very sufficient; Sufficient; Neutral; Insufficient; Very insufficient.
(3) Environmental information (Quantity): Very sufficient; Sufficient; Neutral; Insufficient; Very insufficient.
(4) Environmental information (Quality): Very good; Good; Bad; Very bad.
(5) How difficult it is to coordinate the line offices for implementing the environmental performance information disclosure program if there is a need? Very difficult; Difficult; Neutral; Easy; Very easy.

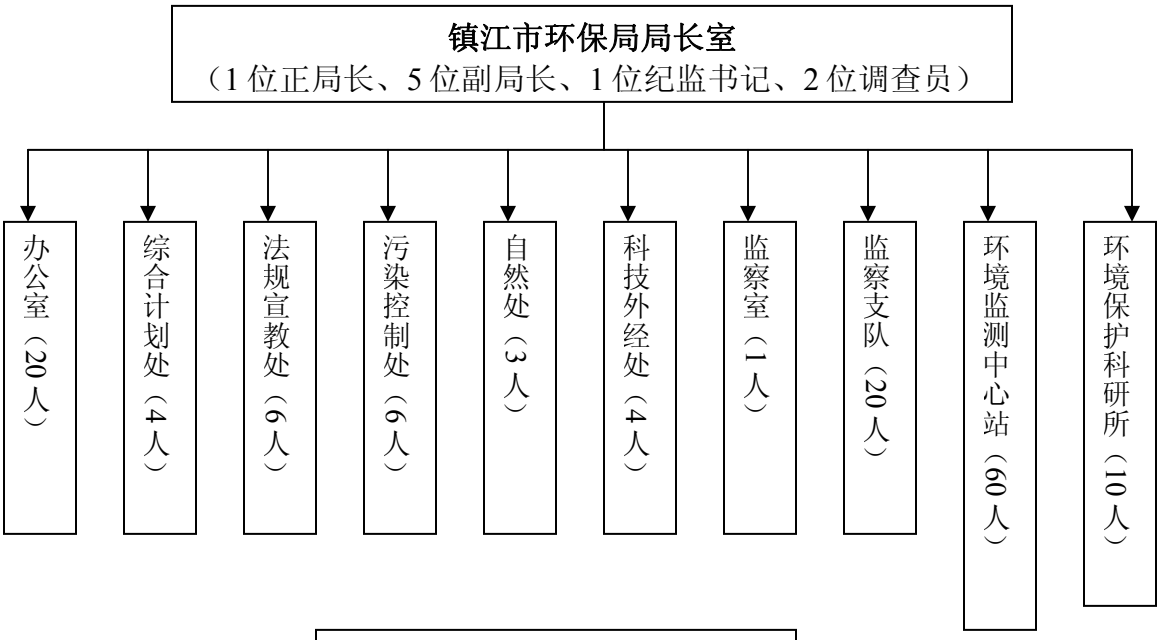
7. Is there an EPB director in charge of implementing and coordinating the environmental performance information disclosure program?
8. If there was a lack of resources for program implementation, how did you solve the problem?
9. Which of the following parties would be interested in environmental performance information disclosure program?
   (1) State Environmental Protection Administration;
   (2) Provincial environmental protection bureau;
   (3) Provincial government;
   (4) City government;
   (5) Relevant industrial and economic agencies of the same level;
   (6) The public;
   (7) Industry;
   (8) The mass media;
   (9) Trade association;
   (10) Nongovernmental organization.
10. Do you work closely with industry within your jurisdiction?
   (1) How many times a week do you communicate with firms?
   (2) Through what channels do you communicate with firms?
   (3) How difficult is it to work with industry? Very difficult, difficult, neutral, easy, very easy?
11. What policies are in place to encourage the adoption of an environmental performance information disclosure program?
12. Did the following parties play an important role in advocating and promoting the environmental performance information disclosure programs?

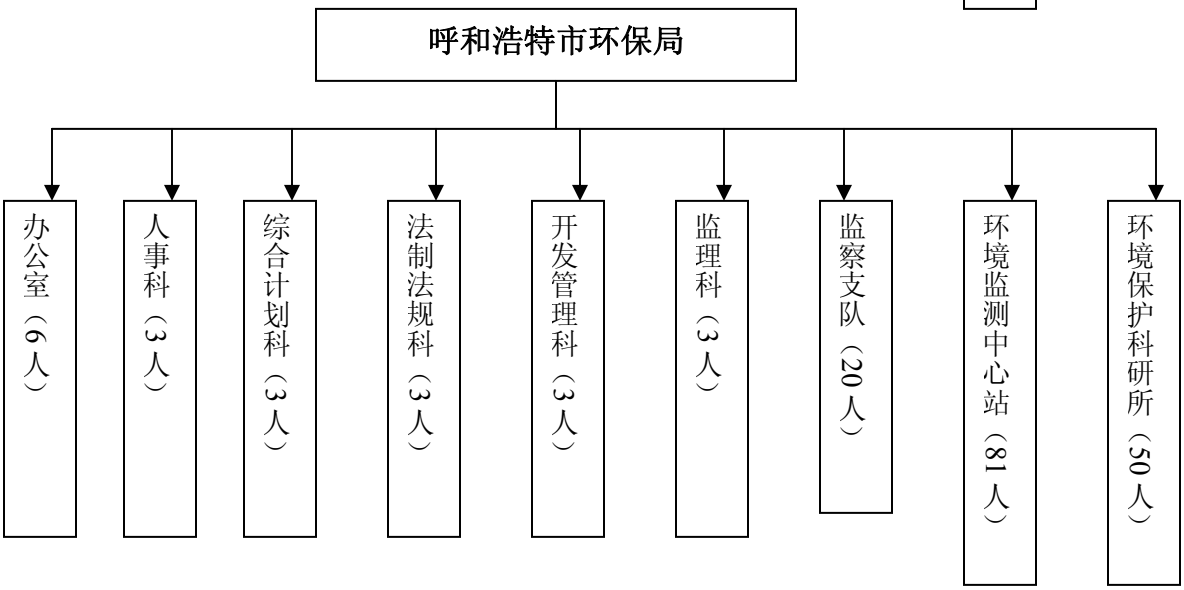
	Very important	Important	Neutral	Unimportant	Very unimportant
SEPA					
Provincial EPB					
City government					
Relevant industrial and economic agencies					
Industry					
The public					
Trade associations					
Environmental NGOs					

13. What is your perception of the context in which the environmental performance information disclosure programs are implemented?
14. What are the favorable/unfavorable contextual factors that influenced the implementation of environmental performance information disclosure programs?

- Impact of the environmental performance information disclosure programs
  1. Are the environmental performance information disclosure programs effective in changing the environmental behavior of firms?
     (1) If yes, please list three aspects which have been most influenced?
  2. What impact did the environmental performance information disclosure programs have on your work?
  3. What impact did the environmental performance information disclosure programs have on the work of your organization?
     (1) Impact on the internal work of your organization;
     (2) Impact on the relationship between your organization and other government agencies;
     (3) Impact on the relationship between your organization and industry;
     (4) Impact on the relationship between your organization and the public.
  4. What lessons have learned from the experience in your city on implementing environmental performance information program?
  5. What impact did the environmental performance information disclosure programs have on SEPA?
  6. What impact did the environmental performance information disclosure programs have on provincial EPB?
  7. What impact did the environmental performance information disclosure programs have on industry?
  8. What impact did the environmental performance information disclosure programs have on relevant industrial and economic agencies?
  9. What impact did the environmental performance information disclosure programs have on the public?
  10. What impact did the environmental performance information disclosure programs have on trade associations?
  11. What impact did the environmental performance information disclosure programs have on environmental NGOs?

APPENDIX 8. Organizational Structure of Zhenjiang and Hohhot EPB





办公室：日常杂务。

人事科：职称评定；业绩考核、晋升；干部培训。

综合计划科：制订环保计划、规划；不管财务。

法制法规科：与呼市人大合作；污染事故处理，等。

开发管理科（含自然生态）。

监理科（含辐射）。

APPENDIX 9. Memorandum on Piloting Environmental Performance Disclosure of Industrial Enterprises in Zhejiang

To: Zhenjiang city government

From: Zhenjiang environmental protection bureau

Date: January 6, 2000

Environmental protection is a fundamental national policy in China. Control of industrial pollution is the most important task for environmental protection. Given changed social and economic circumstances, environmental protection agencies have to explore new pollution control instruments, improve existing environmental management practice, guide and push industry to pursue better environmental performance, and ultimately realize harmonious development both in terms of economic advancement and environmental protection.

Beyond traditional command-and-control and market-based pollution control instruments, governments and environmental protection organizations of different countries are currently exploring a new instrument for environmental management — information-based. Experiences have shown that information-based pollution control instrument is more advantageous than conventional policy tools.

Disclosing environmental performance information of industrial enterprises has been proved to be a cost-effective measure for pollution control. This measure is to rate the environmental performance of industrial enterprises and make the ratings results available to the publicly on a regular basis. Through information disclosure, market and communities will respond to this information and exert pressure on polluters to improve their environmental performance. This "honor and shame" mechanism works in a way that good performers will gain better image and better return from markets and thus good behavior could be sustained; while bad performers will be shamed by the negative publicity and thus their profitability will be impacted negatively.

Under the guidance from the World Bank and SEPA, Zhenjiang EPB has worked closely with Nanjing University for two years to develop an indicator system for rating and disclosing environmental performance of industrial enterprises. This indicator system is fully compatible with current environmental management system in China and the practice and objective of environmental management in economically advanced coastal regions. Moreover, an environmental information database has been constructed. Being theoretically justified and practically designed, Zhenjiang is ready to rate and disclose environmental performance information to the public.

Zhenjiang EPB hope Zhenjiang city government would consider approving Zhenjiang to first experiment with environmental performance information disclosure of industrial enterprises as soon as possible. If approved, this is going to be a very meaningful and significant exploration towards the enrichment of Chinese environmental management system.

Source: Author translation based on (Wang, Hua et al., 2002), Appendix 11.1.2, p.188.

APPENDIX 10. A Zhenjiang City Government Directive on Implementing Environmental Performance Information Disclosure of Industrial Enterprises in Zhenjiang

Zhenjiang city government [2000]94

June 19, 2000

Environmental protection is a fundamental national policy in China. Control of industrial pollution is the most important task for environmental protection. Given changing social and economic circumstances, environmental protection agencies have to explore new pollution control instruments, improve existing environmental management practice, guide and push industry to pursue better environmental performance, and ultimately realize harmonious development both in terms of economic advancement and environmental protection. Disclosing environmental performance information of industrial enterprises is to rate the environmental performance of industrial enterprises and make the ratings results available to the publicly on a regular basis. Through information disclosure, market and communities will respond to this information and exert pressure on polluters to improve their environmental performance.

After the analytical work in the past two years, Zhenjiang has developed an indicator system to rate and disclose environmental performance of industrial enterprises. This indicator system is fully compatible with current environmental management system in China and the practice and objective of environmental management in economically advanced coastal regions. Moreover, an environmental information database has been constructed. Zhenjiang is ready to rate and disclose environmental performance information to the public. To implement this policy well, the following suggestions are better to be considered.

The following principles should guide the implementation of environmental performance information disclosure of industrial enterprises: open, just, objective, and accurate; pursue good quality of work, and environmental and social benefits; be conscious to local conditions, act proactively, and scale up steadily. Zhenjiang environmental protection bureau takes the responsibility to develop detailed procedures and mechanisms for information disclosure. Zhenjiang environmental protection bureau will set up rules and standards to institutionalize the practice of environmental performance information disclosure.

Currently, environmental performance information disclosure is mainly applicable to enterprises within Zhenjiang downtown districts. Other enterprises outside can participate on a voluntary basis. Disclosure can also be extended to more enterprises of more industries. Zhenjiang environmental protection bureau is responsible for selecting enterprises and rating & disclosing their environmental performance.

To facilitate environmental performance information disclosure, a project leading group is formed headed by officials of Zhenjiang city government and comprised of officials from relevant functional agencies. Zhenjiang environmental bureau plays a major role in this leading group. This leading group is responsible for making decisions on important matters and coordinating among project participants.

CC: Zhenjiang EPB, relevant news agencies.

Source: Author translation based on (Wang, Hua et al., 2002), Appendix 11.1.5, p.192.

APPENDIX 11. Notice on Disclosing (Trial) Environmental Performance Information of Industrial Enterprises and Public Organizations in Hohhot by Hohhot Environmental Protection Bureau

Date: January 13th 2000

To the person who may concern:

To facilitate meeting the policy goals of "Control One, Meet Two Standards," improve environmental management and pollution control capacity of polluting organizations, improve the environmental quality of Hohhot, increase public environmental awareness of industry, citizens, communities, and mass media, and make the image of Hohhot better, under the guidance and support from SEPA, the World Bank, and Chinese Research Academy of Environmental Sciences, Hohhot environmental protection bureau decided to disclose the rating results of environmental performance of industrial enterprises and SHI YE DAN WEI. To make disclosure successful, after through discussions, a trial disclosure will be first conducted. Regarding this trial disclosure:

There are 52 industrial enterprises and 48 SHI YE DAN WEI participated in this trial disclosure.

Environmental performance is rated using a five-color scheme. Please refer to the attachment I and II for detailed information on the meaning of the five colors and the rating of your organization.

Disclosure of environmental performance information is going to be carried out twice a year. After this trial disclosure, a formal disclosure will be held on March 1st, 2000. Afterwards, disclosure will be held every half a year. Formal disclosure will be held by Hohhot city government.

This trial disclosure will only invite relevant government agencies and representatives of organizations being rated. While news agencies such as Inner Mongolia TV Station, Hohhot TV Station, Inner Mongolia Daily, Hohhot Daily, and Hohhot Radio Station will be invited to the formal disclosure. Also the rating results will be available from the Internet.

If you disagree with the rating results from this trial disclosure, please send your comments to the office of pollution control and enforcement.

Enclosed: Color rating results of environmental performance

CC: SEPA, Inner Mongolia EPB, Chinese Research Academy of Environmental Sciences

Source: Author translation based on (Wang, Hua et al., 2002), Appendix 11.2.2, p.198.

APPENDIX 12. How Involved was Hohhot EPB in EPID

Mr. Zhang has been working for Hohhot EPB since 1995. He has extensive experiences working with industry. And he is very knowledgeable on environmental regulations and what requirements industry has to meet as well as how to make them comply. In August 1998, he was assigned to be a team member of the Expert Advisory Group. Before that, he neither attended any of the meetings on EPID, nor was informed of EPID through any informal channel by HRAES.

"Oh, that (EPID) is the project of the Director of HRAES. We heard that he has been to the United States because of that project. We didn't participate or contribute that much to it. In December 1999, he came to us for help when he couldn't figure out a way to get things done. He showed us the list of pollutants and indicators on environmental management that he and people of CRAES chose. That list is too long, requires too much information, we couldn't afford. He couldn't get any color rating for industrial enterprises, he was stuck there.

Then we suggested EPID could be combined with the 'Control One, Meet Two Standards' working program. This working program was mandated by SEPA in 1997 and Hohhot EPB takes charge of implementing it. We have to meet the program goals by 2000: all important sources of industrial pollution have to meet national emissions standards on certain specified pollutants both in terms of concentration level and amount of total discharge. To carry out this program, we have compiled a list of important pollution sources. So EPID adopted the same list of pollutants and the same list of target enterprises as the 'Control One, Meet Two Standards' working program.

I didn't know what happed with EPID after the meeting at which we made the suggestions. Yes, I have read some newspaper reports on EPID but didn't get any update from an official channel. It is a pity that we didn't continue carrying it out.

Actually I personally would clap for EPID because it would give industry extra pressure to clean up. But we have to be very cautious in selecting pollutants and type of industrial enterprises. As you may know, pollutant discharge is very industry sensitive and season sensitive. In the beginning, they included some toxics mostly discharged by small chemical plants. The amount of discharge of these pollutants was very small, the pollution sources were very easy to identify, and treatment technology and facility were readily available. Compared with traditional pollutants such as sulfur dioxide they are quite easy to deal with. Probably we don't need to include these toxics or industry of this sort in EPID because we know how to work with them. In contrast, those big power plants emit huge amount of sulfur dioxide and it is very expensive to control emissions. It would be more beneficial if we make the environmental performance of these power plants publicly available. This will give them impetus to do better."

Source: Interview 07152005-02.

APPENDIX 13. Scale Used in Evaluating Environmental Performance of the Zhenjiang and Hohhot EPB

Variable	Code
Enough human resources?	1=非常充足 2=比较充足 3=一般 4=比较不足 5=非常不足 6=不知道
Enough financial resources?	1=非常充足 2=比较充足 3=一般 4=比较不足 5=非常不足 6=不知道
Quantity of environmental information?	1=非常充足 2=比较充足 3=一般 4=比较不足 5=非常不足 6=不知道
Quality of environmental information?	1=非常好 2=比较好 3=一般 4=比较差 5=很差 6=不知道
Difficulty in coordination within an EPB	1=非常难 2=比较难 3=一般 4=比较容易 5=非常容易 6=不知道 7=不需要协调
Frequency of interaction with enterprises	1=非常频繁 2=比较频繁 3=一般 4=比较少 5=非常少
Difficulty in working with enterprises	1=非常难 2=比较难 3=一般 4=比较容易 5=非常容易