Research on regional environmental legal system to solve toxic and harmful pollution

Li-Na Fa
Department of Economics and Management, Shanghai University of Political Science and Law (SHUPL), Shanghai 201701, China

*Corresponding author: falina12@163.com

Abstract. With the development of economy and the promotion of industrial urban agglomeration, the toxic and harmful substance in Yangtze River Delta has become a difficult problem. Toxic and harmful substances not only include NO\(_2\), CO and SO\(_2\) in the air which affect people's health, but also include ammonia nitrogen, petroleum, volatile phenol discharged from waste water caused rivers pollution. From the perspective of regional environmental legal reform, this paper puts forward some suggestions on how to solve toxic and harmful substance pollution by using the principles of law and economics. It is suggested that distinctive and effective legal system measures that corresponding to the local environment should be taken by the regional environmental laws in our country and moreover, in the process of law making, law enforcement and law-abiding, we should pay attention to the important role of public participation. Finally, we actively absorb foreign classic and effective environmental legislation, making the regional environmental legislation norms more and more internationalized.

1. Introduction

With the expansion of urban agglomeration, the toxic and harmful Substances pollution in Yangtze River Delta has gradually become a common problem in the whole region. Taking air pollution in Yangtze River Delta as an example, the Yangtze River delta (YRD) is mostly subtropical monsoon climate. In spring and summer, there is a lot of rain. In autumn, the haze phenomenon is serious and the airflow is lacking. Because of the effects of humid air at sea, air pollutants diffusivity is poor, which provides convenient conditions for air pollution and secondary pollution in the region and presents the characteristics of gradual diffusion [1].

According to China's 2019 Ecological Environment Bulletin, the number of days in which pollutants exceeded the standard in 41 cities of the Yangtze River Delta was 23.5 of the total number of days. Among them, mild pollution is 19.5%, moderate pollution is 3.5%, severe pollution is 0.6%, serious pollution is less than 0.1%. The number of days exceeding the standard with O\(_3\), PM2.5, PM10 and NO\(_2\) as the primary pollutants accounted for 49.5%, 44.3%, 5.1% and 1.3% of the total number of days exceeding the standard, respectively.

According to China's 2019 Ecological Environment Bulletin, the concentrations of six pollutants in the Yangtze River Delta in 2019 are listed in Table 1. As can be seen that the concentration of SO\(_2\), PM2.5, PM10 in the air decreased compared with 2018 but and the concentration of NO\(_2\), CO does not change, even the concentration of O\(_3\) increases which still has the big threat to the human body. Toxic and harmful substances such as NO\(_2\), CO and SO\(_2\) are harmful to human body and excessive SO\(_2\) and
NO$_2$ in air can easily cause acid rain. According to statistics, the Yangtze River Delta is still the key distribution area of acid rain. Moreover, with the government's treatment of PM2.5, the content of PM2.5 decreased, but the photochemical pollution characterized by high concentration of O$_3$ in summer and autumn gradually became a serious problem in the coastal urban agglomeration of Yangtze River Delta [2, 3].

Table 1. Concentrations of six pollutants in the Yangtze River Delta in 2019

| Pollutant indicators | Concentrations (CO: mg/m$^3$, others: $\mu$g/m$^3$) | Change from 2018 (%) |
|----------------------|--------------------------------------------------|---------------------|
| PM2.5                | 41                                               | -2.4                |
| PM10                 | 65                                               | -3.0                |
| O$_3$                | 164                                              | 7.2                 |
| SO$_2$               | 9                                                | -10.0               |
| NO$_2$               | 32                                               | 0                   |
| CO                   | 1.2                                              | 0                   |

In addition to air pollution, the middle and lower reaches of the Yangtze River face different degrees of water pollution and the toxic and harmful substances such as oil, cyanide has affected the water quality of the Yangtze River Delta. Moreover it is obvious that we can see that the pollution of toxic and harmful substances in the Yangtze River Delta shows the characteristics of regional and clustering nature, which also makes it urgent to implement regional legislation to solve the problem of regional the toxic and harmful substances pollution in the Yangtze River Delta.

2. Materials and methods

2.1. Establish a reasonable environmental legal system

When examining illegal pollution or immediate interest generation from an economics and law perspective, industries will often act with the greatest interests. In this way the ambiguity of pollution assessment and insufficient punishment in the environmental legal system have become more conspicuous. As a method to combat these pollution problems, the level of punishment in the aspect of economy and intensity, and enforcement of law should actually be increased in the legal system in environmental legal system of various areas.

2.2. Improve the legal and system construction for enterprises

Because of China’s One Belt and One Road strategy, China will continue to become a melting pot of global trade. The economy of China will accelerate in the future as imports and exports will only increase and the rise of more and more multinational corporations [4]. However, more and more companies will also deliberately illicit behaviors that violate the law to maximize profitability.

With significant differences between the capital background and law of taxes, immediate actions must be taken to improve the environmental legal system, which can prevent more and more companies from using bold illegal methods and destroying their own conscience. Domestic survival runs in the opposite direction with the constantly developing of the economic environment.

Accordingly, while facing environmental contamination, in addition to abiding by the environmental laws and regulations, industries should also play an active part in developing an ecological and environmental-friendly system, which can be beneficial in reducing and controlling the pollution. People praised the government's call for active investment in water pollution control projects [5]. The following methods are the first new water treatment projects for stocks in 2015.

According to the inventory of China's water treatment market in 2015 and its development trend in 2016 (Table 2), we can see that companies in the Yangtze River Delta region in China have been encouraged by the government to take measures including industrial wastewater treatment, water-
contaminated domestic water and so on. Meanwhile, the government also made more investments in highly industrial and economic, water and emissions use regions such as Zhejiang, Jiangsu, and so on.

**Table 2.** New stocks water treatment methods project of 2015

| Regional projects                                      | Investment (x 100 million) | Introduction                                                                 |
|--------------------------------------------------------|----------------------------|-----------------------------------------------------------------------------|
| Zhejiang Yuyao Rural Living River Water Treatment Project | 1.8                        | First Capital and Yuyao City Construction Investment Development Co., Ltd. set up a project company to build Yuyao Rural Rural Sewage Treatment Project with a design scale of approximately 8.6 tons/day |
| Mazhou No. 2 Ground Water Treatment Plant in Xuzhou, Jiangsu | 0.96                       | Project design scale 400,000 tons/day, project operating period 30 years    |
| Jiangsu Zhangzhou Economic Development Zone Industrial Water Plant | 0.65                       | The design scale is 50,000 tons/day, franchise for 30 years                  |
| Anhui Tongling Zhongshun River Water Treatment Plant     | 0.3                        | Scale 80,000 tons/day                                                       |

This is not only a question of strict integration of the legal system from an economic perspective, but it is also an attitude towards the protection of circumstances and related law systems. The law is not the foundation of working out the problems, but generally speaking, the government doesn’t aim to put restrictions or legal sanctions such as fines. It aims at the protection of our environment and the ecosystem which help us to have an effective and sustainable development. Because of our respect and the severity of lawful punishments, distinctive and effective legal system measures that corresponding to the local environment should be taken by the regional environmental laws in our country as well. As a result, the system of environmental law can gradually improve. Also, the sustainability of development of environment in regions should also be realized.

3. Results and discussion

3.1. Social supervision

Since nowadays our society is promoting “I do for you and you do for me”, the masses are increasingly more involved in society. The masses as a large group, are the subjects in all kinds of activities including economic development. Hence, the masses always perform very important functions as significant roles in various activities. On one side, the masses play the role of subject in all activities, and therefore they are the leading actors; in addition, the general public are also the objects in all activities. They need to produce too, so they could judge from both the overall and side view and can supervise the whole activity as well. Thus, we should pay more attention to improve and develop the legal system of environment from multiple facets [6].

3.2. Environmental education

In China, all citizen’s environmental education in terms of laws and regulations is further needed. Schools should strengthen the relevant education. For instance, teaching children at a young age of recycling and sorting garbage can be beneficial for future generations’ perspectives of protecting our environment. In addition, public transportations and walking should be primary method of transportation to help eliminate emission of carbon dioxide. Meanwhile, the government also need to advocate the improvement of education standards in these aspects and call for more people to join in the protection of the legal sustainability in environment law.
Secondly, China’s “Environmental Protection Law” of Article 5 lists examples regarding the education of the environmental legal system. China wants to support and solidify the development in various environmental protection areas such as science education, technological protection programs, and knowledge of environmental protection. This theory is designed for environmental education. Yet, its subject and ideas are actually not very clear. It cannot play accurate and practical roles in guiding the government and other departments. Therefore, certain matters of environmental protection legal system such as the propaganda and education should be necessarily institutionalized and legalized.

Meanwhile, with accountability and public supervision in the environmental legal system, people must target the root of the problem to fully resolve the issue. Many people are lacking environmental legal awareness, which should be solved. A more important question is how to receive public appeals’ opinions to obtain the necessary conditions people deserve and the needs of state-owned enterprises. This calls for establishing more effective environmental legislation and effective proposals of the work of the government departments.

3.3. Internationalized environmental legal system
The law system of environment in regions on one hand demands the establishment of a unitive legal system of law. Simultaneously, laws and regulations of the government in different departments and regions should also be developed.

In addition to that, composition of the law system of environment in regions made by the government also actively absorb foreign classic and effective environmental legislation, making the regional environmental legislation norms more and more internationalized. There are a lot of examples of the environmental protection in foreign countries and laws of precaution that could be taken as a reference in China.

However, China should not follow the way of “control after pollution” in developed countries. Policies and systems should be implemented before the environment becomes damaged or polluted. A law system of protecting the environment which is in line with China’s national conditions should be explored. The Chinese government has implemented various policies and measures to reduce pollutant emissions and to alleviate urban environmental pollution.

4. Conclusion
The fast-paced developments in China has made the country one of the most industrialized countries in the world. The Yangtze River Delta, areas surrounding the Yangtze River, has become a source of life and prosperity for China as it is home to over 400 million people [7]. However, the success of this wealth comes at a large cost, a deteriorating environment. Aligning China’s rapid development and environmental concerns, further efforts are required. It is vital to recognize the complexities of the Yangtze River Delta. Also, extensive research is needed to explore and establish a more detailed and structured environmental policies and legal system.

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