RESOURCES AND ENVIRONMENT ECONOMY AND SUSTAINABLE DEVELOPMENT

LINHAI MEI

Summary

本の要約

This book is a theoretical study work on resources and the environment economy and sustainable development. The book collects a part of author's research papers published in international academic journal and lectured at international conferences, and includes his recent research results and unpublished study papers. This book is divided into 7 chapters, consists of 14 research papers. The book covers the theory and application of resources and the environment economy, agriculture policy and eco-agriculture, the environment and industrial development, the environment and trade, environment and energy, low-carbon economy and sustainable development. This book contains both theoretical exploration and empirical research and it can provide a reference for research scholars, for students provide cases study.

Resources and Environment Economy and Sustainable Development

Contents

Tables Catalogue

Figures Catalogue

Chapter1

Resources and Environment Economy: Theory and Application

1.
Analysis of the Support System for Resources and Environmental Economy: From Theories to Practice[1]

Abstract: In this chapter, a support system for resource and environmental economy concerning six areas are discussed, including regulation system, administrative policies, investment and financing system, environmental education, ecological industry and regional coordination. They are all indispensable and inter-related, and can be classified into two categories—regulatory methods and primitive methods. While comparing and contrasting China and western countries' situation and theoretical backgrounds about these six areas depicted in various literatures, the author proposes classical as well as innovative ideas as regards how to enhance the sustainability of resources, environmental, social and economic development.

Key Words: resources and environmental economy, education, eco-industry, regional coordination

I. Introduction

This Chapter broadly studies the support system for resources and environmental economy. This system mainly concerns six areas: (1) using legal and judicial procedures to regulate the environmental mechanism; (2) applying administrative policies to directly control pollution; (3) using investment and financing mechanism in accordance with economic principles, such as price, cost and tax, etc. to influence and adjust the profit gained from economic activities and pollution-preventing work; (4) strengthening

[1] Dr. CHE, Wenwen is a collaborator of this chapter.

environmental education to ensure economic sustainable development; (5) developing ecological industry, thus promote the consistent development among resources, ecology, environment and economy; and (6) building up an operating system for regional coordination.

These six areas of support are all indispensable and inter-related to each other and can be classified into two categories—regulatory methods and promotive methods. Their relationship with resources and environmental economy can be illustrated in the following diagram (Figure 1-1):

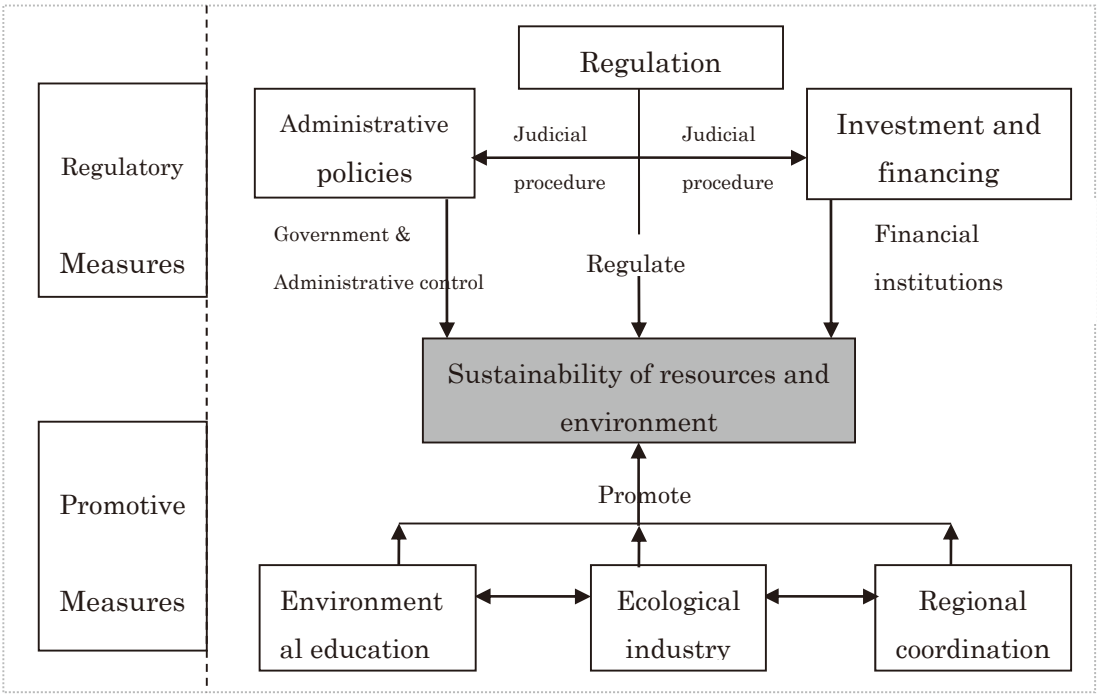

Figure 1-1 Support system framework for resource and environmental economy

While comparing and contrasting China and western countries' situation and theoretical backgrounds about these six areas depicted in various literatures, the following sections will propose classical as well as innovative ideas as regards how to regulate and enhance the sustainability of resources, environmental, social and economic development.

II. Detailed Analysis of Regulatory Measures

2.1 Regulatory Support from Legal and Judicial Procedures

2.1.1 Concept of Resources and Environmental Legal System

Regulation refers to the restrictions imposed on the bases of existing rules by the

regulator towards certain activities, with the purpose of protecting public or private interests or other economic or non-economic related purposes. Environmental regulation is a part of social regulation, mainly concerning applying regulation to solve externalities and information asymmetry, and the resulting adverse selection and moral hazard problems as regards utilization, protection and management of ecological environment and natural resources (Zeng, 2004: 93).

The concept of legal system related to resources and environmental economy can be generally comprehended according to its narrow and broad sense. Environmental legal system in the narrow sense usually only refers to "environmental protection law"; while in the broad sense, it refers to "resources and environmental law", which also includes the narrow sense system. In China, environmental legal system in the narrow sense refers to pollution and other public hazard prevention laws, and natural resources protection laws. They are carried out under the terms about environment and natural resources protection in the constitution. Legal system in the broad sense includes environmental protection laws, natural resources laws and homeland security laws, under the terms about homeland security, environment, natural resources and ecology in the constitution (Wang and Lu, 2008: 25-26).

Two objectives are included in environmental regulation, one is to control the pollution level in the environment within its self-purification capacity, thus protect the environment and the sustainable use of resources; another objective is to improve the efficiency of resources allocation, so as to promote the internal management efficiency of an enterprise (Zeng, 2004: 93). Therefore, resources and environmental legal system is above the other regulatory methods as the diagram shows. It stabilizes the regular operation of administrative policies and investment and financing means through legal and judicial procedures, thereby promotes the sustainable development of society and economy.

2.1.2 Environmental Regulatory Tools

In terms of environmental regulatory tools, Weizman (1974), Ada and Griffin(1976) have argued about two tools respectively—one is quantitative tool, which is regulator decides the pollution aggregate for each manufacturer; another is price tool, which means manufacturers decide the amount of emission, but have to pay for the corresponding fee.

According to the available theoretical research about how to attain socially optimal

level of environmental quality, we have already known that environmental resources are externality-ridden. For this reason, the socially optimal level of environmental quality cannot be achieved through the uncontrolled operation of private markets. What this suggests is market failure and consequently a justification for public intervention. However, as Hussen (2004) suggest, public intervention is not a necessary or sufficient condition for attaining the optimal allocation of environmental resources. Sufficiency requires that we attain the optimal environmental quality through policy instruments that are "cost-effective", which means involving the least cost. Therefore, from practical perspective, resolving environmental problems requires more than mere recognition of market failure or of the necessity of public intervention to correct an externality.

Under such a warning, Hussan (2004) raised three legal approaches for regulating the environment, namely liability laws, property rights or Coasian method, and emission standards. These three methods are all centered on the legal system to prevent the destruction of the environment. In the case of liability laws, the court could establish monetary fines on the basis of the perceived damage to the environment. The Coasian method uses the legal system to allocate and enforce property rights. Emission standards are set and enforced through legally mandated laws. Comparing with Weizman et al's categaries, liability laws can be considered as price tool of environmental regulation, Coasian method can be classified as a tool to define property right under environmental regulation, while emission standard is a quantitative tool.

Both liability laws and property rights were popular ways of environmental legislation in western countries before, while emission standard is a comparatively more widely applied way of legislation in the modern society. Compared with the restriction set for the legal system regulating pollution in western countries, China is still not mature in legislating the compensation system for using resources and reimbursement system for ecological environment. On the whole, there exist obvious gaps between China's legislation in these two systems and actual requirement in environmental and resources protection nowadays. The reasons root in legislators themselves that they don't consider the requirement for environmental protection sufficiently, thus the existing laws are not inter-related and lack of system efficiency and practicability. Wei Xin (2011: 15) believes that China's legal system has its limitation, in that it only provides compensation for action of positive externality, without any necessary compensation for action of negative externality, especially for any impaired ecological function due to environmental pollution. To fill these gaps, Wang Yi (2008) raises

certain effective suggestions. For example, the legal system should confirm laws and regulations related to constructing a resources-based, environmental friendly society; work out with new laws, regulation and rules to deter the emergence of new contaminator and pollution behavior; complete laws related to ecology and nuclear safety; clarify civil liability as regards environmental violation, and formulate relative laws and regulation, etc.

2.2 Regulatory Support from Administrative Policies

2.2.1 Concept of Environmental Administrative System

New classical economics considers environment and resources as externality-driven. If externality could be internalized by the implementation of law, optimal allocation of resources could be accomplished. Nevertheless, the Coase theorem mentioned before about the circumstance of zero or very little transaction cost is very hard to realize. Therefore, government environmental administration is absolutely necessary.

The environmental administrative system mainly includes "allocation of administrative organization, division and coordination of function and power, mode of management operating standard" (Zhang and Xu, 2004: 110). Among these categories, organization allocation is the guarantee for a government to perform well in environmental administration, division and coordination is the assurance for regulating activities to function properly, while the last one determines whether the organizations which have environmental administrative power could perform their function actively. As a major part in social regulation, the policies and measures formulated by the government will adjust economic activities of related party including manufacturers in order to solve the problems of environmental externality, so that the economy could develop in pace with environmental protection. This is the original objective for environmental regulation.

2.2.2 Development Route of Environmental Administrative Policies in Western Countries

We usually like to take western developed countries as predecessors and examples to learn from. Western countries basically hold two separating ideas as regards the relationship among environment, society and economy. One is called "ecology-centered principle", which emphasizes the equal rights for all living creatures or non-living

things to exist on earth, and the idea of "to cherish the environment is to love ourselves" (Eckersley, 1992). Another is called "technology-centered principle", which considers all environmental resources as economic-value-embedded, thus human beings are on the top of the world, and other non-human components in the ecological environment have to serve mankind for their upmost benefit. (Eckersley, 1992)

In the 20th century, there is no doubt that "technology-centered principle" occupied a dominant position in western political thoughts. That's why most of the politicians attached importance to short-term profits during decision making process. Prins (1993) explains this way of decision making as a linear thinking process—each problem is isolated, and is resolved with the intention of satisfying one's demand or releasing pressure; seeking for resolution is emphasized during the process and at last setting down the problem.

Normally, each administration will last for four or five years, so the government must solve the political problems just in this specific period to prevent the opposite party from taking down the regime. However, this traditional way is usually not suitable for resolving environmental problem. The root of such problems is hard to be chased after, for it could have been covered by other problems for a long period of time and suddenly appeared during the last administration, or it could be originated from a neighboring country. Many environmental problems would be hidden for a long time, but once it broke out, it would be devastating. Such slowly generating environmental problem can trace its origin from time-lag effect, i.e. the process of inertia enables the ecological system to transfer the overproduction of one section of the eco-system to make up for the losses in another section. Not until imbalance or damage in the eco-system occurs had people realize the seriousness of the problem. But the possibility is that by then a natural vegetation area may have disappeared, or a species extinguished.

The establishment process of environmental protection policies in western developed countries can be divided into three stages which is depicted in Table 1-1:

Table 1-1 Three stages of the establishment process of environmental protection policies in western developed countries.[2] (Yang, 2008)

Period	Stage	Features
1950s ~ 70s	Strengthening environmental regulation (Command and Control)	USA's enactment of Environmental Policy Act to release the environmental pressure posed by industrialization
1970s ~ 80s	Adjusting policy and utilizing market mechanism	Market function was valued in policy making, and market mechanism was brought into play
1980's/90's ~ now	Promoting social responsibility	Technical means are used to a full extend, public consciousness about social responsibility is aroused.

From these three stages, an obvious trend can be easily recognized that western developed countries tend to weaken government administrative means, but mainly utilize market stimulation function and arouse social and public consciousness.

2.2.3 Three Types of Regulatory Administration

Nowadays, three types of regulatory administration on resources and environment are usually adopted in most countries, namely command-and-control (CAC), market-based incentive (MBI), and ecological compensation mechanism (ECM).

Command and control was adopted in the first stage as shown in table 1. As opposed to market-based incentive, command-and-control means to use emission standard and other regulations to control the quality of environment. Generally speaking, under this type of policy, the government's environmental branch will firstly issue regulation or command, requiring the polluters to take actions to achieve objectives, and then oversee and observe whether these regulations are fully implemented or not. The administrative authorities can reward those who obey the regulation, and punish those who don't. There are some policy making tools to choose for this means, such as environmental standard, emission standard based on environmental standard, technical standard, and so on. (Zhang and Xu, 2004)

MBI, as a economic measure, can internalize environmental externality to the

[2] The content in table is a revision from Yang Chaofei's description.

enterprise itself, so as to include or reflect environmental cost in the prices of products or services, thus the enterprise is stimulated to use resources effectively through searching for higher technology or methods to reduce pollutant and emission, and keeping the environmental pollution control cost at its lowest level. Policies for this measure were adopted in stage two, including emission trading system, pollution charge/tax system, subsidies and deposit refund system, voluntary agreement system.

ECM is a systemic project related to the society, market and judicial system. It has the legal system to ensure its implementation, during which it adjust the market and prevent the eco-environment from being destroyed, while at the same time strengthen and promote its virtuous development. This mechanism in western countries is called "ecological or environmental charge", which mainly targets forests, and is based on market system. It is the most widely used measure in modern western society. In China, ECM is a new but important measure to solve the imbalance between environmental and economic development. These few years have been witnessing its wider and wider application. Accounting method and consultation method are two ways to establish an eco-compensation standard. According to accounting method, the investment to ecological and environmental protection and losses in e-e damage are taken into consideration to establish eco-compensation standard. Under consultation method, stakeholders will carry out ecological compensation negotiation to determine the eco-compensation standard.

2.3 Regulatory Support from Investment and Financing Mechanism

2.3.1 Environmental Correlation of Financial Sector

Some Chinese scholars have done ample research on China's financial policy in eco-compensation. They basically agreed that compensation allocated by the national macro-control should not be the only source of eco-compensation, that financial sector should be motivated to broaden the financing channels of funding for environmental protection (Wang, 2008). The reason lies in the fact that financing sector has involved in a complicated business network covering international market retail, business operations, insurance, investment and development. The business scale and complexity of financing sector inevitably will involve environmental risks. It is worth emphasizing that investment and financing activities could bring about both positive and negative effects to resources and environmental protection. Now, the financial industry has raised the concept of "sustainable finance" or "green finance", mainly referring to "re-adjust

the business philosophy, management policies and business processes of the financial institutions from the environmental point of view, to achieve a win-win situation of sustainable development of financial institutes and environmental protection, and then the sustainable development of the economy as a whole."(Ren, 2008)

EPI 2000 (Environmental Performance Indicator for the Financial Industry) divides financial business into four aspects—commercial banking, investment banking, asset management and insurance. See Table 1-2 for their relevance to the environment, and Figure 1-2 for how financial sector interacts with the sustainable development of resources and environmental economy.

Table 1-2 Environmental correlation degree of products and services in financial sector. (Ren, 2008)

Business sector	Products and services with a higher degree of environmental correlation	Products and services with a lower degree of environmental correlation
Commercial banking	Corporate clients mortgage loan	L/C, Letter of guarantee Lombard loan[3] Interbank business
Investment banking	Corporate financing Project financing Trade financing	Interbank business
Asset management	Stock Fund Real estate	Money market Interbank business
Insurance	Corporate clients Environmental third-party liability insurance	Life insurance

[3] Lombard loan is the name for a securities mortgage loan issued by Bank of England to inter banks.

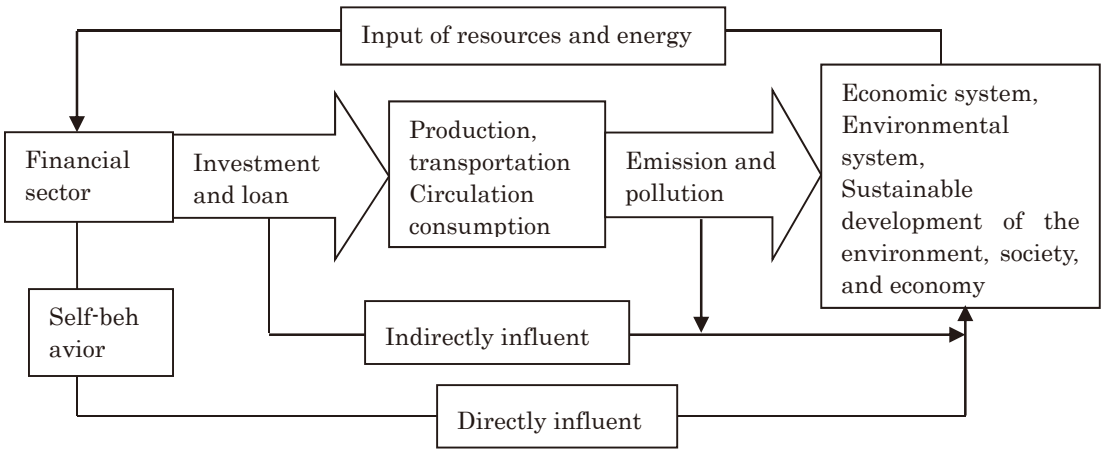

Figure 1-2 Interaction between financial sector and the sustainable development of resources and environmental economy (Ren, 2008)

2.3.2 Environmental Protection Investment in China

Investment in environmental protection is an important indicator of a nation's environmental protection efforts. It first appeared in Japan and America after their large-scale public nuisance events (Ren, 1998).

Early environmental investment was called "environmental protection expenditure", because it mainly includes the cost of decay of human health and huge economic losses due to pollution. This expenses cover the depreciation of fixed assets investment in environmental protection activities, costs of consumed raw materials, fuel and power costs, wages and sewage fees, etc. (Wang, et al., 2003)

As the industry was developing quickly and the idea of sustainable development was proposed, the way of "control after pollution" was questioned. Meanwhile, environmental investment in some areas gained significant economic benefits, so the concept of "green investment" emerged. Strictly speaking, environmental protection expenditure and investment are inter-related despite the differences. Expenditure includes investment, which plays a very important role in expenditure (Wang, 2008).

China's investment in environmental protection can be categorized into three areas: investment in urban environmental infrastructure construction, investment in controlling old industrial pollution sources, "three simultaneous" investment in new construction projects (Sun and Sun, 1999). To be specific, the first area include investment in fixed assets according to urban construction annual statistics, such as gas, central heating, sewage disposal, landscaping, waste disposal and so on. The second area concerns the

investment in corporate governance of industrial waste, noise, vibration, radiation, pollution, and in construction of project or facilities using waste gas, water and slag. "Three simultaneous" in the third area refers to a legal provision in Production Safety Law which says "when a business unit builds safety facilities, the safety project should be designed, constructed and put into production and use along with the main project"[4]. Therefore, the third area means actual investment in environmental facilities built in accordance to the law. Figure 1-3 shows the trend of investment in these three areas.

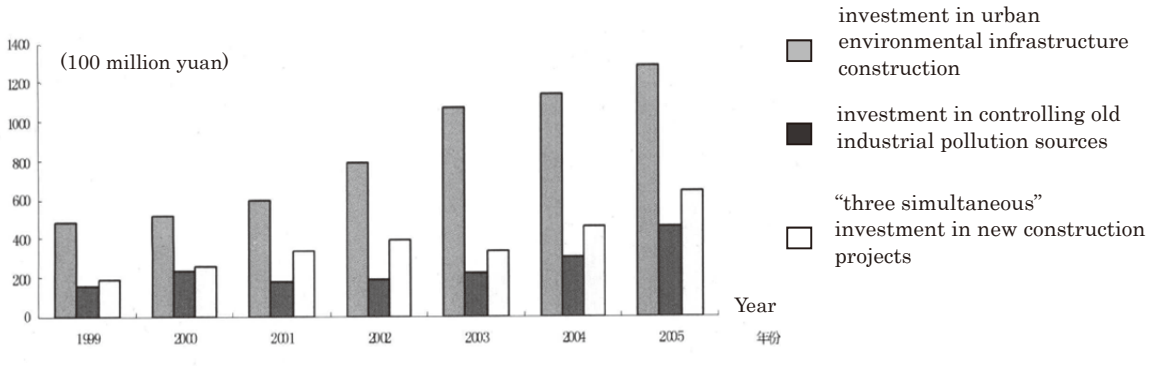

Figure 1-3 China's investment in environmental protection (Wang, 2008: 21)

2.3.2 Environmental Protection Financing in China

Environmental protection financing (EPF) is the behavior and process through which investment entities receive financial support from all sectors of society; in order to invest in environmental protection or other related activities. Such financing in China can also be classified into three kinds. Firstly, government environmental protection financing, major source of China's environmental protection investment, mainly includes the budget for basic construction funds, the budget for renovation fund, city maintenance and construction tax and excessive pollution fine, etc. These funds are usually generated from government financial investment, the Environmental Protection Fund, treasury bonds, pollution fee, user charges, transactions of environmental infrastructure property rights, etc. Secondly, enterprise EPF, derived from free cash, lank loans, grant funds for sewage charges, corporate bond and stock market financing. Thirdly, EPF of other financial organizations, most of which are banks. (Wang, 2008)

III. Analysis of Promotive Measures

[4] Term 24 in Production Safety Law

3.1 Promotive Support for Environmental Education

3.1.1 History of Environmental Education

Environmental education will ensure a sustainable economy in those human beings, as "part of the nature" (Mckeown and Hopkins, 2003), can promote sustainable development through deepening the educational philosophy of resources and environment concerns.

Environmental education has been world widely promoted for more than five decades. During the late 1960s, environmental problems emerged as industry in western countries were quickly developed, thus arouse the government and the academic world's concern about the seriousness of environmental problems. Until the 1970s, environmental education has been introduced to school curriculum. United Nations Conference on the Environment held in Stockholm in 1972 marks the beginning of global environmental education. It was followed by two international conferences held in 1975 and 1977, which formed an international consensus on environmental education—"training the citizen to understand and care about the overall environment and related issues, so that they have the knowledge, attitudes, motivation , commitment and skills to individually or collectively solve the current problems and prevent new ones"(Zhang, 2000).

The 1992 United Nations Conference on environment and development in Rio de Janeiro, Brazil, formed a global consensus on sustainable human development, and proposed environmental education as the key to achieving this goal. Later, UN Commission on Sustainable Development was founded, setting up the "521 Agenda" to guide countries in the process of sustainable development and environmental education. In seems that only governments were making efforts for this matter. Nevertheless, meanwhile, UNESCO recommended that the revised teaching strategies should be adopted by formal education, especially teachers, to cultivate citizens with environmental awareness. The UN has confirmed the associated educational issues, and declared the decade from year 2005 to 2014 as the "Decade for Education for Sustainable Development". (Unesco, 2005)

3.1.2 Importance of Environmental Education in China

China is now facing the condition of large population, extensive operation and relative shortage of resources. As China is now in the economic modernization ear, her future development will further increase the ecological burden on the environment. That

is why environmental education plays a vital role in maintaining sustainable development of China's resources and environmental economy. First, it can improve the grassroots citizens' environmental awareness. Second, it can ensure the long-term implementation of management policies, law and technology related to resources and environmental economy. Third, it can help alleviate the enormous pressure to resources and environment caused by the consumption of a large population.

3.1.3 Ways to Strengthen Environmental Education

There are five possible ways to cope with the environmental education need of citizens in the 21st century. (1) Television, newspapers, radio, websites and other forms of media can be used to promote environmental education to the whole society. (2) Introduce EE to a community through various ways. (3) Introduce EE to the whole formal education process, through kindergarten, primary and secondary schools, to higher education institutes. (4) Environmental governance and education should be implemented at the same time. (5) Strengthen EE in local and regional levels.

3.2 Promotive Support from Industry

3.2.1 Sustainable Development of Industry

Industry is often accused as the source of pollution while the economy rapidly develops. In the late 1980s, when the concept of sustainable development was raise, industry has become the focus for practitioners and researchers supporting this concept. Follow-up study of this issue gradually helps us resolve the conflict between environmental pollution caused by industrial development and resources and environment protection. In 1995, World Business Council for sustainable development (WBCSD) was set up, which attracted around 160 enterprises from 30 countries (Bidwell, 2000). It indicates that the global industry is moving forward to sustainable development.

In recent years, some scholars proposed that the adopting of sustainable business strategy in an enterprise could lead to optimal benefit. A series of research also prove this idea correct and suggest that active environmental strategy can develop important organizational skills, thereby enhancing the competitiveness of enterprises. The previous framework of sustainable development emphasis economy, environment and society only, but some also include industry as the forth aspect. (Zeng, et al., 2008)

3.2.2 Status Quo of China's Eco-industry Development

The past two or three decades have witnessed China's great achievement in industrial development, as well as many challenges, one of which is pollution. China only spent several decades to go through industrialization, which took nearly two hundred years for European countries. China's total population is about 1.3 billion, accounting for 22% of the total world population. Under these circumstances, China's economic development is restricted by many natural conditions and human factors.

To solve pollution problems, scholars from Japan, Germany and some developing countries raised the concept of cyclic economy, which means recycling the waste generated in the production and consumption process, in order to alleviate the excessive loss of natural resources and environmental assets, and ensure the economic-social-natural system of a virtuous circle.

There are various industrial sectors practicing cyclic economy in China: (1) Agricultural cyclic economy, including utilization and initialization of agricultural waste, eco-agricultural experiment and demonstration; (2) Industrial cyclic economy, including resources utilization in industrial enterprises, industrial train development, pilot and demonstration of eco-industrial park; (3) Waste recycling in service sector; (4) Regional cyclic economy, including municipal solid waste reduction and recycling, pilot and demonstration of this model (Feng, et al., 2003). This section will briefly discuss Eco-industrial Park and waste recycling in the service sector.

The concept of Eco-industrial Park, originated from industrial recycling network, was introduced into China in the late 1990s, followed by much attention to its theory, design, function, framework and models. The existing mathematical models of eco-industrial park covers the model of inputs and outputs of raw materials, the model of the flow of energy in various industrial units, and the optimal model of the economy and the environment.

Janssen et al. think that under normal condition, the waste generated from one production process cannot be used again in the same process, but can be used in other production processes. On this basis, enterprises need to cooperate with each other, and establish "the industrial recycling network". They suggest that companies matched can use the upstream waste in their production process through this network. Thus, the purpose of industrial ecological park is to connect manufacturers' production activities, so as to reduce their impact on the environment, and promote regional economic and environmental development.

Waste recycling in the service sector is also a key focus nowadays. The wastes generated in the service sector are in a large volume covering plastic containers and bags used in warehouse sales, disposable plastic table wares used in food and beverage industry, disposable medical supplies, etc. With the development of technology and economy, more and more service industry wastes can get into the cyclic economic system easily. Generally speaking, they can be collected by waste recycling system of manufacturers or packaging companies, or by renewable resources recycling system. Service sector is playing an irreplaceable role of complementing and promoting in the cyclic economic system. By fulfilling its corresponding responsibility, it can guide consumers to the green way of consumption, and speed up reuse and minimization of wastes.

3.3 Promotive Support from Regional Coordination System

3.3.1 Connotation of Regional Coordination

Many countries have begun or are beginning or carry out political and fiscal decentralization reform, which means the original centralized management is changed to allocation of responsibilities to the local authority (Razin, 1998). The central government's role, then, is to aggregate income of all regions, and redistributes it by providing public goods and services. However, the ability of local authorities to provide services varies, thus it requires regional coordination to balance.

Early in 1975, Massam (1975) suggested that regional coordination of two or more neighboring local authorities is an agreement pattern gradually formed for a specific purpose. There are many types of agreements, including the agreement for establishing and operating an important facility between two regions, the agreement of selling services to a small area, and agreement of providing each other services in case of emergency, etc.

3.3.2 China's Practice of Regional Coordination

In 1991, China first adopted theories of coordinated regional development. As the third largest country in the world, each area in China has its particular feature and natural resources. After the implementation of reform and opening up policy, now there are three economic core regions formed in China—Chang Jiang Delta region, Pearl River Delta region, and core economic region around the capital. These three regions are leading regional economic development, but they also experienced severe

environmental destruction due to long-term extensive economic development. This lesson tells us that it is worthless of sacrificing the environment for economic growth, and regional coordination must carry out to maintain sustainable development.

Coordinated regional development requires not only rational exploitation and utilization of regional resources, optimal layout of macro economy, upgrading of regional industrial structure, but also the implementation of effective protection to the ecological environment in this region.

3.3.3 Economic Impact of Environmental Regional Coordination

Regional coordination can bring forward several advantages:

(1) Economies of scale: By transmitting public services, regional coordination can achieve economies of scales.

(2) Balancing disparities between local authorities: A regional cooperation is an efficient mechanism to balance disparities between local authorities, especially for construction of a high-cost infrastructure, which requires fiscal strength and human resources capacity.

(3) *Reducing spillover effects:* Pollution caused by wastewater or waste air does not recognize political boundaries. The long-term neglect of such treatment could cause spillover effects of pollution and nuisances in many areas. A regional cooperation for such treatment can address all sources of pollution and prevent undesirable situation in which some local authorities have invested in such treatment yet continue to suffer from pollution caused by others. (Uitto, 2004)

IV. Conclusion

As what has been analyzed above, in the framework of support system for resources and environmental economy, the regulatory methods are tools to solve the related environmental problems that have occurred in the present society and economy and enforce the effective and active measures in regulating environmental sustainability. They are effective in dealing with environmental “externalities”, through internalizing “externalities” by means of legal and judicial procedures and regulatory policies, and through effective improvement from Pareto efficiency to achieve social welfare maximization. On the other hand, environmental promotive measures concern the promotion of sustainable development of environmental and economic systems from every social and economic developing perspectives, such as personal and family way of

life, how enterprises conduct business and how various levels of administrative units work. These measures are carried out under macro basis of reasonable regulation.

References

Ada, Z. and J.M. Griffen, 1976, "Uncertainty and the Choice of Pollution Control Instruments", *Journal of Environmental Economics and Management*, 3(3): 178-188.

Bidwell, R., Verfaillie, H.A., 2000, *Measuring eco-efficiency: a guide to reporting company performance*, Geneva: World Business Council for Sustainable Development.

Eckersley, R., 1992, *Environmentalism and Political Theory: Towards an Ecocentric Approach*, London: University College London Press.

Feng, J.T., et al., 2003, "Theory of Cyclic Economy and It's Practice in China", *China Population, Resources and Environment*, 2: 28-33.

Hussen, Ahmed, 2004, *Principles of Environmental Economics*, 2ed edition, London and New York: Routledge.

Massam, B., 1975, *Location and Space in Social Administration*, London: Edward Arnold.

Prins, G., 1993, "Politics and the Environment", in G. Prins (ed.) *Threats Without Enemies*, London: Earthscan.

Razin, E., 1998, "The Impact of Decentralization on Fiscal Disparities among Local Authorities in Isreal", *Space and Polity*, 2(1): 49-68.

Ren, H., 2008, "Environmental Protection and the Formation of Sustainable Financial System", *Financial and Economic Issues*, 7: 66-70.

Sun, K.M, and R.Q., Sun, 1999, "Analysis on the Development of China's Investment in Treatment of Environmental Pollution", *China Environmental Science*, 2:97-101.

Uitto, J., 2004, "Multi-country Cooperation around Shared Waters: role of monitoring and evaluation", *Global Environment Change*, 14:5-14.

Unesco, 2005, *Unesco and Sustainable Development*, Paris, France: Unesco.

Wang, X.Y., and Q.Q., Lu, 2008, "On Legal Protection of Environment and Resources", *Suihua College Journal*, 3: 25-26.

Wang, Y., 2008, *Study on Related Issues about Invironmental Regulation*, MA dissertation in Southwest University of Finance and Economics.

Wei, X., 2011, Analysis of the Legal System of Resources and Environment. *Government Regulation*.

Weitzman, M. L., 1974, “Prices vs. Quantities”, *The Review of Economic Studies*, 41(4): 477-491.

Yang, C.F., 2008, “Transfermation of Government Function and Innovation of Environmental Economic Policies”, *Authorities Fax*, 7A: 4-10.

Zeng, S.X, H.C.Liu, C.M. Tam, and Y.K. Shao, 2008, “Cluster analysis for studying industrial sustainability: an empirical study in Shanghai”. *Journal of Cleaner Production*. 16 : 1090-1097.

Zeng, G.A., 2004, “Public Regulation and Economic Regulation”, *Economic Review*, 1: 93.

Zhang, B.L., and Y.X., Xu, eds., 2004, *Environmental Regulation and Plan*. Beijing: China Environmental Science Press.

Zhang, X.G., 2000, “International Environmental Education and A Sustainable Future”, *Comparative Education Research*, 2: 27-30.