



Environment and Health Management System and Policy Framework

CCICED Policy Study Report 2008

2008 Annual General Meeting

China Council for International Cooperation on Environment and Development

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Executive Summary

Since the adoption of the reform and opening up policy in China, China's social economy has witnessed tremendous changes. The economy develops rapidly, the living standard of the ordinary people is raised drastically, and the social security such as education and medical care is improved considerably. However, under the combined action of the economic structure, the economic growth mode, the population pressure and the accelerated development of urbanization, the environmental problems in China are getting increasingly severe, and disputes and group events triggered by the environmental problems are also on the rise. With the improvement of the environmental awareness of the public and the appearance of the accumulative effect of environmental pollution, the adverse impact of the environmental pollution on human health is drawing much more attention.

It is true that the Chinese government has done much work in coping with the environment and health issues, which makes positive achievements: under the huge pressure of environmental resources, the rapid economic growth doesn't bring about the sharp deterioration of the environment, the tendency of environment deterioration is basically controlled, and the environmental quality in some areas is even improved to some degree. Meanwhile, the medical and health service level in urban and rural areas upgraded significantly, allowing the effective control over the infectious disease, increase in the life expectancy of the population, and the decline in infant mortality rate and the maternal mortality rate. Nevertheless, a great deal of problems and challenges still lie ahead of the Chinese government in respect of the prevention and treatment of the adverse impact on human health incurred by the environmental pollution, and a set of effective environment and health management system and mechanism is in urgent need.

With the successful holding of the Beijing 2008 Olympic Games, China draws wide attention throughout the world. In particular, the social, political and environmental issues of China have become the focus of the people worldwide, with no exception of the environment and health issues. Many international organizations and countries show much concerns on China's environment and health issues, hoping to learn more about the basic situation of China's environment and health issues, and the World Bank even conducts research and evaluation on the damage to human health caused by the environmental pollution in China.

Therefore, the environment and health issues in China have become the hot issues concerned commonly at home and broad. In line with the principle of satisfying the domestic demands, embodying the common concerns and active participation, China Council for International Cooperation on Environment and Development (the CCICED) established the research subject of "China's environment and health management system and policy framework" in 2006, with the aim of analyzing the problems and challenges confronted by the environment and health management of China, learning the experience and lessons from the international environment and health management, constructing China's environment and health management system and policy framework, and offering policy suggestions for the government to further strengthen the environment and health management.

The State Environmental Protection Administration (existing Ministry of Environmental Protection) and the Ministry of Health vigorously supported the establishment of the subject team, and helped the CCICED to found the Chinese and

foreign expert group for the subject team, and the secretariat for the organization and implementation of the projects. The Ministry of Environment of Japan provided financial support for the implementation of the subject, and the Japan OECC undertook the task of coordinating the work of the foreign experts. The Policy Research Center for Environment and Economy of the Ministry of Environmental Protection, as the secretariat of the subject team, undertook the task of the organization and implementation of various works of the subject team, the communication and coordination of the experts, the routine management and etc.

To promote the smooth development of various work of the subject team and to ensure the quality of the research results, the subject team successively organized two subject team leader conferences, respectively discussing the subject research framework, the work plan and the policy suggestion report. The Chinese and foreign expert group leaders and core members, and officials from the Ministry of Environmental Protection, the Ministry of Health and the Ministry of Environment of Japan all attended the subject team leader conferences. On top of that, the subject team also successively held three subject team conferences, respectively discussing the work plan, the mid-term and final research results and the policy suggestions. The Chinese and foreign expert group leaders and all experts, the officials from the Ministry of Environmental Protection, the Ministry of Health and the Ministry of Environment of Japan as well as the representatives of relevant organizations all attended the subject team conferences. Through the subject team conferences and the subject team leader conferences, the Chinese and foreign experts came to an agreement on the research tasks, the work plan, the interim report and final reports, the summary reports and the policy suggestion reports and other items, and brought forwards suggestions on the further revision and perfection of the items discussed.

In line with the actual demands of the environment and health management of China, the research content of the subject is mainly divided into four parts: the analysis on status quo of the Chinese environment and health problems and the Chinese environment and health management, the international experience and lessons on environment and health management, the construction of the Chinese environment and health management system as well as the policy and legal framework of the Chinese environment and health management.

The research shows that the Chinese government still faces formidable conditions and challenges in the course of development of environment and health cause. First of all, the environmental pollution situation remains severe, a number of people are still exposed to the environment that is seriously polluted (air, water, soil and noise), and huge environment and health risk is latent. Secondly, China's environment and health problems are not clear presently, and there are much hidden danger in environment and health. Besides, the environment and health management work is still weak, and the prevention, early warning, treatment and other jobs concerning environment and health issues have not been developed effectively, unable to meet the needs of the public for the environment quality and health and safety; in some areas, the social stability and harmony are even affected.

International experience and lessons indicate environment and health problems which are handled improperly may develop into complex social and political ones, which not only gravely jeopardize the public health, affect the credibility of the government, but compel the government to pay a heavy economic cost. Their main experience and practices are: The first is to intensify prevention and make active

intervention so as to avoid environmental pollution from threatening the human health; the second is to improve legislation, intensify the administration of justice, and establish an environment and health-related dispute settlement mechanism and a health compensation mechanism.

Considering the increasingly grievous environment and health situation at present and possibly more environment and health risks in the future in China, the subject team recommended that the Chinese government should raise much concern on environment and health issues, further enhance the environment and health management, and improve the management system and mechanism, lay emphasis on intensification of preventive works, develop the environment and health management work with the risk prevention as the core. It also suggested that priority should be given to solving hot issues in environment and health which cause much attention from the people so as to maintain their environment and health rights and interests.

The concrete policy suggestions are as follows:

The government is the main responsibility body for environment and health management, and should strengthen their leadership, make clear their responsibility and establish an environment and health management system featured by the domination of the government and the wide participation by the general public. The environment and health departments and other major governmental departments should set up special agencies based on their respective functions and equip themselves with sufficient human and financial resources to ensure the implementation of government functions.

The government should reinforce the legislation construction on the environment and health management, with the focus on the legislation and enforcement construction of the environment and health prevention, and establish the settlement mechanism for the environment and health disputes to protect the environment and health rights of the public. It should also gradually establish and perfect the environment and health-related dispute settlement mechanism, provide the dispute parties with various methods to settle the disputes, including regulation, administrative settlement, arbitration and litigation, and gradually establish and implement the compensation system for the damage to human health induced by the environmental pollution, so as to safeguard the public environmental rights and interests.

In conducting the environment and health management, the government should adhere to the principle of focusing on prevention and take effective measures to avert environment and health risks; establish the prevention system by perfecting the environmental standard system, setting down the directory of priority-controlled pollutants, framing and implementing strict environment access system and other policy means and measures; further strengthen and improve the building of the environment and health monitoring network, especially increase environment monitoring and health impact monitoring related to the crowd exposure level; and gradually develop the early warning mechanism related to environment and health, conduct the environment and health risk prediction, and take prompt measures to avoid or reduce the significant damage to human health imposed by the environmental pollution.

The government should increase financial input and reinforce the environment and health management capacity building. The national and local financial

departments should increase investment to support the capacity building of and basic research on the environment and health management. The state may consider the establishment of an environment and health fund mechanism, where public interest compensation can be made for health damage from historical environmental problems, for having no civil compensation capacity on the responsible part, and to victims for whom a principal responsible part is hard to be defined; the state may also support development of environment-caused health education and health damage rehabilitation and other activities. At the same time, the government should establish various social financing channels to raise environment and health funds; and stick to disclosure of environment and health information and encourage public participation in environment and health management. It should opportunely release environment and health information to which the masses pay attention on the government's websites and various news media and the like in a way of easy access and understanding by the public; set up channels for the public to participate in environment and health management, further improve complaint handling via letters and visits, public notification and other systems; strengthen supervision by the public, social groups and media over the environment and health work, encourage the public to inform against and report violations of environment and health regulations, and fully listen to comments from the public on the environment and health work by holding meetings of experts, demonstration meeting, hearings and other ways.

With regard to features and prominent problems of environment and health in China, the government should conduct the environment and health work with focus and take targeted intervention measures. As for the environmental pollution that has caused damage to and disease of the human health, the government should immediately eliminate and harness the pollution and give positive health intervention or medical treatment to the victims; as for the pollutants that may cause serious health hazard, the government should make the priority control directory, the health hazard assessment and the environment access standard and diagnostic standard, strengthen beforehand intervention, and monitor the level of environmental pollution and its impact on human health, so as to avoid and reduce the health impairment incurred by the environment pollution. Meanwhile, to those environmental factors with clear effect on health not identified, it should enhance researches and take positive preventive measures.

Preface

The environmental and health problems are of complexity and related to the two factors of environment and health. The environmental and health problem includes two sides in the broad and narrow. The latter is a major proportion in this study on the environmental and health problems. It is mainly studying and probing the interrelationship between the impact of the new environmental factors produced by human activities such as human production and living as well as changes of such factors on health. And it is studying the rules and problems existing between the two and is probing ways and measures to reduce or eliminate the adverse impact of changes of environmental factors on human health.

The main aim of this subject is to build up China's environment and health management system and policy framework, probe a policy system for China to establish an environment pollution compensation system according to China's actual

needs in implementing effective environment and health management and by reference to international experience. Finally, the subject team will put forward a proposal for establishing an effective environment and health management system and a policy framework to the Chinese government in light of domestic and foreign experience and the study results achieved by the subject team.

The main contents of this study contain five parts, i.e. analysis of the status quo, international experience, policy framework and legal system, management system and policy proposal.

1 Status quo of Chinese environment and health problems:

Since 1980s when China implemented the reform and opening-up policy, China's social economy has developed with high momentum. Nevertheless China's environment and resource issue is increasingly prominent. The environment pollution issue in China is widely concerned, the pollution situation is serious, and the environmental pollution is worse than ever. But with the joint effort of the governments at various levels and the relevant departments, the growth rate of the pollution is sluggish and lower than that of the economy. In some areas, the pollution level even keeps stable.

1.1 The basic situation of the environmental pollution in China

1.1.1 The air pollution remains serious, threatening human health

According to 2006 Report on the State of Environment in China, only 24 cities reached Grade I Air Quality Standard (accounting for 4.3%); 159 cities met Grade III Air Quality Standard (accounting for 28.5%) and 51 cities remained lower than Grade III Air Quality Standard (accounting for 9.1%). It deserves considerable attention that as much as 37.6% of the cities under air quality monitoring failed to meet the national Grade II air quality standard, and some cities are still obsessed by the serious air pollution.

At this moment, the air pollution in China has the following characteristics: a. Coal-burning air pollution is prevailing in provinces abundant in coal and northern areas, oil-burning air pollution is commonly seen in developed areas and southern cities, and the compound air pollution with both the coal-burning and oil-burning pollution has emerged in many large and middle sized cities. In different seasons of different areas, the pollution sources are various. b. Air pollution in mega-cities and super large scale cities is significantly serious than that in the middle and small cities, especially in mega-cities with population being more than 1 million. c. Particulate in the atmosphere is the main pollutant, followed by sulfur dioxide. NOX pollution level is on the rise in some big cities.

At present, indoor air pollution caused by decoration and fitment has become common in cities or relatively developed towns. Additionally, much attention has been drawn to the sanitation and safety of central air-conditioning system in the cities.

In the rural area of China, 80% of the rural households use the solid fuels as the major supply of life energy. It may bring about the serious indoor air pollution. Coal burning contributes a lot to the SO₂ pollution, and the incomplete combustion of biomass fuels gives out particulate matters, carbon monoxide, polycyclic aromatic

hydrocarbons, sulfur dioxide, nitrogen oxides, aldehydes and ketones compound and other hazardous substances.

1.1.2 The drinking water situation is serious and the pollution accidents frequently occur, both of which jeopardize human health.

It is shown in the 2006 Report of State of Environment in China that, among 408 monitoring sections of 197 rivers in seven systems, the monitoring sections which are up to the Grade I~III Water Quality Standard, Grade IV Water Quality Standard, and Grade V Water Quality Standard and the even worse accounted for 46%, 28% and 26% respectively. Among 27 lakes or reservoirs under the key national monitoring, the lakes or reservoirs which met the Grade I~III Water Quality Standard, Grade IV Water Quality Standard, and Grade V Water Quality Standard and the even worse constituted 29%, 23% and 48% respectively.

In rural areas of China, people there takes ground water as the main water supply. A nationwide survey on rural drinking water and environmental sanitation was conducted during August 2006 to November 2007, and the result showed that: the over standard rate of drinking water that fails to meet the basic hygienic safety standard is 44.36%. the surface water claimed the over standard rate of 40.44%; the underground water claimed the over standard rate of 45.94%; the centralized water supply claimed the over standard rate of 40.83%. For the past three years, the water plants financed by the Central Government have claimed the over standard rate of 38.99%, and the decentralized water supply has claimed the over standard rate of 47.73%. The main factor for the over standard rate of rural drinking water is the over standard of the microorganism index. And the low disinfection rate of the rural drinking water is the main reason for the over standard of the microorganism index.¹

1.1.3 The soil environmental pollution can not be neglected, and the potential harm is huge.

According to the incomplete statistics at the end of 2006, the cultivated land nationwide polluted is about 150 million mus, the cultivated land polluted by waste water irrigation is about 32.5 million mus, and the cultivated land that is occupied or damaged by solid waste is 2 million mus, totaling up to more than one tenth of the total area of the cultivated land. Majority of these cultivated land polluted are centralized in the economically developed areas. It is estimated that grain polluted by heavy metals in China reaches as much as 12 million tons each year, with the direct economic loss triggered surpassing 20 billion yuan.²

Wastewater irrigation is one of the key factors for the soil pollution. This largely accounts for the adverse effect of soil pollution on health. The irrigation with urban domestic wastewater may cause the pollution of pathogenic microorganism in the soil, while the organic wastewater from industries such as metallic ore mining and dressing

¹ Data source: Website of the Ministry of Health of PRC
http://www.moh.gov.cn/sofpro/cms/previewjspfile/mohbgt/cms_000000000000000144_tpl.jsp?requestCode=27879&CategoryID=4811

² Data source: Website of the Ministry of Environmental Protection of PRC
http://www.zhb.gov.cn/natu/yjsp/qgtrxzc/200612/t20061231_99195.htm

industry, metal smelting and processing, petrochemical processing, printing and dyeing, pharmacy and chemical are most dangerous to the soil polluted by the industrial wastewater irrigation. The pollution is mainly centralized in the farmland irrigation areas, and the cadmium and lead contained in the irrigation water injure the health of dwellers around the irrigation areas. Irrigation with petroleum water results in the accumulation of the polycyclic aromatic hydrocarbons (PAH) carcinogen such as BaP, which also pollutes the ground water. At the same time, the improper treatment of the industrial solid wastes and the abuse of pesticide and chemical fertilizer are also two main factors for the heavy pollution of the soil, leading to the pollution of heavy metals such as cadmium, hydrargyrum, lead, chromium and thallium, which deserves much attention.

1.2 Health damage induced by the present Chinese environmental pollution:

1.2.1 Health damage induced by air pollution

Among many air pollutants, the biggest threat to health damage comes from the particulate matter, SO₂ and NO_x. A survey on urban air pollution and resident mortality in 26 cities was once conducted³, and the result shows that: a. Coal-smoke pollution caused by coal burning is the leading factor of urban air pollution in China; b. Malignant tumor especially the lung cancer is the main cause of death of urban residents; c. The distribution of lung cancer mortality is in conformity with the air pollution degree in 26 cities; d. The severity of air pollution resulted by the industrialization and urbanization is in conformity with the distribution of lung cancer mortality.

The Meta analysis of the relation between the airborne fine particulate pollution and the daily mortality in recently years shows that every increase of 100µg/m³ of the air PM_{2.5} concentration is coupled with an increase of 12.07% ⁴of the mortality. The research work in Beijing, Taiyuan and Shanghai also indicates that the air pollution, in particular the suspended particulate pollution, is linked with the incidence and mortality of cardiovascular diseases. Moreover, it shall deserve much concern that the low concentration of air pollutions can have a chronic influence on human bodies and this should not be neglected.

The health damage created by the air pollution of formaldehyde and benzene series (including benzene, toluene and xylene), which is related to the indoor decoration, has drawn more concern from people. According to a survey on the indoor air pollution in offices induced by decoration and its health effects, office decoration with bad materials may produce some adverse effect on the health of the working staffs, and the degree of the adverse effect is positively correlated with the concentration of formaldehyde, ammonia and benzene⁵ in the office.

The indoor air pollution created by the combustion of fuels in rural areas has some major effects on human health and especially the respiratory system. The air

³ Review and Prospect of Environment and Health, edited by Geng Jingzhong

⁴ Journal of Environment and Health, Issue No 4 of 2005

⁵ Journal of Environment and Health, Issue No 5 of 2006

pollution is closely related to the symptom of respiratory systems and the lowering pulmonary functions of dwellers.

1.2.2 Health damage induced by the polluted drinking water:

At present, there still remain the waterborne diseases caused by biotic pollution. However, the water biological pollution remains one of the main factors that affect human health at present and quite a long time in the future, especially in the extensive central and western rural areas, where infectious diseases remain one of the main factors leading to the death of children under the age of 5.

Due to the discharge of the industrious, agricultural and domestic wastewater, the total nitrogen and total phosphorus have exceeded the water environmental capacity, leading to the lake eutrophication in China, especially in Lake Tai, Lake Cao and Lake Dian. Besides of affecting the urban water supply, water eutrophication also results in the mass multiplication of the algae, forming the algae toxins. When water in such lakes is taken out as drinking water, after chlorination, the algae organic matters may react with the chlorine elements to produce potential carcinogenic and mutagenic disinfection by-products, posing potential danger for people drinking the water.

In recent years, people have paid more and more attention to the chronic influences of water pollutants on physical health. Taking persistent organic pollutants (POPs) as example, because it is difficult to be degraded, its effect on human health has become a major study subject in the global environmental sanitation safety and food sanitation safety system. Dioxin and furan discharged from the production process and domestic burning widely exist. Researches show that many POPs can disrupt the structure and functions of the body endocrine system and produce various toxic effects, and are called the environmental endocrine disruptors. The types of chemicals that have been proved or suspected as the environmental endocrine disruptors surpass 150 varieties. China started relatively late in the research of this respect, still lacking big samples and thorough epidemiology research data. Health damage related to POPs represents one of the pending environment and health issues for China.

1.2.3 Health damage induced by the polluted soil:

The soil pollution caused by urban wastewater irrigation may produce various pathogens, which will cause various digestive symptoms that affect human health. The salmonella and ascarid infection rate, the infant acute diarrhea incidence and its mortality of the residents in wastewater irrigation areas are far higher than that in the control area.

The health damage posed by the heavy metal pollution in the soil is also formidable. According to the survey⁶ on the growth and development of children that are exposed to the cadmium pollution in respects of height, weight, chest circumference, vital capacity and other indexes, the growth and development of children in the polluted areas lags behind that of the control area, indicating the adverse effect of the environmental cadmium pollution on the growth and development of the children under

⁶ Journal of Environment and Health, Issue No 1 of 1995

exposure. According to the survey⁷ on the reproductive health of the reproductive women that are exposed to the cadmium pollution, among the reproductive women in the polluted areas, the rate of sterility in married women is significantly higher than those in the non-polluted area, and the rate of early birth and stillbirth in married women is also significantly higher than those in the non-polluted area. The standardized mortality of the group that suffered from malignant tumors, respiratory disease, digestive disease and the neonatal diseases in the polluted areas is higher than that in the non-polluted areas.

1.3 Characteristics of environmental pollution and health damage in China:

The unbalance of regional economy development and geographic diversity results in the current condition that traditional and modern environment and health problems coexist. The unfavorable impact of environmental pollution on residents' health is in sight gradually. The environmental pollution in some regions has led to severe health damage.

As the government departments at all levels attach more importance to the environmental pollution problems, an increasing investment is made in the control of environmental pollution. In terms of the local environment, some polluted regions have witnessed an improved environment and controlled the undesirable impacts of environmental pollution on physical health. Since the environmental pollution have various ways of access to human bodies and a long-term influence, together with the serious combined pollution of various pollutants, the human bodies will face the complicated health effects related to environmental pollution, resulting in much difficulty for research and management work.

Generally speaking, the environment and health issues in China have the following characteristics:

(a). High pollution degree. The air and water environment in some areas of China are in serious pollution. And at this moment, the quality of air and water has not reached the national Grade II standard. While the national environmental standards of China are far lower.

(b). Large population exposed and broad exposure approaches. It is preliminarily estimated that more than 150 million people in cities at prefecture level and over in China are living in seriously polluted air environment⁸. The environment pollution has formed a situation where the point source pollution and the area source pollution coexist, domestic pollution and industrious discharge overlap and traditional and newly emerged pollution intertwine. The environmental pollution is complex than ever before,

⁷ Chinese Journal of Epidemiology, Issue No. 10 of 2004

⁸ In 2006, the total population of the cities at prefecture level nationwide was 368 million with the mobile population exclusive. And if the population at county level cities and the mobile population are counted in, it is estimated that nearly a population of 200 million are exposed to the heavily polluted air environment.

and various environmental media are all polluted. All that makes people easily access the pollutants via various environmental media, leading to the diversification of the damage to human health

(c). Notable urban-rural difference. As for the urban areas, air pollution brings great damage to human health. As far as the rural areas are concerned, due to the insufficient guarantee of the drinking water safety, the drinking water pollution causes damages to human health; as the water pollution triggers the soil pollution. Intestinal infectious diseases and tumors are two health impairments induced by water pollution, with the incidence being on the increase. In recent years, the high incidence of the digestive system tumor in some areas is correlated with the drinking water pollution to some extent.

(d). Both the traditional pollution and the newly emerged pollution are severe. Since the 1990s, China has not only failed to bring the problems of environmental pollution under effective control, but also reported a deteriorating trend. The status of environmental pollution are quite serious. The emergency of new products and new industries also leads to the appearance of new compounds, and the newly emerged pollution produced by the production and use of new chemicals intertwine with the traditional pollution to form the compound pollution, which perplexes the environment and health issues. Now we are confronted with more complicated health issues.

2 Analysis of problems and requirements of the Chinese environment and health management

2.1 Status quo of the Chinese environment and health management

At present, the environment and health issue in China is quite outstanding. In recent years, the health damage caused by environmental pollution has experienced an annual increase and adversely affected the social stability and development as well as the construction of harmonious society. Currently, the environmental problem is highly valued by the Chinese government departments. The Chinese environment and health management is being reinforced gradually based on the previous work. Yet, its foundation is still rather weak, and the related scientific research and technical support systems are less than well-established so that the environment and health management as a whole remains at a low level.

2.1.1 System and mechanism of the Chinese environment and health management work

The Health Supervision Bureau and the Disease Control and Prevention Bureau are in charge of the environment and health management of the Ministry of Health, with the focus on the drinking water sanitation in urban and rural areas, the administration of products related to water and the public place sanitation. At this moment, the Ministry of Health, the disease prevention and control centers at different levels as well as the hospitals have developed a set of public health and disease prevention and control systems so as to monitor and deal with the health problems concerning the environmental pollution.

The environment and health work of the Ministry of Environmental Protection also develops rapidly. In January 2005, the former State Environmental Protection Administration established the special Environment and Health Monitoring Office in the Department of Science and Technology and Standards to take charge of the administration and guidance of the environment and health work in China. Currently, it emphatically carries out the basic survey of environment and health, the construction of basic legal system, the management and assessment of technical specification, the study and establishment of standards and etc. Yet, the environmental protection departments at the provincial level or below haven't had the corresponding agencies in charge of environment and health management.

Presently, China's environment monitoring ground network system centering on the state control network monitoring station is preliminarily formed. In addition, thanks to the continuous development for over three decades, China has created the well-established urban air quality automatic monitoring system and the surface water automatic monitoring system so that the automatic monitoring capacity of pollution sources has experienced a rapid growth.

The environment and health management involves many departments. To solve this complicated issue and complete the arduous tasks, we must strengthen the communication and cooperation of various departments.

To this end, the State Environmental Protection Administration (SEPA) and the Ministry of Health jointly established the Cooperation Mechanism of the State Environmental Protection Administration and the Ministry of Health on Environment and Health Work in 2006, to study the micro administrative policies on environment and health to be formulated or required to be adjusted significantly, and direct the environment and health work.

2.1.2 Scientific & Technical support conditions of the Chinese environment and health management work

Since 1980s, based on the scientific research institutions such as the Chinese Research Academy of Environmental Sciences(CRAES) and State Key Laboratory of Environmental Protection and Environment and Health, China has organized and developed a series of field investigations and fundamental researches, preliminarily grasped the state the health damage resulted from some regional environmental pollutions and about the emission conditions and pollution routes of the pollutants capable of health damage, organized the tracing monitoring over the key areas with possible public nuisance diseases, conducted the follow-up investigations of health conditions of those permanent residents living in pollution areas, and strengthened the supervision and management of environment and health, laying a sound foundation for the environment and health management work.

As regards to the scientific research achievements, the health and epidemic prevention stations, scientific research institutes and colleges and universities in various regions have conducted a lot of investigation on the relation of the environment and health. For example, since 2000, the quantitative study of the effect of coal-smoke pollution on human health, urban air pollution and residents' health, the living environment monitoring and its effect on human health, research on the technology of

controlling the damage of indoor air pollutant to human health and other studies have been conducted, attaining substantial achievements.

In China's environment and health management, it also can not be neglected the function of colleges or universities. They are a senior professional structure carrying out environmental science and health research. They have a high standard of environmental science experts and a wealth of young talent resources, and they are one of the important power in the Chinese team of environment and health.

2.1.3 Policies and regulations related to China's environmental and health management work

Environment and health work involves many disciplines and departments, and yet the existing environmental management standards, policies, laws and regulations are a lack of convergence with most health problems. In addition, comparing with environmental pollution work of prevention and treatment, it late starts that environment and health work in China. And the existing environment system has not yet defined the requirements in the work of environment and health. At the same time, it is a lack of the standards, laws and regulations, related to environment and health.

In order to effectively promote the environment and health work in China, and use the experience of other countries for reference, aiming at those outstanding problems in the field of environment and health in China, on November 6, 2007, 18 ministries and commissions including the Ministry of Health and the State Environmental Protection Administration jointly promulgated the National Environment and Health Action Plan (from 2007 to 2015). As the first programmatic document in China's environmental and health field, the Action Plan fully demonstrates the Chinese government's attitude and determination to carry out the basic national policy of environmental protection for people, indicates the development direction and main tasks of China's environmental and health undertakings in the future, defines the jobs and responsibilities of relevant departments and creates a new situation where concerted efforts are made to promote development of the environment and health cause. It is of practical guiding significance for advancing development of China's environmental and health cause in a scientific manner.

2.1.4 Funding mechanism related to China's environmental and health management work

The environment and health work has long been presided by different sectors, so the associated links of the environment and health become the weak point of the management. The study on risks of environmental health damage requires a great many samples, a long cycle and a huge amount of money. But over a long period of time, development study has been stressed in China's scientific researches. The money allocated for investments in scientific researches is not enough in such public fields as environment and health which are related to public interests and the system for investments in scientific researches has not been rational.

Before 1980s, relying on the disease prevention and control system of the health system and the management monitoring system of the environmental protection sectors,

China basically established teams and networks at four levels of city, county or district, town and village, and effectively launched various environment and health work.

2.2 Problems existing in current environment and health management work

2.2.1 The environment and health work management is loose, lacking a long-term mechanism.

Nowadays, the environment and health work in China has two centralized units-the Ministry of Health and the State Environmental Protection Administration. China established the “Mechanism between Ministry of Health and State Environmental Protection Administration for Cooperation in Environment and Health Work” in 2006, released the “National Environment and Health Action Plan (2007-2015)” in 2007, defined the responsibilities of 18 relevant departments for supervision and management of environment and health according to their administrative authority, proposed to establish a work mechanism for cooperation between the state, localities and departments. In 2008, the national environment and health work leading team was established in line with the requirements of the Action Plan, however, owing to the fact that these mechanisms and leading teams are at their primary stage, and their effect still needs further observation. After all, the problems existing in the environment and health work of China can not be solved merely through coordination, and a definite centralized management department is necessary.

2.2.2 The environment and health management professional team construction and the technical force are insufficient.

The environment and health problems belong to the new sphere under environment management and the construction of local environment and health management team has to be strengthened. The environmental protection sectors at all levels should actively cooperate with the State Environmental Protection Administration on the environment and health investigation to find out the environment and health damages within their respective jurisdictions. Special monitoring personnel should be designated and corresponding law enforcement teams should be established in key areas. In addition to that, the environment and health issue which is featured by cross-discipline and cross-sector requires strong specialization and policy nature, but the professional technical reserve, the scientific research ability and the existing facilities of the environment and health work are all limited, leading to gaps with the practical working need. The requirements for the professional team reconstruction and staff ability cultivation of the environment and health work is imperative, so we must conduct relevant work as soon as possible, and cultivate professionals in practice, enabling them to accumulate work experience and raise their technical level.

2.2.3 The basic study on the environment and health is weak, and the investigation, study and monitoring of human health is imperative.

Currently, in China the base number of health damage cases caused by environmental pollution is obscure and the basic data is deficient, therefore it is difficult to tackle the health damage problem.

For this reason, the investigation into human health damage caused by environmental pollution should be carried out. We need to conduct environment and health investigation in key areas to find the pollution source that affects human health and conduct environment and health investigation in typical areas to gradually grasp the basic data so as to understand the health status of the group related to environmental pollution; we still need to launch cutting-edge scientific researches in the environment and health work field, such as conducting research on the damage of the main environmental pollutants to human health at the present stage of China and conducting the health-based risk assessment on the main pollutants; study the effect of environmental pollutants on damage to health, and establish health-monitoring networks, etc.

2.2.4 Early warning against environment and health risks and the ability to deal with emergencies need to be strengthened

It's necessary to warn against serious environmental pollution and damage to health that may happen in environmental and health management, and analyze, forecast and take countermeasures early so as to prevent the occurrence of serious environmental pollution and the damage to health. Considering that damage is often caused by emergent environmental pollution to human health in China, measures for rapid response to emergencies should also be taken immediately against emergent impairment caused by environmental pollution to health.

The work of environment and health is an important content of environmental protection work in China. At this moment, the environment monitoring information data and the human health monitoring data are in separated systems and cannot be shared. Besides that, the environmental monitoring data can not meet the demand of human health monitoring. Viewed from the long-term development, to establish the information database and work network on environment and health and as well as realize information sharing is one of the basic conditions for conducting environment and health work.

2.2.5 The environment and health management work lacks funds guarantee, and more investment is needed.

Although China pays more attention to the environment and health works, and the Chinese government obviously invests more than ever before, in environment and health management work, it is still far from meeting the requirements of the work. As compared with the developed countries, there is still large gap in terms of the investment in the environment and health research.

2.3 Requirements for policy in strengthening China's environment and health management

Since the foundation of the Chinese environment and health management work is weak, currently the Chinese environment and health management remains at a low level. As far as the policy is concerned, at least the following several aspects should be enhanced:

2.3.1 The administrative system for the environment and health administration needs to be established and perfected.

In a word, the Chinese government has not yet established a set of administrative systems that can effectively and completely solve the issues on environment and health. The State Environmental Protection Administration and the Ministry of Health are two major sectors that are related to the environment and health management, but they do not have the functions relevant to the environment and health affairs in their governmental management functions as endowed by the State Council. At the same time, the National Environment and Health Action Plan should be implemented with the close cross-sector cooperation. Though it divides the functions for relevant governmental departments, its own authority and public trust are questioned. The unclear of governmental functions on the environment and health management has not been solved fundamentally. Meanwhile the effect of the existing coordination mechanism for environment and health work remains to be observed. Therefore, the first task for the Chinese government to form the environment and health management system is to clearly divide the functions of relevant government departments based on the principle of "prevention first and combination of prevention and treatment" according to needs from the environment and health management work, and to set up special agencies in important departments to fulfill the environment and health management functions.

2.3.2 A set of complete laws and regulations system and policy needs to be formulated

The existing laws and regulations system is yet to be perfected and couldn't well meet the demands of the present environment and health management work. For example, the existing process of environmental impact assessment tends to lay more emphasis on the effects on air, water and soil, etc, overlooking the impacts of environment on health, etc. Therefore, in view of the problems existing in practical work, the existing environment and health laws and regulations need to be improved on the whole to form a complete system. As the management works of environment and health are charged by different departments for a long time, the existing standard system and technical norms, etc couldn't satisfy the demands of environment and health management work. It is required that the managing organs, after taking the Chinese specific national conditions into account, plan and coordinate the revision of standards as a whole, perfect standard system and press forward to formulate the basic standards urgently needed in important areas of environment and health, so as to guarantee smooth progress of environment and health work.

2.3.3 The prevention, early warning and emergency mechanism of environment and health risk management needs to be established.

Currently, the environment and health risk management system is not perfect. In order to enhance the capabilities of prediction and management and decision-making on controllable environment harmful factors and their health damage, it is required to carry out the assessment on environment and health risks in accordance with the conditions of environmental pollution and environment impacts on health and the existing management policies, etc. The relevant organs should, on the basis of scientific assessment, give early warning on the possible severe environmental pollution and

health damage, realize the targets of early analysis, early forecast and early intervention to prevent the occurrence of significant environmental pollution and health damage. Moreover, the department concerned should strengthen the building up of the handling capability of rapid response to emergency cases involving environmental pollution and health damage, establish and improve the emergency mechanism. When the emergencies happen, the departments of health and environmental protection departments should act as the main entities to carry out the emergency treatment work, guarantee the smooth progress of emergency handling work, and give effective treatment to the health damage cases caused by environmental pollution on time, prevent the damage from developing, alleviate the burden of damage, earnestly safeguard the rights and interest of the victims' life and health.

2.3.4 The compensation mechanism and legal system for handling compensation of environment and health damage needs to be established.

Nowadays, people's consciousness of safeguarding legitimate right has been strengthened much more than before. However, what embarrasses them is that, after the events of health damage resulted from environmental pollution happen, the masses lack the evidences and means in safeguarding the rights, therefore, it is difficult to restrict and supervise the polluters substantially. Moreover, the identification technology and methodology system of health damage caused by environmental pollution are yet to be established, therefore, it is difficult to define the cause-effect relations between environmental pollution and health damage. Even though there are clear evidences which can prove that the health damage is resulted from environmental pollution, there are no unified regulations on the compensation standards and procedures. Therefore, it is urgent to carry out the research of laws and regulations on compensation for health damage induced by environmental pollution, further intensify the legal responsibilities of environmental pollution, perfect the legal evidence of compensation for health damage induced by environmental pollution, as well as research and formulate the detailed compensation methods such as the identification of health damage degree, compensation standards and procedure.

3. International experiences and lessons in establishing environment and health management system

3.0 Preface

This chapter provides recommendations for improving China's environment and health management system⁹ based on the review of international experiences and lessons from the United State, the European Union, Japan and other countries.

⁹ Environment and health management system is defined as a socio-economic system fundamentally concerned with the prevention of health damage caused by environmental pollution induced by human activities.

3.1 Environment and Health Management System in the United States

3.1.1 Experiences and lessons in response to health damage caused by pollution in the US

Although environmental health regulations ultimately are all aimed at improving environmental quality, and thereby reducing environmentally-linked diseases, the terms of each specific regulation are founded on methodologies that have different starting points, depending on the law that serves as a basis for the rule. Some statutes (“risk based statutes”) provide protection with health standards, directing that controls be established taking into account only what is required to protect health and not by examining other issues that might be germane to setting a standard, such as cost to achieve that level of control or whether technology exists to do so. Other statutes (“technology based statutes”) tie the ultimate regulatory standard to the capability of technology. These might be viewed as the opposite of health-based standards because instead of asking what is needed to protect health, they ask what is possible to do from an engineering perspective. Resulting standards are based on the best available pollution control technology. Some statutes require EPA to protect against “*unreasonable risks*” by balancing the environmental and health effects of chemicals against the economic consequences of regulation. Finally, some statutes rely upon *economic incentive* approaches to control, with the most notable example as “cap and trade” approaches under the Clean Air Act that create a system of tradable allowances to emit certain pollutants and by imposing a tax on each ton of emissions.

Of these approaches, history has shown that technology-based standards are by far the easiest to undertake and lead to the most expeditious results in reducing environmental pollutants. This is because determining the best technology available to control pollution is a far easier task than reviewing the toxicology literature to establish a safe standard of exposure.

3.1.2 Information Disclosure and Public Involvement

A critical component of the USA system is the Right-To-Know requirements found in the major U.S. environmental laws and in the broadly applicable Freedom of Information Act. These laws require EPA and other federal agencies to make environmental hazard information available to the public. Environmental NGOs and community groups in the United States have a long history of using this information to pressure government to then take action to improve environmental quality.

Environmental monitoring data collected by the government is available to the public in the United States, for example, much of it over the internet. Similarly, permit conditions and violations are public information. Most comprehensively, the Emergency Planning and Community Right-to-Know Act, which was enacted in 1986 with CERCLA, required businesses to report all their emissions of hazardous substances to EPA, which the Agency then discloses to the public. The resulting Toxic Release Inventory is published each year and widely accessible over the internet. Citizens can review pollution problems in their locale, check on the environmental performance of certain companies across the country, investigate the nature and extent of emissions of certain chemicals to air versus water, etc.

With a similar motivation, the Safe Drinking Water Act as amended in 1996 required public water suppliers to state the nature and levels of contaminants in drinking water; they send this information to customers along with their water bill.

The government is also required to involve the public when developing its policies for environmental health protection by the Administrative Procedures Act. The little-known but important Act establishes specific citizen rights to access government information of relevance and to participate in government decisions affecting them. Rulemakings not compliant with the Administrative Procedures Act can and have been litigated in federal courts.

3.1.3 Citizen Suit Enforcement in Courts of Law

Access to the courts has been an important method to prevent environmental harm in the United States. Congress included an unusual enforcement mechanism in almost all federal pollution control statutes: the environmental citizen suit. In general, citizen suit provisions allow individual litigants to bring two kinds of lawsuits to ensure implementation of pollution statutes: 1) suits against the relevant federal agency for failure to perform duties, and 2) suits against individual polluting factories and facilities, to force compliance and assess civil penalties. These provisions do not require proof of damages to health or property in the case; instead citizens are allowed to sue over regulatory violations that put the public health at risk even if no specific individual has yet to experience signs or symptoms of disease.

Citizen suit authorities, combined with government enforcement decisions, extend the reach of environmental laws enacted by Congress in a very productive way, creating a channel for social judgments about the harms that matter and helping to formulate the balance between costs and benefits of environmental regulation by articulating the public values at stake in environmental law. The combination of EPA oversight of state agencies, easy access to information, media and public attention, and the availability of citizen suits creates considerable transparency and motivation for state officials to enforce environmental requirements.

3.2 Environment and Health Management System in the European Union

The EU is a co-operation between its Member States and thus European policy is a mix of country specific and EU-wide measures. The EU is acting to reduce exposure to pollution through EC legislation, through work at international level to reduce cross-border pollution, through co-operation with sectors responsible for pollution, through national and regional authorities and NGOs, and through research.

An important tool for priority setting in EU environmental policy is the Thematic Strategies, among which is the *EU Strategy on Environment and Health* (adopted in 2003). This Strategy takes a medium-term perspective to around 2020 and is founded on thorough research and science, and follows an in-depth review of existing policy and wide-ranging stakeholder consultation. The Strategy on Environment and Health was followed up by the European Environment and Health Action Plan 2004-2010 which proposes an Integrated Information System on Environment and Health as well as a coordinated approach to Human Biomonitoring. Some useful tools for identifying the relative burden or severity of a given environmental health problem and in prioritizing EH issues based on the degree of health impact and related costs and/or burden in the EU are “Burden of Disease Analysis and Environmental Burden of Disease (EBoD)”, Cost of environmental degradation analysis , Health Impact Assessment, etc.

3.2.1 Experiences and lessons in response to health damage caused by pollution in EU

Urban ambient air pollution is the main environmental contributor to ill health in Europe at present (WHO, 2005¹⁰). However, the levels of air pollutants have been substantially reduced since around 1985 – 1990. The reductions are a result of the combined merits of international treaties on air pollution (e.g. the multi-component Gothenburg Protocol under the ECE Convention on Long-range Transboundary Air Pollution, LRTAP), EU legislation, national implementation schemes for complying with EU and international treaties, and a range of local measure. The main policies are formulated in *EU Directives* which are turned into national law in the member states. Most directives targeting environmental pollution with potential health consequences prescribe command-and-control policies such as BAT, emission limit values and standards. The exception is the NEC (National Emissions Ceiling) directive, which gives member states a freedom of choice in how to meet the national emission ceilings. The role of economic instruments in EHM is discussed in Appendix 3 in the Technical Report. A lesson from an assessment of European air quality policies and measures is that a mix of instruments (command-and-control approaches and economic instruments) should be applied. Whatever policy instruments are used, a large apparatus of monitoring and surveillance has been instrumental to ensuring that emissions are reported correctly¹¹.

In all EU member states, there are national civil liability regimes that cover damages to persons and property. The EU Environmental Liability Directive became effective in April 2007 and is the first EU law specifically based on the "polluter pays principle". It only deals with damage to the wider environment. Personal injury and damage to goods and property will still be dealt with under national civil liability legislation. Its aim is to hold operators whose activities have caused environmental damage financially liable for remedying this and for taking preventive actions. 'Diffuse pollution', as general air pollution and nitrate pollution in water bodies, are not covered by the Directive i.e. because there are large obstacles to damage attribution on an individual level (easier on a population basis). Maritime oil disasters and nuclear accidents are also exempted from the Directive, because they are covered by other international environmental liability arrangements.

3.2.2 Laws, regulations, standards, and other mechanisms related to environmental health management

A main instrument for safeguarding the environment in the EU is the *EU Directives on environment* that require EU states to implement measures to achieve environmental standards. Framework Directives on air quality, water quality, drinking water, waste, landfills, soil (suggested) etc. define and establish objectives for environmental quality, and are supplemented by Daughter Directives. The EU also has legislation to control emissions from different industrial sources, such as the *Large Combustion Plant Directive* and the *Integrated Pollution Prevention and Control Directive*. Industrial accidents and emergency response are addressed in the 'Seveso Directives', the *Council Directive on the major-accident hazards of certain*

¹¹ <http://www2.dmu.dk/atmosphericEnvironment/expost/>

industrial activities and the *Directive on the control of major-accident hazards involving dangerous substances*. The directives lay out procedures for assessing the environmental quality on the basis of common methods and criteria (e.g. *guideline values*, typically based on WHO Guidelines) and prescribe how information on environmental quality is obtained and made available to the public. Health surveillance is part of a national health system. Coordination is ensured via the *European Environment and Health Action Plan 2004-2010*. The Environmental Health Committee in EU oversees coordination and follow-up and involves a range of governmental and non-governmental stakeholders.

The member countries' governments are responsible for implementing the EU Directives, monitoring of environmental quality and health surveillance. The European Environment Agency (EEA) of the EU works closely with WHO and is a major information source for those involved in developing, implementing and evaluating environmental policy, and also for the general public. EEA coordinates the European Environment Information and Observation Network (Eionet), which is co-funded by its member and cooperating countries. The close coordination between national and EU bodies when it comes to monitoring and reporting environmental quality statistics and the supranational level of the EEA have secured that robust and independent information on the environment is made available.

Research funds for EH research and monitoring are provided, inter alia, by EU Framework Programme for Research and Technological Development and national research councils. The European Commission's Directorate General of Health and Consumer Protection also directly support a range of research activities, e.g., the Aphis (Air Pollution and Health: A European Information System) which among other things carry out HIAs. The European Commission co-funds the European Environment and Health Information System project (ENHIS) with WHO/Europe. Extensive funding from national and EU sources have been instrumental to establishing the current knowledge base related to EH issues in Europe.

The environmental Directives set monitoring provisions and requires the Commission to conduct *mandatory reviews of the directives*. The Commission involves stake holders, including expert from Member States, Acceding Countries, Industry, NGOs, the Commission and research bodies, in reviewing directives and giving recommendations on possible amendments. These initiatives related to monitoring and reviewing are core elements in ensuring and improving the quality of EH management in EU.

Legislation requiring health impact assessment and/or environmental impact assessment and litigation are examples of specific legal instruments used to control pollution in relation to specific media and/or specific settings and sectors. Not all forms of environment and health damage can be remedied through liability.

The UN ECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters adopted in Aarhus in June 25, 1998 (the Aarhus Convention) is the first international legal instrument which bases the access to information, public participation and access to justice rights provided by the convention on "the right of every person of present and future generations to live in an environment adequate to his or her health and well-being." It also includes a general obligation for the parties "to guarantee access to information, public participation in decision-making and access to justice in environmental matters". In EU, the European Commission sets rules which ensure freedom of access

to, and dissemination of, information on the environment held by public authorities and to set out the basic terms and conditions under which such information should be made available (Directive 2003/4/EC on public access to environmental information). All results from monitoring of environmental quality carried out by Member countries are in principal disclosed to the public, inter alia via national web sites and EEAs web pages. Concerning private data disclose, as emission data from industries, the European Union decided, in July 2000, to establish a mandatory European Pollutant Emission Register (EPER 2000), to be operated by the European Environment Agency (EEA). These data are accessible through the web.

3.3 Environment and Health Management System in Japan

3.3.1 Background analysis

Japan's serious environmental pollution during the rapid economic growth after World War II led to the outbreak of a large number of victims whose health had been severely damaged. Many lives were lost and an enormous amount of money was needed to compensate the surviving victims and to retrieve the environment from its serious state of pollution. The vast amount that Japan invested to overcome environmental pollution, however, is known to have had no significant negative impact on the subsequent state of the economy. Moreover, the strict environmental regulations against vehicle emission that was introduced in the 1970s motivated the automobile manufacturers to develop innovative technology, which stimulated the succeeding economic growth in Japan.

The lessons derived from Japanese experience demonstrate that while environmental health damage led to huge cost, early environmental investments and preventive measures were rational also in economic terms. Through such experience, environment and health management system in Japan has been established on the basis of prompt and fair compensation and relief, as well as preventive measures against environmental pollution and health damages.

3.3.2 Legal systems and standards related to environment and health management system in Japan

Having experienced the tragic pollution-related health damage incidents, a nation-wide consensus has been built on prevention as the utmost important measure to be taken for environmental protection.

Currently, the Basic Environmental Law is the underlying law in environmental policy and prevention is one of its most important objectives. Article 16 clearly states the environmental standards-setting as the objective of environmental policy: "With regard to the environmental conditions related to air pollution, water pollution, soil contamination and noise, the Government shall respectively establish environmental quality standards, the maintenance of which is desirable for the protection of human health and the conservation of the living environment."

Emission and effluent standards for pollutants released from factories and other facilities are stipulated in Air Pollution Control Law and Water Pollution Control Law as specific measures for achieving the environmental quality standards. Nation-wide uniform emission and effluent standards are set by the central government in which local governments can impose more stringent standards (supplementary standards) if necessary. Penalties are imposed for non-compliance.

A nation-wide environmental monitoring is indispensable for maintaining the environmental quality standards. In principle, local governments are in charge of carrying out monitoring and disclosing the results to the public in real-time or on a regular basis every year. Moreover, companies are also responsible to monitor pollutants emitted from their facilities. In health monitoring system, various surveys are carried out regularly and when needed, both at national and local levels, to check any occurrence of significant or abnormal health issues.

In addition, legal systems for chemicals and pesticide management as well as Environmental Impact Assessment Law to check the impacts on the environment have been established.

The Ministry of the Environment plays the central role for conducting such preventive measures against environmental pollution. At the same time, cooperation among the relevant institutions and overall environmental administration capacity are strengthened through provisions such as personnel exchanges with the Ministry of Health, Labour and Welfare, and other ministries as well as with local governments. Also, training for environmental monitoring and other measures for capacity building are provided by the national government. Information on environment are widely disclosed to the public and Public Comment System is in place to invite opinions of the public.

3.3.3 Other mechanisms for environmental health management in Japan

In Japan, public health centers under the Ministry of Health, Labor and Welfare have been playing an important role in the prevention of environmental health damage and issues related to sudden occurrence of regional health problems. In addition, aside from the provision of laws and regulations related to pollution and judicial settlement, environmental disputes settlement system for prompt and adequate settlement with less rigid procedures, has been developed. Citizens can consult with environmental sections in municipality and public health centers at the local level, and if the problem cannot be solved, the case is handled by the Prefectural Pollution Examination Commission at the prefectural level. For those cases which involve serious environmental pollution, wide-area-concerned case, compensation for damage, and fact-finding of cause-and-effect, the cases are then handled by the Environmental Dispute Coordination Commission at the national level.

Moreover, government and companies as well as the media and environmental organizations have also contributed significantly in the prevention of environmental health hazards through information disclosure.

3.3.4 Experiences and lessons of legal compensation procedures of health damage caused by pollution in Japan

In addition to judicial and administrative resolution stipulated by the civil law, a set of legal systems specifically focused on environmental pollution control have been established. Due to the substantial number of pollution-related health damaged cases that occurred in Japan, many victims were unable to receive compensation and relief through individual civil lawsuits, which required each victim with the time and efforts for the settlement. This drew a serious social attention and led to the establishment of related Laws. Hence, the Law Concerning the Settlement of Environmental Pollution Disputes was established in 1970 and the Compensation Law was established in 1973

as a compensation and relief mechanism based on civil liability. Through such establishment of legal systems, prompt and fair compensation and relief measures for the victims were provided, and a certain degree of resolution was realized. As improvements were observed in air quality, in 1987, this law was amended with the cancellation of designated regions and it was also decided that no further pollution patients would be certified.

3.3.5 Judgment methods and standards in providing relief for pollution-related health damage in Japan

The judgment methods and standards for relief for pollution-related health damage are stipulated in the Compensation Law. Based on the medical certificates, Prefectural Pollution Examination Commissions, established in designated areas, examine whether the applicants are subject to certification. The governor or the mayor of the designated area, then issues the certification at the final stage.

When an individual is dissatisfied with the certification assessment, the first option is to bring a formal challenge against the prefectural governor or designated city mayor who made the assessment. When there is an objection to the governor or mayor's decision regarding the challenge, or when two months have passed since the challenge was brought and no decision had been made, an application for review can be requested to the Pollution-related Health Damage Compensation Grievance Board which is under the jurisdiction of the Minister of the Environment. If there is a further objection to the ruling of the Board, the courts can be asked to void the board's decision.

3.4 Comparison on environment and health management system and implementation mechanism –a comparison between China and other countries

3.4.1 Government's role and coordination mechanism

The US, EU countries and Japan all have government departments specializing in matters related to environmental pollution and its effect on people's health. For years, departments responsible for national medical care, health and public hygiene, safety of drinking water, control of hazardous chemical substances have been established, and in some countries, these departments handle environment and health problems as well. There is also a department that deals exclusively with occupational health. The interrelation among these departments are quite complex and various systems have been formed in order to improve mutual cooperation and coordination.

The situation is similar in China. The Ministry of Health is responsible for providing medical service, managing public hygiene and related matters. The Ministry of Environmental Protection is responsible for the control of environmental pollution likely to have an adverse effect on human health, but does not have the function to carry out a national health survey in relation to environmental pollution. Cooperation and concerted efforts, particularly between the Ministry of Health and the Ministry of Environmental Protection, are indispensable among the relevant departments.

Better integration of environmental policies with other policies is a common issue among the international community.

3.4.2 Financial and human resources

In China, the Ministry of Environmental Protection is established as a part of the central government, whose service primarily covers the establishment of standards for environmental pollutants, collection and analysis of data from monitoring and investigations. A system to carrying out nationwide health survey with respect to environmental pollution and examining the health status of residents in contaminated areas is yet developed. Budget allocated for environmental and health management and officers specialized in this field are very limited. In local governments, each province and city has its Environment Protection Bureau, with assigned personnel, but a system to carry out sophisticated environmental monitoring and health surveys for local residents is yet to be established.

In the US, environmental protection agency or departments are established at the federal and state levels which are financed through tax revenues. Budget is provided from the federal government to the states to cover the cost for enforcing federal laws. The US does not have special financial resource for the compensation of health damage. Polluters are fined for violations, but the collected fines do not always reach to the environmental agencies and in some cases funneled into the general revenue source.

In the EU, national agencies and research institutions are mainly responsible for the execution of EU laws, environmental monitoring and health surveillance. The EU has its own European Environment Agency (EEA), which is closely collaborated with the World Health Organization (WHO). The EEA coordinates the European Environment Information and Observation Network (Eionet) co-funded by the EU countries and cooperating countries. Expenses for research and monitoring investigations on environmental health are financed by the “EU Framework Program for Research and Technological Development” and research councils of the respective central governments. The European Commission’s Directorate General of Health and Consumer Protection provides financial support for a number of environment-related activities.

In Japan, the Ministry of the Environment conducts environmental monitoring and investigations on chemical substances and other various studies and research. Each prefecture and city is responsible for local environmental monitoring. Public health centers are established in each prefecture and government designated city and whenever health defect of local residents arises, it will be immediately reported to the center. The victims of pollution-related diseases are certified by the examining commissions established in each prefecture and government designated city. Collection of levies from polluters, payment of compensation to victims, and others are administered by the Environment Restoration and Conservation Agency of Japan (ERCA).

3.4.3 Priority areas

Even though China has already enacted such control laws as the Water Pollution Prevention Law and the Air Pollution Prevention Law, pollution-related health damage is aggravating. Particularly, the state of health damage attributable to air pollution in urban areas and water pollution in rural districts are serious and yet no sufficient investigation has been conducted to examine the actual situation.

In the U.S., the Environmental Protection Agency prepares lists of priority industries, contaminants and health effects to be dealt with. Priority items are also

determined based on the review by the EPA on pollutant emissions and discharges, results of environmental monitoring and other data.

In EU, the “EU Strategy on Environment and Health” is an important tool for deciding on priority problems in the area of environmental health. This Strategy covers political outlooks over the years up to about 2020 compiled based on consultations with interested parties, and sets out important areas of environmental health and the course of countermeasures to be taken.

In Japan, the prevention of health damage is placed much importance in environmental policy, since environmental administration has been developed in response to the emergence of pollution-related health problems. Therefore, environmental monitoring is emphasized and if pollution level that could seriously threaten the health of the local residents is detected, health survey is carried out immediately.

WHO has developed a program called “Burden of Disease” and the World Bank has developed an analysis methodology on “Cost of Degradation” both which have helped to define priority areas on environmental health issues.

3.4.4 Compensation (and relief) mechanism

China is experiencing an increasing number of court cases involving health damage caused by environmental pollution. Since laws and regulations to deal with these issues are inadequate and there are no established criteria for the court’s decisions, the plaintiffs rarely win their case. In addition to the difficulty in proving health damage, there is also no compensation mechanism.

In Japan, the Law Concerning Compensation and Prevention of Pollution-related Health Damage was established in 1973. The law incorporates the concept of liability without fault (or strict liability) for compensation. Diseases subject to the law are “*specific diseases*” having a definite causal relationship between polluters and victims (such as Minamata disease) and “*nonspecific diseases*” having no clear causal relationship (such as bronchial asthma attributable to air pollution). For *specific diseases*, polluting companies are required to pay compensation fees. For *nonspecific diseases*, polluters throughout the country bear the cost at certain rates (pollution levy collected from factories and the like 80%, automobile weight tax 20%). The Environmental Dispute Coordination Commission has been established as an institution for environmental dispute settlement based on the Pollution Dispute Settlement Law (the Prefectural Pollution Examination Commission has been established at prefectural level). Environmental disputes can be settled without court proceedings through the Commission by approving requests to submit documents and on-the-spot inspection.

The U.S. does not have special laws regarding compensation for pollution-related health damage. When a problem arises, individual or groups of individuals need to bring the causal company to court.

Member states of EU have their own national civil liability regimes that cover damages to persons or property. The EU Environmental Liability Directive (enforced in 2007) is based on the PPP (polluter pays principal), but it concerns compensation for collective damage; individual damage is dealt with under the national civil law.

As for developing countries, compensation system for pollution-related health damage per se has not been identified, but there are some examples on apportionment of liability and consequent reparation measures for environmental damages in countries.

3.4.5 Information disclosure and public access to information

In China, the Ministry of Environmental Protection collects data from nationwide monitoring data of environmental quality and pollution sources and the Ministry of Health collects statistic data on disease, but there are no systems to link the two. Moreover, attempt to study the relationship between pollution levels and the health condition of the people living in the regions, education and public awareness on the environment and health are limited.

In the US as well as in the EU, all information acquired by the respective governments on environmental pollution and violating enterprises is disclosed under the laws concerning information disclosure and such information is easily accessible through websites.

The Japanese government prepares a yearly White Paper on the Environment and local governments also publish annual reports on the results of environmental monitoring and degree of achievements to comply with the environmental standards, etc. The release amount of hazardous chemical substances are reported and disclosed through the Pollutant Release and Transfer Register (PRTR) system based on the Law Concerning Reporting, etc. of Release to the Environment of Specific Chemical Substances and Promoting Improvements in Their Management. Moreover, enterprises are active in publishing environmental reports which include the situation of pollutant emissions and reduction measures.

In India, the government established the Environmental Information System (ENVIS) in 1982 providing information to decision maker, policy planners, scientists, and engineers, research workers. ENVIS network consists of 81 partner nodes including government organizations, research institutes, NGOs, etc. and provides online information dissemination.

Common to many countries, the voice of the citizens and support from the public play a vital role in effectively monitoring pollution and promoting enterprises to take necessary measures. This also requires the provision of valid information via various media, e.g. television and newspapers, and also, the role of environmental educational activities by NGOs is very important.

3.4.6 Performance evaluation

China has established the National Environment and Health Work Leading Team composed of members from 18 ministries. The leading team is responsible for formulating environment and health management policies, and reviewing the development of scientific study and research on environment and health issues. However, practical issues such as ways to implement policies, to assess and evaluate the roles of local governments and relevant authorities still remain.

The U.S. and the EU have mechanisms for investigating and reviewing how the measures and laws concerned are being enforced.

In Japan, based on the Government Policy Evaluation Act, the ministries and agencies prepare policy evaluation reports each year, which are open to the public for

comments. Local governments are directly responsible for environment and health administration at the site and if any health disorder is found, it is reported to the local public health center and an investigation is conducted immediately. In addition, mass media and NGOs observe and monitor performances of government and enterprises.

In Brazil, there is a unique system for prosecution to protect the rights of the people and to question government institutions in charge about non-enforcement problems. The Ministério Público is a body of autonomous magistrates formed of public prosecutors working both at federal and state level protecting the rights of the people including those affected by environmental health damage.

3.4.7 Measures which worked

In China, the National Environment and Health Action Plan (2007–2015) was announced. In the U.S. technology based standards for all major categories of pollution sources proved to be effective in reducing pollutant discharges. The EU took various measures to reduce emission and achieved remarkable results through a command-and-control approach.

In Japan, the Compensation Law was enacted as a remedial response to the outbreak of pollution-induced health damages caused by inadequate legislation and administrative systems. Currently, the priority of Japanese environmental policy has shifted to prevention.

The above-mentioned countries all started with systematic environmental monitoring and steadily lowered the concentration of pollutants in the environment, resulting in successful prevention of health damage.

Also in some developing countries, environmental health information systems have been developed. For example, Brazil has developed an effective environmental health information system, building on the experience from other countries such as the US. A number of topic specific hubs collect information on water, public health, chemicals, etc. which are utilized for policy and decision-making. In India, progress has been made in accessing the judiciary to address environmental pollution issues. An Indian NGO worked through campaigns using quantitative information on health damage effects and estimated mortality rates, raising public awareness which had resulted in the Supreme Court to issue the first comprehensive mandate for tackling air pollution.

3.4.8 Measures which did not work

China needs to improve the administrative level of government agencies related to environment and health management. Capacity development of expert officials, establishment of prevention system for health damage, and formulation of related laws and regulations are necessary.

In every country, whether developed or developing, disclosure of information on environmental health risk is very important. Numerous experiences in countries around the world have demonstrated that lack of scientific information can unnecessarily spread damage on health. There are many incidents where people who are uninformed have been placed at higher risks. For example, the tragic accident in Bhopal India in 1984 took many lives of the people who were exposed to toxins from a nocturnal gas leak in a pesticide plant. This case showed how lack of information

disclosure could exacerbate the scale of damage in such incident. It took twenty years to enact the basic Right to Information law in India.

3.5 Recommendations to improving environmental health management system in China

Based on the environmental health problems faced in China and international experiences on environment and health issues, the following statements provide recommendations to improving environmental health management system in China.

Recommendation 1: Government functions and coordination mechanism

To strengthen government functions and put in place a management and coordination mechanism with clearly defined responsibilities at the central, provincial and local levels. In particular, the functions of environment and health departments should be enhanced. An effective coordination mechanism should be in place, data should be shared and a prevention, early warning and relief mechanism for environmental health should be built eventually.

Recommendation 2: Financial and human resources

To increase financial and human resources for environmental health, priority areas include survey of environmental health problems, R&D of comprehensive and basic technologies, capacity building for monitoring and capacity building for legal enforcement. Increased financial resources can be provided, at least in part, from pollution fees collected from regulated sources (polluters), and other multiple funding channels such as funds and donations, etc.

Recommendation 3: Identification of priorities

To identify key problems and gaps in environmental health management including gaps in laws, information and implementation in the first place, and then set priorities for effective environmental health management such as pollution control and establishment of monitoring and evaluation system, For example, integrated environment and health information system and Health Impact Assessment included into the current Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA) systems.

Recommendation 4: Compensation (and relief) mechanism

To build a compensation mechanism for environmental health in accordance with the polluter pays principle. The financing mechanism for compensation should be addressed including health damage which its polluters are difficult to identify. At the same time, a dispute settlement mechanism before one resorts to court should be put in place to protect people's interest.

Recommendation 5: Information disclosure & public access to information

To enhance information disclosure for environmental health and facility environmental performance through various channels such as the media, NGOs, research institutions and other stakeholders, etc. Government should play a proactive role in providing information on environment and health risks to the public. The public, media, and NGOs should also play as "watchdogs" to monitor and report the environmental pollution and health incidents.

Recommendation 6: Performance assessment

To build a performance assessment mechanism for environmental health management of the government, especially for local government, it provides the necessary incentives to encourage enforcement of environmental laws along with other matters. It is also important to strengthen justice system and the ability to deal with environment and health issues. For example, by strengthening liability for environmental pollution to ensure that the polluter pays and to ensure the truthfulness of the data submitted. Also, it is recommended to establish an accountability office for assessing the performance and industries (enterprises) from the perspective of the environment and health management.

4 Construction of China's environmental and health management system

4.1 Main bodies, objects and goals of China's environment and health management

To conduct effective environmental and health management, government departments' responsibilities should be made clear firstly, an effective communication and coordination mechanism should be set up between departments secondly, there should be a clear management system and measures thirdly, the state should have a specific strategy and objective fourthly and there should be a work plan and work highlights for implementation step by step fifthly. The five aspects are also the issues we give priority to in studying China's environmental and health management system.

4.1.1 Main bodies for governmental management

The environmental and health issue involves various aspects of the society, economy and environment and there are many departments which are connected with environmental and health management. Therefore it is highly possible to incur the overlapping in functions and management conflicts among different departments and the weakening in environment and health management efficiency without the sound inter-department coordination mechanism and the clear division of government duties. Considering the basic characteristics and management basis of the Chinese environment and health issues, the government agencies serve as the core departments closely related to management include the Ministry of Environmental Protection, the Ministry of Health, the National Development and Reform Commission, the Ministry of Finance and the Ministry of Science and Technology.

4.1.2 Stakeholders of the environment and health management

Major stakeholders of the Chinese environment and health management and the functions they exert are described in the following four aspects. There are the pollution producers, the pollution preventers, the stakeholders of pollution-induced health damage, the parties responsible for health prevention and medical treatment by sequence. Four stakeholders involved in many aspects. For example all levels of government, enterprises and institutions, ordinary people, scientific research institutions, social groups and organizations and so on.

4.1.3 Working thoughts and basic principles of environment and health management:

According to the international experience, the early prevention is the fundamental working thoughts and starting point for environment and health management work, and the active follow-up relief is the basic demand for protecting the rights and benefits of victims. The status quo and future trend of the Chinese environment and health problems have shown that the basic starting point and work focus for environment and health work are to prevent the environment and health problems from worsening, and guard against more serious health damage from environmental pollution. Meanwhile, some comprehensive treatment and relief measures shall be taken to resolve the health damage incurred by environmental pollution.

Thus, the environment and health management work of China shall adopt the working thoughts of “focusing on prevention and combining prevention with control”. The construction of environment and health management system shall not merely aim to resolve the current environment and health problems, but prevent any possible environment and health risks in the future by improving the policies, systems, technologies and methods, and enhancing the management capacities. Meanwhile, the Chinese environment and health management work shall also comply with the principles as dominant status of government and social participation, making overall plans and conducting the inter-department coordination, prevention, early warning and active treatment.

4.1.4 Management goals

The final goal of establishing the environmental and health management system is to strengthen the government’s public service, safeguard the public’s environmental and health rights and prevent, control and salvage health damage done by environmental pollution. The establishment of the environment and health system is main involved with the following seven parts such as establishment a management system and coordination mechanism in which work is clearly divided, establishment a monitoring and information exchange system and mechanism for environment and health, establishment a prevention, early warning and salvage mechanism for environment and health, establishment a scientific and technical R&D mechanism for environment and health, establishment a financial and fund guarantee mechanism for environment and health, establishment a legal, regulation and policy system for environment and health and establishment a compensation mechanism for environment and health.

4.2 Arrangement of China’s environment and health management system

As far as the environment and health management work is concerned, the government shall play a predominant role. The well defined management responsibilities are the basis and precondition for the governments to conduct the effective environment and health management work. Besides, the broad social participation also serves as a significant guarantee for supervising and encouraging the environment and health management work of government departments.

4.2.1 Responsibility and division of work for environmental and health management

Environmental protection departments should set up the work philosophy of protect human health as its goal and gradually establish the management style whose core is health risk control to change passive management for active prevention and control. At the same time, it is necessary to strengthen the law studies of environmental management, environmental quality and human health and comprehensively prevent and monitor the environmental risk for these departments. It is also important for them to lay stress on the prevention of the damage to human health done by environmental pollution and control links and particularly in pollution prevention and control areas to fulfill commitment more government functions. They should develop the prevention, early warning and intervention systems to environment and health and make the task on environment and health into the mainstream of the environmental protection. At the same time, the environmental protection departments should conduct a comprehensive study and find those different pollutants on human health. Furthermore, the environmental protection departments should strengthen the research of baseline and implement the environment and health management based on the "risk prevention".

The Ministry of Health shall focus on assuming and performing government functions in discovery, response, and treatment of damage from environmental pollution, and other links, bring the prevention and control task on disease caused by environmental pollution into the mainstream in the national disease control and health work, and provide support for development of the environment and health prevention and pre-warning work through the research on and oversight over the serious health damage possibly induced by environmental pollution.

Besides, National Development and Reform Commission (NDRC) shall play an important role in coordinating environmental protection, public health, economic development and other aspects. Its main responsibilities are to bring the environment and health work plans and mid and long-term programs of the Ministry of Environmental Protection and the Ministry of Health into the program and plan for national economy and support them with policies, projects and funds, etc; incorporate environmental protection and prevention from health damage into the formulation and implementation of local development planning so as to guard against the occurrence of environment and health problems.

The Ministry of Finance shall ensure the government finance's role in intensifying the support in environment and health management and intervention. It shall enumerate the fund for environment and health management on the routine budget list, give necessary fund support for all work concerned, set up financial support mechanism for the work of environment and health.

The Ministry of Science and Technology shall play an important role in organizing and strengthening environment- and health-related basic research and development. Its main governmental functions are to organize significant scientific and technical researches in the environmental and health field, enumerate researches on the benefit relationship between environment and health (dosage-reaction) and the lists of pollutants to be controlled under priority control as important national projects

for scientific and technical researches and give them support in technology, finance and human resources.

4.2.2 Coordination mechanism for environmental and health management

To better coordinate related departments in promoting environmental and health works, a national environmental and health administrative coordination mechanism which is widely participated by all departments is proposed to be established on the basis of the current coordination mechanism for environment and health work between the Ministry of Environmental Protection and the Ministry of Health. It is suggested that a leading group responsible for promoting the environmental protection and health work shall be established under the State Council. This group is mainly tasked to discuss and handle significant topics related to environment and health management such as strategies and planning; to coordinate work between different departments and establish a platform for exchange of views and communication; to coordinate and settle departmental disputes and conflicts; to tackle difficulties and problems in their work; to press forward with the implementation of various tasks, so that the national strategy, tasks and administrative duties with regard to environment and health can be put into place.

This leading group shall be headed by a related leader of the State Council with the minister of environmental protection and the minister of health as its vice heads, and other major leaders of departments concerned as its members.

Meanwhile, the leading group has to have its own office in which routine organization and coordination are handled.

4.2.3 Mechanism of Public Participation in environmental and health management

The establishment of a public participation mechanism mainly contains the following two aspects. One is to establish an information-communicating mechanism. The government shall release timely information about environment and health of public concern on the governmental website and through other news media in ways that are mostly available to the public, so that the public are able to grasp the timely, accurate information on environment and health. The government shall also open a special channel to listen to the information of environment and health reflected by the general public, especially establish the procedure and approach for the public to appeal to the government for the solution of environment- and health-related problems. The other is to study and discuss establishment of public interest litigation, legal assistance and hearing systems in the environment and health field. The state and other groups may lodge a lawsuit with regard to some major pollution-caused health harms on behalf of the public to safeguard their interest. As for the difficulties for the social vulnerable group in defending their rights to environment and health, the state shall offer legal assistance and help them defend their rights. At the same time, the hearing on environment and health shall be added to the examination and approval of major development plans and projects and other administrative examination, so that the public opinion can be heard. In addition, it shall be prudent to approve the plans and projects that are universally objected by the public.

4.3 Establish a prevention system for environment and health management

Establishment of a prevention system for environmental and health management is the core of the establishment of the environmental and health management system. Effective environmental and health management is not only to solve the environmental and health problem which has already arisen formerly, but, more importantly, is to prevent the problem from arising and avoid or alleviate health damage that may be caused by environmental pollution through establishing a prevention system for environmental and health.

4.3.1 Establish a standard system guarding against the environment and health risks

The environmental and health standards constitute an important basis for identifying the environmental health risks and conducting the environmental intervention.

We shall, in accordance with the requirements of environment and health work and in consideration of the actual national conditions of China, plan, coordinate and intensify the formulation and revision of standards, improve the standard systems, work hard to design the fundamental standards in urgent need of key environment and health fields, solve the continuity of current standards in the shortest possible time and support the smooth progress of environment and health work. At present, we shall make more efforts to strengthen the construction of following standard systems. The first is to revise pollutant emission control standard based on impact on health. Secondly, it is to revise evaluation standard for environmental quality based on impact on health. The third is to revise environment monitoring standard based on impact on health. The fourth is to revise evaluation standard for environmental impact based on impact on health. The fifth is health impact monitoring and risk assessment of environmental pollution. The sixth is control standards, and other standards for soil pollution, electromagnetic radiation pollution. The last is assessment and identification standards of the damages caused by environmental pollution.

4.3.2 Establish a directory of priority-controlled pollutants

In order to prevent the damage to health by environmental pollution, the priority shall be given to the study and establishment of national and local directories of priority-controlled pollutants so as to carry out the prevention from damage to environment and public health with clear aims and emphases. The environmental protection and public health authorities shall strengthen their cooperation for its early appearance. Meanwhile, local governments at all levels shall study and establish their own directories of priority-controlled pollutants and take effective measures to prevent severe health risks in light of the actual conditions of their local environmental protection and health work.

4.3.3 Establish a stringent environmental access system

It is an important part of effectively preventing pollution-caused damages to public health to establish a stringent environmental access system. Those pollutants that may severely endanger human health shall be banned or restricted in their production, use and discharge. The directory of chemicals that are banned in

production, use and discharge shall be established with a view to safeguarding human health. For those chemicals that are restricted in their production, use and discharge, we shall establish a stringent access standard in order to extinguish the possibility of environmental pollution and health damages in the wake.

As a result, it is required that, while formulating its industrial development policy, the state shall prohibit the domestic production of those chemicals of which production and sales are banned, and apply active measures such as evaluation of environmental impact, real-time monitoring and tracking survey of health effect to those chemicals that are restrictedly used, in order to prevent serious harm to public health.

4.4 Establish an environmental and health monitoring system

The top priority of establishing the environment and health monitoring system is to transform these existing monitoring networks and forces of the Ministry of Environmental Protection and the Ministry of Health, to build an environment-monitoring and disease-monitoring system and an information platform that support the environment and health prevention, to monitor for long run those key pollution sources and pollutants and grasp the dynamic changes of the Chinese major pollutants and human health to provide important data for the state's preventions and interventions by establishing the environment and health monitoring database.

4.4.1 Establish a water environmental and health monitoring network

On the basis of existing monitoring facilities such as the water environment monitoring system and the drinking water monitoring system, we shall intensify the monitoring of water pollution and health damage, especially the monitoring of water quality of drinking water source and rural water environment and health, with the overall requirements of national water pollution prevention work and related requirements of urban and rural drinking water safety taken into consideration.

4.4.2 Establish a monitoring network for air pollution and health

Monitoring air pollution means monitoring and tracking the major pollutants in the air to be controlled that will directly affect or indirectly affect through other channels the health of the residents. It means in particular the effective monitor and control of the pollutants to be controlled in priority. At the same time, it means the monitor of the health conditions of different groups of people and the establishment of a health monitoring station in each social community and formulation of the relevant indexes for monitoring and collecting the health information of the residents.

4.4.3 Establish a monitoring network for soil environment and people's health

On the base of the investigation on the current state of the soil environment and the assessment of the soil environment health risks, we should integrate and strengthen the existing monitoring resources and capability to form a national soil environment and health monitoring network according to the needs of the monitoring work.

4.4.4 Establish a monitoring network to monitor extreme weather events and people's health

Provinces (autonomous regions and municipalities directly under the Central Government) shall be regarded as a monitoring unit with monitoring stations and posts established at the municipal and county levels to monitor, analyze and assess the extreme climate harm to the people's health. The existing weather and health monitoring resources and capability in the national meteorological departments and health departments shall be consolidated and reinforced to set up a national extreme climate event and health monitoring network.

4.4.5 Establish a monitoring network for the public place health and biological safety in given places:

Based on Hygienic Management in Public Places, it is necessary to set up monitoring areas in important places, monitor the hygiene biological safety and form a national monitoring network of hygiene in public places and biological safety in specially designated places.

4.5 Early warning mechanisms for environment and health management

Where the prevention system has not been improved or has not even been established yet and the pollutants producing grave consequences to people's health cannot be effectively controlled, it is necessary to establish a pre-warning system for people to evade and avoid the hazards to people's health. Others unexpected events, extreme weather and accumulated effects may still bring about great pollutant threat to people's health. Therefore, it is still necessary to establish a pre-warning system for people to evade and avoid health risks.

4.5.1 Establish the assessment mechanism for environment and health risks

China shall establish the assessment mechanism for environment and health risks. Environmental protection and health departments and other relevant departments shall have a close cooperation to set up and improve environmental and health risk assessment system, research and perfect risk assessment procedures, and constitute related guidance, techniques and methods, and determine the acceptable level of danger, scientifically work out grade divisions of national environment and health risks, and gradually keep the costs of environmental and health risks under control.

4.5.2 Strengthen early warning ability for environmental and health risks

Departments of environmental protection and health at all regions shall jointly conduct the early warning work on environmental and health risks, warn the possible serious environmental pollution and damages to health in advance, put forward management and technical responsive measures to realize scientific decision-making and prevention on the basis of environment and health monitoring and risk assessment; set up early warning mechanisms for environment and health risks, reporting systems for environmental pollution and health damages and early warning release systems,

improve early warning and prevention policies, measures and means and strive to prevent serious environmental pollution and health damaging events from happening by early analysis, early prediction and early intervention; study the relationship between environmental pollution and health damages with a purpose of stressing and decreasing environmental pollution and health damages, make reasonable early-warning, prevention and treatment plans for different risk grades and constantly increase the level of guarding against grave environment and health risks.

4.6 Improve the emergency handling mechanisms for environment and health management

It is necessary to further improve the environment and health mechanism against emergencies and formulate the work rules to deal with the outbreak of unexpected events, the report system of emergent and major events and the regulations to handle the unanticipated environment and health events. The environmental protection and health departments shall cooperate with each other closely to deal with emergent events in connection with the environment and health and improve their capacity to deal with such events. It is necessary to realize unified decision making, command, allocation of resources and dealing with the emergent cases, striving to swiftly and effectively control the pollution, mitigate the health harm and provide prompt medical treatment to the victims.

4.7 Reinforce the construction of technical support systems for environment and health management

4.7.1 Strengthen the construction of technical capabilities and professional teams

Strengthening the technical supporting capacity for the environment and health is crucial to enhancing the supporting level with science and technology. What needs strengthening urgently is the basic research capability of environment and health, the monitoring capability, the laboratory facilities and equipment, the standard system development capability and the capacity building for the human resources training.

4.7.2 Strengthen investigations on the current condition of the environment and health impact

The inadequate investigation of the environment and health problems has not only directly affected the objective and accurate judgment of the environment and health problems in China but also the effective development of the environment and health management. Hence, it is necessary to timely carry out investigations on the major environmental factors and damages to health caused by the polluted environment nationwide, find out the kinds, degrees, nature and distribution of the health damages caused by the environmental pollution in China and keep abreast of the spectrum of diseases caused by environmental pollution to provide scientific basis for the implementation of the environment and health actions.

The investigation of environment and health problems mainly covers the following two areas. One is Investigations on the status quo of the major environmental pollutants. The other is Investigations on health impact caused by environmental pollution.

4.7.3 Launch the environment and health research projects in urgent need

According to the development situations and actual requirements of international and domestic environment and health work, some basic application researches shall be started in the shortest possible time. For instance, study on assessment technology of health damages caused by environmental pollution and study on the load assessment system of the diseases caused by environmental pollution.

4.8 Complementary mechanism of environment and health management in China:

4.8.1 Financial assurance mechanism

It aims to meet the requirements of the government departments such as environmental protection and health to conduct the environment and health surveys, monitoring and system maintenance, and complete the environment and health prevention, warning and emergency work. The environment protection department and the health department at all levels shall formulate medium- and long-term plans and annual plans on the environment and health management, specify work content, apply for reasonable financial budget and submit it to the financial department for approval. Meanwhile, the financial allocation of central government and local governments at different levels shall arrange the funds in their annual budgets to ensure the administrative fees and major project costs.

The State is advised to develop the environmental pollution responsibility insurance system and create the compensation fund for environmental health damages (hereinafter referred to as the compensation fund). The State shall implement the environmental pollution responsibility insurance system and intend part of premium as the compensation fund. The financial departments shall make some financial contributions to the compensation fund on an annual basis. In the meantime, a certain amount of pollution discharge fees collected on an annual basis shall be contributed to this fund. The social donations can also constitute a source of compensation funds. The compensation fund shall be paid in the following situations. Firstly, compensation for the victims of health damages caused by historical environmental problems; Secondly, compensation for the victims if the responsible parties lack the civil compensation capacities; Third, compensation for the victims if the responsibility subjects can't be identified.

4.8.2 Information supporting system:

The establishment of environment and health information management and publication mechanism will contribute to the creation of national environment and health information platform and the environment and health information service mechanism. We shall periodically release environment and health news and publish environment pollution data and health damage to the public so as to accept the public supervision and help the public to evade and avoid the health risks. We also shall establish the national and local dynamic monitoring databases of environmental pollution and health effects and create the effective information sources of monitoring data to provide the scientific basis for the national and local environment and health

decision-making work, and offer the basic data for the environment and health research.

4.8.3 Supporting policies and regulations

It's necessary to assess the implementation outcome of current laws and regulations in a comprehensive manner and suggest the general plan for improving the related environment and health laws and regulations in order to dissolve the outstanding contradictions in the present work. We shall gradually set up a complete set of legal systems including the laws and regulations on environmental health risk and impact assessment, prevention of environmental health problems, compensation of environmental health damages, emergency treatment of environmental health events, relief of environmental health damages so that the each link of environmental health work can act upon the laws and regulations accordingly. We shall study the legal systems on compensation for damages caused by environmental pollution, further consolidate the legal responsibilities for environmental pollution, improve the legal basis of compensation for damages caused by environmental pollution, and study and design the specific compensation measures including the identification of damages caused by environmental pollution, and the compensation procedure and scope, as well as the legal aid methods for those suffering from pollution. We shall better the construction of laws and regulations on environmental impact assessment, treat the environmental health impacts as an integral component of environmental impact assessment and strengthen the prevention and control of environmental health damages.

4.8.4 Other supporting policies and measures:

The related departments shall intensify the organization of environment and health work, earnestly carry out the tasks, goals and requirements, guarantee the transparency of government affairs, tighten the responsibility checkup, receive the social supervision, and ensure the successful and effective development of environment and health work. Meanwhile, we shall spare no efforts to launch the publicity of environment and health knowledge and the public education, enhance the people's consciousness of environmental protection and health protection, boost the development of sound individual and social conducts, and create a positive atmosphere in which the whole society protects environment and maintains health. In addition, we shall actively conduct the domestic and international exchange activities absorb the advanced experience in environment and health work, learn the new technologies and methods, and continuously increase the capacity and level of environment and health work in China.

4.9 Key fields of China's environment and health management:

China's environment and health intervention work shall focus on the prevention and treatment of the health damages and risks induced by air pollution in urban area (including highly urbanized rural areas) and in big cities in particular. Since there is lack of drinking water and increasing pollution of water bodies in the vast rural areas of our country, priority of intervention shall be given to the prevention and treatment of health damages and risks caused by water pollution or biological pollution of the water environment there. Great attention shall be paid not only to modern

environment and health problem but also to the traditional environment and health problems there. Strategically, we shall intervene without delay the environmental risks which have led to diseases or definite damages, and create the remedy and compensation mechanism for environmental health damages. Though we have definite knowledge of environmental health damages and influence approaches, the serious damages are still yet to come, such being the case, we shall focus our efforts on monitoring and prevention, strengthen the early intervention, and avoid and decrease the health damages caused by environmental pollution. We shall intensify monitoring and impose a rigorous access requirement on those environmental factors with indefinite health influences.

5. Policy and legislation framework of Environment and Health

5.1 Basic framework of China's environment and health management policies and legislation

5.1.1 Basic framework of China's environment and health management policies

China's environment and health policies consist of health policies in connection with environmental protection and environmental policies in connection with health protection involving environmental factors. Specifically they include:

(1) Policies for preventing environment health-related damage. The prevention policy remains one of the basic policies for the environment and health protection. Policies for preventing environment health-related damage are mainly realized by rational planning, assessment of health impact and development of clean production and recycling economy. First, China tries to protect the environment, prevent and control the pollution, avoid the adverse impact to the utmost of the production and construction on the living environment and health of people through rational development plan. Documents such as the Outlines of National Economy and Social Development every five years and the Program of Action for Sustainable Development in China in the Early 21st Century all embody the policy of protecting the environment and human health via planning. Next, China lays emphasis on the assessment of impact of environment on health, and prevents the adverse impact of production and construction on human health through environmental assessment of planning and construction projects. The Assessment of the Impact of Environmental Pollution on Health (for trial) released by the Ministry of Health in 2001 and the National Environment and Health Action Plan (2007 to 2015) jointly issued by many ministries and commissions have concentrated reflection. And the Action Plan puts forwards the requirements of reasonably determining the acceptable risk level, mapping out the national environment and health risk grade division, improving the prediction and management decision-making on the controllable environmental harmful factors and health hazard, gradually realizing the environment and health risk cost control and etc. Second, China formulates a series of policies of eliminating backward productivity and developing clean production and recycling economy. These policies are partially reflected in the Decision of the State Council on Several Issues Concerning Environmental Protection released in 1996, Several Opinions of the State Council on Speeding up the Development of Recycling Economy and the

Decision of the State Council on Implementing Scientific Concept of Development and Strengthening Environmental Protection issued in 2005. These policies also are best reflected in the documents of various competent administrative departments, such as the Catalogue of Backward Productivity, Process and Products to Be Eliminated, the Technical Guiding Catalog of Clean Production of National Key Industries and etc.

(2) Policies for restoring and relieving environment and health-related damage. Restoring and relieving environment health-related damage includes contents in three aspects: first, restoring environment that does harm to human health; second, restoring human health; and third, relieving and remedying damage done by environment to health. First of all, regarding the restoration of the environment that causes damages to human health, the policies and stipulations in China are mainly reflected in the policy of “whoever pollutes shall control”, the substitutive execution system and etc. Second, in terms of restoration of human health, special and definite policies are yet to be established. As to the damage to human body caused by the environment and health-related damage accidents, temporary measures are normally taken after the accidents, and the pollution enterprises and the government together provide funds for the treatment. At last, in respect of relieving the environment and health-related damage, China currently has no special policy and the relief is generally administered through the administrative or judicial channel.

(3) Emergency policies for environment and health-related accidents. Since 2003, the Chinese Government has gradually constructed and perfected the preparation system for rapid response to environmental pollution emergencies, and established the “National Inter-Ministry Joint Conference System for Environment Protection” as the top integrated coordination institution for the outbreaks of environmental pollution emergencies. The above-said emergency system certainly covers the rapid response to the environment and health-related accidents.. The National Environmental and Health Action Plan is a policy document which stipulates early warning against environment and health risks and rapid response to emergencies for the first time. It requires to establish the disposal system for rapid response to emergencies and the reporting mechanism for emergencies and major events; makes it clear that environmental protection departments and health departments should take the main responsibility for dealing with emergent public accidents caused by environmental pollution and other relevant departments should participate according to needs; integrates relevant institutions and posts of the environmental protection sectors and the health sectors....gives full play to the environment and health monitoring network and the risk assessment measures. ...carries out afterward on-the-spot environmental investigation, health impact tracing and monitoring and emergency disposal effect assessment, to direct the on-the-spot environmental remediation and health damage treatment after the outbreak of an emergency....timely and effectively treats the damage to health caused by the environmental pollution in line with the existing medical security system and the medical assistance system in urban and rural areas, prevents the aggravation of the damage, reduces the damage burden and feasibly safeguards the life and health of the victims.”

5.1.2 Basic framework of China's environment and health management legislation

China has preliminarily set up the environment and health law guarantee system including the constitution, civil laws, criminal laws, administrative laws, environmental laws and etc., which are described as follows:

(1) Constitution. The state has the responsibility for protecting citizens' health and the Chinese Constitution contains many such provisions. Article 21 of the Constitution (1982) stipulates the state should develop the medical and health cause, develop public health activities and protect people's health. And Section 2, Article 36, Article 42 and Article 45 of the Constitution stipulate the state has the responsibility for protecting citizens' health in different aspects.

(2) Civil law. The General Principles of Civil Law gives detailed stipulation of the health right which is one of the important personal rights of citizen. Article 98 of the law stipulates citizens have life and health rights. Article 106 prescribes the civil liability for infringing others' life and health rights and the liability principle.

(3) Criminal law. The criminal liability and criminal punishment induced by infringement upon citizens' life and health rights which has constituted crimes is an important component of the Criminal Law, which effectively guarantee citizens' rights to health.

(4) Health law. The administrative laws that protect citizens' health right are mainly health laws. At present, China has already published 9 health laws and over 20 health regulations. But the health administration regulations relating to the environment and health management are only prescribed in the public health legal norms, such as the Law of the PRC on the Prevention and Treatment of Infectious Diseases, the Food Hygiene Law, the Law of the PRC on the Prevention and Treatment of Occupational Diseases, Regulations on Preparedness for and Response to Public Health Emergencies and etc.

(5) Environmental law. One of the objectives of the environment legislation in China is to safeguard human health. It prescribes the relief for the damages to human health caused by the environment problems. First, on the basis of establishing "safeguarding human health" as one of the objectives of the environmental legislation, the existing Environmental Protection Law prescribes, in the first article, that the law is formulated for the purpose of protecting and improving people's living environment and the ecological environment, preventing and controlling pollution and other public nuisance, safeguarding human health and facilitating the development of socialist modernization. The subsequently promulgated laws and regulations such as the Law of the PRC on the Prevention and Control of Atmospheric Pollution, the Law of the PRC on the Prevention and Control of Environmental Noise Pollution, the Law of the PRC on the Prevention and Control of Environmental Pollution Caused by Solid Waste, the Law of the PRC on the Prevention and Control of Radioactive Pollution, the Regulations on the Administration of Agriculture Genetically Modified Organism Safety and the Regulations of the Safety and Protection of Radioisotopes and Radiation Apparatus all list "safeguarding (protecting) human health" as one of their legislation objectives without exception. Second, with regards to the relief for

damages to human health caused by environment problems, Article 41 of the Environmental Protection Law stipulates that any unit that has caused an environmental pollution hazard shall have the obligation to eliminate it and make compensation to the unit or individual that suffered direct losses. A dispute over the liability to make compensation or the amount of compensation may, upon the request of the parties concerned, be settled by the competent administrative department of environmental protection or another department vested by law with power to conduct environmental supervision and management. If a party refuses to accept the decision on the settlement, it may bring a suit before a people's court. The party may also directly bring a suit before the people's court." Article 42 stipulates that the limitation period for prosecution with respect to compensation for environmental pollution losses shall be three years, counted from the time when the party becomes aware of or should become aware of the pollution losses. Other environmental protection laws all have the similar stipulations.

(6) Labor law. So far, China has successfully set down a series of laws, regulations and rules relating to the environment and health and safety protection of labors, such as Mine Safety Laws, Labor Law, Law of the PRC on the Prevention and Control of Occupational Diseases, Law of the PRC on Safe Production, Decision of the State Council on Strengthening Control on Dust-proof and Toxicant Prevention, Regulations for the Implementation of Law of the PRC on Safety in Mines, Regulations on Labor Protection in Workplaces Where Toxic Substances Are Used and Measures for Administration of the Occupational Health Monitoring and Protection. These normative documents have played a very important role in protecting the safety and health of labors in China.

(7) Judicial interpretation. The Supreme People's Court makes several judicial interpretations that favor the environment and health protection. For example, Article 4 of the Several Provisions of the Supreme People's Court on Evidence in Civil Proceedings clearly stipulated that adopting the inversion in burden of proof for environmental tort litigation cases, which vails the victims for safeguarding their rights and interests. While the Interpretation of the Supreme People's Court on Several Issues Regarding the Ascertainment of Compensation Liability for Mental Damages in Civil Torts feasibly solves the operability of the life and health right protection in the judicatories, so as to allow the victims of the pollution to obtain the compensation for mental damages.

(8) Environmental standards. China has established many environment standards that closely relate to the environment and health. First is to make out environmental quality standards to protect the environment and safeguard human health. Second is to establish standards for pollutant discharge to prevent and restrain the environmental pollution from damaging human health, such as the Integrated Emission Standard of Air Pollutants, the Standard for Pollution Control on the Landfill Site of Municipal Solid Waste and etc. Third is to establish the health protection zone standards to prevent the toxic and harmful substances of the factories and mines corporations from affecting the normal living environment and health of the residents, such as the Health Protection Zone Standard for Oil Refinery and the Health Protection Zone Standard for Cement Plant, so as to prevent, control and reduce the adverse effect of pollution on human health. Forth is to establish the using standards for the toxic and harmful substances to prevent the environment and health-related damage caused by using

such substances, such as the Hazardous Materials Control Standard for Motor Vehicle Gasoline and the Guidelines for the Hazard Evaluation of New Chemical Substances. Fifth is to establish the discriminant and identification standards of the environment and health-related damage to solve the environment and health disputes, such as the Discrimination Standard for Health Hazard Area Caused by Environmental Cadmium Pollution and the Standard for Identification of Area of Chronic Arsenic Poisoning Caused by Environmental Arsenic Pollution.

5.2 Analysis of the problems of the Chinese environment and health management policies and legislation

Despite the fact that China has made remarkable progress in the construction of laws and policies on environment and health, we have to say the policies and legislation on the environment and health management in China remains confronted with severe challenges. And these to be solved are caused by many factors such as economy, history, science and technology.

5.2.1 Challenge confronted by the Chinese environment and health management policies and legislation

The environment and health management policy and legislation system in China has defects with respects to the environment and health management policy, the laws, regulations and normative documents on the environment and health management, and the environment and health management system. And it has many shortcomings in respect of the execution of the policy and legislation, which is mainly reflected as follows:

First is shortage of the comprehensive and systematic environment and health management policies. Currently, the environment and health policies are not comprehensive enough, and there're not the comprehensive and systematic relief policies for the environment and health-related damage like the environmental health recovery and the insurance of environment and health-related damage, nor are there the environment and health supervision policies mainly supported by facilitating the disclosure of environment and health information and promoting public participation.

Second is shortage of the sound legal systems on environment and health management. China lacks the special legislation on environment and health problems, and the related laws and regulations can be found in quite a few legal departments so that the judicial practice is impossible without the coordination of several related laws and regulations. At present, the legal guarantee system on environment and health consists of the related entities like the civil law, administrative law, criminal law, environment law, civil procedure law, administrative procedure law and criminal procedure law, and the specific provisions of procedural laws, which appears to be rather disorderly and can hardly form a complete and systematic legal system. These disorderly environment and health laws and norms can hardly effectively protect the human health and prevent the frequent occurrence of the environment and health accidents.

Third is shortage of the necessary legal system on environment and health management. A multitude of environment and health legislation cases are just limited

to the abstract prescription in the objectives of the legislation. There aren't any detailed provisions concerning the measures for safeguarding the human health, the criterion for assessing the health damage, and the relief approaches and methods for health damage, resulting in failure to satisfy the needs for environment and health protection. Meanwhile, some specific environment and health management systems are imperative to be established, such as environment and health risk assessment system, reporting system for environment and health-related damage, monitoring system for environment and health-related damage, early warning system for environment and health-related damage, authentication and evaluation system for environment and health-related damage, compensation system for environment and health-related damage, insurance system for environment and health-related damage, disclosure system for environment and health-related damage information, emergency system for environment and health-related accidents.

The last one is ineffective implementation of the present environmental management systems and measures. It is the truth that we lack special environment and health management system. But if some of the existing environment management systems can really be implemented, we can still solve the environment and health issues to some degree. As a matter of fact, these systems are not implemented effectively. Especially the criteria on human health protection have not been given proper attention. For example, the environment impact assessment system inherently contains the assessment on human health impact. However, in the concrete operation, the relevant assessment standards are absent. What's more, the personnel for approving environment assessment documents seldom considers the influence of the projects on human health, some environment assessment units even practice fraud intentionally just to pass the environment assessment report smoothly. Taking another example, the environmental damage compensation system surely includes the compensation on human health damage, however, the institutions, procedures and standards on the identification of damage to human health caused by pollution are absent. As a result, many victims of the environmental pollution can not be identified and compensated.

5.2.2 Analysis of the reasons of the Chinese environment and health management policies and legislation absence

The various problems in environment and health policies and legislation as stated above not only originate from some historical origins, but from certain economic and technical causes; they can be attributed to the restricted awareness of government leaders and the insufficient public consciousness of environment and health, and are related to the management mechanisms and judicial practices. Concretely speaking:

(1) The environment and health management starts late in China. The history of environmental protection is just 30 years in modern China, and less than 30 years in terms of the environmental protection legislation. And at this stage, it is difficult for the state to pay proper attention to the health damages that are not visible or are featured by posteriority and potentiality. Therefore, the legislation work may state the general provisions on "protecting the human health", but the specific management and protection measures are rarely available. Besides, due to the lacking of environment and health cases and the environment and health management experience, the draft

and establishment of the environment and health policy and legislation surely can not be emphasized and conducted.

(2) The environment and health management is restricted to the economic development. In the past 30 years, China has always taken the development as the overriding principle, while some local leaders even unilaterally interprets the “development is the most important principle” as “economic development is the most important principle”, which results in an average annual growth rate of 10% or over for the GDP but much less investment on environmental protection. During the 8th Five-year Plan, the ratio of the environmental protection investment to the GDP was only 0.69%, nearly 1% during the 9th Five-year Plan, and 1.32% during the 10th Five-year Plan, which is registered as dramatic increase. While the investment in environmental protection in developed nations generally accounts for 1.5% of the GDP.¹² With such low proportion of environmental protection investment, China’s environmental situation will surely deteriorate, and then affects human health. While the general public, especially the leaders at various levels are absorbed in the economic development, having little time or not willing to pay attention to the environment and health, the special and concrete legislation on the environment and health management certainly can hardly be put on the agenda.

(3) The technological capacity of environment and health management is weak. In respect of the technical factors, it still remains uncertain to identify the cause-effect relations for environment and health-related damage. The diseases related to environment and health can’t be identified often because of the absence of technical authentication. As a result, some facts on environmental health hazard are concealed. Furthermore, the environmental medical researches of China not merely have a late start, but are confronted with the technical weakness. The research expenditures in short supply and the restricted site investigations render it hard to master the comprehensive data of environment and health. Because the environment and health problems are not based on the scientific researches and the comprehensive survey data, they can’t draw enough attention from the government and administrative departments, or be put on agenda of national legislation work.

(4) The environment and health management is not emphasized by the leaders. Some local government leaders don’t recognize the significant impact of the environment health hazard on the state, and they blindly think that the environmental pollution hazards including the environment and health hazard are inevitable in the course of economic development, even view that certain environment and health hazard is the cost China has to pay for its economic soar. Under such mentality, it is impossible for them to highly value the environment and health issues. In addition to that, due to the mentality of “holding back the unpleasant information” that prevails through the whole country, the environment and health damage which will affect the political achievement and image can not be reported actively. In addition to that, due to the mentality of “holding back the unpleasant information” that prevails through

¹² Analysis on the Chinese Environmental Protection Investment at <http://www.paper800.com/paper8/39151403/>, Time of Latest Browse: 18: 00. .August 20, 2007.

the whole country, the environment and health hazard which will affect the political achievement and image can not be reported actively.

(5) The environment and health management is deficient in public basis. For a long time, China has lacked propaganda and education in environment and health, leading to the low environment and health consciousness of the Chinese citizens. They are accustomed to and can not recognize the environment and health damage they suffered, even when they are seriously jeopardized, they do not actively complain and press for solving the problems. Some residents that suffered damage from the environmental pollution even give up their complaints if obtaining some economic compensation from the polluter, which also affects the cognition of the decision making departments on the seriousness of the environment and health problems and the urgency for solving these problems, and further influences the legislation of the environment and health.

(6) The environment and health management lacks the judiciary support. Various courts are normally reluctant to accept the environment and health hazard cases. So, few environment and health damage cases can be successfully prosecuted, let alone cases that win the lawsuit. Since the courts have witnessed few lawsuits concerning environment and health problems, it'll be hard to reflect the judicial demands for legislation of environment and health and accumulate various environment and health cases necessary for legislation work. Hence, people have a false impression that the legislation is unnecessary and ungrounded.

5.3 Perfection and improvement of the Chinese environment and health management policies and legislation

As we said above, the environment and health management policy and legislation system is perplexed by many problems with manifold causes. With the establishment of the scientific concept of development, the Chinese government pays more attention to people's livelihood, pursues the social harmony, and increasingly concerns the environment and health issues that relate to the fundamental interests of the majority of the people in China. Meanwhile, with the economic development and the scientific and technological progress, China has possessed the ability to solve environment and health issues, and the People's governments at all levels and the general public are all gradually realized the importance of environment and health management. On top of that, along with the perfection of the environmental law system of China, People begin to notice the defects of the environment and health policy and legislation, and are willing to improve and perfect it with effective measures.

The environment and health policy and legislation should be improved and perfected mainly in the following aspects:

5.3.1 Formulation of the comprehensive and systematic environment and health management policies

The comprehensive and systematic environment and health management policies shall include the preventive policies for environment and health-related damage, which focus on the rational planning and the environment and health risk assessment;

the industrial policies favorable for environment and health, dominated by the clean production and environmental friendliness; the policies on treatment of environmental pollution sources, which focus on the elimination of backward production process and equipment; the relief policies for environment and health-related damage, mainly including the development of insurance for environment and health-related damage, the administrative relief and the judicial relief; the environment and health supervision policies mainly supported by facilitating the disclosure of the environment and health information and promoting public participation.

5.3.2 Gradual improvement of the legal systems on environment and health

Since China's environment and health work was just initiated, it's still premature to develop the comprehensive environment and health legislation immediately. During the "10th Five-Year Plan", the former State Environmental Protection Administration organized the national science and technology development topic entitled the Research into the Human Health Damage Caused by Environmental Pollutions and the Compensation Mechanisms, worked out the legal framework for the health damage rating and compensation mechanism, providing a technical platform for conducting the environment and health management and identifying and compensating for the environment and health-related damage. On the basis of that, through the cooperation of various departments, clauses that relate to the environment and health can be properly added in the process of drafting and establishing relevant environmental protection laws and regulations. For example, content of human health impact assessment can be added in the Technical Guideline of Environment Impact Assessment. We can revise the related clauses of Civil Procedure Law, Administrative Procedure Law and Criminal Procedure Law, and specify the procedures concerning the lawsuits against environment and health-related damage including the plaintiff's procedural competence, collection of evidence, burden of proof, the determination of cause-effect relation, and time limit for litigation. On the basis of the supplement and perfection of relevant laws and regulations, we can also draft and establish special laws and regulations on environment and health, such as the Law of Compensation for Environment and health-related Damage and the Regulations for the Management of Environment and Health, and work out a series of standards and technical specifications to support the implementation of the laws and regulations. And finally, we will form a harmonious and unified environment and health law system constituted by a series of laws, regulations, rules and standards. See Table 4.1

5.3.3 Establishment of a whole set of inter-linked and coordinated environment and health management systems

The sound environment and health systems shall include the environment and health planning system, the assessment system for impact of planning and construction projects on health, the monitoring system for environment and health-related damage, the disclosure system for environment and health-related damage information, the public participation system for environment and health management, the early warning system for environment and health-related damage, the reporting system for environment and health-related damage, the treatment system for environment and health-related damage, the identification and assessment system for environment and health-related damage, the compensation system for environment and health-related damage, the fund system for environment and health-related

damage, the insurance system for environment and health-related damage and the emergency system for environmental health accidents. These systems should be inter-linked and coordinated to create a whole set of well-established systems. At present, the several systems that urgently need to be established are listed as follows:

(1) The environment and health-related damage monitoring system. At this moment, the biggest challenges we face in our environment and health management are that the quantity and degree of the environment and health-related damage are not clear and the relevant data is deficient, so it is necessary to establish the environment and health-related damage monitoring system as soon as possible. The environment and health-related damage monitoring system should comprehensively and dynamically investigate the environment and health-related damage situation over all the country, especially in areas that have long been afflicted by pollution, opportunely integrate the environmental pollutant monitoring and the epidemic monitoring, and realize the connection with the environment and health planning system, the early warning system for environment and health-related damage and etc. At this moment, we can conduct the monitoring work relying on the environment monitoring network which is relatively sound. As for the monitoring on the status quo of the human health, the Ministry of Health can organize the disease control center and the relevant medical institutions to conduct the monitoring. The monitoring data of various departments and units should be disclosed and shared, and consultation should be conducted for major problems found in the monitoring.

(2) Identification and assessment system for environment and health-related damage. The compound character of the environmental problems in China brings about the complexity and diversity of the environment and health issues. Since the identification of cause, nature, size, degree and impact scope of environment and health-related damage requires the considerable professional and technical capacities, it's necessary to establish the special identification and assessment institutions for environment and health-related damage so as to provide the parties concerned with the damage identification and assessment services. The environmental protection administrative department of the State Council should establish the environment and health-related damage assessment system to identify the assessment qualification of the environment and health-related damage evaluation institutions, and frame and release relevant identification standards and technical specifications for environment and health-related damage. The conclusive assessments, which are made by the statutory assessment institutions according to the relevant assessment norms, should have the legal effect, and constitute a major basis for determining the damages related to environment and health.

(3) The environmental liability insurance system. The environment and health hazard events always involve a large number of people and huge compensation amount, and generally the pollutant discharging enterprises can not bear the charges independently. So, we must set up the environment liability insurance system to disperse the risk in a socialized way

(4) The emergency system for environment and health accidents. At present, the environment and health accidents in China are mainly managed in line with the policy documents such as the National Environmental and Health Action Plan, lacking effective laws and regulations basis. The feasible emergency system for environment

and health accidents is yet to be established. Based on the own characteristics of the environment and health accidents, it is required that the environment and health accident emergency system should pay more attention to the beforehand prevention and early warning and the afterwards long-term relief, etc. The environment and health accident emergency system should contain the following content: establishing special environment and health accident emergency management legislation on the administrative regulations level, as well as relevant matching department rules; nailing down the leading bodies and the participating departments for the environment and health accident emergency treatment; establishing the emergency management pre-plan system for environment and health accidents; setting up the reporting system for environment and health accidents; making clear the source of emergency funds for the environment and health accident and establishing corresponding accidents restoration funds; creating stringent emergency responsibility investigation system for environment and health accidents.

5.3.4 Creating the robust law enforcement mechanism of environment and health management

The environment and health management work in China starts late, and is featured by insufficient investment, low level and weak public participation base, so the administrative law enforcement remains the main mean and inevitable path for implementing the environment and health policies, laws and regulations. First, we should strengthen the construction of environment and health institutions, and nail down their corresponding responsibilities. Currently, we should specially make clear the status and responsibilities of the administrative departments such as the environmental protection departments and the health departments in enforcement of the environment and health management, furnish necessary professionals and funds for them, and improve their ability and level in conducting the administrative enforcement on environment and health management. Second, we should enhance the communication and coordination of various departments on the government level, establish and perfect the enforcement cooperation mechanism of the environment and health management among various departments. Finally, we should provide ways for the public to participate in and supervise the enforcement of the environment and health management through the disclosure system for environment and health-related damage information and the public participation system for environment and health management, strengthen the acceptance and trial of the judicatory system on the civil cases, administrative cases and criminal cases concerning the environment and health, and enhance the administrative enforcement of the environment and health management by social supervision and judicial supervision and etc.

5.3.5 Implementation of various applicable systems and measures on environment and health management

Promotion of the implementation of various systems and measures on environment and health management is the realistic choice to solve the issues concerning the environment and health management policy and legislation, also is the implication for perfecting the environment and health management policy and legislation. The environment planning system, the environment impact assessment system, the environment damage compensation system and other systems are all proven environment management systems supported by relevant sound policies,

legislation and concrete measures. Because we have not yet comprehensively and clearly recognize the relation between the environment and health management and these systems, these systems and measures fail to meet the practical need of the environment and health management in the implementation process. The implementation of various systems and measures of the environment and health management should be initiated with two aspects. On one hand, we need to firmly carry out various systems and measures to facilitate the rapid development of the environment and health management. On the other hand, we need to make overall arrangement, using the existing systems and measures to promptly and properly regulate in advance the issues that are scheduled to be governed by policies, systems and measures that have not been mapped out and also can be regulated by the existing systems and measures, so as to make up the system construction lagging. For example, before the promulgation of the special Law of Compensation for Environmental Damage, we can flexibly use the existing environmental damage compensation system to solve the issues on compensation from environment and health-related damage.

6 Report on Recommendations for Policies on Strengthening the Environment and Health Management

According to international experience, environment and health problems which are handled improperly may develop into complex social and political ones, which gravely jeopardize the public health, affect the credibility of the government, and cause the government to pay a heavy economic cost. Therefore, different countries all over the world currently pay much attention to the environment and health management, strengthening management and intervention, and have made good results. Their main experience and practices are: The first is to intensify prevention and make active intervention so as to avoid harm from environmental pollution to human health; the second is to improve legislation, strengthen the administration of justice, and establish an environment and health-related dispute settlement mechanism and a health compensation mechanism.

Considering the increasingly grievous environment and health situation at present and possibly more environment and health risks in the future in China, the subject team recommend that the Chinese government should raise much concern for environment and health problems, further enhance the environment and health management, and set up an environment and health management system, in which the government plays a dominant role and the public participate extensively. The focus should be on reinforcing the environment and health prevention work, eliminating or reducing harm from environmental pollution to human health, and averting environment and health risks. Priority should be given to solving hot issues in environment and health which cause much attention from the people, in order to maintain their environment and health rights and interests.

6.1 To strengthen the responsibility of the government and build an environment and health management system, in which the government play a dominant role and the public participate extensively

Firstly, the main body responsible for the environment and health management is the government, which should further enhance the environment and health management by making clear responsibility and intensifying leadership, supervision and other measures, for the purpose of establishing an environment and health management system, in which the government plays a dominant role and the public participate extensively.

Secondly, the government should first set up an administrative system with clear division of work. The major governmental departments for environment and health management such as environment and health departments should set up special agencies based on their respective functions and equip themselves with sufficient human and financial resources to ensure the implementation of government functions.

The environmental protection departments should bear and fulfill more governmental functions in the prevention and control links of guarding against the damage from environmental pollution to the human health and should further make clear the guiding ideology that safeguarding human health is the basic starting point and the fundamental purpose for pollution prevention and control, mainstreaming the environment and health work to the environmental protection work.

The health departments should focus on assuming and performing governmental functions in prevention, monitoring, and treatment of disease from environmental pollution, and other links, should bring the prevention and control task on disease owing to environmental pollution into the mainstream in the national disease control and health work, providing technical support for development of the environment and health prevention and pre-warning work. At the same time, it should specify governmental duties of the development and reform, finance, science and technology, social security and other related departments to support the environment and health work.

Thirdly, a national environmental and health administrative coordination mechanism which is actively coordinated by departments such as environmental protection and health departments, and widely participated by all departments under the leadership of the State Council is proposed to be established on the basis of the current coordination mechanism for environment and health work between the Ministry of Environmental Protection and the Ministry of Health for the purpose of discussing and dealing with the difficulties and problems arising in environment and health management, coordinating the workflow among different departments and urging the implementation of various tasks to ensure China's environmental and health strategies, tasks and government duties are implemented. To this end, the State Council Working Group for Environment and Health Work may be established which is headed by a leader in charge of the State Council and deputy heads should be leaders in charge of the General Office of the State Council, the Ministry of

Environmental Protection, and the Ministry of Health, with members from other 16 departments concerned¹³.

It is suggested to employ the civil servant exchanges and shift-rotating system between different governmental departments and between the central and local departments to step up staff exchange, communication and understanding among people engaged in environment and health management and boost the coordination and mutual support among departments as well as between central and local governments.

Fourthly, it should emphasize the building of local environment and health management systems. Local governments at all levels should set up their respective environment and health management systems, clarify the duties of relevant departments, form agencies and furnish personnel by referring to the one established by the Central Government, so as to identify and solve local environment and health problems and report major environment and health problems in time.

Fifthly, it is necessary to establish a government performance assessment and accountability mechanism of the environment and health work, in order to supervise and urge governments and departments at all levels to fulfill their environment and health management duties. Responsibility of governments and leaders at all levels should be clarified in respect of environmental protection and public health safeguarding, and supervision and restriction should be strengthened over the government's fulfillment of its environment and health management function by improving the government and cadre performance assessment and accountability mechanism, in order to increase the effectiveness of environment and health law enforcement. At the same time, criminal and civil penalties should be given to the government officials, enterprise legal persons and individuals and others who cause major environment and health hazards by perfecting relevant laws and regulations.

6.2 To improve environment and health laws and regulations and policy systems and form an effective environment and health management system

Firstly, it is imperative to strengthen the construction of legislation in environment and health management. It is a must to start from paying attention to the public health rights and interests, amend, supplement and perfect the existing laws and regulations and policy systems related to environment and health. Such systems should be established through improvement in legislation as an environment and health planning system, an environment and health impact assessment system, an environment and health monitoring system, an environment and health prevention, early warning and emergency system, an environment and health information disclosure system, a public participation system of environment and health management, an environment and health damage dispute handling system, an environment and health damage compensation system, and so on.

Secondly, the focus should be on intensifying the legislation and law enforcement building of environment and health prevention. It is necessary to

¹³ Sixteen departments including the finance, development and reform, water conservancy, construction, agriculture, and meteorology which participated in signing and formulating the National Environment and Health Action Plan.

proceed from maintaining human health and avoiding health risks, further revise and improve the current environment and health standards, access standards and emission standards, and set up a strict legal system of environment access management.

Thirdly, suggestions are to strengthen requirements for health impact assessment in the existing environmental impact assessment system, amend the Environmental Impact Assessment Law, establish and implement the environment and health impact assessment system, carry out environment and health impact assessment of construction projects, plans and strategies gradually, and fulfill environment and health management access system.

Fourthly, an environment and health dispute settlement mechanism should be set up to protect the rights and interests of the public environment and health. The government can gradually form and improve an environment and health dispute settlement mechanism through environmental dispute handling legislation, providing parties to environment and health disputes with mediation, administrative treatment, arbitration, litigation and many other means for dispute settlement. Besides, it is necessary to establish public interest litigation, legal aid and hearing systems. Against the problem in difficulties for vulnerable groups to safeguard their environment and health rights, the state should consider provision of legal aid and establishment of a public interest litigation system to help the public safeguard their rights.

Fifthly, a compensation system of human health damage from environmental pollution should gradually be set up and implemented in China to maintain the rights and interests of the public environment by further improving relevant laws and regulations, enhancing related judicial capacity construction, furnishing legal aid, launch public interest litigation, forming a compensation fund, and other means and measures according to China's national condition and the characteristics of health damage compensation issues from pollution. The foregoing compensation system should be established in line with the principle of "polluters pay expenses", and compensation responsibility of the main body in charge should be specified through the legal system building. At the same time, public interest compensation should be given to victims of health damage from pollution through establishment of an environment and health fund and other means.

6.3 To adhere to the principle of focusing on prevention and take effective measures to avert environment and health risks

Firstly, a prevention system of environment and health management should be set up by bettering the environment standard system, preparing a directory of preferentially controlled pollutants, forming and implementing a strict environment access system, and other policy means and measures, in order to carry out source control, especially rigorous control over pollutants which do great harm to human health and enter into the environment via production, flow and consumption and other links, and to guard against environment and health risks.

Secondly, it is a must to further strengthen and improve the building of the environment and health monitoring network, especially to increase environment monitoring (including pollution source monitoring) related to the crowd exposure level and the relevant disease monitoring. On the basis of intensification of risk evaluation and analysis on monitoring data in relation to environment and health, it is required to carry out the pre-warning mechanism of the environment and health step by step, conduct the forecast and the pre-warning of the environment and health risks

and take the prompt measures to avoid or reduce the environmental pollution from jeopardizing people's health.

Thirdly, according to the current problem of frequent environmental pollution emergencies in China, it is necessary to further enhance and perfect environment and health emergency handling and the handling mechanism, and develop an emergency disposal work system, an emergency and major incident notification mechanism, and environment and health emergency disposal norms, for the purpose of upgrading the emergency disposal ability. The environmental protection and health departments shall cooperate with each other closely to realize unified decision making, command, allocation of resources and dealing with the emergent cases, striving to swiftly and effectively control the pollution, mitigate the health harm and provide prompt medical treatment to the victims.

6.4 To increase financial input and reinforce the environment and health management capacity building

Firstly, it is necessary to strengthen the governmental responsibilities and increase the financial input. Meanwhile, the financial allocation of central government and local governments at different levels shall arrange the funds in their annual budgets to ensure the administrative fees and major project costs. According to the actual demand of China's environment and health management, the main focus of the government investment comprises the following three aspects: the first is to strengthen the environment and health monitoring capacity building and gradually improve the processing capability of relevant environment and health monitoring information, providing services for development of environment and health risk prevention and early warnings; the second is to increase investment in scientific research into environment and health, organize and launch large-scale surveys of environment and health problems and study of the environment and health base and application, and conduct in-depth study of relations between environmental pollution and health damage, so as to find out the basic condition of China's environment and health problems and provide scientific and technical support for the government's scientific decision-making and development of effective environment and health management. The third is to enhance the government's capacity building of environment and health management, especially the capacity building of local governments, the public and judicial system and incorporate relevant expenditures into the financial budget of the local government at the same level.

Secondly, the state may consider the establishment of an environment and health fund mechanism, where public interest compensation can be made for health damage from historical environmental problems, for having no civil compensation capacity on the responsible part, and to victims for whom a principal responsible part is hard to be defined; the state may also support development of environment-caused health damage education and health damage rehabilitation and other activities.

The state formulates relevant provisions of the environment and health fund raising, operation and use. Local governments at the provincial and municipal levels should establish local environment and health funds in accordance with the relevant provisions of the state, specifically forming and operating the funds, implementing relevant compensation, and organizing development of related activities. The state can support local governments by furnishing special capital from national finance.

Thirdly, efforts should be made to establish social multi-channel financing channels, raise environment and health funds, and support development of public interest compensation for human health damage for reasons of the environment. The raising channels of environment and health funds include: the first is that the state raises capital by forming an environmental responsibility insurance system, where the specific method is to take a certain proportion of the capital from premiums for addition to a compensation fund; the second is that a certain amount of pollution discharge fees collected on an annual basis shall be contributed to this fund. the third is to accept donations from all sectors of society; the fourth is that a certain proportion of capital should also be injected from the government revenue into the fund to ensure capital needs of the fund for developing relevant compensation and activities; the fifth is that the compensation fund can be managed under the oversight of the Chinese government according to the limited market operation model so as to maintain the fund safety and promote its value increase through investment or operation in the capital market.

6.5 To stick to environment and health information disclosure and encourage public participation

Firstly, the government should intensify environment and health education through regular and irregular education channels and various media and networks and the like, in order to deepen the public understanding of environment and health issues and upgrade their capacity of participating in environment and health management.

Secondly, the government should opportunely release environment and health information to which the masses pay attention on the government's websites and various news media and the like in a way of easy access and understanding by the public. Environment and health information which should be released to the public in time includes: environmental air and environmental quality, water environment quality and other important environmental quality information; possible environment and health risk pre-warning information; health risk pre-warning information on major environmental pollution incidents; important monitoring information on health disease due to environmental pollution; major incidents of health damage owing to environmental pollution; the procedures and means through which the public request the government to address environment and health problems, and so on.

Thirdly, the government should set up channels for the public to participate in environment and health management, further improving complaint handling via letters and visits, public notification and other systems. The environmental protection and health departments should establish specialized agencies or provide special personnel to listen to views of the public, opportunely feed back and deal with environment and health problems reported by the public, supplying them with approaches to participation in politics, discussion on government affairs, and reporting issues.

Fourthly, it is necessary to strengthen supervision by the public, social groups and media over the environment and health work, encourage the public to inform against and report violations of environment and health regulations, and fully listen to comments from the public on the environment and health work by holding meetings of experts, demonstration meeting, hearings and other ways.

6.6 With regard to features and prominent problems of environment and health in China, it is recommended to conduct the environment and health work with focus and take targeted intervention measures.

First, the government should apply different countermeasures for different environment and health problems, and focus on problems of health damage incurred by environmental pollution, and prevent environmental pollution with high risk on human health. To be specific, we should intervene without delay the environmental pollutions which have led to diseases or definite damages, and provide the victims with the treatment and compensation. For the pollutants which have been proven to possibly cause serious health damage, the state must identify a directory of preferentially controlled pollutants, rigidly enforce access, and intensify early intervention, so as to prevent and reduce harm of environmental pollution to health. Meanwhile, to those environmental factors with clear effect on health not identified, we should enhance researches and take positive prevention measures. The emphasis of work on environmental pollution prevention and control should gradually expand from control of traditional pollutants to that of contaminants such as organics, PM2.5 and so on, which are more harmful to human health.

Second, in China, as air pollution in urban areas and water pollution in rural areas are two severe threats to human health, it is imperative to strengthen the management and intervention of environment and health. In urban areas, more importance should be attached to the prevention, precaution, emergency management and medical treatment for environment and health events closely related to air pollution, establishing and perfecting relevant monitoring, information sharing, intervention, and treatment systems. In rural areas, the focus should be on prevention and medical treatment of environment and health problems because of water pollution, and on establishment of an environment and health monitoring, prevention and intervention system.

(The Report was Provided by Task Force)

Acknowledgement

During the implementation of the subject, Director General Zhang Yingmin, Division Chief Liu Shusheng, Deputy Division Chief Wang Mingliang, Doctor Wan Yue and Ms. Li Yi of the Ministry of Environmental Protection, and the Division Chief Yang Xia and Ms. Guan Shanshan of the Ministry of Health all gave the subject team vigorous support, collaboration and guidance; Division Chief Guo Jing, Ms. Lu Xueyun and Mr. Li Yong from the Secretariat of CCICED gave their considerable support, help and guidance to the organization, implementation and management of the subject activities;

Mr. Someno Kenji and Mr. Tsuchiya of the Japan Ministry of Environment provided positive support and assistance for the subject team. Officials Ms. Naoko Iwakami and Ms. Aya Horiuchi from OECC of Japan provided vigorous collaboration and support for the development of various activities, especially in assisting the subject team to coordinate the international experts for various researches.

Director Xia Guang from the Policy Research Center for Environment and Economy, Ministry of Environmental Protection, Professor Chen Bingheng of Shanghai Medical University, Academician Wei Fusheng of China National Environmental Monitoring Center and others all presented valuable suggestions to the research result of the subject.

The task force team expresses its sincere thanks to these units and individuals for their great support!