Industrial Water Pollution in Dongying City, the Yellow River Delta of China

Communication Interfaces between Government Agencies and the Local Population

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Jiaxin Tan
aus
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First Supervisor: Prof. Dr. Solvay Gerke

Second Supervisor: Dr. Franz W. Gatzweiler

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[1] "Delta Information System for Geoenvironmental and Human Habitat Transition" (http://www.delight.eoc.dlr.de/).

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List of Abbreviations

ACEF	All China Environment Federation
CAS	Chinese Academy of Science
COD	Chemical Oxygen Demand
DELIGHT	Delta Information System for Geoenvironmental and Human Habitat Transition
DYEDA	Dongying Port Economic Develop Area
DYEEI	Dongying Action Program of Enhancing the Ecological Environment Improvement
DYEPB	Dongying Environmental Protection Bureau
DYOFB	Dongying Ocean and Fish Resources Bureau
DYG	Dongying People's Government
DZG	Daozhuang Town People's Government
DZHEA	Daozhuang High-efficiency Ecological Economic Develop Area
EIA	Environmental Impact Assessment
EPB	Environmental Protection Bureau
GREPB	Guangrao County Environmental Protection Bureau
GRLRB	Guangrao County Land and Resources Bureau
GREPB	Guangrao County Envrionmental Protection Bureau
GRG	Guangrao County People's Government
GRWRB	Guangrao County Water Resources Bureau
HKG	Hekou District People's Government
HKWRB	Hekou District Water Resources Bureau
ICT	Information and Communications Technology
IGSNRR	Institute of Geographic Sciences and Natural Resources Research
IPE	Institute for Pubic and Environment
MEP	Ministry of Environmental Protection
MOHURD	Ministry of Housing and Urban-Rural Development
MWR	Ministry of Water Resources
NDRC	National Development and Reform Commission
NRDC	Nature Resource Defense Council
NGO	Non-government Organization

PCIPI	Petroleum and Chemical Industry Planning Institute
PITI	Pollution Information Transparency Index
RMB	Renminbin
SDDEP	Shandong Provincial Department of Environmental Protection
SDHUC	Shandong Provincial Department of Housing and Urban Construction
SIWI	Stockholm International Water Institute
SPBEZ	Shandong Peninsula Blue Economic Zone Development Plan
TCPCS	Tough Choices Policy Consensus Systems
WRB	Water Resources Bureaus
WWT	Wastewater Treatment
XHG	Xianhe Town People's Government
YRD	Yellow River Delta
YRDHEZ	Yellow River Delta High-efficiency Ecological Economic Zone Development Plan
ZEF	Centre for Development Research

Deutsche Zusammenfassung

Während China sich schnell von einer landwirtschaftlich basierten Ökonomie zu einem Industrieland gewandelt hat, hat die außergewöhnliche Intensität der wirtschaftlichen und sozialen Veränderungen Umweltprobleme hervorgerufen. Industrielle Wasserverschmutzung ist wegen ihrer Auswirkungen auf Gesundheit und Umwelt besonders gefährlich. Mit dem zunehmenden Umweltbewusstsein chinesischer Bürger muss die Regierung sowohl auf Anfragen reagieren als auch den gegenseitigen Dialog mit den lokalen Gesellschaften aufbauen. Diese Studie schlägt eine analytische Sicht auf Schnittstellen der Kommunikation vor, um das Auftreten industrieller Umweltverschmutzung und die sozialen und politischen Reaktionen darauf in der Stadt Dongying im Delta des *Yellow River* zu untersuchen. Die Forschung betrachtet tägliche Routinen und bürokratische Praktiken der Umweltkontrolle, wie sie in der lokalen Wasserverwaltung durchgeführt werden. Die empirische Studie dokumentiert ebenso die Wahrnehmung der Bewohner in betroffenen Ortschaften sowie deren Wissen über Verschmutzung.

Die analytische Sicht auf Kommunikationsschnittstellen basiert auf der Schnittstellenanalyse von Long (1989) sowie auf der Philosophie der Metakommunikation von Bateson (1951). Die Einbettung von Kommunikationsschnittstellen in allgemeine Machtverhältnisse ist durch die Studien von Foucault (2000) inspiriert. Die Studie hat den Anspruch, innerhalb komplexer Gegebenheiten Muster zu erkennen und somit den dynamischen und vielschichtigen Charakter von Umweltmanagement in China zu analysieren.

Es wurden vor allem Interviews, Beobachtungen und *Participatory Rapid Appraisal* sowie eine Umfrage unter 110 Haushalten eingesetzt, um die individuellen Erfahrungen der lokalen Akteure zu dokumentieren. Inhaltsanalysen politischer Strategie- und Planungsdokumente, Gesetzestexte und Sekundärdaten zur Umweltverschmutzung trugen zu einem besseren Verständnis der industriellen Entwicklung im Delta des *Yellow River* bei. Informationen aus öffentlichen Medien, Diskussionsforen im Internet und Dokumentarfilme boten reichlich Material über die öffentliche Debatte zu Umweltmanagement in China.

Die Ergebnisse zeigen eine Zunahme technischer Maßnahmen in Dongying, die industrielle Verschmutzung verringern sollen. Maßnahmen zur Steigerung der öffentlichen Teilhabe an Umweltmanagement sind jedoch wenig effektiv. Anhand des anschaulichen Beispiels der Kampagne „*China Water Week*“ wurde festgestellt, dass die gegenseitigen Botschaften, die

innerhalb der Wasserbürokratie und über verschiedene Ebenen ausgetauscht wurden, nicht kohärent waren. Der Informationsfluss zwischen Wasserbeamten und der Bevölkerung war oft unterbrochen und behinderte die öffentliche Teilhabe an der Kampagne.

Im Hinblick auf widersprüchliche Signale der Regierungsbehörden in die Richtung von Umweltaktivisten, ergab die Analyse der Daten, dass bei den Kadern der Wille vorherrscht, die Situation unter Kontrolle zu halten. Dieses Ziel soll mit täglichen Routinen erreicht werden, die Vorsichtsmaßnahmen beinhalten, die sowohl Beschuldigungen vermeiden als auch den Kadern erlauben, sich sicher in ihrer *comfort zone* aufzuhalten, statt sich mit den Anfragen der Bewohner auseinanderzusetzen oder auf sie zu reagieren.

Für die Analyse der Kommunikationsprozesse und Interaktionen zwischen Regierungs-behörden und lokalen Akteuren wurden zwei Arten von Schnittstellen untersucht: (a) die virtuelle Schnittstelle zwischen Behörden und betroffenen Bewohnern und (b) die nicht-virtuelle Schnittstelle zwischen Behörden und Umweltaktivisten.

Die virtuelle Schnittstelle war vor allem durch eingeschränkte Aktivitäten und den eingeschränkten Zugang zu Informationen für die ansässige Bevölkerung sowie durch fehlende Rückkopplungskanäle und wenig Unterstützung durch Vermittler geprägt. Durch die Untersuchung von Umweltaktivismus wurde die nicht-virtuelle Schnittstelle dokumentiert. Umweltaktivisten setzten auf eine Strategie des schrittweisen Wandels, um ihren Verhandlungsrahmen gegenüber den Kadern auszuweiten. Die Ergebnisse illustrieren sowohl die Politik der Entscheidungen als auch die Strategien der Mitarbeiter der Behörden, um Verhandlungsraum zu schaffen.

Neben dem Umweltaktivismus in Donying wurde auch eine Initiative einer Umweltorganisation auf Provinzebene betrachtet. Die Umweltorganisation erreichte eine hohe Performanz der Kommunikationsschnittstelle (zum Aufbau eines gegenseitigen Dialoges mit Topkadern der Provinz) durch eine Strategie, die sowohl digitale Werkzeuge als auch die Weitergabe von Informationen an die Behörden förderte Die Ergebnisse verdeutlichen allerdings, dass die Herangehensweise der Organisation (*"give-and-take"* Ansatz) keine Auswirkung auf den asymmetrischen Informationsfluss zwischen Regierungsbehörden, der allgemeinen Öffentlichkeit und anderen Umweltorganisationen hatte.

In Bezug auf die Diskussion um die Förderung digitaler Umwelt-Governance wurde herausgestellt, dass während die Behörden auf Provinzebene diesen Ansatz unterstützen, die

lokale Umsetzung wenig vorankam. Ausschlaggebend dafür waren institutionelle Unzulänglichkeiten, eingeschränkte Ressourcen sowie die geringe digitale Kompetenz lokaler Kader.

Das Erkennen der virtuellen und nicht-virtuellen Schnittstellen in dieser Studie zeigt, dass der Zugang zu Informationen und das Vorhandensein gegenseitiger Kommunikationskanäle ausschlaggebend zur Verminderung von Kommunikationsbarrieren sind. Die Resultate der Umfrage illustrieren, dass die Bevölkerung die meisten Informationen aus Massenmedien bezieht. Die Nutzung digitaler Medien zum Erhalt von Umweltinformationen ist noch gering. Das stärkste öffentliche Interesse besteht an Daten zur Wasserqualität. Informationen darüber werden vor allem in Gesprächen mit Verwandten und Freunden ausgetauscht.

Mit Hinblick auf die Lebensgrundlagen und Sorgen der Bewohner sind vor allem die Relevanz der Information (Ausbildung der Kinder, Gesundheitsversorgung, Krankenversicherung) sowie der wirtschaftliche Wert der Information (ländliche Politik, Programme zur Wirtschaftsförderung) wesentlich für die Bevölkerung. Um die Rolle von Akteuren herauszustellen, schlägt die Studie einen grundlegenden kausalen Mechanismus vor, der eine dynamische Art, Bewältigungsstrategien der Bevölkerung in Bezug auf industrielle Wasserverschmutzung einzusetzen, skizziert. Dieser Mechanismus unterstreicht die kausalen Verbindungen zwischen Kommunikation, Informationsfluss, Wahrnehmung und Bewältigung.Die Ergebnisse zeigen wie Kommunikation und Informationsaustausch das Wissen der Anwohner über Wasserverschmutzung beeinflussen. Dieses Wissen ermöglicht es ihnen, sowohl ihre Beobachtungen zu interpretieren als auch Kapazitäten im Umgang mit Verschmutzung zu entwickeln. Dabei wurde festgestellt, dass die Anwohner sich reflektierend mit Wasserverschmutzung beschäftigen. Die meisten Leute negieren weder die Verschmutzung noch leisten sie Widerstand. Stattdessen akzeptieren sie die gegebenen Umstände. Eine kritische Aneignung findet statt. Dieses Ergebnis unterstreicht die subtile Bedeutung von Bewältigung in Bezug auf lokale Praktiken der Machtausübung.

Die Analyse der Schnittstellen wurde zur Interpretation der Beziehungsmuster unter den Akteuren und deren Gruppen im Umweltbereich genutzt. Der Fokus auf Kommunikation ermöglichte eine dynamische Dokumentation der Interessen sowie der kommunizierten Signale.Der konstituierende Charakter von *fractal and connective tissue* – zwei Schlüsselkonzepte des analytische Rahmens – bietet praktische Ansätze um lokale Perspektiven und kulturelle Praktiken im Umweltmanagement zu berücksichtigen. Um einen

inklusiven Ansatz des Umweltmanagements zu fördern, sollten Entscheidungsträger den vorgeschlagenen kausalen Mechanismus in ihren Umweltprogrammen aufgreifen.

Zusammenfassend lässt sich die Studie folgendermaßen beschreiben: Die Untersuchung betrachtet die Machtbeziehung zwischen Staat und Gesellschaft in China, indem sie neue Erkenntnisse zum dynamischen und vielschichtigen Charakter der aktuellen Umwelt-Governance anbietet, die sie aus der Analyse der Kommunikationsschnittstellen zwischen Umweltbehörden und von Verschmutzung betroffenen Anwohnern gewonnen hat. Der Blick in beide Richtungen ermöglicht die Identifizierung widersprüchlicher sozialer Interessen, sowie von Werten, Zuschreibungen und vorhandenem Wissen. Da weiteres wirtschaftliches Wachstum laut Regierungsplan mit der Vermeidung von Verschmutzung einhergehen soll, sollten die lokalen Anwohner, die täglich auf saubere Wasserressourcen angewiesen sind, in die Kommunikation über die politischen Visionen durch die politischen Entscheidungsträger und Umsetzungsbehörden einbezogen werden. Bisher wird vor allem über die Anwohner kommuniziert, nicht mit ihnen. Ein stärkeres Engagement zur Einbeziehung der Bevölkerung in den Dialog, Wissensaustausch und gemeinsames Lernen wäre wichtig. Die Studie zeigt, dass während sich das Umweltmanagement in China zunehmend digitaler Werkzeuge bedient, die Bevölkerung noch Zeit braucht, diese digitalen Werkzeuge zu akzeptieren und zur Informationsbeschaffung zu nutzen. Aus diesem Grund ist es ratsam, Kommunikationskanäle, die dem gegenseitigen Austausch dienen, zu pflegen und weiterhin traditionelle Medien wie das Fernsehen sowie Gespräche in Gemeinden zu nutzen, um die Bevölkerung über Wasserprobleme zu informieren.

CHAPTER 1 INTRODUCTION: PROBLEMATIZING INDUSTRIAL WATER POLLUTION IN CHINA

The 2015 World Water Week -organised by the Stockholm International Water Institute (SIWI) - addressed the issue of "water for development". According to the SIWI (2015), water is critical to pursue a new set of Sustainable Development Goals - for sustaining a productive economy to live healthy lives, producing our food, energy and other basic commodities. However, drivers of economic growth such as rapid industrialization and urbanization in developing countries have brought serious challenges to water resources management. In particular, water pollution triggered by rapid industrialization poses a big risk to the local population, due to its negative environmental and health impacts. In order to sustain water for human sustenance, health and dignity, it is hence imperative to increasingly base growth on accelerated prevention of pollution and abatement efforts (ibid.).

The contestation of China's water pollution

Since the beginning of its political reform in 1978, China has undergone a rapid move from agriculture-based economies to industrial production. The country experienced the greatest of economic growth within period, on the one hand. The extraordinary intensity of economic and social changes became the latent inducement to China's emerging environmental issues, on the other hand. Notably, the emergence of environmental pollution has a close link to China's economic transition. The onset of the country's rapid industrialization started in the late 1990s, when China began to build large industrial parks and economic development zones in urban areas (Yuan *et al.*, 2010). The intensive industrial activities produced significant volumes of untreated wastewater and solid waste, which resulted in the heavy pollution of the receiving water bodies (Bao & Fang, 2012; Hu & Cheng, 2013). According to one World Bank (2006) report, roughly 70% of the river water in China is unsafe for human consumption, which is perceived as a significant challenge for drinking water supply to rural people who rely on those sources. Results from the 2012 national water quality survey reveal that, water from only 64.2% of the river sections, 58.8% of the major lake areas, 81.1% of the major reservoirs, and 23.2% of the groundwater wells could meet the quality criteria of drinking water (MWR, 2012). According to Ebenstein (2012), the pollution levels in China's water bodies are believed to be the highest in human history. This magnitude of

water contamination also poses a significant threat to China's food security, since large amounts of produced grains, vegetables, and fruits are found to be irrigated with untreated industrial wastewater (Circle of Blue, 2013). These accounts shed light on the fact that the environmental cost of China's industrialization is enormous which may even suffocate Chinese economy.

While contributing to China's economic growth, rural industrial enterprises were found to be the driving forces of China's industrial water pollution (Schmidt, 2002; Wang *et al.*, 2008). To specify this, Xu *et al.* (2001 cited in Wang *et al*. 2008) underline that there is a positive correlation between the density of rural industries and the runoff load they generated. It is worth noting that water pollution was found to be an inducement in the occurrence of cancer villages in China (Liu, 2010; Gong & Zhang, 2013 cited in Lu *et. al,* 2015). A more specific example is illustrated in Ebenstein's (2012) study on the causal linkage between water pollution and digestive cancers. The author points out that rural cancer rates increased immensely since the 1990s, and this trend was proved to be concurrent with the decline in water quality (ibid.). Zhang *et al.* (2014) address that rural cancer morbidity is higher than urban areas, because most rural residents still depend on the untreated industrial wastewater for drinking. Scholars ascribe the rootedness of the problem to the bad environmental performance, low technology of wastewater treatment of rural industries, as well as strong support to intensive industrialization by local authorities (He *et al.*, 2014; Wang *et al.*, 2008).

In examining the health consequences of industrialization, Ebenstein (2012) highlights that the need to curb industrial dumping of untreated wastewater in the near future is pressing for the Chinese government. Indeed, the top government leader has signalled that they would commit an unprecedented sum toward pollution control. In the opening session of the 2015 National People's Congress, Chinese President Mr. Xi Jinping announced that, "we are going to punish, with an iron hand, any violators who destroy [the] ecology or environment, with no exceptions." At the same event, Chinese Premier Mr. Li Keqiang also raised his concern about environmental pollution and declared "war on pollution"[2](McGregor & Liu, 2015). China's battle with water pollution cannot, however, be done in isolation, but only in dialogue with stakeholders. This is a process-based approach that extends beyond legislation

[2] Premier Li said in the 2015 National People's Congress opening session, "environmental pollution is blight on people's quality of life and a trouble that weighs on their hearts" adding, "we must fight it with all our might."

and (or) rule making of resources use, also considering the broader implications from the perspective of lay actors who depend on the resources on a day-to-day basis (see SIWI, 2015). On that account, China has to strike the balance between the interests of industry and those it employs against the interests of local communities (Ebenstein, 2012).

The emergence of China's industrial water pollution triggers public concern in the midst of people's increasing environmental awareness. Citizens are getting more active in the contestation of China's environmental management. In 2015, a documentary "Under the Dome" which investigated the country's air pollution garnered over 100 million views within 48 hours of its release in the web, showing that Chinese people were frustrated with pollution (McGregor & Liu, 2015). The documentary addressed open criticism of the government's efforts, and was eventually removed from the major video streaming sites, due to the fact that not everyone in the country was comfortable about high public focus on the smog (deBoer, 2015). Despite this, the documentary turned out to be an unprecedented inspiring show of public support to environmental protection in China. It also presented a powerful mandate to the government (ibid.). In relation to the public sentiment of discontent and anxiety about China's environmental pollution, a survey reported by China Youth Daily showed that 71.8% of Chinese people were feeling threatened by water pollution (Miao *et al.*, 2015). The new emerging Chinese middle-class had started to articulate their environmental interests in antipollution protests and to voice their concern by confronting local governments and industrial enterprises (Yang & Calhoun, 2007). Most notably, information and communications technology (ICT) has contributed to the development of grassroots environmental activism and the construction of green public sphere in China (Sima, 2011).

In this context, the Chinese authorities also sense the public distrust and discredibility in its environmental governance, and embark on taking recourse to institutional measures for pollution abatement. Among these, the program of environmental information disclosure has been applied widely through institutional and local experiment (Zhang *et al.*, 2016). In relation to the rapid development of ICTs, digital enablers - social media and open data - have brought significant impacts on China's environmental governance. Applying the functions of ICTs, China has endeavoured to promote those digital enablers (i.e. communication channels, online platform for pollution data disclosure) for boosting

efficiency in its environmental governance.[3]According to the SIWI (2015), ICT's ability to redraw the dynamics of power and representation in relation to the use and access to natural resources, has never been more compelling.

In 2008, China released the *Open Government Information Regulations and the Environmental Information Disclosure Measures*. This has advanced the diversification and pluralism of environmental information suppliers and users, as well as the diversification in the methods of transparency and disclosure (Zhang *et al.,* 2016). The indirect effects of environmental information disclosure implementation in terms of raising environmental awareness and learning, as well as empowering citizens are tremendous (ibid.). Nonetheless, the implementation of relevant programs is still far from effective, due to the longstanding reticence, confidentiality and monopoly of environmental information in China's political system (Mol *et al.*, 2011). Direct effects on environmental improvement and pollution control hence remain to be seen. Last but not least, the most challenging task ahead is to bridge the digital divide[4]. Digital revolution has spread benefits throughout the economy and society in China, bringing immediate benefits such as easier communication and information (World Bank, 2016). However, China still has one of the largest offline population in the world – group of people that are still lacking access to internet and can't participate in the digital economy in any meaningful ways (ibid.). Most of this offline population concentrates in the rural areas of the country. Therefore, bridging the digital divide across China should go hand in hand with addressing social exclusion in the agenda of pollution control.

China's bureaucratic system of water pollution management

In addition to environmental information disclosure, Chinese authorities have initiated a series of institutional programs for abating water pollution. More specifically, the State Council released the *Water Pollution Prevention and Control Action Plan* to strengthen water pollution management in April 2015. Before this, the revision of new Environmental Law was released at the beginning of 2015 for scaling up the state's efforts of environmental

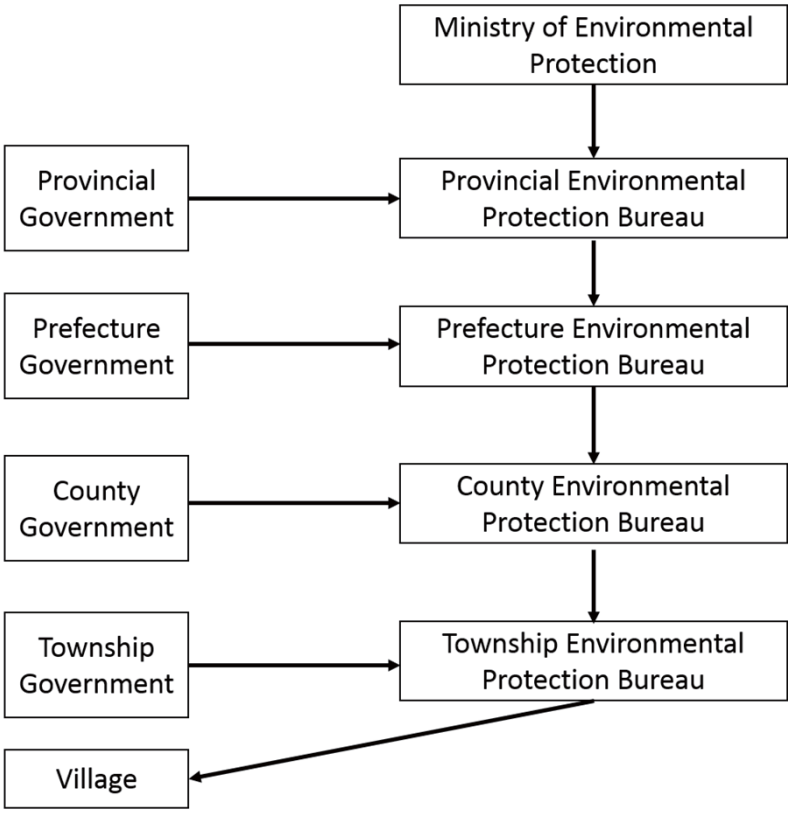
[3] The implementation practices of China's environmental information disclosure and promotion of digital tools for environmental governance are elaborated in detail in Chapter 6.

[4] The definition of the term is in reference to Evers & Gerke (2013) – denoting the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard to their opportunities to access ICTs and their use of the Internet.

protection. Commentators argue that China now has a comprehensive legal framework for implementing environmental programs. Nonetheless, a lack of coordination of policies, ambiguity of the legal framework, as well as the compartmentalization of responsibilities across different authorities, make the current legislation and relevant environmental regulations underperforming (Wang *et al.*, 2008; Zhang & Zhong, 2010; Zhang Y. *et al.*, 2012; Zhang *et al.*, 2013). Most importantly, China's national plans and ideas of water pollution control meet challenges in their local implementation, due to the existing organizational structure (He *et al.*, 2012; Kostka & Mol, 2013).

China's organizational structure of water resources management is a complex and multi-layered system. The chief organ of China's water administration is the Ministry of Water Resources (MWR) but the Ministry of Environmental Protection (MEP) is the primary body in charge of water pollution control nowadays. Every ministry has numerous bureaus under its authority, the cooperation between which is usually poor in spite of the rigid structure (Liang, 2011). Taken the MEP as an example, an Environmental Protection Bureau (EPB) belongs to two distinct government units. Vertically, a local EPB is part of the functional line from the MEP and as such receives policy mandates and programs direction from the upper-level EPB (Figure 1.1). Horizontally, it is also one of the departments in and gets financial support from the local government (Wang *et al.,* 2008). Within this structure, every bureau has a rank and the authorities' order of communication should flow up and down level by level (Liang, 2011). This complex organizational structure hinders effective coordination and coherent implementation of national policies.

Figure 1.1 Vertical and horizontal functional lines of Environmental Protection Bureaus

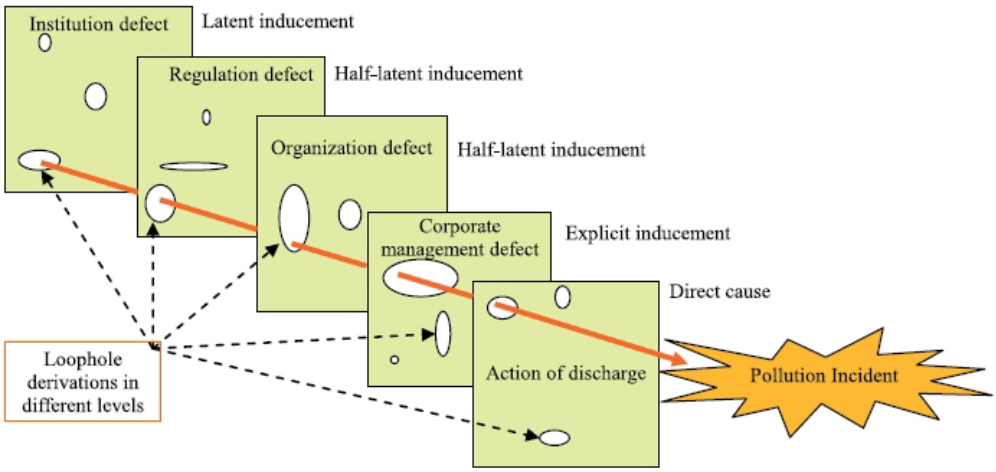


*Note- The vertical arrows denote that the functional lines (e.g. authorities order, funding) from the MEP flow up and down level by level; the horizontal arrows denote that a local EPB is part of and gets financial support from the local government. Source: Drawn by author

A large body of literature has discussed the organizational failure of China's water pollution control (see Miao *et al.,* 2015). To trace the causes of the pollution incidents, Miao *et al*. (2015) apply the extended Swiss cheese model (Figure 1.2) and emphasise that the interference from local bureaucrats and particularly their interwoven relations with local enterprises, are latent inducement to ineffective environmental supervision. This sheds light on the national-local gap in China's environmental governance. While the Chinese President and Premier have addressed their commitments to environmental improvements, such national initiatives may meet obstructions due to the failures of local bureaucrats to motivate, direct, steer and control local power elites (He *et al.,* 2012). Furthermore, due to the common situation whereas the state elites and economic elites have close connections and common interests, this makes the enforcement of national policies at the local level difficult (ibid.; Wang *et al.*,2008). To remedy this barrier, scholars suggest that performance appraisal on local officials should be adjusted (Miao *et al.*, 2015). Indeed, Chinese authorities seem to

have considered institutional experiments for this adjustment. According to the "red line"[5] proposed in 2011 by the state to set limits on water pollution (up to 2015, 2020, and 2030), the provincial governments are requested to take responsibility for limiting total pollutant discharges; and the results will be used to evaluate the performance of local government leaders (Global Water Partnership, 2015). In that sense, the "red line" marks a threshold of pollutant discharges and local government leaders should ensure the threshold not be crossed by industries.

Figure 1.2 An extended Swiss cheese model about water pollution incident



Source: Miao *et al.*, 2015

The communication interface approach

While there is often much focus on the structure and defects of the formal institutions in China's environmental management, such studies might lose sight of different meanings, understanding and (re)acting of people give to the pollution issue. In that sense, a broader perspective should be taken to consider the interests of the population vulnerable to the health risks of industrial water pollution, as well as other relevant and marginalized social groups. Recent literature in social anthropology has indicated a local perspective to match the macro institutional analysis of China's pollution control programs. More specifically, scholars draw upon empirically rich, ethnographic data to add complexity to our understanding of China's

[5] In total, "three red lines" were proposed by the Chinese state for water resources management. Apart from targets on water pollution, the other two "red lines" were set to limit water use and to increase water use efficiency (Global Water Partnership, 2015).

environmental issues. Relevant projects have been undertook to explore people's experiences of toxic exposure and the shifting contexts of people's suffering from pollution (Lora-Wainwright, 2013b; Lora-Wainwright, 2014a; Tilt, 2006;Tilt, 2013a). In a broader international context of anthropological studies about health impacts of industrial pollution (i.e. cancer), Lock (2013 cited in Mathews & Burke, 2015) addresses that social anthropologists need to embrace both the concepts of local biologies and embedded bodies. To advance the argument, Lock proposes the concept of "biosocial differentiation", understood "as a product of individual lived experience in specific environmental, historical and socio-political contexts" (ibid., p.11). The challenge ahead, however, is to bridge the individual lived experience from local people and environmental management programs implemented by government agencies.

Resonating with the work of Lock, Lora-Wainwright (2013a) explores pollution through an extended case study of rural people's intimate individual and family experiences of "fighting for breath" on a daily basis. Lora-Wainwright (2013b) underlines that it is not only physical health that is affected by pollution in China, but also the relations between individuals, communities and the state. As discussed with more details in this research, the relations between local communities, cadres from towns/districts (or counties)/municipality, the state are intertwined in a complex way (see Chapter 4).Moreover, their relations are often closely linked to institutional (dis)trust. To strengthen this, He *et al.* (2012) point out that the widely perceived incapability of the Chinese government to deal with pollution issues had contributed to an increased lack of trust and credibility in environmental authorities. Mertha (2008, p.151-152)argues that as China has become increasingly decentralized and politically heterogeneous, the control and management of water have been transformed into a lightning rod of bureaucratic infighting, social opposition, and even open protest. Van Rooij (2010) even takes a further step predicting that in China pollution victims are likely to continue to choose political action regardless of the constraints they face, as long as environmental authorities and local governments remain unresponsive.

In situations whereas institutional distrust and conflict with regard to environmental governance is high in the society, building dialogues with stakeholders is critically important to initiate a quality perspective in addressing growth – emphasising growth that is environmentally sustainable and socially equitable (SIWI, 2015). Failures to have mutual communication with the society and to take responsive action could turn out to be costly,

especially considering the fact that environmental awareness of Chinese citizens has increased substantially. With information revolution and more powerful formats of ICTs, the diversification and pluralism of communication channels have increased in our society. This might also advance the possibility of and approach to making such *mutual* communication happen in local societies. In this light, the present research proposes an analytical lens of "communication interface" to explore the emergence of China's industrial water pollution, as well as its social and political responses. The analytical approach of this research is built upon the work on institutional analysis as well as on ethnographic studies about China's industrial water pollution. Such an approach produces a more nuanced portrayal of China's environmental issues, supports the increasing approachability of the state in environmental governance, and further brings us toward a more dynamic view of the state-society relations. With this in mind, this study looks at industrial water pollution in Dongying City, the Yellow River Delta of China.

Background of the research

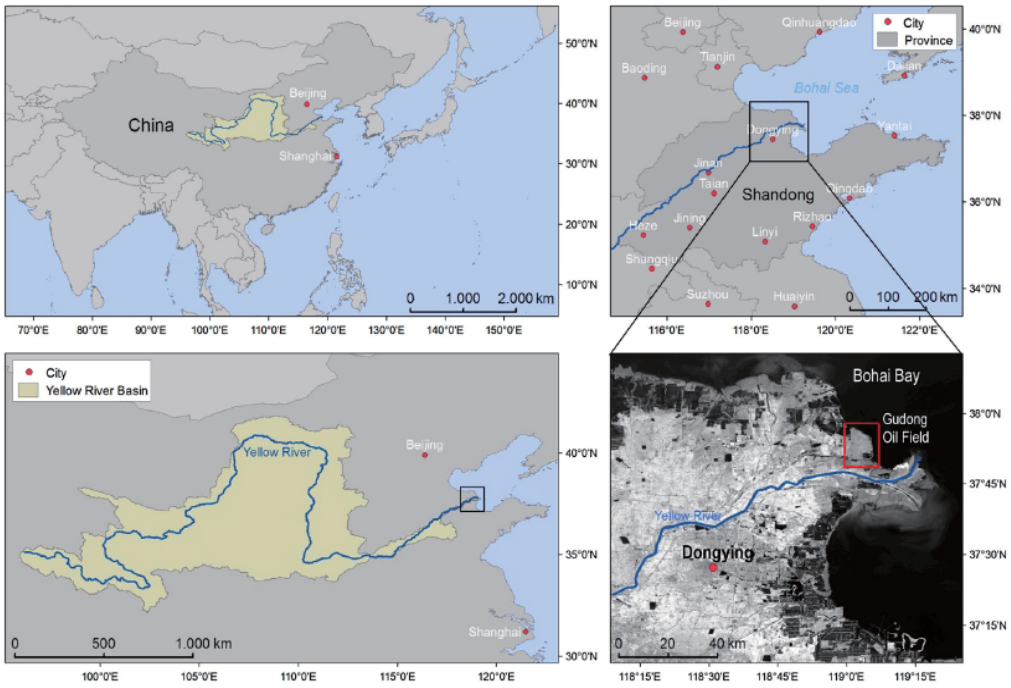
The Yellow River Delta – "China's youngest republican land"[6]

The Yellow River Delta (YRD) represents the place where the Yellow River meets the Bohai Sea, in north-eastern China (see Figure 1.3). It is formed from sediments travelling from the Yellow River (Huang He) basin and depositing in its estuary. The YRD covers an area of approximately 10,000 km^2 with a population exceeding 6 million people (Li *et al.,* 1999). The Yellow River basin is the cradle for China's civilization – containing 15% of China's farmland and hosting a total population of 160 million (Barnett *et al.*, 2006). The Yellow River has problems of water scarcity, pollution and sedimentation. Sedimentation is one of the strongest natural forcing factors controlling vulnerability, as well as social and economic development of the YRD. Beginning at around 4000 before the Common Era, the YRD gradually began to expand as the rate of sedimentation surpassed the rate of sea-level aggradation (Pietz, 2015, p.13). The high sedimentation rate has caused extraordinarily high spatio-temporal dynamics, which led to the relocation of the river bed over 10 times; and hence directly affects coastalline changes and coastal wetlands conservation (Li *et al.,* 1999; Kuenzer *et al.,* 2014). Related to this, the YRD hosts the most complete and extensive young wetland ecosystems, and is home to rich biodiversity and abundant natural resources (Wang

[6] "共和国最年轻的土地"

et al., 2012). To conserve the fragile ecosystem and biodiversity, the Yellow River Delta National Nature Reserve[7] was approved in 1992 in order to protect national and regional ecological safety (ibid.).

Figure 1.3 Location of the Yellow River Delta in China



Source: Kuenzer *et al.*, 2014

Historically, agriculture in the YRD was based on crop and cattle farming. The agriculture was classified as "grain-cotton model", but difficult to maintain due to unfavourable physical conditions and harsh natural conditions, such as salinity, hail and storm surges (Li *et al.*, 1999). The alluvial soils brought from the west to the YRD were not particularly fertile. In order to sustain cultivation of traditional crops, the soil must be regularly seasoned with organic material (e.g. animal manure) (Pietz, 2015, p.13). The irrigation water mainly comes from the Yellow River, but there are water conflicts between the upstream and downstream areas. It is also commonplace that the irrigation water reaching the YRD is already polluted, due to the high concentration of untreated wastewater in the Yellow River basin. According to Pietz (2015, p.27), the forces of demographic growth, agricultural intensification, industrialization, and urban expansion have pressured the ecological carrying capacity of the

[7] The local nature reserve was firstly approved by the Dongying government in 1990 and then upgraded to a national reserve in 1992 (Fang & Xu, 2000 cited in Kuenzer et *al.*,2014).

North China Plain (where the YRD is located). These forces also complicate the patterns of water use and transformation of water management. Due to industrial expansion and other human activities, the pollution severity of the Yellow River basin is high. Water is continuously classified as non-functional and not suitable for agricultural uses in wider northern region of China (World Bank, 2006). This worsens the situation of water scarcity facing the YRD. Drinking water supply in the YRD is mainly from reservoirs and ground water resources. Saltwater intrusion is perceived problematic which increases pressure on the already limited freshwater supply. Due to high salinity, the surface water of the YRD is unfit for primary production.

The livelihood structure in the YRD has gradually changed due to urbanization and industrialization. Artificial aquaculture and salt farming are expanding, but limited to the coastal zones. Tidal flats along the coastal zones - crucial to local fishermen's livelihood and ecosystem conservation- are threatened by human interference via dykes and further regulations of the delta (i.e. sluice gates, pumping stations, canal systems) (Li *et al.,* 1999). As Kuenzer *et al.* (2014) have questioned, it remains uncertain if a delta which is so tightly influenced by anthropogenic control and human interference would have higher resilience than a delta in its natural state.

According to Wolters & Kuenzer (2015), coastal river deltas often accommodate abundant natural resources due to it dynamic geomorphic types and ecological systems. The YRD hosts the second largest oil field of China – the Shengli oil field. The place also has other rich resources of natural gas, brine and geothermic energy (Li *et al.,* 1999), which has attracted human populations. The revenues from oil and gas exploitation in the YRD furthermore increased the investment into programs of infrastructure construction. For example, infrastructure for agriculture (Figure 1.4 (1) & (3)), artificial aquaculture (Figure 1.4 (4)) and urban agglomeration (Figure 1.4 (6)). These have resulted in rapid process of urbanization, industrial pollution (Figure 1.4 (7)), oil spillage and subsidence (Figure 1.4 (5)), vegetation degenerated and biodiversity loss (Figure 1.4 (2)). Apart from the anthropogenic influences, natural forces such as salinization, receding ground water table and land compaction induced by groundwater extraction, reducing water and sediment resources also pose a risk to the delta system (Li *et al*., 1999; Kuenzer *et al.,* 2014; Wolters & Kuenzer, 2015). To this end, the ecological, social, and economic dynamics of the YRD have been affected by numerous

processes as well as threats arising from within and from localities outside of the delta (Wolters & Kuenzer, 2015).

Figure 1.4 A conceptual framing of the environmental challenges in the YRD

(1): River canalization, (2): wetland ecosystem threatened by anthropogenic processes, (3): water diversion for irrigation, (4): aquacultural-related ground water pumping and subsidence, (5): oil pumping, spillage and subsidence, (6): urban agglomeration, (7): industrial causing pollution and subsidence. Source: Kuenzer *et al.*, 2014

The status quo of industrial water pollution

The industrial activities in the YRD commenced after the discovery of the Shengli oil field in the 1960s (Kuenzer *et al.*, 2014). Industrial expansion was observed at the beginning of the 21st century, following the coordinated economic development strategy initiated in *China's Ninth Five-Year Plan* (Li *et al.,* 1999). According to the outline of *China's Ninth Five-Year Plan*, the Bohai Rim Economic Region - containing Eastern Liao Peninsula, Shandong Peninsula, Beijing, Tianjin and Hebei Province - was built for promoting coordinated development and common prosperity (China's State Council, 1995). After this, the official program *Long Term Target of Shandong Province (2001-2010)* furthermore emphasised that the development of the YRD should realise fully the comparative advantage of its concentration of oil and gas resources (Li *et al.,* 1999). In 2009 and 2010, two more national plans were implemented which officially marked the rapid process of industrialization in the YRD. [8] These government initiatives led to upgrades to the road infrastructure, residential

[8] These two national plans in relation to the industrial boom in the YRD are discussed in Chapter 2.

buildings, seawall and leave construction to accommodate and protect economic areas (Kuenzer *et al.,* 2014).

The principal industrial activities in the YRD were oil-related, while food processing, textiles, chemicals, brick making and paper product made a sizable contribution (Wang *et al.,* 1997 cited in Li *et al.,* 1999). The various industries produced over 40×10^6 m^3 of urban and industrial wastewater annually (Table 1.1). Foremost among these was the oil-related industry, which was the key driver of industrial wastewater output in the YRD. Oil spills also posed a risk to wastewater management. Since 1990s oil spills occurred more than 20 times in the Bohai bay, with around 25,000 tons dispersed to the sea – around 1,300 tons of oil-related pollutants annually (Cui, 2008). Apart from the oil-related industry, the aforementioned small-scale industrial sectors (i.e. chemical, paper) were also significant engines of the industrial wastewater output (Table 1.1).Regarding wastewater treatment, rate of treatment was high for the chemical (100%) as well as for the thermal, electric power industry (99.7%) compared with that of petroleum production (23.8%).

Table 1.1 Industrial wastewater and its pollutants in the YRD[9]

Industry	**Discharge amount (10^4 T)**	**Rate of treatment (%)**	**Specific pollutants**			
			COD (t)	Oils (t)	TSS (t)	Phenol (g)
Petroleum Production	830	23.8	3266	197	718	11 115
Petroleum Processing	168	81.9	248	65	134	1 415
Chemical	57	100.0	4	0	20	0
Paper	146	25.0	382	0	342	0
Themal, Electric Power	385	99.7	173	1	88	43
Machinery Electronics	87	88.3	36	2	15	2
Other	394	99.8	68	1	49	157
Total	2067		4123	266	1368	12 732

Source: Li *et al.*, 1999

[9] There is no recent literature on industrial wastewater discharge in the YRD and updated data on amounts of relevant pollutants is not available.

The economic growth of the YRD is concentrated around industries in towns and cities, enhanced by increasing inputs from rural areas. Rural industries[10] stand out as one of the most spectacular contributors to China's economic growth, which "have not developed in any other country on such a large scale and at such a rapid rate" (Wang *et al.,* 2008). However, the environmental cost of rural expansion of China's industries is enormous, resulting in a large volume of wastewater discharge, adding nitrogen, phosphates, phenols, cyanide, lead, cadmium, mercury and other pollutants to the local water bodies (ibid.). Li *et al.* (1999) pointed out in their vulnerability assessment of the YRD that the concentrations of heavy metals in sediments of the rivers were very high. More specifically, chromium and lead ranged from 1.5 to 5 times higher than the average values of national and foreign rivers; and curium, arsenic, zinc and nickel were in the upper limits of the average range (ibid.). To study the characteristics of water pollution in the YRD, Zhang J. *et al.* (2012) discover that oil and cadmium were major pollutants, with the pollution reaching excessive rate of 100% and 40% respectively.

Apart from the internal drivers, wastewater from outside flows through the YRD via the regional Xiaoqing River and Zhimaigou River, polluting the flood plain and riverine ecosystems in their estuaries, in the adjacent tidal flats and the shallow sea. Table 1.2 shows that the six rivers flowing through the YRD have been polluted to different extents. Due to the extraction of oil and the existence of large geochemical factories, groundwater is perceived unhealthy for consumption (Wolters *et al.,* 2016). Based on these arguments, industrial water pollution has directly affected the life quality of local residents and posed a significant threat to the environment of the YRD, as well as constrained the local economic development (Zhang J. *et al.*, 2012).

Table 1.2 Surface water quality of six major rivers running through the YRD

Rivers	*Section*	*Water quality*	*Heavy metals (x)[1]*	*% over standard[2]*	*Water quality[3]*

[10] In China, rural industries can be broadly classified into two categories of ownership: township and village enterprises as collective enterprises, and private rural enterprises (Wang *et al.,* 2008). The development of a typical village enterprise and its business model in the context of the YRD, are discussed with the background information of case study areas in Chapter 2.

Xiaoqing River	Xiaoqiao	Serious pollution	0.462	0	20
	Shicun	Serious pollution	0.647	0	20
	Sancha	Light pollution	0.429	11.1	30
Guangli River	Dongyingcun	Heavy pollution	0.238	0	20
	Guangliqiao	Middle pollution	0.374	0	20
	Haigang	Middle pollution	0.197	0	20
Yihong River	Daoxiangcun	Middle pollution	0.502	20	40
	Kenlinan	Middle pollution	0.362	20	40
	Yangjichang	Middle pollution	0.587	20	40
Tiaohe River	Laoyemiao	Middle pollution	0.495	20	40
	Dongcuizha	Middle pollution	0.478	0	20
	Diaokouqiao	Middle pollution	0.232	0	20
Shenxiangou	Gudaoxi	5^{th} class water	0.228	0	20
	Wuhaozhuang	Heavy pollution	0.491	20	40
Zhimaigou River	Wangying	Middle pollution	0.386	10	30

*Note- (1): Average exceedance of the pollutant over the National Standard Class 5, (2): percentage of samples whose pollution index surpasses the National Standard Class 5, (3): 10 – high-quality third

class water; 20- high–quality fifth class water; 30- fifth class water; 40 – low-quality fifth class water. Source: Li *et al.,* 1999

Problem statement and the study objective

Much of the YRD area is under the jurisdiction of Dongying Municipality, Shandong Province. Dongying has grown and developed from the establishment of Shengli Oil Company. After the oil resources were discovered in mid-1960, a dense network of oil and gas pipelines and distributing stations were constructed gradually. Dongying was then established in 1983 as a home base for oil related companies and workers (Kuenzer *et al.,* 2014). To implement the state's initiative of accelerating industrialization in the YRD, more than 50 industrial parks – including one national level and seven provincial level – were settled in Dongying by 2014 (CAS, 2015). The principle activities of the local industrial enterprises are oil-related, while the chemical sector has become a more significant engine. Some industrial parks are located in close proximity to nearby residential areas. Since 2010, chemical accidents were reported more and more frequently by residents living near those industrial parks (21 Century Business Herald, 2012.07.11). This further triggered public discontent and people's sentiment of anxiety and dissatisfaction. According to the result of a recent survey on environmental awareness in Dongying, local people's concern about pollution is widespread and the adversity to live in proximity to industrial areas is very high (Wolters *et al.*, 2016).

In the past decade, China has been rapidly enhancing relevant technologies for the improvement of water quality, such as technology of ecological restoration, biological disposal, advanced chemical oxidation and high-efficiency adsorption (Bao & Fang, 2012). Commentator however argues that, while the capacity and technology of wastewater treatment facilities have grown, they have not kept pace with the growth of China's industrial output (Ebenstein, 2012). This argument pinpoints the challenges of wastewater management which Dongying Municipality is facing currently (see Chapter 2). Following the state's approach to developing wastewater treatment facilities, the local government of Dongying is more reliant on its "hardware power" - implementing technological measures for the control of water pollution. While perceived as a cost-effective way to provide water and sanitation, resource recovery, as well as to facilitate the synergies with other sectors, this technology-fix approach might not provide a solution - by itself in isolation- but only in dialogue with

stakeholders. Without the platform for mutual dialogue, local people's distrust in the government's ability to control pollution would continuously grow, since their environmental awareness has increased and people are more concerned about the health impacts of pollution. Fundamentally, industrial wastewater management is a process-based approach that extends beyond the control of water resources, also considering the broader development implications of participation and the right-to-know on environmental information.

With regard to environmental public participation, the top leader of Shandong Provincial Department of Environmental Protection has been devoted to promote information disclosure, transparency and participation in environmental governance (Southern Weekend, 2015.12.17). Under his strong political leadership, Shandong Province is increasingly enhancing its environmental informational governance and playing a leading role in China. With the information revolution and ICT development, more local stakeholders (environmental non-government organizations, research institutes, media, and enterprises) are actively involved in the debate on environmental informational disclosure (see Chapter 6). This in theory offers a window of opportunity for initiating *two-way* communication between government agencies and the population of Dongying. Despite this, before this research little was known about what kind of environmental information was available within the bureaucratic system; how the flow of information would affect people's perception and acting upon water pollution; how institutional (dis)trust affected people's attitude to support the local municipality in the control of water pollution.

Toward this end, this research sets out to examine the daily routines and practices of the bureaucracy for problem-solving related to industrial water pollution in Dongying. Through the use of the proposed analytical tool of communication interface, the empirical study strives to explore the processes of interaction and communication between government agencies and local people. The research documents the strategies taken by different social groups to confront the authorities. Apart from this, the research intends to understand the causality mechanism in relation to human agency (i.e. communication, access to information, adaptation) that underpins people's coping strategies toward pollution. On a more ambitious note, this research intends to contribute to the debate on China's environmental informational governance, through proposing an inclusive approach which takes into account local perspectives such as cultural practices and individual lived experience.

Theoretically, the research is devoted to both recapitulate and redirect the line of inquiry in the interface studies. Through the proposed *communication* lens together with the vantage point of *interface*, it is conducive to document the diverse claims and to track the signalling mechanism between the authorities and local people. Informed by system thinking, the research strives to shed a clearer light on the contour of social discontinuities via the application of the proposed analytical framework. Eventually, situating the communication interfaces within wider power structure, the research also embraces the ambition to detect patterns in complexity, as well as the dynamic, contingent and multi-layered character of China's environmental management.

The following research questions guide the process of data collection:

1. How is the issue of industrial water pollution perceived and managed by local authorities?
2. What is the main conflict line of communication between relevant authorities and the local population on environmental pollution?
    - How does the communication interface perform? Are there different domains of interfacing? Who and what are represented in different domains of interfacing?
    - What variables affect the development and outcome of communication interfaces?
3. How does the communication pattern relate to people's perception of and coping strategies toward industrial water pollution?
4. What are the practical implications for environmental governance, drawn from findings derived from the lens of communication interface?

Methodology

To have a more nuanced study on environmental pollution issues, while it is important to understand the scientific facts such as – the amounts of pollutant and volume of wastewater – it is also important to understand how pollution is framed in people's knowledge and life experience. As Jansanoff (2010 cited in Tilt, 2013a) has argued, "Scientific facts arise out of detached observation whereas meaning emerges from embedded experience." Following this line of thought, the approach taken in this study is to see science as a process of "science-in-the-making", a body of knowledge that reflects the situated perspectives, values and actions of lay actors as well as institutions that produce it (Latour, 1987 cited in Tilt, 2013a). To

follow this idea, a combination of qualitative and quantitative methods was applied for data collection and analysis.

Engaging with the question of detecting different scenarios of communication interfaces – how they are conceptualised, performed, produced, justified and contested – qualitative methods were better suited for the study of perceptions, values and preferences of different actors in the interface situations. While the author shall frequently refer to the qualitative data set, so that nuanced analysis can be made on the communication patterns and flows of information, empirical illustration of the information access and demand for information relied essentially on quantitative data. The quantitative data was taken from the survey conducted in the Dongying port. The primary results of the survey were used to complement the qualitative data in order to obtain a more dynamic picture about people's epistemology, experience and coping strategies toward industrial water pollution. As such, a combination of quantitative and qualitative methods conduced to the reliability and good quality of content of the collected data. Data collection of this research was however more guided by the qualitative approach, as it granted advantages of absorbing the fluid and subtle changes of the state-society relation, of furthermore categorising different scenarios of communication interface while preserving the richness of local context.

Research design

This research has been undertaken in the context of the interdisciplinary Sino-German joint research project entitled "Delta Information System for Geoenvironmental and Human Habitat Transition" (DELIGHT), which was funded by the German Federal Ministry of Research and Education. The Centre for Development Research (ZEF), University of Bonn was responsible for the social science work package on social-economy and urbanization.[11]The empirical field research of this dissertation was conducted from May 2014 to April 2015. The study was more explorative than descriptive, using an abductive research strategy.

[11] The project period under the "Delta Information System for Geoenvironmental and Human Habitat Transition" (DELIGHT) framework was between 2010 and 2013. Also see the website of the DELIGHT project http://www.delight.eoc.dlr.de/.

As this research set out with an explorative goal, the case study approach proved to be suitable as it "enjoys a natural advantage in research of an exploratory nature" (Gerring, 2004). The very "subjectivity" of case study research and not very clear boundary between phenomenon and context, connote the fuzziness of case studies (ibid.). It is this fuzziness of case studies grants this research a strong advantage to explore different hypothesis, variables and causal linkages embedded in different scenarios of communication interface. Apart from this, case studies serve as opportunities to shed empirical light on some theoretical concepts - through corroborating, modifying, advancing the prior development of theoretical propositions - and hence form the groundwork for an analytic generalization in this study (Yin, 2014, pp. 40-41). In this research, case study inquiries were drawn on multiple sources of evidence through the mixed-methods approach, with data needing to converge in a triangulating fashion (ibid., p.17).

Although the representativeness nature is not the special focus in the intensive study of a single unit (Gerring, 2007, p. 20) the selected case studies strive to cover the divergent process of industrial development. The development process of industrialization in different districts/counties of Dongying shapes people's different understanding and lived experience in relation to industrial water pollution. However, it is somehow challenging to distinguish the context of industrialization and its content– the individual lived experience of lay actors - due to the nature of fuzziness of case study. Given this, informed by Latour's (2007, p. 147) work, the approach was to deploy the content with all its *connection* – through focusing on people's ways of building communication, social network and interaction - and then let the *context* manifest by itself.[12]In this process, instead of taking a reasonable position and imposing some order beforehand on the content, the author shall be cautious to find order after having let the actors deploy the full range of controversies in which they are immersed (ibid., p.23). By doing so the actors were allowed to unfold their differing cosmos. It is as if we were saying to the actors:

"We won't try to discipline you, to make you fit into our categories; we will let you deploy your own words, and only later will we ask you to explain how you came about settling them" (ibid., p.23).

[12] Latour (2007, p.147) argued that: "Deploy the content with all its connections and you will have the context in addition."

This approach is conducive to explore what more categorically minded experts may overlook, as when people express their most pressing and ordinary concerns - the empirical evidence emerging- it then opens up to complex human stories in time and space (Biehl & Petryna, 2013 cited in Mathews & Burke, 2015, p.6).

In this research two study areas were selected in Dongying– one located in Daozhuang Town, Guangrao County and the other located in Xianhe Town, Hekou District (Figure 1.5). During the very starting period of field work in May 2014, an explorative two-week field trip was arranged together with researchers from the Institute of Geographic Sciences and Natural Resources Research (IGSNRR) of Chinese Academy of Science (CAS). All jurisdictional areas including two districts and three counties of Dongying were visited in order to generate an explorative overview of the socio-economic and environmental conditions of Dongying. Going back and forth between view of reality and theoretically informed ideas at an exploratory stage, the author was apt to reflect on the research questions, as well as to develop a more critically informed methodological framework. After the explorative field trip, the first DELIGHT project training was held in Beijing in June 2014. Attending the meeting the author was able to present her research ideas, to discuss and gain feedback from the local research partners on the questionnaire and other practical issues of field research in Dongying.

Figure 1.5 Map of case studies areas in Dongying

Source: Di Liu (CAS)

As addressed before, the selection of case study areas was based on the principles of presenting the divergent processes of industrialization in Dongying. To fulfil this, Hekou District and Guangrao County were chosen to explore the context of industrialization and its influences on the lived experience and values of local people.[13]For the study towns the selection was based on qualitative criteria - insights drawn from newspaper articles, expert interviews, as well as other information extracted from the official public websites. Before setting out to the field, a chronology of local environmental mass events since 2010 was written based on information obtained from media reports. With reference to the scientific literature from the region, it helped to gauge the overall influence of industrial pollution to the local society. Insights drawn on different sources of preliminary information showed that Xianhe Town of Hekou District was particularly problematic regarding the contestation of industrial pollution addressed by local inhabitants. Within Xianhe Town three of four villages were undergoing relocation, due to the implementation of the national program of *New Rural*

[13] Background information about Hekou District and Guangrao County will be elaborated in Chapter 2.

Construction. Haixing Village-enterprise[14] was the only one not included in the local planning of reconstruction. Hence, it was more practical to conduct the field work there.

To ensure the consistency of data collection and the analytical process, the author intended to select one company[15] and one village in the second case study. The Deputy Director of the local research partner - The Yellow River Delta Sustainable Development Research Institute of Shandong Province - was assigned by the local government to support Shandong Hugerrubber Company Limited (hereafter Hugerrubber) in Daozhuang Town, improving and strengthening their business. His solid connections in the area meant that the author could obtain permission to conduct her field work in Hugerrubber, as well as convenience of having access to different sources of secondary data. There are in total 45 administrative villages and 40 natural villages of Daozhuang Town. Sanshui Village was selected to explore the perception of lay people on industrial water pollution. The reason was that quite many Hugerrubber workers live in Sanshui Village (located in close proximity to Hugerrubber). During the explorative research in Daozhuang Town, two field visits were arranged to the local constructed wetland and wastewater treatment plants. These were very helpful to have a glimpse at and gauge the scale of infrastructure construction – the "hardware" power promoted by the local government for water pollution control (see Chapter 2).

Methods of data collection and data analysis

In this research, 124 interviews were conducted including explorative, semi-structured and group interviews (Table1.3). In total 37 interviews were conducted with local people from Hekou District and Guangrao County. Interviewees from the industrial sector included 17 respondents from Haixing, 14 respondents from Hugerrubber, and 17 respondents from Shengli Oil Company. In addition, interviewees included 13 environmental activists fighting against water pollution at various administrative scales. Interviews conducted with relevant government agencies (e.g. Environmental Protection Bureau, Water Resources Bureau) were carried out systematically with officials in the district/county and township level. Moreover, these interviews were exclusively conducted with senior staffs such as deputy directors,

[14] Haixing Village is also an enterprise involved in different industries of aquatic products, aquaculture, fisheries technology, mariculture, salt chemical, port service (see Chapter 2).

[15] Since Haixing Village-enterprise was already selected in the first case study, the author intended to seek analogous study object that shares similar attributes or characteristic features with Haixing. This however doesn't mean the companies are involved in similar industries or operated in a similar scale.

department heads and section chiefs of government agencies. During the interviews, insights drawn from local actors helped to generate a preliminary understanding on the communication interface between local communities and government agencies. This further informed the line of inquiry targeting the government officials. Such a process could more sophistically unravel the "mixed signals"[16] of the government agencies to handle environmental conflict, as well as the variables and causal links in different scenarios of communication interface. The duration of interviews was between 20 and 90 minutes. Audio recorder was not used due to the fact that informants were hesitant to open up in conversation particularly on topics about governmental programs and behaviours of cadres. More details about the explorative interviews are elaborated in "Situating the field research" of Annex I.

Table 1.3 Number of interviews matched to different target respondents

Target respondents	Number of interviews	Localities
Cadres from municipal level government agencies	11	Dongying
Cadres from district/county level government agencies	11	Hekou District Guangrao County
Cadres from township level government agencies	4	Xianhe Town, Daozhuang Town
Workers of Haixing	17	Dongying port Haixing Village-enterprise
Workers of Hugerrubber	14	Daozhuang Town
Workers of Shengli Oil Company	17	Dongying port
Environmental activists	13	Beijing, Dongying
Local Population	37	Xianhe Town Daozhuang Town Dongying Port

Source: Table by author

[16] The term was used by Stern & O'Brien (2011) to study China's politics at the boundary. With reference to this term, the author discusses the "mixed signals" deployed by governmental agencies to local environmental activism in Hekou District (Chapter 6).

Apart from the interviews, observation was applied to document informants' daily routines, their talks in public occasions, environmental campaigns and other official events. Observation offered significant opportunities to capture the communication patterns among and between the stakeholders. Serving as a mirror, it helped to reflect on the situation whereas power relations are always embedded and not easy to distinguish. In addition, Participatory Rapid Appraisal was adopted to pursue the idea of working-close-to-the-ground[17]. More specifically, transect walks and timelines were conducted to explore and visualise the spatial features and environmental changes after the emergence of industrial enterprises in the study areas. Content analysis was applied to the materials obtained from the environmental events. Based on the primary data analysis, results were used to triangulate the findings from the household interviews and to compare other secondary data obtained from the government.

Documents on policies, laws and local planning were collected to have a more sophisticated understanding on the industrial development in the YRD - how and through which angle the initiative was framed and promoted, what approaches were taken for implementation. These documents were sorted into chronological order for tracing the patterns and subtle changes of the discursive orders. Moreover, information posted on the official public websites and minutes of meetings were used as background information for generating new lines of inquiry during the interviews with government officials. Brochure, posters, leaflet, outreach materials disseminated by the local government were used to analyse what kind of environmental information was available in the public. Project documents about water engineering (e.g. the constructed wetland, wastewater treatment plants) and relevant feasibility reports were gathered from government agencies in order to examine the technocratic practices of water pollution control. Data obtained through various official channels were consolidated and encoded with index words, with an attempt to pinpoint the catchwords of China's environmental governance.

Apart from the official data, media portrayals helped to trace the public debate on China's environment and captured the dynamics of the opinions. Information derived from online discussion forum, documentary films and photography provided a rich source of material to document the bottom-up perspectives. Other sources of data included research reports and

[17] The term is borrowed from Stern & O'Brien (2011).

scientific literature provided by the local research partners, as well as some project documents obtained from the companies. These materials provided insightful perspectives of the socio-cultural and historical changes of the study areas. Practically speaking, being a Chinese granted substantial advantages of accessing local information because much of the material would not be accessible for language reasons otherwise.

Quantitative data on the access to information, interests and demands, perceived severity of water pollution, local sense of place were collected through the survey execution (Photograph 1.1). The sample size of the survey was 110, including 71 workers of Haixing who were involved in fishery, 25 workers involved in salt farming and 14 involved in salt chemical production. In total, 26 were females and 83 were males.[18]The mean age of informants was 47. The trajectory of executing the survey is discussed in detail in "Contextualization of the survey" of Annex I.

Photograph 1.1 The author conducting survey in Haixing

Source: Photograph by author, 2014

Informed by Gerring's (2004) triangulation essence of social science research, this research adopted a mixed-methods approach for data collection. The case studies rely on holistic data collection strategies for studying the situated perspectives on water pollution, and then call upon surveys to collect data about access to water- relevant information in local communities.

[18] Gender information of one respondent was missing.

Apart from this, following Tilt's (2013b) methodological approach that combines macro-level analyses with community-based fieldwork, official water pollution data obtained from annual reports, statistics, project documents in this research was analysed and compared with findings derived from the survey and other qualitative data. In spite of this, access to state-generated water pollution data was constrained in this research, due to the reticence and confidentiality in China's environmental governance system. In the context whereas governmental information is limited, working-close-to-the-ground is a good strategy to start in order to understand the dynamic state-society relation (Stern & O'Brien, 2011).

Limitation of research

Given the geographically remote location[19] of the survey execution and the small sample size of the survey, the result is not representative for the whole population of Dongying. It provides only chance explanations of a common phenomenon associated with information channels, interests and demands of local population, as well as on the provision and access to water-relevant information. While limited cases as these make the statistical results difficult to generalize, they provide a wealth of insights that can illustrate and analyse the practices of environmental informational governance from a grassroot perspective. Apart from this, quantitative measurement of informants' "sense of place" and "adaptation" is supposed to take into account the notion of time – the dynamic, complex local environmental changes and its effects on individual lived experience. This is due to the fact that individual perceptions, meanings and narratives of people give to a certain phenomenon, do not take place once, but are continuous processes occurring in the ebbs and flows of social interactions. To surpass this limit of the survey, in-depth household interviews provided a rich source of material to explore people's perception, values, and lived experience relating to industrial water pollution.

To increase the approachability of the pollution "truth" in this research, the presented picture might not be comprehensive without government-generated water pollution data. However, official data collection on water pollution was limited in local level and turned into a time-consuming process. In this context, personalised connections proved to be a resourceful strategy to build a solid network in the research area. Personalised connections allowed opportunities of organising informal meetings with government officials. This informality

[19] The survey was conducted in the Dongying port, a geographically remote area of Dongying.

was helpful to provoke insightful discussion on the daily routines and implementation practices of government agencies in relation to water pollution controls (see also "Situating myself" in Annex I).

Structure of thesis

Chapter 2 traces the process of industrial development in the YRD through reviewing relevant national plans and policies. Under this policy framework, it proceeds to explore approaches taken by Dongying Municipality to boom local industrialization. The line of inquiry in this chapter concentrates on the technocratic measures and digital communication channels promoted by local authorities for its environmental governance. **Chapter 3** examines how the interface studies have approached the issue of social discontinuity. The second building block of communication is then elaborated to unveil the comprehensive contour of "communication interface". Motivated by the theoretical grounding of power relations, the chapter continues to discuss how power is individualised and executes influence in the micro setting of communication interface. Informed by the theoretical building blocks, an analytical framework for an ethnographically informed interface analysis is presented ultimately.

The empirical study starts in **Chapter 4**, which zooms in on the virtual communication interface between government agencies and local communities. The chapter illustrates two case studies focusing on the influence of industrial water pollution to local livelihood on a daily basis. In order to connect with the responses by government officials highlighting the *interface* angle, the mass events of environmental protest and oil spillage are discussed. The study summaries crucial factors that shapes the development of communication interface at the community level. To explore the institutional perspectives, **Chapter 5** offers a detailed description on the China Water Week campaign implemented by the water bureaucracy of Dongying. It questions the deficiencies of communication and interaction between cadres and people during the campaign, pinpointing the incoherent messages across different levels of the bureaucracy. To further probe into the flows of water information, the chapter also examines public access to drinking water quality data, focusing on the daily routines and implementation practices of water information management in the bureaucracy. Through the illustrative examples of the water campaign and access to drinking water quality data, chapter

5 grapples with issues that interrupt the mutual-flow of information between the water bureaucracy and local people.

Chapter 6 depicts the scenario of non-virtual communication interface through the study of local environmental activism. It portrays the strategies adopted by environmental activists to build up dialogue with government agencies, and the mixed signals from relevant authorities. Moving beyond local environmental activism, this chapter also traces the heated debate on environmental information disclosure through use of empirical and secondary data to question its implementation practices. Although mutual dialogue was built between government officials and environmental activists, the findings presented in Chapter 6 bring into the question of the gap between the promotion of digital sphere for environmental management and information access in grassroots society. Following this line of thought, **Chapter 7** investigates the root cause of people's limited access to information drawn on the quantitative data. To highlight the role of communication which contributes to major source of information in local communities, the chapter presents an illustrative example of village election. Focusing on local livelihood concerns, the study then turns to people's demand for information in relation to their interest in issues about individuals/family and society/country. Combining both the quantitative and qualitative data, the chapter traces the subtle meaning of coping in local communities which are under threat of water pollution. Through building the correlation of access to information, perception and coping, it reveals a causality mechanism in relation to human agency that underpins people's reflexive strategies toward pollution.

Chapter 8 summarises the findings of the previous chapters, combining the insights drawn from studies about the local bureaucracy and communities. The chapter recapitulates different scenarios of communication interface and discusses key valuables that affects its development and outcome. The proposal of an inclusive approach to China's environmental governance is discussed, in relation the presented causality mechanism which allows serious account of human agency. To incorporate local perspectives into environmental management, the study pinpoints a medium which helps to activate the process of incorporation. The functionality of this medium is connected to the instrumental value and encompassing ability of the analytical approach of this research. From examining to activating communication interface, the chapter presents some ideas of social learning emerged from grassroots society, which might offer practical implication for decision makers to initiate the platform of mutual communication with the local population.

CHAPTER 2 INDUSTRIALIZATION AND THE TECHNOCRATIC PRACTICES OF POLLUTION CONTROL IN DONGYING CITY

In *China's Ninth Five-Year Plan*, the central government promoted the initiative of common prosperity in the Bohai Rim Economic Region[20]. Dongying Municipality is an important component of this region that helps to achieve the coordinated economic development (Li *et al.,* 1999). Following this, two key national plans were promulgated in 2009 and 2011 respectively to further enhance the comprehensive development of industries in the YRD (i.e. modern marine industry, chemical engineering, petro-chemicals). Dongying is the only city in the YRD targeted in these two national plans. This chapter examines the historical process of industrial development in Dongying. In addition, two aspects are at the heart of this chapter – the "hardware power" and "software power" developed by Dongying Municipality for implementing environmental programs. To trace the development of "hardware power", the study discusses Dongying's *technocratic* practices of pollution control – the expansion of wastewater disposal facilities and constructed wetland. The chapter then turns attention to Dongying's "software power", sketching on the digital tools (i.e. weibo[21], official public websites) applied by the municipality in its environmental governance. The final section of this chapter presents the background information of the two case studies areas.

The national initiative of ecological economic development in the YRD

In April 2009 when China's former President Mr. Hu Jintao visited Shandong Province (where Dongying is located), he spoke of the vision of building the Peninsula Blue Economic Zone in Shandong. The plan was then endorsed by China's State Council in January 2010, entitled with an official name *Shandong Peninsula Blue Economic Zone Development Plan* (SPBEZ). Before this, there was another national key document - the *Yellow River Delta High-efficiency Ecological Economic Zone Development Plan* (YRDHEZ) – which came into effect in 2009. The national ideology of "high-efficiency ecological economic development" was initiated in *China's Eleventh Five-Year Plan* in March 2001 (Dongying Daily, 2010.09.18). It was finally approved by the state council in November 2009. These planning

[20] It includes Eastern Liaodong Peninsula, Shandong Peninsula, Beijing, Tianjin and Hebei Province.

[21] One format of digital media – so called "Chinese Twitter".

documents marked onset of dramatic industrialization and urbanization in Dongying. Table 2.1 summaries the overall frameworks of two national planning, as well as the key development principals that target Dongying Municipality.

Table 2.1 Overall framework of two national planning

National Planning Documents	*Yellow River Delta High-efficiency Ecological Economic Zone Development Plan (2009)*	*Shandong Peninsula Blue Economic Zone Development Plan (2011)*
Overall Framework	-Rational *"zonation"* into core-protected zone, control development zone and intensive development zone -Prohibition of all different kinds of development and constructive activities in the core-protected zone of the YRD to maintain its *biodiversity and ecosystem service* - Increased efforts of environmental protection to promote a *resource-saving* and *environmental-friendly* society	-Development of a *modern marine industry* cluster with strong international competitiveness -Reliance on *marine economy* to promote regional economic development through following China's marine resource exploitation principle
Key Development Principles targeting Dongying	- To *lead* the high-efficiency ecological economic development in the YRD - To boom *high-tech industry*, ecological tourism and high-efficiency ecological agriculture -To build an *oil equipment manufacturing* base with	-To initiate a reasonable expansion of city size -To emphasize the characteristic features of high-efficiency ecology, *marine* economics -To develop bigger and stronger competitive industries - To develop *new growth* areas and liveable eco-towns for the

	national importance -To construct a regional *logistics* centre and product distribution centre	Bohai bay region

Source: Table by author based on SPBEZ (NDRC, 2011) and YRDHEZ (NDRC, 2009)

In general, YRDHEZ takes a broader perspective emphasizing the need of environmental protection. This initiative advocates serious account to be taken for ecosystem services conservation particularly in the YRD National Nature Reserve. This planning document serves as a guideline for the development of high-efficiency ecological economic in Dongying. In comparison, SPEBE focuses on the development of marine economy in particular, stressing that the YRD should realise fully the comparative advantage of its concentration of marine resources. Under this framework, Dongying is geared to rapid urbanization, as well as the development of a marine industrial cluster (Table 2.1).

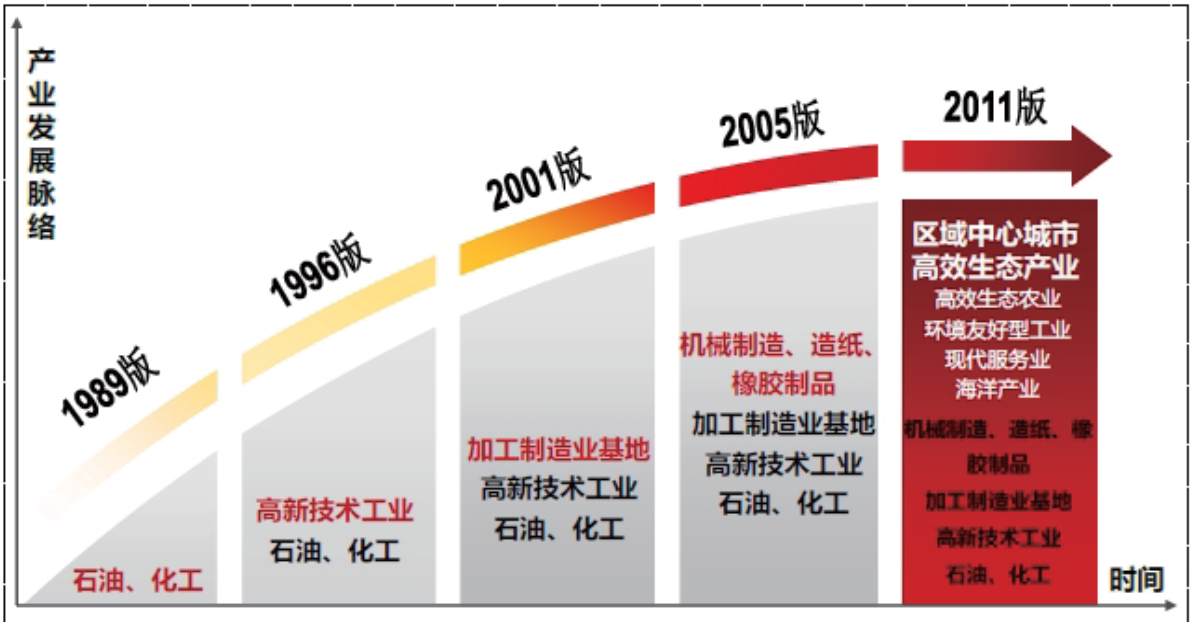
The stepwise industrialization in Dongying

To implement the national planning and provincial program of booming chemical industry, Dongying gradually established nationally important bases for petrochemical and marine-chemical industry (PCIPI[22], 2012, p.15). More specifically, Dongying experienced an industrialization process from economic reliance on oil exploration and oil-related chemical industries, to manufacturing industry, and a recent shift to high-efficiency ecological industries, as shown in the city planning documents (CAS, 2015). These high-efficiency ecological industries include ecological agriculture, environmental-friendly industries, modern service and marine industries. Figure 2.1 shows how five rounds of city planning[23]shaped the developmental path of Dongying. Toward this end, 57 industrial areas were established in Dongying by 2014(CAS, 2015).

[22] Petroleum and Chemical Industry Planning Institute.

[23] By 2015 Dongying has published five rounds of city planning documents in 1989, 1996, 2001, 2005, 2011.

Figure 2.1 Five rounds city planning and industrial development in Dongying[24]



Source: CAS (2015)

According to *Dongying City Industrial Zones Spatial Layout Planning*[25] , the leading mainstay industry of Dongying is petrochemical industry, with gross annual output reaching nearly 500 billion Renminbin (RMB[26]) in 2013. Chart 2.1 shows the top eight leading industries of Dongying and its gross industrial output. Even though the oil exploration and exploitation activities have contributed largely to Dongying's economic development, the city faced the bottleneck of oil resources exhaustion. To overcome this challenge, the incumbent Mayor of Dongying proposed:

"Dongying should be committed to the development orientation of high-efficiency ecological economic, […] accelerate and promote industrial restructuring and upgrading,

[24] The figure implies that the first-round city planning of Dongying in 1989 targeted petroleum and chemical industry as priority for development; the second-round in 1996 incorporated the target of high-tech industry; the third-round in 2001 incorporated the target of processing and manufacturing industry; the fourth- round in 2005 incorporated the target of machinery and textile industry , as well as the rubber-processing products; the fifth-round in 2011 incorporated the target of regional and urban high-efficiency ecological industries (e.g. modern service and marine industry).

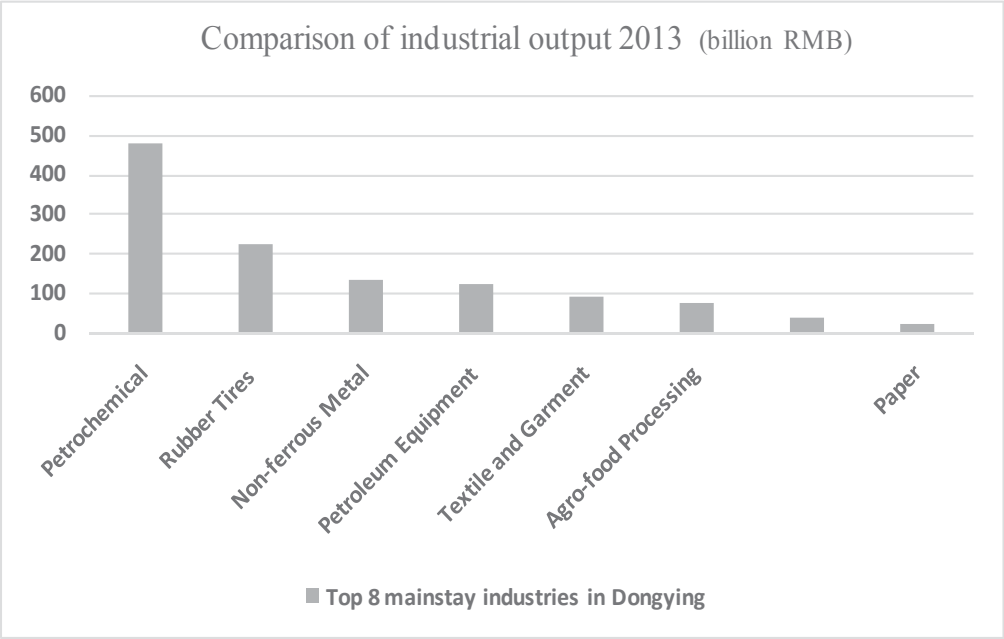
[25] The document was published in 2015 by the Institute of Geographical Sciences and Natural Resources Research Institute (IGSNRR), Chinese Academy of Science.

[26] The field research was conducted between May 2014 and April 2015. The average rate 1 EURO = 8.09 RMB is applied for all calculation in this research.

focus on the adjustment and optimization of economic structures, engage to the construction of high-efficiency and ecological modern industrial system" (quoted from China Economy Wang, 2015.03.10).

However, traditional resource processing industry with relatively high economic benefits is still prevalent in the local market. Thus, most of the local industrial enterprises are either reluctant or not prepared to enforce the economic reconstruction and transformation encouraged by the local authorities (PCIPI, 2012; CAS, 2015).

Chart 2.1 Comparison of industrial output among eight leading mainstay industries 2013



Source: Adapted from CAS (2015)

In this context, Dongying faced the dilemma of economic development and environmental protection. The phenomenon of "industrial siege" - high concentration of industrial areas near some residential places of Dongying - was identified as a tremendous hindrance to Dongying's place-making and sustainable development in the future (CAS, 2015). Most notably, those traditional resource processing industries were distributed in close proximity to the city centre. It was hence perceived detrimental to local environment, life quality, city image and so forth. As a remedy strategy, the local government implemented a program to relocate the industries to *the Dongying Port Economic Develop Area* (DYG, 2010). Soon after the enforcement of this program, there came another heated debate on the 'new'

environmental impact of industries to the Dongying port.[27]To be specific, the criticism claimed that *the Dongying Port Economic Develop Area* (DYEDA) became both a refuge and paradise for Dongying's industrial enterprises (China Business Newspaper, 2013.01.18). It was argued that the industrial enterprises would bring significant threats to the ecological status of the nearby nature reserve[28] (Finance Huanqiu, 2012.03.06). This was also noticed in the *DYEDA Chemical Industries Adjustment and Optimization Planning*:

"Due to its close proximity to the YRD National Nature Reserve, which is ecologically sensitive and fragile, the DYEDA should avoid introduction of poisonous chemical projects which is categorized with high pollution and risks" (PCIPI, 2012, p. 24, translated by author).

Here, the crucial question at hand, is, what the local government does to solve the environmental pollution and relevant health impacts brought to the local population. In addition, how local authorities address their environmental programs and how this further affects the local residents' responses and coping strategies toward pollution.

The technocratic intervention practices of industrial pollution control

Expansion of wastewater disposal facilities

The infrastructural intervention approach was initiated through the state's promulgation of *Urban Drainage and Wastewater Disposal Ordinance* (China's State Council, 2013). The ordinance emphasises the construction and maintenance of wastewater disposal facilities, while assigning responsibilities to specific government agencies. Thus, engineering emerged as a key paradigm of water pollution control, while environmental governance was rather perceived help to implement engineering programs through monitoring the pollution loads for example (Hajer, 2005, p. 269). As a specific example, Box 2.1 presents the online monitoring program implemented in the DYEDA.

[27] See also Box 2.1 of this chapter.

[28] Given the fact that the DYEDA is located in close proximity to the YRD National Nature Reserve, commentators are sceptical whether the planning of the DYEDA has gone through legal procedures. See also Kuenzer *et al.* (2014).

Photograph 2.1 The Environmental Monitoring Emergency Support Centre

Source: DYEDA, 2015

Box 2.1 The Environmental Monitoring Emergency Support Centre in the DYEDA

The DYEDA was established in 2006 to accommodate the traditional industrial enterprises distributed in close proximity to the city centre of Dongying. It was reported that local environment had been polluted substantially by industries of the DYEDA. As a remedy strategy, the initiative of establishing the Environmental Monitoring Emergency Support Centre was made for pollution abatement (see Photograph 2.1). The Department of Engineering which is part of the Management Board of the DYEDA was responsible for establishing the centre. According to one official who worked for the project, there were four main steps of building the centre:

1. To install the video monitoring systems with equipment of box camera, integrated ball machine, DVR, optical machine, ethernet switch, cable and other cabinet accessories in the industrial enterprises;
2. To construct monitoring stations (24-hour online monitoring through automatic sampling extracted from the wastewater every 2 hours) for measuring the pollutants (e.g. chemical oxygen demand and ammoniacal nitrogen) discharged from the industrial wastewater outfalls (data should be integrated into the pollution monitoring system hosted by the Dongying Environmental Protection Bureau[DYEPB]);
3. To construct *the Environmental Monitoring Emergency Support Centre* within the DYEDA;

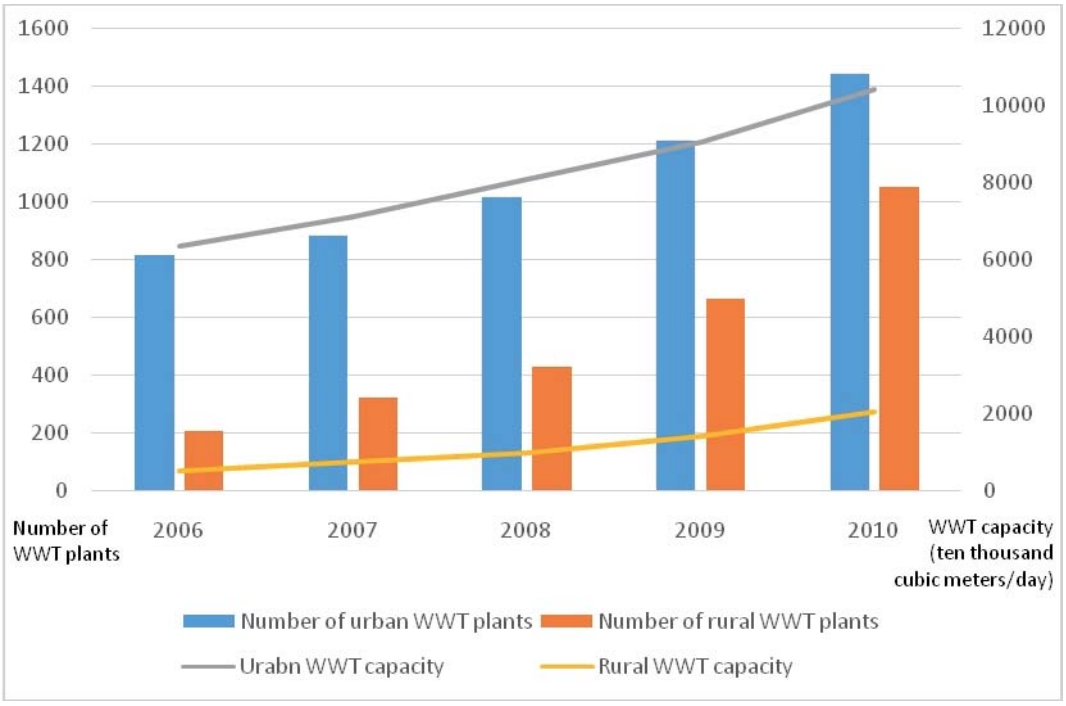
4. To set a data interfacing device in the monitoring system hosted by the DYEDA Wastewater Treatment Company, facilitating the company to access the pollutant data obtained from the monitoring stations.

The total investment of this project was more than 21 million RMB. The project was designed and implemented by one local environmental research institute. The centre is expected to be operated in 2016. The Management Board of the DYEDA signed a contract with the wastewater treatment company that the DYEDA assumes the responsibility of monitoring, inspecting and supervising wastewater discharge by the industrial enterprises. This approach was taken to ensure the wastewater treatment plants run in a normal scale without disturbance triggered by excessive wastewater discharge by enterprises.

Source: Box by author based on the interviews conducted with the Management Board of the DYEDA in 2014

In examining the rapid development in China's wastewater disposal sector, Chart 2.2 shows the increase of construction programs of wastewater treatment plants as well as the growing capacity of wastewater disposal since 2006.

Chart 2.2 Development of wastewater treatment (WWT) plants and disposal capacity



Source: MOHURD (2015)

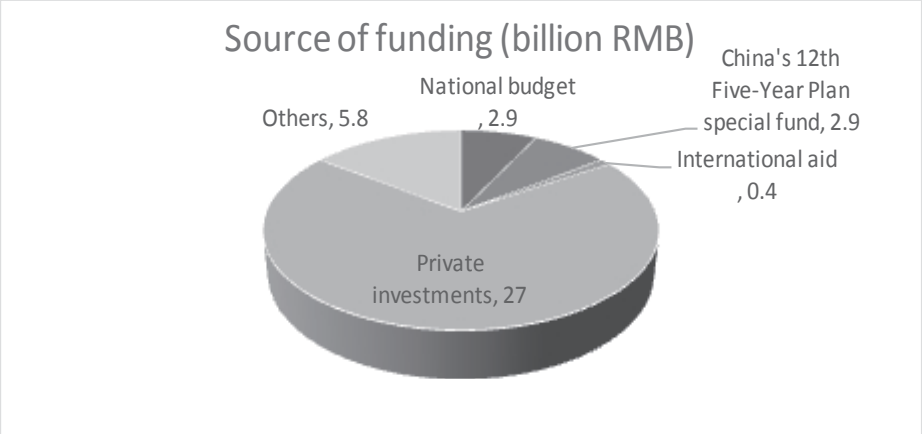
To follow the national initiative, Shandong Province has also upgraded its wastewater disposal system (Table 2.2). By 2014, 39 billion RMB was invested into the sector. Funding to the steady expansion and upgrading of infrastructures was mainly from the state's budget line and private investments etc. (Chart 2.3).

Table 2.2 Development of WWT capacity in Shandong Province 2014

Shandong Province	*Urban WWT plants*	*Rural[29] WWT plants*
Numbers	290	458
Disposal capacity (ten thousand tons/day)	1,270	398.8
Total length of drainpipes (km)	8,794.9	19,600.33

Source: SDHUC (2015a), SDHUC (2015b)

Chart 2.3 Sources of funding for the upgrading of waste disposal in Shandong



Source: SDHUC (2015c)

In spite of the government's embracement of the construction of wastewater disposal facilities, the facilities were often running either for the official inspection or running not at full capacity due to its low operation effectiveness. For the case of industrial areas, it was found that enterprises play a crucial role in ensuring a regular and normal operation of WWT plants. More often than not, at least one public WWT plant is required in the industrial area. If the industrial enterprises discharge excessive untreated wastewater, it would substantially increase the workload of public treatment plants. However, enterprises which have low

[29] In this context, wastewater treatment plants are referred to those built in towns/villages.

environmental consciousness and sense of social responsibility are usually reluctant to invest in wastewater disposal or to meet the drainage standard. These issues pose a big challenge to wastewater management in the industrial areas.

The emergence of constructed wetland

Despite the debate on the effectiveness of WWT plants, constructed wetlands are emerging as an environmental-friendly engineering system. With high performance of preserving biodiversity and ecosystem services, constructed wetlands require lower investment and operation costs than conventional WWT methods (Liu *et al.*, 2008) (see Photograph 2.2).

Photograph 2.2 Construction of WWT plants and constructed wetlands

(1) & (2): WWT facilities in Daozhuang Town, Guangrao County, (3): constructed wetland in the DYEDA. Source: Photographs by author, 2014 and 2015

In order to examine the operation effectiveness of the constructed wetlands in Dongying, participant observation in a stakeholder meeting offered valuable insight. The meeting was held by the YRD Sustainable Development Institute of Shandong Province[30],with top officials from Dongying Environmental Protection Bureau and Forestry Bureau, as well as with technical experts from the Shenyang Environmental Science Institute[31]and

[30] In this context, the YRD Sustainable Development Institute of Shandong Province acted as an agency introducing the local/international WWT technology to local government agencies.

[31] A top research institution of constructed wetland program implementation in China (http://www.rengongshidi.com).

UNIQUEST[32]. The technical experts were asked to give a presentation on the advanced technologies of their institutes, which might potentially increase Dongying's wastewater disposal capacity. The discussion on these 'advanced' technologies focused on its running cost and scales of operation. After the meeting, the experts were invited to visit some local water bodies in the city centre of Dongying. Due to the very short-term stay, it was found to be a challenge for the technical experts to fully understand the local conditions, take into consideration the capacity of local water bodies and propose sound technical solutions.

In sum, due to a lack of specific implementation plans in the *Urban Drainage and Wastewater Disposal Ordinance* initiated by the state, the local implementation of engineering constructions is rather a process of trial and error. The expert-fix approach may not be effective enough to solve the pollution issue, due to a lack of local knowledge and full understanding of the local conditions. Compared to this, a community-driven approach to implementing the constructed wetlands programs is perceived more sensitive to local conditions and knowledge (Reynolds *et al*. 2007 cited in Liu *et al.,* 2008). With active participation of local people who are adequately informed, it might also help to maximize the efficiency of engineering programs.

The discursive order of environmental management

In February 2014, the local government implemented *Dongying Action Program of Enhancing the Ecological Environment Improvement* (DYEEI), with an attempt to improve the water and air quality, as well as to increase substantially the local efforts of environmental protection (DYG, 2014). In particular, the outline of DYEEI indicates that government agencies should "promote urban environmental *infrastructure construction*, […] built sewage treatment *facilities* in all townships, strengthen a comprehensive *pipe network* for sewage collection" (ibid., my emphasis). This reaffirms the fact that the engineering approach pervades in the domain of environmental management. Apart from the promotion of the "hardware power", local authorities strive to develop its "software power" through making

[32] UNIQUEST is the University of Queensland's main commercialization company, specialising in industry-university collaborations, global technology transfer, and provide access to University of Queensland's world-class expertise, intellectual property and facilities (http://www.uniquest.com.au/about-uniquest).

discursive order of environmental management, as well as informing the public about their acting on environmental protection. To trace this strategy of discursive order making, online official interviews serve as a window of opportunity to explore how the local government develops it "software power".

***Online official interviews*[33]**

As a strategy of increasing their interaction with the public, Dongying government has endeavoured to build different formats of communication platforms, i.e., weibo, campaigns, online official interviews and complaint channels. In particular, online official interviews have gained public attention. In view of its prevalence in local governance, the author virtually participated in these kinds of official interviews acting as a local citizen. To ensure the consistency of data collection and analysis, the online official interviews with provincial, city, and county level of EPB were examined. As an example, Figure 2.2 shows the format of the online official interview conducted with the Director of DYEPB. It presents a location where the top government official and the local population meet *virtually* to discuss environmental issues.

[33] In Dongying, online official interviews are scheduled with government agencies at different administrative levels (e.g. municipal, district/county level) regularly. Schedules are usually posted online before the interviews. The top official (of government agencies) is then invited to the forum of online official interviews, hosted by Dongying E-Governance Information Service Centre. A coordinator is also present in the forum to interview the top official. Everyone could virtually participate in this forum as long as they have access to internet. People can also post questions but only part of the questions will be answered due to time constraint.

Figure 2.2 Online official interview with DYEPB

*Note - Profile of the Director was shown on the webpage. The theme and content of the interview, as well as questions proposed by netizens [people use anonymous names to interact with government officials in the web] were also displayed in the forum. Source: Screenshot by author, 2014

In examining the content of the interview, the Director of DYEPB expressed strong commitment to implement more strict environmental enforcement programs targeting industrial enterprises, as shown in the following statement:

“The purpose of implementing DYEEI is to let people get access to drinking water of good quality, breathe fresh air and live better life. Through DYEEI, it is conducive for us to develop a sophisticated philosophy and comprehensive pattern of environmental protection. […] Through this environmental action, it is conducive for us to build a professional team for environmental protection. This team should win trust from our party and government, as well as provide satisfying service to local people” (quoted from DYEPB, 2014, translated by author).

However, the official’s taking recourse to institutional change seems not so convincing to the local population. It is noted that netizens posted harsh questions on the forum with a purpose to express their discontent. Some critique displayed on the forum is translated below:

“Our government [Guangrao County government] has mentioned the so-called implementation year of environmental improvement [referring to the DYEEI program] for a long time. We ordinary people are already so used to this slogan addressed by the cadres. But why is our environment still so bad? Why is the smell from rubber tire processing still so

strong every time we enter this place [Guangrao]? Is this the outcome of the implementation year of the environmental improvement? When is it going to be solved […]?" (quoted from the Guangrao County Environmental Protection Bureau[34][GREPB], 2015, translated by author).

As a response, the Deputy Director of GREPB suggested the public should check their recent programs of environment protection such as investment into engineering and infrastructure programs, implementation of institutional measures against industries. In this context, the technology promotion and consecutive sequences of engineering serve as a safe umbrella for local cadres, indicating to the public that they – the bureaucratic system as a whole – are acting on pollution control.

Slightly different, during the online official interview with the Director of the Shandong Provincial Department of Environmental Protection (SDDEP), the Director expressed something new underlining the role of public in environmental protection:

"Environmental issue has nowadays become a more visible conflict in our society. […] [To fulfil the] public environmental needs is our fundamental incentive of [implementing programs of] environmental protection. […] Any kind of development, if it is against the *public environmental needs*, is deemed to fail" (quoted from SDDEP, 2015c, translated by author).

His statement reflects a recognition and respect to the public environmental needs. This perspective is not identified from the official rhetoric made by government officials from the municipality or counties. Furthermore, these kinds of official statement offer a rich source of material to examine the government's discursive practices of environmental management. As explored in more detail in Chapter 5, the highly-placed officials seem to have higher awareness of respecting public voice. In comparison, cadres in the districts/counties seem to opt for environmental policy and (or) infrastructural intervention to justify their acting on environmental management[35]. This discrepancy of awareness leads to the fact that governmental respect for grassroots voice is poor in local communities (see Chapter 5).

[34] Online official interview with the Deputy Director of GREPB.

[35] More discussion is elaborated in Chapter 4 with reference to the interviews with the Management Board of the DYEDA (p. 81).

Toward this end, the local authority speaks of the ecological perspective of development, in fact, implying their technocratic practices of engineering-fix to facilitate the industrialization. When the Dongying government still relies on the industries for revenue and place branding, for example industries of rubber-tire processing and petro-chemicals, the municipality in fact confront the dilemma between ecological protection and economic development. When people's environmental awareness is increasing and citizens begin to raise their voices against industrial pollution, the conflict between the local population and government agencies grows. With the enactment of two national planning of booming industrialization in the YRD, government officials of Dongying were passionate about the state's ideology of ecological economic development. Officials perceived this ideology as a panacea, which does goods to both economics and ecology. However, they are confused how to operate and achieve the national target, since specific implementation guidelines are lacking in the state's 'recipe'. Accordingly, the national initiative of ecological economic development only keeps industrialization projects running in Dongying, serving as an excuse for local government's unresponsiveness to people's complaints about the deteriorating environment. Furthermore, the trial and error approach to engineering programs and its contingency of offering an effective, accountable solution to industrial water pollution might further trigger local people's discontent.

Background information of two case studies areas

The trajectory of industrialization in Hekou District and Guangrao County

According to CAS (2015), the spatial difference of "north week- south strong" is embedded in Dongying's economic development. To generate a more comprehensive understanding of Dongying's industrial process and relevant impacts to the local society, two in-depth case studies were selected in Hekou District (northern area of Dongying) and Guangrao County (southern area of Dongying).

When Hekou realm into land more than 100 years ago, the local population consisted of immigrants from more than 20 provinces of China (Hekou Statistics Office, 2012). People who first arrived in this isolated place opened up new settlements and reclaimed land for agriculture. Agricultural production was the main economic activity during that period of time. Natural disasters (i.e. flood, drought, hail, storm tide) and frail environment constrained the agricultural development though. As a consequence, productivity growth stagnated and

local people were vulnerable to storm erosion, for example (ibid.). Due to the harsh environment, the whole area was sparsely inhabited. The turning point came in 1961 when first oil resources were discovered. Hekou was then labelled as a place hosting abundant oil resources. The turning point of 1961 also marked a long journey of exploration and exploitation of oil resources in Hekou. Recently to follow Dongying's strategy of booming industrialization, the government of Hekou implemented a local development plan *One port-three districts - one belt - three lines - one city* (see Annex III). It aims to initiate a new economic structure, by building five strong industrial bases and achieving great local success through implementation of the YRDHEZ. Compared with Hekou, Guangrao County has longer history of development. Guangrao came into existence more than 5,000 years ago and it was assigned to Dongying in 1983. Constrained by scarce land resources Guangrao has always been densely populated. Soil is fertile and agricultural production is relatively high. Irrigation areas take up more than 90% of the whole cultivated land. The place is also the supply base of vegetables for the whole region of Dongying (Li *et al*., 1999).

The discrepancy of physical characteristics and natural conditions between Hekou and Guangrao, led to a different development trajectory between the two places. Industrialization commenced late in Hekou and proceeded on a small scale. By comparison, local industrial development was initiated in Guangrao since 1949. Guangrao's gross value of industrial output was nearly 332 billion RMB by the end of 2011, more than 4 times of that of Hekou (Table 1 of Annex IV). In particular, the collectively-owned township/village enterprises have made great contribution to Guangrao's economic boom. These local enterprises were emerging since the end of 1960 and are mostly operated as family business. Reportedly, some capable and talent villager took the initiative and mediated the successful development of their collectively-owned enterprises. In other words, those talent people made use of their intelligent business mind and guided their villages to affluence and prosperity. This is the so-called "village-enterprise-business-model" which has achieved great success in Guangrao during the past years. Most of Guangrao's village enterprises involve business of rubber and metal processing, food, leather products, building materials, construction, chemical industry etc., producing more than 150 different kinds of goods (see Table 2 and 3 of Annex IV).

Case study area in Xianhe - an emerging industrial town featured as "habitat of cranes"

The name of Xianhe (Town), pronounced as the same as the Chinese word "immortal cranes", denotes its environmental beauty and life vitality. Moreover, Xianhe is a home base for

Shengli Oil Company workers and is identified as an oil district by the inhabitants of Dongying. Most of the population of Xianhe are oil workers living in the dispersedly distributed residential areas (Photograph 2.3 (1)). By 2012, the population of Shengli oil workers reached 36,106 taking up almost 96% of the total population of Xianhe (unpublished document[36], 2014). In the outskirt of Xianhe Town, many oil pumps and infrastructures for oil-related production activities are located (Photograph 2.3 (2)).

Photograph 2.3 Residential areas and oil pumps in the outskirt of Xianhe

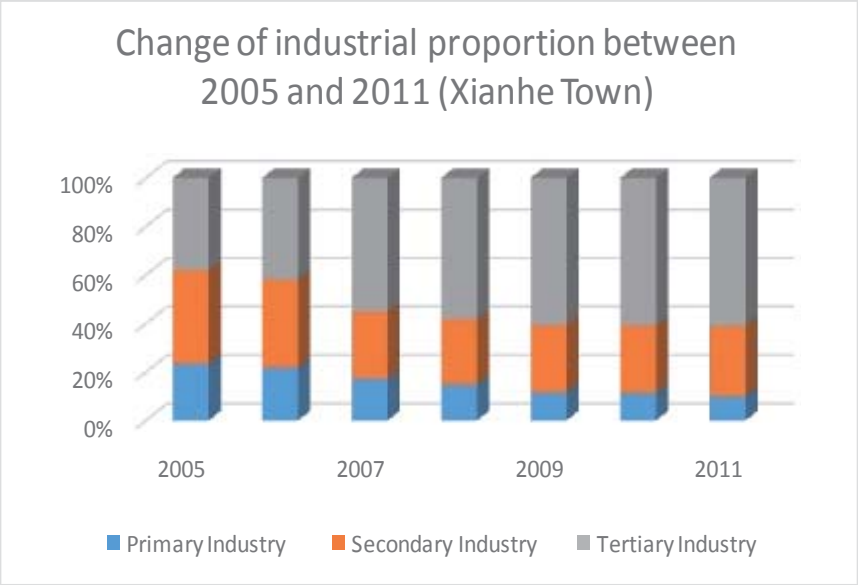
(1): Residential areas for Shengli Oil Company workers, (2): oil pumps and infrastructures in the outskirt of Xianhe Town. Source: Photograph 1 by author, Photograph 2 by Shimin Xu[37]

Apart from oil workers, a small group of the local population consists of farmers who migrated from other places of Dongying and fishermen whose livelihoods are based in the Dongying port. The dominant industry of Xianhe is fishery, but the salt farming activities have emerged fast. Chart 2.4 shows the change of industrial proportion since 2005. Notably, the secondary industry takes only a small portion as seen from the chart.

[36] The document is about the demographics of Xianhe Town obtained from Xianhe Town People's Government in 2014.

[37] Thanks Mr. Xu for providing photographs for this research.

Chart 2.4 Xianhe's industrial proportion change from 2005



Source: XHG (2014), Dongying General Statistics Office (2012)

People regard Xianhe as the backyard of Dongying (Finance Huanqiu, 2012.03.06), as well as a beautiful town that accommodates rich biodiversity suitable for eco-tourism. Many tourists from the country visit Xianhe and the YRD National Nature Reserve for bird-watching (Photograph 2.4). Tourists are attracted by its abundant wetland resources and the special landscape of river-sea integration. Xianhe was selected as the "national environmentally- outstanding town" and "provincial demonstration area of building liveable human habitat". This is, however, gradually changed since the establishment of the DYEDA (see also Box 2.1). The DYEDA focuses on the development of petrochemical industry, combining a variety of chemical industries to form an 'ecological' chemical industrial chain (PCIPI, 2012, p. 28). In 2012 more than 30 chemical projects were already initiated with total investment of more than 50 billion RMB (ibid.). Under the framework of the YRDHEZ, the Dongying government expects to develop the DYEDA into a key area of economic growth (DYEDA, 2015).

Photograph 2.4 Bird watching in the YRD National Nature Reserve

Source: Photographs by author, 2014

Due to the negative environmental impacts, some inhabitants of Xianhe are seeking opportunities to move out. Some already bought apartments in the city centre of Dongying. The case study hence strives to understand local people's experiences and strategies of coping the situation. To fulfil this goal, Haixing Village was selected to conduct the case study. The village was established in 1998, with 79 households and 224 inhabitants in 2014. Inhabitants were mostly immigrants from different places to Haixing for starting an undertaking. Rejuvenation of population created also favourable conditions for inhabitants' engagement in the business sector. Most inhabitants are now involved in the industry of aquaculture and salt chemical.

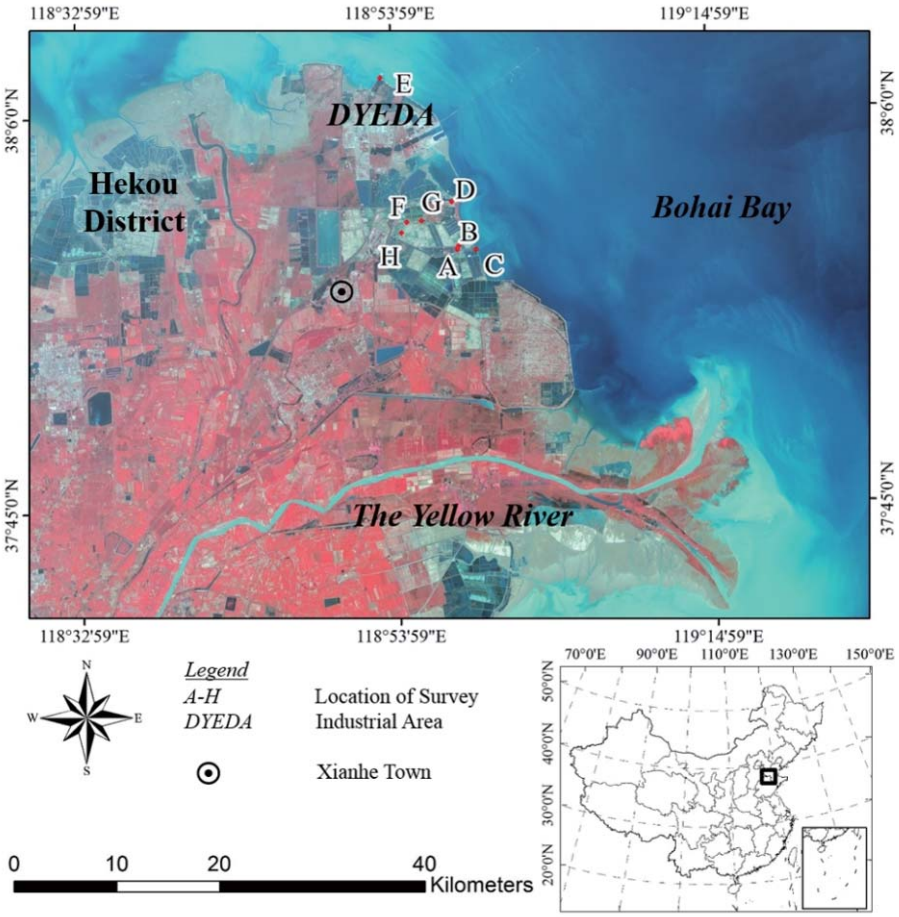
In 1997 before the Haixing Village Committee was established, the village head founded Shandong Haixing Group Company Limited (hereafter Haixing). Reportedly the villagers raised funds together to establish the company and holdings are still shared by the village members. In that account, Haixing is also a village enterprise. Haixing has a collection of business in aquatic products, aquaculture, fisheries technology, mariculture, salt chemical, port services etc. The company employs totally 524 staffs, including inhabitants of Haixing. Table 2.3shows a list of Haixing's branch companies and its location in the Dongying Port, where the survey (see A-H in Figure 2.3) and semi-structured interviews were conducted with different social groups working in Haixing's field stations.

Table2.3 Branch companies of Haixing

Time of establishment	*Name of branch companies*	*Business*	*Location of the field stations/offices (see Figure 2.3)*
1997	Shandong Haixing Group	Aquaculture, acquisition and sales of seafood, aquatic products import and export trade, sea water desalination, clam breeding	⊙ (Headquarter of Haixing in Xianhe Town)
2004	Haixing Mariculture Company	Fishes, shellfishes, shrimps, prawns etc.	C&E
2004	Haixing Changying Aquatic Products Company	Processing of aquatic products	B
2004	Haixing Fishery Technology	Desalination, fish/shrimp/sea cucumber seedlings, clam breeding, technological aquaculture	A
2006	Yuhai Aquaculture Company	Aquatic products breeding and sales	A
2008	Tiancheng Salt Chemical Industry Company	Salt farming and chemical producing of bromine	F (G&H - fields of salt farming)
2012	Haixing Port Service	Transportation and logistics	D

Source: Table by author based on reports and documents obtained from Haixing

Figure 2.3 Research sites in the Dongying port



Cartography: Di Liu (CAS)

Case study area in Daozhuang - an industrial town famous for the rubber smell

Daozhuang Town is much more populated than Xianhe. Its population density is 637 people per square kilometre (see Table 1 in Annex IV). Local economic development run fast since 2005 and ranked third among the nine administrative areas of Guangrao County in 2009 (Guangrao Statistics Office, 2013). Daozhuang has stronger secondary industry than Xianhe (Chart 2.4 and Chart 2.5), taking up more than 80% of the total output value.

Chart 2.5 Daozhuang's industrial proportion change from 2005

Source: XHG (2014), Dongying General Statistics Office (2012)

According to the *Master Plan of Daozhuang Town*, *Guangrao County* (DZG, 2013), the local government has recently invested more into the industrial infrastructure construction in order to maintain the good momentum of its industrial economy. Against this backdrop, different scales of industrial enterprises were emerging in the whole area of Daozhuang Town. The boundary between villages and industrial factories is getting blurred (Photograph 2.5 (2)). The main road connecting Daozhuang Town with central Dongying, is full of the big trucks loaded with rubber-tires, metals and different chemical products (Photograph 2.5 (1)). This heavy traffic and advanced development of logistic show the industrial vitality of the town.

Photograph 2.5 Rapid industrialization in Daozhuang Town

(1): Truck loaded with rubber tires driven out from Daozhuang Town, (2): industrial enterprise located in close proximity to local farmland. Source: Photographs by author, 2015

Daozhuang's industrial structure is dominated by traditional resource processing, rubber and plastic products, textile, chemical occupying a large market share (DZG, 2013). As addressed in its development roadmap - "agglomeration, business focus, centralized industries and distinctive features"- Daozhuang is ambitious to develop strong industrial areas within the region (Public Daily, 2013.10.24). Following this, Daozhuang High-efficiency Ecological Economic Develop Area was built in 2013 to integrate the local industries. The research target Shandong Hugerrubber Limited Company is located in this economic develop area. Hugerrubber is a subsidiary of the leading group company namely Xishui Group.

Xishui, originally a rural village located in Daozhuang Town, followed the region's developmental path and developed several village enterprises during the 1980s (Xishui Ethnography Compilation Committee, 2010). Built on a strong base of its village enterprises, Xishui initiated a successful business model - the "Xishui Mode" (see Box of Annex V). The business started from a household-household-joint factory to factory-factory-joint enterprise, then to enterprise-enterprise-joint group (Xishui Ethnography Compilation Committee, 2010). Based on this business mode, Xishui has developed into a large-scale group company - Xishui Group – one leading company in Dongying. It contains more than 20 subsidiaries and Hugerrubber is one of them. Xishui represents a typical development model of China's rural village enterprises, which according to Wang *et al.* (2008) stands out as one of the most spectacular respondents to China's economic growth (see Chapter 1).

Hugerrubber was established in1988. Its main business is manufacturing tire-relevant products. Every year the company produces 2,800,000 pieces all-steel radial tires and 400,000 pieces tire curing bladders.[38] The total number of employees is 935, with 634 male workers and 301 female workers. 564 of them are locals from nearby villages of Daozhuang. Hugerrubber has in total nine departments – the department of capital construction, sales, purchase, equipment, management, production, technology, finance and production quality. The field research was mainly conducted in the semi-finished-product workshop of the production department[39] (Photograph 2.6), which was randomly selected.

Photograph 2.6 Semi-finished-product workshop in Hugerrubber

Source: Photograph by author, 2015

Sanshui is one village located in the Daozhuang High-efficiency Ecological Economic Develop Area, in close proximity to Hugerrubber. By the end of 2011, Sanshui Village had in total 408 households and 1387 inhabitants (unpublished document, 2014)[40]. The village has a long history of agriculture. The primary food is wheat and maize, with supplementary crops

[38] Introduction of Shandong Hugerrubber Limited Company (http://www.hugerubber.com/about/intro.aspx last accessed 2015.09.06).

[39] The production department has in total one office and four workshops – production management office, workshops of semi-finished products, molding, curing and banbury.

[40] The document is about the ethnography of Sanshui Village obtained from Daozhuang Town People's Government in 2014.

such as cotton, sweet potatoes and grains. Export of labour services contributes a large part to its primary source of income, as more than 70% of the local population work in the local enterprises (ibid.). In average, each household could earn 6,000 – 8,000 RMB per year depending how many family members work in the enterprises. Apart from this, some households receive money from land rental. The owners receive around 2,000 RMB per mu[41] land annually, depending on the annual market price of wheat (spring harvest) and maize (autumn harvest).

[41] 15 mu = 1 acre

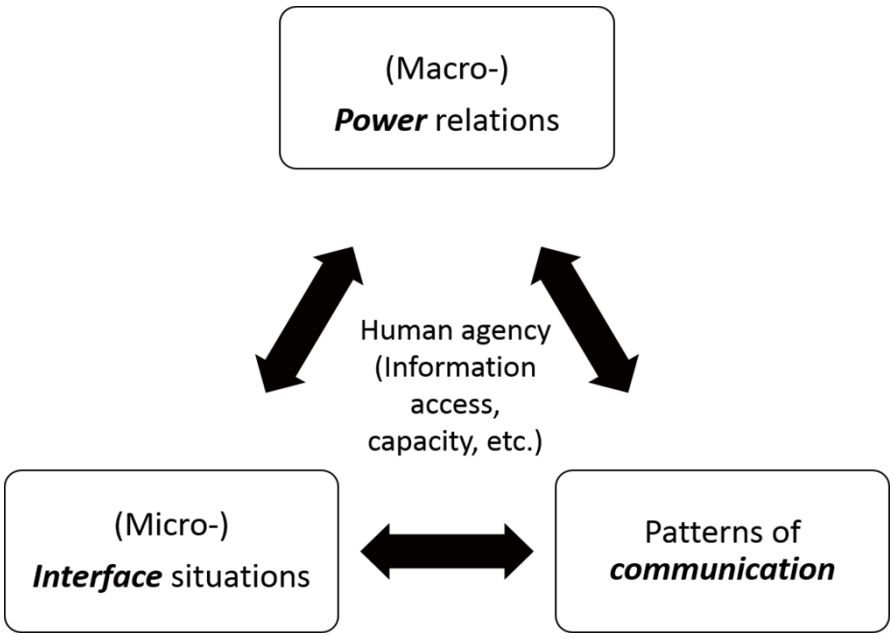
CHAPTER 3 THEORETICAL FRAMEWORK AND ANALYTICAL TOOLS

In this research, the analytical tool of "communication interface" is proposed to explore social discontinuities in the field of environmental management. The concept was inspired by a combination of interface studies and the currents of communication. The first section of the chapter spells out an actor-oriented approach to interface studies based on Long's (1989, 2001) work. Within the framework of structure, actor and agency, the issue of environmental management in China is conceptualized - highlighting the characteristic of embeddedness of China's environmental activism. To present the comprehensive contour of "communication interface", the other prism of communication is then unfolded drawn greatly from Bateson's (1951) study about interpersonal relationships, mediation, and communication.

Situating the communication interface analysis within the wider structure of power, the theoretical grounding of this research is informed by Foucault's (2000, 2003) study of power and subject. Moreover, Foucault's notion of "heterotopia"[42] and its disturbing function to the normality of the society shed a new light on the contestation of China's environmental pollution. Inspired by this notion, the chapter redirects the line of inquiry about social discontinuities in the field of environmental management. Built upon the elaborated theoretical building blocks, the final section presents an analytical framework for the communication interface analysis. Notably, the notion of human agency functions as a conceptual bridge to merge the theoretical building blocks – power relations, interface, communication– in this study (see Figure 3.1), as well as provides valuable insight to explore social discontinuity in the field of environmental management.

[42] The "heterotopia" notion denotes a different place that interrupts the normality of everyday space of social life (Dehaene & De Cauter, 2008, p.3). More details about its characteristics in relation to China's environmental management will be discussed in this chapter.

Figure 3.1 Three building blocks of the theoretical framework



Source: Drawn by author

The interface problematic and its analytical fields

An actor-oriented approach to interface studies

The Dutch sociologist Norman Long speaks of social discontinuities in rural development. He also depicts a methodological device – "interface" - for studying the types and sources of social discontinuity. According to Long (1989, p.232), social discontinuities present in situations "wherein the interactions between actors become oriented around the problem of devising ways of 'bridging', accommodating to, or struggling against each other's different social and cognitive worlds". Furthermore, he characterizes the organizational and cultural means of reproducing or transforming these situations of social discontinuity. Long's perspective is taken in this study to explore China's environmental management, a situation wherein government agencies and local society are meeting at critical points of *linkage* or *confrontation* negotiating solutions to environmental crisis of industrial water pollution for example. Moreover, Long's (ibid, p.221) thesis of interface sensitizes the researchers to the importance of exploring how discrepancies of social interest, value and meaning, knowledge and power are mediated, perpetuated or transformed at critical points.

Notwithstanding Long's study provides a fertile theoretical grounding, the relation between structural interface and the interface interaction settings was not clarified in his work (Benda-Beckmann *et al.*, 1989, p. 218-219). In order to build up the linkage between micro-interactional settings and macro-phenomenon, a conceptual bridge or middle-ground framework is crucial for the interface analysis. In response to this, Long advocated that the interfaces analysis should embrace actor-oriented approach. Within the actor-oriented framework, it conduces to map out other essential theoretical notions (Long, 1989, p. 222).

Long's promotion to actor-oriented researches can be traced to his earlier work on agrarian change in South America, whereas he explored the intervention projects initiated by government agencies, as well as local actors' differential adaptation or responses to those kinds of rural development projects. To justify his actor-oriented approach to the interface analysis, Long (2001, p.17) elucidates that lay actors' differential responses or social actions were closely connected to those processes by which social arrangements or 'structures' are constructed. Through building the relation between actor and structure, Long stresses that actors' contestation and struggle over meanings, values should be analysed within the wider setting of organising processes and practices. To reveal these organising processes, Long traced the work of Giddens and emphasized that differential conceptions of power, knowledge may shape the responses and strategies of the different actors in the field of development (ibid., p.19). Moreover, Long stressed the influence of the cultural dimension of social practices on the conception of human agency, and further advocated a more grounded and ethnographic approach to interface studies.

In short, Long's elaboration of the interface studies offers an entrance to structure the state and society relation in the field of China's environmental management. The prism of interface, as Long (1989, p.232) argued:

"tends to convey the image of some kind of two-sided articulation or confrontation, interface situations are generally much more complex and multiple in nature, containing within them many different interests, relationships and modes of rationality and power."

His account of the interface situations sheds light on the dynamic, intricate and contingent relationship between government agencies and lay actors, which is placed at the core of enquiries in this study of China's environmental politics. Following the positions of Long (1989) and in concert with wider efforts to capture the intricacy of interface between

government agencies and lay actors, the issue of environmental management shall be conceptualised within the wider framework of structure, actor and agency.

Conceptualizing environmental management – structure, actor and agency

In his work on structuration, Giddens (1984) grapples with the role of agency in the interplay between structure and actor. More specifically, he points out two key elements of agency – knowledge ability and capability. Within the limits of information, uncertainty, socioeconomic positions or other constraints, agency of individual actor grants them capacity to process social experiences and devise ways of coping with life (Long, 2001, p. 16). Similar arguments are brought forward in the discourse of risk governance, which discusses the role of human agency in re-shaping the modernity approach. The term risk society is closely associated with several key scholars writing on modernity. Among these scholars, Beck (1992) speaks of the nexus of modernity, technology, the environment and human security, which embraces the key dimension of our risk society. From Beck's perspective, the continuity of autonomous modernisation processes triggered the rise of risk society, but we human beings remain blind and deaf to its threat (ibid., p.71). To remedy this, Beck called for a *reflexive modernity* approach to risk governance (ibid., p.153-154). To advance the questioning of modern world, Giddens addressed the importance of re-examining the role of tradition as well as institutional reflection to grapple with the challenges of the risk society (Giddens, 1994, p.94-95).

In light of Beck's reflexive modernity approach, technology intervention to environmental management shouldn't be considered more powerful without taking the lived experience of local people into account. Moreover, (environmental) risk management needs to deal with the way individuals perceive the world and their own place in it; as well as how lay actors define, perceive and act upon (environmental) risks (Mol, 2008, p.48). This again sheds light on the vital importance of human agency in the interplay between institutional structure and its constraining and (or) enabling effect on human behaviours. This interplay and intertwined relation between structure and actors are of key concern in this study. Thereby, the role of human agency deserves more sophisticated examination as it enriches the *embeddedness* of social action. Giddens (1987 cited in Long, 2001, p. 17) writes:

"In following the routines of my day-to-day life I help reproduce social institutions that I played no part in bringing into being. They are more than merely the environment of my action since… they enter constitutively into what it is I do as agent. Similarly, my actions

constitute and reconstitute the institutional conditions of actions of others, just as their actions do mine… My activities are thus embedded within, and are constitutive elements of, structured properties of institutions stretching well beyond myself in time and space."

This general point of embeddedness of social action was taken by Ho & Edmonds (2008, p. 220) in their study on China's environmental activism. In the words of the authors:

"[…] embedded environmentalism is a resourceful and negotiated strategy employed by activists to gain maximum political and social influence, at least in name, by professing to uphold the principles of the Chinese Communist Party and state. This is the contradictory essence of the embeddedness of Chinese activism: limiting while enabling."

The characteristics of limiting and enabling reflect the state's differentials in levels of tolerance to the advocates initiated from the bottom-up. Relative to this, Stern & O'Brien (2011) propose the concept of "mixed signals" to study China's politics at the boundary; and support viewing the state "from the perspective of people who make choices based on their reading of what power-holders will put up with". The authors point out that uncertainty, ambiguity and ambivalence are often used to depict Chinese politics (ibid.). These visions, however, exclude a more dynamic and holistic view of state-society communication (ibid.).In light of the concept of mixed signals, the state's ambiguous and cross-cutting signals embody an "[un]stable equilibrium of expectation" (Spence, 1973 cited in Stern & O'Brien, 2011). Furthermore, the state's bottom line and institutional practice of environmental activism remain unclear, rather than a "socially shared rule" (Helmke & Levitsky, 2006 cited in Stern & O'Brien, 2011).

The status of unstable equilibrium resonates with Woodman's work on China's "segmented publics". In her study about regulation of critical speech in China, Woodman (2014) conceptualizes segmented publics as "dynamic spaces where boundaries are permeable, often contested and constantly in formation". Notwithstanding she adopts a more institutional focus of the segmented publics - highlighting boundaries and the making of them triggered by the state's mixed signals – this theoretical device provides a useful framework to bridge together institutional practices, actors and agency. The concept of segmented publics has been applied in the domain of discursive and spatial separation of public spheres (ibid.). To explore the operation of this theoretical device in China's political landscape, Woodman (2014) traces the emergence of "public sphere" back to post-Mao era. During the post-Mao era, Chinese

intellectuals - inspired by their reading of Habermas -conceptualised public sphere as a realm of rational deliberation. The concept nowadays is often adopted by scholars writing on Chinese civil action. For example, the term "green public sphere" is cited in literature on China's environmental activism (Yang & Calhoun, 2007; Sima, 2011). Using the example of media and information access, Yang and Calhoun (2007) elucidate three dimensions of the emerging green public sphere – discourses, public and the role of media. Their account of the three dimensions of China's green public sphere sheds a clearer light on the interplay between structure, actor and agency. In particular, the authors emphasise the agency of actors in turning their struggle and (or) conflict into public matters (ibid.).

Although "mixed signals" and "segmented publics" speak more of the state's power of setting institutional rules, the concepts address the role of human agency in shaping China's political landscape. As Woodman (2014) points out, social actors were inherently "self-creating and self-organized" by the discourse they engaged, even in the segmented form they constantly overflew actual institutional space (Warner, 2002 cited in Woodman, 2014). In a similar vein, Stern & O'Brien (2011) stress the skills and capabilities of local actors to get the essence of the state's mixed signals for making use the room for manoeuvre. To this end, what is the interplay between institutional practices and actors in the domain of environmental management? How to explore the interlocking arena of communication and interaction between government agencies and lay actors? To shed a clearer light on these issues and to display a redrawing of the contour of the interface between government agencies and local actors, the usefulness of the prism of communication is allowed to emerge.

Structuring interface through the prism of communication

The vantage of metacommunication

To construct the communication angle in the interface situations, this study is drawing greatly from Gregory Bateson's (1951) work on communication. Among the major currents in interactional relation studies, Bateson presents his philosophy of "metacommunication," or "communication about communication," which is a unique way of thinking about certain aspects of interpersonal relationships, mediation, and communication (Liu J., 2015). To be specific, metacommunication refers to "all exchanged cues and propositions about (a) codification and (b) relationship between the communicators" (Bateson, 1951, p.209). Bateson's idea of "codification" has been discussed by other scholars writing on

communication. For example, Bennett & Calman (2010, p. 34) grapple with the issue from a vantage of language. They argue that *language* used to communication is important in helping to shape the nature of the dialogue and the attendant understanding that comes with it. Along similar lines, the significance of *message* is addressed in the discourse of risk communication. Jaeger *et al.* (2001 cited in Renn, 2008, p.207) argue that "the informer intends to expose the target audience to a system of meaningful signals, which, in turn, may change their perception of the issue or their image of the sender". Following the classic definitions of communication, scholars from the field of risk communication conceptualize communication as a purposeful exchange of information between actors in society, based on shared meanings (de Fleur & Ball-Rokeach, 1982 and Keeney & von Winterfeldt, 1986 cited in Renn, 2008, p.207).

From a Bateson's (1959, p. 208) perspective, the author speaks of the "communication about communication", indicating that "each participant [is made] aware of the perceptions of the other" and that "this *mutual awareness* (my emphasis) becomes a part determinant of all our action and interaction". The perspective of mutual awareness is also addressed by scholars writing on risk governance. For example, Renn (2008, p.208) argues that building *mutual* awareness and *two-way* communication is crucial for risk communication. He stresses that "the issue is not a one-way street of informing someone, but an exchange of argument, experiences, impressions and judgement" (ibid., p.108). Mol (2008, p.113) even took a bigger step advocating the necessity of *integrating* people's knowing, perception and life experience into informational governance. Inspired by Beck's reflexive modernity approach, Mol argued that government agencies should move from their concern on sensitive data to the value on survey data in social science about people's perception and sensory information (ibid., p. 113).

To speak of the sociology of informational governance and the environment, Mol claims that the digitalization of our life, the acceleration of information flows, as well as the enhanced potentials of monitoring, tracking and tracing shed a new light on framing environmental issues in our society (ibid., p.xv). Emerging from the increasing information flows in the environmental sector, the centrality of informational quality and transparency moves to the fore (ibid., p.153). In this context, scholars have to deal with the fundamental issues of surveillance and monitoring in informational governance – the relations of power in the production, distribution and control process of information. To advance the analysis, Mol

follows Giddens' approach to frame surveillance in informational governance, describing that surveillance has reached "an intensity quite unmatched in previous types of social order, made possible through the generation and control of information, and developments in communication and transportation, plus forms of supervisory control of 'deviance'" (Giddens, 1987 cited in Mol, 2008, p.119).

Merging the idea of "metacommunication" and informational governance, Bennett & Calman (2010, p.32) point out that if people's feelings of antagonism and rejection emerge, the flow of information between government and social actors becomes either stationary or single-directional, wherein structural ignorance and social discontinuity give their birth. In this context, the sense of social learning is important to trigger interlocutors' mutual awareness of *the other* as well as to facilitate mutual dialogue. The term of social learning has been discussed in different domains, such as natural resources governance and organizational management. For instance, Freire (2000 cited in Pelling, 2011) discusses the relationship between learning and political change. The author calls for a *critical reasoning* approach, which "is not the default orientation for problem-solving held by marginalized or powerful – both prefer to make adjustments within the confines of established norms and structures" (ibid., p.60). In light of Freire's statement, the question put forward is -what conditions are needed to motivate actors to make adjustments, to challenge existing social practices and to take risks to enhance learning opportunities. In response to this, the German scholar Claudia Pahl-Wostl (2006, 2009; Pahl-Wostl *et al.*, 2010) who has written extensively on social learning and water resources management, argue that social interaction which allow different actors to interact in a reciprocal way and (or) reflecting on the interactions among the actors could facilitate information exchange and therefore lead to new ways of thinking. This sheds light on the role of social interaction[43] in building actor's awareness on *the other*, as well as in producing or transforming social discontinuities.

'Making' communication interface – the components of domain, arena and information

So far the study has elaborated the synthesized device "communication interface" and its components. To display a more vivid contour and in concert with wider effort to detect the

[43] More detail about framing social interaction in micro- interface setting is described in the next section - "An analytical framework for an ethnographically informed communication interface analysis".

communication interfaces in China's environmental management, the concepts of "domain" and "arena" are borrowed. These two concepts were developed by Long (2001) as an analytical handle on the kinds of constraints and enabling elements that shapes social action. In the setting of interface, the concept of domain is central to understanding and analysing how social and political boundaries are created and defended (ibid., p.59). To clarify the process of boundary creation, the concept of "arenas" is used referring to "social locations or situations in which contests over issues, resources, values, and representations take place" (Oliver de Sardan, 1995 cited in Long, 2001, p. 59). In light of the concepts of domain and arena, it advances the examination of communication and information exchange between actors.

In this study, two domains – government agencies and local people – are selected as key study objects to explore China's environmental management (Figure 3.2). According to Long (2001, p.59), at points where domains are seen to impinge on each other or come into conflict, the values and interests of actors as well as how social meaning is elaborated in these two domains, become especially visible and defined. Long's account sheds a new light on problematizing information management -as one kind of process of interaction and information exchange between government agencies and local people (Figure 3.2). In particular, when government agencies intend to mediate an *inflow* of information to lay actors, as Long (2001, p.71, my emphasis) puts it:

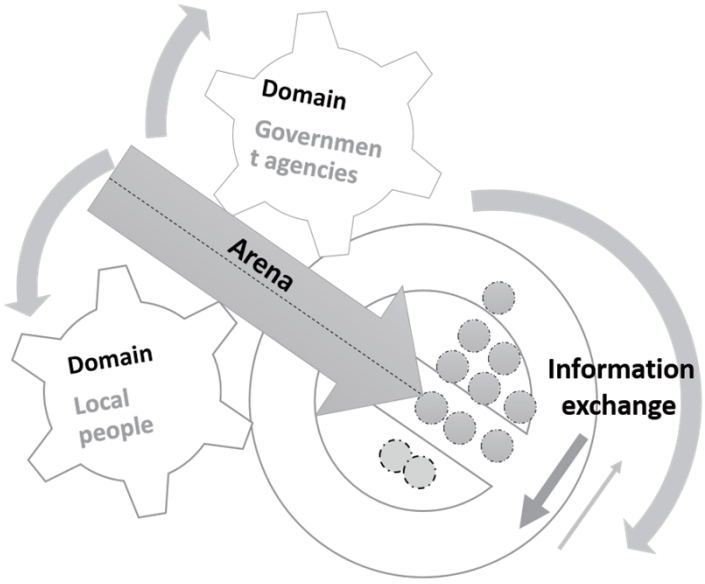
"The *incorporation* of new information and new discursive or cultural frames can only take place on the basis of already – existing knowledge frames and evaluative modes, which are themselves re-shaped through the *communicative* process."

Following his lines of thought, incorporating new information may provoke feelings of antagonism and rejection, without understanding existing knowledge frames, evaluative modes and concern of lay actors (Bennett & Calman, 2010, p. 32). In a similar vein, Renn (2008, p.123) advocates:

"People's perception on and response to risk should be contextualized into the local informational governance system, as personal experiences of risk have been increasingly replaced by external information about risks, and institutional risk management has substituted the quest for personal control."

These narratives imply that the outcome of information exchange in the arena is a process of "interaction, dialogue, reflexivity and contest of meaning, and involves aspects of control, authority and power" (Long, 2001, p.71).

Figure 3.2 Making the communication interface between government agencies and local people



Source: Drawn by author

In arenas wherein the situations of contest, conflict and (or) struggle take place, local actors draw symbolic boundaries to deal with the issue of social discontinuity in micro-settings (Cohen, 1985). The concept of "symbolic boundaries" was developed by Cohen in his work on the symbolic construction of community. The author discussed how symbolic elements defined community boundary, thus creating a "sense of belongingness", as well as forms of strategic interaction between particular individuals who, as it were, establish the parameters and conception of "self" and "other" relevant to particular interactional contexts and confrontations with "outsiders". These symbolic elements also produced trickled down effects in people's daily practices, denoting that "even the most informal networks of individual and families will tend to evolve standardized modes of dealing with *non-members* or *outsiders*" (Long, 1989, p.238, my emphasis). When local authorities try to intervene or mediate an *inflow* of information to local communities, the members of the community tend to use their standardized modes or normative middle ground for interacting and negotiating with the officials (ibid.,p.238). In this process, the causal linkages between boundary

creations and the influence from outsiders are actively constructed by the actors themselves to comprise interlocking configurations (Long, 2001, p.63). Notably, agency of local actors affects how they develop, define and elaborate the standardized modes for interacting and negotiating with outsiders. As such, social perception, cultural dispositions, classification shall be taken into account for a more sophisticated understanding of local practices as well as its effects on the interlocking configurations (ibid., p.51).

Situating communication interface in the wider power structure

Following Long's position that the interface analysis should be situated in the wider structure of power, this section presents the theoretical grounding of power relations. Notwithstanding the elaborated lens of interface takes into account the interplay and interlocking configuration between government agencies and local people, it is essential to examine the *medium* of the interplay – pinpointing the question of power and its individualizing tactic. In this regard, Handelman (1978 cited in Long, 1989, p. 234) depicted that interface as the crucial point of articulation wherein such discrepancies of connection and communication (between government agencies and local people) are most likely to be evident, and hence as a like "node through which to expose the coercion and fragility of structure of power". A major task of the interface analysis is thus to spell out the power implications - the social practices of incorporation and (or) subversion of power; the blending and (or) segregation of opposing discourses (Long, 2001, p.71). More specifically, Long writes:

"Discursive practices and competencies develop primarily within the circumstances of *everyday* social life and become especially salient at critical points of *discontinuity* between actors' life-worlds. It is through the lens of interface that these processes can best be captured conceptually" (ibid, p.72, my emphasis).

Following his position, the theoretical grounding of power will be presented in the next section, mainly drawn from Foucault's study on power and subject. In addition, his notion of "heterotopia" will be discussed in relation to the issue of social discontinuities in China's environmental management.

Power relations and subjects

The question of how power obtains productive service from individuals in their concrete lives is essential in Foucault's (2000) writings on power relations. To trace the onset of power

relations, Foucault (ibid., p. 125) argues that power moves from the state and its super structural power networks, gains access to the bodies of individuals, to their acts, attitudes, and modes of everyday behaviour through the 'individualizing' tactic. Its influence on everyday social life embodies the following aspects:

"This form of power that applies itself to immediate everyday life *categorizes* the individuals, marks him by his own *individuality*, attaché s him to his own *identity*, imposes a law of *truth* on him" (Foucault, 2003, p. 130, my emphasis).

It is thus a form of power that makes individuals subjects. Apart from the arguments on subjectivity, Foucault's conceptualizing of power intertwines with the process of the production of truth in our society. He claims that each society has its regime of truth – operating the general functioning of an apparatus of truth through the wheel of power (Foucault, 2000, p. 131). In parallel, the active subjects through their perceiving and knowing render themselves ability to modify, use, consume, or destroy power moved from the state's super structural power network. This pinpoints the key question in this study – how to situate and analyse the role of human agency in the wider power structure?

According to Foucault (2000, p.123), the states render through its super structural power network a whole number of power relations functioning possible; social practices in life-world, however, develop different types of codification of the same relations. The notion of "codification" connotes that social actors possess different levels of capacity to act on the exercised power. In that sense, power inevitably generates different forms of reaction by those confronted with power relations - resistance, accommodation and strategic compliance (Scott, 1985 cited in Long, 2001, p.71). It also formulates regular components of the politics of everyday life (ibid., p.71). To highlight the form of resistance, Foucault (2003, p.129 -130) argues that struggle against the forms of subjection had become more and more important in our society. Relative to this, the formation of subjects and subjective freedom, rules of normalization and forces of de-normalization were Foucault's main interest in his writings. The sense of anti-domination was manifest especially in his texts written during the 1970s. Foucault particularly focused on the *counter-productive* side of power relations – those that resist, push back and are free (Harrer, 2005 cited in Boyer, 2008, p. 63).

To merge the analytical tool of communication interface and the theoretical grounding of power in this study, the question put forward then, is, how power relation affects

communication in the setting of interface and vice versa. Regarding this, Foucault supports the necessity to distinguish between power relations, relationships of communication and objective capacity. To clarify this, he points out that the application of *human agency* – actors' objective capacity of knowing and (or) perceiving – in their most elementary forms implies relationships and the embedded patterns of *communication*; relationships of communication imply goal-directed activities (i.e. information exchange) and by modifying the field of information between partners produce effects of *power* (Foucault, 2003, p.135-136). His account sheds a clearer light on the role of human agency – as a conceptual bridge merging the building blocks of power, interface and communication in this study. In particular, one shall also take the role of *information* into account, which exerts influence in human agency, shapes communication patterns and power relations in the field of environmental management (see also Figure 3.2).

The notion of heterotopia

Foucault's account of the 'individualizing' tactic of the state's power offers insights on the influence of wider power structure on the individual body as well as the politics of everyday life. In this section, the study proceeds to explore the bottom-up processes of incorporation, manipulation and subversion of power practices by the relatively less 'powerful' lay actors. Through the combination of both a top-down and bottom-up perspective, the theoretical grounding of this study helps to pursue a more nuanced analysis of the state-society relations. The challenge ahead, however, is when the interplay between institutions and actors becomes more complex, the binary framing of power practises of lay actors- as a process of *either* incorporating *or* subverting power – is not sufficient to understand the bottom-up perspective as well as the complex state-society relation in China's environmental management. It is against this backdrop Foucault's notion "heterotopia" (of other spaces) sheds a new light on the contested arena between government agencies and local people. Box 3.1 presents a detailed elaboration of the notion based on Foucault's text "Of other spaces" and a recent publication *Heterotopia and the City*.

Box 3.1 The notion of heterotopia

Foucault's text entitled "Des espaces autres" ("Of other spaces") was initiated in a lecture on architectural studies in 1967. In this article, Foucault adopted the term heterotopia to qualify a vastly encompassing category of space, including young girls' 'honey-moon trip', rest homes and psychiatric hospitals, cemetery, theatre, vocation villages, motel rooms, brothels and colonies. It is worth noting that heterotopia is originally a medical term referring to a particular tissue that develops at a place other than is usual; and the tissue is not diseased or particularly dangerous but merely placed elsewhere, a dislocation (Johnson, 2006). Notably, Foucault used "mirror" as an explanatory basis to depict its *dazzling* characteristic, both real and unreal, as well as the *disturbing* function of heterotopia. However, the bunch of verbs that Foucault used to describe his heterotopia is somewhat confusing, as Johnson (2006) noted, "they mirror, reflect, represent, designate, speak about all other sites but at the same time suspend, neutralize, invert, contest and contradict those sites". Notwithstanding the idea of heterotopia remains debated due to a lack of clear definition, the recent publication *Heterotopia and the City* offers some valuable insights to explore the notion, as well as to redirect the line of inquiry with regard to social discontinuities.

The book *Heterotopia and the City* compiles articles written by scholars with backgrounds in urban studies. It brings together theoretical pieces and concrete case studies on urban architecture (i.e. theme park, shopping mall), post-civil society (i.e. gated community), transgression and urban activism, splintering metropolis etc. According to Dehaene &De Cauter (2008, p. 4), the term heterotopia has been applied into the theoretical current of urban studies since late 1960s. It was perceived as a source of inspiration but also one of confusion. Along similar lines, Heynen (2008, p.311) concludes in her afterthoughts of the book that "heterotopia is too slippery a term to be of any fundamental significance in the discourse on space and culture". In spite of this, the exemplary works of the book show that heterotopia could in fact open up different layers, different contexts and different adumbrations of its meaning (ibid., p.311). The spatial entity of the heterotopia offers advantages of going beyond the strict line of dichotomies and sheds a new light on the issue of social discontinuities.

Source: Box by author

According to Foucault (1967), the notion of heterotopia denotes a kind of place that is outside all places, of different spaces, as a sort of simultaneously mythic and real contestation of the space in which we live. To highlight the spatial characteristic of heterotopias, Johnson (2006) posits that heterotopias are fundamentally disturbing space, which contests the space where we live, as well as detaches us from ourselves. Cowherd (2008) takes a further step to explore the interwoven relations between the spatial and social-cultural entity of heterotopias. The author notes that "social norms are regulated, imposed, managed and reproduced in relation to specific physical forms of the built environment" (ibid., p.275). In light of the spatial-social constellation of heterotopias, the *contested arena* explored in this study is not only a physical site where government agencies implement their intervention programs of environmental management, but its spatial characteristic also offers a stage for social-cultural phenomenon. In that sense, local practices and individual lived experiences should be incorporated in the official programs of environmental management. However, barriers to social continuities such as discrepant interests, values and knowledge of actors often hamper the process of incorporation. In line to this argument, environmental management in China has triggered issues such as social conflict, institutional distrust. These issues echo the disturbing function of heterotopias. Inspired by Foucault's conception of heterotopias, it is highlighted that the contested arena in the field of environmental management shall be perceived as an *in-between* space, emphasizing on the permeability of the domains of government agencies and local people with fluid, tense and unstable boundaries (see also Figure 3.2).

Apart from its spatial and social-cultural characteristics, heterotopias reveal a logic of doubleness which offers some insights to study the interplay between institutions and actors. To explore the politics interpretation of heterotopias, Heynen (2008, p. 319) elucidates that Foucault's heterotopias denote places which embodies both forces of liberation and subjugation. Boyer (2008, p.64) occupies a similar position, in that he supports a double logic of heterotopias deployed by Foucault: "spaces of normalization coexist alongside different modes of existence, different temporalities and spatiality that constitutes counter-discourse and 'other spaces'." His account of the double logic sheds light on the essence of heterotopias, as a place where "the *interplay* between normative disciplining and liberating transgression manifest itself most clearly" (Heynen, 2008, p.322, my emphasis).

The revealed double logic and the interplay between normative disciplining and liberating transgression offer implications for problematizing the co-existence of the state and non-state power displayed in the contested arena between government agencies and local people. In relation to the role of human agency, the key questions here, is, what angel shall we take to examine the power practise of lay actors? According to Heynen (2008, p.329 -330), human agency is the most troubling question in Foucault's study of heterotopias, as his essential argument on the politics of anti-domination is not as much showcased in the heterotopia text as his previous writings. This is the reason for the uneasiness evoked by reading it (ibid., p.329). Despite this, Johnson (2006) notes that Foucault's construction of heterotopias ultimately leads to his essential work on power relations. To unravel the essence and nature of power relations, Foucault's proposal of heterotopias addresses the necessity to "think differently about, and uncouple the grip of, power relations: to overcome the dilemma of every form of resistance becoming entangle with or sustaining power" (ibid.).

Re-visioning social discontinuities in China's environmental management

Generally speaking, heterotopias point to various institutions, power relations and physical spaces that interrupt the apparent continuity and normality of ordinary everyday space of social life (Dehaene & De Cauter, 2008, p.3), contributing to the problematique of social discontinuities in our society. The *interrupting* force of heterotopia echoes the emergence of environmental pollution in China, which triggered a huge debate in local society about the health impacts of pollution, as well as issues of institutional (dis)trust and societal (dis)stability in wider terms. Moreover, the contestation of China's environmental pollution has 'disturbed' the arena where authorities and the local population meet, interact and communicate the environmental solutions, resulting in increasing environmental conflicts. In this context, the notion of heterotopia provides alternative source to problematize the discrepancy of social interests, values and power between different actors in China's environmental management.

Resonating with Ho & Edmonds' (2008) argument about the embeddedness of China's environmental activism, the heterotopia proposal advocates the conception of power practise of local actors beyond the binary framing – perceiving it as a process of *either* incorporating *or* subverting power relations. Instead, it is suggested that the process is *in the making*. In relation to the contestation of environmental pollution in China, the authorities are facing the dilemma of balancing the interests of industry and those it employs against the interest of

local communities. In this context, carefully balancing the hugely different interests of the industry and local communities is the daunting challenge that confronts the Chinese state. In this process, the sense of time is crucial to pursue a more nuanced understanding of China's environmental governance. The role of *time* is nicely written in Ho's (2009) work on (environmental) institutional evolution in China. To seek in the way how the Chinese state shaped its development interventions over time, the author proposes the principle of gradualism – which implies having a good eye to the role of time. Ho (2009, p. 187, my emphasis) notes:

"Sometimes this means [the state, JT] establishing new institutions to channel development. Sometimes this means [the state, JT] adopting a 'hands-off-approach' and leaving grassroots institutions space for their own institutional trajectories. It all depends on *place*… and *time*."

Here, Ho's argument accords nicely with the study on mixed signals and the Chinese state by Stern & O'Brien (2011). Ho's account of the different choices made by the state on its development interventions underlines that there is no "stable equilibrium of expectation" (Spence, 1973 cited in Stern & O'Brien, 2011) in its institutional practices. In this light, one shall prepare for a contingent and multi-layered processes of communication and interaction between government agencies and local people in the field of environmental management.

In view of the *making* process of communication interface, one should be aware of the 'individualizing' tactic of power – moved from the state's super structural power network to individual life – as well as its influence on people's defining and acting upon the situations of social discontinuities, on the one side. In examining the processes of incorporation, manipulation, subversion of power exercised by lay actors, these three processes may usually occur hand-in-hand which can't be easily undone, on the other side. To stress Heynen's (2008) position, it is suggested to avoid the misstep of binary analysis – 'push-pull' effect of power relations. In other words, detecting the communication interface in the field of environmental management is not to interweave or get stuck in mud, by the interlocking liberating and subjugating forces of power, but to go beyond this strict dichotomies. In this light, one shall take into account the third term – *the other*- the sacred, the play- where the everyday in life-world is suspended and where possibilities for alternative social formations open up (heterotopia) (Heynen, 2008, p.320). Combining the insights drawn from heterotopias and Ho's account of China's institutional changes, it is suggested that making those *other* images

and *counter*-discourses open to reinterpretation, inclusion and uncertainty is significant to have a more nuanced analysis of the state-society relation in China's environmental management. In light of the *other* images and *counter*-discourses, one might detect another layer of power practice by social actors – the 'individual tactic' (versus the 'individualizing tactic' of power) utilised by people every day - for creating "an escape route from power"[44] detaching them from the state's super structural power network.

An analytical framework for an ethnographically informed communication interface analysis

Through a combination of institutional and actor analysis, Long's interface approach offers a fertile ground for conceptualizing the situation of social discontinuities in China's environmental management. However, Long hasn't proposed instrumental tools to operate the transformation project of social discontinuity. He speaks of organizational and cultural means of reproducing or transforming social discontinuities, but these terminologies are too blurred to apply in empirical depth. Neither does Long go into examining the pathway operating these two means he sketched. To trickle down the abstract organizational and cultural means in micro interactional setting and explore its instrumentality, some ideas are borrowed from the Tough Choices Policy Consensus Systems (TCPCS) thinking to advance the transformation project toward a more practical and grounded pathway. Before elaborating the idea of TCPCS, one has to justify why TCPCS thinking is useful to the communication interface analysis.

TCPCS thinking resonates with the interface studies in a sense that, making tough policy choices "involves broad sectors of society in considering the competing interests, values, and tradeoffs in societal issues" (Johnson-Lenz & Johnson-Lenz, 2008, p. 160). Relevant to the research topic of industrial water pollution, this complex system thinking typically applies in the field of environmental management or risk governance. For instance, how to make tough choices policy consensus system that could provide for human needs while conserving natural resources - the dilemma between economic development and environmental protection our society is facing. Hence, it is chosen as a conceptual bridge to detect different scenarios of communication interface between government agencies and local people in this

[44] The phrase is borrowed from Johnson (2006).

study. In light of the TCPCS thinking, this study strives to advance the questioning of social discontinuities (intrinsically) and to support an ethnographically informed communication interface analysis (instrumentally).

The TCPCS thinking is inspired by the idea of collective intelligence, and aims to provoke the debate on learning to transform conflict and think together effectively among social actors (ibid., p.160). In that account, it connects closely to the project of transforming social discontinuities discussed in this study. Enriched by the science of collective intelligence, whose object includes the study and the optimization of the inner-subjective and out-objective emerging properties of communities (Pór, 2008, p. 234), the TCPCS thinking supports lay social actors' deliberation and respects their voices. These perspectives of support and respect are often underestimated in the project of transforming social discontinuities. To elaborate with more details, the TCPCS embodies the following key constituents (Johnson- Lenz & Johnson-Lenz, 2008, p.161):

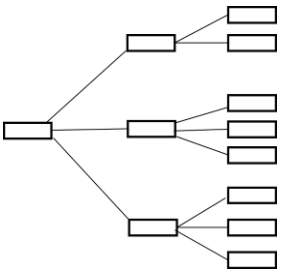
1. *Inquiry teams* constantly scan the environment; monitor changes and trends; gather data, information, stories, and lore about what's happening; frame emergent issues; converse and deliberate; and generate knowledge about key societal issues (building connection with lay actors through the communicative process).
2. *Weaving teams* organize the knowledge from inquiry teams by looking for patterns and identifying perspectives, agreements, disagreements, and connections to past conditions and future goals.
3. *Policy teams* use the organized knowledge for their deliberations, make tough choices and develop policy recommendations, identify desired outcomes, and develop benchmark indicators of progress.
4. *Benchmark teams* track the implementation of policies using the benchmarks to measure progress towards objectives, note successes and failures, and suggest changes for improvement.
5. *Bootstrap teams*, discovered and named by groupware pioneer Douglas C. Engelbart, watch the knowledge system in action, note how well it's working and where the new engagement technologies help and hinder, specify the next generation of technology tools, and ensure continuous improvement in the system itself.

Borrowing from the TCPCS, five teams in the system resemble different roles/government agencies of the bureaucracy in this study. The fundamental structure of the TCPCS – a *layered* organizational pattern - is consistent with Long's elaboration on the micro setting of interface. Long (1989, p.232) emphasizes that interface situations are not a two-sided articulation or confrontation. From the government side there could be many different interests, relationships, and modes of interaction, intersection of different normative and politico-administrative orders (ibid., p.232). In parallel, this *intra-relation* function (of the government agencies) applies in local communities where interaction in-between different social groups is intensive. Most notably, in this multi-layered organizational setting, information does not flow freely due to many constraints and controls that hinders information to move easily through the organization (Allee, 1997, p. 96). Along similar lines, "hierarchy- especially many layers of hierarchy [of a bureaucratic system] - also decreases the likelihood of a single, clear message as policies make their way from higher to lower levels with opportunities for distortion (both deliberate and inadvertent) each step of the way" (Wedeman, 2001 cited in Stern & O'Brien, 2011, p.13).

According to Allee (1997, p.100), a successful system network that surpasses structural ignorance or social discontinuities, is built upon "connective tissue" that in the form of languages and communication systems that carry information and feedback. In line with this, the inquire team in the TCPCS carries important tasks of building connection, communication with local actors, when they are assigned to gather stories/data. In this context, members of the inquire team are geared to collecting local views, creating feedback channel for articulating local voices and ensuring local deliberation -constructing a communication system that carries both information *and* feedback in local society. In this scenario of interface, the team members function as connective tissue bridging the bureaucratic system with lay actors.

For different social groups of lay actors, there is a similar structure which functions as connective tissue that bridges individuals in their communication system. Allee (1997, p. 100-101) proposed that another type of connective tissue that we see in web relationships is the pattern of "fractal" geometry. Fractals explain how every tiny branch of a tree holds the same basic structure as the larger branches and of the tree itself (ibid.). The pattern of fractal sheds light on some key constituents of social interaction in local society – the active subjects, social ties, repetitiveness of the structure (Figure 3.3).

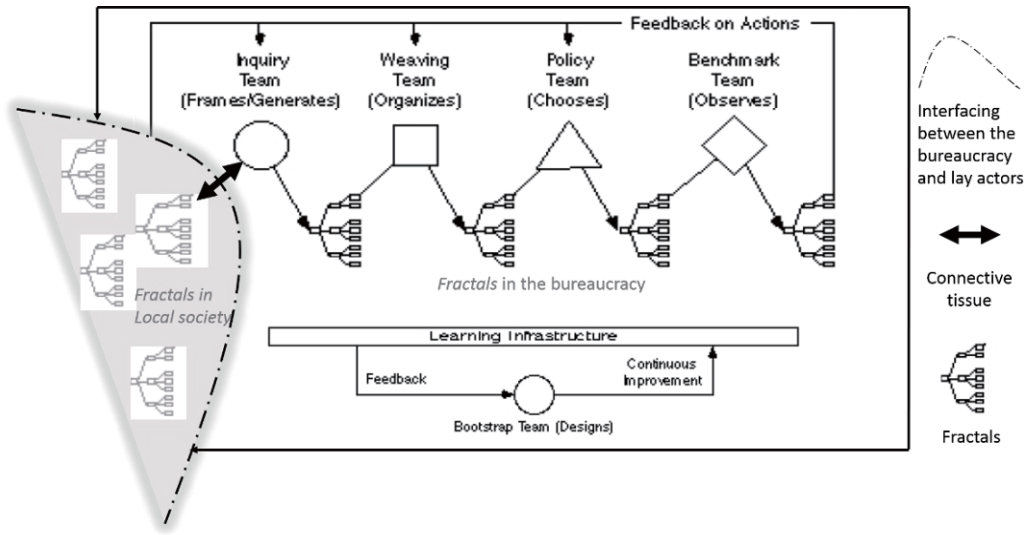
Figure 3.3 Framing social interaction in the micro setting of interface – the pattern of fractal



Source: Drawn by author

In lay circumstances, *active subject* denotes that individuals develop their own perceiving and knowing based on the level of their capability and knowledge ability. Moreover, individuals are fundamental constituents of web relationships built upon individual social ties. The role of social ties in shaping interactional relations is well illustrated by Passy's (2003) work on social network. The author describes the process of social interactions, "taking place among individuals with social ties, as this process facilitates both the production of meanings that are integrated into the self, and the communication of perceptions and preferences that later engages others in collective action" (ibid., p.26, my emphasis). The pattern of fractal exists everywhere and is a repetitive structure in local society –shaping actors' social interaction and (or) networking. At the same token, the function of fractal applies to the multi-layered bureaucracy – shaping the relationship as well as modes of interaction, intersection between different normative and politico-administrative units. Enriched by the pattern of connective tissue and fractal, framing interactional relationship (in-between government officials and local people) in the TCPCS offers a holistic view on the interface situations - how actors placed in this setting perceive the existence of *others* and build up dialogue with each other.

Figure 3.4 An analytical framework for an ethnographically informed interface analysis



Source: Adapted from Johnson- Lenz & Johnson-Lenz, 2008

Toward this end, an analytical framework for an ethnographically informed interface analysis is developed based on Johnson – Lenz & Johnson – Lenz (2008) (see Figure 3.4). The framework is inspired by the TCPCS and enriched by the element of connective tissue and fractal. The operation of this framework is conducive for bridging micro interactional setting and macro institutional structure. In this framework, the interrupted flows of information or hindrance of moving messages free within the layered organisational structure resonates with the existence of mixed signals in China's political landscape. In the critical linkage point where actors are bridging, accommodating to, or struggling against each other (Long, 1989, p.232), human agency is key to either reproducing or transforming social discontinuities.

CHAPTER 4 EVERYDAY STRUGGLE WITH POLLUTION AND A VIRTUAL COMMUNICATION INTERFACE

In light of Tilt's (2013b) methodological approach to studying China's industrial pollution, this chapter strives to combine the macro-level pollution data with qualitative insights obtained from the community studies in Guangrao County and Hekou District. The case study of Guangrao County situates the context in Sanshui Village, whereas the rapid industrialization has triggered villagers' sentiment of ambivalence at the intersection of environment and economy. Slightly different, the case study in the Dongying port delineates the victims of industrial water pollution – local fishermen who suffered from the impacts of pollution and confronted livelihood decreases. To crystallize the effects of industrial water pollution, the studies start with the perception of lay actors on the environmental change, focusing on how they describe the locus of pollution and related sensory details. To connect with the perspective of government agencies and give prominence to the *interface*, two specific events - one mass protest and one oil spillage accident – are described to investigate local cadres' responses to pollution. Despite its contextual differentiation, two case studies zoom in on the function of connective tissue[45] that shapes the interfacing between lay actors and government officials. The last section presents the synthesize findings with regard to the barriers to communication interface at community level.

An interface between villagers and cadres in the village, township and county

Onset of industrialisation in Sanshui Village and people's ambivalence

Since 2013, the industrial zone Daozhuang High-efficiency Ecological Economic Develop Area (DZHEA) was initiated by Guangrao County People's Government in order to develop agglomeration integrating chemical and machine building industries. Factories have gradually emerged during 2009-2014 in close proximity to the villages of Daozhuang Town (Photograph 4.1).

[45] The structure of connective tissue exists in the form of languages and communication systems that carry information and feedback. According to Allee (1997), a successful network that surpasses the barriers of dis-interfacing is built upon the structure of connective tissue. Details were presented in Chapter 3.

Photograph 4.1 Emergence of industrial enterprises in Daozhuang Town

Source: Photograph by author, 2015

By 2014, 350 industrial enterprises have been introduced to the DZHEA, of which 42 are large-scale enterprises (Guangrao Public, 2014.10.28). Local inhabitants have benefited from their establishment. The benefits mainly originate from land rental and employment in local industrial enterprises, as one villager explained:

"Before [the industrialization] we had to farm using fertilizers and pesticides, investing much labour, very hard and exhausting. Now we could have time to play, and we don't need to invest. Less risky than before" (Household interview No. 16, Sanshui Village, 2015.01.08).

"Those who seek jobs outside could stay and work for the local industrial enterprises now. They do not need to move out from here. If two young people [one couple of the family] work for the industrial enterprises, they could earn 70,000-80,000 RMB per year. Isn't it rich enough? They are all getting richer nowadays, unlike us elders who are too old to get employed. I only have a few mu land which was not expropriated by the government, so we earn very little" (Interview with elder villager during transect walk, Sanshui Village, 2014.12.25).

Interviews in Sanshui Village show that the annual revenue from land rental varies among households[46], spanning from 2,000 to 10,000 RMB. For those working in the industrial enterprises, people usually earn 3,000 to 5,000 RMB monthly. On the one hand, inhabitants happily embrace the establishment of the industrial enterprise as competition for employees raises the salary quickly. Recruitment advertisements by industrial enterprises were found everywhere near Sanshui Village (Photograph 4.2). On the other hand, inhabitants worry about the impacts to their health. The following quotation from an interview vividly captures this local ambivalence:

"People could only see the immediate short-term benefits. They think they are still young and should make use of their physical strengthen to work, earn money and help to solve their family's economic burden. In the future, their health … [suffers and people would pay the price, JT]" (Group interview in Household No. 6, Sanshui Village, 2014.12.09).

Photograph 4.2 Recruitment advertisement posted by one local industrial enterprise[47]

Source: Photograph by author, 2015

[46] The size of land each household owns is dependent on the number of family numbers. In average local inhabitants could receive a bit more than 2,000 RMB per mu land annually. The compensation depends on the market price of crops. Sanshui villagers used to grow wheat (spring season) and maize (autumn season). The harvest is 300- 350 kilos wheat/maize per mu land. The market price of wheat/maize is around 3 RMB/kilo. Every year they receive the compensation money in spring and autumn harvest season respectively (Household interview No. 16, Sanshui Village, 2014.12.09).

[47] Translation of the advertisement: One rubber-processing industrial enterprise is looking for employees aging between 18 and 35. Male or female is not constrained. The employees are expected to work 8 hours/day with monthly income of 4,000-6,000 RMB.

The processes by which villagers sense the harmful impacts of pollution to their health, is nicely depicted in Jun Jing's work on environmental protests in rural China. He argues that people would take initiatives to fight against the pollution when the initiative resonates with "a society's value system and its symbolic manifestation" (Jun Jing, 2003 cited in Lora-Wainwright, 2010). In the context of Sanshui Village, the local value system is dominated by people's motivation and pressure to catch up with the wealthy people, and to strive for a more comfortable life. Inhabitants are afraid that protest against the industries may increase their risks of unemployment in case that the local government would shut down the industrial enterprises. Irrespective of this, when the environmental impacts become more salient in people's daily life, they feel anxious of the health threats, particularly for employees of industrial enterprises or those exposed to smoke inhalation. On those accounts, the experiences of local inhabitants echo Lora-Wainwright's (2013b) argument - "dying for development"- which the author used to describe the dilemma of economic growth and environmental protection in China. The interview with one female employee underlines this point:

"I have been working in a tire factory for 5-6 years. My throat is not good. When I low down my voice I could not hear myself. If I speak loud I don't feel comfortable for my ears. I guess this is because of my job, too demanding. We have no time to drink water when we are working. […] I went to the hospital in Shouguang[48], and the doctor asked me if I am from Guangrao County. They all know that our environment is bad. Many local people go to their hospital. The doctor even knows that I probably work in an environment like this [the tire factory]. For that reason, the doctor suggested me to change the working environment" (Group interview in Household No. 5, Sanshui Village, 2014.12.09).

Her remarks contradict to Tilt's (2013a) findings that many industrial workers downplay the risks from pollution because of their financial dependence on the factories and fear of the collapse of local industries. The empirical study conducted in Hugerrubber shows that the workers share different attitudes on the issue. The perceived severity of pollution is hardly uniform.[49] Rather than concluding the workers lack awareness, finding suggests that they feel

[48] A nearby city which is located in close proximity to Guangrao County, and many people from Guangrao go to Shouguang because people assume they have better medical treatment.

[49] Some would just say everyone is only concerned about their job, and it is fine if they could earn money; some consider it not useful to bother the pollution issue; some are worried about the health impacts of pollution.

incapable to understand the pollution impacts and the onset of disease. The following interview with one employee from Hugerrubber supports this argument:

"All I have described to you is *phenomenon* because I don't have *evidence* [my emphasise]. During the past few years, the elders living in my village mentioned that they got sick often. Most were diagnosed with cancer at the end. It may be possible the number of people who had cancer before equals to the number of today. But they didn't know it was cancer before. Anyway I feel more often people mention cancer nowadays. […] I do not think we have good ways to deal with this, except we leave this place. But we need many conditions like money and resources to do this" (Employee, Hugerrubber, 2014.11.13).

Sanshui inhabitants might experience what Brown, Kroll-Smith and Gunter (2000 cited in Tilt, 2013a) call "ontological insecurity", that is to stay, a feeling of anxiety and a state of uncertainty about the future, and about how to weigh up the risks and environmental impacts induced by the rapid emergence of industrial industries. Moreover, it sheds light on the terminology of "transitional disease"[50], the effects of which as Holdaway (2013) argues, may be "delayed but long lasting owing to the gradual accumulation in the environment and the human body of toxic levels of chemicals, frequently from multiple sources." To have a more nuanced analysis of the environmental impacts caused by the rapid industrialization, the next section outlines an array of local people's sensory details and how they reflect on the situation.

Observation of industrial water pollution and its impacts

During the household interviews, Sanshui villagers often complained about the smell and smoke diffused from the chimney of the nearby factories, which they suspected to be poisonous (see Photograph 4.1). For them the frequent haze weather was a signal of the visible effect of air pollution. People mentioned that many years ago the distant small mountain could be observed from their village when the weather was nice (Household interview No. 3, Sanshui Village, 2015.12.07). In the point of view of local inhabitants, the issue of poor air quality is more urgent than water contamination, as they need to breathe every second (Employee, Hugerrubber, 2014.11.13). However, the mass protest in 2013 delivered a significant message about the harmful effects of water contamination to Sanshui Village. Importantly, the issue has emerged as the new focus of protest against industrial

[50] A disease that is related to rapid industrialization and urbanization (Holdaway, 2013).

enterprise.[51] People relate health threats of pollution to the prevalence of tracheitis and skin diseases, especially among the elders and children. A woman who just gave birth mentioned: "when I was pregnant, I had to visit the hospitals many times - more often than my older generations- to check the health status of my baby, and to examine if there are malformation symptoms" (Household interview No. 7, Sanshui Village, 2014.12.09). Moreover, Sanshui inhabitants reported the decrease of crop yields, declining biodiversity, problems with drinking water quality and soil contamination (see Table 4.1). They claimed that these observation have set in after the establishment of the local industries. In Sanshui, local drinking water supply comes from the groundwater resources. Due to the threat of groundwater contamination, a filtration device was arranged in the water station for drinking water treatment (Photograph 4.3). Notably, industrial water pollution was perceived detrimental to local agriculture, as expressed by one farmer:

"The crops are covered by a layer of grey or black particulate matter. The irrigation water [coming from the Yellow River] runs black. We don't have other water sources except for this dirty water, so we have to use it. Some local people don't dare to eat their own crops. Instead, they prefer to buy the wheat flour from outside, which is grinded from wheat irrigated by water from wells" (Household interview No. 15, Sanshui Village, 2014.12.23).

Photograph 4.3 A filtration device arranged in the water station of Sanshui

Source: Photograph by author, 2015

[51] See the section "A mass protest against local industrial enterprise" of this chapter.

Table 4.1 Observed health impacts of industrial pollution in Sanshui

Impacts	*Description of an array of sensory details*	*Main sources of pollutant*
Decrease of air quality	-Frequent haze weather, black smoke, awful smell like rotten cabbage -Difficult to breathe especially during the night, and people prefer not to open the window - Villagers who live outside for a long period of time complain the local environment is very bad, when they return to their village for visiting	Waste gas
Water contamination in the pond	-Black effluent observed in the pond -Decrease of fishes and plants (i.e. reeds)	Untreated wastewater
Biodiversity decline	Decrease of diversity of species (i.e. birds, insects[52] on the farm land)	Solid liquid
Negative health implications	-Teeth dropping out -Choke and cough common for those working in the industrial enterprises -Skin disease especially among children and elder people -Infertility among women	General industrial waste
Crop contamination	-Deposition of grey or black particulate matter on the wheat	Waste gas
Soil contamination (due to blockage of the gullies)	Sewage stuck in the gullies and not flow away	Sewage
Decrease of drinking water quality	Untreated wastewater reportedly pumped to underground by industrial enterprises	Wastewater

Source: Table by author based on household interviews conducted in Sanshui, December 2014

Land acquisition for industrial areas

To generate a comprehensive picture of the patterns of local natural resources, a transect walk was conducted. To depict environmental change, local villagers produced one map during

[52] One elder informant recalled that when he farmed during the early period of time, he could easily hunt one kilo of locusts from the wheat, which they used to cook for food. Since the emergence of the industrial factories, he could still find some locusts the first 1-2 years after their emergence. But now they just disappear.

this transect walk (Photograph 4.4). The conversation during the transect walk focused on four gullies which were partly blocked by nearby industrial enterprises.

Photograph 4.4 Mapping the boundary between farmland and industrial enterprises

Source: Photographs by author, map produced by informants and author based on transect walk, 2015

According to Sanshui inhabitants, when the industrial enterprises rented land from their Village Committee, they did not calculate the areas of those gullies. Nowadays, the industrial enterprises suddenly block the gullies and the dirty water can't flow away. It is detrimental to the soil quality and crop yield in the long term (see Table 4 of Annex IV). The issue of land expropriation is found to be a major contributor to the communication barriers between Sanshui villagers and local cadres. More crucially, villagers seemed to be excluded from the discussion about land expropriation, as shown by following quotations by local cadres:

"Some industrial enterprises could directly rent the land from the village committees if Guangrao's quotation of construction land is used up. They have room for manoeuvre as land resources are scarce in Guangrao. […] If the industrial enterprise directly rents the land from the village, it would not do any harm to the villagers. They would get compensation in any case. About the compensation, sometimes the village committees sign the contract directly with the enterprises. Sometimes they sign the contract with the township government, because they do not trust the industrial enterprises [in this case the township government is responsible for the compensation, JT]. When the enterprise rents their land, usually they would calculate the area of ponds or gullies, then they could plan how to use those areas. In that case they [enterprises] of course would not let the water run in the gullies. People complained they do not get compensation from the enterprise, but in fact those [gullies] are collective properties which individual household doesn't count towards. This proves that villagers are only concerned about their individual benefits. They only want more money from that" (Interview, Dongying, 2015.02.03).

"[The respondent opened the document[53]*Daozhuang Town Overall Planning* on her computer, and pointed to the places where the gullies are located] They were already categorised as construction land [rather than collective agricultural land] in 2012.[54] Regarding what kind of projects are initiated and how many industrial enterprises are settled, it is decided by the local government as they have authorities to make decision based on their development initiative and willingness" (Officer, Guangrao County Land and Resources Bureau [GRLRB], 2015.01.13).

"The immediate benefits of local industrialization are good as local people could work in the industrial enterprises. Meanwhile, they get benefits from land rental. But they don't consider that in the future [their] environment may be degraded, because they are only concerned about their short-term interests now. From our perspectives, land resources are scarce and we won't let it remain idle [without use]. We could still rent the land to other enterprises if one is shut down or goes bankrupt" (Section Chief, GRLRB, 2015.01.13).

The perspective of these cadres confirms Lora-Wainwright's (2014b) argument that government officials perceive themselves, "as a mediator with investors and a guarantor of compensation and is seen as a protective presence" in the case of land dispute.[55] However, their role as a *protective* presence is often questioned by lay people. In the case of Sanshui, villagers complain, "most often than not, the compensation money is not delivered to us in time" (Household interview No.2, Sanshui Village, 2014.12.04). Villagers were suspicious that the Village Committee used the money for individual purposes.[56] Due to people's dissatisfaction, issues about compensation money and other scandals of the Village

[53] According to the respondent, the document is not accessible to the public unless they come to their office for consultation. The version of the *Daozhuang Town Overall Planning* is the updated one published in 2012.

[54]According to the respondent, if the collective farmland is to be expropriated for construction use, the county Bureau of Land Resources has to inform the provincial Department of Land Resources for approval. If the provincial department agrees, then the farmland can be used for non-agricultural purpose and sold to investors. During these processes, they would organize a few hearings. Relevant bureaus such as EPB should participate, propose their opinions and sign on the official documents.

[55] A detailed discussion of different levels of government responsibility on land compensation can be found in Lora-Wainwright's (2014b) study. The author documents the issue of land dispute under a similar research background whereas dramatic industrialization and urbanization were undergoing.

[56] For example, if the Village Committee put the money in bank village cadres could get benefits from the interest (Household interview No. 2, Sanshui Village, 2014.12.04).

Committee were written in "An open letter to Sanshui villagers"[57]. The letter was disseminated in the village two days before the committee election held in December 2014. During that period of time, rumours about corruption and omission against Sanshui's party secretary were spreading. In line of this, findings indicate that low trust was placed in the party secretary. Villagers were not, however, willing to challenge that first and seemly most difficult[58] hindrance to consult the township or county cadres. The following example given by the villagers reinforces this argument:

"[…] We have to work and earn money, and we can't waste our time. If we go upwards [the hierarchy] to report our issues, the officials say they would have a check. Then one, two, three years pass without one answer reported to us. We ordinary people can't afford it [to waste time because we have to work]" (Group interview in Household No.6, Sanshui Village, 2015.12.09).

Even if local people are too busy[59] to approach the cadres, the cadres should guarantee people's right-to-know according to Guangrao County People's Government (GRG):

"This year we have posted two times *Guangrao County People's Government Land Expropriation Announcement* in the visible place of the village whose land is to be expropriated, and then made public the prepared *Land Compensation and Resettlement Program for the Affected Village* in the same place of the affected villages. Meanwhile, we have took the initiative to disclose relevant information on our official public website, in order to effectively protect people's right-to-know" (quoted from GRG, 2014a, translated by author).

In theory people enjoy right-to-know about the process of the land expropriation and relevant compensation programs, but in factuality it is difficult to carry out as reflected by one local villager:

"The production brigade [referring to Sanshui Village Committee] did not inform us and hold meetings to discuss how to deal with the gullies. I only knew they were blocked when

[57] The format and content of this letter are discussed in Chapter 7 in relation to the Sanshui Village Committee election, in order to explore the causal linkage between communication and flows of information among villagers.

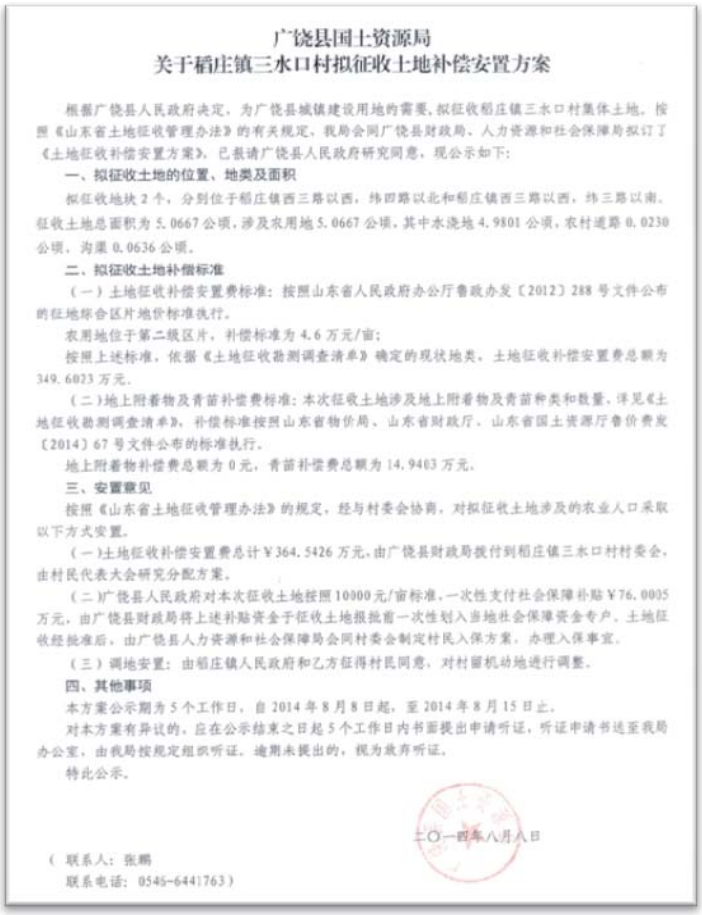
[58] People complain that if they go to the township or county government for petition, they would be 'invited' home by their party secretary.

[59] Here people's narrative of busy life in fact shows their feeling of powerlessness to act.

the wall was built there, exactly near my farmland. When the wall was built it looked so 'fresh' then I knew [the gullies are blocked]. I don't know how to deal with this. I haven't reported this upward [to the production brigade]" (Interview conducted during transect walk, Sanshui Village, 2014.12.25).

In his account, villagers are ruled out from the process of consulting– which local cadres are supposed to conduct to collect public opinion before the implementation of local planning. In fact, GRLRB has announced *Sanshui Village Land Compensation and Resettlement Proposal* (Figure 4.1) on their webpage. However, it is unclear whether the document was posted in the notice bulletin board of Sanshui Village (see Photograph 4.5). During the household interviews, no villager mentioned about this proposal when asked about their access to official information on land compensation.

Figure 4.1 *Proposal for Land Compensation and Resettlement in Sanshui Village*



广饶县国土资源局
关于稻庄镇三水口村拟征收土地补偿安置方案

根据广饶县人民政府决定，为广饶县城镇建设用地的需要，拟征收稻庄镇三水口村集体土地。按照《山东省土地征收管理办法》的有关规定，我局会同广饶县财政局、人力资源和社会保障局拟订了《土地征收补偿安置方案》，已报请广饶县人民政府研究同意，现公示如下：

一、拟征收土地的位置、地类及面积

拟征收地块2个，分别位于稻庄镇西三路以西，纬四路以北和稻庄镇西三路以西，纬三路以南。征收土地总面积为5.0667公顷，涉及农用地5.0667公顷，其中水浇地4.9801公顷，农村道路0.0230公顷，沟渠0.0636公顷。

二、拟征收土地补偿标准

（一）土地征收补偿安置费标准：按照山东省人民政府办公厅鲁政办发〔2012〕288号文件公布的征地综合区片地价标准执行。

农用地位于第二级区片，补偿标准为4.6万元/亩；

按照上述标准，依据《土地征收勘测调查清单》确定的现状地类，土地征收补偿安置费总额为349.6023万元。

（二）地上附着物及青苗补偿费标准：本次征收土地涉及地上附着物及青苗种类和数量，详见《土地征收勘测调查清单》，补偿标准按照山东省物价局、山东省财政厅、山东省国土资源厅鲁价费发〔2014〕67号文件公布的标准执行。

地上附着物补偿费总额为0元，青苗补偿费总额为14.9403万元。

三、安置意见

按照《山东省土地征收管理办法》的规定，经与村委会协商，对拟征收土地涉及的农业人口采取以下方式安置。

（一）土地征收补偿安置费总计￥364.5426万元，由广饶县财政局拨付到稻庄镇三水口村村委会，由村民代表大会研究分配方案。

（二）广饶县人民政府对本次征收土地按照10000元/亩标准，一次性支付社会保障补贴￥76.0005万元，由广饶县财政局将上述补贴资金于征收土地报批前一次性划入当地社会保障资金专户。土地征收经批准后，由广饶县人力资源和社会保障局会同村委会制定村民入保方案，办理入保事宜。

（三）调地安置：由稻庄镇人民政府和乙方征得村民同意，对村留机动地进行调整。

四、其他事项

本方案公示期为5个工作日，自2014年8月8日起，至2014年8月15日止。

对本方案有异议的，应在公示结束之日起5个工作日内书面提出申请听证，听证申请书送至我局办公室，由我局按规定组织听证。逾期未提出的，视为放弃听证。

特此公示。

二〇一四年八月八日

（联系人：张鹏
联系电话：0546-6441763）

Source: GRLRB, 2014

Photograph 4.5 A standardized bulletin notice board in villages of Daozhuang Town

Source: Photograph by author, 2015

The following information captured in a personal conversation with a government official, provides some valuable insights on the large spectrum of manoeuvres that the government agencies may use to tackle the issue of land dispute:

"[…] but in reality local cadres would only post the announcement in the notice bulletin board of villages, take a picture, and then put it down. It is because of the sensitive information on the announcement [which may trigger villagers to compare the amounts of money they receive]. With the picture the officials of Land and Resources Bureau can prove to their superior they that have made public the announcement. Then they can seek consent from their superior in order to complete the official procedures of land resources conversion [from agricultural use to commercial use, JT]" (Personal communication, Dongying, 2015.01.30).

To broaden the discussion on the interface between local people and cadres in the village/township/county, the next section presents the mass protest against one industrial enterprise initiated by Sanshui Village, followed by a discussion on the role of local cadres during the negotiation process.

A mass protest against local industrial enterprise

Since 2012 people discovered that the colour of water in the pond – located in the east side of Sanshui Village – looked a bit different. Now and then, some black effluent was observed in the water. People assumed that the effluent originated from the untreated wastewater

discharged by *Dragon* – one industrial enterprise located in close proximity to the pond (see Box 4.1). One respondent recalled that people usually went to the pond for fishing (Photograph 4.7). Local villagers used to pump the pond water for irrigation when the Yellow River irrigation water came late.[60] In 2013, the polluted pond water used for irrigation caused crop death on a large area. According to one cadre in the township government, "the villagers were not supposed to use that water which is lye for irrigation, and it is not good to their crops" (Director of Committee on Agriculture Sector, DZG, 2015.02.03). In his opinion, every year the township government has to pay large amounts of money to Guangrao County Water Resources Bureau (GRWRB) for irrigation[61]. The villagers would only waste the government's money if they don't make use of the irrigation water from the Yellow River (ibid.).

Box 4.1 Water contamination of the pond and its ecological degradation

The artificial pond exists for more than 21 years. Originally it was farm land used by local villagers. When the highway (in close proximity to Sanshui Village) was built, the dug-out soil was used as building material for the highway. The hollow was gradually filled with water from the Yellow River during the crop seasons. The water depth could reach up to 4 meters. During the first years, reeds grew up to 3-meter high. People used to go fishing when the water receded. Apart from various fish species, there were also small crabs, shrimps living in the pond. But nowadays those aquatic creatures are mostly gone. Local people claimed that water contamination killed those aquatic creatures. Moreover, only little supply from the irrigation water could reach the pond because the gullies were partly blocked since October 2014. Photograph 4.6 shows the comparison of water levels before and after the irrigation water comes.

[60] The irrigation water is supposed to come two times in the winter and spring crop season.

[61] GRWRB is responsible for managing the irrigation water from the Yellow River to local villages. Township governments have to pay the fee to GRWRB in order to use the irrigation water.

Photograph 4.6 Comparison of water levels in the pond

It was observed that in 2012 a large amount of dead fishes floated on the surface of the pond. One villager had observed 2 times illegal pollutant discharges by *Dragon* in the recent years. In 2013 some polluted substances were moved from the enterprise and dumped in the gully. When the spring came in 2014, ice smelted and all those pollutants ran off in the pond. When villagers went fishing and dug a hole in the ice, they found all fishes coming to the hole. Their experience told them that the water has been polluted. Thereby the fishes couldn't breathe underwater any more.

Earlier between 2011 and 2012, *Dragon* shifted the solid waste -filled in two trucks- from their factory to the rural road. The solid waste was dumped on the road. It looked something like black clay, felt sticky and smelt pungent. The observer couldn't stop choking when he passed by. He guessed it must be something like chemical sources. The solid waste was there for almost one year. Many people saw it but they didn't discuss it. Later when the rural road was rebuilt those pollutants just disappeared.

Source: Box by author based on household interviews in Sanshui, December 2014; photographs by author, 2014 and 2015

Photograph 4.7 One local villager fishing by the pond

Source: Photograph by author, 2014

Gradually, the accumulative poisonous air inhalation and toxic substance permeation in people's surroundings, i.e., water and farmland, increased the villagers' negative emotion and dissatisfaction. This eventually triggered the mass protest against *Dragon* in the summer of 2013.The village leader announced the protest over local broadcast and encouraged Sanshui inhabitants to join. Around 50 villagers attended. The mass protest lasted for around 10 days. The slogan - "give us back justice, give us back fresh air, and give us back clean water" – was written on a poster put up on the wall of *Dragon*. The participants got a stipend- 100 RMB per day- from their Village Committee. Meanwhile, the Village Committee also informed the township government for solutions. A compensation of 200,000 RMB was negotiated from *Dragon* in the end (Group interview in Household No. 5, Sanshui Village, 2014.12.09). But people were disappointed with the outcome, as they had expected *Dragon* would stop pollution[62] if the company was not shut down. While the Village Committee received the compensation, village cadres did not take any measures to control the pollution. According to Woodman (2011, p.79) who studied the institutions of village committee in rural China:

[62] For example through an upgraded wastewater treatment facility.

"Village committees are locations where people can legitimately exercise their constitutional and legal right to complain about official actions and policies and to receive an answer. […]They [local cadres] are required to deal with *all* [my emphasis] complaints brought to them, no matter what the subject. In the place where you belong, someone must always hear you out, and the various authorities of that place have an obligation to assist you."

Empirical data from this study, however, shows that the Village Committee acted to maximize their individual benefits, rather than fulfilling their obligation to assist the villagers as a whole. In a similar vein, cadres in the township are supposed to assume relevant responsibility to carry out environmental enforcement programs against the industrial enterprises. But in reality the challenge of implementation of environmental programs remains. According to local villagers, during the protest against *Dragon*, the township government did not play a supportive role in the whole process (Group interview in Household No.5, Sanshui Village, 2014.12.09). Moreover, villager assumed that cadres from the township acted as a mediator in order to calm people down to prevent a riot (ibid.). The interview conducted with one local cadre confirmed this tendency:

"When village cadres from Sanshui informed us, we acted promptly. At the beginning, the villagers asked for 100,000 RMB but *Dragon* was not willing to give that money. Their manager directly took the water from the gully and drunk it. He wanted to prove to us the water was not problematic. We found it *difficult* [my emphasis] to coordinate [their negotiation]. […] The protest lasted for nearly half a month. And then Sanshui changed their idea and asked for a compensation of 200,000 RMB. *Dragon* did not know how to deal with that and gave 300,000 RMB[63]to Sanshui Village in the end. […] We actually went there to check if *Dragon* discharged untreated wastewater to the pond. We dug a 2-meter-deep ditch behind the wall of *Dragon*. But we could not find any pipe to prove they discharged wastewater to the pond. It ended up with *nothing definite* [my emphasis]" (Section Chief of Safe Production and Environmental Protection, DZG, 2015.02.03).

Interestingly, a cadre in the county government showed a different reading of the protest compared to the township government:

[63] This is contradictory to what the villagers said. People mentioned Sanshui only got 200,000 from *Dragon*. It is unclear how much exactly Sanshui Village Committee received at the end.

"We knew the villagers initiated a protest against *Dragon* from the *grapevine* [my emphasis]. I myself did not know this from my office mates here. I guess the township government wanted to solve the issue *in private* [my emphasis]. If the villagers came to us for a petition, then the township government or county government [if the issue is very serious] is supposed to lead an investigation and propose a remedy "(Section Chief of Pollutant Emission Control, GREPB, 2015.01.13).

Her remarks reflect Ho's (2001) argument on China's environmentalism that lay actors lack both the opportunity and the immediate agency to openly confront the local government or even highly-placed cadres. Furthermore, the map of the problematique in rural environmental management lies in the fact that cadres in the village, township, and county orchestrated uncertainty and miscommunication to their benefit, covering each other's backs by pleading ignorance or staying unresponsive to avoid conflicts or more duties (Lora-Wainwright, 2014b).

The challenge of local implementation of "ecological economic development"

Through the use of the Guangrao's case study, it delineates the challenge of ecological economic development addressed in the national planning targeting the YRD. As the empirical data shows, the intersection of environment and economy has emerged as the locus of Sanshui villagers' war against water pollution. On the one hand, the villagers embrace the settlement of industrial enterprise as this increases substantially their economic income. On the other hand, they suffer from environmental pollution. This experience as addressed before might be regarded as what Lora-Wainwright (2013b) calls, "dying for development," which she adopts to highlight the tension between desiring development and yet suffering its negative impact on health.

This tension has prompted the state to initiate relevant policies and environmental programs for pollution abatement. For example, the *Ministry of Environmental Protection's Overall Program for the Twelfth Five-Year Plan* was initiated in 2011, referring explicitly to the threats that pollution presents to public health and social stability (MEP, 2011).[64] Relevant targets were set to strengthen environmental risk prevention and to improve environmental management in industrial areas:

[64] See also Holdaway (2013).

"Industrial areas should develop standards for environmental protection facilities construction in the chemical industrial parks, improve relevant facilities and environmental emergency response systems, strengthen the management and disposal of hazardous chemicals and waste" (MEP, 2011, translated by author).

Against this backdrop, an array of targets and responsibilities was initiated at different levels of government agencies with the purpose of urging pollution control and remediation. To follow the national initiative, the local government in Guangrao County proposed the idea of green transformation, encouraging reconstruction and green investment to the industrial enterprises. Moreover, many efforts and investment have been put into the hydraulic engineering sector. In 2014, around 80 million RMB was invested to implement 28 key environmental pollution control projects (Guangrao County Envrionmental Protection Bureau [GREPB], 2014). The local government is ambitious to attract competitive investors for building a stronger industrial base. These initiatives could help to turn Guangrao County into a new growth engine for the whole YRD (Guangrao Public, 2014.11.19). The industrial enterprises are nonetheless quite critical to this green initiative. It is largely due to a lack of (clean) technology support and funding from the local government (Manager of Environmental Protection and Safe Production Department, Hugerrubber, 2014.11.13). The willingness of pollution abatement may be dampened if interests of the industrial enterprises are not taken into account by the local government.

Recently, GRG also initiated a program of moving cadres from the county to township government, for the purpose of increasing the efficiency of industrial pollution control. From the perspective of local authorities, this shall increase the efficiency of environmental enforcement and monitoring which targets the industries (GREPB, 2014). Moreover, the authorities expect that the program could facilitate villagers to reach the cadres from the county government, if villagers get some clues of illegal discharge and want to report them to the government (ibid.). Despite this, the township cadre complained that the main hindrances to the official monitoring programs are outdated equipment, limited funding and understaffed situations (Section Chief of Safe Production and Environmental Protection, DZG, 2015.02.03).

In his account, the cadre assigned from the county government doesn't help much in reality (ibid.). For villagers, they are also suspicious whether the cadres assigned from the county

government could implement an effective environmental monitoring program. One villager noted: “usually when the cadres get there, the toxic smell is gone and the effluent is dissolved in the water” (Household interview No. 5, Sanshui Village, 2014.12.09). This sheds light on the barriers to communication between villagers and local authorities. In other words, the initiative from local authorities seems not *grounded* and effective enough to solve people’s major concerns.

According to Dongying Newspaper (2014.11.24), to promote the local policy of urban upgrading and creating nice living conditions, modern communities, high-class office buildings and a financial business district (Photograph 4.8) are built in the centre of Guangrao County, with total investment of 200 million RMB. Villagers in Sanshui got some grapevine that their village may be soon relocated in the context of urban upgrading. The elder people are mostly against this for they don’t feel comfortable to live in high buildings. For the local population who suffer from the pollution on a daily basis, nothing would really hold true apart from having access to clean water and fresh air. This was also a vision outlined by the party secretary of Guangrao County during his public speech (Guangrao Public, 2014.11.26). Its efficacy, however, comes under scrutiny in the context of rapid and dramatic industrialization in Guangrao.

Photograph 4.8Office buildings in the centre of Guangrao County

Source: Photograph by author, 2015

An interface between fishermen, local authorities and the state

Impacts of industrial water pollution in the Dongying port

In Guangrao County, the emergence of industrial enterprises degraded the environment while providing economic income for local people. On that account, the process of local industrialization is identified as a *trade-off* that local people seem to accept. Compared with this, people in Hekou District perceive themselves as victims of industrialization. In this context, the study probes into those lay actors depending on the communal resources of the Bohai bay (where the Dongying port is located) and explore their perception on local environmental change.

In April 2015 China's State Council released the *Action Plan for Water Pollution Prevention*, referring explicitly to the implementation of prevention treatment in the Bohai bay as well as in other coastal areas. The outline shows that the central government seems ready to be tough on industrial enterprises by taking recourse to legal means:

"All polluting units should emit pollutants according to laws. We should screen pollution situation of industrial enterprises one by one […]. To those enterprises that exceed specific standards or total volume standards, we should warn them with a yellow card and restrict or stop their production so that they can rectify their non-compliance. To those enterprises that still do not meet standards after emission rectification and commit serious standard violation, we should warn them with a red card and stop their production or put them out of business.[…]. We should crack down on violations against environmental laws. We should mainly crack down on non-compliance including pipe drainage, emission of water containing toxicant and pathogens through leaching well, leaching pit and karst caves, faking monitoring data, misuse of water pollutant treatment plants, and unapproved demolishment or idling of water pollutant treatment plants" (China's State Council, 2015, translated by EGP[65]).

In Shandong Province, the above national targets may be difficult to achieve. Currently, there are totally 153 provincial Economic Develop Areas, and all coastal cities have already set up chemical industrial parks along the coast (China Business Newspaper, 2013.01.18). Similar to other coastal cities of Shandong, Dongying gradually moves industrial enterprises to

[65] EGP- the EU - China Environmental Governance Programme. (http://www.ecegp.com/chinese/DataBase/UploadFile/20150511113319501.pdf last accessed 2015.08.26.)

coastal areas. This pinpoints the context whereas the DYEDA was established (Chapter 2). According to the data obtained from the Shenxian Ditch sea outfalls monitoring station[66], the main pollutants discharged to areas near the Dongying port consist of chemical oxygen demand (COD), ammonia and phosphorus, among which the excessive discharge of COD and cyanide is problematic (Table 4.2). The overall evaluation of pollution was "D" level - implying that the monitored pollutants posed a s*mall* threat to the marine environment (Dongying Ocean and Fish Resources Bureau [DYOFB], 2014). It is worth noting that this is the only accessible official data about water pollution near the Dongying port. The author found it is extremely difficult to access to other micro-pollution data from local government agencies.[67]

Table 4.2Shenxian Ditch sea outfalls overall evaluation 2013

Sea Outfalls	*Type of outfall*	*Excessive discharged pollutant*	*COD pollution index*				*Overall evaluation*
			March	May	August	October	
Shenxian Ditch	industries	COD, Cyanide	1.4	8.0	25.0	23.7	D

Source: DYOFB, 2014

To raise public concern about the Bohai bay protection, a series of newspaper articles were published to criticize the environmental impacts of industrial enterprises settled along the Bohai bay. According to Time Weekly (2011.09.22), there were 38 above-scale petrochemical enterprises located along the Bohai coastline[68]. The enterprises' non-compliance of wastewater discharge has caused substantial destruction of the ecology of the Bohai bay, which used to be described as a "treasure bowl" due to its abundant fish resources (21 Century Business Herald, 2012.07.11). Some Chinese regional planning experts argued that Bohai Sea absorbs up to 5 billion tons annual emissions of industrial water; the heavy metal content exceeds the normal level about 2,000 times; and almost no fish live near the outfalls within a radius of a few miles (China Industry Newspaper, 2010.06.01). Based on the

[66] It is the only one in close proximity to the DYEDA.

[67] Regarding access to official data about water pollution, the author will come back to this point in the last part of this chapter.

[68] The total area of the Bohai bay coastline is 5.84 square kilometres.

above argument, degradation of the Bohai bay has posed a significant impact to the livelihood of local fishermen in the Dongying port. Photograph 4.9 shows the housing and working conditions of local fishermen.

Photograph 4.9 Housing and working conditions of fishermen

Source: Photographs by author, 2014

The following interview excerpt would probably represent the sentiments of many fishermen who face similar challenges:

"We need to address the issue of 'Saving Bohai Bay', as almost all shellfishes were extinct here in the past two years, on a large-scale. This used to be the birth place of many special species of shrimp, clams and crabs. But they are mostly extinct due to industrial pollution. […] The water here is polluted within 12 nautical miles. […] Many of us will gradually disappear from this place. We need to switch our job to work in other fields. [This is OK for us] Our choices should follow the government's plans" (Interview with local fishermen, Dongying Port, 2014.08.01).

For local fishermen, they could only count on themselves to reduce the risks of declines of fish resources. Slightly different, workers of Haixing have the feeling that the situation may be not that tough, as they are confident in the competency and leadership of the party secretary of Haixing (Head of Haixing No. 2 Aquaculture Station, Dongying port, 2014.08.01). In fact, Haixing began to shift their industrial focus from aquaculture to salt-processing and bromine chemical producing when marine resources couldn't support their economic development any more. By contrast, due to their low position in the industrial value chain fishermen are more vulnerable to the dramatic environmental changes of the Bohai bay, where a clear shoreline retreat and decreasing natural functions of self-adjustment are manifest (Kuenzer *et al.*, 2014).

According to Wang *et al.* (2012), with the intense operation of oil exploration along the Dongying port most tidal flats have been enclosed and reclaimed. Salt marshes have greatly degenerated over the recent 20 years. This echoes the findings drawn from the timeline exercise, which was conducted to document the environmental changes in the Dongying port (Table 4.3).[69]Data indicates that the state-owned enterprise Shengli Oil Company has driven local economic development dramatically since 1970s. Most notably, the infrastructures of dykes have increased - as a men-controlled measure coupled with further regulation of the delta (i.e. sluice gates, canal systems) - to increase the stability of the shorelines (Kuenzer *et al.*, 2014). Apart from this, the emergence of salt farming industry has increased land use changes of the YRD since 2007, leaving large areas of salt crusts on degraded land. Interview with one local environmental activist also confirms this tendency. In her account of the dramatic land use changes in the Dongying port, two major phenomena was highlighted: the emergence of brine pond destroyed a large area of wetland resources (2007), the establishment of the DYEDA led to a huge debate regarding its threats to the YRD National Nature Reserve and local environment (2011) (Interview with local environmental activist, Xianhe Town, 2014.07.16).

Table 4.3 Major environmental changes along the Dongying port since 1980

Year	*Description*
1980	(the respondent began his first job in the Dongying port) The yellow dyke was built with a large area of tidal flats observed in the south.
1985	Intensive oil exploitation activities commenced, with related oil infrastructure (i.e. pipelines, road transport) distributed on the large area of oil field.
1985/1986	The blue dyke was built.
1992	A strong hurricane storm surge opened the dyke. Then the new Dongying port was built as a measure of protecting the delta from natural disaster; meanwhile the 1st Haixing Aquaculture Station was found.
1998	Haixing Village Committee was found.
2000	Water-proof levee near the 1st Aquaculture Station was built.

[69] See also the map generated from the timeline exercise in Annex VI.

2003-2005	A large-scale expansion of aquaculture was detected.
2007	Large areas of brine pond (salt farming) emerged.
2008	Small-scale salt farming was booming fast (see Photograph 4.10).
2009	The DYEDA was established with industrial factories gradually coming into view.
2012	The dams were built for reclamation, shellfishes in the tidal flats extinct and river bed of Shenxian Ditch changed. Large-scale salt farming was detected.
2014	The main road from Xianhe Village to the new Dongying port was built.

Source: Table by author based on time line exercise conducted with male respondent from Haixing

Photograph 4.10 Emergence of salt farming near the Dongying port

Source: Photograph by author, 2014

In the course of the timeline exercise, the respondent reflected on his difficulty to recall the specific year of the major events. In spite of this, he was confident about his knowledge due to long-term working experiences near the Dongying port:

"I may not understand your professional research language, but I have my own analysis based on my work experiences. I use to observe the environment and landscape when I reach a new place, then I have an overall insight on the situation. From what I observe on-site, I

would connect it to nearby industries, i.e., chemicals, salt farming, the oil production" (Head of Haixing No. 2 Aquaculture Station, Dongying port, 2014.08.01).

In his account, he takes the *experience-based approach* to understand the issue of industrial water pollution. This is typical and was found also with other respondents in the situation whereas official information on water pollution and environmental enforcement programs seems lacking or insufficient in the local society.

Perception of water pollution

According to literature review, antibiotics from river discharge and aquaculture, intense fishing as well as water pollution pose significant threats to the ecology of the Bohai bay (Jin, 2004; Zou *et al.*, 2011). This also became empirically evident during the interviews with inhabitants of the Dongying port. Most respondents assumed that the rapid emergence of industrial enterprises accelerates the environmental degradation and decline of fish resources. Moreover, they accredited this understanding to their life experiences. Table 4.4 elucidates an array of perception of industrial water pollution based on interviews with local respondents.

Table 4.4 Perception of industrial water pollution in the Dongying port

Observation	*Description*
Skin disease	"The wound soaked in the sea water and got recovered soon, when I had skin disease 20 years ago; but nowadays the wound is discharging pus when it soaks into the water. Those whose skin is allergic to sea water would get pimples in their body when working in sea for a long time."
Colourful substances on the surface of water	-"[…] colourful float, not very big, difficult to tell what it is." -"Sometimes the sea water looks red, something like crude oil substance floating on the surface of water. It is worse in the summer season."
Size of the shellfish	"They used to be very big and fat, but now they are much smaller. The number is also decreasing dramatically. The ratio would be 100:10 comparing the yield of 10 years ago to today."
Yield (in different field stations of Haixing)	"This station [Haixing's 2rd Aquaculture Station] is located with close proximity to those industrial enterprises, compared with Haixing's 1st Aquaculture Station. The ratio of our yield compared to theirs could be 1000:900. Apart from the proximity

	to the industrial enterprises, I guess because the 1st station is close to the Yellow River mouth so the water could dilute the pollution. Hence they may have more yield because the water quality is better there."
One large-size pit near the Dongying port	"I saw a large pit near the port and guessed it is for covering the drainage pipes. But I don't know the specific location of the wastewater outfalls. It looks mysterious. I guess they [industrial enterprises] don't dispose the wastewater but discharge it directly to the Bohai bay […]."

Source: Table by author based on interviews conducted in 2014 in the Dongying port

Feeling *mysterious* and *confused*, most informants were also frustrated to their incapacity to get a better clue to prove the effluent is discharged by the industrial enterprises. The following example given by the employee of Haixing reinforces this argument:

"I guess the decrease of fish stock is relevant to the emergence of industrial enterprises. Imagine where they would discharge the wastewater, if they want to do it in a most convenient and cheap way. It must be there [the ocean]. But I haven't got any clue and evidence on this. To be specific, which outfall [X, Y, Z…], I have no idea at all. *No evidence* [my emphasis]. I haven't seen a large area of water turning red or black. If they [industrial enterprises] illegally discharge, you could only see the change of colour in a small area. When the water flows to the sea, it would be diluted in short time" (Head of Haixing No. 2 Aquaculture Station, Dongying port, 2014.08.01).

During several field visits to the DYEDA, it was observed that the effluent was changing all the time in different formats and colours (Photograph 4.11). According to one local environmental activist who has for long time followed the case of industrial water pollution in the DYEDA:

"[…] from the colour it gives a clue whether and to which extent the effluent is treated. Sometimes the liquid looks extremely black or red, smells awful, but it can be diluted very quickly in the water especially during the rainy seasons. If you come just after it is discharged then you can observe that. More often than not, they [industrial enterprises] prefer to discharge the toxic effluent at night" (Interview, Dongying port, 2014.07.16).

Photograph 4.11 Observation of effluents in the water bodies of the DYEDA

Source: Photographs by author, 2014

According to the Deputy Manager, during their meetings with the Hekou District Ocean and Fishing Bureau, Haixing has raised the issue of industrial pollution several times. The officials usually wrote down the issues but would not give any reply during the meeting. Government officials assumed the establishment of the DYEDA implies the policy trend and development initiatives of the local government, with both pros and cons (Deputy Manager of Haixing, Xianhe Village, 2014.08.07). From the perspective of the Deputy Manager, the cadres' unresponsiveness is a signal to the public that their structural position within the institutional hierarchy prevented them to do anything. Apart from their inactiveness, official data on industrial water pollution was lacking or not accessible to the general public. After several incidents of industrial water pollution, fishermen have learned to call the government agencies immediately if they discover abnormal situations (21 Century Business Herald, 2012.07.11).Usually the officials from DYEPB go there and take water samples, but they would not give any feedback to the fishermen (Nandu Wang, 2011.09.21). More often than not, the cadres would answer that they could not find the specific outfall and assume the drainage pipe was probably put underground by the industrial enterprises (Nandu Wang, 2014.12.24).

With regard to perceptions of pollution, findings suggest that a lack of official data on industrial pollution hinders local people to have a clear understanding of the issue. Their attempts at seeking redress from the local government often failed due to the lack of 'scientific' evidence. According to one natural scientist who has more than 10 years of research experience in the YRD:

"It is not easy to describe with specific data of the status quo of industrial pollution, because of lacking real and transparent quantitative data on the industrial enterprises' wastewater discharge" (quoted from Nandu Wang, 2014.12.24, translated by author).

According to information on the official public website of DYOFB, there are more than 20 monitoring spots near the Dongying port. With an attempt to obtain the objective description of the status quo of the industrial water pollution, the author tried to apply the water quality data from DYOFB through the official channel. According to the official response, data monitored in the Shenxian Ditch sea outfall is accessible through their publication *Dongying Marine Environment Bulletin*[70]. Other data is not accessible to the public though.[71] The author's experience of interacting with the government agency confirms Tilt's (2013b) argument that when researchers attempt to drill down beyond nationally/regionally aggregated figures, information about local environmental quality is extremely hard to come by. In spite of that, the interviews with relevant stakeholders of the DYEDA provide some valuable insight on the issue of information access:

[JT] How could the general public know about the quality of the disposed wastewater after the treatment processes? – "We will set up a big indicator screen soon outside our factory, as well as a biological indicator pool [with fish inside]. COD and ammonia of the disposed water will be shown on the screen, and we welcome any people or media agencies to come and check the water quality" (Deputy Manager, DYEDA Wastewater Treatment Company, 2014.08.28).

[JT] Do you have the monitoring data of the wastewater discharged by the industrial enterprises? Is it open access? – "Nowadays only the industrial enterprises subject to provincial control would upload the wastewater quality data to the government agencies. These industrial enterprises only have the annual *accumulative* data, but not *real-time* data. [He then showed the author one brochure published by Haike Company[72] - pointing to the data of their annual amounts of wastewater discharge] We are now building the *Environmental Monitoring Emergency Support Centre* with total investment of 21 billion

[70] Data in Table 4.2 "Shenxian Ditch sea outfalls overall evaluation 2013" was extracted from this publication.

[71] The government official suggested the author to hold an official meeting between their bureau and the DELIGHT project local research partner, then there is a high chance the author could access to other official data.

[72] One of the top three industrial enterprises of the DYEDA regarding their investment and business scale.

RMB.[73] The purpose is to have 24-hour real-time monitoring of the industrial wastewater discharge. The data would be uploaded to the municipal-level government agency. Then the public would also have access to the data" (Deputy Director, Environmental Protection Bureau of the Management Board of the DYEDA, 2014.08.28).

Based on the official response from the Management Board of the DYEDA, the discourse of technology-fix seems to pervade in their approach to industrial wastewater management (see also Chapter 2). They shift the discussion of pollution control to the engineering infrastructure which further reflects their practices of technocratic intervention. In addition, findings suggest that the official rhetoric of technology-fix excludes people from the discussion about industrial wastewater management, as well as about public access to official pollution data. There is hence a *communication barrier* between lay people and government officials on the issue of industrial wastewater management. To explore in-depth on the communication interface between lay people and relevant authorities, the 2006 oil spillage near the Dongying port is presented in the next section.

Situating the state in the interface between lay people and local government

Between 2005 and 2006, four people premeditated several times their plan of stealing oil from Shengli Company ocean oil industry, located in close proximity to the Dongying port (Democracy and Legal Times, 2007.08.06). This eventually led to a large-scale oil spillage on March 12, 2006. The accident was observed by the head of Haixing's No. 3 Aquaculture Station, who recalled that a large area of oil was detected on the surface of water. The Chairman of Haixing immediately assigned the senior managers to the scene dealing with the issue (Head of Haixing No. 3 Aquaculture Station, Dongying port, 2014.08.05). The oil spillage caused shellfish death and Haixing claimed that 38890.4 mu of their sea area was polluted (Photograph 4.12). They proposed legal action against Shengli Oil Company, as they argued that a series of oil spillage accidents - since Haixing's foundation- have caused a big loss to their business.

[73] The program was illustrated in Box 2.1.

Photograph 4.12 Oil spillage and shellfish death in the Dongying port

Source: Photographs by Haixing, 2006

Based on their strong social network, Haixing's leader called on their villagers to protest in front of Shengli Oil Company (Interview with local environmental activist, Xianhe Town, 2014.07.17). The police from Hekou District showed up and the protest put big social and political pressure on Shengli (ibid.). Apart from this, Haixing's General Manager maintains solid network with the government officials from the Shandong Provincial Department of Ocean and Fish Resources, which was entrusted by the Dongying government to do the environmental impact assessment after the oil spillage (Haixing Manager, Dongying port, 2014.07.22). Using different strategies Haixing managed to get compensation from Shengli. By contrast, other fishermen took a more passive approach as revealed in the following interview quotation:

[JT] How did you know about the accident? Through which major information channel? – "We were working there and we all saw it [the oil floating on the water]. We ourselves could tell its environmental impacts [to the ecology] and information doesn't matter for us either. Shengli Company assigned their workers to deal with the accident, using boats and giving us money for removing the oil together with their workers. Shengli mainly led the remediation and we mostly interacted with them after the accident." – [JT] Did you report this to Haixing? - "No. They observed it. They also have their networks with the government to deal with it." – [JT] Were you worried about the impacts to your livelihood? – "We were worried about the environment, feeling that we could not *eat*[74] [no income, JT]. But we were not concerned about the process how they would deal with it. The ocean is a national resource, belonging to *others* [the state] not us. Those who know how to manage would manage it, and we don't need to bother about this." – [JT] Did you address or report your

[74] "吃不上饭"

concern to the local government? – "Who could I report to? How could I address that? I don't have the ability" (Group interview, Dongying port, 2014.08.05).

The responses imply that the fishermen were concerned about ecological degradation of the ocean, but didn't believe the industry could stop the pollution. Some respondents were even sceptical that the big industrial enterprise of the DYEDA is run by highly-placed government official (Interview, Dongying port, 2014.12.06). From the perspective of government officials, institutional measures, for example increasing the threshold of industrial enterprises settlement, would help to enhance environmental management. The failure of this sort of measures may be predictable though, due to the fact that Dongying still relies on the industrial enterprises for revenue and place branding.[75] Thereby, the fishermen could only rely on themselves to minimize the environmental risks, while Haixing would manage to adapt to the situation by liaising with highly-placed government officials.

The responses by the fishermen also imply a sense of *sacrifice*. In reality, the fishermen wouldn't believe they have the capabilities to approach government officials. Moreover, they believe that the establishment of the DYEDA was the initiative from the state. In other words, it was the *state's* idea of prioritizing the development in the Dongying port. As ordinary people they could only obey this and support the national policy. In their opinion, the local government needs this industrial project for economic development. Furthermore, due to the fact that the Dongying port is sparsely populated, it grants advantages for the industrial enterprises to discharge wastewater without triggering public concern (Interview, Dongying port, 2015.08.05). In particular, fishermen stressed that it was the state's idea. These responses echo the findings by Lora-Wainwright *et al.*(2012, my emphasis) which notes that "locals were framed as environmental subjects not only of the *local* but also of the central *state*".

The above account of fishermen's sense of *sacrifice* also sheds light on the relations between fishermen, local government and the state. Fishermen's consent on developing industries, however, may not be a local sacrifice for the good of the nation, but as merely an excuse to legitimize *local* gain for Dongying and the officials through rapid industrialization. In the

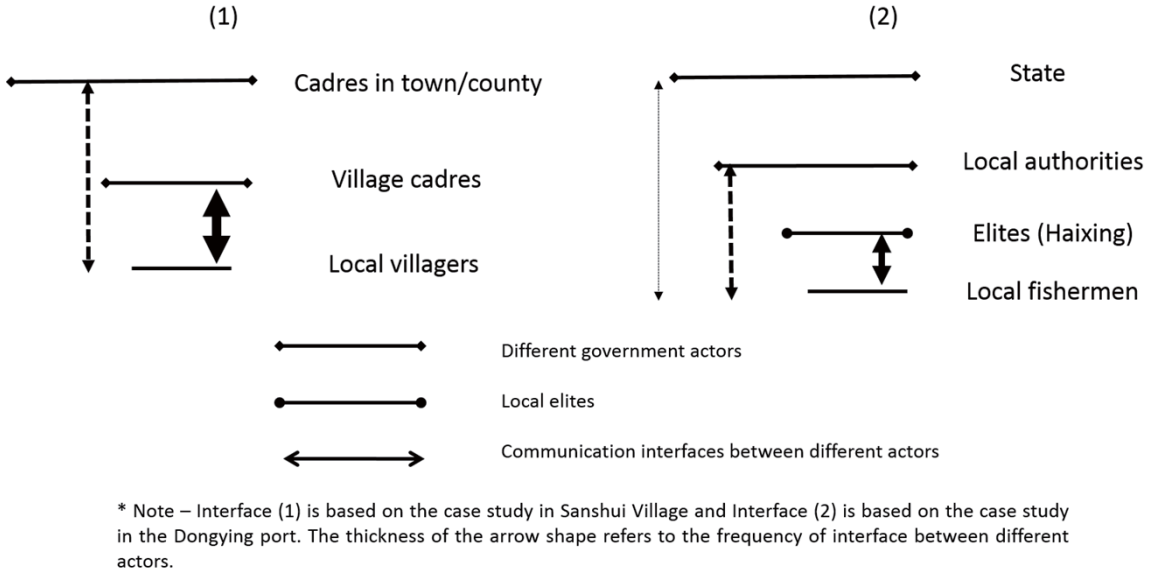
[75] For example, the industry of tire-processing, oil exploitation, petrol chemicals have become the pillar industries of Dongying which are important for local economic development.

context of the Bohai bay, apart from oil exploitation which is controlled by the state, local governments decide on their own development plans (Gu, 2012). More specifically, the planning of coastal economic zones is drafted by local governments – most often than not expressing local interests rather than considering the overall situation of the nation. Then the plans are submitted to the state for approval. In that situation, the state is 'kidnapped' by local governments and forced to support their development plans of 'making the best' out of the ocean resources (ibid.). In the trajectory of local struggle against water pollution, the state has an influential role as local inhabitants assumed that it is the state's idea of booming industrialization in the YRD. Local inhabitants as ordinary people therefore have to follow the state's initiatives. Nonetheless, the state doesn't always play a proactive role in environmental protection due to influence of local governments and the barrages they created (e.g. justification of local industrialization for economic growth).

Conclusion

This chapter examined the performance of the function of connective tissue in the interfaces between government agencies and the local population. Informed by this analytical tool, the case study in Guangrao County presents an interface between villagers and cadres in the village, township and county (Figure 4.2). In this context, the Village Committee is the location of a main port of call to learn about rural policy and related official programs made higher up the hierarchy. In particular, village cadres act as agents bridging the villagers and cadres in town/county, which the villagers know by heart and hence do not dare appeal to higher-level cadres. In comparison, the case study in the Dongying port illustrates an interface between fishermen, Haixing village enterprise, local authorities and the state (Figure 4.2). Findings highlight how local fishermen situate their understanding of the pollution in the context of the national initiative governing industrialization in the YRD. In that situation, the state also exerts influence on the interface of fishermen and local authorities.

Figure 4.2 Mapping the interfaces between lay people and different government actors



* Note – Interface (1) is based on the case study in Sanshui Village and Interface (2) is based on the case study in the Dongying port. The thickness of the arrow shape refers to the frequency of interface between different actors.

Source: Drawn by author

Mapping the interfaces between lay people and different government actors helps to move us towards a deeper understanding of the dynamic, fluid, and multi-layered character of the interface setting. In this vein, the interfaces shed a clearer light on the *information hierarchy* in the local society, within which people do not dare leapfrog certain position. Between upper and lower level of this information hierarchy, information has to flow *step by step.* Government actors at each level or position of this hierarchy -to a large extent -could decide whether the information can succeed to go upward to next higher level. For those placed in the lowest level of this information hierarchy, the channel for allowing for feedback to upper level is lacking or deficient (see the arrows in Figure 4.2).

Through the case studies demonstration, findings also highlight that local people rely on the external agents – either village leaders (e.g. the party secretary for Sanshui villagers) or the elites (e.g. Haixing village enterprise for the Dongying port fishermen) – to represent their collective interests. For instance, the villagers wouldn't initiate the protest against *Dragon* without consent from their party secretary. In other words, it was the "yes and go ahead" spelled out from the party secretary that triggered the mass protest. At the same token, fishermen relied on Haixing village enterprise to fight against the oil spillage. Placed at the bottom level of the socio-economic strata, fishermen lack a channel for their articulation of claims to the local authority. By contract, Haixing managed to raise their concern to Shandong Provincial Department of Ocean and Fish Resources, based on their personalised

connections with government officials. These accounts create a picture of intertwined power relations and limits of people's immediate agency. From the point of view of environmental justice, victims of industrial pollution have the prerogative to determine the level of pollution that is tolerable to them and their communities. However, findings elucidate that a lack of feedback channel for the local community hinders local people to address concern to relevant authorities. Besides, external agents- be the village cadres or local elites - would not represent the common interests of local people. More often than not, external agents manoeuvre their relations with government officials to maximize their own profits.

In examining the practices of local cadres, findings suggest the technocratic practices and their employment of the rhetoric of constraint (e.g. limited capacity/funding/equipment) is prevalent in the local bureaucracy. Notably, local cadres have few incentives to take voices of lay people into account, due to the fact that the payoffs to local cadres usually have nothing to do with how they serve local people. While cadres serve as mediators between local people and the government, their unresponsiveness hinders mutual communication between the two. In addition, when cadres are geared to collecting local views and ensuring local deliberation, their overlook of the processes of building connection and interaction with lay actors leads to those barriers to interface. In this scenario, the interface was not attempted and is hence better perceived as a *virtual communication interface.*

CHAPTER 5 PROBING INTO THE FLOWS OF WATER INFORMATION

As elaborated in Chapter 2, the local government of Dongying initiated programs to develop its "software power" through utilising different kinds of communication channels for dissemination of environmental information. Following up this, here the study proceeds to probe into the flows of water information and explore to what extent the government is willing to create a communication platform that promotes mutual dialogue. To pursue this, the official campaign - China Water Week (CWW) - serves as a springboard to have a deliberate analysis on this issue. Outreach materials of the campaign will be examined to explore what major information the local water bureaucracy intends to disseminate to the public. The materials - as different puzzles put together- offer a glimpse of the government-generated "water information pool". Tracing this source of information could provide some valuable insights on the implementation practices of water administrators, who act both as information senders and communicators. The chapter then moves towards an analysis of access to information about drinking water quality. This prompts the discussion of water-relevant information sharing between government agencies and local people. Zooming in on the bureaucratic system, the study focuses on the functional lines, daily routines and implementation practices of water administrators. It touches upon the key issues of incoherent messages *across* different levels of the bureaucracy, as well as interrupted mutual-flow of information *between* the bureaucracy and local people.

Implementation of the CWW campaign in Dongying

In line with the 23rd World's Water Day[76], China organised its own Water Week between 22rd and 28th March, 2015. The first CWW campaign was initiated in 1988. The theme of 2015 CWW was *"Conserve Water Resources, Protect Water Security"*. The campaign was led by MWR and implemented throughout the water bureaucracy. Relevant responsibilities were assigned to different water resources bureaus (WRB) in Dongying (Figure 5.1). The guiding principle of this campaign was to:

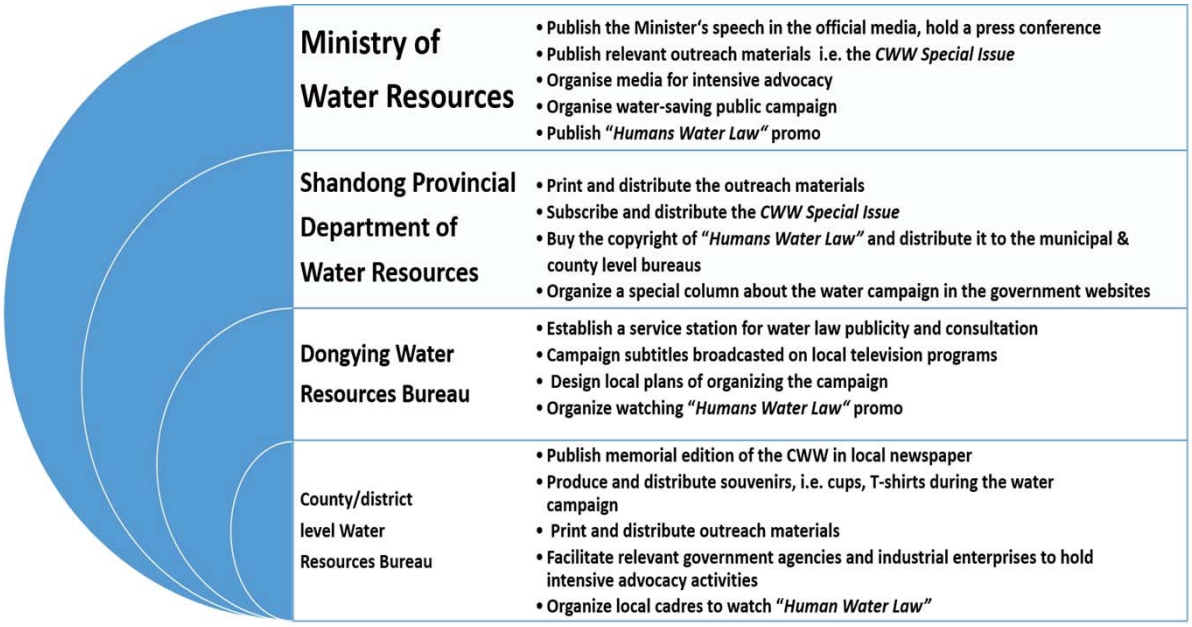
[76] The 23rd World Water Day was held on 22rd March 2015 with the theme of "*Water and Sustainable Development*" organised by the SIWI in Stockholm.

"[…] comprehensively implement the national, provincial, municipal, and county level water conservancy work arrangement, uphold the central [tasks], take into account the overall situation, vigorously improve hydrological conditions and water conservancy construction, as well as vigorously promote the rule of law to the society" (MWR, 2015b).

This shows the implementation of the CWW campaign is highly bureaucratic and centralized. It is designed upon the traditional principle of command-and-control. Additionally, the state's emphasis on hierarchy and control also trickles down to the provincial Department of Water Resources, as expressed by the Director of Shandong Provincial Department of Water Resources:

"[…] to protect water security, we should follow the central government and Shandong provincial government's deployment requirements, […] strengthen the liability institution and make our government officials responsible for their own tasks. For instance, the higher level water administrators should supervise his subordinates, carry out a 'level- by- level' response system, so that everyone should be responsible. Such a working pattern is favourable to trickle down the tasks to lower administrative units and ensure a step-by-step implementation of their responsibility. Based on this, we would construct a 'horizontal-to-edge, vertical-to-end, full coverage' responsibility system" (quoted from China Water Resources Newspaper, 2013.11.01, translated by author).

Figure 5.1 Responsibilities of WRBs on implementing CWW



Source: Designed by author based on MWR, 2015b

In theory, the design of such a pattern is supposed to strengthen the sense of responsibility within the bureaucracy, but in factuality the reliance on hierarchy does not overcome the horizontal and vertical compartmentalization of tasks across the bureaucratic system (Zhang & Zhong, 2010). Furthermore, the reliance on hierarchy provides a legitimate excuse of unresponsiveness, as Lam (1996) argued. While every official knows that – the water bureaucracy as a whole – is expected to deal with the tasks, individual responsibility remains unclear. This attitude of unresponsiveness becomes empirically evident during the interviews with different levels of WRBs responsible to carry out the CWW campaign in Dongying.

Lax implementation and limited funding

According to DYWRB, during the CWW campaign a steering leader group was established, with its office set in the Department of Water Affairs and Legislation of DYWRB. This group was the main organiser responsible for promotional activities, coordination, inspection and supervision during the campaign (DYWRB, 2015). Meanwhile, the county, township levels of WRBs and relevant government agencies should design their own plans for implementing the campaign. The plans should ideally reflect local characteristics and creativity (Deputy Chief of Water Administration Department, GRWRB, 2015.03.22). In Hekou District, the dissemination of leaflets, brochures as well as car touring were the main approaches taken during the CWW campaign (Photograph 5.1). The water administrator who organised the campaign explained:

"[…] we target different groups [during this campaign]. But those showing up here [downtown of Guangrao County] are mainly villagers and elder people. […] We explained to them the importance of saving water resources. People are concerned about water safety. For instance, they are worried the water is not clean when they see scale. […] But actually it doesn't mean it is dirty. It's only because the water harness is relatively high in Guangrao." [JT] Is the campaign also organised in towns? – "They are supposed to implement the campaign, but in fact they do not organize as formal events as we do here. This is because the implementation is not clearly and strictly regulated" (Deputy Chief of Water Administration Department, GRWRB, 2015.03.22).

Photograph 5.1 CWW campaign organised in Hekou District

Source: Photographs by HKWRB, 2015

The above response from GRWRB official implies that CWW campaign usually doesn't target towns located in rural areas, due to a lack of clear responsibility and targets. In Daozhuang Town such a campaign was actually organized, though. With respect to this, one local water administrator explained why rural communities were ruled out from the campaign:

[JT] What is your main approach to implementing the CWW? – "We put up posters in the villages, disseminated the leaflets in downtown, and organised a car touring." [JT] Was the car touring organised in every village? – "In fact, no. We only organised it in a few villages. To be honest, time is limited. And we also have much work to do. […] We don't organize many public events in a year and this campaign is basically the only chance to communicate with people. Not everyone necessarily feels interested. If they are not [it's reasonable because] people are still interested in earning more money. In those relatively developed areas [like Guangrao County] people are more concerned about earning money [rather than saving water]. And they see it more important to satisfy their personal interests. From our perspectives, it doesn't matter much for us if people are not interested in the campaign. They could access this information through television, newspaper. Then they would understand the issue" (Head of Rural Centralised Water Supply Station, DZG, 2015.04.07).

The above account underlines the lax implementation of the water campaign in villages. In rural China the payoffs to local cadres are usually not related to villagers' satisfaction or evaluation on local cadres' jobs. This is why the administrator's indifference to public reaction to the campaign is no exception. Furthermore, a lack of incentive and limited funding seem to be the root of the problem of lax implementation, as expressed in the following statement:

"This campaign is not necessary [for us], because it is not mandatory. We have to use our own [water supply station] money, which is mainly taken from the water fee collected from local people. With this money we have to handle many things - giving salaries to the staffs, maintaining the operation of the offices etc. Neither DZG nor GRWRB[77] gives us money. Sometimes we get funds for some engineering programs. Except that we have to collect money by ourselves" (Head of Rural Centralised Water Supply Station, DZG, 2015.04.07).

This issue of limited funds allocated to the CWW campaign is more evident in Hekou District. To support this, the campaign was not organized in the towns of Hekou District for many years, due to its public influence was not effective. Moreover, water administrators did not perceive campaign as something *necessary* because there was no supervision or evaluation from higher administrative units (Interview, Dongying, 2015.04.01). Due to financial constraints, no authority was willing to fund the campaign this year. The financial issue becomes more imperative for water administrators placed at lower position of the bureaucracy. As one township cadre critiqued:

"A real campaign should be led by the local government, with coordination of relevant government agencies that organizes the event together. For instance, WRBs could provide the themes, and use different channels of television, newspaper, and magazines to disseminate information." [JT] Isn't the information already available to the public? – "Yes. But we have *limited* sources and funding [my emphasis]. For instance, you can see how the information is disseminated. It was just written in a very tiny corner of the newspaper. Apart from this, I didn't get any CWW outreach materials from our superior this year. If I didn't ask them, they wouldn't even give it [the special issue of CWW[78]] to me. Still, it is the issue of *money* [my emphasis]. Besides, it depends on if the government is determined to do this. Maybe they are more interested in other issues. […] From our perspective, we neither have incentive nor motivation to carry out such a campaign, especially if the superiors don't evaluate the implementation" (Interview, Dongying, 2015.03.26).

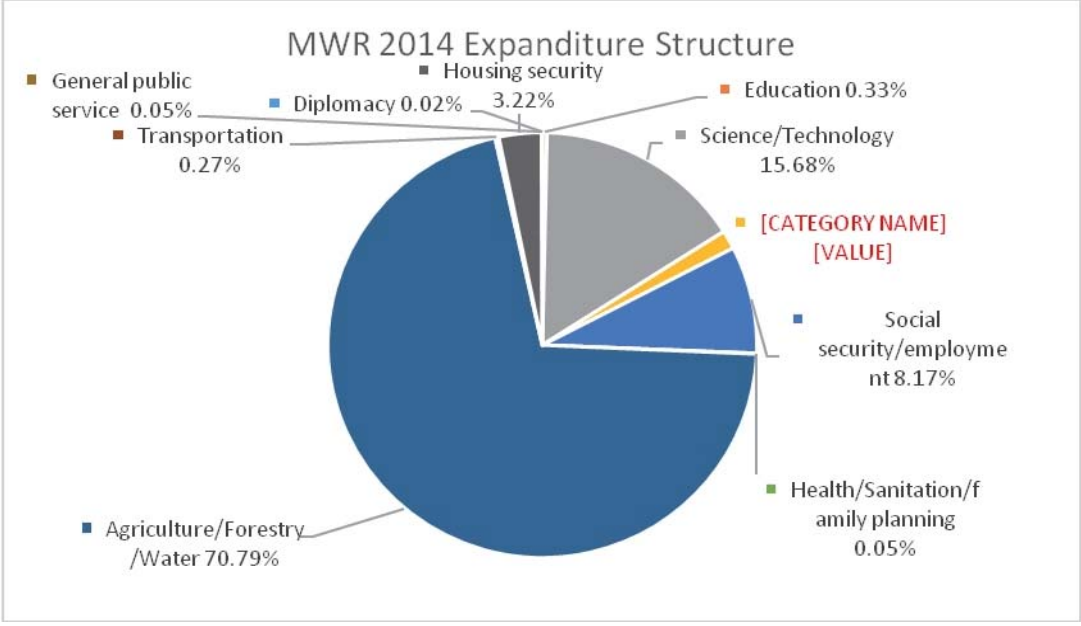
[77] According to the interview with one official from GRWRB, GRWRB assigns annual funding to DZG for water resources management. It is unclear how this money is spent by DZG and whether the money is delivered to the water supply stations.

[78] The special issue was published in commemoration of CWW by China Water Resources Newspaper. See below.

For water administrators in towns funding is the crucial factor. As empirical data reveals, the accessibility and amounts of funding should be weighed in their priority decisions about the implementation of water programs. During the CWW campaign, the official rhetoric of "constraint" such as limited funding serves as an excuse to pledge their low enthusiasm and incentive of carrying out the campaign.

According to the data from MWR, money spent on culture, sports and media – mainly used for public campaigns and publication of outreach materials – took up only 1.42% of annual expenditures in 2014 (see Chart 5.1). This figure reveals that the national funding to the "software power" development is far less than and subverts to the state's investment into the engineering sector.[79]Although relevant data is not available in the provincial and municipal level financial reports[80], the national figure provides some insight to gauge the effects of limited funds on the implementation of water campaigns in grassroots society particularly.

Chart 5.1 2014 Expenditure Structure by the Ministry of Water Resources



Source: MWR (2015a)

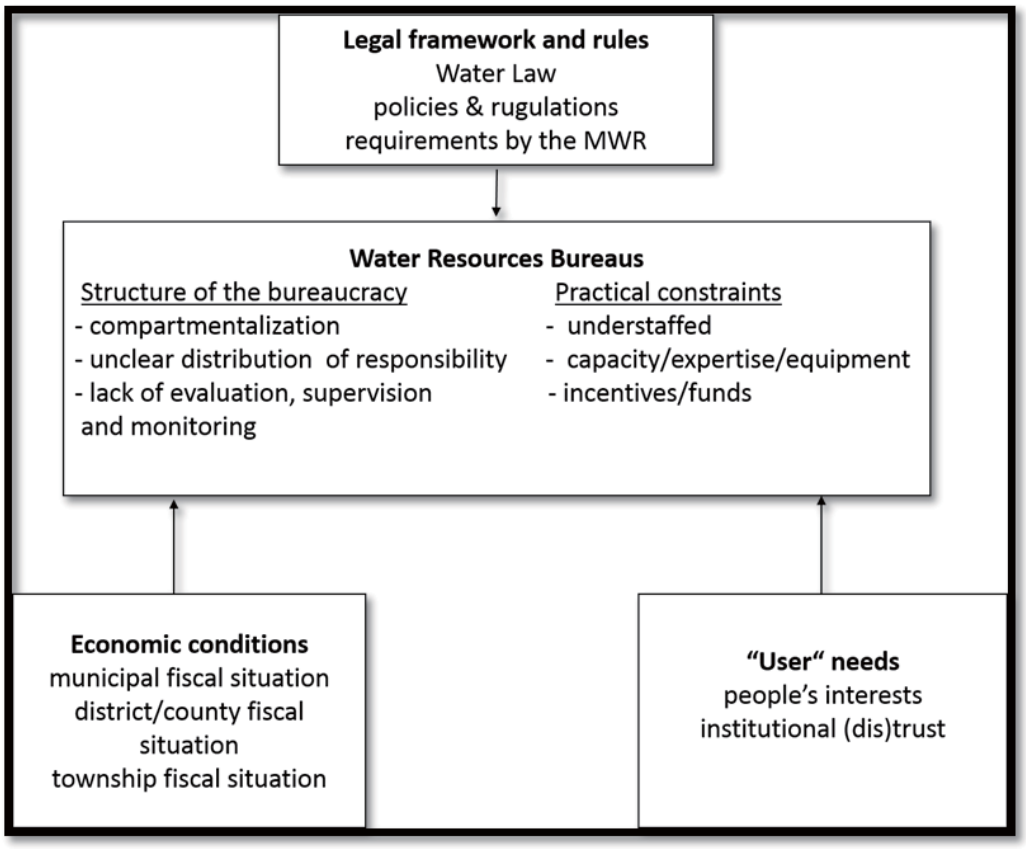
[79] As seen from the chart, the expenditure of agriculture, forestry, and water takes up the biggest part, which was mainly used for hydraulic engineering construction and maintenance. The figure increases 9% compared to 2013 and the money was spent on the infrastructure projects organised by China Development and Reform Commission (MWR, 2015a).

[80] The category of "Expenditure of culture, sports and media" does not exist in the annual financial reports of the Shandong Provincial Department of Water Resources and DYWRB.

Institutional infrastructures

The lax implementation and limited funding for the CWW campaign shed light on some institutional deficiencies of the water bureaucracy. To broaden this discussion, Figure5.2presents the range of influencing factors of the local implementation of the CWW campaign. In primary, structure of the bureaucracy hinders a full and effective implementation of the CWW campaign in grassroots society. To support this, empirical studies show that local water bureaucracy depends on the technocratic top-down practices and bottom-up reporting to carry out their water programs. This is detrimental to the liberty and proactive response taken by local cadres to work things out. Through the accumulative daily routines, cadres develop and reinforce the idea that the hierarchy is *indispensable*. Relying on the hierarchy and supported by its authority power, cadres are apt to stay in their comfort zone for the avoidance of blaming and omission.[81]

Figure 5.2 Influencing factors of the local implementation of CWW



Source: Designed by author

[81] See also the next section for a detailed discussion with reference to the empirical data.

Apart from the organisational structure, findings point out that people's lack of interest and (or) their distrust to local authorities dampens the government officials' motivation to carry out the CWW campaign (see Figure 5.2). The following interview excerpt also demonstrates this point:

"The effect of CWW is limited, because 20 years are gone but the implementation keeps the same style. Sometimes people even replied to you, 'you do your own job and that's enough; don't tell us how to save water; we know how to do it if we wanted' […]. This manifests their distrust to and conflict with us. […] The effect [of the CWW campaign] is limited because local people think government agencies always initiate different campaigns in front of them without showing the effectiveness of the environmental programs. […] I feel that people are easy to feel satisfied, as long as you do some good things for them. The important thing is [we] can't just focus on organising campaigns and implementing programs which are not practically meaningful [to people]" (Interview, Dongying, 2015.04.01).

Interestingly, at the beginning of the interview the respondent was rather critical of people's low awareness of saving water. They blamed people for wasting so much of national resources as well as funds used to the engineering-based hydraulic programs, due to people's misbehaviour of water use. When the dialogue was built, the respondent seemed more open to discuss people's negative attitudes to the water campaign. This actually sheds light on his ambivalent awareness. As a government official, the respondent tends to feel superior and alienated from the local population, on the one hand. As public servant, he feels frustrated by local people's misunderstanding and distrust, on the other hand.

Flows of messages across the hierarchy

Whilst the CWW campaigns in rural areas were implemented at narrow scale, the campaign in the city centre of Dongying was very formal and wide-ranging. Apart from outreach materials, such as posters, leaflets, brochures, officials from DYWRB also prepared eco-bags and T-shirts for the public (Photograph 5.2). This might be regarded as a strategy to attract more people to participate in the campaign.

Photograph 5.2 Eco-bags and T-shirts disseminated to local people[82]

Source: Photograph by author, 2015

Apart from some DYWRB officials, there was a team of volunteers working for the campaign. The top official of DYWRB in charge of the campaign showed much enthusiasm, as the following interview excerpt unravels:

"We work through disseminating outreach materials, which we call 'paper of understanding' [83] -very straightaway and understandable. […] Public campaign is necessary as the platform helps to answer people's questions. Interaction is important, as it helps to solve conflicts and maintain societal stability. Just like this 'paper of understanding', it helps to answer people's questions and solve conflicts. [He further explained that if people have issues, they should come to their offices. The officials would try to help. The hostile situation could be prevented if both of them try to understand each other better. The misunderstanding often originates from small conflicts.] We shouldn't let those small issues get accumulated, and we have to communicate often with people and avoid conflicts with each other. As government officials, we should have the awareness of serving people, because WRB is supposed to act as public servant" (Head of Water Governance Department, DYWRB, 2015.03.23).

[82] Translation of the slogan - "Dongying Water Resources Bureau Consulting Station for Water Law Publicity".

[83] "明白纸"

In comparison to township and village cadres who regard building communication with people as wasted effort, the above response from the top official of DYWRB shows a higher awareness of respecting people. The empirical data analysis also suggests that this tendency seems to increase when government officials are placed higher up the hierarchy. The following quotation of an interview with the Minister of Water Resources underlines this argument:

> "In the process of promoting water conservancy construction, we must set it as a priority target to design infrastructure programs that could bring direct benefits to people, fulfilling a couple of good and practical things that are visible, tangible and beneficial to people. […] In the process of the development and introduction of water policy or measures, we should coordinate and consider the needs of different stakeholders, pay attention to the opinions and voices of grassroots cadres, and ensure the policies and measures reflect the public willingness and grassroots reality" (quoted in Study Times, 2012.04.08, translated by author).

During the interview, the Minister of Water Resources acted as a high-profile figure in front of the public. Naturally he was concerned how his image was built and perceived by the public. In that scenario of *open interface*, the Minister would discursively show respect to local people as they expected to build good relations with them. Apart from this, highly-placed officials usually have very good educational background and value the effort of empowering local people. More often than not, these officials have to pass tough processes of assessment before appointed in the higher position of the bureaucracy. Afterwards, officials would seldom visit the grassroots because their daily routines don't require that (Deputy Director of E-Governance Information Service Centre, Dongying, 2015.04.10). Notwithstanding they have relatively high awareness of respecting and serving people, this unfortunately seldom be applied in the reality.

By contrast, local cadres in towns and counties (or districts) have to confront the villagers often when implementing policy programs in rural communities.[84]Due to their educational background, local cadres' capability and willingness of serving people are relatively low.

[84] According to one cadre from Guangrao County government, most of the policy programs and measures targeting rural communities are implemented by county level government agencies in China. The municipal level government agencies are only responsible for giving guidance, supervision, assessment and coordination.

Their approach to communicating and interacting with villagers is usually more practical and straightaway. The following quotations of interviews reveal how different levels of government officials value the work of addressing water law to local people:

[JT] What's the purpose of disseminating water law materials? – "People nowadays have higher awareness of using legal means to address their concern. To promote the water law information to them, people would know better how to use law to protect their own right" (Head of Water Governance Department, DYWRB, 2015.03.23).

[JT] What's the purpose of addressing water law during this campaign? – "We don't emphasise much on water law here [Daozhuang Town]. Information is mostly about how to save water. The water law is just like a *catchword* [my emphasis]. People are not much interested. Water administrators should learn those regulations and law [but not ordinary people, JT]" (Head of Agricultural Water Station, DZG, 2015.04.07).

These accounts create a picture of distinction regarding the perceived value of *empowering* local people between upper- and lower-level water administrators. This distinction is a result of the incoherent messages across the hierarchy when messages are moved from higher to lower levels. For example, highly-placed officials highlight the importance of authority and bottom-up reporting to stabilize the hierarchy and strengthen control of the bureaucracy. To avoid blaming or omission, local cadres seem to have a 'regular checklist' in mind - ensuring everything on the checklist is fulfilled through daily routines in order to pass the evaluation and assessment organised by their superiors. Other than this, no one is willing to assume more responsibility to work things out. In this context, the initiatives of building communication with people and respecting grassroots voices promoted by those highly-placed officials would not hold true for local cadres. As such, reliance on the hierarchy and the incoherent messages across different levels of the bureaucracy stood in a viciously productive relationship, which further constrains public participation especially in grassroots society.

Flows of information between the water bureaucracy and local people

According to Gordon (1980), the success of many public programs depends on the behaviour of people and requires the provision of their assistance and cooperation. For instance, the promotion of water saving - addressed in the CWW campaign - needs *reciprocal collaboration* between the water users and government agencies. Thereby, a lack of base-line

survey on people's interest and mutual communication with them, might dampen people's motivation to join such government programs. To pursue a more nuanced analysis on this issue, this section discusses people's interest in the CWW campaign in relation to the government-generated "water information pool".

Outreach materials and messages

During the CWW campaign organised in the city centre of Dongying and Guangrao County, relevant outreach materials disseminated in those occasions were collected. Table 5.1summarises the main content of the outreach materials as well as the government agencies that were responsible for the design and publication of the materials.

Table 5.1 Outreach materials collected during the CWW campaign

Levels of government agencies	Categories	Materials and content
Ministry level	3	-"*Humans, Water, Law"* promo broadcasted in national television programs -*China Water Resource Newspaper Special Issue* in commemoration of CWW -CWW campaign posters and slogans used in counties
Municipality level	3	-*CWW Dongying Proposal* - CWW campaign posters and slogans used in Dongying -Materials about national water law and relevant regulations [85]
County/district level	1	-Banners and slogans
Township level	1	-Banners and slogans

Source: Table by author

Given the large volume of information disseminated from the government-generated "water information pool" during the CWW campaign, the collected materials are not meant to be representative. They were, however, widely distributed during the one-week campaign

[85] Its content is not designed by DYWRB, but the water law was one key material disseminated during the CWW campaign. Hence, it is a key reference used by the author to conduct content analysis of the outreach materials.

organised in different places of Dongying. Furthermore, they were the most prevalent and widespread materials bridging the WRBs and local people during the campaign. Through content analysis of the outreach materials, the line of inquiry concentrated on *to what extent* the water bureaucracy is willing to construct a mutual-communication platform through this public campaign. In essence, was their purpose just to *send out* materials (from the "water information pool") or to *absorb* social input from local society in that context of face-to-face communication interface?

In examining the collected materials, findings show that most of the content is about the water law and regulations. The language format is more 'convincing' than objective, in a sense that the purpose of information dissemination seemed to be imposing behavioural change on individuals. To crystalize this, a detailed examination of the material *China Water Resource Newspaper Special Issue* (in commemoration of CWW) is presented here. The reason to present this material is that it was published by the *China Water Resources Newspaper*, an official media subordinating to the MWR. This special issue was most widely distributed during the author's participation in the CWW campaign. This special issue has in total 24 pages. Relevant themes and contents in relation to water pollution were extracted from the material (see figures of Annex VII). Content analysis shows that the messages strongly underline what ordinary people should do for water resources management. Moreover, the content is restricted to the coverage of the national issues. Regional perspectives are missing. Most notably, it emphasises the responsibilities of people but seldom provides information about the responsibilities and assistance of government agencies. In general, the intention seems to be teaching ordinary people (education), giving recommendation of how to live with water pollution (adaption) and imposing an idea of fulfilling an array of daily routines to achieve a good status of water (behavioural change). Here, the most crucial issue at hand is, with only an *education* agenda of talking about people rather than a design of *communication* strategies of talking with people, it may risk people's interest in this sort of government-generated water information.

To this end, finding illustrates that that the main purpose of this public water campaign was to mediate a top-down flow of information from the government-generated "water information pool". Outreach materials were designed to foster public sentiment to support official water programs, through the messages of education, adaptation and behavioural change. Through mediating a top-down flow of information, the government tried to

reinforce the idea that water issues could be solved as long as people follow government suggestions. From the perspective of government officials, there was no need seen for social input and feedback from local population (see also Kotsila, 2014). The problematic issue of a successful mediation of a top-down flow of official information while neglecting feedback channels for bottom-up were in other research contexts of Vietnam and Burkina Faso for example (Eguavoen & Wahren, 2015; Kotsila, 2014). In developing countries, government agencies are keen to, as Lo & Lung (2000) argued, exploit supportive public opinion to strengthen their own position in the government apparatus. However, their failure of creating a basis for public discussion on issues that links to people's own concerns, needs, and interest, hampers their goal of achieving supportive public opinion. To broaden this discussion, the next section discusses people's responsiveness to the outreach materials disseminated during the CWW campaign.

People's sentiment of confusion, indifference and inactiveness

Participant observation on the CWW campaign provided a vivid picture of the face-to-face communication interface. Moreover, the visual materials together with the interviews helped to generate a more comprehensive understanding on the extent people think they belong to this public platform. With this regard, empirical data analysis suggests that people had very diversified opinions on the content of the outreach materials. Their reaction and comments to the campaign were hardly uniform. However, it is worth noting that interviews with local people were conducted in the presence of government officials during the campaign. Therefore, respondents would probably had reservation expressing their opinions in front of the officials. Moreover, socio-economic factors such as education, age, environmental awareness would also have an effect on people's (dis)embracement on the campaign. Despite these, findings highlight that through organizing the public water campaign, a communication platform was constructed, but mostly for the purpose of handing out materials from the government-generated "water information pool" (Photograph 5.3). This is why the public event rather turned into a "give-and-take" lesson targeting ordinary people, which offered an intensive learning on water saving and water law.

Photograph 5.3 Government officials handing out the CWW outreach materials

Source: Photographs by author, 2015

Interviews with the participants show people generally had different evaluation on the campaign, as expressed in the following comments:

[JT] What information do you get from these outreach materials? Is it useful for you?

"It's about water saving. We elders are [already] concerned of saving water, and relatively have stronger awareness of water saving" (Interview, Dongying District, 2015.03.23).

"Through the promotion of water saving, it helps to increase our awareness. Before we saved water because of money, now we know saving water resources for environmental protection and our future generations, to leave precious resources for them" (Interview, Dongying District, 2015.03.23).

"Today is Water Day. I know they [officials from WRBs] come here for organising water-saving campaign. It is good that we have a look at these materials. It's useful. It also helps us to teach the kids to save water" (Interview, Dongying District, 2015.03.23).

According to these kinds of responses, people seemed to be happy and embraced the lesson offered by the government agency. They were prepared to accept 'new' information or 'interesting' outreach materials. It was also observed that some people, however, seemed to be very confused on the content of the materials, acting as a spectator rather than a participant when the material was handed out to them. The following quotation of an interview and observation notes (see also Photograph 5.4) provide some insights:

[JT] What do you learn from the outreach materials? - "[Before the informant looked into the material, the first sentence spelled out without any consideration] Water fee is very expensive! [Then he observed the material and looked very interested] It is about water saving." - [JT] Is it useful to you? [A long silence- the informant seemed a bit confused- then the question was repeated by author] "Useful or not [it doesn't matter], we [only] have a check on it" (Interview, Guangrao District, 2015.03.22).

Photograph 5.4 People reading the CWW outreach materials

Source: Photograph by author, 2015

The informant's long pause implies, on the one hand he felt attracted and interested in the material because he expected something from it. On the other hand, he seemed to be quite distanced or unfamiliar with the content of the material. During the campaign, the author observed that apart from the catchword "water saving", the government officials seldom offered an explanation on the materials or purpose of the campaign. People did not asked questions, either. These accounts create a picture of *interrupted* mutual-flow of information between water administrators and local people. In that context, the strong "salesman" (water administrators) tried to promote one certain product but those "lay consumers"(participants of the campaign) not even showed interests to ask back the price. As such, mutual dialogue between the two was not attempted. Fundamentally, without feedback channels for raising voices people might perceive themselves as spectators rather than participants during the

water campaign. This finding is consistent with Wamsler & Brink's (2014) argument that, "people are inactive because they are discouraged by (a lack of or by inadequate) institutional assistance"- in the format of a communication platform that promotes mutual dialogue and encourages people to be *communicative* on water issues, for example.

Examining access to information on drinking water quality

In examining the CWW outreach materials, results highlight an imbalance of assigned responsibilities to local people and government agencies. This distinction points not only to different roles, but also to *inequalities* in who is heard and who listens (Woodman, 2014) pinpointing the issue of limited participation in the local society. These inequalities resulted in a top-down flow of official information without concerning people's information interest and demands. To further explore the interrupted mutual-flow of information between lay people and the water bureaucracy, this section grapples with the issue of access to information about drinking water quality. The line of inquiry concentrates on the monitoring of drinking water quality and data management in Guangrao County.

Public concern about drinking water quality and available complaint channels

Public concern about drinking water quality came to the fore during the interviews with cadres from WRB.[86] Empirical data highlights that local people consult the government officials quite often to complain about the smell or colour of the water. According to local officials, people may use diverse complaint channels to give feedback or address their concern to relevant government agencies. In Dongying, the complaint channels include mayor hotline, official public websites, weibo, e-mail contacts. These channels are widely applied in local society from the perspectives of government officials. The promotion of complaint channels were initiated by the central government. In view of Chinese citizens' increasing demand of environmental public participation, the MEP promulgated *Environmental Protection Public Participation Approaches* in July 2015(MEP, 2015). According to its outline, rights of complainants and government responsibilities are highlighted:

[86] This research also collected quantitative data on public concern on drinking water quality. More details are discussed in Chapter 7 drawn from results of the survey conducted in the Dongying port.

- People may report to the Environmental Protection Bureau when they discover any behaviour undermining environment and natural resources, through the complaint channels of letters, fax, emails, the "12369" environmental hotline, official public websites.
- People are entitled to report to supervisory authority in case they find the local government or Environmental Protection Bureau do not perform their duties in accordance to laws.
- The reported Environmental Protection Bureau should investigate and verify the reported matters in accordance with relevant laws and regulations, as well as inform complainants about the processes and results of the investigation.

As revealed by the empirical data analysis, these national initiatives face challenges of local implementation in Dongying. It is discovered that those complaint channels are overlapping, due to the absence of clear distribution of responsibility in the bureaucratic system. Moreover, overlapping hinders the delivery of efficient and effective services promised by the government. One government official from DYWRB explained:

"We have no authority to manage drinking water supply and monitor drinking water quality. It is supposed to be the Urban Management Bureau taking charge of that. Likewise, it is the EPB manages water pollution in general. We can't do much on this. […] But in any case, people could call the mayor hotline. And the authority responsible for that issue has an obligation to provide an answer in time. The complaint channels are available for people to address their issues" (Head of Water Governance Department, DYWRB, 2015.03.23).

"[…] If people have issues, there are different channels for them to report or complain. If they raise a certain issue, a relevant government agency is supposed to provide an answer to them. Like us, we have to give timely responses. Government officials have an obligation to react promptly. The satisfaction survey which is organised by the municipal government and targets ordinary people in the whole city puts us under pressure. If we don't [respond promptly], we would be scolded due to omission. […] In every department of our bureau, we assign a staff to take charge of that [answering people's questions]" (Group interview, Heads of departments, GRWRB, 2015.03.22).

Here, the issue of unclear distribution of responsibility is concealed behind the official rhetoric of *sufficient* complaint channels. This official rhetoric seems to tell - the government

apparatus has an 'invisible hand' that assigns people's questions or complaints to various authorities. Then relevant authority would give a satisfying response to the complainant. The 'invisible hand'– away from the public eyes- complicates the issue of how government officials overcome the horizontal and vertical compartmentalization of tasks and responsibilities across authorities. With respect to this, a scholar on China's water industry pointed out that:

"[If] there are problems with the water sources, is it the responsibility of the MEP for its bad management or the MWR's poor planning? It is clearly not the responsibility of one single government body. The reality is more complex" (Xue Tao, Deputy Director of the Water Industry Policy Research Centre at Tsinghua University, quoted in Liu H., 2015).

Apart from the above mentioned issues, challenges remain regarding how to prioritize the complaints and who sets the standards and (or) rules of interpreting, processing and investigating people's complaints. In theory, these channels are supposed to be the location where people can legitimately address their complaints about official actions and receive an answer. Authorities are then supposed to deal with all complaints brought to them and have an obligation to provide assistance, whatever may be the subject (Woodman, 2014). Given the fact that most rural people in China depend on these channels to report their complaints (Michelson, 2008 cited in Woodman, 2014), the key question here is whether such channels are efficient, accountable and transparent. Regarding this, empirical data shows that the number of channels for people to complain is increasing in Dongying. However, these channels are still far from effective, widespread and full. More often than not, people get delayed or unsatisfying answers from the authority. Along similar lines, access to information about drinking water quality is lacking or deficient, remaining problematic particularly in rural areas.

Monitoring of drinking water quality

Due to increasing population coupled with intensive economic activities in Dongying, the demand for water resources supply is high. In Guangrao County, groundwater resources face over-extraction due to intense industrial activities (see Chapter 2). This complicates the task of delivering drinking water supply. The main source of drinking water is from wells in Guangrao. Local people recall that they were able to access water via 200-meter wells during the 1990s. Nowadays, the water is extracted from 500-meter wells according to the authorities. In the long run, this may lead to subsidence and increasing water scarcity.

Additionally, expansion of industrial enterprises increases the risks of contamination of water resources. Given this, not only industrial wastewater could potentially enter drinking water sources. Also harmful particles in the air from factory emissions could cause contamination via rainfall and runoff (Liu H., 2015).

The issue of industrial pollution and relevant impacts have attracted popular media and become a heated debate in China's society (see Chapter 1). Investigation initiated by environmental non-governmental organizations (NGO) and research institutions points out the challenges faced by the government to ensure clean and safe drinking water supply to people (see Liu H., 2015). Among these challenges, unclear distribution of responsibilities of water quality monitoring remains problematic. In 2013, a scandal of groundwater contamination due to illegal industrial wastewater discharge in Weifang City[87]occurred. The scandal triggered a huge public debate on risky water and industrial pollution. Reportedly chemical, ethanol plants and paper mills of Weifang invented new methods of sewage discharge down to the aquifers (up to 1000 meters) through leaching wells. This strategy of sewage discharge could thoroughly contaminate groundwater resources (People's Daily, 2013.03.01). Beyond Weifang, issues of over-extraction of groundwater and industrial pollution in the whole area of Shandong Province, are problematic and well-known to China (21 Century Wang, 2011.11.18; Circle of Blue, 2013).

Not surprisingly, under the influence of the media by self-experience, drinking water quality and potential life-threatening effects of water pollution gradually enter people's mind. For the government, the challenge is not only to meet people's basic need by providing clean and safe drinking water, but also to ensure people's right-to-know about water via a publicly accessible information system. Ironically, secrecy and sensitiveness of data are often used as excuses to exclude people from access to relevant information. For example, according to one scientist from Chinese Academy of Geological Sciences, a systematic base-line investigation has been conducted to study groundwater pollution on the North China Plain[88], but the findings will not be made public due to the sensitiveness of data (21 Century Wang, 2011.11.18). The scientist's accounts underline that the spaces of information disclosure, participation and transparency exist in a complex and intertwined relationship in China.

[87] It is located in close proximity to Dongying.

[88] Shandong Province is located on the North China Plain.

For the case of Guangrao County, it was found that people's right-to-know about water was perceived by local cadres as threat to the legitimacy of their bureaucracy. Moreover, people's general concern about water security is concealed behind the official rhetoric that water from deep wells (400to 500-meter wells) could ensure villagers' clean and safe access to water, as shown in the following interview excerpt:

"People usually distinguish the water quality from smell and colour. If it smells ok and looks not problematic, they wouldn't bother to check the data about the drinking water quality.[…] In fact, it is not necessary for them to buy purified water. Our own water supply is most natural and healthy. It doesn't need filtration. People always complain that there is scale in the drinking water, but that is because the hardness of Guangrao's water is high. […] Our drinking water resource is extracted from deep wells, very stable, monitored regularly by relevant authorities" (Group interview, Heads of departments, GRWRB, 2015.03.22).

As addressed before, monitoring of drinking water quality and data management are problematic in rural China due to unclear distribution of responsibilities.[89] According to authorities of Guangrao County, township water stations, county-level health departments, municipal-level health bureau and city management bureau have the responsibility of examining rural water quality, including inter-departmental crosscheck. To be specific, the township water stations conduct a quarterly examination and its results should be reported to the county-level WRB; county-level health departments have an un-regular examination; municipal-level health bureau and city management bureau have an un-regular examination including sample surveys of the water sources (ibid.). For the un-regular examination, the selection of wells to conduct sample surveys is random. In theory the inter-departmental crosscheck could increase the regulatory transparency and data validity. But finding shows that it serves as an excuse to cover the absence of clear distribution of responsibility on *who*

[89] In China, multiple departments –National Development and Reform Commission, MEP, MWR, Ministry of Housing and Urban-Rural Development (MOHURD), the Ministry of Land and Resources, National and Health Family Planning Commission (former Ministry of Health) - with undefined responsibilities complicate the country's water resources management. For water supply services alone, the urban water supply is managed by the MOHURD and the rural water supply is managed by the MWR. With regard to drinking water quality and safety, the NHFPC is in charge of the monitoring. But in reality it's not only the NHFPC that carries out water quality tests. Their tests are reportedly nowhere near as frequent as waterworks, and even less frequent than the MOHURD (Liu H., 2015).

and *how often* should conduct the examination. This is consistent with Liu H.'s (2015) argument in her investigative report *China's long march – to save drinking water*:

"[…] on a local-level the real status of water safety in each city, town, county or village remains unclear. Official information disclosure on water quality is poor, and the government keeps official tests and monitoring data *secret*. Although water supply enterprises have been publishing their water quality test data, there is *room for improvement* in test frequency, the number of published indicators and public interfaces" (my emphasis).

During the author's visit to Daozhuang Town water station, 14 hard copies of water quality examination reports were requested from the water administrator (see one sampled report in Annex VIII). According to these reports, the examinations were conducted between 2011 and 2015. Data was not consistent due to lacking examination results. The 14 copies were the only copies the water station kept unfortunately.[90] Despite this, the government-generated water data provides some valuable insights on data management in rural areas. Firstly, from these reports the frequency of monitoring is unclear. Secondly, the number of indicators varies in different examination reports (5, 22, 42 indicators were found in different reports). Lastly, four government agencies were noted on these reports as organizers to conduct the examination. But no single data from these reports could demonstrate a case of crosscheck by them. Here, the official rhetoric of inter-departmental crosscheck should be questioned. Empirical data infers there may be only one set of examination data but it is used by various authorities in reality. This might not be unsurprising for understaffed agency with low capacity and limited funding. The key question however, is, if we can truly know the quality of drinking water from these reports. The answer is almost not possible. Amongst the 14 examination reports, the results of each indicator are similar without big discrepancy. This non-fluctuation of data wouldn't prove the government's abilities of water resources management, without providing a publicly accessible and comprehensive information system to local people. With regard to the issue of accessibility of data on drinking water quality, a group interview conducted with GRWRB provides some valuable insights:

[JT] How about the monitoring results, are they open to the people? – "Results and examination reports were online before. But they were not updated in the past two years,

[90] For data access, the author also consulted GRWRB. The officials mentioned that only the township water station keep the examination reports. By contrast, cadres from the township water station mentioned that they deliver their data to county-level WRB every quarter. It is hence unclear who is responsible to generate and manage the water quality data.

because the data is quite *stable* without much *fluctuation* [my emphasis]" (Group interview, Heads of departments, GRWRB, 2015.03.22).

Ironically, the non-fluctuation of water quality data serves as an excuse to restrict access to information. This is consistent with the argument by Mol *et al.* (2011) that in China a lack of enforcement and the ambiguity of *Environmental Information Disclosure* give environmental agencies great discretion to avoid environmental data disclosure.

Conclusion

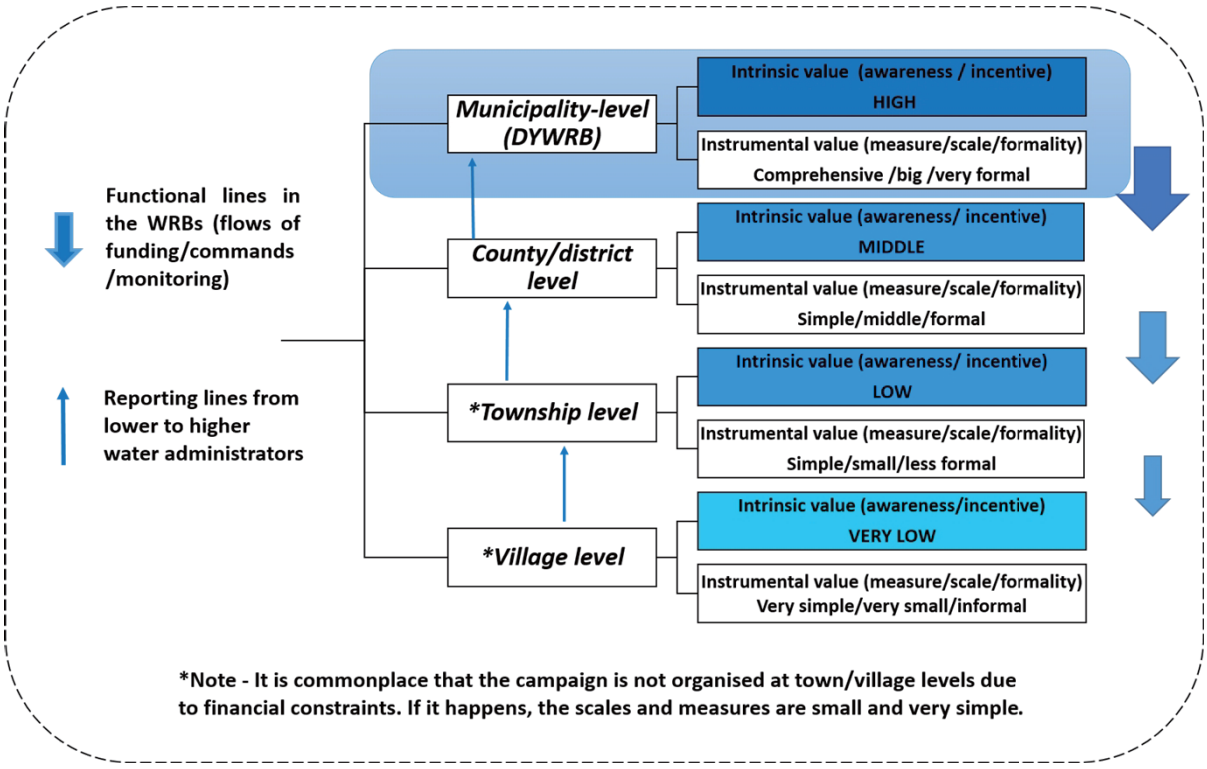
This chapter explored the development of software power promoted by local authorities and how they deployed sophisticated methods to mediate a top-down flow of information through the CWW campaign. Probing into the flows of water information, empirical data implies that this platform of interfacing is based on *one-way* communication. Several factors in relation to the communication barriers are identified here which hinders mutual dialogue between government officials and local people during this campaign. Firstly, highly-placed government officials have relatively higher awareness of respecting and listening to people's voice. However, reliance on hierarchy and the multi-layered bureaucratic structure decrease the likelihood of the messages moving their way freely from higher to lower level of the bureaucracy. Secondly, due to incoherent messages across different levels of the hierarchy, local cadres prefer to stay inside their comfort zones, and prioritize only those tasks that could help them to pass the assessment conducted by their superior.[91] Communication and interaction with lay people are hence perceived as 'image projects'. Its targets and assessment could be easily fulfilled, as long as cadres could provide visual evidence (i.e. pictures) to show they have organised public events to 'communicate' with people. Beyond this, an agenda for building mutual communication with lay actors - about how, with whom, why to communicate is missing. Thirdly, limitation of funding dampens local cadres' incentive to carry out the campaign, which further constraints participation of villagers. While the implementation was wide-ranging and formally organised in the city centre of Dongying, it is quite commonplace that towns or villages did not organize any events.

[91] Long-term experience of working in the bureaucracy helps cadres sense what would be evaluated by their superiors or what matters to their career promotion. According to this principle, cadres prioritize different tasks in mind and use it as a guide in their daily routines.

Based on the above arguments, it is found that a four-level response system is embedded in the local water bureaucracy for implementing the CWW campaign. As shown in Figure 5.3, the levels of "governmental respect" (awareness and incentive of respecting local people) fluctuate within the hierarchy. In the upper level of DYWRB, government officials have relatively high intrinsic value of listening to local voices and empowering people. In parallel to the high intrinsic value, government agencies at higher administrative scales have better resources to implement a formal and large-scale campaign with relative comprehensive measures, compared to those at the lower administrative levels. Moreover, through the bottom-up reporting the hierarchy of the local water bureaucracy seems to keep its stability. Informed by the analytical tool of "fractal"[92], the presented four-level response system sheds a clearer light on the relationships, modes of interaction, intersection between water resources government agencies at different administrative levels (see Figure 5.3). Resonating with Allee's (1997, p.96) argument, results also stress that this multi-layered bureaucratic structure hinders information and knowledge flow freely; and there are many barriers for messages to move easily across the hierarchy.

[92] Fractals explain how every tiny branch of a tree holds the same basic structure as the larger branches and of the tree itself (Allee, 1997, p.100-101). In this study, the fractal pattern is applied to study interaction and communication patterns of different actors. See also Chapter 3.

Figure 5.3 Responses to CWW at different levels: municipality, district/county, town, village



Source: Designed by author

With regard to the monitoring of drinking water quality and accessibility of data, findings demonstrate the problematic nature of these issues. Given the situation of understaffed agencies and unclear distribution of responsibilities, increased access to drinking water quality data would stir up many deeply rooted conflicts in the local water bureaucracy. Besides, local cadres perceive increasing information access as constraints and threats to the legitimacy of their bureaucracy, and hence show resistance to it. At the same token, information disclosure is perceived as an obstacle that hampers the government apparatus running their tow-down technocratic programs. Accordingly, government officials prefer to stick to the traditional technology of rule. Relative to this, it is highlighted that the traditional bureaucratic awareness – staying in the comfort zones and getting the prioritized tasks done through daily routines – is deeply *rooted* throughout the hierarchy. In light of Ho's (2009) principle of gradualism applied in China's institutional change, having a good eye on the role of time and implementing training programs to change the norms of conduct of government officials would be significant and meaningful.

In relation to institutional change, local cadres seem not to prepare for a more integrated approach to environmental management. During the interviews, the officials seemed to be surprised, confused on the concept of information disclosure, open data and right-to-know. The integrated approach to water resources governance was promoted in the national initiative of "Construction of a Water Saving Society".[93]According to Xia & Pahl-Wostl (2012), this integrated approach underlined a paradigm shift from an engineering-centred approach of water supply and management. Although it has been promoted for more than 10 years, its effect is still far from full or satisfying. To urge governmental officials to change their mind set, it would be imperative to promote social learning in the bureaucracy. In this research context, social learning is promoted as a strategy of listening to the grassroots voice and allowing for feedback from below; of learning about innovative solution to problems occurring in the communities; and breaking down the barriers to initiate mutual-flow of information between government agencies and lay people. During the processes of interaction between government agencies and lay people, *mutual awareness* is crucial determinant of triggering mutual dialogue between the two – highlighted as self-reflection and being aware of the perceptions of the other from a Bateson's perspective (1951, p. 208).

In sum, this chapter probed into the flows of water information to pursue a more nuanced understanding of the daily routines and implementation practices of the local water bureaucracy. Through the use of two illustrative examples of the CWW campaign and access to drinking water quality data, it is argued that the government's employment of the "software power" - based on a top-down flow of information– reflects the institutional deficiencies of allowing people's space of participation. In the long run, this may bring about conflicts and threats to societal stability. In particular, local environmental activists may not stand keeping quiet any more, but rather employ different ways to negotiate with government agencies, seeking to expand the scope of participation and to challenge existing norms, as unravelled in the next chapter.

[93] The national initiative was outlined in *China's Tenth Five-Year Plan (2000-2005)*.

CHAPTER 6 ENVIRONMENTAL ACTIVISM AND A NON-VIRTUAL COMMUNICATION INTERFACE

Zooming in on the local water bureaucracy, the study has so far offered a more nuanced analysis of the "software power" promoted by the local government. Empirical data suggests that such an approach is not convincing to local people, as the mutual flow of information is not attempted in the communication platform. It echoes the finding drawn from the case studies, which delineates the picture of *virtual* communication interface due to a lack of channel for allowing for feedback from lay people (Chapter 4). In this context, people have to take matters into their own hands when local authorities fail to respond to people's demand on pollution remediation. Following this line of thought, this chapter moves towards those "boundary pushers" who upgraded their strategies to confront government agencies for making a *non-virtual* communication interface. Here, the study touches upon the crucial issue of environmental activism in local society.

A large body of work has been conducted to depict environmental activism in China. The terminology "embedded environmentalism" is often used by scholars to describe such initiatives, referring to that activists employ a resourceful and negotiated strategy to gain political and social influence (Ho & Edmonds, 2008, p.220). To pursue a more sophisticated understanding of limiting and enabling of China's embedded environmentalism, this chapter probes into the institutional setting in Hekou District. It explores the differentials in levels of tolerance to approaches taken by local environmental activists in Hekou. To highlight the fluid and constantly shifting boundaries of China's environmental politics, the "mixed signals" concept - bringing both the state and society into view simultaneously (Stern & O'Brien, 2011) – functions as a catalyst in this chapter to detect the communication interfaces. When information passes constantly between signals senders (government agencies) and signals receivers (the local population), the concept brings us toward a more dynamic view of the state–society relation as well as supports increasing accessibility and approachability of the communication interfaces.

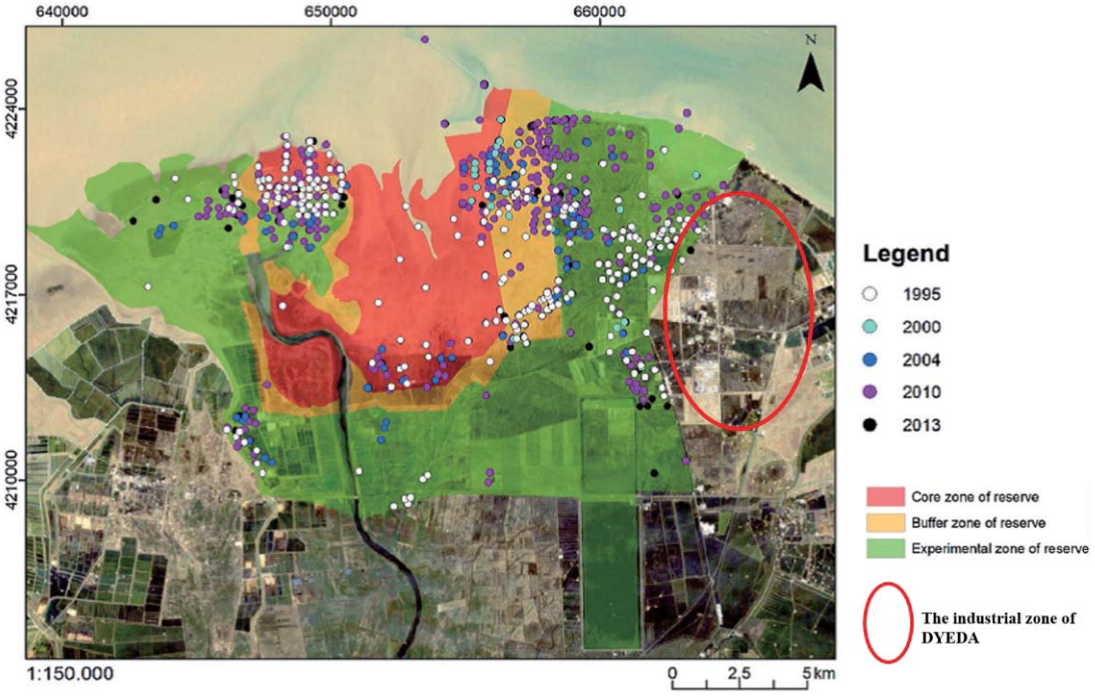
Environmental activism among Shengli oil workers

The YRD is home to the second biggest oil field of China (Chapter 1). There are different oil related industries located in Dongying, i.e., Gudong industry, Gudao industry, Zhuangxi industry and Ocean industry. Shengli is the state-owned company in charge of the oil production and related industrial activities. Since the local government claimed their authority when Dongying city was established in 1983, Shengli as a state-owned company has intricate relation with the local government. This complicates the issue of environmental protection in relation to the distribution of responsibility (between the local government and Shengli) and space for negotiation (initiated by Shengli oil workers).

Studies on the impacts of oil related industries on local environment claimed that intense oil exploration and exploitation activities devastated the wetland ecosystem, increased the fragmentation of coastal landscapes, and that the incessant oil spills caused substantial destruction to the local biodiversity as well as water bodies (Bi *et al.*, 2011; Liu & Qi, 2011; Wang *et al.*, 2012). In particular, in the local nature reserves a strong expansion of oil extraction activities was detected (Figure 6.1), showing its noncompliance with national environmental protection regulations (Kuenzer *et al.*, 2014). Most notably, since 2010 serious accidents of poison gas leakage broke out unregularly, provoking local people's anxiety and anger to the industries. To raise people's concern on environmental risks, oil workers initiated a series of environmental activities. They have advocated the protection of wetland ecosystems, biodiversity and bird species, sustainable management of the Bohai bay resources. Most strongly, the oil workers addressed their blame against the industrial enterprises.

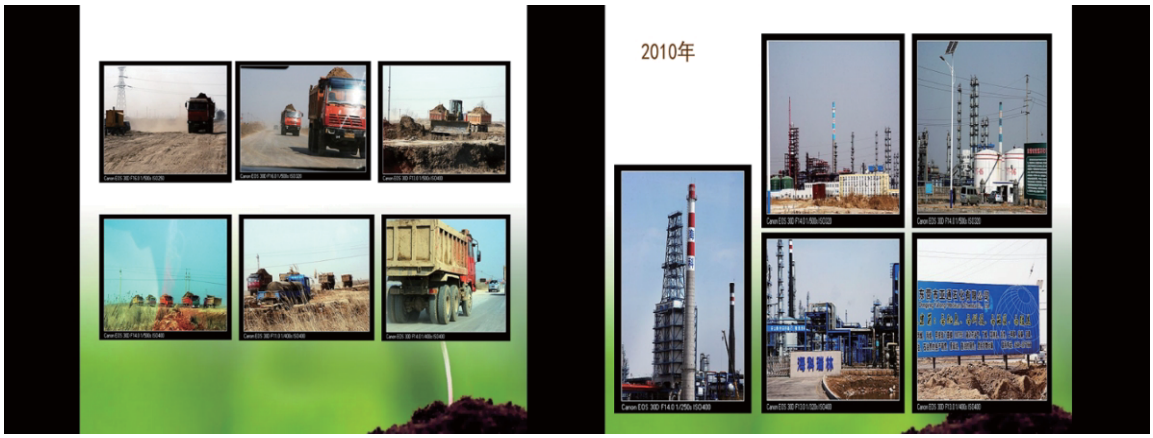
Hekou District is the home base for the oil workers' families. Apart from expansion of oil pumps (see Figure 6.1), local environment was kept in a quite good condition in the early period. There were only two or three oil related industrial factories located in Hekou before the rapid industrialization. But situation is changed dramatically after the national goal of ecological economic development was initiated (see Chapter 2). To follow the national planning of booming high-efficiency industries, three industrial areas have been established gradually in Hekou District. Photograph 6.1 shows the dramatic change of local environment since the establishment of three industrial areas.

Figure 6.1 The spread of oil and gas pumps in the nature reserve



Source: Adapted from Kuenzer *et al.*, 2014

Photograph 6.1 The emergence of industrial areas



Source: Photographs based on presentation given by one local environmental activist, 2015

In Xianhe Town of Hekou District, the population of oil workers reached 36,106 taking up almost 96% of the whole population of Xianhe by the end of 2012. The increase of oil exploration and exploitation activities attracted more employees to work for the oil field. Most of these employees are involved in Gudao, Zhuangxi and Ocean oil industry. Although the oil workers come from different places of China, they gradually develop a common identity since settling down in Hekou. The oil workers don't interact much with the local

population, who are mostly farmers moving from other areas of Dongying and migrants moving in for business. Intermarry is common among the oil workers, but oil workers would not prefer to marry other locals. Moreover, the oil workers regard themselves more aware of and active in environmental protection. Their company is often criticized by its bad social responsibility - destroying and causing disturbances to the delta habitat. As a remedy strategy, Shengli Oil Company has tried to implement more strict environmental enforcement programs. For instance, "wastewater reinjection"[94] and "green and low carbon" were initiated by the Director of Sinopec to reduce negative environmental impacts (Instructor, Zhuangxi Oil Industry Team Eight, 2014.09.03). The company also tries to disseminate environmental information to the workers, in order to increase their responsibility for environmental protection (Photograph 6.2). It is noted that these initiatives are welcomed by the oil workers, as the initiatives helped to improve the environmental knowledge of workers. However, the daily experiences of working and living in the polluted environment developed the workers' grievance and formed their collective action against the industrial water pollution.

Photograph 6.2 Information about the "World Environmental Day" in the office of Shengli oil field

Source: Photograph by author, 2014

[94] According to Sinopec, they requested the oil resources extraction industry of Shengli to close the mouth of their sewage efflux in order to achieve zero sewage discharge in the southern areas of the Yellow River (http://www.sinopecgroup.com/group/shzr/qhbh/dtjsyf/, last accessed 2015.08.12).

Development of grievance and blaming among Shengli oil workers

The locations of Zhuangxi and Ocean Oil Industry of Shengli – where most of the oil workers from Xianhe Town work in – are in close proximity to the DYEDA[95]. Workers have to stand the awful smell - as described as smell coming from the dead fish or rotten cabbage- when implementing their daily routines in the oil field. It was observed that equipment of air purifier for example, was arranged in some offices of the oil field as measures to protect workers from poison gas attack (Photograph 6.3).

Photograph 6.3Air purifier and plants in the office of Shengli oil field

Source: Photograph by author, 2014

Before the start of local industrialization, the place used to be an area[96]that was rich in biodiversity and hosted many species of animals, plants and birds (Photograph 6.4). Some oil workers recalled that swans, pheasants, reeds, grus, snakes, small fishes were seen now and then before the settlement of the DYEDA. The initiative of industrialization in the Dongying port is claimed to have caused substantial devastation of local environment and people's living conditions, as elucidated in the following statement:

[95] Dongying Port Economic Develop Area.

[96] Xianhe Town is located in close proximity to the Yellow River Delta National Natural Reserve.

"Our place Xianhe Town was not poor before. It was just like a heavenly place with blue sky and fresh air. The street was clean, and the salt water intrusion nurtured the species of fishes and shrimps, which we could get easily in the rivers before. The fishy smell from the sea made people feel comfortable. But see how it looks nowadays. We get polluted wastewater 'intrusion' [other than sea water]. People look very anxious especially due to the poisonous gas attack. […] If the government wants economic development, they should at least guarantee our right of breath" (Oil worker, Zhuangxi Oil Industry Team One, 2014.08.22).

Photograph 6.4 The suaeda salsa near the Dongying port

Source: Photograph by Shimin Xu

The devastation of local environment also affects people's sense of place and belonging. Nowadays many oil workers apply to work in other areas of Dongying because they don't want their future generations to live in Xianhe Town anymore. Many young female oil workers worry that the working environment would affect their fertility. It was often reported that some oil workers were suddenly sent to other offices in the evenings. It was found that the industrial enterprises illegally discharged excessive waste gas which was dangerous to people's life (Interview, Zhuangxi oil industry Team Four, 2014.08.22). In the worst situation, the oil workers were sent to hospitals due to respiratory problems. But they never got an official report from the hospital proving the harmful effects of the poison gas attack to their health. This also increased the oil workers' frustration because they would not have convincing evidence to make complaints to government agencies. Many workers took

pictures or made short videos of the 'polluted' scene. These visual documentation could not convince relevant authorities, though. People felt upset and blamed the government agencies for not assuming their responsibility of monitoring and collecting pollution data. One oil worker recalled:

"We asked our company if they have some monitoring equipment for us to collect pollution evidence, but it seems only the Management Board [of Shengli Oil Company] has one facility. Apart from this, there are only two mobile cars monitoring air pollution in Dongying. They are owned by government agencies. In 2010, when a serious accident of poison gas leakage broke out, the EPB of Hekou District asked us if we collected any evidence. […] They were supposed to have the pollution data [not us]. They have several monitoring stations in the DYEDA, and their data should be open to us" (Oil worker, Zhuangxi Oil Industry Team Four, 2014.08.22).

Disappointed about the inefficiency of environmental monitoring programs and the complaint channels, as well as the lack of publicly accessible pollution data, oil workers gradually developed a grievance about their situation. According to van Rooij (2010), no matter how much information people get about the effects of the pollution, they are more likely to develop a grievance if such knowledge is connected to their own experience or interests, such as the life-threatening impacts to their health on a daily basis. In the context of Hekou District, public distrust increased due to the deficiencies of the monitoring programs and local authorities' omission against the industries. Some workers began to suspect that government agencies have close ties to industrial enterprises. On a day-to-day basis, people's negative feelings increased. This triggered their discontent and abuse against the authorities. Most of the abuse was addressed through the digital channels.[97] The content of abusive messages were reportedly tracked by the local government. In this context, the communication interface between government agencies and the local population became *incisive*. The officials felt *innocent* and wrongly abused, as expressed in the following statements:

"Look at the 'Xianhe tieba'[98], there is so much abuse against us. Whatever we say, they don't *trust* us [my emphasis]. I think it is an issue of personal understanding. If people think the official information is not true, they could ask experts or consult the professionals. […]

[97] For example website, web forum, online chatting platform, BBS.

[98] "贴吧" - An online forum which has become popular among the residents of Xianhe Town for public discussion about local environmental issues.

We are actually under great pressure now. Even if people abuse us, we have to keep working. Sometimes we have to continue overwork at night several days in a row to track the pollution sources. While the most exhausting work comes to us, the most suffering goes to the people. So actually we, the Environmental Protection Bureau, and the public is *one together* [my emphasis]" (Deputy Director, Environmental Protection Bureau of the DYEDA Management Board, 2014.08.28).

"[…] their abuse reflects their low diathesis. If they have issues, they could discuss with us together, but not cursing and writing those abusive messages online. Then they disappear and leave us so much bad reputation. I think they are not against the government, but it [their abuse] reflects the dark side of their personality. Some people just ignore you, no matter how you do and how much efforts you have made. And they think what we do is only to fool them. […] In fact, we have cultivated many channels for people to make complaints. In our website we just established the 'online chatting forum', but it seems people are reluctant to talk and interact with us" (Head of Legal Publicity Office, HKEPB, 2015.04.03).

It is also noted that the national initiative of high-efficiency ecological development was questioned by the public. More specifically, the local population questioned how the goal of *ecological* development could be fulfilled since the emergence of industrial areas in Dongying has brought huge negative environmental impacts to the local society. For government officials, they assumed the initiative came from the state and people shouldn't question it (ibid.). Despite this, the officials confessed that they were indeed facing challenges to implement the national plans without specific guidelines from the state. In addition, the increasing environmental awareness of the local population as well as people's higher expectation of environmental management also put the local government under great pressure. The following interview with one government official demonstrates this point:

"I think the initiative [ecological economic development] is meaningful, which strongly improves our knowledge and awareness. [Based on this initiative] we could take actions and make progresses. However, when a national goal is proposed, the central government usually doesn't tell you how to achieve it. [For us] how to achieve the goal is a long-term process. At the same token, environmental protection is a gradual process. Our country has undergone more than 30-year reform and economic development, and accumulates these pollution issues, which can't be solved in short time. For example, the industrial enterprises can't be shut down suddenly. Instead we have to improve them *step by step* [emphasis in the original]. This

process should be accepted by the public, but they usually have high expectation on it [environmental management] and request the industries to change immediately after the accidents broke out" (Head of Environmental Management Office, HKEPB, 2015.04.03).

According to Lieberthal (1992 cited in van Rooij, 2010), in China the local government usually directly controls the local EPBs, because the government pays their personnel and appoints their leaders. In light of this, if Dongying government has more interest in local revenue and job opportunities provided by the enterprises, people's concern might be addressed but difficult to be taken into account by the EPB officials. In that context, oil workers had to take matters into their own hands through multiple courses of actions against the industries.

The borderline between the acceptable complaints and controversial activism

According to van Rooij (2010), while fighting against the pollution, environmental activists will often try multiple course of action, starting with relatively non-confrontational and simple action such as complaints and petitions, and then move toward more formal and risky action such as protests. Since 2010, five cases of collective action in Xianhe Town were recorded (Table 6.1).

Table 6.1 Chronology of collective action in Xianhe Town since 2010

Time	*Typology of collective action*	*Description*
2010.03.27	Demonstration	People demonstrated in the Shengli Oil Square advocating environmental protection.
2010.06.05	Public signature event	The public made their signatures in front of Penglai Park to advocate environmental protection.
2010.06.27-29	Blockade	An accident of air contamination provoked people's discontent and they initiated the blockade in the main road of Xianhe.
2013.02.23	Public gathering	An accident of toxic gas leakage provoked the collective action but people were not allowed to hold up banners or shout

		slogans when they were gathering.
2014.08.11	Demonstration	An accident[99] of toxic gas leakage triggered a demonstration in front of Hekou District Government. Participants include people living in different towns of Hekou District.

Source: Table by author based on interviews conducted in Xianhe Town, 2014

As seen from the table, most of these collective actions were initiated after the accidents of industrial pollution. It is also noted that participants of the mass events are mostly oil workers. Their protest was constrained by the Shengli Oil Company – which has intricate relations with the local government. Workers were discouraged or not allowed to participate in these events. In essence, Shengli Oil Company is concerned that if their workers organise collective action, it would cause social instability which is prohibited by the local government. The following interview excerpt would strongly demonstrate this point:

"Many people joined the demonstration organised in front of the Xianhe Town Cinema. If this way worked, why did the action end up with nothing? […] When our leaders receive some news or feel something abnormal, they would inform us that 'if anything happens tomorrow, you shouldn't allow your team to join. *Watch them*! [emphasis in the original] You should look after your team members'! They [the highly-placed managers of the oil company] are all watching you" (Instructor, Zhuangxi Oil Industry Team Eight, 2014.09.03).

His remarks reflect that the oil managers are afraid to lose their jobs, if they go against their company. They have to go through the step-by-step reporting across the hierarchy of their company, through the Oil Workers Congress[100] for example. In other words, the oil workers are supposed to make petitions to their superiority, and then the top manager of Shengli Oil Company would consult the local government and seek a solution. Ironically, the negotiation between Shengli and the DYEDA is contingent and the result of their discussion is never released to the public. For the oil workers, they are concerned if they try to make "boundary-

[99] The accident did not happen in Xianhe Town, but residents of Xianhe were reportedly affected especially the children and elders who had respiratory issues.

[100] Deputies from the oil workers could address their issues and seek for support from the highly-placed managers during the congress.

spanning claims"[101], it would be labelled turmoil and would bring themselves in sanction. They assume the priority of the local government is to maintain social stability. If many of them gather in a public place – as a measure taken to legally raise their voices but without any political purpose– the authorities might perceive the gathering as turmoil (Interview, Xianhe Town, 2014.08.24). In this fluid socio-political context where the boundary is blurred, what are the limits and border of acceptable or uncontroversial? What variables affect the response of local authorities to people redressing their grievance? The following information captured in an interview provides some valuable insights:

"If people come to us and raise their issues, it doesn't mean we could help them to solve the problems. It is a question about how the policy-makers make *overall* arrangements [emphasis in the original]. For instance, they may need to consider if this issue bothers many people [but it doesn't mean the issue could be solved if many people are affected], if the issue is important or not, if the person who reports the issue is professional or not. The governments have limited budgets but they have to solve so many issues. The question of making *priority* is important, and it involves so many *complex* interests and *intricate* relations [my emphasis]" (Officer, HKWRB, 2015.03.26).

The empirical data analysis elucidates that the fiscal situation, priorities setting, interests of the government, and whether there is a strong voice coming up from the society are key factors affecting the official response. Despite this, on different days and on different encountering, those who dare to redress a grievance about their environmental suffering and advocate changes, have to deal with a multifaceted state that may endorse, tolerate, or suppress their actions (Stern & O'Brien, 2011). Here, it is noteworthy that the bottom line of governmental tolerance to local environmental activism remains unclear rather than a "socially shared rule", as Helmke and Levitsky (2006 cited in Stern & O'Brien, 2011) would call. The environmental activists, however, can make use of the room for manoeuvre for enlarging the scope of negotiation, when government agencies have "disparity of attention" on their political agenda or when they have "more vital *other* interest" (Hirschman, 1978, emphasis in the original). This space – as demonstration areas of going beyond the asymmetric power relations for political innovation[102] - could help the local environmental

[101] The term is borrowed from O'Brien & Li (2006 cited in Woodman, 2014).

[102] For this point the readers are referred to Hirschman (1987), who discusses the asymmetric relations between the dominant and dependent countries. In that context, the demonstration areas refer to actions/approaches taken by dependent countries to initiate political and economic innovation.

activists to extend the boundary of governmental tolerance.

Boundary micro-politics and the constraints of "isolated activism"

The presented data highlights that economic dependence on the company constrains Shengli oil workers' collective action against local industrial enterprises. Another constraint is found to be relevant to the challenge of "isolated activism". The local environmental leader of Xianhe Town – a Shengli oil worker who has been advocating for environmental protection since 2010 - was assigned to work in another city and is not active in Xianhe anymore. This dampened other oil workers' long-term commitment for fighting against pollution. This local environmental leader, Liu Hong[103], started her job in Shengli Oil Company in 1997. Being not interested in her job in the oil industry, Hong devoted herself to environmental protection and has been organising local environmental campaigns. For example, the public event of bird watching, wetland resources conservation, ocean resources protection, environmental education. She also networked with national environmental NGOs and journalists.

As a local environmental activist, Hong assisted more than 100 media agencies to get access to Dongying and report the local environmental issues (Liu Hong, Xianhe Town, 2014.07.16). Reportedly Liu Hong was regarded as a "high-profile figure" by the oil company, due to her extensive networking with the media. According to a colleague of Hong, the media reports brought negative influence to Dongying due to the disclosure of local industrial pollution, which triggered discontent of the local authority (Shengli Oil worker, Xianhe Town, 2014.08.30). Hong was then assigned to work in the nurse home of Shengli Oil Company in Yantai City in August 2010.

In an article published on China Environment (2011.11.02), Hong claimed that she was against the *confrontational* approach to environmental protection, and advocated a more *rational* and *peaceful* way to promote local wetland conservation. Still she was perceived by the authorities as an influential person in the blockade of June 2010 (see Table 6.1) (Liu Hong, Xianhe Town, 2014.07.16). After that, Hong had a few opportunities to encounter the top official of DYEPB both formally and informally (ibid.). Her non-confrontational approach to environmental protection seemed to be recognised gradually by the local government. Since 2014, she was assigned to work for the Provincial Department of

[103] The name "Liu Hong" is used to protect anonymity in this research.

Environmental Protection and currently works on the promotion of public environmental education.

In her study on China's boundary politics and segmented publics, Woodman (2014) argues that, "those who dismiss 'confrontational' strategies as being counterproductive ignore the fact that the boundaries are blurred, and often people do not know where the 'forbidden zones' begin and end". To advance this analysis, the subject of "those" in Woodman's argument should be clarified. Findings imply that *local cadres* tend to ignore or dismiss initiatives addressed by environmental activists, while *higher-level officials* have a more vital other interest than the local struggles of pollution. In such a context, there seemed no consistent standard of enforcement, and the norm was granting local officials discretion to judge if a boundary of environmental activism has been crossed or not (Stern &O'Brien, 2011). Due to lacking experience of tackling environmental activism, it is found that local cadres tend to *dismiss* any strategy that is not familiar to them in order to keep the situation under control, avoid blaming and stay *safe* in their comfort zones. The question regarding, how the officials make their decisions and how their positions affect their action, requires more study in the future.

Although Hong has been networking with media and national NGOs, their effects on improving local environmental protection are often short-lived and there is rarely follow-up measure. This results in *isolated activism*[104] in Xianhe, which means that local activities operate in isolation without support from either relevant authorities or NGOs. The situation of isolated activism leads to almost no interaction between the authorities and local environmental activists. In a focus group discussion conducted with local and external activists, the participants shared their experience of how to build mutual dialogue with the government:

"[In this situation] it is important that the government offers support to local activists and collaborate together on the issue of pollution abatement" (Focus Group Discussion, Xianhe Town, 2014.08.20).

"But if the activists want to have a conversation with the government, they should also try to expand their social influence. It is important to let the government know our value,

[104] The notion is borrowed from van Rooij (2010).

strengths and the advantages of collaboration [otherwise they wouldn't show interest in mutual dialogue]" (Focus Group Discussion, Xianhe Town, 2014.08.22).

Here, it is noteworthy that social learning is manifested in *negotiated symbiosis* (see Zhu & Ho, 2008, p. 151). Activists need to increase their knowledge and bureaucratic skills to negotiate with the government on the one hand. The government institutions should also realise the strength of local activists, whose experiment and exploration in the grassroots could offer them a dynamic view of environmental management on the other hand.

Core activists and their strategy of incremental change

The collaborative initiative VS. distinct approaches

While Hong was assigned to work in Yantai City, other local activists continued to make efforts to environmental protection in Xianhe Town. Originally, they networked with each other and communicated through digital channels, such as chatting platform and web forum. Through the online platforms, they also managed to build network with other activists in other parts of Hekou District. Their main purpose was to advocate the establishment of a local environmental association. In China, environmental associations and NGOs are required to register at the Bureau for Administration of NGOs - a subordinate institute of the Ministry of Civil Affairs (Zhu, 2013). Since 2007, Hong has addressed the initiative of establishing an environmental association to DYEPB. But authorities claimed that there were already many associations in Dongying, for instance associations of bird watching, technology, hairy crabs and aquatic products. They did not see the need for an additional environmental association. Nowadays, it is much more difficult for local activists to negotiate with the government agency due to the political tension.[105]

Although the network for local environmental activists is expanding in Hekou District, they adopt quite different approaches to environmental protection. Some advocate the non-

[105] Due to frequent accidents of poison gas leakage in 2014, the local environmental activists of Hekou District have tried different approaches to address their concern about industrial pollution, which put the local government under great pressure. Thereby, government officials are concerned if a local environmental association is established, those environmental activists would increase their social influence. This might further trigger public discontent to the local government.

confrontational strategies to keep their environmental activities low-profile. In December 2014, one public campaign *"To protect environment, reduce haze, create a green place"* was co-organised by relevant authorities and local activists in Xianhe Town (Photograph 6.5). The slogans and banners were reportedly designed in advance by the government agencies. Accordingly, the local activists had the feeling of disempowerment because the campaign was conducted in a perfunctory way for calming people down (Personal communication with local activist, Xianhe Town, 2014.12.06). Despite that, activists still had to keep low-profile and depoliticized their actions, in order to highlight environmental aspects of their initiatives, rather than portraying it as a political conflict between the government and local residents (see also Zhu & Ho, 2008, p.162).

Photograph 6.5 Environmental campaign organised in Xianhe Town

(1): Participants holding banners[106]and making a group photo in front of the Xianhe Town Cinema, (2): cyclists ready for a tour in the outskirt of Xianhe. Source: Photographs by author, 2015

Other activists utilized their networks with the media to uncover the issue of industrial pollution. However, provincial media as well as television is controlled by local authorities. For that reason some of their reports were withdrawn due to the complex interests between the government and enterprises (Personal communication with local activist, Xianhe Town, 2014.12.06). In this vein, unlike the open and relatively free public opinion environment in southern China, local media in Shandong Province is relatively conservative. The traditional value system of Confucianism has entrenched influence in Shandong -the hometown of Confucius. Due to the deep-rooted influence on local society, Confucianism - which promotes respect, hierarchy and conflict avoidance - still affects people's value and

[106] Translation of the banners - "Reduce car driving for our blue sky" "Green commuting, low-carbon life-style" "Beautiful Shandong (created) by you and me".

behaviour. Even if local environmental activism has gained significant progress in local society, people are usually against defaming their own city especially through negative media exposure. This reflects the ambivalent awareness and attitude of the activists. In essence, it sheds lights on the issue that cultural and social norms shape people' motivation and strategies even when they negotiate with the government for environmental solutions.

Apart from the non-confrontational and peaceful strategy, other activists claimed a more confrontational approach to uncovering the inefficiencies of local environmental management. For instance, this group of activists advocated reporting the misbehaviour and unresponsiveness of cadres to the public through negative media exposure. They also uploaded the visual documentation of industrial pollution online to trigger public concern. By doing this, they expected the local government could make prompt response and take actions to control pollution. To some extent, the distinction of the activists' viewpoints and approaches is conducive to stimulate innovation and vitality on the one side. This dispersion could dampen people's long-term commitment, persistence and vigour on the other side. In the long term, loose organization and disparity of interest may hinder the effects of local environmental activism. In particular, without an entity of environmental association to unite the people, the challenge of isolated activism remains. For local government agencies, it seems the conditions are not ripe to establish a local association for environmental protection. The following interview excerpt demonstrates this point:

"It [establishing a local environmental association] is only a time issue. Its establishment is a gradual process, which needs more people to increase their environmental awareness. In some places there is an active civil society because people are more advanced. But in some places people don't know how to operate [establishing an environmental association] because the state doesn't stipulate *consistent* standards [my emphasis]. For those who addressed this initiative to us, I guess they haven't got enough time to consider how to operate this association specifically. For instance, if the association has a comprehensive charter, personnel structure and funding etc. If they only ask those extreme activists to join, it doesn't create positive but rather negative impacts. If you just let them do it [establishing an association], when it was still premature, then it would be a freak and it is difficult to stop them later" (Head of Legal Publicity Office, HKEPB, 2015.04.03).

His remarks reflect that local officials in fact don't have much experience of handling local environmental activism, particularly regarding the procedures of establishing an association.

For this reason, they adopt more *proactive* and *preventive* measures to keep the situation under control. In this context, the judgement about whether the officials are tacking toward openness (*fang*) or tightening (*shou*) (Baum,1994 cited in Stern & O'Brien, 2011), and about which initiate or action is permissible, rests on activists' skilful interpretation of incomplete information (Stern & O'Brien, 2011).

Environmental accidents as a trigger to enlarge the scope of negotiation

In August 2014, two serious accidents of poison gas leakage (Box 6.1) led to political tension between Hekou District People's Government (HKG) and the local population. Abuse and cursing against the local government agencies were initiated on a local tieba[107]. According to Yang & Calhoun (2007), with the rise of a green public sphere and people's increasing environmental awareness, new ways of talking and communicating on the environmental issues have been introduced to the Chinese public. In Hekou, people's creative use of digital communication channels and spaces these create are perquisites for people's involvement, building common identity, as well as essentially for their sustaining ongoing discussion about pollution.

[107] See Footnote 98.

Box 6.1 "811 accident"[108]of poison gas leakage in Hekou District

In the late evening of 10th August 2014, people in Hekou District suddenly had problem of stifle, suffocation and choking due to poison gas leakage. The residents mentioned that now and then they had to suffer this kind of odor, but this time was special and they had to find something to cover their child's face in case he breathed in the poison gas (Dazhong Wang, 2014.08.11). People posted their complaints online in order to share their sentiment of anxiety and anger. The accident brought direct health impacts to children, elders and pregnant women. After the accident, the district, municipal and provincial level EPB immediately established an investigation group to tackle the accident. They reported to the public that the accident was caused by a small industrial factory in Zhanhua City – located in close proximity to Hekou. The result of the investigation seemed not be convincing enough to calm down local people. They suspected that the distanced factory could not produce that serious effects in relation to the poison gas leakage. The official framing of the accident - "odor nuisance" – further triggered people's negative emotion and anger. After a second "odor nuisance" occurred in the evening of 14th, the residents of Hekou District submitted a joint announcement to HKG "*Those suffering Hekou residents have some words to say – we breathe, we live and we share the same destiny! Those who wish to take matters into their own hands, would get help from God!"* Indeed, these accidents shocked local authorities and after the accidents they put much pressure on HKEPB to track the pollution sources and to calm down local people.

Source: Box by author based on interviews with local people and government agencies, 2014

After the accidents, local people initiated a demonstration in front of the building of HKG. The highly-placed official of HKG showed up and gave an official statement to explain the accidents. He asserted that HKEPB would give a comprehensive response after one week. Meanwhile, five representatives of the masses were invited to a talk with government agencies. According to the local environmental leader of Hekou District, they posed four requests during their meeting with the authorities:

1. To set up a "pollution information sharing platform", which the EPBs, enterprises, deputies and the public could have access to;
2. To announce the distribution of industrial enterprises and the location of their outfalls, with details about the content of pollutants and relevant monitoring data;

[108] The accident was named "811" due to the fact that the poison gas leakage occurred in the evening of 10th August and it triggered a huge debate on the media reports on 11th August.

3. To announce the specific locations of the monitoring stations and contacts;
4. To request Hekou District Deputies to People's Congress to raise their voices against pollution.

Part of the requests have been fulfilled by the government agencies. Even if only one was fulfilled, people took it as a good sign showing that the government at least was responsive to people's concern (Personnel communication with local activist, Hekou District, 2015.01.24). In this case, empirical data provides support to the argument by Stern &O'Brien's (2011) that the government is not always the first mover, and advocates are not simply passive recipients and processors of information. During the trajectory of conflict, the "811 accident" served as a trigger that stimulated the communication interface between the government and the local population. When both parties were brought to the table for mutual dialogue, both of their voice or messages could be signalled to the other side. Once this communication interface was created, people should be careful and sense the mixed signal of the government, make use of the room for manoeuvre to maintain the dialogue.

After the "811 accident", the activists continued to create occasions of interacting with government agencies. During their negotiation with the officials, activists often referred to environmental laws or regulations, such as, *the Environmental Information Disclosure Clause*. Many of these were not even known to the officials (see also Zhu & Ho, 2008, p.157). Their action reflects the characteristic - "negotiated symbiosis" - of China's environmental activism, which means that social action between state and society is an interaction and ongoing negotiation (Ho & Edmonds, 2008, p. 218). Up and down the chain of command, people's responses to mixed signal provide clues about what the officials are thinking as well as about what the biggest risk the activists are willing to take (Stern & O'Brien, 2011).

Self-organise, networking and the strategy of incremental change

Through creating opportunities of interaction and communication, the approach taken by local activists seemed to make them safe and not involved in the "forbidden zones" – whereas actions are categorised not acceptable by the government. To expand the constantly shifting boundaries of the "forbidden zones", local activists continued to self-organise for strengthening their forces, increasing social support and local influence as well. To be specific, activists in Xianhe Town organised regular meetings to discuss the priority of their action and negotiation strategies. Those who had experiences of involving journalists also

endeavoured to expand the scope of their debate through the media. Regarding this, Fürst's (2008 cited in van Rooij, 2010) study shows that people's knowledge of environmental activism, for instance knowledge about how to find evidence for pollution, how to file a complaint and how to involve the media, is not just a product of wealth and formal education. This kind of environmental knowledge could be obtained through experiences, self-study, communication with other activists, environmental and legal experts willing to help (ibid.). In line with this argument, local activists in Xianhe Town collaborated with the provincial NGO – Green Land - to gain more advice, support and inspiration.

Established in 2012 in the capital city of Shandong Province, Green Land is active in promoting environmental education and participation.[109]In April 2015 Green Land co-organised a public campaign *"To conduct a body check for the mother river of Yellow River"* in Dongying with local activists and another volunteer group (Photograph 6.6 (1)). The purpose of the campaign was to increase people's awareness on water pollution and their knowledge about pollutants by teaching them how to use simple monitoring tools (Photograph 6.6 (2)). Moreover, Green Land's main approach was to explore and cultivate a formal[110] information channel among the local activists of Dongying (General Director of Green Land, Dongying, 2015.04.09). For water sampling, they suggest people to focus on the source of wastewater discharged by those industrial enterprises subject to intensive monitoring and control of Shandong Province.[111] The water quality data drawn from the sampling should be uploaded regularly to their own database, in order to enable the activists to compare these results with the official data generated in the "online environmental information disclosure platform" hosted by SDDEP.[112]

[109] Introduction of Green Land (http://www.greenqilu.org/Item/list.asp?id=21 last accessed 2016.02.27).

[110] Green Land assume that for ordinary people, their main information access to environmental issues is based on informal channel such as daily talks, discussion, rumours without much scientific evidence.

[111] Since 2014, SDDEP has constructed an online platform to disclose the pollution data self-monitored by those industrial enterprises subject to intensive monitoring and control of the province. The purpose of intensive monitoring and control is to strengthen the dynamic monitoring and management of key pollution source discharged by those enterprises. Accordingly, a water sampling point as well as a standardized sign with indicators should be set near the wastewater outfalls (SDDEP, 2015a) (see below).

[112] See below.

Photograph 6.6 Environmental campaign in Dongying organised by Green Land

(1): Participants of the campaign making a group photo by the Yellow River, (2): simple monitoring tools applied for testing the quality of water sample. Source: Photographs by author, 2015

For the local activists of Dongying, they were concerned that ordinary people were not very much interested in that kind of information due to their relatively low awareness of right-to-know (Personal communication with local activist, Hekou District, 2015.04.06). Importantly, utilising digital tools for accessing (or producing) environmental data is rare even among local environmental activists. The sustainability of this approach and people's long-term commitment could be questioned. Despite this, local activists assumed it is still a good learning opportunity and safe strategy to work with Green Land, before the foundation of their own environmental association in Dongying.

By 2015, the official permission for such a local environmental association was still pending. Interestingly, the author received a call from a top official of HKEPB requesting the contact of Green Land. The official wanted to learn more about the experiences and procedures of registering a local environmental association (Personal communication, 2015.04.28). This reaffirms the argument that local officials generally lack experience and knowledge of handling environmental activism. Although they are granted discretion to decide if the boundary of local environmental activism is crossed, it is still a *learning-by-doing* process. In this context, the local activists' strategy of incremental change seems to be effective to exert influence on the institutional climate to promote participation. The following interview conducted earlier with the same official from HKEPB provides some insight to this point:

"If this local environmental association is established, we could call on more people to join our environmental campaign, let them participate in our monitoring programs targeting the industrial enterprises. [And based on these actions] we could gain more support and understanding from the public. This association could also have effective supervision on our work. We could stand alongside to fight against the pollution" (Head of Legal Publicity office, HKEPB, 2015.04.03).

Through all the wariness the authorities displayed toward activists, the presented data shows there was actually room to manoeuvre in the no man's land between the uncontroversial and the forbidden (Stern & O'Brien, 2011). When the activists further probed for openings and encountered mixed messages from the officials, this process actually turned into a learning experience for them to better shape their frames, tactics and strategies (ibid.). During this process, bureaucratic techniques were crucial skills to maintain mutual dialogue with government agencies when communication interfacing was attempted.

The increasing employment of digital tools for environmental governance

Progress of environmental informational governance in Shandong Province

In Shandong Province, Green Land has been leading the work of promoting pollution information disclosure and public participation in environmental management. These approaches seem to be an effective way of bridging Green Land with SDDEP and policy-makers. In 2015, in response to the request of information disclosure proposed by Green Land, SDDEP released the name list of 686 industrial enterprises on their official public website. These industrial enterprises were requested to set a wastewater outfall sign in a specific location (see Figure 6.2), in accordance with *Shandong Province Wastewater Outfall Environmental Information Disclosure Specifications Clause*. According to Green Land (2015a), 686 (industrial enterprises) is not just a number, but a window of opportunity for public participation and supervision of environmental informational governance.

Supported by a national NGO called the Institute for Pubic and Environment (IPE)[113], Green Land (2014) has published the *2013-2014 Annual Pollution Information Transparency Index*

[113] Established in 2006 in Beijing, IPE is a public environmental research institute that develops and operates China's Pollution Map database, promotes environmental information disclosure and public participation,

Assessment of Shandong Province. IPE has together with Chinese and foreign partners been leading the non-state disclosure of environmental information through their construction of an updated online pollution database, as well as through the development of Pollution Information Transparency Index (Zhang *et al.*, 2016). The Pollution Information Transparency Index (PITI) evaluation targets both the self-disclosed and non-self-disclosed[114]environmental information of EPBs (see IPE & NRDC, 2014).The PITI evaluation consists of four key areas: environmental supervisory information, interaction and response, enterprise emissions data and environmental impact assessment (EIA) information (Figure 6.3). The higher score implies a better performance of environmental information disclosure of the EPB.

In 2014, IPE and Green Land visited the Education Centre of SDDEP, where they had an exchange of opinions about environmental information access and the future development of the "online environmental information disclosure platform" hosted by SDDEP. This platform (Figure6.4) includes information on the concentration and volume of pollutants discharged by enterprises subject to intensive monitoring and control of the province (SDDEP, 2015a). The main goal of constructing such a platform was to further involve new actors in environmental governance, such as enterprises, NGOs and the media (Zhang *et al.*, 2016).

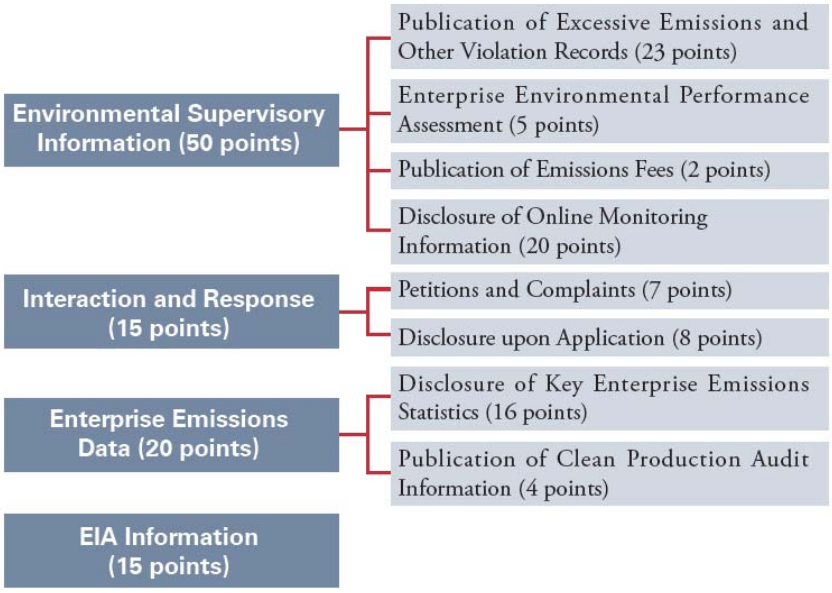
devoting to improve the mechanisms of China's environmental governance (http://www.ipe.org.cn/about/about.aspx, last accessed 2015.08.16).

[114] It refers to information made public upon requests from citizens in accordance with relevant regulations.

Figure 6.2 A standardized sign near the wastewater outfall of the enterprises

Source: Green Land, 2015a

Figure 6.3 PITI evaluation areas and scores



Source: IPE & NRDC, 2014

Figure 6.4 SDDEP "online environmental information disclosure platform"

Source: Screenshot by author

According to Nulman & Özkula (2016), more environmental NGOs are nowadays utilising digital technology, which has altered the flows of information between environmental NGOs, the general public and policy-makers. In this vein, Green Land strives to promote mutual dialogue with SDDEP through digital media according to the general director of Green Land (ACEF, 2015). In Shandong Province, the local government strongly promotes the initiatives of integrating digital technology into their governance system. During the past 10 years, the development of environmental information disclosure in Shandong has achieved great success. In the*2014-2015 Annual Pollution Information Transparency Index Assessemnt* targeting 120 cities in China, the experience of Shandong Province was highlighted due to its significant progress and great success (see IPE & NRDC, 2015). This significant progress is due to the strong promotion of information disclosure by the government institutions (IPE & NRDC, 2015). In particular, the Director of SDDEP has devoted to promote public participation in environmental governance. The following statement from the Director underlines this argument:

"Firstly, the government should be open-minded, encourage public supervision which is conducive to reflect the 'dark side' [of our work] and put them on the table. Secondly, the government should listen to public opinion and based on that have serious rectification.

Thirdly, the effects of our rectification are still open to and accept public's supervision" (quoted from SDDEP, 2015b).

This speech labelled as -"syllogism of public participation[115]" - was often cited in Chinese newspaper articles (see China Environment, 2015.01.01) to present Shandong's advanced and rapid development in environmental information disclosure, and their successful experience of promoting public participation in environmental governance.

The implementation practices of environmental informational governance

In China, more government departments and public sector agencies are using the web to publish and distribute official information, and to a lesser extent to facilitate the delivery of online services (see also Norris, 2001). However, to which extent the increasing use of electronic infrastructures in the domain of environmental governance could bridge the digital divide, is left to open discussion. As an example, the "online environmental information disclosure platform" hosted by SDDEP so far only targets those enterprises subject to intensive monitoring and control of province. Municipal and county-level enterprises are not covered by the platform. Hence, the challenges of implementing environmental enforcement towards medium and small size industrial enterprises remain. This is problematic because these medium and small size enterprises usually contribute major pollution source in rural China (see Chapter 1).

In the study on digital divide, Norris (2001, p.128-130) pointed out the deficiencies of electronic infrastructures applied in the government agencies. She claimed that the opportunities for "bottom-up" interactivity in communicating with official departments are fewer than the opportunities to read "top-down" information (ibid., p.130). In the environmental reform age, it remains a question whether the application of electronic infrastructures such as official public websites, different forums for "online official interviews" fosters access to crucial information on the decision-making process. More crucially, if those electronic infrastructures stimulate mutual dialogue between government officials and the local population; if they increase lay actors' knowledge about relevant environmental programs (Zittel, 2004, p.82).In China, information on local environmental programs and (or) pollution data released to the public is often fragmented, limited and

[115] "公众参与的三段论".

blurred. This results in growing distrust in both official information provision and environmental governance (He *et al.*, 2011). To strengthen this argument, empirical studies show that local people in Hekou District were not informed about relevant environmental risks and pollution data after the accidents of poison gas leakage, which made local people suspicious of virtually everything and increased political tension (Personnel communication with local activist, Hekou District, 2015.01.24). Mol *et al.* (2011) pointed out that the lack of enforcement and the ambiguity of some clauses in the policies give local environmental agencies great discretion to avoid information disclosure.

In 2008, China enacted the *Open Government Information Regulations and Environmental Information Disclosure Decree*. After this, the year of 2014 also saw an intensive enactment of policy documents to guide and advance the state's measures of information disclosure (Zhang *et al.*, 2016). To follow and comply with the state's idea of promoting informational governance on the environment, Dongying has increasingly applied digital technology in their government departments. This to some extent facilitates the local government's release of official information and delivery of online services. Among this large spectrum of digital technology utilised by Dongying government, "online official interview" has gradually become one prevalent form within the bureaucratic system. As demonstrated in Chapter 2, its style is however more like monologic communication[116], which doesn't allow *two-way* or *dialogic* communication. Regarding the performance of environmental information disclosure, Dongying is improving but still far from full and effective. In the Shandong Province PITI Evaluation Report 2013-2014 released by Green Land, Dongying ranked seventh among 17 evaluated cities (Table 6.2) (Green Land, 2014). In addition, the industrial enterprises of Dongying seemed reluctant to cooperate with the authorities on implementing the environmental information disclosure measures.[117] By all accounts, it pinpoints the deficiencies of the implementation practices of environmental informational governance in local society.

[116] See also Uzunoğlu E., 2014 (cited in Nulman & Özkula, 2016).

[117] At the time being, 224 industrial enterprises in Shandong were found to make public relevant self-monitoring pollution data upon requests from citizens. But in Dongying only 5 industrial enterprises were found to respond to public requests, ranking the last one among all the 17 evaluated cities (IPE & NRDC, 2015)

Table 6.2 Dongying PITI evaluation 2013-2014 (areas and weights)

Evaluation area	*Indicators*	*Score*
Environmental Supervisory Information (50 points)	Publication of Excessive Emissions and Other Violation Records (23 points)	4.6
	Enterprise Environmental Performance Assessment (5 points)	0
	Publication of Emissions Fees (2 points)	0.2
	Disclosure of Online Monitoring Information (20 points)	19
Interaction and Response (15 points)	Petitions and Complaints (7 points)	6.6
	Disclosure upon Application (8 points)	3.2
Enterprise Emissions Data(20 points)	Disclosure of Key Enterprise Emissions Statistics (16 points)	0
	Publication of Clean Production Audit Information (4 points)	1.2
EIA Information (15 points)		1
Total Score 35.8		
Rank	**7**	

Source: Green Land, 2014

In examining the practices of environmental information disclosure in Dongying, findings show that county/district governments have more comprehensive implementation measures than the township governments. As an example, the official public websites of the county-level government agencies have more user-friendly and practical functions. This is because the state has highlighted that county/district governments are key to implementing national policies and programs. By contract, functions of the township governments are weakened without strong authorities, indicating their main responsibility is to carry out the decisions initiated by county/district governments (Deputy Director, Dongying E-governance Information Service Centre, 2015.04.10). Apart from this, there is no full-time township cadre organising the work on information disclosure. The low digital competencies of cadres, limited funding and human resources hinder the implementation of informational governance in township governments. One government official mentioned:

"The county [or level below] cadres do not have high capacities of accepting new things or high awareness of changing their routines. It is difficult to let them realize and respect the

value of grassroots work. This awareness is deep-rooted. It is slow to change. It is difficult to change. […] It is now the information age, […] the highly-placed officials have relatively stronger adaptability as they have more ideas and are willing to share opinions with different people" (Deputy Director, Dongying E-Governance Information Service Centre, 2015.04.10).

Drawn on the empirical data, it is revealed that local cadres' codes of conduct -concealing what is unpleasant and producing optimistic report - increase public distrust to the government-generated information. More often than not, local cadres release information about official meetings, speeches, action programs which are not relevant enough to attract public interest. Those of high relevance for the local population, such as policy documents on demolition, land acquisition compensation are not released on the official public websites, because those kinds of information are classified "sensitive" (Interview, Dongying, 2015.04.01). Moreover, local cadres are concerned that people would compare the amounts of money they received from compensation programs, if people had access to the information (Interview, Dongying, 2015.04.01). If people think the distribution of compensation was not fair they would make a petition to the government, which is perceived troublesome by government officials. In line to this, the longstanding reticence, secrecy and monopoly of information in China's political system (Mol *et al.*, 2011) are roots of the problem and support the tendency of local cadres to keep everything secret.

Findings also suggest that the public demand of environmental information disclosure is not high, due to people's low awareness of right-to-know and limited environmental knowledge. In particular, local people don't approach the officials directly, but rather count on guanxi[118] if they want to access information about official programs. However, people's reticence is understood by local cadres as "everything is fine", as shown by the following quotation of interview with one cadre from Guangrao County:

[JT] How many applications of information disclosure do you have in 2014? – "We have eleven cases of information disclosure all through online application. This is only a small county and we didn't receive many applications. People are concerned about earning money and not very interested in policies. Apart from this, the low demand shows the construction of electronic infrastructures is good and full. So people know the news and they don't need to

[118] "关系" – Personal network.

apply for official information from us" (Deputy Director, E-Governance Information Service Centre of GRG, 2015.01.23).

To have a nuanced analysis of the implementation practices of informational governance in the grassroots, the author contacted one applicant[119]who applied environmental information from GREPB. In order to conduct his environmental research, the applicant applied for the air, water, soil monitoring data and location of Guangrao's environmental monitoring stations. The applicant elaborated his experience:

"[…] government agencies would share part of their data to you. But the quality and reliability of this data is open for discussion." – [JT] What do you mean by 'part'? – "The data I received was already published on their government webpage. Others is difficult to obtain. You probably have to use guanxi if you want more reliable data. If I use the official data to run my model, the result is different from my experience. I was born here and my experience tells me that the air quality is not so good, especially environmental pollution. […] But the model tells the environment is good or only slightly polluted. If researchers have to rely on this data, it is not very trusted" (Phone interview, 2015.03.19).

Based on the narratives of this applicant, sharing 'qualified' data and ensuring transparency of environmental data management are challenges for accountable informational governance. The author's own experience of applying water pollution data from DYOFB supports this argument.[120] The two attempts (by the author and the other applicant) demonstrate that building good contact with local stakeholders is key to accessing 'qualified' official data.

Probing into the implementation practices of information disclosure in Dongying, findings show that the targeted functions of information disclosure - increasing public (online) service and participation through the usage of digital technology (GRG, 2014b)- are not yet fulfilled. Coping with the official assessment is perceived more crucial by cadres, rather than

[119] The contact was obtained from the official of the Guangrao County E-Governance Information Service Centre, when the author requested the detailed information about eleven cases of information disclosure application in 2014.

[120] To get access to the pollution data, the author was requested to present an introduction letter (issued by one local research institute). And the local research partner (of DELIGHT project) was encouraged to involve in order to build contact with DYOFB. Based on this, the involved stakeholders could organise a meeting together to discuss the author's research in Dongying and data needs.

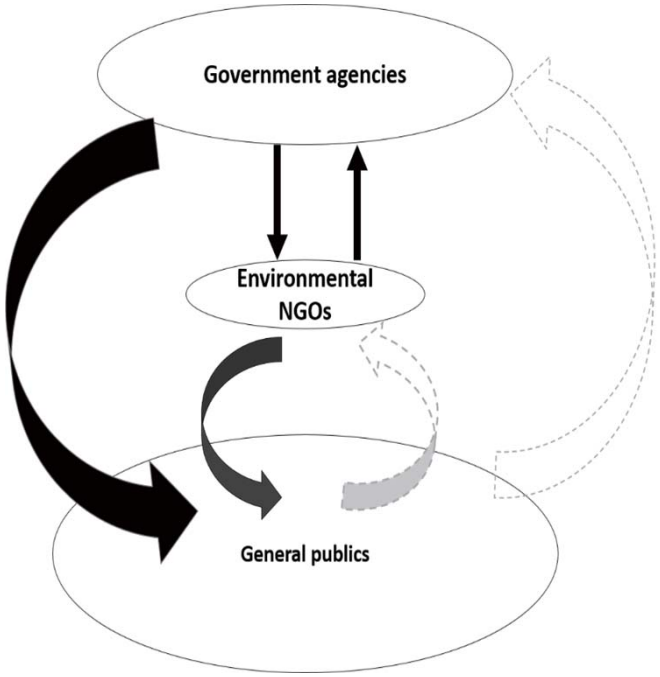
disseminating practical information that is of relevance for people. Apart from this, the challenge of building a full three-dimensional communication channels for the public, as addressed by the local government remains. For those placed at the bottom level of the information hierarchy, digital tools are rarely applied for accessing environmental information (Chapter 7). People do not put much trust in online information, which is perceived invisible and intangible (Group interview, E-Governance Information Service Centre of HKG, 2015.04.01). More often than not, people tend to rely on personal networks to obtain official information. In addition, informational governance is a brand-new concept and it might take time for the population to accept and apply (ibid.). At the time being they are still more concerned about their individual interests, i.e., wages and agricultural subsidies policies.

Recently, Green Land conducted a survey on environmental participation in Shandong Province. According to the results of the survey, more than 40% of informants provided responses on reasons of low environmental participation with "don't know how to report (industrial pollution)" (40.6%) or "no time and energy to report" (42.4%). Green Land (2015b) noted that the general public adopt 'ending-participation' [121]and act rather as a passive recipient in the domain of environmental informational governance. In order to promote digitals tools for public participation, government agencies and (or) environmental NGOs confront the challenges of integrating the general public into their environmental programs. In light of Sima's (2011) study on environmental activism and the internet in China, internet technology effectively empowered resource-poor activists in Hekou District in their self-representation, information brokering, network building and public mobilization. There is, however, not enough attention paid on those internet-resource-poor general publics who have low digital need. To advance this argument, Figure 6.5 presents the problematique of the asymmetry of information flows between government agencies, environmental NGOs and general publics. On the one hand, while a top-down flow of official information is successfully mediated, there is no upflow from local society bridging people's feedback to the bureaucratic system (Chapter 5). On the other hand, while the approach of environmental information disclosure taken by environmental NGOs has bridged them with policy-makers,

[121] According to Green Land (2015b), it denotes that people participate in environmental protection after the procedures of environmental policy-making and (or) relevant planning on local development.

environmental NGOs haven't took up the issues of integrating the general public's need or interest.

Figure 6.5 Information flows between government agencies, environmental NGOs and general publics



*Note - The black arrows imply that the top-down flow of information mediated by government agencies and environmental NGOs; the white arrows imply that feedback channels for articulating people's demand are lacking or insufficient. Source: Drawn by author

Conclusion

In this chapter, the study has illustrated in Hekou District how local people's concern about the health impacts of industrial water pollution translated into a grievance. Moreover, the multiple course of action the activists undertook in seeking a remedy for such grievance, as well as the constraints and outcomes of their communication interface with the authorities were discussed. Compared to Hekou District, people living in Guangrao County have less experience or feeling of dramatic environmental change, as their industrialization has undergone for more than 20 years. The change is hence *incremental* rather than *dramatic*. The Chinese saying "killing the frogs in warm water"[122] is often used to describe people's reluctance or inactive response to local industrialization in Guangrao. For that reason, this

[122] "温水煮青蛙"

study mainly focuses on the environmental activism initiated in Hekou District. Results show that the activists' employment of the strategy of *incremental change* to expand the scope of their negotiation, sheds light on the embeddedness of China's activism-limiting while enabling (Ho & Edmonds, 2008, p.220). Based on the strategy of incremental change, environmental activists in Hekou gradually open mutual dialogue with relevant authorities, creating a picture of *non-virtual communication interface* in this scenario.

During the process of negotiation, the mixed signals of the local authorities elucidated their wariness displayed toward the activists. Three main variables are highlighted here which have significant influence on the micropolitics of choices as well as on officials' strategies of making room for manoeuvre. In primary, local government's priority in their overall arrangement[123]and resources available for decision-making affect their commitment into pollution abatement. Secondly, local cadres' awareness and experience of environmental activism affect the bargain power exerted by the environmental activists. In this regard, findings show that it is a process of learning-by-doing for government officials to handle local environmental activism. In Hekou District, government agencies do not have much experience of interacting with local environmental activists as presented data indicates. When disputes arose and a group of people tried to address their demand, government officials perceived them as "trouble-makers" and deployed the technocratic interventions to keep the situation under control. Relative to this, findings reveal that the rule of technology for government officials is to take *preventive* measures for avoiding omission and remaining safe in their comfort zones. Last but not least, a bottom-up initiative with strong social support proves to be significant to affect the institutional climate. Whereas government officials strive to keep situation under control, the environmental activists' social influence and their sense of solidarity affect if their bargain power would be taken into account by local authorities.

Among the variables highlighted above, which holds true is accorded with the specific circumstance. The different circumstance, variables and outcomes shape the "mixed signals" of the authorities. Due to these mixed signals, local environmental activists have to sense the blurred and constantly shifting boundaries of governmental tolerance. Moreover, activists'

[123] If the local government has more interest in the job opportunities and local revues provided by the enterprises, it is hard people's concern could be fed back to the officials.

bureaucratic techniques are key to initiating communicate interface with the government agencies. When the interface was attempted, local environmental activists need to figure out the preference of the government officials, as well as to home in on their signals and receptions to maintain the mutual dialogue (Stern & O'Brien, 2011). In these processes, it is found that incremental change - "as a transient phase which is itself changing through time, is a transitional feature of a burgeoning civil society in a semi authoritarian context" (Ho & Edmonds, 2008, p.222) was a useful strategy for environmental activists to uphold the principle of *non-virtual* communication interface with government agencies.

Beyond local environmental activism in Dongying, the study also explored the environmental initiatives of Green Land. Through promoting environmental information disclosure and the usage of digital tools, Green Land managed to open up mutual communication with the top official of SDDEP. However, the approach of information disclosure seems not accountable enough to increase people's access to environmental information. In relation to the debate about environmental informational governance, its implementation still stuck in the mud in Dongying. The deficiencies of the implementation are found to be relevant to the low digital competencies of cadres and low digital needs of the local population in general. For Green Land - the only legally established environmental association involved in Dongying, they focus more on giving the public advice for processing the official information, rather than the flows of information among the local environmental activists, general publics and government agencies. As such, the "give-and-take" approach taken by Green Land leaves the information asymmetry and alack of feedback channel in grassroots society largely untouched. These issues are, however, the most challenging tasks ahead for environmental informational governance. As has been demonstrated by Nulman & Özkula (2016), while government agencies have promoted the use of digital technology within existing governance structures, critical variables in determining its future role in environmental governance may be largely dependent on the expansion of this digital sphere to the *general public*.

CHAPTER 7 LIFE-WORLD REVISITED: LINKING INFORMATION ACCESS, PERCEPTION AND ADAPTATION

The study has so far presented two scenarios of communication interface – a *virtual* one at the community level and a *non-virtual* one upheld through environmental activism. However, the issue of asymmetry of access to information -embedded in the conventional environmental governance - remains unsolved. Moreover, the digital need of the general public is not taken enough account in the debate of grassroots environmental activism. Following this line of thought, this chapter explores the function of the digital sphere in local society. In other words, what is people's main access to water-related information? How to address people's information needs linking their own preference and interest? These issues underline a causality mechanism in relation to human agency (i.e. information access, capability) that affects the development and outcome of communication interfaces. The exploration of this causality mechanism is one of the main focuses in this chapter.

Following up on Chapter 6, this chapter proceeds to investigate the dominant access to information in local communities. To explore the prism of communication highlighted in this study, the discussion then turns to an illustrative examination of the village committee election occurring in Sanshui. Informed by Foucault's thesis on truth and power, the study focuses on how power individualises and is internalised to people's modes of thinking and everyday act - "constituting individuals as correlative elements of power and knowledge" (Foucault, 1995, p. 194; 2000, p. 125). Situating communication interface within the wider power structure, the investigation thus focuses on how the individualised micro power affects the flows of information in-between people, shaping people's framing of the reality and their perception on the pollution 'truth'. Following this, the second part sketches people's information needs and demands in relation to their livelihood concerns. Finally, the analysis shifts to people's reflexive strategies of living with industrial water pollution. Through this journey of life-world revisited, the discussion concentrates on the underlying causality mechanism in relation to human agency –access to information, perception, coping - and explores its role in the project of transforming social discontinuities. The chapter largely draws on a survey conducted with different social groups in the Dongying port and in-depth household interviews with Sanshui villagers.

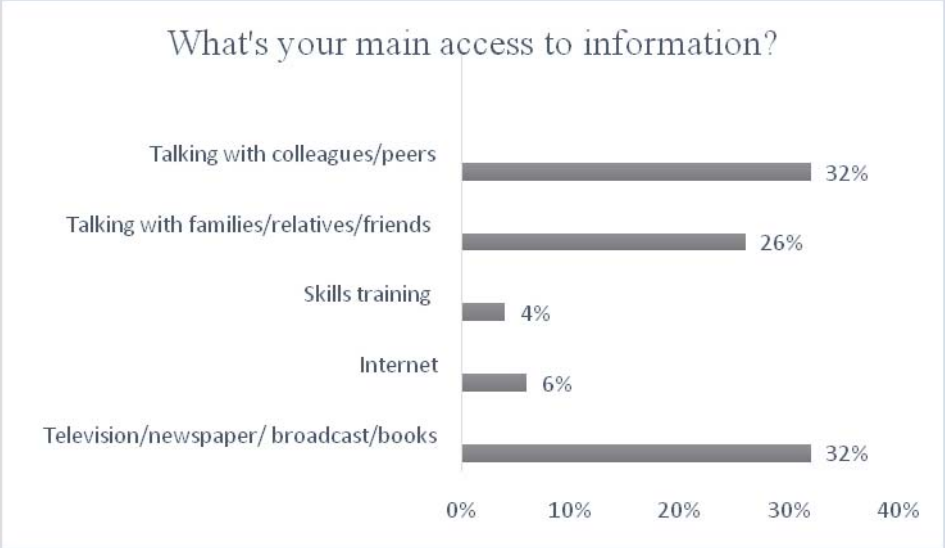
Unravelling the rootedness of information asymmetry

In their study on China's green public sphere, Yang & Calhoun (2007) highlighted the role of communicative space - emerging through actors' creative use of mass media, alternative media and internet – in public participation. Following this thought, the line of inquiry in this section concentrates on people's access to information and communication channels, explores how the communicative space is constructed in local society, in order to provide a nuanced examination of the communication prism highlighted in this study.

Access to information

The result of the survey in the Dongying port revealed that mass media (television, newspaper, broadcast, books) and talking with colleagues/peers are two dominant ways of accessing information. 32 % of informants provided responses with these two formats of access to information respectively (Figure 7.1).

Figure 7.1 Distribution of responses on access to information

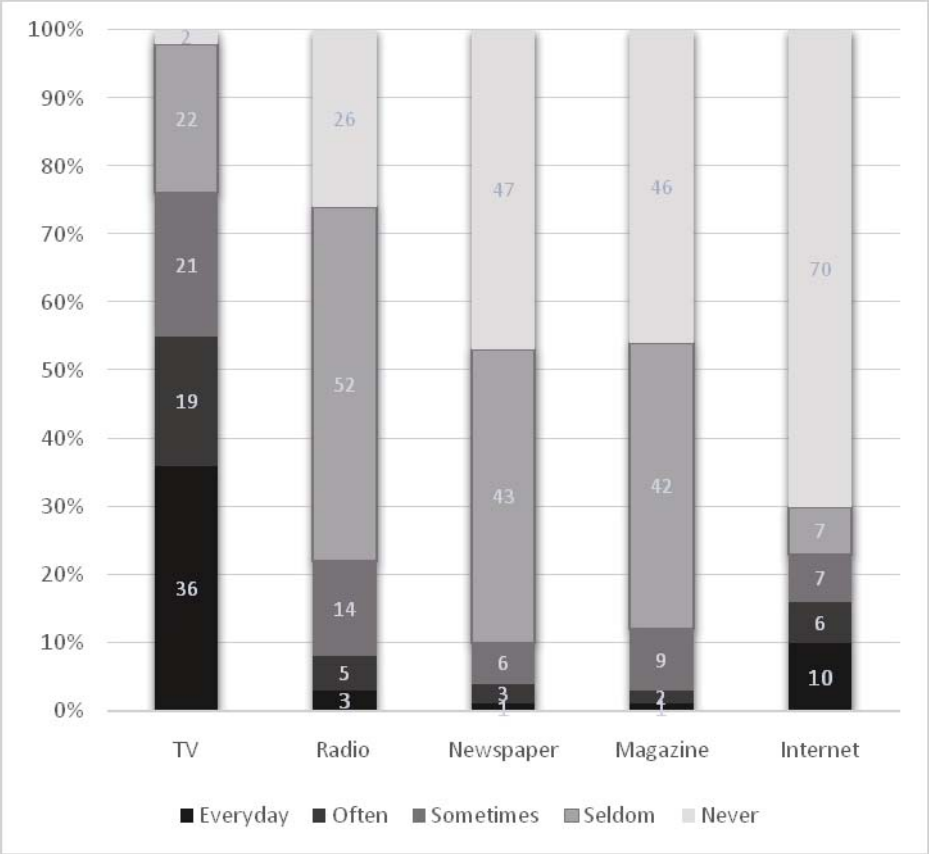


Note: Multiple-answer question. Data from survey conducted in the Dongying port, 2014 (n=110)

Moreover, 26% informants cited talking with families/relatives/friends as their main access to information. Among different formats of mass media (TV, newspaper, radio and books), the prevalent usage of TV can be illustrated by Figure 7.2. To be specific, 36% of informants used TV everyday to access information. In comparison, the usage of other formats of mass media is much lower - radio (3%), newspaper (1%) and magazine (1%). Another interesting

finding (Figure7.2) highlights that the usage of internet in the Dongying port is very low. About 70% of informants responded that they never had access to internet.

Figure 7.2 Frequency of access to information



Data from survey conducted in the Dongying port, 2014 (n=110)

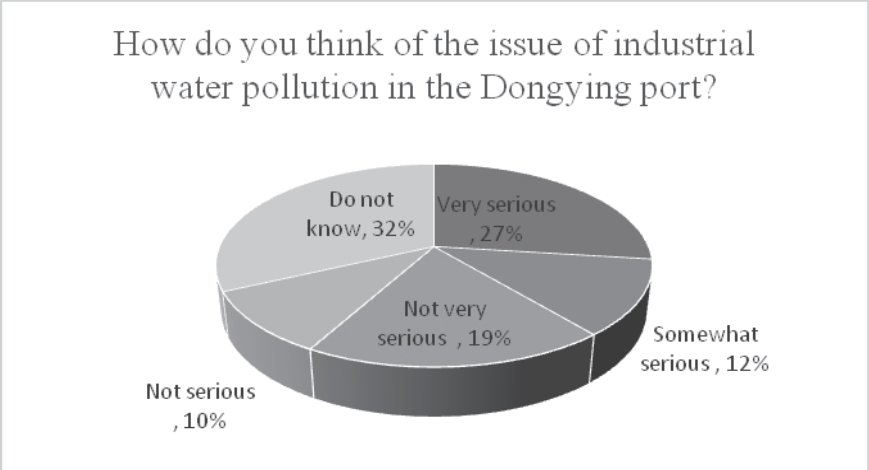
In addition, quantitative data analysis (crosstab) shows that the response distributions on frequency of internet use differed significantly between young and elder workers[124](Table7.1). More than 24% of young workers used the internet everyday, much higher than the elder workers (4.94%). In addition, more than 81% elder workers cited they have *never* got access to internet, as compared to 37.93% of the young workers.

Table 7.1Cross-tabulation of age and frequency of internet use (%)

	Everyday	*Often*	*Sometimes*	*Seldom*	*Never*	*Total*

[124] For this survey conducted in the Dongying port, informants' mean age was 47. This can be explained that in the Dongying port, most workers have worked in other fields for a long time. Most of them were already in middle age when they shifted their job in the industries of aquaculture, salt chemicals, salt farming. For those under the age of 41, they are labelled as "young workers" for the research purpose.

Figure 7.10 Distribution of answers regarding the perceived water pollution severity



Data from survey conducted in the Dongying port, 2014 (n=110)

In addition, it is commonplace that informants tried to throw the ball to other people, when asked to rate on the severity of water pollution. In this context, what could explain informants' reluctance and their sense of ambiguity on the pollution issue? According to Tilt (2006), in China governmental respect for individual rights and view is poor, and people have little legal resources to raise concerns about pollution problems. In the long run, this low awareness could deny people a voice. One local fisherman reflected on this:

"I haven't seen you [the author] for a long while. I was worried and thought you might be in trouble with government officials. These weeks many government agencies from HKG came here to visit. From the manager of Haixing, I got to know that they came to check the construction programs. At the beginning I thought it was because you were doing research here, and it triggered dissatisfaction of the local government." – [JT] "Did you manage to talk with the officials and express your concern about industrial pollution?" – "Who dares to say that? People need to survive and continue their work. People need government's permission and official certificate to go fishing! […] Officials only came here and walked around, checking this and that, no time for us" (Fisherman, Dongying port, 2014.08.01).

In his view, people are little motivated to rise up and take control over their own situation. This sentiment is shared among people, reinforced through people's communicative ties and daily conversation. Finding also unravels that this subject formation –feeling powerless and not motivated - affects how people's common identity is defined or elaborated. Taken the "communication room" of the Dongying port as an example, it was observed that many

usage. It was observed that some workers from Haixing field stations have a computer in their dorm, which is usually shared by many people. Workers commented that they access internet mainly for the purposes of watching movies or playing computer games. Apart from computers, other informants were observed to access internet with cell phones in order to receive information on weather forecast. This is because these informants need to go fishing in the Bohai sea. In short, internet use is limited in the Dongying port, especially for workers who have to devote much time and effort to manage their livelihood.

In examining the expansion of the digital sphere in wider society of Dongying, the following interview conducted with one official provides some insight:

"Nowadays many families in the villages could have access to internet. But internet is mostly accessed by young people. Internet is getting more prevalent [in the villages]. But now this platform is basically used for the purpose of entertainment and commerce. Most [young] people use internet for watching movies, chatting or playing games. For the elders, it is difficult for them to learn" (Group interview, E-Governance Information Centre of HKG, 2015.04.01).

In her view, while the digital sphere expands fast among young people, digital tools haven't functioned properly for them to access (useful) information. Due to their demanding jobs and much focus on daily livelihood issues, digital tools are applied mainly for the purpose of amusement and relaxation.

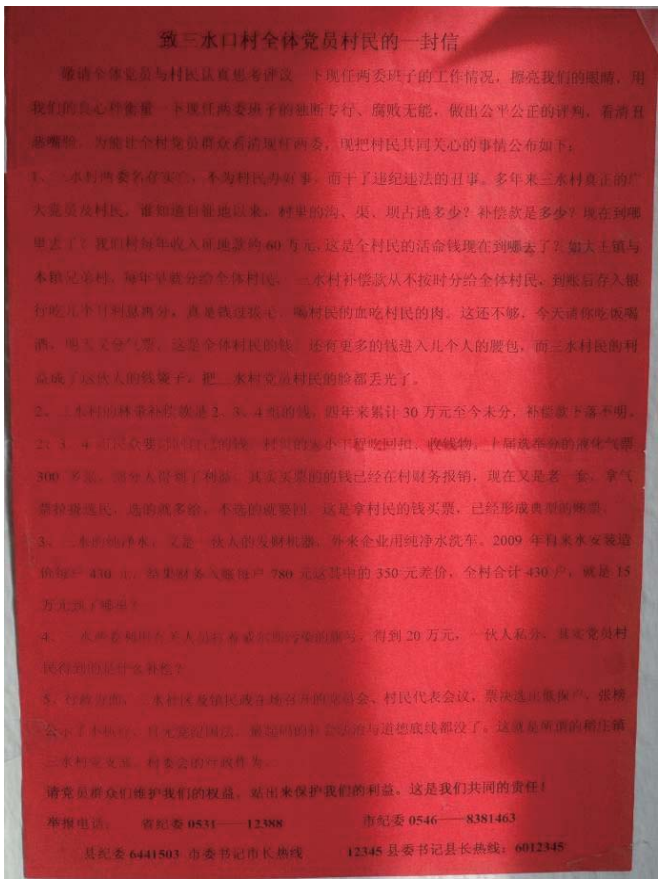
Communication patterns and perceptions

According to the survey on public participation conducted by Green Land (2015b), more than 67% of the informants responded that television and broadcasting are their main accesses to environmental information. This result reaffirms the argument that mass media is the main information channel for the general public in the Dongying port (Figure 7.1). Moreover, young people were revealed to use more diversified channels for accessing environmental information, while the elders were reliant more on traditional channels of community outreach for example (Green Land, 2015b). A related finding drawn from the survey in the Dongying port shows that *communication* contributes to a large part of information source for the informants. 26% of informants mentioned that talking with families/relatives/friends was major access to information, as compared to 32% of talking with colleagues/peers (Figure 7.1). To explore the correlation between people's communication patterns, flows of

information and their perception on water pollution, the following section presents one illustrative example of village committee election occurring in Sanshui Village.

During the field research in Sanshui in December 2014, the village committee election was held. In China, the village committee election usually happens once in three years. Due to villagers' discontent about the delayed transfer of their compensation money for land relocation, scandals and political gossip about corruption disseminated during the whole period of election. The scandals were documented on the *Open Letter to Sanshui Villagers* (Photograph 7.2 and Box 7.1), which was reportedly written by one local villager who had entanglement with the party secretary.

Photograph 7.2 An open letter to Sanshui villagers



Source: Photograph by author, 2014

Box 7.1 An Open Letter to Sanshui Villagers

Before the party election occurred on 23rd December, 2014, an anonymous "Open Letter to Sanshui Villagers" (Photograph 7.2) was disseminated secretly to the households. The predominant critique of practices goes to the behaviour of village cadres who were blamed to be arbitrary, imperious and immoral. In particular, people complained bitterly about the Village Committee's disordered management of the public property and money, and people were not informed any details about the finances.

The specific object of blame focuses on corruption of the Village Committee. One critique refers to the protest against *Dragon* enterprise (see Chapter 4):
"We organised a protest against *Dragon* and received 200,000 RMB as compensation. But where is this compensation money [and how was it spent]? Who went to the front [to protest] and who sat behind? Do you [village leader] dare to disclose the list of our public financial account? Your behaviour is one sort of corruption and misdoing."

Apart from the compensation money gained from the protest, another location for contestation goes to the issue of land expropriation. For example, people complained that the Village Committee got benefits from renting out those collective gullies. However, people had never been consulted on the distribution and use of the money. In addition, public meetings such as Villagers Congress haven't been arranged since 2008. In that sense, people assumed they were excluded from the discussion on the development of their village.

To arouse the sense of solidarity, one 'powerful' slogan was written at the end of the letter for triggering people's sentiment:
"Dear Sanshui villagers, we can not be cheated by the Village Committee any more. We should address our rights and kick out the embezzler!"

Source: Box by author based on the open letter collected during the field research in Sanshui Village in December, 2014

Overall, the open letter shows that the election had become a locus for triggering people's blame against the Village Committee. Insights gained from the household interviews helped to provide a framework for interpreting the trajectory of blame and people's sentiment of

discontent. During the interviews, the topics of corruption and blame against their Village Committee were often mentioned by Sanshui villagers. Moreover, gossips about village cadres went on before the election. People, however, would only discuss the election and behaviour of village cadres with their close friends, as one villager put it:

"We also discuss these things [corruption, scandals about village cadres] outside our family. But we don't talk with everyone on this. We only talk with those standing in our side. We have lived here for more than 20 years and basically we know each other well. This means I know if the other one stands 'under the same roof of mine'[125] […] Sometimes you can't even discuss much in detail, in case [you can't distinguish his position then] the other person betrays you. It is different from home, where you can discuss everything [with your families]" (Household interview No. 6, Sanshui Village, 2014.12.08).

In his opinion, long-term residents living in the village for many generations have developed an extended kinship and community network. Based on this networking, people could easily distinguish *insiders* and *outsiders*. Although villagers were keen to discuss the election and behaviour of village cadres, they also expressed the sentiment of incapableness of and indifference to the election outcome. Villagers assumed that the candidates of the election only gave *empty talks* to fool people, while nothing promising could be guaranteed after the election. Accordingly, the election was perceived pointless. People assumed whoever elected would not represent their common interest. Discursively, Sanshui villagers were not passionate about the election outcome. This non-excitement was however slightly different to their active reaction captured on the scene of the election (Box 7.2).

[125]"同一条船"

Box 7.2 Village committee election in Sanshui

On the official date of election, the author was invited to have a look into the event and kindly suggested by some villagers not to talk with random villagers – who the author might not be familiar with. Interestingly, some interviewees, who the author knew before, pretended they did not know me and avoided to talk with me in such occasion. It is not surprising given the sensitive atmosphere during the election. In particular, those present in this occasion were cautious about their images. Talks with *random* people – who were not identified as insiders - could be of real concern. In such occasion, Village Committee becomes a site for discussion and circulation of critical comments about local leaders and their behaviour. The politics of local gossip and talk could have a real effect (Woodman, 2011, p.79).

During the day, people run around frequently between their home, neighbours' houses, Village Committee or other open space. A large group of people gathered outside the office of the Village Committee. Those working in the courtyard - where the committee office was situated - were mostly village cadres. They were helping to organise the election, for example, maintaining public order, coordinating people to vote and counting votes. Two letter boxes (for votes) were put in the middle of the courtyard (see Photograph 7.3). Villagers went inside the courtyard to vote. Then they had to leave soon after putting their vote inside the letter box. The fence of the courtyard seemed to be a sign of separation, between the village cadres and ordinary villagers.

Most of the time, people were just standing quietly. When a villager showed up and went to the courtyard to vote, people began to *talk* with each other. Those who knew this villager would walk to him. Then they greeted with each other and began to *talk*. The majority of villagers present were middle-aged or elder men, who were the most talkative. Villagers were standing in groups. Some were silent, while some were having gossip with others in the group. Those who stood in the same group were relatives or colleagues knowing each other for long time and were of similar age.

In the afternoon the mayor of Daozhuang Town showed up and the atmosphere of the whole village reached the peak. Then the counting of votes started. Inside the courtyard, village cadres wrote the numbers of aggregate votes of each candidate on the wall. Villagers were all moving to the fence and standing side by side (see Photograph 7.3). More and more people came out from their houses waiting for the announcement of the election outcome.

Photograph 7.3 Communication patterns captured during the election

Source: Box by author based on observation during the election. Photographs by author, 2014

Insights gained from observation emphasize the primacy of traditional face-to-face oral talks for people's producing their knowing and understanding. This way of communication creates a rich source of information on things happening around. This sort of information is disseminated fast among villagers over their daily talks and (or) gossip. Furthermore, information as signal is ignited and functions as medium helping people to distinguish *insiders* and *outsiders*, which affects communication pattern and mode of thinking in rural communities. Taken the election as an example, different candidates had their own supporters, and one group of supporters drew a clear borderline between them and the other groups. Villagers would only communicate with those standing in the *same* group. In such "discursive space", room is created for communal life (Foucault, 1987, p. 252). Through

intra-communication and engaging in political gossip and talk, people continually produce and re-produce their own perception on the issues they communicate.

The image of discursive space generated during the election, elucidates that this space is also a location for power networks. To specify this, the election became "a struggle between elite factions, rather than a means of ensuring collective decision-making" (Yao, 2009and Hu, 2008 cited in Woodman, 2011, p. 54); as well as a location for power bargaining among the local elites. Those keeping good networking with higher-level officials reportedly could get more support from township cadres to win the election. They could also have better opportunities and resources to pursue their individual economic interests, in the name of state priorities and (or) government initiatives. In relation to the mass protest initiated by Sanshui villagers, the owner of *Dragon* enterprise is reportedly son-in-law of one member of Sanshui Village Committee. This information was very often mentioned by local inhabitants during the household interviews. It reflects people's assumption that village cadres are standing together with local industrial enterprises. When trying to understand water pollution and to *make sense* of the issue, *truth* is produced in a sense that people deem village/township cadres or higher-level officials have intricate interest with local industrial enterprises, on the one hand. The enterprises are protected due to the official rhetoric of booming industrialization and promoting economic growth, on the other hand. These accounts underline Foucault's (2000, p. 123, my emphasis) arguement that *power* invests the individual body, kinship, community; and further affects people's *making* of their own understanding and knowing of the world. The communication patterns captured in the election also shed a clearer light on the correlations between power relations and people's development of cognitive skills to approach the pollution *truth*.

In addition, finding unravels that the power relations and competing interest among the elite factions, made people feel difficult to judge who potentially would be a good or bad leader. Feeling confused to distinguish the borderline between *insider* and *outsider*, people would draw boundaries to the village cadres – assuming all candidates are the same and the election outcome is pointless to change their livelihood. Meanwhile, they take recourse to making communication blockages in mind to prohibit the *inflow* of official information. This echoes the previous finding drawn on the China Water Week (Chapter 5) - local people acted as spectators feeling inactive and distanced to the official rhetoric of saving water resources and

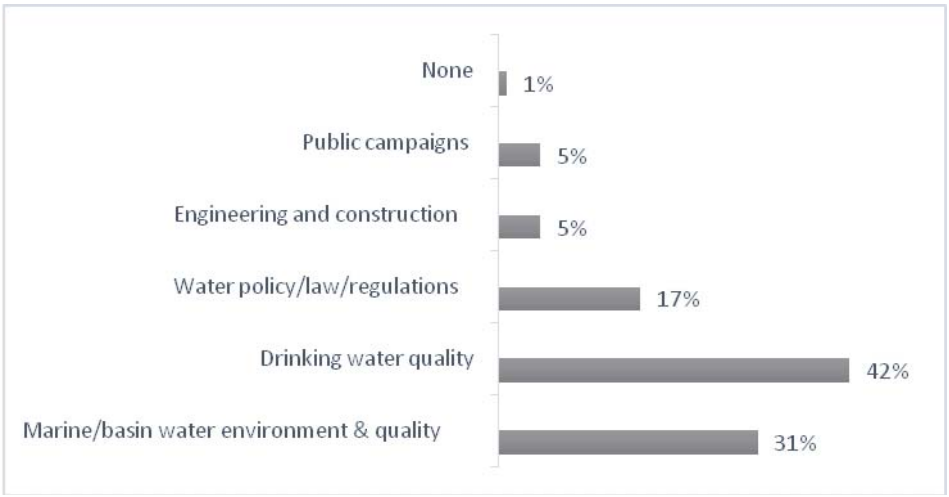
behaviour change. As a consequence, those barriers to communication emerge and people gradually develop the sentiment of distrust and (or) discontent.

Linking information needs and individual lived experiences

Information demands in relation to water-relevant issues

Following up on the discussion of implementation practices of information disclosure on drinking water quality (see Chapter 5), this section moves toward an analysis of the local population and investigates how they perceive the issue, based on quantitative data collected in the Dongying port. Results indicate that a majority of informants (42%) were keenly aware of and concerned about drinking water quality (Figure 7.3). Moreover, 31% of informants expressed their interests in marine/basin water environment and quality, as compared to 17 % of water policy/law/regulations. Additionally, people's concern about public campaigns on water issues is low, with only 5% of informants cited this theme.

Figure 7.3 Distribution of answers given informants' concern on water-relevant information

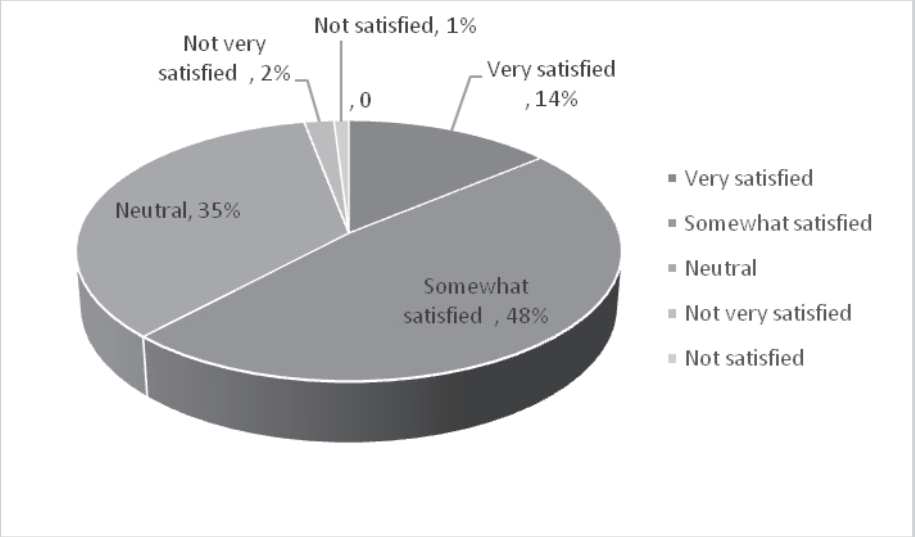


Note: Multiple-answer question. Data from survey conducted in the Dongying port, 2014 (n=110)

A related finding (Figure 7.4) shows informants' satisfaction ratings on local drinking water quality. 48 % of informants said they were somewhat satisfied with the drinking water quality. It is found that informant narratives on their satisfaction rating were of two kinds. Some were not concerned about drinking water contamination in the Dongying port, as reservoir water supply from the Yellow River was perceived less risky and not polluted by nearby industrial enterprises. By contrast, some informants commented that water from the Yellow River was

highly polluted by the upstream industrial factories[126]and its quality is bad. Notwithstanding informants' narratives were hardly uniform, media exposure of groundwater contamination in Shandong Province triggered a big debate in local society.[127]

Figure 7.4 Rating of satisfaction on drinking water quality in the Dongying port



Data from survey conducted in the Dongying port, 2014 (n=110)

According to the Deputy Director of Environmental Science and Engineering from Shandong University:

"Media exposure of China's groundwater contamination is contradictory [to the official data]. As revealed by several research institutes, about 80 percent of China's groundwater can be drunk directly or after some simple treatment. However, China has so far not yet organised a comprehensive survey on groundwater quality. In view of high public concern about drinking water quality, relevant government agencies should soon verify the data source of groundwater quality and give public authoritative interpretation" (quoted from People's Daily, 2013.03.01, translated by author).

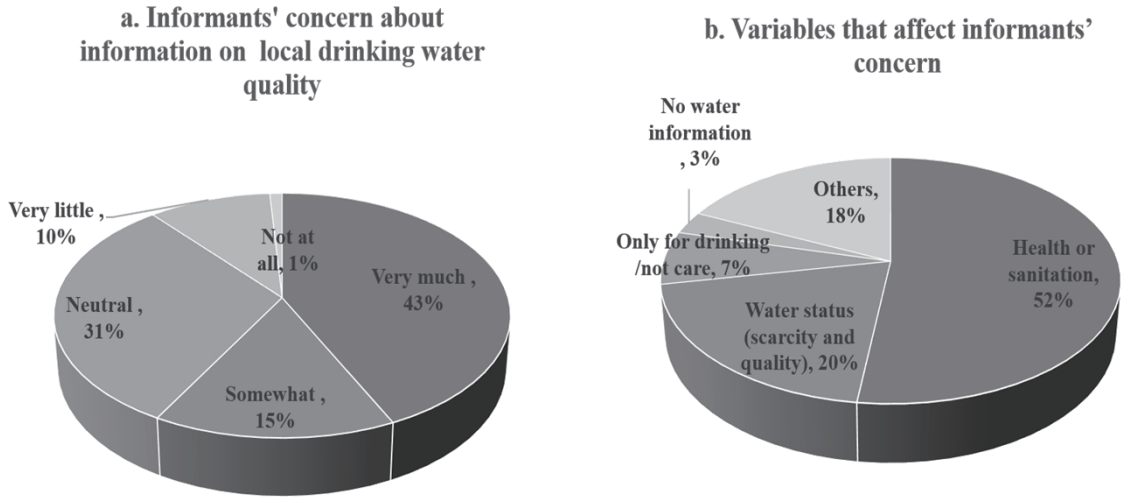
Regarding public concern about drinking water quality, result (Figure 7.5 (a)) shows that 43% of informants in the Dongying port cited they were very much concerned about information on drinking water quality. To justify their answers, more than half of informants

[126] Dongying is located in downstream - the mouth of Yellow River.

[127] In Chapter 5, the author discussed the media exposure of over-extraction and contamination of groundwater resources in Shandong, which triggered a heated debate about safe drinking water supply.

(52%) mentioned the reasons of health or sanitation, as compared to 20% of water status[128] and 7% of only for drinking/not care[129] (Figure 7.5 (b)).

Figure 7.5 Distribution of given answers regarding informants' concern about drinking water quality and variables of concern



Data from survey conducted in the Dongying port, 2014 (n=110)

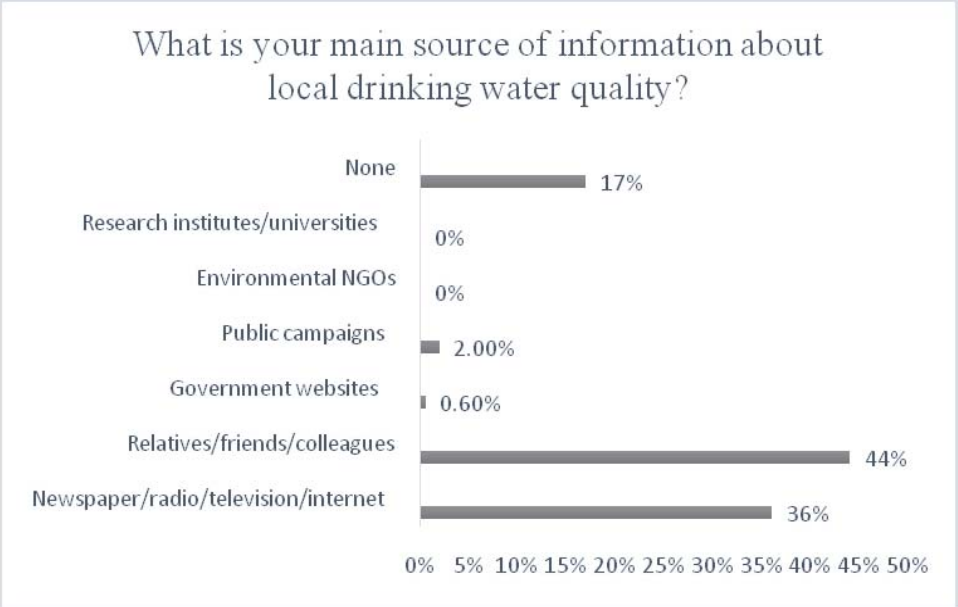
With respect to the issue of information source, finding is consistent with the statement expressed by the Deputy Director of Shandong University. To be specific, less than 3 percentage of informants responded that they ever got access to official information (derived from official public websites, public campaign) on drinking water quality (Figure7.6). A perhaps more striking finding is that *no* informant in the study area has got access to information provided by environmental NGOs or research institutes/universities. This again, could be partly explained by the remoteness of the Dongying port. In other words, workers in the Dongying port were more difficult to reach by environmental NGOs or research institutes. Not surprisingly, inhabitants of the Dongying port were not identified as main targets of information outreach programs. Apart from this, a fundamental issue is that it is commonplace that people's right to information access is not respected; and agency of

[128] For example, people mentioned about colour, smell, scarcity of water resources, which are categorised as "water status".

[129] Some informants expressed that as long as the water is drinkable, they are not concerned about its quality.

information provision is either lacking or not involved much in rural areas (Chen, 2013, p. 43).

Figure 7.6 Sources of information on local drinking water quality



Note: Multiple-answer question. Data from survey conducted in the Dongying port, 2014 (n=110)

A detail look in the survey result shows that talking with relatives/friends/colleagues provides the main source of information on drinking water quality, with 44% informants cited this answer compared to 36% of newspaper/radio/television/internet (Figure 7.6). Insights gained from household interviews conducted in Sanshui Village reinforce this argument as well. Some employees working in nearby industrial enterprises of Sanshui considered themselves more 'knowledgeable' on water contamination issue, especially regarding chemical production, wastewater treatment/discharge, pollution prevention measures. One worker reported that he witnessed how the enterprise pumped the wastewater to underground for reducing their cost of wastewater treatment (Employee, Hugerrubber, 2014.12.17). This worker also mentioned he shared the information with close friends or family members.

His account reflects how local rumours of water pollution were ignited and spread among relatives, friends and neighbours. For instance, when other informants were asked how they knew something, the most common answer was that "others told them". In this context, network serves as key channel for the circulation of information about on-going daily activities and (or) gossip, on the one hand. Communicative ties operate to strengthen local

people's access to information and facilitate the development of their cognitive skills, on the other hand. This finding echoes Long's (1989, p.226) argument that the various sets of social relationships in which one is embedded - both within and beyond the household –affect the pattern of communication in local society. However, the mouth-to-mouth communication is often perceived not productive to promote scientific understanding of pollution. As expressed by the Director of Green Land, "mouth-to-mouth communication is explicit and fast. However, the content of information may be not verified or trustworthy. And this may mislead people's understanding on water pollution" (General Director of Green Land, Dongying, 2015.04.09).With respect to the trustworthiness of different sources, He *et al.*(2014)argued that information from relatives and friends was perceived as the second most trustworthy source on industrial pollution (46%). The most trustworthy information source was the central government (61%). Ironically, as has been empirically shown, people's access to government-generated data on drinking water quality is constrained due to institutional deficiencies (see Chapter 5).

Information demands in relation to people's livelihood issues

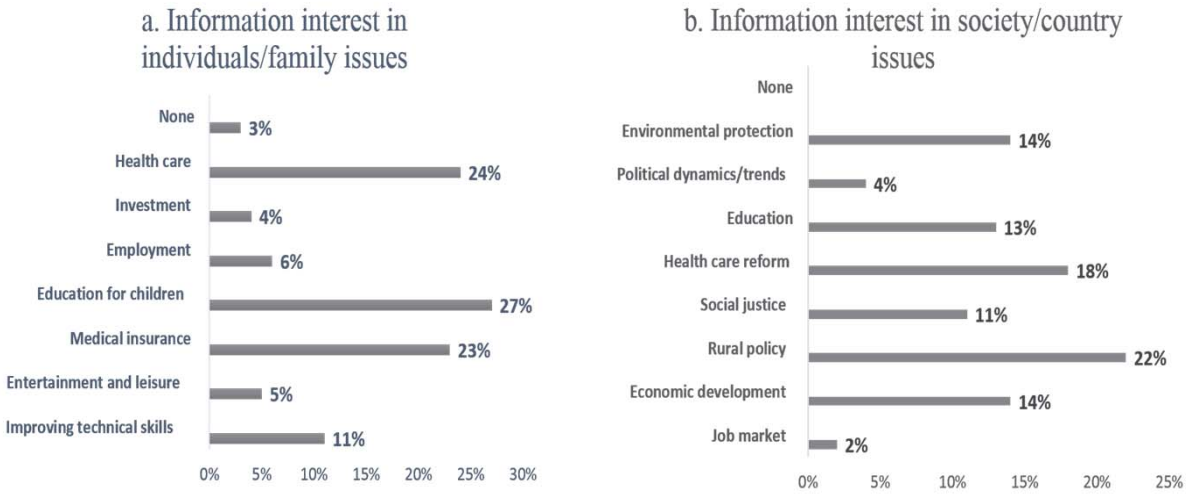
This section presents people's general information interest based on their life experiences. Informants were asked to indicate their interest in different sources of information. The questions were designed to understand people's information demands in relation to their livelihood. Furthermore, they were intended to explore how to integrate people's information demand into environmental informational governance. As addressed in the previous chapter on the CWW campaign, without a consumer-research process to understand people's information interest, people act as spectators rather than participants.

Figure 7.7 (a) illustrates people's information interest in issues about individuals/family. Results show that informants were most concerned about education for children (27%), health care (24%) and medical insurance (23%). Due to the remoteness of the Dongying port, informants mentioned that they had to send their children to school in nearby areas.[130] This was perceived very challenging as most of the workers had to work early and didn't have enough time to pick up their children from school. For migrant workers, it is more difficult to find a local school for their children, as their residence is not registered in Dongying.

[130] Xianhe Town or Donggang Village were often mentioned by informants, which are located around 30km away from the Dongying port.

Fishermen expressed the sentiment that they hope their children could go to university, have better education and do not iterate their life, because work is hard and demanding as fishermen. They expect that life is easier and more convenient in the urban areas of Dongying, and hope their future generations could find a job and live there (Fishermen, Dongying port, 2014.08.04). Photograph 7.4 shows the living room of two elder fishermen and picture of their children.

Figure 7.7 Rates of interest in different kinds of information



Note: Multiple-answer question. Data from survey conducted in the Dongying port, 2014 (n=110)

Photograph 7.4 The living room of elder fishermen in the Dongying port

(1):Pictures of government leaders hang on the wall, (2): picture of fishermen's children.

Source: Photographs by author, 2014

Apart from children's education, family and health were perceived important for fishermen, as one informant put it: "we are concerned if we could earn [enough] money and take care of

our family. […] Apart from earning money to support our livelihood, health is the most important" (Fisherman, Dongying port, 2014.07.31).

Figure 7.7 (b) shows people's information interest in general issues about society/country. To be specific, 22 % of informants were interested in rural policy, followed by 18 % of health care reform and 14 % of economic development. Informants' primary interest in rural policy can be explained by the fact that people get support from local government for farming or medical care for example, if they are eligible for the government subsidize. In such context, information interest of local people is closely linked to national initiatives. Empirical data however suggests that there is an information gap between national and regional/local policies. Informants commented that they knew little about government programs implemented in the regional/local context. In contrast, information on national policy is much better disseminated through the mass media of CCTV[131] for instance. A related finding provided by He *et al.* (2014) shows that information source from national government was perceived the most trustworthy, while local government was perceived as unreliable source of information due to their intricate interest with industrial enterprises. To justify his answer on information interest in national issues, one employee from Haixing noted:

"National issues are not placed in the first place and relevant information is not important for us, as our primary concerns are family, food and income. However, country is always placed in our heart [see Photograph 7.4], without county there wouldn't be family" (Employee from Haixing, Dongying port, 2014.07.31).

In this context, the perceived vital role of the *state* is consonant with the finding on people's sense of sacrifice[132] revealed in Chapter 4. Moreover, Figure 7.7 (b) shows that the issue of social justice was perceived less interesting with only 11% informants cited this theme. This result slightly contradicts to the statistics produced by China's Academy of Social Science on the characteristics of a good society.[133] According to the result of their survey, more rural

[131] China Central Television. Local people mentioned CCTV is the most prevalent channel to access to government news.

[132] It refers to that people are not hopeful that industrial water pollution could be stopped, as they assume it is the state's initiative to promote industrialization in the Dongying port. They as ordinary people have to follow the national policy.

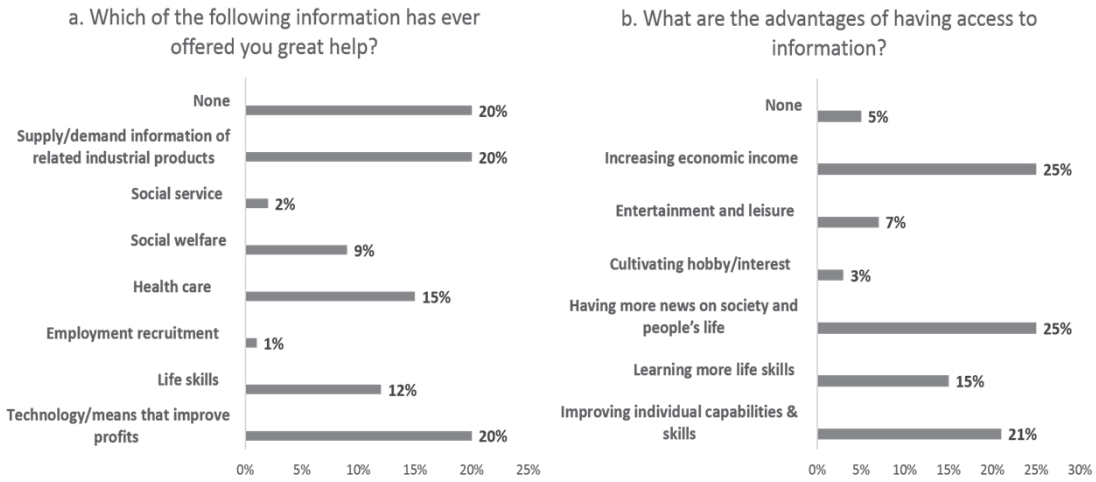
[133] In 2013, China's Academy of Social Science implemented a comprehensive survey on Chinese social situation targeting 10,206 people from rural and urban China. In this survey, informants were asked which social

informants cited justice as a characteristic of a good society than urban informants. In other words, rural people addressed more concern on the issue of social justice. Given this, the organiser of this survey from China's Academy of Social Science commented that, although rural people have much lower income compared to urban people, they are relatively optimistic and hopeful to the society (Southern Weekend, 2015.01.23). In view of their low socio-economic status, rural people assume low capability and limited life skills are their main constraints (ibid.). Despite this, rural people may co-opt for flexible strategies to adapt, rather than making complaints to the society.[134]

Perceived value of information access

Results illustrated by Figure 7.8 (a) show that informants perceived technology/means that improve profits (20%), supply and demand information of related industrial products[135] (20%) most helpful, as compared to 15% of health care. Moreover, 25% of informants mentioned that having more news on society and people's life is the advantage of information access, another 25% of informants citing increasing economic income, 21% of informants citing improving individual capabilities and skills (Figure 7.8 (b)).

Figure 7.8 Response distribution of helpfulness and advantages of information access



value they perceived most important for a good society. The available options include 19 answers on different social value – equity, democracy, freedom, justice, civilization, affluence, harmony, solidarity, respecting human rights, respecting the constitution, honesty, patriotism, rule of law, innovation, advocating science, inclusiveness, friendliness, collectivism and dedication to work.

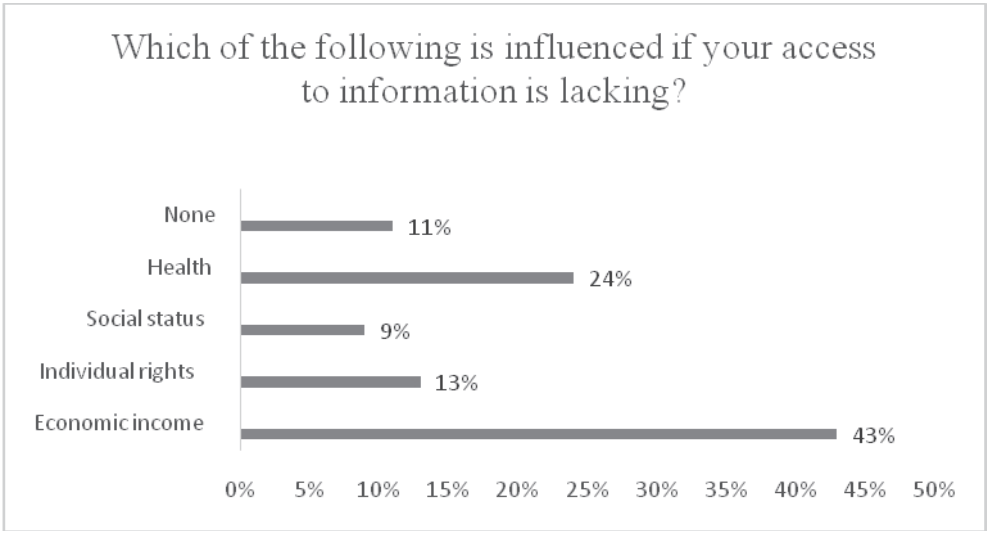
[134] Regarding people's reflexive strategies and adaptation, the author will come back to this point in the last section of this chapter.

[135] Aquatic/salt/bromine chemical products in relation to the sector that the informant is involved in.

Note: Multiple-answer question. Data from survey conducted in the Dongying port, 2014 (n=110)

These results highlight that the instrumental value of information seems most crucial given informants' interest. In particular, informants showed more interest in information that could provide suggestions of increasing individual benefits. Finding on the influence of lacking information access provides support to this argument. 43% of informants mentioned that economic income (43%) is perceived most affected if information access is constrained, followed by 24% of health (Figure 7.9). These findings highlight that *self-relevance* and *economic value* is important attributes of information, which could trigger people's interest and motivation to *actively get* rather than to *passively receive.*

Figure 7.9 Rates of influence of lacking access to information



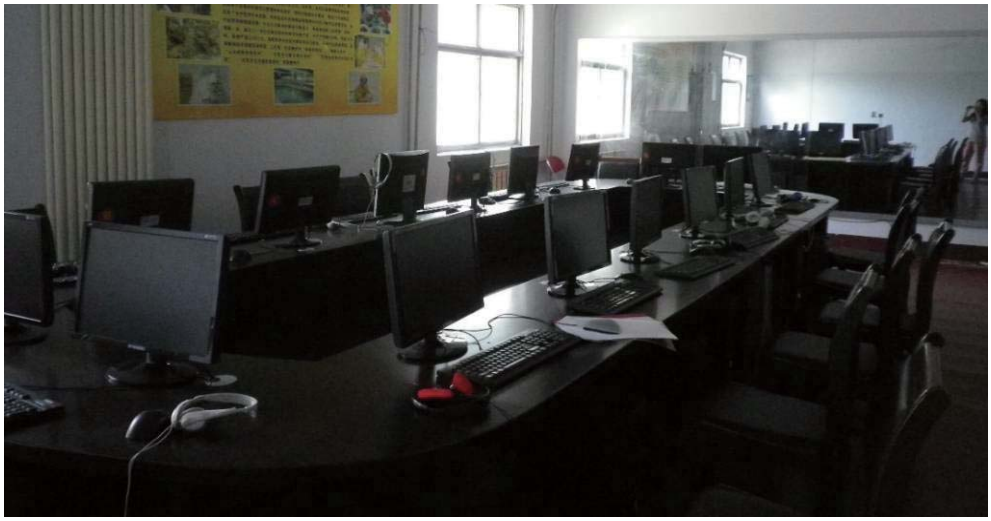
Note: Multiple-answer question. Data from survey conducted in the Dongying port, 2014 (n=110)

A perhaps more striking finding is that 20% of informants said they had never received helpful information; 5% of informants perceived *no* advantage of obtaining information; and 11% of informants perceived *no* influence of lacking access to information (see Figure 7.8&7.9). By itself, such findings are significant in that it calls into a question – what explains informants' low evaluation on the usefulness and advantage of information access under such conditions? To justify their answers, informant narratives were of two kind. On the one hand, informants mentioned frequently that they were very busy and had no time, apart from chatting with families or peer workers. On the other hand, informants iterated that due to their position placed at low social-economic strata, very few government agency or

institute was concerned to implement information outreach for workers in the Dongying port (Fisherman, Dongying Port, 2014.07.31).

With respect to public education for rural people, the state has promoted a program of "rural books house" [136]since 2007. The program was implemented to follow the state's initiative of enhancing rural cultural construction and improving villagers' information access (Chen, 2013, p. 41). To enforce this program, villages had to set up their own "cultural stations", in which public cultural facilities of computers, books and magazines were arranged. Observation in Haixing Village's cultural station provides some insights of the implementation of this program. It was observed that one electronic reading room with computers (Photograph 7.5) was arranged in the cultural station, but villagers seldom showed up to read or surf the internet. The desks and books were dusty, implying they were arranged mainly for the purpose of decoration or dealing with the evaluation implemented by the township government agencies.

Photograph 7.5 Electronic reading room in Haixing Village



Source: Photograph by author, 2014

Based on the above argument, official programs of enhancing rural public education or increasing people's access to information are hollow. This finding is consistent with Chen's (2013, p. 42-43) argument that implementation of information programs in rural communities is more for the purpose of meeting targets set by local government, rather than of

136 "农家书屋"

disseminating meaningful information to rural people. Furthermore, such programs usually lack sustainable funding support or long-term planning. According to the vice-manager of Haixing Village who has more than 40-year experience of working with fishermen, there already exist many information channels such as television, broadcast, interphone for villagers, and information access is thus about individual awareness and willingness. To increase information access for fishermen, he suggested that government agencies organise some learning classes, focusing on ocean resources protection and prevention measures of water pollution (Vice-manager of Haixing, Xianhe Town, 2014.08.07). Furthermore, he addressed that fishermen have un-regular working schedules; and setting up some bookstands in the Dongying port would be helpful to trigger their demand for information (ibid.).

Adaptation and reflexive strategies toward industrial water pollution

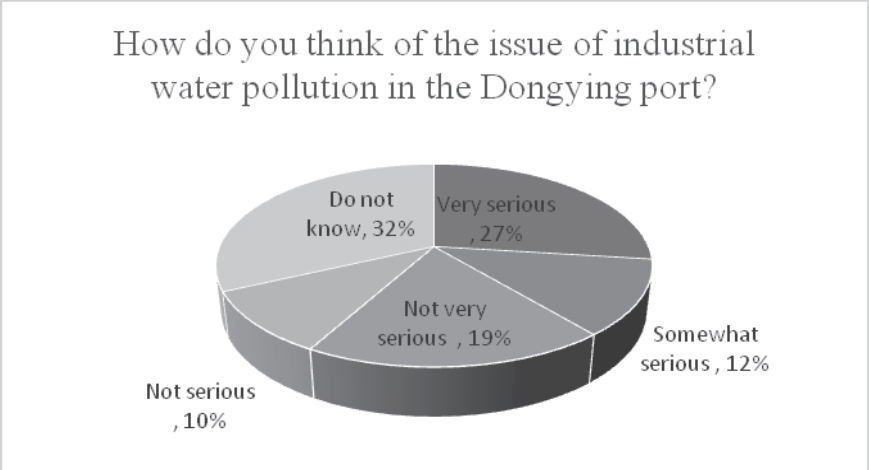
The perceived pollution severity

As illustrated through the committee election in Sanshui Village, when people drew the boundaries with local cadres, distrust and those communication barriers emerged. In this context, villagers assumed that local cadres had intricate relations with industrial enterprises. Cadres and enterprises shared the same goal of making profit through local industrialization, while leaving the polluted environment for local inhabitants. Following this, another line of inquiry in this section would concentrate on how local people – insider their "borderline"-approached the pollution *truth* and coped with the situation.

Figure 7.10 shows how informants rated the severity of industrial water pollution in the Dongying port. To be specific, 27% of informants mentioned the pollution was very serious, while 10% of informants citing not serious. Notably, 32percentage of informants cited they do not know about the severity of water pollution. Within their position of socioeconomic marginality, workers' livelihood has been substantially undermined by industrial water pollution.[137] These threats to informants' livelihoods in theory would underlay *heightened* perception of pollution severity, but the survey result shows more informants were unclear on the pollution severity.

[137] In Chapter 4, the author discussed that fishermen have less resources and opportunities to shift towards alternative sources of livelihoods, when the Bohai bay resources have declined substantially due to water pollution and other factors.

Figure 7.10 Distribution of answers regarding the perceived water pollution severity



Data from survey conducted in the Dongying port, 2014 (n=110)

In addition, it is commonplace that informants tried to throw the ball to other people, when asked to rate on the severity of water pollution. In this context, what could explain informants' reluctance and their sense of ambiguity on the pollution issue? According to Tilt (2006), in China governmental respect for individual rights and view is poor, and people have little legal resources to raise concerns about pollution problems. In the long run, this low awareness could deny people a voice. One local fisherman reflected on this:

"I haven't seen you [the author] for a long while. I was worried and thought you might be in trouble with government officials. These weeks many government agencies from HKG came here to visit. From the manager of Haixing, I got to know that they came to check the construction programs. At the beginning I thought it was because you were doing research here, and it triggered dissatisfaction of the local government." – [JT] "Did you manage to talk with the officials and express your concern about industrial pollution?" – "Who dares to say that? People need to survive and continue their work. People need government's permission and official certificate to go fishing! […] Officials only came here and walked around, checking this and that, no time for us" (Fisherman, Dongying port, 2014.08.01).

In his view, people are little motivated to rise up and take control over their own situation. This sentiment is shared among people, reinforced through people's communicative ties and daily conversation. Finding also unravels that this subject formation –feeling powerless and not motivated - affects how people's common identity is defined or elaborated. Taken the "communication room" of the Dongying port as an example, it was observed that many

people just walked in and out from this tiny room.[138]Some were ordering food from the restaurant outside. Some were chatting in groups. The name "communication room"[139]–as the informants called it - indicates that the public space is created for people to interact and talk with each other. It is indeed a place for the circulation of information about on-going daily activities, such as the weather, how many stocks were fished and what people have encountered. It is indeed a place where people gossip about the local elite (i.e. Haixing) and the politics (i.e. fishing policy, subsidies). Finally, it is also a place where inhabitants complain about water pollution and express their concerns.

Apart from informants' sense of powerlessness, finding reaffirms the previous argument that people feel confused and not knowledgeable to evaluate the pollution severity (see Chapter 4). Their comments included references to their low education, social status and their lack of scientific knowledge. Moreover, informants were not confident and comfortable to express their opinions in front of the author, who was perceived more 'knowledgeable' and 'capable' by informants.

Ambivalence between perceived pollution severity and people's sense of place

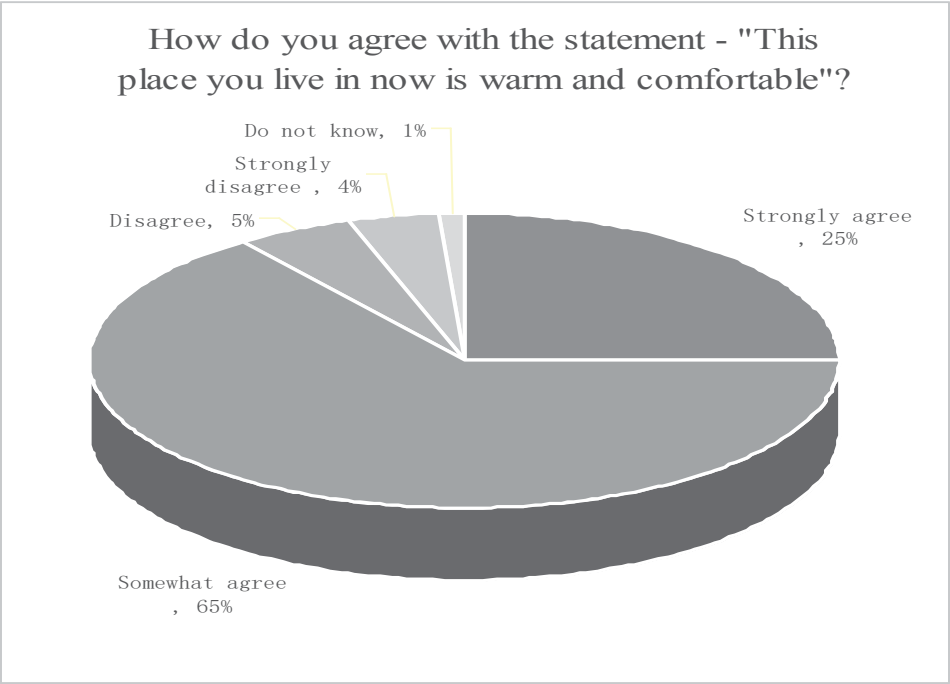
Figure 7.11 illustrates another finding regarding people's evaluation of the place they live in. A majority of informants indicated a strong agreement with the statement – "this place you live in now is warm[140] and comfortable". To be specific, 25% of informants mentioned they were strongly agree with the statement, while 65% of informants cited somewhat agree. Moreover, quantitative data analysis (crosstab) shows that place of birth is a significant variable affecting informants' feeling of the place. As shown in Table 7.2, for those who expressed strongly agree with the statement, 19 informants were locals who were born in Dongying. This number is much higher than that of the other two categories (informants who were not born in Dongying).

[138] Most of the survey with fishermen was conducted in this communication room.

[139] "交流站".

[140] "温暖". The word "warm" in Chinese has a connotation of feeling home and cosy to live in a place.

Figure 7.11 Distribution of answers regarding people's sense of place



Data from survey conducted in the Dongying port, 2014 (n=110)

Table 7.2 Cross-tabulation of informants' sense of place and their place of birth

Place of birth of informants	Level of agreement with the statement "This place you live in now is warm and comfortable"					
	Strongly agree	*Somewhat agree*	*Disagree*	*Strongly disagree*	*Do not know*	*Total*
Dongying	19	25	0	0	0	44
Shandong Province (outside Dongying)	8	32	3	4	1	48
Outside Shandong Province	1	14	2	0	1	18
Total	28	71	5	4	2	110

Data from survey conducted in the Dongying port, 2014 (n=110)

The presented result implies that the perceived pollution severity and people's sense of place are held in ambivalent suspension. On the one side, threat triggered by industrial water pollution in the Dongying port has undermined workers' livelihoods. On the other side, a majority of informants expressed that they feel warm and comfortable to live in this place. In a similar vein, this ambivalent suspension was revealed in the case study of Sanshui Village. A mass protest against *Dragon* industrial enterprise was announced due to the negative pollution effect (Chapter 4). However, the empirical study also highlights that Sanshui inhabitants assume the *polluted* place is their *home* - no matter how much it has changed.

To interpret this ambivalence, village narratives and their justification offer critical insights. Given the life-threatening effects to normal life, people yearn to get rid of pollution as one local inhabitant put it, "we [have] lost blessing from our mother Nature, and without the protection of environment our life is getting more difficult – just look at the haze and air pollution" (Interview with villager during transect walk, Sanshui Village, 2014.12.29). The polluted place, however, is home for local people where they feel rooted. One villager noted:

"I don't consider that [future situation] much. I consider how to get more plants in my house to filtrate the polluted environment. If I have more plants, the air quality will get better. Also these birds [see Photograph 7.6], I can easily listen to their sound so I feel closer to the environment. All these plants, birds and flowers are [only] to make myself live happier; to live humble but not profound or great. If we live humble and *grounded*[141], pollution is going up then we could get rid of the pollution issue" (Household interview No. 16, Sanshui Village, 2015.01.08).

[141] "接地气"

Photograph 7.6 Plants and birds in one local house

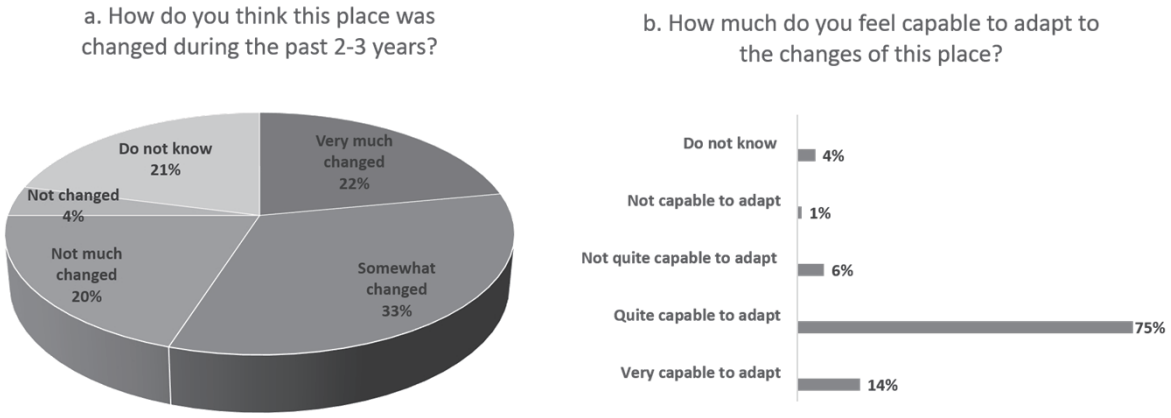
Source: Photographs by author, 2015

In his description of the humble and *grounded* life, it reflects a sort of internal reconcile to adapt to the external polluted environment. Moreover, it sheds light on people's reflexive strategies toward industrial water pollution. A related finding (Figure 7.12) on the correlation between perceived change of place and informants' sense of adaptation, provides a more sophisticated understanding on people's reflexive strategies.

Ambivalence between perceived change and people's sense of adaptation

As shown in Figure 7.12 (a), 22 % of informants in the Dongying port mentioned that the place was very much changed, followed by 33 % of informants citing the place was somewhat changed.

Figure 7.12 Distribution of answers regarding the perceived local changes and sense of adaptation



Data from survey conducted in the Dongying port, 2014 (n=110)

This can be partly explained by the emerging human activities of aquaculture and salt farming, which have brought significant changes to the local environment in the Dongying port.[142] Relative to this, one local photographer who has been long time devoted to depict the environmental changes of Dongying expressed the sentiment:

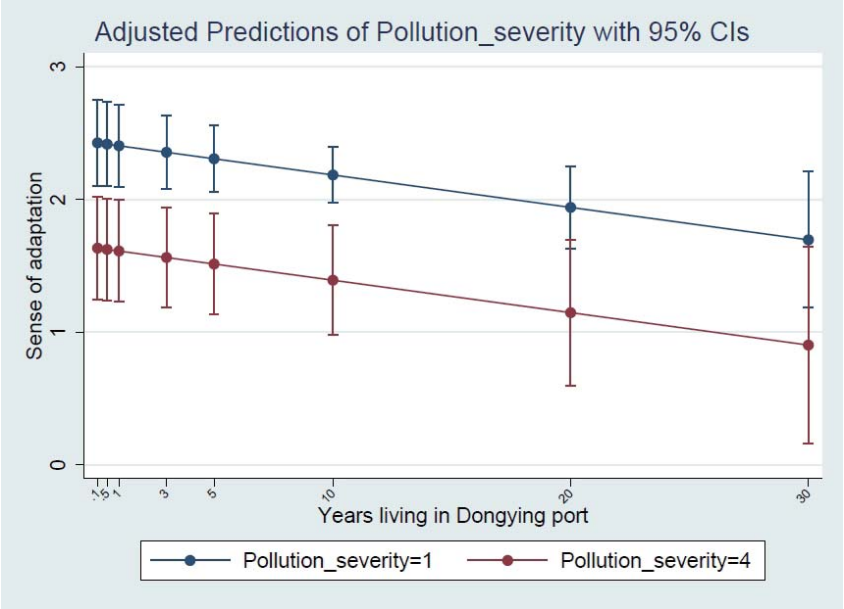
"Since 2006 I have been filming the change of local wetlands. The pace of change is so dramatic and surprising that goes beyond [my] imagination. My childhood memory is gone and will never come back. […] This beauty [saved in my childhood memory] was sacrificed in the confrontation between traditional culture and industrial civilization. Behind the disappearance of the wetlands [and its beauty], is the collusion of power and capitals" (quoted from Southern Weekend, 2011.07.22, translated by author).

From his historical vantage point on how local environment and natural resources were sacrificed for the economic development, there is a sentiment of pity, nostalgy and helplessness. Despite the dramatic environmental change, lay people however felt they were capable to adapt to this change. To demonstrate this, the result of survey shows that 75% of informants mentioned that they felt quite capable to adapt to local changes, as compared to 6% of informants citing not quite capable (Figure 7.12 (b)). A related, and perhaps more interesting finding is illustrated by Figure 7.13. Informants who live longer in the Dongying

[142] See also the timeline exercise conducted to trace the major environmental changes along the Dongying port in Chapter 4.

port felt more adapted to the place. Those who perceived higher severity of pollution ("Pollution_severity=1") felt less adapted compared to others who perceived less severity of pollution ("Pollution_severity =4"). But the differentiation gets smaller (statistically not significant) when informants live in the place for more than 30 years.

Figure7.13 Correlation of sense of adaptation, perception on pollution and residence time



Note – "Sense of adaptation": 1= 'very capable to adapt', 2= 'quite capable to adapt', 3= 'not quite capable to adapt'. Data from survey conducted in the Dongying port, 2014 (n=110).

To explain their feeling of adaptation, comments by informants included references to improved living conditions, modern facilities and long-term residence. Some informants cited life is much easier than before, as they could do grocery shopping whenever they wanted. It was observed that there were a few small-size shops and restaurants in the Dongying port, where workers usually go to buy food and other articles for daily use. An elder worker from Haixing depicted the changes of the local environment:

"When I first came here [the Dongying port] in 1986, there was almost nothing – only large area of saline land – at least several decades lagging behind the development of my hometown. Now I could live in this modern office much better than the previous poor thatched cottage with many mosquitoes" (Employee from Haixing, Dongying port, 2014.07.15).

In his account, the effect of industrial water pollution seems less visible or significant. Another informant also put it: "It is ok [to live in the Dongying port]. What could you ask more?" Here, informants' justification reaffirms that people assume that they are in the low socio-economic strata and should be flexible and adapted. In addition, there is a significant difference between long-term residents and short-term migrant workers regarding their sense of adaptation. As shown in Figure 7.13, those living longer in the Dongying port felt more capable to adapt. It was observed that long-term residents usually live with their family. Even if their children have to go to school in other places, their children come to visit them often. Accordingly, being close with their families makes workers feel more capable to adapt to the place. It is also noted that some informants felt reluctant to express their feeling in front of the author– who presented herself as a researcher. Informants were suspicious if this stranger was assigned from the local authorities or newspaper companies. This could potentially bring them into trouble, if informants highlighted they were not adapted or comfortable to the local changes. On that account, it may increase bias of the survey result.

Tracing people's perception on pollution and the subtle meaning of adaptation

To vividly capture the subtle meanings of people's sense of adaptation, household interviews conducted in Sanshui Village provide valuable insights. Inhabitants commented that they are just doing what others do, as one informant put it, "as individuals we can't do much. We just live in the same way as others do" (Household interview No.11, Sanshui Village, 2014.12.19). In examining the pattern of village narratives, result highlights that these narratives – in which people also situated their understanding of water pollution– disseminate and reinforce themselves through people's communicative ties. In this scenario of communication interface, *information* as signal is ignited and flows in-between people. It forms people's understanding of the pollution reality and their common identity, implying to local people that they as individuals forming the community would either suffer from industrial water pollution or adapt to it, together, and no individuals would be alone.

Here the finding emphasizes a socially-induced influence on people's perception on and adaptation to industrial water pollution. The following interview with one local villager captures the essence of this socially-induced influence:

"If everyone drinks this water [well water supply provided by Daozhuang government], I don't want to be special [not to drink it]. If everyone is not afraid of the potential effects of

water pollution to our health, I will follow others" (Household interview No. 4, Sanshui Village, 2014.12.05).

Her statement could probably represent the sentiment of many others– to think as others think; to do what others do; and to live *normally*. Apart from the socially-induced influence on people's perception, finding reveals that a sense of fearless and liberty, and the spirit of let-go is embedded in people's reflexive strategies. In this scenario, let-go refers to people's belief in that some stories or suffering are only part of your life, but not part of your destiny, as one informant put it: "Life is mysterious! Whatever is wrong and whatever is right, confusedly you would live through it in the end" (Household interview No. 12, Sanshui Village, 2014.12.16). This is a *life principle* that shapes people's flexible attitude, develops their internal council, and supports their adaptation to water pollution, as demonstrated by the following statement:

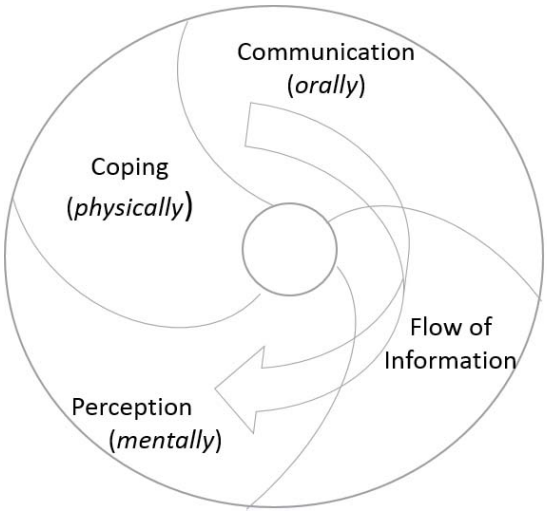
"People live within the contradictions of our society. It is commonplace that contradiction [economic development and environmental protection] exists, and you can't solve all of them" (Household interview No.16, Sanshui Village, 2014.12.30).

Conclusion

Through the journey of life-world revisited, this chapter grapples with the issue of information access in local society. The illustrative example of the village committee election in Sanshui highlighted the role of oral talks, which underpin the circulation of information in the local community. Through building the linkage between communication, flow of information, perception and coping, the study reveals a causality mechanism in relation to human agency (Figure 7.14). In this vein, communication and information exchange shape people's cognitive frames on water pollution, thereby enabling them to interpret the issue and to define a set of coping strategies. In such a context, information as signal is ignited and *flows* in-between people during the face-to-face oral talks. This affects how people perceive and situate their understanding of the pollution issue. In a society where individuals are constituted as correlative elements of power and knowledge (Foucault, 1995, p. 194), the inflow of information from others makes a significant impact on people's understanding of the world, on the one side. Communication patterns operate to further strengthen the common identity and solidarity of local people, on the other side. These accounts elucidate that the *oral* (communication) and *mental* (perception) aspects of individual lived experiences of

facing water pollution, affect also people's *physical* strategies (coping). Altogether the three aspects shed light on the socially-induced influences on people's development of cognitive skills and competencies to act upon the situation. It is argued that this causality mechanism (Figure 7.14)–linking oral, mental, physical aspects of individual lived experiences- offers insights on people's subject formation and how they develop reflexive strategies to cope with water pollution.

Figure 7.14 A causality mechanism in relation to human agency



Source: Drawn by author

With respect to the access to information, the survey suggests that television is the most used source of information. While young people utilise multimedia channels, internet is rarely applied by elders. Among different sources of water-relevant information, information on drinking water quality attracts most concern from local informants. Talking with relatives/friends/colleagues/peers proves to be the main source of information on local drinking water quality. Among different sources of information about individuals/families, society/country, information on children's education and health was perceived most helpful or practical by informants. As such, it is suggested that information outreach should promote knowledge on health and sanitation. Information concerning children's diet and health could potentially trigger people's interest. Instead of disseminating information on water resources saving, practical suggestions on water pollution prevention, food security may be more meaningful. For instance, regular official reports on the health status of aquatic products could increase people's awareness on not eating poisonous fish. Toward this end, increasing access to information is a two-way process. Not only does it need increased awareness of

local people, but also inflow of information that is of *self-relevance* and *economic value* to trigger people's interest. Furthermore, the "give-and-take" approach taken by environmental NGOs or government agencies should be remedied, as flows of information became either interrupted or single-directional (see Chapter 6). Apart from raising people's concern on sensitive environmental data which takes the form of chemical and biological quantitative number, practitioners shall also integrate survey data in social science studies about lay actors' perceptions and sensory information (Mol, 2008, p.113). This also prompts the imperatives for practitioners to design programs taking into account local characteristics and interests of target groups, based on a more critically informed research agenda.

Through the use of the illustrative example of village committee election in Sanshui, this chapter also demonstrates how power is individualised and gets access to the bodies of individuals, affecting their subject formation. This reflects on the 'individualizing tactic' of power from a Foucault's (2000, p.125) perspective. In the discursive space captured during the election, power, flows of information and people's perception are interwoven. Finding reveals that when distrust and communication barriers emerged, people drew boundaries with local cadres and prohibited *inflow* of official information. When boundaries were drawn, there came the "space of the outside"[143], where people tried to find an escape route from power influence. In this process of boundary-making, it reflects the characteristics of heterotopias, where the double logic of disciplining and liberating is embedded.[144] Informed by the heterotopia thesis, results show that in the contested arena – where villagers and cadres confronted with each other and negotiated - the force of disciplining and liberating are part of a double bind which cannot be easily undone.

In relation to Foucault's account of the 'individualizing tactic' of power, people's drawing a boundary with cadres and creating "space of the outside", unravel their 'individual tactic' adopted to detach themselves from the power game of the elite factions. In this process, local people attempt to define and defend their own social space and cultural boundaries, as well as to promote their own interest. Along similar lines, when virtual communication interface

[143]The notion is borrowed from Foucault's article "Des espaces autres".

[144] According to Dehaene & De Cauter (2008, p.3), heterotopia is a different place that interrupts the normality of everyday space of social life. More discussion about the heterotopias in relation to the issue of social discontinuities is presented in Chapter 3. Additionally, Heynen (2008, p. 322) provides a detailed account of the double logic of heterotopias.

emerged (see Chapter 4), people tried to reclaim this arena – blocking *inflow* of information from the government - and "reterritorialized" it as a place of local deliberation.[145] By developing a place of local deliberation where flowers/plants grow and birds sing, people create a self-space to externalise the effects of industrial pollution (see Photograph 7.6). Such a place of local deliberation, however, is not a site for resistance or exclusion. Instead, local people adopt reflexive strategies to adapt. People assume that contradiction is normal and conflict or self-struggle is unavoidable. There is, however, way to go beyond, through self-mediation and reconciling with the external world. In that sense, adaptation and people's liberation in life-world is attempted not through negating or resisting the pollution, but rather through accepting and mimetically – critically – *re-appropriating* it.

[145] See also Feuchtwang (2004 cited in Woodman, 2011, p. 82).

CHAPTER 8 CONCLUSION: FROM EXAMINING TO ACTIVATING COMMUNICATION INTERFACES

With the central objective to explore the processes of communication and interaction between government agencies and local people, this research set out to investigate the approaches taken by Dongying Municipality to pollution controls, probing into the daily routines and implementation practices of the local water bureaucracy. Attention was then paid to the "making" process of communication interfaces – how different local actors dealt with those barriers to communication with government officials, as well as constraints and opportunities the local actors faced. By doing this, the study mapped different scenarios of communication interface and discussed how they have emerged, performed and (or) contested. Built upon the work of examining different scenarios of communication interface, a causality mechanism relating to human agency was then revealed. The mechanism connects the oral (communication), mental (perception) and physical (coping) aspect of lived experiences of local actors facing water pollution.

Since two national plans were implemented in 2009 and 2011 for booming industrialization in the YRD, Dongying witnessed large-scale expansion of industrial areas as well as tremendous rise in salt-farming and industrial fish production. Under this background, rapid industrialization and urbanization were found to be key contributors to industrial water pollution in Dongying. More than 57 industrial areas have been established by 2014 in Dongying (CAS, 2015), which produced significant volumes of untreated wastewater and caused heavy pollution of the receiving water bodies. While the pillar industries (i.e. petroleum, chemicals) contributed to the economic growth of Dongying, its resulting effects regarding the environmental and health influences to the local population were extremely negative. Consequently, this triggered anxiety of local people, particularly of those living in close proximity to industrial areas. Based on these arguments, it is estimated that Dongying Municipality is facing the dilemma of increasingly base growth on accelerated pollution prevention and abatement efforts. This prompted the approach of hardware and software power development taken by local authorities to water pollution controls.

On the one hand, *hardware power* denotes to the technocratic intervention in the wastewater treatment sector. This was attempted through large-scale infrastructure construction programs

such as wastewater treatment plants and constructed wetland. On the other hand, *software power* development was initiated by relevant authorities through the promotion of digital channels in environmental governance. For instance, online official interviews, official public websites, weibo. After the national goal of ecological economic development in the YRD was initiated, the hardware power was furthermore promoted by Dongying Municipality, which was perceived as a *panacea* to eliminate the environmental impacts of rapid industrialization. However, such technological efforts were revealed to be based on trial and error approaches, since the specific "recipe" of technological-fix was lacking in the national plans. Furthermore, inefficiencies and defectiveness appeared in the local implementation of engineering programs. In this context, the software power development was supposed to serve as a complementary role, providing a discursive basis for informing the public about the governmental efforts of pollution abatement. This discursive space - created through the cultivation of different communication channels – however, did not render the space for *mutual* communication. As such, public participation was limited in local environmental programs. While large-scale technocratic interventions to mitigate environmental risks have increased, action to enlarge the scope of participation hasn't been given enough consideration.

To offer a nuanced analysis of how participation is framed in the local water bureaucracy, the research elaborated an illustrative example of the CWW implementation in Dongying. Official responses to the CWW implementation were discussed at four different levels: municipality, district/county, town, and village. At first glance, the public campaign appeared to offer an opportunity for communication and interaction between the water administrators and local people. Nonetheless, zooming in on the local water bureaucracy, incoherent messages across different levels of the hierarchy as well as interrupted mutual-flow of information between water administrators and local people, were found to be the root causes that hinder public participation in the water campaign.

In examining the daily routines and implementation practices of the water administrators, it is estimated that highly-placed officials have higher awareness of respecting people, as well as better resources to implement a relatively comprehensive public campaign which takes into account local voices. By contrast, local cadres at grassroots levels place high priority in daily routines on fulfilling the assessment initiated by their superiors. To explain this, Allee (1997, p.96) argues that there are many barriers to a coherent flow of messages within the bureaucracy. As such, grassroots voice is usually poorly respected by cadres in the village

and county/district. Probing into the flows of water information during the CWW campaign, findings also indicate that a top-down flow of information was mediated by the water bureaucracy. However, a feedback channel for articulating people's voice on water issues was apparently missing in the official agenda. With reference to the "mixed signals" deployed by government agencies to local environmental activism in Hekou District, the study underlines that bureaucratic awareness of keeping situations under control is prevalent in minds of local cadres. This was attempted through the daily routines of taking preventive measures for avoiding omission and staying safe in their comfort zones, other than getting things done to respond to people's request on water issues (e.g. water fee and drinking water quality).

While the hardware and software power promoted by local municipality haven't offered an effective and accountable solution to water pollution, the local population adopted different strategies to deal with the issue. This provided the setting based upon which two scenarios of communication interface were examined – the *virtual* one at the community level and the *non-virtual* one upheld via local environmental activism. As demonstrated through case studies in the communities, a lack of sustenance of reciprocity - so to say a relatively symmetric relationship, complementarity, and credibility - was found to be the key contributor to those communication barriers. For cadres who were geared to collecting local voices and creating space for communication, finding reaffirms that their traditional bureaucratic awareness and responses - staying in the comfort zones and not assuming liberty or responsibility to get things done – hinder the ferment or sustaining of the sustenance of reciprocity. This resulted in the virtual communication interface – the channel for lay people's articulation of claims and allowing for feedback to local cadres was lacking or deficient. Drawn from two in-depth case studies, this study highlights that limited agency and information access of local people, a lack of feedback channels and low support from brokerage were found to be key characteristic features of the virtual communication interface.

A non-virtual communication interface denotes that local environmental activists attempted to expand the scope of communication and negotiation with government agencies, based on the strategy of incremental change to depoliticize their action. Notably, workers from Shengli Oil Company formed core environmental action, upholding the principle of non-virtual communication interface with cadres from the district and towns. The trajectory of non-virtual communication interface development sheds light on the micropolitics of choices as

well as on officials' strategies of making room for manoeuvre in grassroots society. In this trajectory, the tactics, experiences, bureaucratic techniques of local activists affected if their bargain power was taken into account by relevant authorities. For government agencies, they were granted discretion to handle environmental conflicts without much intervention from the state. As such, it turned out to be a trial and error as well as leaning-by-doing process for government officials. In this context, experience of dealing with conflict was found to be a significant variable that shaped official responses to environmental activism. Informed by the notion of "mixed signals", the documentation of the non-virtual communication interface in this study strengthens the argument of embeddedness of China's environmental activism (Ho & Edmonds, 2008).

Beyond local environmental activism in Dongying, the study explored some initiatives relevant to public participation and environmental education addressed by Green Land - one environmental NGO acting at the provincial level. Promoting digital tools in environmental management served as a window of opportunity for Green Land to build communication with SDDEP. In this context, the communication interface was attempted via mutual and insightful dialogue mediated by Green Land with provincial authorities. Nonetheless, the "give-and-take" approach taken by Green Land – educating local people to produce and (or) process water pollution data[146]- neglected the root cause of information asymmetry and limited agency of local people in grassroots society. In other words, the malfunction of flows of information between the authorities, general public and environmental NGOs was not taken enough account.

With respect to the heated debate on environmental informational governance, the study has examined the implementation practices of environmental information disclosure by relevant authorities of Dongying. While the approach is embraced by provincial authorities, the local implementation is still far from effective due to institutional deficiencies, low capacity of local cadres, as well as low digital needs of the local population. Based on the empirical data, it is estimated that the application of digital sphere for increasing access to environmental information leaves still large room for improvement.

[146] The "give-and-take" approach was mediated through teaching people to use some simple water quality monitoring tools to produce water data, or through promoting the "online pollution data disclosure platform" hosted by SDDEP (Chapter 6).

According to a survey report on environmental public participation in Shandong Province published by Green Land, the following is addressed:

"In publicity (of environmental information, JT) through new media, the role of *community* [my emphasis] which is well-known to the public should be strengthened in environmental protection and relevant information outreach programs. Taking into account the local characteristics, through organizing salons, seminars, quizzes with prizes, visiting industrial enterprises as well as other kinds of flexible outreach programs, [practitioners, JT] should timely and accurately convey environmental knowledge, news, business conditions of local industrial enterprises to the local population, as well as create opportunities for people to visit those industrial enterprises in close proximity to the residential communities, in order to fulfil the environmental information needs of the local population."

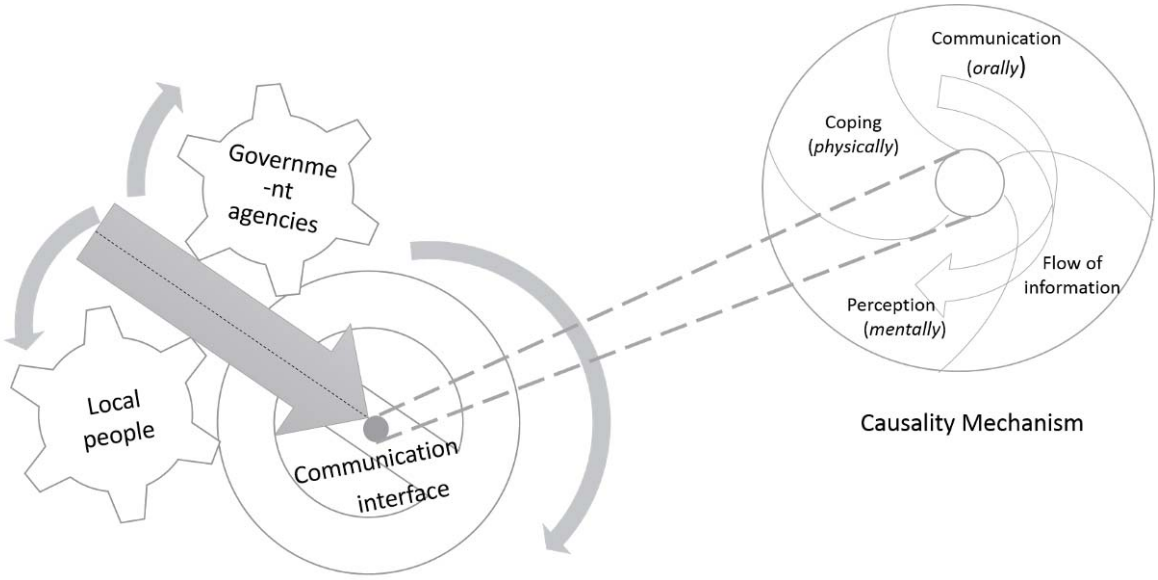
(Green Land, 2015b, translated by author)

In China, while environmental NGOs have engaged to incorporate local communities into environmental protection, and to initiate communication between local inhabitants and industrial enterprises, actions to bridge the digital divide should be given greater consideration. There is no doubt that information access and communication opportunities were not equally distributed in grassroots society, as demonstrated by quantitative data analysis of this research. Resonating with the argument by Evers & Gerke (2013), while there are people who have access to advanced digital tools, others are not even enabled to make use the internet and other ICT features. As such, it is imperative to formulate minimal standards of "basic digital needs", in order to narrow the gap of digital divide at the lower end (ibid.). While China has increased substantially the public sector investments in digital technologies, the absence of accountable institutions which take into account the "user needs" of the local population might only amplify the voice of elites and leave the digital dividends lagging behind.

With reference to the proposed analytical framework motivated by the TCPCS thinking, this research showed that limited access to information, a lack of feedback channels in local communities, as well as incoherent messages across different levels of the bureaucracy are influencing factors for the existence of communication barriers. These, after all, are crucial issues at hand. To tackle these issues, human agency is significant to transform the communication barriers and to bridge the digital divide.

Through building the linkage of oral, mental and physical aspect of lived experience of local people facing industrial water pollution, the study offered a causality mechanism in relation to human agency. The mechanism sketched a dynamic recruitment process of coping strategies which are linked to people's cultural practices and knowledge. To emphasise its importance, here the author shall speculate the individual component – communication, flow of information, perception and coping - of the causality mechanism (Figure 8.1). Combining the quantitative and qualitative data analysis, the findings elucidated that communication- as a basic element shaping individual lived experience – underlines, and is also reflected upon by local value systems and cultural practices. In grassroots society where communication opportunities, for instance utilising digital tools for accessing information is constrained, face-to-face oral talk is the locus *effective* for information exchange about daily activities. In relation to this cultural practice, word of mouth, dependence on social ties and defocus of 'truth' are found to be key attributes of people's development of their knowledge on pollution. Furthermore, through oral talks and social interaction, local people build and solidify identities while developing competencies to interpret and to define a set of actions toward pollution.

Figure 8.1 Incorporating the causality mechanism into China' environmental governance



Source: Drawn by author

Engaging with the goal of proposing an *inclusive* approach to China's environmental governance, the revealed causality mechanism serves this purpose as it allows serious

account to be taken on cultural practices and individual lived experience. It is hence argued that it is imperative to incorporate this causality mechanism into China's environmental governance (Figure 8.1). To facilitate the incorporation, stakeholder participation involving relevant parties in some way in the discussion, analysis or handling of industrial water pollution would be a useful approach. In their review about vulnerability assessments conducted in coastal river deltas, Wolters & Kuenzer (2015) point out that stakeholder group was, however, rarely mentioned in over 50 analysed studies. Along similar lines, it is unclear whether communication with local stakeholders has taken place (ibid.). If it seems unlikely that the lacuna of stakeholder participation could be filled completely in due time, at least some challenges should be addressed here for improving the reach of efforts to initiate meaningful stakeholder participation in the future. With this regard, the work by Lundgren and McMakin (2013) on stakeholder participation in environmental, safety and health risks communication provides valuable insights. The authors note:

"However, stakeholder participation can be a frightening proposition to some risk managers. They fear the *loss of control* over the risk decision, instead of seeing that the audience's input can be invaluable to a lasting, equitable decision. If there is no commitment to stakeholder participation […], the effort can be devastating to an organization's credibility and hamper any future risk communication or management efforts. Stakeholder participation is generally more costly than simply issuing a technical report or holding a press conference. So, unless your organization is completely committed to letting the audience *interact* in a way that is meaningful to that audience, stakeholder participation is a very poor choice" (ibid., p.123, my emphasis).

Among the above lines, the most challenging task is to implement stakeholder participation for the communication and interaction to have *meaning*. In a broader setting such as the CWW campaign discussed in Chapter 5, the short-lived and campaign-styled public activity didn't bring government officials and local people into mutual communication. The underlying contributors to this failure have their roots in the malfunction of institutional infrastructures. Apart from this, communication plans were neglected due to the fact that public consultation is not a component part of China's environmental governance. The Maoist legacy of mass line politics –which consists of initiatives being taken from above and social input from below- is neglected particularly in the grassroots bureaucracy (Lo & Lung, 2000). Without a design of communication agenda about talking *with* people but only setting

an education agenda of talking *about* people, it may risk people's interest and support in those public campaigns promoted by the government.

In relation to the perceived frightening preposition of stakeholder participation by decision makers and (or) practitioners, defocusing on the anthropogenic processes of environmental management was found to be problematic. To strengthen this argument, environmental researches in the YRD have stronger focus on natural processes (e.g. salinity, tidal) and are mostly scientifically motivated. The lacuna of anthropogenic processes, according to Wolters & Kuenzer (2015), might be due to its complexity and the difficulty of obtaining sufficient data to quantify these processes. Apart from the challenge of quantitative measurement, evaluating qualitatively how people perceived the risks from exposure to environmental pollution and how they *processed* certain types of information were difficult. At the end of the field work of this research, a focus group discussion was arranged by the author with some environmental activists and local people. The purpose was to communicate some preliminary research results with participants, to discuss with them the topic of environmental risks communication, as well as to have better understanding of the information needs of local actors.

However, it turned out to be challenging experience in this stakeholder meeting to promote relatively free-flowing discussion about the communication topic – its needs, target groups, and practical methods to facilitate communication. Although the purpose of the meeting was addressed clearly before, participants seemed not interested in the research results. In their opinion, priority and attention were paid on how this (information and preliminary research results conveyed by the author) would make an effect and help in reality. *Only* if "this" is fulfilled local actors would then further consider why and how they should be involved into the communication. By saying "this", it denotes that some preconditions relating to needs and interests of local actors should be fulfilled, in order to promote mutual communication and collective willingness. This is crucial to cultivate trust and initiate further cooperation with local stakeholders. In his study about the construction of rural societies in China, Liang (2006, p.311) addresses that rural construction should start from practical issues which are easy for people to be involved, which are of self-relevance to and benefit people's personal interests. Built upon these practical issues, practitioners could further involve people in the construction programs and develop their strengthen (ibid., p.311). In this light, the practical issues or preconditions should be considered prior to stakeholder participation.

Apart from the consideration of information needs of local actors, it is particularly challenging to make people feel that focus group meeting and content of the conveyed information are meaningful to make *real-time* effects (e.g. exerting influences on relevant authorities for industrial pollution control). There is no doubt that communication barriers, difficulty of defining and discussing the goal of communication (between the author and participants of the focus group meeting) might account for this challenge. The most crucial issue at hand, again, is implementing stakeholder participation for the interaction and communication to have *meaning*, other than inviting stakeholders for making their presence possible. Considering this, a role of mediator and (or) bridging organization is very important for increasing the performance of stakeholder participation, which functions to facilitate the understanding of user needs and audience analysis. To this end, to fill the lacuna of anthropogenic processes in environmental researches conducted in coastal river deltas, focus group discussion could provide a rich source of material for more systematic quantitative measure of anthropogenic processes. Despite the challenge of effectively involving participants into mutual communication, the approach taken in a trial and error manner in this research, helped not only to assess communication effectiveness, but also to explore practical implications drawn from the analytical lens of communication interface.

Setting out with Long's (1989) thesis of interface in mind, the research explored how discrepancies of social interest, value and meaning, knowledge and power between government agencies and the local population in Dongying were mediated, perpetuated or transformed. While the lens of interface helped to probe into the setting wherein local actors and government officials situate, power relations function at the macro level which also exert influences on the interface setting. With reference to the theoretical grounding of power relations, the interface analysis was led ultimately to the question of power implications. To spell out the power implications, the research zoomed in on the interplay and interlocking configuration between government actors and local people in Dongying. By doing this, it is addressed that the binary framing of power practices – people either incorporate or subvert power - is not sufficient to offer a holistic accounting for the dynamic character of the state-society relation in China.

Informed by Foucault's (2000, p.125) account of the *individualizing* tactic of power – which gains accesses to the bodies of individuals, to their acts, attitudes, and modes of everyday behaviour- this study revealed the *individual* tactic adopted in people's everyday practices for

creating "an escape route from power". This power implication offers valuable insights for the analysis of individual lived experiences and knowledge of the local population facing environmental crisis. In light of the thought-provoking notion of heterotopia, this research also redirected our gaze for a more dynamic view of the coping strategies by local people. With this regard, it is argued that people adopted reflexive strategies to adapt to environmental pollution, not through negating or resisting, but rather through accepting and mimetically – critically – *re-appropriating* it.

The above account of people's reflexive strategies accords nicely with the work by Ho & Edmonds (2008), which spells out the embeddedness of China's environmental activism. To further explore the *interplay* between institutions and actors, Ho (2009) turned attention to China's (environmental) institutional architecture. In examining the type and timing with which core institutions were (or were not) introduced into society, the author proposed the principle of gradualism and credibility which underpins China's institutional change. Ho (ibid., p.191) noted:

"The evolution of credible institutions is not a matter of one or the other – state versus society, dependent versus independent variable, cause versus effect – yet; is a matter of *interaction* [emphasis in original]. Thus, while China's institutional innovation started at the grassroots it was the state that allowed it to happen; to protect it when it was contested; and to codify and upscale it once it had proven effective. […] The *balance* [my emphasis] between state and society, informality and formality, private and common, intervention and a 'hands-off' approach, […] prompts us to rethink theory and praxis of development, and shift to new 'rules of developmental engagement.' It all comes down to Gradualism and Credibility, or what Chinese call pragmatism."

In his account, both disciplining and liberating, tightening (shou) and openness (fang) are embedded in China's institutional change, which leads to the limiting and enabling characteristics of environmental activism. This double bind echoes the "mixed signals" deployed by local authorities to environmental activism in Dongying. Moreover, the principle of gradualism sheds a clearer light on the contingent, dynamic and multi-layered characteristics of China's environmental governance. With this in mind, one shall keep an open eye on the "making" process of communication interface – allowing those other images and counter discourses open to reinterpretation.

In the field of environmental management, whereas standard political analysis focuses on the structures, practices, and methods of state institutions that organize the play of power for program implementation (Zhang & Zhong, 2010; Zhang *et al.*, 2013; Kostka & Mol, 2013), anthropology studies more fundamentatally emphasize local people's construction of value and meaning to environmental pollution, as well as social practices inherent to it (Tilt, 2006; Lora-Wainwritght, 2014a). In the Chinse context, where environmental pollution has posed a big risk to local society (Chapter 1), the growing body of anthropology resarches is noteworthy. Drawn upon empirically rich, enthnographic data, social anthropologists broaden the base of our understanding of the health impacts of pollution to the local population, dedicate a rich local perspectives for matching the macro insustional studies of China's environmental governance. The challenge aheadis, however, to *bridge* the documented social practices of local society and those environmental programs implemented by the government.

Combining the approach of political ecology and critical anthropology, Kotsila (2014) explores the public health governance system in Vietnam. In examining both the cultural and institutional perspective of diarrohea disease treatment, the author addresses the importance of integrating people's patterns of behaviour that are linked with cultural practices into health governance. In her account, "the turn of attention to culture entails grappling with meaning, ideas, and forms of knowledge that may be unfamiliar in western knowledge paradigms, " and critical anthropological view offers valuable insights on that by highlighting where change can beg: "in the ideas and the practices of everyday life" (ibid., p.179). While the cultural and institutional perspectives were sorted out, and the importance of *incorporation* was addressed in Kotsila's study, there seems to be a lacuna regarding the question of how to activate and operate the incorporation. Without filling the lacuna it seems too slippery for practitioners and (or) decision makers to work on the incorporation project. Hence, the crucial question here, is, through what kind of medium can we incorporate relevant cultural practices into environmental governance?

When the discrepent interest, value and meaning, knowledge and power between the authorties and local people were spelled out, the space for *incorporating* cultural practices, is not justfilled up with their competing interests and (or) practices. Instead, the space shall be perceived as something that is mediated and (or) bridged through two-way communicaiton and interaction. Following this line of thought, one needssomething akin to organizational and cultural mean which functions as a bridge. This is how the uniqueness and novelties of

the proposed analytical approach of communication interface was allowed to emerge. To be specific, whereas the *interface* analysis helped to map relational structures associated with episodes of environmental governance, the *communication* prism vividly and dynamically documented the claims and tracked the signalling mechanisms. Altogether through the lens of communication interface, it conduced practitioners and (or) decision makers to sensitize the discrepancies of social interest, value and meaning, knowledge and power between the involved parties. More crucially, the lens of communication interface yields structure of meaning by rendering a medium to incorporate the individual lived experience to environmental governance. To operate this incorporation project, the analytical framework informed by the TCPCS thinking offers a more holistic and practical guide.

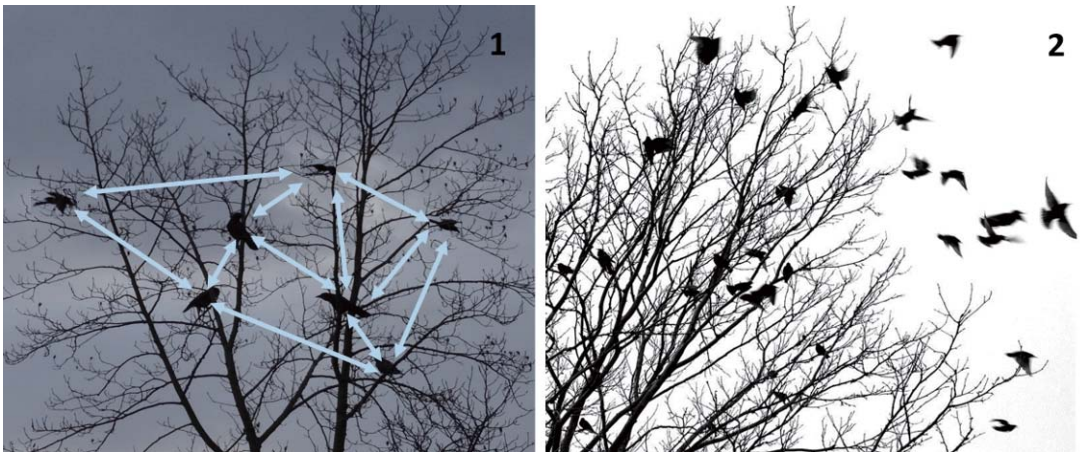
The proposed analytical framework combines the component of connective tissue and fractal patterns. The function of connective tissue was applied to examine the process of communication and interaction between government agencies and the local population, on the one hand. The pattern of fractal was utilised in the life-world to probe into people's value, cultural practices and lived experience in relation to water pollution, on the other hand. Through the *co-constituting* character of connective tissue and fractal, the framework displayed a systemic perspective on authorities and local communities. Furthermore, applying the framework was conducive to understand the underlying contributors to information asymmetry, as well as those communication barriers which had their roots in the *malfunction* of connective tissue and fractal.

Based on the empirical studies, it was estimated that the function of fractal[147] was performed through ground-level cultural practices (e.g. information exchange in grassroots society is based upon traditional face-to-face oral talks and social interaction). The function of fractal concatenated into more or less firmly constituted structure and (or) space that goes on to influence people's collective thinking and action in systematic ways. To explain this, Figure 8.2 (1) shows the function of fractal in the cultural and cognitive space of grassroots society. On the one hand, both direct and indirect social ties activate a number of mechanisms in

[147] Fractals explain how every tiny branch of a tree holds the same basic structure as the larger branches and of the tree itself. The pattern of fractal sheds light on some key constituents of social interaction in local society – the active subjects, social ties, repetitiveness of the structure (see Chapter 3).

relation to agency of actors (i.e. information access, cognition, knowledge ability) which in turn affect the chances and forms of communication and interaction among actors. On the other hand, whereas social ties activate a number of mechanisms in relation to human agency, the function of fractal performs to facilitate the production and circulation of information about daily activities, as well as others which are also essential to form actors' mutual recognition and collective identities.

Figure 8.2 Conceptual sketch of the function of fractals in life-world

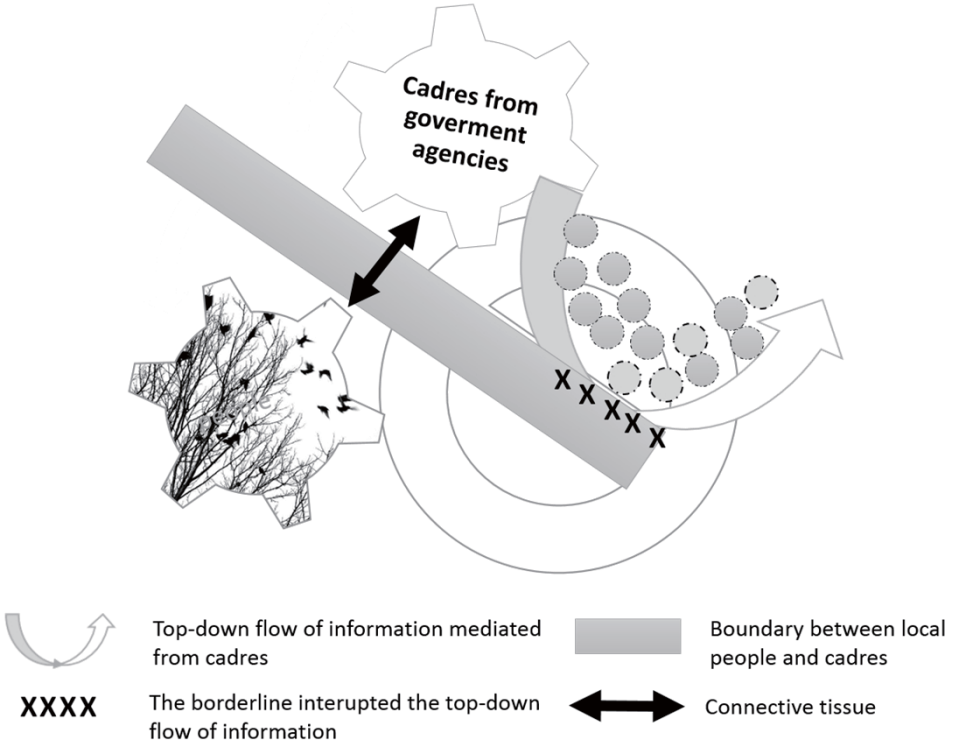


*Note - (1): Through both direct and indirect social ties, the function of fractal performs to facilitate the circulation of information about daily activities, (2): through the lens of fractal, it renders a three-dimensional contour of the life-world by documenting the trajectory of perception and knowledge development. Source: Designed by author

Through the lens of fractal, it renders a more vivid view of people's development of cognitive skills to interpret and act upon the pollution issue. To specify this, people make sense and incorporate in their self the multiple and concrete interaction with others, giving free rein to their own perception and knowledge on water pollution. Notably, this is a two-fold process which takes place during social interaction. The process operates down-stream when the cultural and cognitive space produces meanings that are integrated into the actor, and it operates up-stream when perceptions are communicated from the actor to others. Probing into the pattern of fractal, it hence renders a three-dimensional contour of the life-world through documenting the trajectory of people's perception and knowledge development of the pollution issue (Figure 8.2 (2)). While the function of fractal takes effects on the local population, it also influences the function of connective tissue during people's interaction and communication with cadres. For instance, when environmental conflicts arise, people uphold

the principle of defending – drawing the boundary to protect their cultural space and borderline – and set up their mental blockages to prevent the top-down flow of information mediated from the government (see Figure 8.3). This hence results in the malfunction of connective tissue in such context. This is the co-constituting character between fractal and connective tissue that is emphasised in this study.

Figure 8.3 Conceptual sketch of the co-constituting character between fractal and connective tissue



Source: Drawn by author

To offer an inclusive approach to China's environmental management, the resulting analytical framework demonstrated its instrumental value and encompassing ability through combining the institutional and local perspectives. By implications, its instrumental value manifests not in a sense of sensitizing the discrepancy of interest, knowledge and power between government agencies and local people in the control of industrial water pollution, but pinpointing a medium that facilitates mutual communication between the involved actors and hence further *activates* the incorporation project. To construct and work on the medium for *incorporating* local perspective, it is significant for decision makers to take into account the co-constituting character between fractal and connective tissue (see Figure 8.3). As

emphasised above, when local people created the communication blockages in mind, the inflow of information initiated from the government was interrupted and social discontinuities emerged. To deconstruct the communication barriers and transform social discontinuities, the function of fractal - how local people make sense and incorporate in their self the multiple and concrete interaction with others, giving free rein to their own perception and knowledge on water pollution – offered valuable insights for decision makers and (or) practitioners who are geared to implementing environmental programs such as information outreach (see Figure 8.2). Moreover, a systematic thinking– considering the co-constituting character of, the interplay and mutual forces between the domain of government agencies and local people – would be meaningful for implementing accountable environmental governance.

In sum, through the integration of the lens of communication interface and the proposed analytical framework, the study redraws the contour of state-society relation by shedding a new light on the dynamic, fluid and multi-layered character of China's environmental politics. The focus of the domains of government agencies and local communities allowed decision makers to sensitize the discrepant social interest, value and meaning, knowledge and power. Applying the analytical framework, it granted opportunities of incorporating local perspectives into environmental governance. Moreover, the usefulness of the analytical framework was evident in its ability of mid-range generalizations about people's perception and knowledge development about environmental issues, which allows for contingency and contextual specificity at both local and larger-scale levels. Last but not least, motivated by the TCPCS thinking, the framework illuminated our understanding of social conflict and cooperation in general, provoking the idea of collective intelligence and co-production of knowledge.

In order to disentangle the patterns of social conflict and other communication barriers, the research highlighted the role of mediator, bridging/boundary organization in transforming social discontinuities. In addition, a platform such as public events, official campaigns, visual media art for communication interface could stimulate social learning and collective intelligence. Relative to this, some social innovation and (or) experiment of building a fluid

"waterscape"[148] for communication on water-relevant issues has been documented in China. Whereas the public in China play a limited role in the process of decision-making and implementation of environmental policies, social and cultural innovation creates room in the society for people to inspire themselves, for people to learn from the history on balancing the relation between mankind and nature, as well as between human beings.

In 2014, a Chinese cultural activist who is also a scholar of anthropology studies, invited a famous musician for an ecological art performance. The performance was initiated to raise public concern about water pollution as well as to share public anxiety induced by the emerging environmental crisis. The theme of this performance was "Mountain, Rivers and Water". According to the Chinese musician, the music for his performance was inspired by a water pollution incident occurring in Huang Pu River in 2013, which resulted in 10,164 dead pigs dumped to the river (Southern Weekend, 2013.03.19). Reportedly, the dead pigs were dumped from the pig farms of Jiaxing, a city located in close proximity to Shanghai. The pollution provoked a heated debate on the health of China's riverine systems and drinking water safety. From the perspective of the musician, the riverine ecosystems in China are getting "sick". He hopes the created "soundscape" through his music (see Annex IX) could provoke public concern about China's water pollution (Zhou, 2014). For the anthropologist who organised this ecological art performance, the idea was motivated by an official news from the MWR, which mentioned that since 1950s China has lost 28,000 rivers. In his opinion, the society needs to reflect on the way how mankind are making use of water resources, as well as to understand the root causes of China's water pollution (ibid.). To complement the performance of the musician, the anthropology scholar was making the calligraphy of content from two Chinese classic books on water resources management – *Classic of Mountains and Seas*, *Commentary on the Water Classic* (see Annex IX). The created "waterscape" – combining the music and visual art of the calligraphy – sensitized the audience about the water crisis confronting our society, and further stimulated people's reflection on China's environmental pollution.

[148] The notion is inspired by the created 'soundscape' during one "ecological art performance" - combining the music and visual art of the calligraphy of contents from two Chinese classic books on water resources management.

To this end, the "ecological art performance" initiated from the grassroots society represents a meaningful lesson for free-flowing discussion and reflection on China's environmental crisis. Such inherently social innovation and cultural reclamation inspired by Chinese history, by implications show that a *platform* of interaction and social learning is crucial for building shared understanding and communication on water pollution. While (water) policy model often leaves unexplained new social trend that connects institutional organization with spontaneous ideological and normative transformation in society (Arce, 2010, p.280), the presented grassroots initiative offers critical insights on how to stimulate and make those new social trend possible. In this light, solutions to environmental issues can't be made in isolation, but only in dialogue with the local population. To base growth on accelerated prevention of pollution and abatement efforts, it is important for decision makers and (or) practitioners to communicate the vision together *with* local communities who depend on the water resources on a daily basis, rather than talking *about* them. Stronger efforts to engage local people in dialogue, knowledge exchange and joint learning would be significant and meaningful. While the digital sphere is expanding fast for environmental governance in China, this research shows that it might take time for local people to accept and apply the digital tools for accessing environmental information. Thereby, cultivating mutually-communicative channels and utilising traditional media such as face-to-face talks in communities, might provide more effective services of informing people about water problems.

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ANNEX I Situating the Field Research

Entering the field

At the beginning of the field work, explorative interviews were conducted with environmental activists during the "Beijing Environmental Charity" held in May 31st and June 1st 2014. This environmental event focused on China's water and air pollution. During the event, the author built very good contact with NGOs which had experience of organising environmental activities in Dongying before. Through these contacts the author was introduced to environmental activists from Dongying. Unstructured interviews were applied with environmental activists, in order to absorb holistic ideas about China's environmental management. These interviews provided also valuable insights on framing the processes of interaction and communication between government agencies and local communities in Dongying.

After the case studies areas in Dongying were selected, explorative interviews were applied with workers from Haixing and Hugerrubber Company. In these situations, the human resource managers of the companies usually facilitated the first interviews with workers. The managers helped to arranged field visits[149] to the field offices (Haixing)/workshops (Hugerrubber), so the author could have preliminary insights on the working environment of the companies. After the field visits, interviews were conducted with human resource managers to discuss the author's information needs and access to secondary data (e.g. socio-economic background of their labour sources, project reports, statistics). Then a name list of the branch companies of Haixing and location of its field offices in the Dongying port, departments and the affiliated workshops of Hugerruber were requested from the human resources managers respectively. The author was left freely to select the specific field office/department/workshop to conduct her field work.

Contextualization of the survey

After visiting the field offices of Haixing Company in the Dongying port and interview with their human resource manager, the survey method appeared to be effective for data collection.

[149] The first field visit was usually accompanied by the human resource managers or general manager.

In primary, workers from Haixing have various socio-economic backgrounds and are involved in different industries (e.g. salt farming and aquaculture). Secondly, the informants had intensive work and only short interviews were recommended by Haixing.[150] Lastly, the human resource manager of Haixing seemed very familiar with the survey method, as they coordinate the local government to conduct surveys on local fishery regularly. Given these, a survey execution seemed conducive to capture the dynamics of the situated perspectives with strong support from the company as well. In addition, a survey conducted in the beginning of the field work was very helpful to explore new phenomenon or perspective that was not taken into account before, as well as to complement the generated insights.

Sampling and questionnaire design

Haixing Company has in total 524 workers (including Haixing villagers), among which 21 are managers and 227 are senior staffs. Moreover, 126 workers of Haixing are involved in the salt farming industry, 48 workers involved in the salt chemical industry and others involved in the fishery industry and port service. Practically speaking, stratified sampling among workers from the salt farming, salt chemical and fishery industry was not feasible as those working in the field stations had un-regular working routines. It was not predictable how many workers would be available for interviews during the field work. Given this, informants were randomly selected when they were having a short break form their work. Gender of the survey sample was statistically not controllable, due to the fact that workers in the Dongying port were male dominant.

The questionnaire design of this survey referenced Chen's (2013) work on public culture information service in rural China. To explore the access to information and digital needs in rural societies, Chen conducted her survey in Hunan Province targeting rural villagers and labourers. Given there is a dearth of study on access to information and digital needs of rural population in China, Chen's book resembles a travel guide through a terrain that is overlook, and reminds the author that 'what is worth seeing there'. Although public culture is not the focus in this research, the formulated categories (i.e. access to information, demands for information, perceived value of information access) in Chen's questionnaire provide a framework to formulate the 'building blocks' of this survey. To better fix the research context

[150] Normally the workers had to work 6-8 hours per day and they were tired after finishing work from the field stations. Due to this, they didn't feel very comfortable to have interviews and open up long conversations either.

and objective of this research, Chen's questionnaire was modified. Two more new categories were added, including "access to water-relevant information" "sense of place" (see the questionnaire in Annex II). The questionnaire was formulated in Chinese and pre-tested during the first field visits to the field offices of Haixing. Notwithstanding the topic of this research focuses on industrial water pollution, the questionnaire didn't explicitly address the pollution issue. Instead, the questionnaire set out from a broader perspective focusing on people's general interests and demand for information in relation to their livelihood concerns. This was for the purpose of reducing bias in a context whereas industrial water pollution was prominent enough that posed a risk to the livelihood of local population already (see Chapter 2). On that account, the format of the questions was more explorative.

Over the survey execution, an open-minded manner was kept in my mind. Listening to informants' narrative and (or) justification of their answers with patience was important to build trust and reciprocal understanding. Their narratives helped to pinpoint some issues which were not informed in the generated research framework, and served as reference for formulating interview questions with other stakeholders (e.g. government officials, environmental activists). In some occasions, follow-up unstructured interviews were conducted to furthermore clarify issues that either were not mentioned or contrasted to information gathered from other respondents. Follow-up unstructured interviews turned out to be a useful way to open up insightful discussion with informants. However, arrangements of the follow-up unstructured interviews were usually constrained by the informants' working schedules. In a few cases the author was invited to dinner, and some interesting/unprepared/unexpected topics were discussed over these informal conversations.

In general, the exploratory nature of the questionnaire designed with open-ended, multiple-choice questions, granted opportunities of experimentation as well as deliberative examination on the "pure" information interests of lay actors, while allowing space for them to address the livelihood concerns. It was also helpful to avoid the conduct of proving the preliminary hypothesis or seeking evidence to demonstrate the author's assumptions of lay perspectives. Last but not least, the survey conducted in the very beginning of the field work, allowed an "authentic" observation in the local situation without influence by insights drawn from other stakeholders.

The survey was conducted by the author herself. Given the fact that the Dongying port is a geographically remote area, it was difficult to find enumerators being university students or other suitable candidates. After discussion with Haixing, they appeared to be hesitant to allow my research assistant jump in and interact with their workers over the survey execution. However, the fact that the survey was all conducted by the author granted advantages for a coherent and systematic way of data collection. The consistent way of asking questions and probing also increased the reliability and the quality of data content. In spite of this, the author had to overcome the challenge of fatigue, frustration, confusion; and had to keep patient and polite over her encounter with many 'similar' informants.

Situating myself

In the explorative period of this field work, attending the national environmental event organised in Beijing offered a valuable opportunity for the author to build contact with 'resourceful' informants. Through encounters with the 'resourceful' informants in Beijing, it paved ways for building a solid network in Dongying. In particular, personalised connections and informality proved to be useful to make contact with local informants, granting advantages to build trust and to open the dialogues in short time. It was also a cost-effective strategy without much intervention from local stakeholders formally. More crucially, personalised connections were effective to provoke insightful conversation with government officials during the interviews.

To pursue the methodology approach of "science-in-the-making" and "working-close-to-ground", the author however confronted the challenge of balancing her role as both an insider and outsider. For instance, when the author was introduced to Hugerrubber Company as an 'outsider' – entering the company as a doctoral student for her field work – it was challenging to build reciprocal understanding with the workers. The workers perceived me as a highly educated person, keeping respectful while staying distant to this 'outsider'. In addition, they seemed to be very cautious over conversations, in case of any inappropriate narratives would be reported to their managers. In order to break the iceberg and initiate more insightful conversation, the author needed to create opportunities herself by making informal interaction with the informants. Making informal interaction was attempted mainly through having dinner or random talks after informants' daily routines in the company. In this context, rather than throwing out a question and urging the informants to give and justify their answers, the author usually started the conversation with topics about family relations or living curiosities.

It was this random setting allowed the opportunities to observe and document the processes of interaction and communication among informants. Meanwhile, this allowed the opportunity for the author to develop and increase her reflection – trying to enter, to learn, and to think from the perspective of lay actors – to make efforts of situating herself as an 'insider' in the local society. While the impression was attempted to the informants – 'she is just like us normal person'- the relationship between the author and her informants fostered. The social world of the informants unveiled also their meaning.

Being a normal and local in the field helped the author to situate herself during the field work. This so-called 'lomal' principle was not only academically sound because it conveyed a sense of relationships fostered during the field research, but was also a principle for the author to balance her role as an 'insider' and 'outsider'.

ANNEX II Questionnaire

Survey on Water Resources Management and Access to Information in the Dongying Port

Date of interview:

Location: (Field stations of Haixing Company)

ID of informants:

Dear Sir/Madam,

The survey is part of an interdisciplinary research project entitled "Delta Information System for Geoenvironmental and Human Habitat Transition". The purpose of the survey is to obtain a better understanding about the status quo of marine environmental quality and future development trends of ocean resources use in the Bohai Bay. In addition, we are also interested in your general demands for information in relation to your livelihood, as well as your access to information in the Dongying Port.

Your opinions are very important for this survey and we will keep all your answers strictly confidential. We will not share your answers with anyone else. Your identity will be also kept anonymous. The survey would take 20-30 minutes and we appreciate your big help!

Jiaxin Tan (Ph.D candidate)

A. Background information

1. What's your gender :
2. What's your age:
3. Which place were you born?
   1) Dongying
   2) Shandong Province
   3) Outside Shandong Province

4. What's your highest completed level of school? ☐
   1) Less than primary school diploma
   2) Primary school diploma
   3) Junior school diploma
   4) High school/ secondary specialized school/ technical school
   5) Above high school

5. What industry are you involved in? ☐
   (Fishery/ Salt farming/Salt chemical)

6. How many years have you been involved in the industry of fishery/salt farming/salt chemical producing?
   ☐

7. What's your average income per year? ☐

8. Do you live in Haixing Village currently? ☐

B. Access to information

1. What is your main access to information? ☐
   (Please check ALL that apply)
   1) Television/newspaper/ broadcast/books
   2) Internet
   3) Skills training
   4) Talking with families/relatives/friends
   5) Talking with colleagues/peers
   6) Others

2. How often do you use the following information channels in your daily life? (Please check one per row)

	Everyday	Often	Sometimes	Seldom	Never
Watch TV					
Radio					
Newspaper					
Magazine					
Internet					

3. Which of the following information about individuals/family do you pay most attention to? (Please check ALL that apply) ☐

   1) Improving technical skills 2) Entertainment and leisure 3) Medical insurance

   4) Education for children 5) Employment 6) Investment 7) Health care

8) None

4. Which of the following information about society/country do you pay most attention to? (Please check ALL that apply) ☐

   1) Job market 2) Economic development 3) Rural policy 4) Social justice

   5) Health care reform 6) Education 7) Political dynamics/trends

   8) Environmental protection 9) None

5. Which of the following information has ever offered you great help? (Please check ALL that apply) ☐

   1)Technology/means that improve profits

   2) Life skills 3) Employment recruitment 4) Health care

   5)Social welfare 6) Social service 7) Supply/demand information of related industrial products[151] 8) None

6. What are the advantages of having access to information? (Please check ALL that apply) ☐

   1)Improving individual capabilities & skills 2) Learning more life skills 3) Having more news on society and people's life 4) Cultivating hobby/interest 5) Entertainment and leisure 6) Increasing economic income 7) None

7. Which of the following is influenced if your information access is lacking? ☐

   1)Economic income 2) Individual rights 3) Social status 4) Health 5) None

C. **Access to water-relevant information**

1. Which of the following water-relevant information do you pay attention to? (Please check ALL that apply) ☐

   1) Marine/basin water environment and water quality 2) Drinking water quality
   3) Water policy/law/regulations 4) Engineering and construction
   5) Public campaigns 6) None

2. Are you satisfied with the drinking water quality of this place? ☐

[151] Aquatic/salt/salt chemical products relevant to the specific industry which the informants are involved in.

1) Very satisfied 2) Somewhat satisfied 3) Neutral
4) Not very satisfied 5) Not satisfied

3. (a) How much are you concerned about the information on local drinking water quality?

1) Very much 2) Somewhat 3) Neutral 4) Very little 5) Not at all

3. (b) Why are (aren't) you concerned about the information on local drinking water quality?

4. What is your main access to drinking water safety information? (Please check ALL that apply)

1) Newspaper/radio/television/internet 2) Talking with relatives/friends/colleagues
3) Government websites 4) Public campaigns 5) Environmental NGOs 6) Research institutes/universities 7) None

5. How do you think of the issue of water pollution in this place?

1)Very serious 2) Somewhat serious 3) Not very serious 4) Not serious 5) Do not know

D. Sense of place

1. How long have you worked in this place?

2. Do you live with your family now (e.g. spouse/children/parents/relatives)?

3. How much do you agree or disagree with the following statement?
I think the place I currently live in is warm and comfortable.

1) Strongly agree 2) Somewhat agree 3) Disagree
4) Strongly disagree 5) Do not know

4. How do you think this place is changed during the past 2-3 years?

1) Very much changed 2) Somewhat changed 3) Not much changed
4) Not changed 5) Do not know

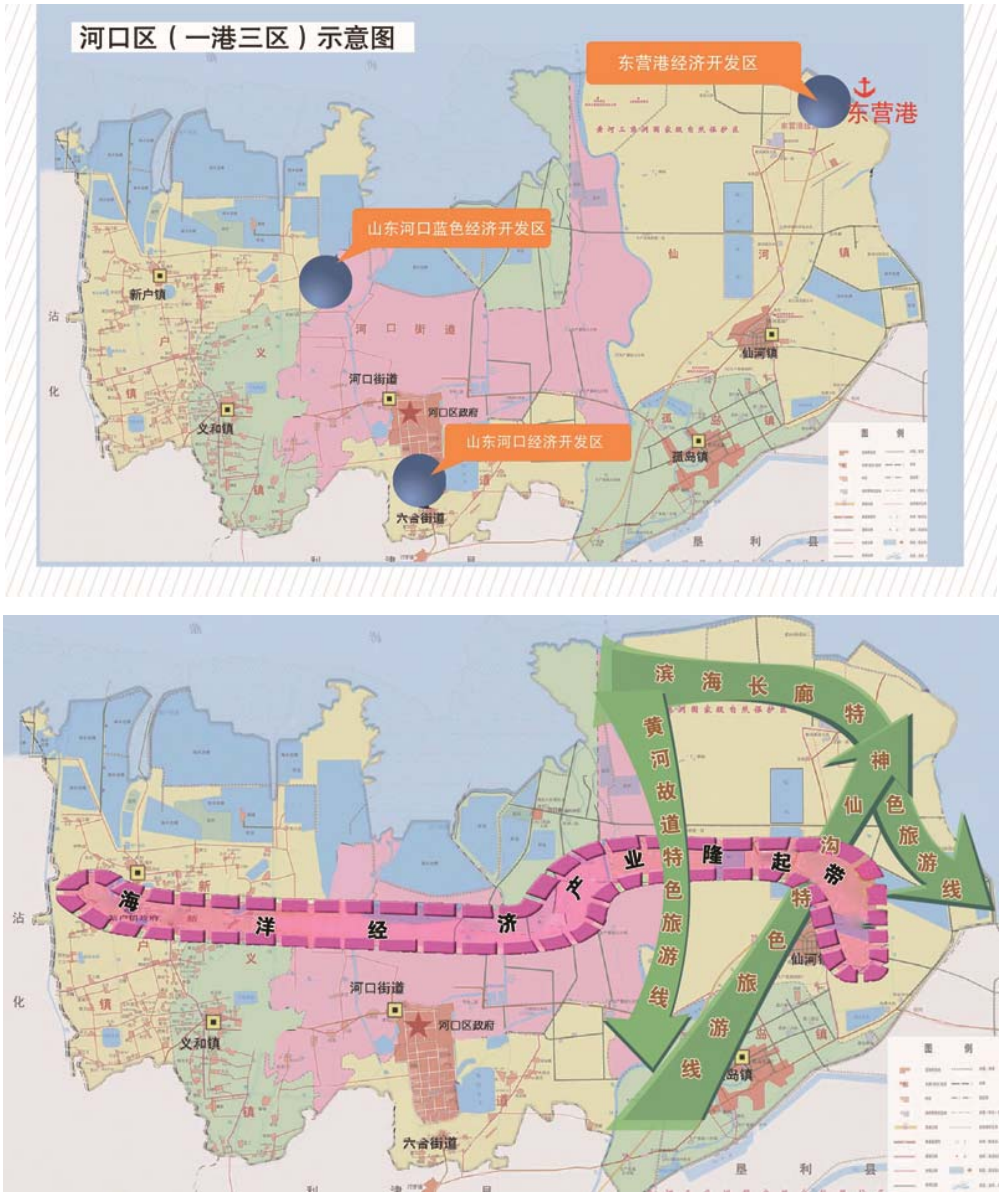
5. How much do you feel capable to adapt to the changes of this place?

1) Very capable to adapt 2) Quite capable to adapt 3) Not quite capable to adapt
4) Not capable to adapt 5) Do not know

ANNEX III Development Roadmap of Hekou District: One Port- Three Districts -One Belt – Three Lines – One City

The goal of "One port" is to accelerate the construction of Dongying port and develop it into a modern and international logistics port; "three districts" is to strengthen the Dongying Port Economic Development Area, Shandong Province Hekou District Economic Development Area, Shandong Province Hekou District Blue Economic Area; "one belt" is to increase the blue marine resources industry boom; "three lines" is to create three special areas for local tourism; "one city" is to crate liveable conditions while supporting the regional development of Hekou.

Figure 1 Development roadmap of Hekou District



Source: HKG, 2015

ANNEX IV Tables

Table 1 Demographic and socio-economic characteristics of two case studies areas

Research Sites	Case study one			Case study two	
	Hekou District	Xianhe Town	Dongying Port	Guangrao County	Daozhuang Town
Jurisdictional areas	4 towns and 2 sub-districts, 8 residential committees and 178 village committees	4 villages	1-Donggang Village	6 towns, 1 township, 2 sub-districts, 10 residential committees and 557 village committees	85 natural villages, 45 of them are administrative villages
Population	215,100	37,640		500,603	66,882
Population density	91 people per square kilometre				637 people per square kilometre
Total area of land （square kilometres）	2365.13	672	23,200 (area for future development 46,600)	1165.63	105
Total output value (billion RMB)	19.5	3.9	-	60.8	10.7
The gross value of industrial output (billion RMB)	72.9	19.1	8.8	331.5	47.5
Number of large-scale industrial enterprises	119	-	119	241	-
Urban disposal income (RMB)	29,239	-		27,504	-
Rural residents' net income[152]	11,317	16,341		12,055	12,305

[152] Data from rural household surveys conducted by the local government.

(RMB)					
-Rural labour income from local enterprises	2,510	-		5,502	-
Residential Consumption (RMB per person)					
-All residents	15,828	-		12,265	-
-Urban residents	20,586	-		26,632	-
-Rural residents	9,397	-		9,847	-
Water Resources Supply and Agriculture					
Water resources	1) drinking water sources – reservoir water 2) fresh water is scarce, surface and ground water is salty due to the land salinization 3) irrigation water comes from the Yellow River (80 million cubic meters)		sources of drinking water are from nearby reservoirs	1) drinking water sources-well water 2) both freshwater and ground water is useable 3)irrigation water comes from the Yellow River (56 million cubic meters)	
Agriculture	1)land output and utilization rate is low 2)due to low groundwater level and high salinity, small amounts of nitrogen, phosphorus, organic matter in the soil 3)ecological environment is frail - flood, drought, hail and storm is frequent that constrained agriculture 4)main crops – maize, wheat			1)land output and utilization rate is high 2)the physical shape and alluvial sediments provide favourable conditions (e.g. fertile soil and nitrous organic matter)for agriculture 3)main crops - maize, wheat, cotton, vegetables	

Source: XHG, 2014; Dongying General Statistics Office, 2013

Table 2 Development of Guangrao's village enterprises since 1973

Year	Number of village enterprises	Employees	The original value of fixed assets (million RMB)	Gross value of industrial output (million RMB)	Profit (million RMB)
1973	187	612		0.3	0.04
1974	188	743		0.3	0.05
1975	195	880		1.32	0.19
1976	228	915		1.37	0.20
1977	273	1,680		2.5	0.37
1978	406	4,383	3	9.8	4.05
1979	346	6,120	2.4	9.1	3.3
1980	511	5,657	1.9	14.2	3.1
1981	572	6337	6	16.1	3
1982	546	6014	12	22	4
1983	494	4993	12	23	2.4
1984	339	7606	8	30	2.8
1985	384	8876	13	31	4

Source: Guangrao Statistics Office, 2013

Table 3 Overview of Guangrao's village enterprises 1985

Industry	Number of village enterprises	Employees	Gross value of industrial output (million RMB)
Rubber products	9	113	0.7
Metal processing	19	222	2.73
Food processing	13	107	0.52
Building material and other non-metal processing	119	4592	13.38
Construction	56	-	-

Source: Guangrao Statistics Office, 2013

Table 4 Environmental changes observed near 4 gullies of Sanshui Village

Gullies	I	II	III	IV
Location (with names of nearby industrial enterprise)	N. – AGR	N. –processing factory E. – Dragon S. - HX W. – large area of farmland	N. – HX E. – YW S. – farmland W.- farmland	N. – KJE and YD E. – Dragon N. – farmland W. – HY
Water flows	limited amount of water	source is from the Yellow River irrigation water	source is from the Yellow River irrigation water	limited amount of water
Historical development	- built in around 1958 during the division of local land resources - the water can still go through to the pond	- in the spring crop season of 2014 the water could still go through, and the water level of the pond was high - It was blocked in October 2014 by *Dragon* without seeking consent from Sanshui Village; the area of gully is nearly 20 mu which is not calculated in the land expropriation - the sewage can't go through and people have to use	- in the spring crop season of 2014 the water can still go through to YW factory, but not to the pond - in the summer of 2014 HX factory built up a wall in the gully and the water goes through until the wall - sewage can't go through and not good for the nearby farmland; - during rainy seasons it may lead to flooding because	- it was built during the division of local land resources - the eastern part was blocked in 2014; while the western part was blocked 3-4 years ago when the main road was built

		this dirty water for irrigation	the water can't go through	
Stuffs inside	- filled with garbage and some reeds - some obstacles were found in the gully but the water can go through - water does not ice up in the gully	- the mark on the riverbed indicates that the water levels up to 80cm when the Yellow River irrigation water comes - mostly filled with garbage	- when the irrigation water comes, it levels up to 80cm from the mark left on the riverbed -almost no garbage and reeds - the water ices up and looks quite clean	- reeds (around 2-meter high) - dry corn stalk
Function (irrigation or drainage)	drainage	drainage and irrigation	drainage and irrigation	mainly for drainage

N. = north S. = south E. = east W= west

Source: Table by author based on transect walks conducted with Sanshui villagers on 2015.01.09

ANNEX V "Xishui Mode" in Daozhuang Town

BOX Development of Xishui Group in Daozhuang Town

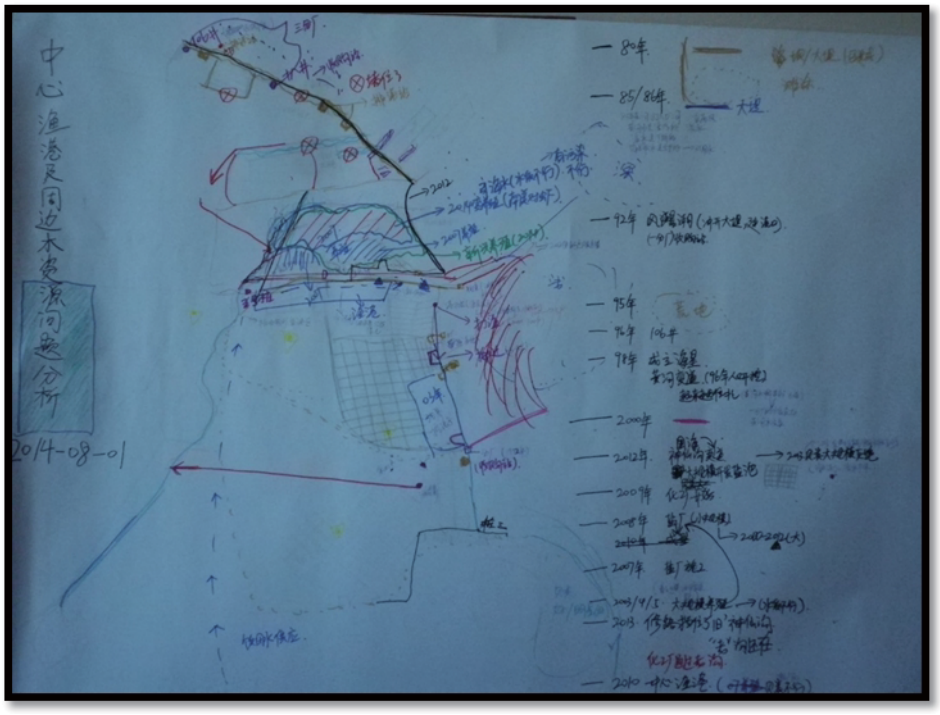
Xishui Group shows a typical story about how a rural village enterprise developed their business model successfully and expanded itself into one of the largest global production bases of rubber tyres, leading the development of China's tire manufacturing and processing industry.

In 1987, household contract responsibility system was initiated in China. This benefited rural people to increase their agricultural production while reducing their risks of famine and hunger. Meanwhile, local villagers were able to gradually accumulate their initial capital. With use of their initial capital, several households of Xishui Village joined together and set up their first factory. They also allowed other villagers to have shares in their factories, if the villagers showed willingness to join. After 1992, market economy was initiated in China which provided good conditions for the rapid growth of enterprises. Under this background, spontaneous joint of factories became popular in Xishui, as this was regarded helpful to collect human, financial and labour resources. They self-organized and developed themselves into bigger joint-enterprises. After 2000, several enterprises joined together and established the joint-group-company, namely the Xishui Group.

From household-household-joint factory to factory-factory-joint enterprise, to enterprise-enterprise-joint group, Xishui created a development model for private enterprises: 1) collecting money from local villagers, 2) setting up factories under the leadership of capable and intelligent person, 3) sharing risks and profits together. This is the development of "Xishui Mode" which is well-known to local people nowadays. It demonstrates a typical case of how industrial boom in rural China was initiated by the entrepreneurs and to what extent it changed livelihood of rural population.

Source: Xishui Ethnography Compilation Committee, 2010

ANNEX VI A Map Generated from the Timeline Exercise in the Dongying Port



Source: Drawn by author, 2014

ANNEX VII China Water Resources Newspaper Special Issue


8 世界水日·中国水周

节约水资源 保障水安全

如何才能防治水污染

水污染综合防治的主要对策有哪些？

防治水污染我们该做点什么？

应对水污染水利部门干了啥？

HOW TO PREVENT WATER POLLUTION?

What we could do to prevent water pollution?

- Be careful of the use of cleaners – if possible use soap to reduce water pollution;
- Minding the use of paper – is minding the resources of forests and rivers;
- Choosing non-phosphorus detergent - to protect rivers and lakes;
- Developing afforestation- to increase forest areas and enhance water conservation.

WHAT TO DO IN ACCORDANCE WITH *THE LAW OF SOIL AND WATER CONSERVATION*?


节约水资源 保障水安全

世界水日·中国水周 11

水土保持法要我们做什么

Requirements of ‘can’ and ‘can’t ’ according to the *Law of Soil and Water Conservation*?

WHAT TO DO IN ACCORDANCE WITH THE LAW OF WATER POLLUTION CONTROL ?

What is written on the law of Water Pollution Control?

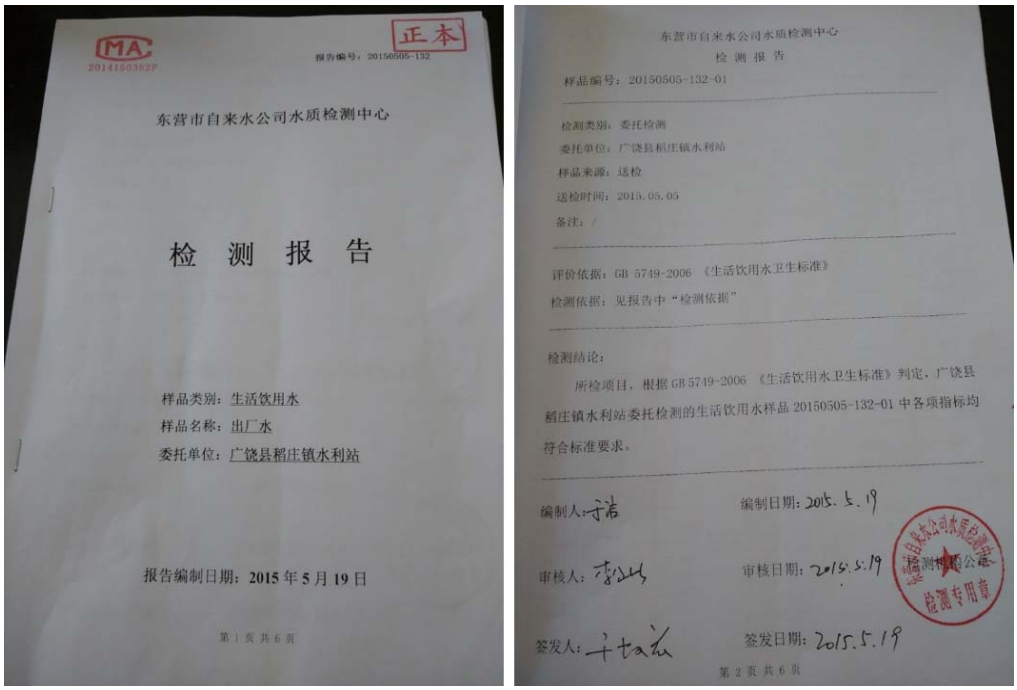
- What is water pollution?
- How to conserve the drinking water resources?
- What behaviours are encouraged ?

HOW TO SAVE WATER?

Tips of saving water:

- Clean the oil first before use water for dish washing
- Multiple use of water
- Choose water-saving washing machine, toilets
- Wash vegetables smartly
- Use a washbasin to wash hands or face
- Bath-shower is better than bath-tub for saving water
- [...]

ANNEX VIII Sampled Report on Drinking Water Quality in Daozhuang Town



东营市自来水公司水质检测中心

正本

报告编号：20150505-132

检 测 报 告

样品类别：生活饮用水

样品名称：出厂水

委托单位：广饶县稻庄镇水利站

报告编制日期：2015 年 5 月 19 日

第 1 页 共 6 页

东营市自来水公司水质检测中心

检 测 报 告

样品编号：20150505-132-01

检测类别：委托检测

委托单位：广饶县稻庄镇水利站

样品来源：送检

送检时间：2015.05.05

备注：/

评价依据：GB 5749-2006 《生活饮用水卫生标准》

检测依据：见报告中“检测依据”

检测结论：

所检项目，根据 GB 5749-2006 《生活饮用水卫生标准》判定，广饶县稻庄镇水利站委托检测的生活饮用水样品 20150505-132-01 中各项指标均符合标准要求。

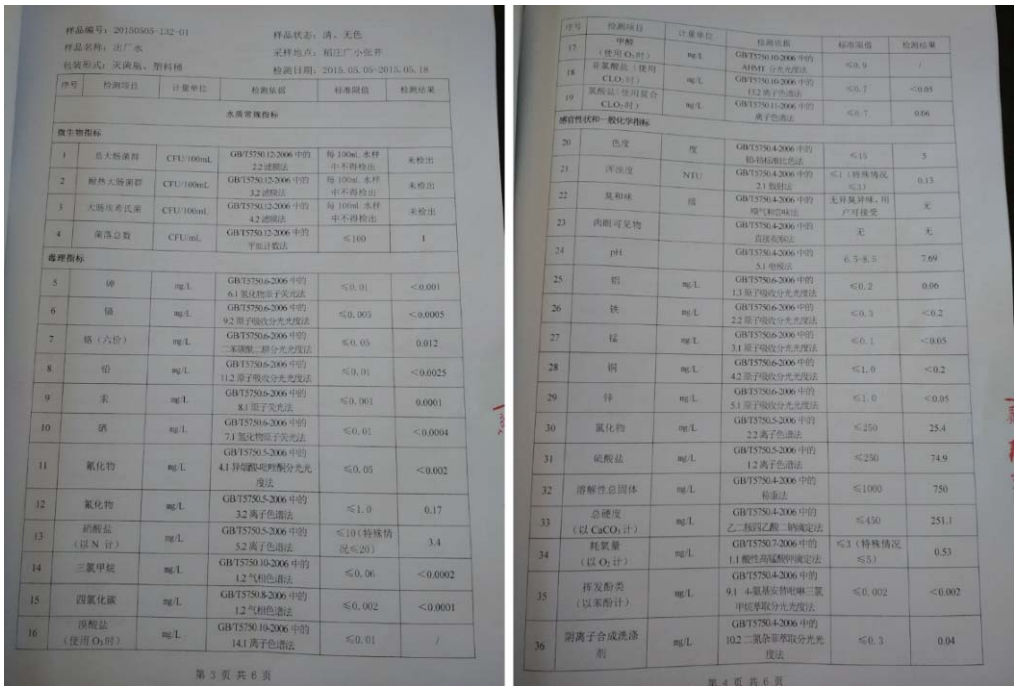
编制人：于洁　　编制日期：2015.5.19

审核人：李XX　　审核日期：2015.5.19

签发人：于XX　　签发日期：2015.5.19

第 2 页 共 6 页

Source: Rural Centralised Water Supply Station of DZG (Page 1-2)



样品编号：20150505-132-01　　样品状态：清，无色

样品名称：出厂水　　采样地点：稻庄广小区井

包装形式：灭菌瓶、塑料桶　　检测日期：2015.05.05-2015.05.18

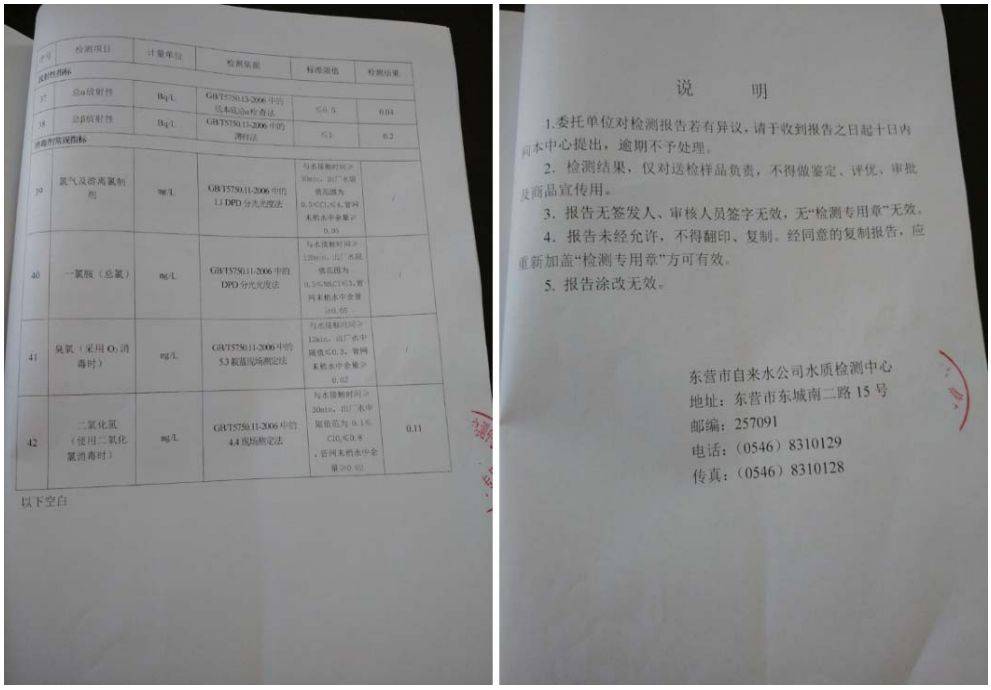
序号	检测项目	计量单位	检测依据	标准限值	检测结果
	水质常规指标				
微生物指标					
1	总大肠菌群	CFU/100mL	GB/T5750.12-2006 中的 2.2 滤膜法	每 100mL 水样中不得检出	未检出
2	耐热大肠菌群	CFU/100mL	GB/T5750.12-2006 中的 3.2 滤膜法	每 100mL 水样中不得检出	未检出
3	大肠埃希氏菌	CFU/100mL	GB/T5750.12-2006 中的 4.2 滤膜法	每 100mL 水样中不得检出	未检出
4	菌落总数	CFU/mL	GB/T5750.12-2006 中的 平皿计数法	≤100	1
毒理指标					
5	砷	mg/L	GB/T5750.6-2006 中的 6.1 氢化物原子荧光法	≤0.01	<0.001
6	镉	mg/L	GB/T5750.6-2006 中的 9.2 原子吸收分光光度法	≤0.005	<0.0005
7	铬（六价）	mg/L	GB/T5750.6-2006 中的 二苯碳酰二肼分光光度法	≤0.05	0.012
8	铅	mg/L	GB/T5750.6-2006 中的 11.2 原子吸收分光光度法	≤0.01	<0.0025
9	汞	mg/L	GB/T5750.6-2006 中的 8.1 原子荧光法	≤0.001	0.0001
10	硒	mg/L	GB/T5750.6-2006 中的 7.1 氢化物原子荧光法	≤0.01	<0.0004
11	氰化物	mg/L	GB/T5750.5-2006 中的 4.1 异烟酸-吡唑酮分光光度法	≤0.05	<0.002
12	氟化物	mg/L	GB/T5750.5-2006 中的 3.2 离子色谱法	≤1.0	0.17
13	硝酸盐（以 N 计）	mg/L	GB/T5750.5-2006 中的 5.2 离子色谱法	≤10（特殊情况≤20）	3.4
14	三氯甲烷	mg/L	GB/T5750.10-2006 中的 1.2 气相色谱法	≤0.06	<0.0002
15	四氯化碳	mg/L	GB/T5750.8-2006 中的 1.2 气相色谱法	≤0.002	<0.0001
16	溴酸盐（使用 O_3 时）	mg/L	GB/T5750.10-2006 中的 14.1 离子色谱法	≤0.01	/

第 3 页 共 6 页

序号	检测项目	计量单位	检测依据	标准限值	检测结果
17	甲醛（使用 O_3 时）	mg/L	GB/T5750.10-2006 中的 AHMT 分光光度法	≤0.9	/
18	亚氯酸盐（使用 ClO_2 时）	mg/L	GB/T5750.10-2006 中的 13.2 离子色谱法	≤0.7	<0.05
19	氯酸盐（使用复合 ClO_2 时）	mg/L	GB/T5750.11-2006 中的 离子色谱法	≤0.7	0.06
感官性状和一般化学指标					
20	色度	度	GB/T5750.4-2006 中的 铂-钴标准比色法	≤15	5
21	浑浊度	NTU	GB/T5750.4-2006 中的 2.1 散射法	≤1（特殊情况≤3）	0.13
22	臭和味	级	GB/T5750.4-2006 中的 嗅气和尝味法	无异臭异味，用户可接受	无
23	肉眼可见物		GB/T5750.4-2006 中的 直接观察法	无	无
24	pH		GB/T5750.4-2006 中的 5.1 电极法	6.5-8.5	7.69
25	铝	mg/L	GB/T5750.6-2006 中的 13 原子吸收分光光度法	≤0.2	0.06
26	铁	mg/L	GB/T5750.6-2006 中的 2.2 原子吸收分光光度法	≤0.3	<0.2
27	锰	mg/L	GB/T5750.6-2006 中的 3.1 原子吸收分光光度法	≤0.1	<0.05
28	铜	mg/L	GB/T5750.6-2006 中的 4.2 原子吸收分光光度法	≤1.0	<0.2
29	锌	mg/L	GB/T5750.6-2006 中的 5.1 原子吸收分光光度法	≤1.0	<0.05
30	氯化物	mg/L	GB/T5750.5-2006 中的 2.2 离子色谱法	≤250	25.4
31	硫酸盐	mg/L	GB/T5750.5-2006 中的 1.2 离子色谱法	≤250	74.9
32	溶解性总固体	mg/L	GB/T5750.4-2006 中的 称重法	≤1000	750
33	总硬度（以 $CaCO_3$ 计）	mg/L	GB/T5750.4-2006 中的 乙二胺四乙酸二钠滴定法	≤450	251.1
34	耗氧量（以 O_2 计）	mg/L	GB/T5750.7-2006 中的 1.1 酸性高锰酸钾滴定法	≤3（特殊情况≤5）	0.53
35	挥发酚类（以苯酚计）	mg/L	GB/T5750.4-2006 中的 9.1 4-氨基安替吡啉三氯甲烷萃取分光光度法	≤0.002	<0.002
36	阴离子合成洗涤剂	mg/L	GB/T5750.4-2006 中的 10.2 二氯苯亚甲蓝萃取分光光度法	≤0.3	0.04

第 4 页 共 6 页

Source: Rural Centralised Water Supply Station of DZG (Page 3-4)



序号	检测项目	计量单位	检测依据	标准限值	检测结果
放射性指标					
37	总α放射性	Bq/L	GB/T5750.13-2006 中的 1.4 或 2.0 检查法	≤0.5	0.04
38	总β放射性	Bq/L	GB/T5750.13-2006 中的测试法	≤1	0.2
消毒剂常规指标					
39	氯气及游离氯制剂	mg/L	GB/T5750.11-2006 中的 1.1 DPD 分光光度法	与水接触时间≥30min，出厂水限值范围为 0.3<Cl2≤4，管网末梢水中余量≥0.05	
40	一氯胺（总氯）	mg/L	GB/T5750.11-2006 中的 DPD 分光光度法	与水接触时间≥120min，出厂水限值范围为 0.5<NH2Cl≤3，管网末梢水中余量≥0.05	
41	臭氧（采用 O_3 消毒时）	mg/L	GB/T5750.11-2006 中的 5.3 靛蓝现场测定法	与水接触时间≥12min，出厂水中限值≤0.3，管网末梢水中余量≥0.02	
42	二氧化氯（使用二氧化氯消毒时）	mg/L	GB/T5750.11-2006 中的 4.4 现场测定法	与水接触时间≥30min，出厂水中限值范为 0.1≤ClO2≤0.8，管网末梢水中余量≥0.02	0.11

以下空白

说　　明

1.委托单位对检测报告若有异议，请于收到报告之日起十日内向本中心提出，逾期不予处理。

2. 检测结果，仅对送检样品负责，不得做鉴定、评优、审批及商品宣传用。

3. 报告无签发人、审核人员签字无效，无"检测专用章"无效。

4. 报告未经允许，不得翻印、复制。经同意的复制报告，应重新加盖"检测专用章"方可有效。

5. 报告涂改无效。

东营市自来水公司水质检测中心
地址：东营市东城南二路 15 号
邮编：257091
电话：（0546）8310129
传真：（0546）8310128

Source: Rural Centralised Water Supply Station of DZG (Page 5-6)

ANNEX IX Photographs of the Ecological Art Performance

(1) & (3) :The organizer of the ecological art performance was making the calligraphy of contents from two Chinese classic books on water resources management – *Classic of Mountains and Seas*, *Commentary on the Water Classic*,(2): the musician was playing his song. Source: Zhou, 2014