

An Analysis on Statistical Indicators and Methodology of Environmental Investments in China

WANG Jinnan LU Yuantang

(Chinese Academy for Environmental Planning, Beijing, 100012)

Abstract: The environmental investment is an important guarantee for materializing the basic national policy of environmental protection and implementing the sustainable development strategy. Though Chinese government has attached great importance to environmental protection with continued efforts in increasing environmental investment, there are still some fundamental issues to be addressed with regard to environmental investment. Based on the concept identification of environmental investment, input, and expenditure, this paper has made comparative analysis on the concept of environmental investment in China and in other countries and systematically analyzed the statistical scope, indicators, and method of environmental investment currently exercised in China. Analysis results show that China's statistical system for environmental protection investment is far from well-established, lacking standardized data management of environmental protection investment; without clear definition of environmental protection investment and unified statistical scope; weak scientific basis of statistical methodology with duplicated calculation or time inconsistency. To improve the statistical system of China's environmental protection investment and get a real picture of environmental protection investment, the paper suggested recommendations in aspects of adjusting the statistical scope of environmental investment, developing statistical methodology with strong scientific basis, and improving the statistical system of environmental investment.

Key words: environmental investment, environmental statistics, China

The environmental investment is an important guarantee for materializing the basic national policy of environmental protection and implementing the sustainable development strategy. Knowing its important role in improving environmental quality China has been making efforts in increasing environmental investment since 1980s. In 2008, the statistical nominal environmental investment was 449 billion RMB yuan accounting for 1.49% of GDP in that year. However, there are still some fundamental issues to be addressed with respect to the environmental protection investment. The connotation of environmental investment is not clear, being difficult to compare with those of foreign countries. The statistics on environmental investment is inconsistent with the real situation due to the flaw of the statistical system and lacking standardized statistical scope and methodology, that adversely affects the environmental planning and environmental policy making.

1 Comparative analysis on the concept of environmental investment

1.1 Environmental investment: cost-based or investment-based?

(1) Cost-based environmental investment

This concept is typically adopted by the U.S. and Japan who started environmental control and treatment comparatively early, in that the environmental investment means the costs of environmental protection, i.e. the total cost paid by the whole society on pollution control and environmental quality improvement in order to maintain certain level of environmental quality^[1]. It is typical in the U.S. that

all financial input in environmental protection has been considered as the cost of environmental protection. There is similar understanding in China that “all cost spent on restoration/ proliferation, protection, and treatment of environmental resources should be considered as environmental investment^[2]”, or environmental investment is the “total capital paid for protecting resources and controlling environmental pollution^[3]”.

(2) Investment-based environmental investment

Another explanation on the environmental investment is “investment-based environmental investment” which suggests that environmental investment is an important component of fixed assets investment in economic and social development, being a policy investment in terms of the investment bodies. It is considered that environmental investment as a comparatively independent and special investment in economic and social development is of not only the general attributes but also its own special attributes. That is, 1) enterprises are the main bodies of environmental investment; 2) The environmental investment bodies are not necessarily the beneficiaries; 3) The benefit of investment is mainly shown in environmental improvement; 4) it is hard to value the benefit of environmental investment in monetary term.

1.2 Three concepts related to environmental protection investment

(1) Environmental investment

There is no common definition of environmental investment in China. There are diverse understanding of environmental investment, no clearly defined statistical scope and method for environmental investment^[4]. In general, the environmental investment in China mainly includes investments in industrial and regional pollution control, construction of environmental infrastructures (e.g. urban waste water treatment plant) and the capacity building of environmental protection departments, etc. usually not including the investment in ecological conservation. Therefore, the environmental investment in China is usually mentioned as environmental pollution control investment, meaning the fixed assets investment in the treatment of industrial pollution source and construction of urban environmental infrastructures, including the funds spent on environmental engineering projects of industrial pollution control for both existing and new sources, “santongshi*” environmental investment in construction projects, and construction of urban environmental infrastructures^[5].

(2) Environmental input

The environmental input means the funds from social accumulation fund and various compensation and production/business funds, and spent by relevant investment bodies in the society on preventing and controlling pollution and protecting and improving ecological environment in the process of national economic and social development. In accordance with the common practice both at home and abroad, the environmental input is usually defined in terms of objectives or effectiveness. In objective-based definition, the environmental input includes input in environmental pollution control, input in the conservation of ecological environment, and input in environmental management and science and technology. Also, the environmental input could be classified into fixed assets investment of environmental protection, maintenance and operation costs of environmental engineering or facilities, and funds for environmental management and R&D.

(3) Environmental expenditure

Environmental expenditure means the costs incurred in conducting environmental protection activities, including the depreciation of fixed assets which were utilized in the environmental protection activities, costs of raw materials that were consumed, costs of fuels and power, employee’s salary and additional income, and pollution discharge fee, etc.

* The environmental facility has to be designed, constructed, and put into operation at the same time when the main body of a construction project that will generate pollutants is designed, constructed and put into operation.

1.3 Concept of environmental expenditure in developed countries

The concept of environmental expenditure is commonly used in developed countries. The concept of environmental protection expenditure in EU is quite different from the concept of environmental protection investment in China in terms of their connotation, scope, and statistical method.

The concept of environmental expenditure has been used in EU in stead of an independent concept of environmental protection investment. In the European System for the Collection of Economic Information on the Environment (SERIEE), the environmental expenditure is the capital expenditure plus recurrent expenditure spent on environmental protection. There are nine expenditure categories of environmental protection activity in terms of the content of environmental protection activities in the internationally agreed classification of environmental protection activities (CEPA2000). The environmental protection activities can also be divided into independent environmental protection activities and environment friendly activities. The environmental protection activities here are different from business activities of enterprises. The environmental protection expenditure mainly means the expenditure on independent environmental protection activities, not including the expenditure incurred on environment friendly activities (e.g. natural gas project).

The Statistical Office of the European Union (Eurostat) defines the environmental protection expenditure as the sum of recurrent expenditure and capital expenditure. The recurrent expenditure includes operational costs of environmental facilities, expenditures on environmental management and R&D, expenditures on purchasing non-fixed assets, expenditure on environmental services, and special taxes, etc. The capital expenditure includes costs on the end-of-pipe pollution control and the comprehensive production process, in which the cost for end-of-pipe pollution control is mainly spent on waste water, solid waste, and air pollution treatment. The Statistical Office of the European Commission (SOEC) defines the environmental protection expenditure as expenditures on reducing and preventing air and water pollutants, protecting and cleaning soil and ground water, reducing, treating, and disposing solid wastes, including operational cost (OPEX) and capital expenditure (CAPEX). In Germany, environmental expenditure also includes the recurrent expenditure and capital expenditure.

In the United States, all financial input in environmental protection is considered as environmental protection cost which can be divided into damage cost, protection cost, and clean-up cost. In the United Kingdom, the environmental protection cost includes operating expenditure and capital expenditure. In Finland, the public environmental expenditure includes the operational cost and capital expenditure of environmental protection facilities/equipment, and financial input in compensation fund and others.

1.4 Comparison of concepts on environmental investment in China and developed countries

The concept of environmental protection expenditure commonly used in North American countries, European countries, and Japan includes the capital expenditure and recurrent expenditure. Its covering scope is broader than the concept of environmental investment used in China.

(1) In EU, the operational cost of environmental facilities of enterprises is included in the environmental protection expenditure. The recurrent expenditure on pollution control includes the expenditures related to the operation of pollution control facilities and monitoring, such as operation cost of waste water treatment plants, cost of solid waste collection and disposal, pollution monitoring, etc.

(2) In Eurostat's statistical report on environmental expenditure, with regard to afforestation/greening, only the expenditures on planting trees, green zones, green shelters surrounding industrial parks and factories were listed as environmental protection expenditure. In UK, it is clearly provided that the urban environmental expenditure should be excluded from the statistical scope for environmental protection expenditure. In China, the expenditure on urban greening has been listed as environmental investment.

(3) In EU, the investment in projects that are of environmental benefit is not included in the environmental protection expenditure. According to EU's criteria, the environmental protection investment includes investment in pollution control and part of urban public infrastructure, not including the expenditure on environment friendly activities. In contrast, the investment in the central heating, natural gas, etc has been considered as environmental protection investment in China - this entails further discussion.

(4) In EU, the investment in clean production has been listed as the environmental protection expenditure. Eurostat's capital expenditure on pollution control includes the cost of comprehensive production process, which was defined as the additional cost of employing novel production process to realize cleaner production. That is, the additional investment in clean production for the purpose of reducing pollution should be listed as environmental protection expenditure.

Table 1 Comparison between environmental investment in China and environmental expenditure in EU

type	China	EU
Operational cost of pollution control facilities and monitoring cost in enterprises	Not included in environmental investment	Listed as environmental protection expenditure
Investment in urban greening and sanitation	Listed as environmental investment	Only the expenditures on planting trees, green zones, green shelters surrounding industrial parks and factories are listed as environmental protection expenditure
Investment in projects having environmental benefit	Investment in projects of natural gas and central heating is listed as environmental investment	Not included in environmental protection expenditure
Investment by enterprises in clean production	Not clear	Listed as environmental protection expenditure
Cost of capacity building on environmental management and environmental management services	Not clear	Listed as environmental protection expenditure

2 Statistics of China's environmental protection investment and its problems

2.1 Statistical system of environmental protection investment

It is requested in State Council's decree on some issues related to environmental protection (1996) that "input to environmental protection be increased with the percentage of environmental pollution control input in GNP at the same period being increased, and a corresponding check and supervision system be established." To unify the scope of environmental protection input and to facilitate the calculation of environmental protection input in national economic and social development decision-making, a 《Notification on the Establishment of the Survey System of Environmental Protection Investment》 was issued by the State Administration of Environmental Protection (SEPA) in 1999, which as a key regulation on statistical system of China's environmental protection investment has clearly defined the

classification and statistical scope of environmental protection input, provided for the statistical survey method of environmental pollution control investment and environmental management capacity building investment.

2.2 Statistical scope of environmental protection investment

According to the requirements in the 《Notification on the Establishment of the Survey System of Environmental Protection Investment》, the statistical scope of environmental pollution control investment (environmental protection investment) should cover three aspects: (1) investment in the construction of urban environmental infrastructure including urban waste water drainage, central heating, fuel gas, landscape greening, urban sanitation, etc., which can be reflected in the annual report on urban construction; (2) Investment in industrial pollution control. This mainly indicates the investment of existing polluting enterprises in pollution control by combining technical innovation and clean production. Data are mainly available from the annual report on environmental statistics; (3) “Santongshi” environmental protection investment of construction projects. It means the investment in the pollution control facility which has to be designed, constructed, and put into operation at the same time when the main production facility of a construction project that will generate pollutants is designed, constructed and put into operation. This kind of investment is an important component of environmental protection investments. Data can be obtained from the annual report on environmental statistics.

2.3 Statistical method of environmental protection investment

The statistical figures of environmental protection investment in urban infrastructure are derived from the “Comprehensive Form of the Fixed Assets Investment in the Construction of Urban Public Utility”. The statistical figure of investment in the treatment of industrial pollution sources is a component part of the comprehensive reporting system on environmental statistics of the environmental protection department. The enterprises whose industrial pollution control projects are still in construction will fill out the “Form on the Construction of Pollution Control Projects in Industrial Enterprises”. Then the environmental protection department will collect and compile those forms to generate a form on the construction status of industrial pollution control projects in all regions. The statistics of “Santongshi” environmental protection investment of construction projects are the component part of the reporting system of environmental statistics of environmental protection departments. A form on the implementation status of environmental impact assessment of construction projects in all regions will be generated by compiling the reporting forms from the lower level to the upper level. This part of environmental protection investment will be included in the “Santongshi” environmental protection investment of construction project of the same year when the project has completed and passed the final check and acceptance.

2.4 Major problems in environmental protection investment

First, there is no clear definition of environmental protection investment resulting in inconsistency in statistical scope. The statistical scope of environmental protection investment varies greatly from region to region because the boundary condition of statistical scope has not been well established. In this regard there is strong haphazard, usually subject to the understanding of individual statistical personnel on the question. The main problems are followings: (1) Whether the operation cost should be considered as the environmental protection investment; (2) Whether the input in ecological conservation and construction should be covered by environmental protection investment; (3) Whether the cost of capacity building of environmental management and cost of environmental management should be included in environmental protection investment; (4) Whether the investment in projects that can produce environmental protection benefit should be considered as environmental protection investment; (5) Whether the investment in clean production and the production of environment friendly products should be put within the scope of environmental protection investment. In the actual exercise of environmental investment statistics there is a trend of extending the scope of environmental protection investment and enlarging the absolute size of environmental protection investment either intentionally or unintentionally, resulting in a statistical figure of environmental protection investment

being on the higher side and, in contrast, without harnessing the environmental pollution and getting tangible environmental quality improvement^[6].

Second, the statistical method of environmental protection investment lacks strong scientific basis with lots of duplication and overlap in doing statistics. At present, the environmental protection investment consists of investment in the construction of urban environmental infrastructure, “Santongshi” environmental protection investment of construction projects, and investment in the treatment of industrial pollution sources, in which there is overlap in statistical scope resulting duplication of statistics. This mainly occurs as: (1) Duplication between “Santongshi” environmental protection investment and investment in the treatment of industrial pollution sources. The statistical figures of “Santongshi” environmental protection investment are based on the data in the project check and acceptance report that cover both “Santongshi” environmental protection investment of the newly constructed project and the environmental protection investment in pollution control of existing industrial pollution sources. (2) Duplication between “Santongshi” environmental protection investment and the investment in the construction of urban environmental infrastructures. The investment in urban waste water treatment plant and solid waste disposal facility counted in the investment in the construction of urban environmental infrastructures has also been considered in “Santongshi” environmental protection investment, resulting in the duplication in statistics. (3) Time inconsistency of the statistics of “Santongshi” environmental protection investment of construction projects with those of investment in the treatment of industrial pollution sources and in urban environmental infrastructures. Currently, the statistics of “Santongshi” environmental protection investment of construction projects are derived from the project check and acceptance report. If the construction period of the project is longer than one year, the “Santongshi” environmental protection investment will be the accumulated investment rather than the annual investment and only be counted for the year when the project is completed and accepted.

Third, the statistical system of environmental protection investment needs to be improved, especially in data management. (1) Dispersed management of data on environmental protection investment with low level of coherency. The investment in the construction of urban environmental infrastructure, “Santongshi” environmental protection investment of construction projects, and the investment in the treatment of industrial pollution sources are managed by different departments thus resulting in poor coherency of statistical indicators among these three component parts of environmental protection investment. (2) There is no standardized way of filling out the statistical form. The data filled in the form are of comparatively high haphazard. In the process of filling out the “Form on the Construction of Pollution Control Projects in Industrial Enterprises”, it is quite common that there is no data available in some items, or duplication in some items. In addition, there is no system on data certification. Therefore the resulting statistics on environmental protection investment have not accurately reflected the real situation.

3 Recommendations on the improvement of China’s statistical system of environmental protection investment

3.1 Clearly define the connotation of environmental protection investment and adjust the statistical scope of environmental protection investment

(1) The environmental protection investment should be clearly defined as a fixed assets investment with its scope and components being specified based on objective-oriented and effectiveness-oriented principles. (2) The investment in the treatment of industrial pollution sources and the “Santongshi” environmental protection investment should be merged as the investment of industrial pollution control. (3) The components of urban environmental infrastructure investment should be adjusted in which the investment in fuel gas, central heating, and urban landscape greening will be excluded, and, in the urban water drainage and sanitation aspect only the investment in waste water treatment plant and solid waste disposal is considered as environmental protection investment. (4) The investment in the capacity building of environmental supervision, rural environmental protection, construction of national key protected areas of ecological function and natural reserves should be included in the statistical scope of environmental protection investment. (5) The definition of circular economy and clean production

should be well established to prevent the arbitrary extension of the scope of environmental protection investment.

3.2 Develop scientific statistical system of environmental protection investment to reflect the real picture of input level of environmental protection

(1) Further clarify that the “Santongshi” environmental protection investment does not include investment in urban waste water treatment plan and solid waste disposal facilities. The investment in the treatment of existing industrial pollution sources should not be included in the “Santongshi” environmental protection investment. (2) The statistical methods for different types of environmental protection investment should be developed based on the adjusted statistical scope of environmental protection investment. The issues on the duplication and time inconsistency in the statistics of environmental protection investment could be addressed by drawing on the experience of the statistical method of fixed assets investment. (3) Improve the statistical system of the recurrent expenditure for environmental protection, making it comparable with that commonly exercised internationally. The pilot exercise of the improved statistical system should be conducted.

3.3 Improve the statistical system of environmental protection investment and standardize the statistics of environmental protection investment

(1) Address the issue of the dispersed management of the statistics of environmental protection investment by centralizing the management in each government department. (2) Improve the statistical system of environmental protection investment by redesigning the statistical form in which the components of environmental protection investment should be classified in terms of environmental media and industries, and the information on fund source and operation cost, etc should be added. The database of environmental protection investment should also be improved. (3) Establish the accounting system of environmental protection investment and quality control system of statistical data. The certification and checking of statistical data should be strengthened in order to improve the data quality and reflect the real situation of environmental protection investment. (4) Establish financial accounts for the environmental protection investment, environmental input, and environmental protection expenditure to facilitate the comparison with other countries. Standardize the method of collecting and issuing data on environmental protection investment. The indicators to be issued should be increased.

References

WANG Ziyu. Comparison and China's Innovation on Environmental Investment mechanism between China and America[J]. Journal of Anhui University.2001.(6):7.

HE Xudong, HOU Lisong, SUN Dongyu. Theoretical Study and Development on Environmental Investment[J].Sichuan Environment.1999(1):28.

SUN Dongyu, WANG Zhensheng, HE Xudong. Natural Capital and the Meaning of Environmental Investment[J].Environmental Protection.1999.5(5):38.

XU Xiang, TANG Shangying. Connotation and Philosophical Consideration on Ecological Investment[J]. Theory Monthly. 2005.No11:28-30.

WANG Jinnan, GE Chazhong, YANG Jintian. Environmental Financing Strategy[M].Beijing: China Environmental Science Press, 2003. 38-39.

WU Shunze, CHEN Bin, LU Yuantang. Analysis and Suggestion on Distortion of Environmental Protection Investment in China. China Population Resources and Environment[J].2007.17(3).