



TOWARD A NATIONAL ECO-COMPENSATION REGULATION IN THE PEOPLE'S REPUBLIC OF CHINA

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Foreword

The People's Republic of China (PRC) has been developing the concept and practice of “eco-compensation” for more than a decade, and its efforts have been internationally recognized. Provincial, municipal, and county governments have been undertaking innovative and wide-ranging experiments of different eco-compensation schemes. In 2010, the Government of the PRC determined that the time had come to comprehensively regulate eco-compensation at the national level, and designated the National Development and Reform Commission (NDRC) as the lead of this initiative. By 2013, coupled with reforms in forest ownership and massive government investment, eco-compensation was being hailed as one of the most important support measures to slow the degradation and loss of the country's soils, grasslands, and forests.

Eco-compensation in the PRC is mainly a public mechanism to promote environmental protection and restoration, including through the payment for ecological services. It is a package of different mechanisms that employ monetary subsidies as an integral part of project support. The PRC intends to use the new national regulation to introduce market-based mechanisms in this transaction.

The PRC sees a national regulation for eco-compensation as an essential prerequisite for implementing crucial environmental safeguards. It is also an important policy measure for promoting the coordinated development of basic public services across the country. However, regulating eco-compensation is no small task. It requires a fundamental rethinking of the existing economic development model and educating people to create a resource-conserving and environment-friendly society in all parts of the country.

To spur that rethinking process, the NDRC, with support from the Asian Development Bank (ADB), undertook a 3-year study to map out the scope and content of a national eco-compensation regulation. The NDRC published the results of that study in Chinese in 2013. In response to the interest from other developing member countries, we prepared an English version, which is this publication.

This publication is the most recent product from ADB's continuing collaboration with the NDRC—our earlier joint work include *An Eco-Compensation Policy Framework for the People's Republic of China: Challenges and Opportunities* (2010), *Payments for Ecological Services and Eco-Compensation: Practices and Innovations in the People's Republic of China* (2010), *Eco-Compensation for Watershed Services in the People's Republic of China* (2011), and *Developing Eco-Compensation in the PRC: The Way Forward* (2013).

While this report primarily focuses on the findings and the recommendations of the 2011–2013 study, we need to be fully aware of the rapid progress the PRC is making in the environment protection related policies and regulations. The 2014 amendment of the Environmental Protection

Law that came into force in 2015 provides the legal basis for a national eco-compensation mechanism and enables the use of market mechanisms for eco-compensation.

In 2015, the Central Committee of the Communist Party of China and the State Council released the Master Plan for the Reform of Ecological Civilization Institutions, calling for the establishment of an ecological civilization by 2020 consisting of a system for property rights of natural resource assets, an eco-compensation system for paid resource use, and an ecosystem protection market system, among others, so as to promote the modernization of the governance system and capacity of the state in the field of ecological civilization.

More recently, in May 2016, the State Council approved a paper entitled “Several Opinions on Establishing a Sound Eco-compensation Mechanism and the Eco-compensation Regulations (Opinions Paper).” The Opinions Paper calls for the establishment of new mechanisms to promote ecosystem protection, including eco-compensation, and notes that market-based mechanisms should be further studied and introduced. It also advocates the establishment of an initial distribution system for water rights, pollution rights, and carbon emissions rights, and the development of relevant trading platforms. Suggestions are made to explore further eco-compensation for transprovincial and interbasin areas, and areas between the upstream and downstream of river basins. I understand that the Opinions Paper is the first special document of the State Council dedicated to eco-compensation. We believe its release in 2016 is highly beneficial for the promotion and development of innovative policies and coordinated mechanisms for further development of the eco-compensation policy framework and legislation in the PRC.

This report documents the experience and directions the PRC is taking on eco-compensation and highlights the many questions the country still has to answer in developing the regulations in the context of the broader eco-compensation policy framework at the national level. It also offers a basis for future dialogue about how to support and learn from the path the PRC has taken toward using eco-compensation schemes as tools for promoting equity in development, conserving ecosystems and natural resources, and ensuring that social and economic development is environmentally sustainable.

ADB’s long-term strategic framework for 2008–2020, Strategy 2020, focuses its assistance on three distinct but complementary development challenges for the region: (i) inclusive economic growth, (ii) environmentally sustainable growth, and (iii) regional integration. ADB’s support for the PRC’s work on its national eco-compensation regulation contributes to all of these issues. As ADB celebrates its 30-year partnership with the PRC this year, I believe the wider community of ADB’s developing member countries, and indeed the rest of the world, have much to glean from these valuable lessons and innovations from the PRC in eco-compensation legislation development.



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Abbreviations

ADB	Asian Development Bank
CCCPC	Central Committee of the Communist Party of China
CCFGP	Conversion of Cropland to Forest and Grassland Program
COD	chemical oxygen demand
EIA	environmental impact assessment
ha	hectare
MEP	Ministry of Environmental Protection (formerly the State Environmental Protection Administration, or SEPA)
MOF	Ministry of Finance
NDRC	National Development and Reform Commission
NFPP	Natural Forest Protection Project
PRC	People's Republic of China
SFA	State Forestry Administration

Currency Equivalents

(19 October 2016)

Currency Unit – yuan (CNY)

CNY1.00 = \$0.15

\$1.00 = CNY6.74

Executive Summary

Eco-compensation, together with reforms in forest ownership, has been credited with helping to slow the degradation and loss of soils, grasslands, and forests in the People's Republic of China (PRC)—thanks to massive government investment over more than a decade.

Rapid economic growth over the past 40 years has created considerable pressure on the country's environment and the availability of natural resources. In 2011, the Ministry of Environmental Protection reported that the environmental situation in the PRC over the past 3 decades had been constantly degrading and was still declining overall. By 2013, there were signs that the situation was beginning to change in some sectors and that eco-compensation had contributed to making that change possible.

Eco-compensation is a policy the Government of the PRC has been developing as it has explored options for ensuring the country's environmentally and socially sustainable development. After more than a decade of pilot testing eco-compensation, the central government decided in 2010 to regulate it at the national level.

As of 2013, three national laws—the Forest Law, the Law on the Prevention and Control of Water Pollution, and the Water and Soil Conservation Law—have established only the principle of eco-compensation. While these laws provide a legal basis for eco-compensation pilot projects, they are resource-specific and do not provide the legal foundation for a comprehensive national eco-compensation system.

Central government ministries have been piloting eco-compensation projects since 2000, primarily focusing on grasslands, forests, and watersheds. Within 5 years after the central government began piloting eco-compensation, provincial, municipal, autonomous region, city, and county governments began to launch their own eco-compensation initiatives, primarily focused on watersheds, wetlands, marine areas, and mining areas.

Existing national eco-compensation schemes can be divided into three broad categories: (i) ecological protection projects, (ii) ecological damage restoration projects, and (iii) ecological grants and subsidies. The government at all levels has poured enormous amounts of money into these projects and has achieved some significant success, particularly with reforestation and afforestation. It has also gained insights on what characterizes eco-compensation at this stage of its evolution and what needs to be done to consolidate experience with eco-compensation into a long-term, comprehensive eco-compensation mechanism.

Several features characterize eco-compensation as the PRC is implementing it in 2015:

- (i) The state is the primary driver.
- (ii) The state is the primary payer.

Existing national eco-compensation schemes can be divided into three broad categories: ecological protection projects, ecological damage restoration projects, and ecological grants and subsidies.

- (iii) Market mechanisms are incipient.
- (iv) Participation is usually mandatory.
- (v) Eco-compensation is both vertical and horizontal.¹
- (vi) Natural, social, and administrative diversity influence eco-compensation.

The government intends to use eco-compensation as a tool for promoting equity in development and achieving two goals: (i) conserving ecosystems and natural resources and (ii) ensuring that social and economic development is environmentally sustainable. Under the 2010 National Main Function Zoning Plan, eco-compensation will mainly focus on ecological function areas in limited development zones and on prohibited development zones. By directing eco-compensation to designated areas where development is restricted or prohibited, the National Main Function Zoning Plan encourages subnational governments whose jurisdictions include such areas to focus on “green development” rather than the traditional development model. In this context, eco-compensation will function as a means to more equitably distribute the benefits of overall national economic growth to the country’s rural, poorer areas.

Existing fiscal policies that reward subnational governments for attracting industrial development encourage those governments to permit development that depletes and degrades natural resources and causes environmental damage. To partly offset this, each year the central government allocates considerable fiscal resources for conserving natural resources and protecting the environment, and expends them primarily through transfer payments to subnational governments. Subnational governments are also piloting eco-compensation arrangements involving transfer payments within one province or city and between two provinces.

It was against this background that the National Development and Reform Commission (NDRC) started the process of preparing a national eco-compensation regulation involving ministries and a team of experts. In order to gather and distill the information and experience needed to prepare the national eco-compensation regulation, the NDRC, with support from the Asian Development Bank, carried out a study during 2011–2013, the purpose of which was to draw lessons for the national eco-compensation regulation development.

The 2011–2013 study on the PRC’s eco-compensation regulations examined the theory and practice of eco-compensation in three ecosystem types (forests, wetlands, and marine areas), one landscape type (watersheds), and one type of natural resource (minerals). The study also analyzed selected ongoing eco-compensation programs at national and subnational levels, interregional eco-compensation, existing fiscal systems for eco-compensation, eco-compensation models, and existing legislation governing eco-compensation. In addition, the 2011–2013 study compared other countries’ experiences with legislating and implementing payments for ecosystem services and other market-based mechanisms. This publication, which is based on the results of that study, focuses on the lessons from the PRC’s own experience.

Most of the PRC’s existing national-scale forest eco-compensation projects, which provide the majority of the funding for watershed eco-compensation as well, have adopted a “blood

¹ Vertical eco-compensation refers to mechanisms under which funding is provided through financial transfer payments from the central government to subnational governments and from provincial governments to lower levels of local government. Horizontal eco-compensation refers to arrangements between provinces, autonomous regions, and municipalities, or between two equivalent levels of subnational government below the provincial, autonomous region, and municipality level.

transfusion” type of compensation, which primarily focuses on subsidies and other financial payments while ignoring the socioeconomic factors that are important influences on the behavior of the individuals receiving eco-compensation payments. The national grassland eco-compensation mechanism, launched more recently, takes the local socioeconomic context into account. Subnational eco-compensation projects have generally proven more flexible in adapting eco-compensation to the requirements of the jurisdictions involved. As the PRC develops its national eco-compensation regulation, it will need to capture the diversity the subnational projects have tapped while integrating its experience with eco-compensation at all levels of government into a coherent national regulatory framework.

The 2011–2013 study provided a starting point for the process and provided input to the development of a draft eco-compensation regulation that is currently being used as the basis for further consultation. The study also highlighted the fact that there will be significant challenges for harmonizing the eco-compensation regulation with existing laws and other legal instruments. The study identified several lessons learned from studying experiences with eco-compensation that were the same or similar for two or more types of eco-compensation schemes, as well as additional lessons that were specific to a single type of eco-compensation scheme.

The national eco-compensation regulation should create a long-term eco-compensation mechanism that differentiates eco-compensation for individual ecosystem types and activities, is primarily funded through government financial transfer payments, and is supplemented with market-based schemes.

The overall recommendation from the 2011–2013 study is that the national eco-compensation regulation should create a long-term eco-compensation mechanism that differentiates eco-compensation for individual ecosystem types and activities, is primarily funded through government financial transfer payments, and is supplemented with market-based schemes. Lessons learned from the field studies of eco-compensation in different ecosystem types provide guidance on specific issues that the national eco-compensation regulation should address. Many of these lessons are related to issues for which the National Main Function Zoning Plan requires supporting measures. Incorporating provisions based on these lessons into the draft national eco-compensation regulation would contribute significantly to the implementation of the National Main Function Zoning Plan.

The study recognized the need for consideration of numerous issues when developing eco-compensation regulations. These include (i) provision of guidance for determining the eco-compensation rate; (ii) establishing an eco-compensation arbitration system to deal with disputes (e.g., in the case of watersheds); (iii) requirement on understanding of actual needs of the beneficiaries (e.g., the need for technical assistance and other types of nonmonetary support may be more critical than cash subsidies); (iv) strengthening the supervision, monitoring, and evaluation mechanisms that might otherwise lead to inefficient use of funds; (v) including clauses for independent third-party monitoring of eco-compensation programs; (vi) clarification of property rights; and (vii) inclusion of measures designed to ensure that eco-compensation supports poverty alleviation.

Key challenges for the fiscal system that the 2011–2013 study identified indicate that the national eco-compensation regulation should provide for (i) improving the central government’s transfer payment system by factoring eco-compensation into general transfer payment calculations; (ii) gradually reforming the existing tax regime to support and provide incentives for ecosystem conservation as well as pollution control; and (iii) calculating eco-compensation rates based on a range of factors including, but not limited to, economic valuation of ecosystems and the services they provide, development opportunity cost, and actual costs of ecosystem and natural resources conservation.

The PRC's approach to regulating eco-compensation is also particularly challenging, because it aims to govern all of these aspects of eco-compensation in one legal instrument. The government will have to explore how to integrate eco-compensation schemes into overall government fiscal policy and develop eco-compensation as part of a larger strategy to create a stable and sustainable source of funding for natural resources conservation.

In April 2014, the Standing Committee of the National People's Congress adopted the PRC's amended Environmental Protection Law, which specifically requires a national eco-compensation mechanism. Article 31 of the Environmental Protection Law of the People's Republic of China (revised edition) proposed that "the state will establish and improve eco-compensation system, and strengthen the fiscal transfer payment for ecological protection region; the relevant local government shall implement eco-compensation funds and ensure it is used for eco-compensation; the state will guide relevant governments of the beneficiary areas and ecological protection areas to implement eco-compensation in accordance with the market rules through consultation."

The government will have to integrate eco-compensation schemes into overall government fiscal policy and develop eco-compensation as part of a larger strategy to create a stable and sustainable source of funding for natural resources conservation.

Introduction

1

Eco-compensation, together with reforms in forest ownership, has been credited with helping the People's Republic of China (PRC) slow down the degradation and loss of its soils, grasslands, and forests.¹ This is the result of more than a decade's worth of massive government investment. From 2001 to 2012, central government funding for eco-compensation increased from CNY2.3 billion (\$341.4 million) to CNY78 billion (\$11.6 billion), and totaled CNY250 billion (\$37.1 billion) over that period.²

Since 1978, when the PRC began the shift from a centrally planned to a market-based economy, the country's gross domestic product has grown at an average annual rate of more than 9% (Figure 1).³ By 2010, the PRC had become the world's second-largest economy, and it was projected to be the world's largest economy by 2020.

Such rapid economic growth has, however, created considerable pressures on the country's environment and on the availability of natural resources.⁴ In 2011, the Macro Strategic Research Report on China's Environment noted that the environmental situation in the PRC over the past 3 decades had been constantly degrading and was still declining overall.⁵ By 2013, there were signs that the situation was beginning to change in some sectors and that eco-compensation had contributed to making that change possible.

Eco-compensation is a policy the Government of the PRC has been developing as it has explored options for ensuring the country's environmentally and socially sustainable development. After more than a decade of pilot testing eco-compensation, the central government decided in 2010 to regulate it at the national level. In order to gather and distill the information and experience needed to prepare a national regulation on eco-compensation, the PRC's National Development and Reform Commission (NDRC), with support from the Asian Development Bank (ADB), carried out a study during 2011–2013 whose purpose was to draw lessons for the national eco-compensation regulation.

This 2011–2013 study examined the theory and practice of eco-compensation in three ecosystem types (forests, wetlands, and marine areas), one landscape type (watersheds), and one natural

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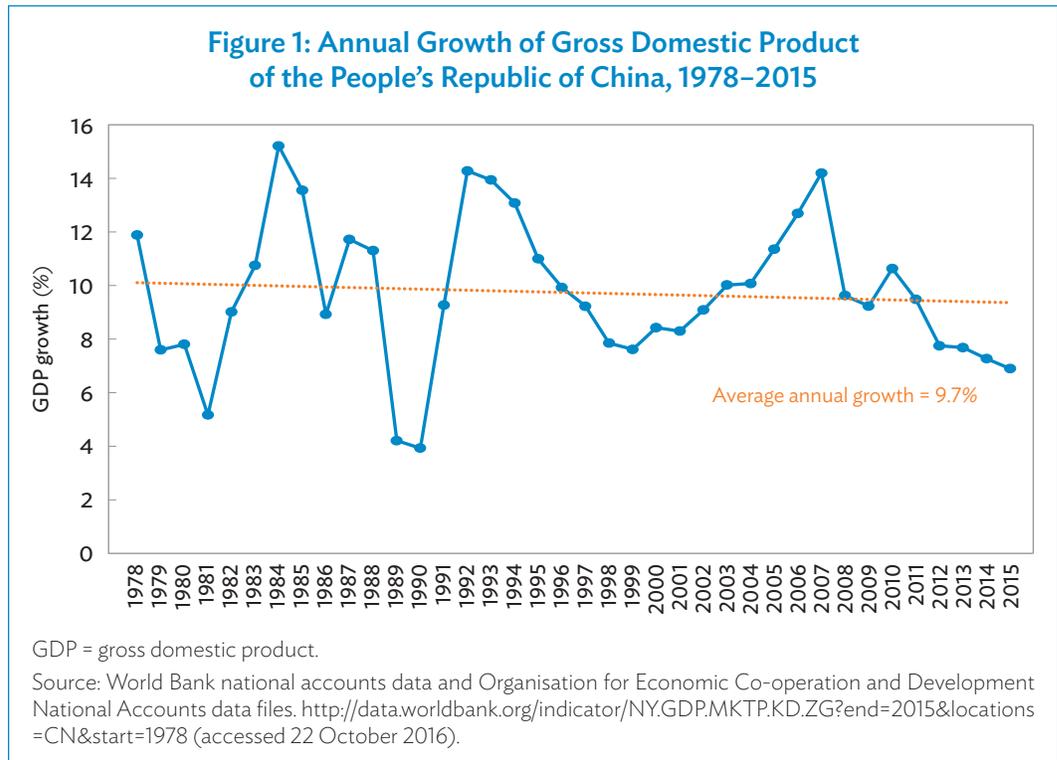
¹ World Bank and the Development Research Center of the State Council of the PRC. 2013. *China 2030: Building a Modern, Harmonious, and Creative Society*. Washington, DC: World Bank. p. 245. <http://www.worldbank.org/content/dam/Worldbank/document/China-2030-complete.pdf>

² National Development and Reform Commission. 2013. Report on the Eco-Compensation Progress in China. National People's Congress of the PRC. 23 April. http://www.npc.gov.cn/npc/xinwen/2013-04/26/content_1793568.htm (in Chinese); Xinhua News Agency. 2013. Chinese Lawmakers Call for Laws on Eco-Compensation. 25 April.

³ Asian Development Bank (ADB). 2012. *Country Partnership Strategy: People's Republic of China, 2011–2015*. May. pp. 1–2. <https://www.adb.org/sites/default/files/institutional-document/33584/files/cps-prc-2011-2015.pdf>

⁴ Footnote 3; footnote 1, p. 8.

⁵ Chinese Academy of Engineering and Ministry of Environmental Protection (MEP). 2011. *Macro Strategic Research Report on China's Environment*. Beijing: China Environmental Science Press. p. 12. MEP released this report in April 2011, after 3 years of study that involved more than 50 academicians. The Government of the PRC and ADB cofinanced the study.



resource (minerals).⁶ The study also analyzed selected ongoing eco-compensation programs at national and subnational levels, interregional eco-compensation, existing fiscal systems for eco-compensation, eco-compensation models, and existing legislation governing eco-compensation. In addition, the 2011–2013 study compared other countries’ experiences with legislating and implementing payments for ecosystem services and other market-based mechanisms. This publication, which is based on the results of the study,⁷ focuses on the lessons from the PRC’s own experience.

⁶ The PRC is also piloting eco-compensation in the context of hydropower development, which the 2011–2013 study did not examine. See B. Yu and L. Xu. 2012. Study of Eco-Compensation in Hydropower Development in China. *Procedia Environmental Sciences*. 13. pp. 891–898.

⁷ Y. Qin, J. Wang, Z. Tong, W. Xiao, A. Lopez, and L. Jin, eds. 2013. *Developing Eco-Compensation Regulations in China: The Way Forward*. Beijing: Peking University Press. pp. 141–189 (in Chinese with an executive summary in English).

Eco-Compensation in the People's Republic of China

2

Eco-compensation is a package of different mechanisms (including financial subsidies, project assistance, constructive policies, and other measures), which the PRC, at all levels of government, employs to compensate those who invest money or suffer economic losses to protect ecosystems by transferring resources from those who benefit from or damage them. Market-based mechanisms and the role of the private sector in eco-compensation is still somewhat limited.⁸

To explain eco-compensation another way, it is mainly a public mechanism for adjusting benefit-based relationships involved in environmental protection and restoration. Eco-compensation creates both incentives and disincentives.⁹ The goal is to protect the natural environment and promote harmonious relationships between human beings and nature, taking into account ecosystem values, environmental protection costs, and development opportunity costs, and using administrative and market measures to accomplish this.¹⁰

Central government ministries have been piloting eco-compensation projects since 2000, although there are national programs that began before then (see the Forest Eco-Compensation chapter). The central government, as of 2015, is carrying out projects and programs on grassland eco-compensation, forest eco-compensation, and watershed eco-compensation. Several of these are interregional in nature (see the Interregional Eco-Compensation chapter). Most subnational governments launched their eco-compensation initiatives beginning in 2005, although there are some that started earlier. Subnational eco-compensation projects and programs involve watersheds, wetlands, marine areas, and mining areas.

Existing national eco-compensation schemes can be divided into three broad categories:

- (i) Ecological protection projects, e.g., the Natural Forest Protection Project (see the Forest Eco-Compensation chapter);
- (ii) Ecological damage restoration projects, e.g., the Beijing-Tianjin Sandstorm Source Control Program (see the Forest Eco-Compensation and Interregional Eco-Compensation chapters); and
- (iii) Ecological grants and subsidies, e.g., the Conversion of Cropland to Forest and Grassland Program, the Returning Pastureland to Grassland Project, and the Subsidy and Rewards for Ecological Protection of Grasslands Program (National Grassland

Eco-compensation is mainly a public mechanism for adjusting benefit-based relationships involved in environmental protection and restoration. It creates both incentives and disincentives.

⁸ To date, there is no legal definition of eco-compensation in the PRC.

⁹ L. Dai. 2014. Exploring China's Approach to Implementing Eco-Compensation Schemes: The Lake Tai Watershed as Case Study Considered through a Legal Lens. *Water International*. 39 (5). p. 757.

¹⁰ J. Gao and Y. Han. 2010. Strategy Report for Ecosystem Management in the People's Republic of China's Experience. In T. Lin and T. Swanson, eds. *Economic Growth and Environmental Regulation: The People's Republic of China's Path to a Brighter Future*. London and New York: Routledge. p. 169.

Eco-Compensation Program) (see the Forest Eco-Compensation and Grassland Eco-Compensation chapters).

The Government of the PRC, at all levels, has poured enormous amounts of money into these projects, has achieved some significant success,¹¹ particularly with reforestation and afforestation, and has gained insights on what characterizes eco-compensation at this stage of its evolution and what needs to be done to consolidate experience with eco-compensation into a long-term, comprehensive eco-compensation mechanism.

Several features characterize eco-compensation as learned from the PRC's implementation of various such projects and programs.

(i) **The state is the primary driver.**

In the PRC, state ownership of natural resources provides the primary justification for government regulation of all types of ecosystem services. However, state ownership of land and other natural resources does not preclude the development of market-based mechanisms. Land rights are already strong enough in the PRC to provide a basis for market-based mechanisms as part of eco-compensation.¹²

(ii) **The state is the primary payer.**

Government fiscal funds are the main source of financing for eco-compensation. Subsidies and direct financial payments are the foundation of the majority of the large-scale, national eco-compensation projects and programs in the PRC. Some of the national programs, and many of the eco-compensation schemes that subnational governments are implementing, also provide for tax rebates, preferential loans, technical and other in-kind assistance, and other types of government support. The State Environmental Protection Administration (SEPA), now the Ministry of Environmental Protection (MEP), advised in 2007 that there are four basic sources of funding for eco-compensation and described them as “developer protects, beneficiary pays, polluter pays, and destroyer restores.”¹³ “Developer protects” means that any individual or entity that implements whatever activity that has negative impacts on the environment is required to mitigate and/or offset those impacts. “Beneficiary pays” means that the government or other entity that benefits from a particular ecosystem service must compensate those who contribute to ensuring that the service is provided. As the concept of eco-compensation has evolved in the PRC, it has included the “polluter pays” principle and expanded it to incorporate the idea that anyone who degrades or destroys an ecosystem or a natural resource in any way must compensate for that degradation or destruction. The way in which the PRC was implementing eco-compensation in 2014, a government at any level

There are four basic sources of funding for eco-compensation: developer protects, beneficiary pays, polluter pays, and destroyer restores.

¹¹ Between 2002 and 2012, total investment for the sloping land conversion program amounted to CNY438.5 billion (or about \$65 billion), including the grain subsidy, seed fund, maintenance fees, and various special funds, of which CNY326.2 billion (or approximately \$48.4 billion) constituted direct payments, benefiting 32 million households in 25 provinces. See Z. Liu and J. Lan. 2015. The Sloping Land Conversion Program in China: Effect on the Livelihood Diversification of Rural Households. *World Development*. 70. pp. 147–161. DOI: 10.1016/j.worlddev.2015.01.004.

¹² Q. Zhang and M. Bennett. 2011. *Eco-Compensation for Watershed Services in the People's Republic of China*. Manila: ADB. p. 26; Article 20 of the 2002 Law of the People's Republic of China on Land Contract in Rural Areas provides a 30-year tenure right for agricultural land, 30–50 years for grasslands, and 30–70 years for forest land. An English translation of the law is available at http://english.gov.cn/laws/2005-10/09/content_75300.htm

¹³ SEPA. 2007. Guiding Advice on Launching Pilot Ecological Compensation Projects. HUANFA No. [2007] 130.

may be a developer who protects, beneficiary who pays, polluter who pays, or destroyer who restores.

(iii) **Market mechanisms are incipient.**

The PRC is experimenting with market-based mechanisms in eco-compensation. The central government recognizes that, although its funding will dominate eco-compensation for some time to come, it must also mobilize the participation of market actors (especially the private sector) in order to alleviate pressure on government financial resources and expand funding sources for eco-compensation. Traditional financial incentives such as subsidies, direct payments, and other similar measures, which were the basis for eco-compensation in 2014, do not require that beneficiaries pay for the services provided. Enabling markets for ecosystem services will allow governments at all levels to transfer part of the cost of maintaining environmental services to other actors. Some provincial governments, as of 2014, are using a type of intragovernmental market in which different levels of government compensate each other by passing on such costs to other provinces or to subprovincial governments in the form of transfer payments. At least one provincial government is piloting an emissions trading scheme.¹⁴

(iv) **Participation is usually mandatory.**

Under the eco-compensation projects and programs that the central government has introduced, participation is a process characterized by extensive consultation among the principal stakeholders which gives each party an opportunity to negotiate and compromise toward an agreement. Once the final decision is made, all parties have to abide by it. The participation process, as of 2014, differs from market mechanisms in that the minority has to follow decisions made by the majority through the participation process, while market mechanisms allow the markets to guide decisions.

(v) **Eco-compensation is both vertical and horizontal.**

Vertical eco-compensation refers to mechanisms under which funding is provided through financial transfer payments from the central government to subnational governments and from provincial governments to lower levels of local government. The majority of existing eco-compensation arrangements relies on vertical financial transfer payments. Horizontal eco-compensation refers to arrangements between provinces, autonomous regions, and municipalities,¹⁵ or between two equivalent levels of subnational government below the provincial, autonomous region, and municipality level. Provinces have voluntarily implemented horizontal eco-compensation, particularly for watershed conservation (see the Watershed Eco-Compensation chapter).

(vi) **Natural, social, and administrative diversity influence eco-compensation.**

Eco-compensation has evolved differently for each ecosystem, landscape, and activity to which it is applied. This has created a diversity of measures governing how eco-compensation should be allocated and how it can be used. The public's understanding of and attitude toward natural resources conservation and development vary from one area of the country to another. Eco-compensation arrangements must accommodate

The “polluter pays” principle incorporates the idea that anyone who degrades or destroys an ecosystem or a natural resource in any way must compensate for that degradation or destruction.

¹⁴ Footnote 7, pp. 144–145.

¹⁵ Municipalities are large cities that report directly to the central government and whose status is the same as provinces. There are four municipalities in the PRC: Beijing, Shanghai, Chongqing, and Tianjin.

those differences if they are to be effective. Similarly, because eco-compensation is multi-sectoral, there are multiple authorities involved in implementing it at all levels of government whose understanding of and attitude toward natural resources conservation and development also vary and sometimes even conflict, particularly where their performance incentives emphasize economic development.

The government intends to use eco-compensation as a tool for promoting equity in development and achieving two goals: conserving ecosystems and natural resources, and ensuring that social and economic development is environmentally sustainable. Although the PRC has met and exceeded its Millennium Development Goal of reducing poverty, there are still strong links between the environment and poverty in the country. Many areas that the government has identified as requiring special attention for alleviating rural poverty are located in ecological function zones.¹⁶ Since urbanization and/or industrialization may be restricted or prohibited in these ecological function zones, eco-compensation will be the mechanism by which the government will seek to equalize improvements in the living conditions of people in rural and already urbanized areas and, at the same time, improve and sustain the natural resources that the country requires for its future development.

The government intends to use eco-compensation as a tool for promoting equity in development and achieving two goals: conserving ecosystems and natural resources, and ensuring that social and economic development is environmentally sustainable.

2.1 The National Main Function Zoning Plan and Eco-Compensation

In the National 12th Five-Year Plan for Environmental Protection (2011–2015), MEP projected that by 2015 the area of terrestrial nature reserves will account for 15% of total national land area, and 90% of nationally significant species and representative ecosystems will be under protection.¹⁷

To lay the foundation for achieving this goal, the State Council in December 2010 released the PRC's first national territorial development plan, the National Main Function Zoning Plan,¹⁸ which is the basis for national development zoning. The plan's formal objectives are to set out clear patterns for development, optimize development infrastructure, improve efficiency of the use of space and resources, enhance coordination of regional development, and build capacity for sustainable development. In practice, the plan is the PRC's blueprint for regulating environmental protection and sustainable development and reversing a trend toward "polluting first and cleaning up later."¹⁹

The National Main Function Zoning Plan divides the country's territory into four categories: (i) areas where development should be optimized to solve existing environmental problems; (ii) key areas for future development; (iii) areas where development should be limited; and (iv) areas where development is prohibited (footnote 1):

¹⁶ Footnote 3, p. 1.

¹⁷ MEP. 2012. MEP Explains the National 12th Five-Year Plan for Environmental Protection. 1 February. http://english.mep.gov.cn/News_service/infocus/201202/t20120207_223194.htm

¹⁸ State Council of the PRC. 2010. The National Main Function Zoning Plan. http://www.gov.cn/zwqk/2011-06/08/content_1879180.htm (in Chinese).

¹⁹ Footnote 1, p. 231.

- (i) **Optimized development zones** and (ii) **future development zones** are urbanized, industrialized areas where industries and trade will be regulated to take advantage of economies of scale to strengthen the integration of subnational and national markets with the globalized economy.
- (iii) **Limited development zones** include major agricultural production areas and ecological function areas. In ecological function areas, the primary objective is to enhance the provision of ecosystem services. In major agricultural production areas, the primary objective of development is to enhance agricultural production capacity.
- (iv) **Prohibited development zones** include key ecological function areas which need special protection and all levels and categories of legally established natural and cultural resource reserves where industrialization and urbanization are prohibited.

Under the National Main Function Zoning Plan, eco-compensation will mainly focus on ecological function areas in limited development zones and on prohibited development zones. By directing eco-compensation to designated areas where development is restricted or prohibited, the plan encourages subnational governments whose jurisdictions include such areas to focus on “green development” rather than the traditional development model (footnote 1). In this context, eco-compensation will function as a means to distribute the benefits of economic growth more equitably to the country’s rural, poorer areas.²⁰ To support eco-compensation for these areas, the central government has established the Transfer Payment Mechanism to Important Ecological Function Areas.²¹

The National Main Function Zoning Plan calls for a series of supporting measures on the fiscal system,



Jin Leshan

Cyathea spinulosa in the nature reserve, Guizhou Province

²⁰ G. Bennett, N. Carroll, and K. Hamilton. 2013. *Charting New Waters: State of Watershed Payments 2012*. Washington, DC: Forest Trends. p. viii.

²¹ There is no legal document that supports this mechanism. The Ministry of Finance (MOF) issued a series of policy documents to set it up. In 2012, MOF issued the latest policy paper titled “Central Government’s Transfer Payment Mechanism to Important Ecological Function Areas in 2012” (Available in Chinese at http://www.gov.cn/gzdt/2012-07/25/content_2191786.htm).

investment, industrial development, and performance assessment procedures. These supporting measures must include the following:

- (i) Reforming central government financial transfer payments to take into account the costs of ecosystem and natural resources conservation and the costs of managing and maintaining nature reserves, and accordingly increasing transfer payments to ecological function areas, particularly those in the midwest of the country.
- (ii) Requiring provincial governments to improve their systems for transfer payments to subprovincial governments to strengthen support for ecological function areas and to promote intraprovincial financial support mechanisms.
- (iii) Requiring optimized development zones and future development zones, which benefit from the ecosystem services that ecological function areas provide, to compensate the limited development and prohibited development zones with general financial aid, targeted assistance, and counterpart support.
- (iv) Changing the performance appraisal system for all government officials to prioritize assessing progress with sustainable development and the conservation of ecosystems and natural resources instead of emphasizing traditional indexes such as gross domestic product (GDP), industrialization, and urbanization, among others.
- (v) Providing compensation for ecological migrants. The National Main Function Zoning Plan calls for gradually moving all people out of the core areas of nature reserves and dramatically reducing the population in buffer zones and experimental zones. This may be done in two ways: on-site transfer and off-site transfer. With on-site transfer, local residents who agree to work in nature reserves in order to remain in the area should receive a one-time compensation payment. Local residents who transfer off-site should receive long-term compensation that focuses on resettling them and ensuring their long-term survival and development.
- (vi) Providing compensation to subnational governments whose jurisdictions include limited development and/or prohibited development zones. Restricting and prohibiting development will result in lower revenues for these governments; eco-compensation will encourage their support for ecosystem and natural resources conservation and sustainable use. Such compensation could take the form of tax rebates for the governments as well as reforming the performance appraisal system for individual officials.

In ecological function areas, the primary objective is to enhance the provision of ecosystem services.

A national regulatory regime for eco-compensation is an inherent requirement for implementing the National Main Function Zoning Plan, a crucial safeguard for the environment, and an important measure for promoting coordinated and harmonious development and equalizing the provision of basic public services across the country.

On 24 April 2014, the Standing Committee of the National People's Congress adopted the amended Environmental Protection Law.²² The amended law requires the state to establish and improve an eco-compensation mechanism and increase fiscal transfers for ecological function areas.²³ It requires environmental protection plans at the national and subnational levels and stipulates that those plans must be aligned with planning for main functional areas as well as

²² Xinhuanet. 2014. China's Legislature Adopts Revised Environmental Protection Law. 24 April. http://news.xinhuanet.com/english/china/2014-04/24/c_133287570.htm

²³ Standing Committee of the National People's Congress of the PRC. Environmental Protection Law of the People's Republic of China. Adopted in 1989, amended on 24 April 2014, and came into force on 1 January 2015. Article 31.

land use and urban and rural development.²⁴ The amended law also requires incorporating environmental protection criteria into the performance evaluation system for government departments and officials that are responsible for environmental supervision and for making evaluation results public.²⁵

Further regulating eco-compensation will require fundamentally rethinking the existing economic development mode and educating people to create a resource-conserving and environment-friendly society in all parts of the country. The amended Environmental Protection Law provides legal support for doing this. It stipulates that environmental protection is a basic national policy for the PRC.²⁶

2.2 Fiscal Policy and Eco-Compensation

In piloting eco-compensation, the central government and subnational governments at all levels have focused on how existing fiscal mechanisms can most effectively support it and how those mechanisms may need to be adjusted to do so. That process is still ongoing. Existing fiscal policies that reward subnational governments for attracting industrial development encourage those governments to allow development that depletes and degrades natural resources and causes environmental damage.²⁷ To partly offset this, the central government allocates considerable fiscal resources each year for conserving natural resources and protecting the environment and expends them primarily through transfer payments to subnational governments.

There are two types of transfer payments: vertical financial transfer payments and horizontal transfer payments. Vertical financial transfer payments are further categorized as special transfer payments and general transfer payments. The central government channels all vertical financial transfer payments to subprovincial governments through the corresponding provincial governments.

Special transfer payments fund eco-compensation through six national projects: (i) Natural Forest Protection Project (NFPP), (ii) Conversion of Cropland to Forest and Grassland Program (CCFGP), (iii) Returning Pastureland to Grassland Project, (iv) Beijing–Tianjin Sandstorm Source Control Program, (v) Forest Ecological Benefit Compensation Fund (see the Forest Eco-Compensation chapter), and (vi) Subsidy and Rewards for Ecological Protection of Grasslands (National Grassland Eco-Compensation Program). Subnational governments use special transfer payments from the central government for the purposes specified by the project that makes the funds available. Local governments below the provincial level in Zhejiang, Guangdong, and other provinces are piloting special transfer payments for forest, watershed, and marine area eco-compensation. Subnational governments are also piloting eco-compensation arrangements involving horizontal transfer payments within one province or city and between two provinces (see the Interregional Eco-Compensation chapter).

Existing fiscal policies that reward subnational governments for attracting industrial development encourage those governments to allow development that depletes and degrades natural resources and causes environmental damage.

²⁴ Footnote 23, Article 13.

²⁵ Footnote 23, Article 26. Also see M. Ker and K. Logan. 2014. New Environmental Law Targets China's Local Officials. *Chinadialogue*. 28 April. <https://www.chinadialogue.net/article/show/single/en/6939-New-environmental-law-targets>

²⁶ Footnote 23, Article 4.

²⁷ Footnote 1, p. 245.

General transfer payments aim at equalizing the significant differences in available fiscal resources between the more developed eastern part of the country, whose demand for ecosystem services is growing, and the less economically developed western part of the country whose development has been further restricted or even prohibited to ensure that its ecosystems continue to provide the services the rest of the country needs (see the Interregional Eco-Compensation chapter). The central government makes general transfer payments for four purposes: (i) to compensate counties that are implementing the NFPP; (ii) to compensate counties that are implementing the CCFGP;²⁸ (iii) to cities of resource-exhausted type (CRET);²⁹ and, as of 2011, (iv) to compensate subnational governments in key ecological function areas. Subnational governments use general transfer payment funds for key ecological function areas and from the NFPP and CCFGP projects primarily for environmental protection and support for basic public services. CRET use the general transfer payments primarily to improve their capacity to provide public services and work toward sustainable development. Zhejiang Province took the lead in making intraprovincial general transfer payments for eco-compensation (see Watershed Eco-Compensation chapter).

The PRC has not yet created a separate eco-compensation tax system. The amended Environmental Protection Law provides the legal basis for doing so.³⁰ Existing fees and charges that governments at all levels are using to support eco-compensation include sewage charges and several types of fees collected from mining companies, including environmental security deposits and other fees to support ecosystem restoration in areas that have been mined. Taxes and nontax revenue fees and charges that are indirectly related to eco-compensation because they include polluter-pays or user-pays measures include consumption tax, resource tax, urban maintenance and construction tax, travel tax, land occupation tax, urban land use tax, and mineral resources compensation fees, among others.

Under the National Main Function Zoning Plan, there are regulations on providing compensation to local governments which may also apply to eco-compensation (footnote 18). These regulations authorize tax rebates and changes in the performance appraisal systems for local officials that focus on assessing progress with conservation and environmental protection in addition to criteria that measure progress with industrialization and urbanization. The amended Environmental Protection Law, which requires incorporating environmental protection criteria into the performance evaluation system for government departments and officials, supports the National Main Function Zoning Plan regulations.³¹

2.2.1 Key Challenges for the Fiscal System

As of 2014, there is no specific law or regulation that guides the central government and subnational governments on how to establish and manage the fiscal systems that eco-compensation requires. The amended Environmental Protection Law enables fiscal assistance

²⁸ In 2006, the central government abolished the agriculture tax. Since then, the central government has used the Conversion of Cropland to Forest and Grassland Program to continue to subsidize farmers.

²⁹ Cities of resource-exhausted type are cities that have heavily relied on the exploitation of natural resources such as coal, oil, iron ore, and other mineral resources, and where these resources are about to be exhausted. The economy of these cities is shrinking, but many people have settled in these places over the years to work in the resource-based industries. The central government makes transfer payment to those city governments primarily to enable them to provide basic public services.

³⁰ Footnote 23, Article 21.

³¹ Footnote 23, Article 26.

for environmental services;³² specific guidance will have to be developed. The existing national fiscal system does not provide for eco-compensation schemes, and fiscal policies related to eco-compensation have many design, implementation, and management problems. Most central government funding for eco-compensation is channeled through national-scale projects. The challenges for the fiscal system that the 2011–2013 study identified include the following:

- (i) General transfer payments do not give due consideration to eco-compensation and the amounts of the payments are too low to support it. Central government transfer payments are the major funding source for eco-compensation, but eco-compensation is not an important consideration in calculating them and the percentage allocated for eco-compensation in general transfer payments is relatively small and far from adequate. The relatively low level of financial guarantees for eco-compensation influences the ability and enthusiasm of local governments to implement it.
- (ii) Special transfer payments depend on projects for their funding, which means that there is no long-term stability for them. Project-based eco-compensation is relatively convenient in practice, but is governed only by the terms and conditions of the corresponding program or project and lacks long-term stability.
- (iii) Some special transfer payments require subnational governments to contribute counterpart funds, which creates conflicts for scarce resources for governments in less-developed areas. Moreover, as some earmarked transfer payments require counterpart supporting funds from local governments, they can create a significant burden on local revenues. In such cases, local governments must either cut down other vital expenditures or allow eco-compensation projects to suffer from lack of funds. This is particularly acute in economically disadvantaged areas.
- (iv) Special transfer payments for eco-compensation projects create challenges for intersectoral coordination at all levels of government because they often deal with issues that require input from multiple agencies, including forestry, agriculture, water resources, and environmental protection authorities, which has led to conflicts of responsibility and disputes.
- (v) The existing fiscal transfer payment system does not enable horizontal transfer payments, and there is little financial support for them. Existing initiatives are spontaneous, not institutionalized, and there has not yet been a comprehensive evaluation of their performance. One basic challenge is that when subnational governments attempt to negotiate horizontal eco-compensation mechanisms without the support of the government at higher levels, developed areas which benefit from ecosystem services have advantages over less developed areas that will have to provide those ecosystem services.
- (vi) There is no specialized environmental tax targeted to provide funding for eco-compensation. The amended Environmental Protection Law enables such a tax (footnote 23); creating and implementing it will require additional regulation and guidance. Although some tax and nontax revenues are nominally relevant to eco-compensation, most of them did not take eco-compensation into consideration in their original design. There is also the problem of duplicate and redundant fees and charges. Because most fees are independently controlled by different departments, their collection and disbursement is departmentalized, and it is difficult to identify the degree to which those revenues actually contribute to eco-compensation. Local governments, in

Central government transfer payments are the major funding source for eco-compensation.

Because most fees are independently controlled by different departments, their collection and disbursement is departmentalized, and it is difficult to identify the degree to which those revenues actually contribute to eco-compensation.

³² Footnote 23, Article 21.

particular, have experimented with the use of nontax revenues, imposing miscellaneous fees and charges in the name of eco-compensation. Some of these contribute to eco-compensation, but there are some defects in the design of these fees and charges which weaken their incentive effect; and

- (vii) Eco-compensation rates are often not equitable. In theory, the central government and subnational governments are supposed to calculate eco-compensation rates on the basis of the costs of environmental protection and the opportunity cost of development. In practice, however, there is not yet an agreed methodology for valuing ecosystem services, the opportunity cost of development is not sufficiently taken into account, and environmental protection costs are often the only basis for an eco-compensation rate.

2.2.2 Key Lessons Learned for the Fiscal System

The challenges for the fiscal system that the 2011–2013 study identified indicate that the national eco-compensation regulation should provide for the following:

- (i) Improving the central government's transfer payment system by factoring eco-compensation into general transfer payment calculations, clearly stipulating responsibilities for coordinating and using special transfer payments, and enabling horizontal transfer payments.
- (ii) Gradually reforming the existing tax regime to support and provide incentives for ecosystem conservation as well as pollution control.
- (iii) Calculating eco-compensation rates based on a range of factors including, but not limited to, economic valuation of ecosystems and the services they provide, development opportunity cost, and actual costs of ecosystem and natural resources conservation. The regulation should provide the option that subnational governments may negotiate eco-compensation rates with the guidance of the central government in cases in which this would be more equitable than applying a central standard for eco-compensation.

The PRC's approach to regulating eco-compensation is unique, and particularly challenging, because it aims to govern all of these aspects of eco-compensation into one legal instrument. As it develops the national eco-compensation regulation, the government will have to explore how to integrate eco-compensation schemes into overall government fiscal policy and develop eco-compensation as part of a larger strategy to create a stable and sustainable source of funding for natural resources conservation.

In practice, there is not yet an agreed methodology for valuing ecosystem services, the opportunity cost of development is not sufficiently taken into account, and environmental protection costs are often the only basis for an eco-compensation rate.

The Road to a National Eco-Compensation Regulation

In the PRC, mechanisms like eco-compensation must be established by national law. The amended Environmental Protection Law does that by updating the PRC's environmental legal regime and requiring the establishment of an eco-compensation mechanism. First promulgated in 1989 during the period when the country's rapid economic development came at the expense of the environment, the PRC's Environmental Protection Law adopted major amendments on 24 April 2014 that became effective on 1 January 2015.³³

In 1992, the State Council approved the policy paper "Notice on Key Economic Institutional Reforms," which called for the establishment of forest eco-compensation.³⁴ This policy paper made significant inputs and contributions to the 1998 amendment of the Forest Law of the PRC, the law that laid the regulatory foundation for forest eco-compensation in particular and eco-compensation in general.

The National People's Congress in April 1998 amended the Forest Law to enable a national fund to support eco-compensation for forest ecosystems. It was natural disasters later in 1998, however, that dramatically brought the consequences of environmental degradation to the attention of policy makers and the public. Floods along the Yangtze River and two other places in the country during June–September 1998 were a tipping point. The scale of the human and economic costs of the Yangtze River floods convinced the central government that it had to begin implementing strong measures, including a logging ban around the headwaters of the Yangtze, to restore and conserve natural ecosystems.

An explosion in a petrochemical plant that released 100 tons of toxic substances into the Songhua River along the PRC's northeastern border with the Russian Federation on 13 November 2005 triggered a similar government response with respect to controlling pollution.³⁵ Weeks later, on 3 December 2005, the State Council issued a decision which called for the government to "build an ecological compensation mechanism."

Since 2005, the State Council has included the establishment of eco-compensation mechanisms in its annual key initiatives.³⁶ The 16th Central Committee of the Communist Party of China (CCCPC) (2002–2007) issued a decision calling for an environmental appraisal system and

Natural disasters dramatically brought the consequences of environmental degradation to the attention of policy makers and the public.

³³ M. W. Vella and L. He. 2016. China Begins Enforcing Newly Amended Environmental Protection Law. *Jones Day*. 21 January. <http://www.jonesday.com/china-begins-enforcing-newly-amended-environmental-protection-law-01-21-2016/>

³⁴ State Council of the PRC. 1992. Notice on Key Economic Institutional Reforms. 19 February.

³⁵ United Nations Environment Programme. 2005. The Songhua River Spill, China, December 2005—Field Mission Report. p. 4. http://www.unep.org/PDF/China_Songhua_River_Spill_draft_7_301205.pdf

³⁶ For a list, see footnote 9, Appendix 1, p. 770.

compensation mechanism.³⁷ The 2007 report of the 17th CCCPC called for creating a perfect ecological compensation mechanism.³⁸ During 2006–2010 and in 2012, the annual report on the work of the government included information on progress with creating eco-compensation systems.

In 2010, the China Council for International Cooperation on Environment and Development (CCICED) noted that eco-compensation initiatives had blossomed, but that these initiatives were neither part of a comprehensive system nor functioning optimally.³⁹ The PRC's national development zoning plan—the National Main Function Zoning Plan,⁴⁰ which the State Council issued in 2010—and the National 12th Five-Year Plan for Environmental Protection (2011–2015) assign to eco-compensation a central role in equalizing economic development and environmental protection across the country. Also, in 2010, the State Council listed researching and drafting a national eco-compensation regulation in its legislation plan.

The 2012 report to the 18th CCCPC (2012–2017) called on the government to “accelerate the establishment of [an] eco-compensation mechanism.”⁴¹ In April 2013, the head of the NDRC delivered a report to the Standing Committee of the National People's Congress, which stated that the process of developing the national eco-compensation regulation should be accelerated (footnote 2).

As of 2013, three national laws—(i) the Forest Law, (ii) the Law on the Prevention and Control of Water Pollution, and (iii) the Water and Soil Conservation Law—have established only the principle of eco-compensation. The 1998 amendment to the Forest Law provides that the government must create a national forest eco-compensation fund which can be used only for managing designated forests and that the State Council must specify how the fund is managed.⁴² The Law on the Prevention and Control of Water Pollution provides that the government must establish an eco-compensation mechanism to protect sources of drinking water and the upper reaches of rivers, lakes, and reservoirs.⁴³ The Water and Soil Conservation Law assumes that there is a national eco-compensation system and provides that the government must bring eco-compensation for water and soil conservation into it.⁴⁴

The PRC's national development zoning plan—the National Main Function Zoning Plan, which the State Council issued in 2010—and the National 12th Five-Year Plan for Environmental Protection (2011–2015) assign to eco-compensation a central role in equalizing economic development and environmental protection across the country.

³⁷ Central Committee of the Communist Party of China (CCCPC). 2005. CCCPC's Suggestions on Making the 11th Five-Year-Plan of China. <http://www.hnfgw.gov.cn/hgzgh/gjgh/19306.html> (in Chinese).

³⁸ CCCPC. 2007. Report of the 17th CCCPC. http://www.gov.cn/ldhd/2007-10/24/content_785431.htm (in Chinese).

³⁹ China Council for International Cooperation on Environment and Development (CCICED). 2010. Ecosystems and China's Green Development. *CCICED Annual General Meeting 2010*. pp. 181, 186. The program and all documents of the CCICED Annual General Meeting 2010 can be found at http://www.cciced.net/encciced/event/AGM_1/2010AGM/proceedings/201205/PO20120524369065861990.pdf

⁴⁰ The plan sets 2020 as the target year for achieving its objectives, but the goal for the long run is for the plan to remain in effect indefinitely.

⁴¹ CCCPC. 2012. Report of the 18th CCCPC. <http://cpc.people.com.cn/n/2012/1118/c64094-19612151.html> (in Chinese).

⁴² Standing Committee of the National People's Congress of the PRC. Forestry Law of the People's Republic of China. Adopted on 20 September 1984, as amended on 29 April 1998. Article 8 (6). Unofficial English translation available at <http://www.asianlii.org/cn/legis/cen/laws/flotproc367/>

⁴³ Standing Committee of the National People's Congress of the PRC. Law of the People's Republic of China on Prevention and Control of Water Pollution. Adopted on 11 May 1984, as amended on 15 May 1996 and on 28 February 2008, and came into force on 1 June 2008. Article 7. Unofficial English translation available at <http://faolex.fao.org/>

⁴⁴ Standing Committee of the National People's Congress of the PRC. Law of the People's Republic of China on Water and Soil Conservation. Adopted on 29 June 1991, as amended on 25 December 2010, and came into force on 1 March 2011. Article 32. Unofficial English translation available at <http://faolex.fao.org/>

The central government ministries that administer the Forest Law, the Law on the Prevention and Control of Water Pollution, and the Water and Soil Conservation Law have issued policies and rules for eco-compensation, but these rules are relatively low in the national legal hierarchy. The sectoral rules provide a basis for implementing eco-compensation projects, but they do not clearly define the rights and responsibilities of all parties to eco-compensation in the context of property rights in land and natural resources. Existing sectoral rules do not provide adequate guidance on the standards and procedures that should be used to calculate and disburse eco-compensation payments or on how to monitor and evaluate eco-compensation's effectiveness, nor do they provide any basis for enforcement. While these laws provide a legal basis for eco-compensation pilot projects, they are resource-specific and do not provide the legal foundation for a comprehensive national eco-compensation system.

It was against this background that the NDRC started the process of preparing a national eco-compensation regulation involving ministries and a team of experts. The NDRC promoted the eco-compensation regulation process in 2009 with the first International Eco-Compensation Conference in Shizuishan, Ningxia Hui Autonomous Region in 2009 cosponsored by the NDRC and ADB, and the State Council included the eco-compensation regulation in its legislation plan in 2010. The 2011–2013 study provided a starting point for the process, produced a draft regulation that will be the basis for further consultation, and highlighted the fact that there will be significant challenges for harmonizing the eco-compensation regulation with existing laws and other legal instruments.

Moreover, the state continues to expand the scope of eco-compensation pilots and establish the needed legal mechanism for eco-compensation, as done by the amended Environmental Protection Law.⁴⁵ In more recent developments, the NDRC and other relevant departments jointly drafted Several Opinions on Establishing a Sound Eco-Compensation Mechanism and the Eco-Compensation Regulations (approved in 2016 by the State Council), which proposes the general framework and policy measures for establishing an eco-compensation mechanism.

The chapters that follow synthesize the findings of the 2011–2013 study with respect to interregional eco-compensation, eco-compensation in individual ecosystem types, and eco-compensation in the mining sector.

⁴⁵ Footnote 23, Article 31.

Interregional Eco-Compensation

The goal of interregional eco-compensation is not only to sustain the conservation of ecosystems and natural resources, but also to support and equalize economic and social development.

Interregional eco-compensation refers to horizontal eco-compensation arrangements that can be both interprovincial, between jurisdictions in two or more provinces, and between two or more jurisdictions within one province. Although the PRC has developed quite a bit of practical experience with interregional eco-compensation, there is essentially neither a legal basis for it nor any consensus on the optimal way to implement it.

Achieving sustainable development in the PRC will require coordination across all regions, and the central government has determined that eco-compensation is necessary to do this. Disparities in regional economic growth are the main impediments to realizing coordinated development throughout the country. These disparities have adverse impacts on consumption and on national economic growth in the short term, and they will certainly affect social equity and stability in the long term. The goal of interregional eco-compensation is not only to sustain the conservation of ecosystems and natural resources, but also to support and equalize economic and social development (footnote 18).

Most of the protected natural areas in the PRC are located in the less developed western provinces, while in the relatively more developed eastern part of the country there are increasing demands for the ecosystem services these protected areas provide. Under the National Main Function Zoning Plan, the government will restrict or prohibit economic development in all levels and categories of legally established natural reserves and other key ecological function areas. If the western provinces where these ecological function areas are located are not compensated for the development opportunities they must forego to provide ecosystem services for the rest of the country, and if the rest of the country benefits freely from these ecosystem services without paying for them, the economic development gap between the western and eastern provinces will gradually widen. The central government intends to use interregional eco-compensation as a primary tool for equalizing economic development across the country.

The provision of the amended Environmental Protection Law that requires the state to establish interregional mechanisms to prevent and control pollution and ecological damage does not specifically refer to interregional eco-compensation as a tool for doing this.⁴⁶ The article of the amended law that requires the state to establish an eco-compensation mechanism does not explicitly mention interregional eco-compensation, either.⁴⁷ Nevertheless, these two provisions together provide a legal basis for including interregional eco-compensation in the national eco-compensation regulation.

⁴⁶ Footnote 23, Article 20.

⁴⁷ Footnote 23, Article 31.

The PRC's experience with interregional eco-compensation is primarily with large-scale, long-term national projects. On a smaller scale, there are interprovincial eco-compensation arrangements as well as other eco-compensation schemes within individual provinces (see the Watershed Eco-Compensation chapter). The 2011–2013 study examined two interregional eco-compensation projects: (i) the Beijing–Tianjin Sandstorm Source Control Program in Zhangjiakou City and Wulanchabu City and (ii) Eco-Compensation in the Shaannan–Qinba Biodiversity Ecological Function Area.

4.1 Funding for Interregional Eco-Compensation

The central government funds the Beijing–Tianjin Sandstorm Source Control Program primarily through vertical financial transfer payments that it makes through the provincial governments to Wulanchabu City in Inner Mongolia Autonomous Region and Zhangjiakou City in Hebei Province. Both cities are located in important national ecological function areas which are prohibited development zones. Desertification in the areas around these two cities is closely related with the sandstorms that affect Beijing and Tianjin each year. Both cities also receive subsidies from the Conversion of Cropland to Forest and Grassland Program (CCFGP), the national Forest Ecological Benefit Compensation Fund (see the Forest Eco-Compensation chapter), and the Graze for Grass project (see the Grassland Eco-Compensation chapter). Independent of the Beijing–Tianjin Sandstorm Source Control Program, the State Council established in 1995 a partnership arrangement between Beijing and Zhangjiakou City to support poverty alleviation in Zhangjiakou.

Similarly, the central government provides subsidies, which it channels through the provincial government, to county and city governments in southern Shaanxi Province under the CCFGP, the Natural Forest Protection Project (NFPP), and other financial transfer payments to support the nationally important ecological function area around Qinba Mountain where development is restricted. The provincial government and county and city governments in the area have invested substantially in conserving and restoring ecosystems, including the panda habitat, while provincial, county, and municipal revenues have declined because of the restrictions on development.

4.2 The Basis for Interregional Eco-Compensation

There is no independent basis for interregional eco-compensation. The basis for eco-compensation payments in interregional arrangements depends on the rates established under each national project that provides the funding (see the chapters on Forest and Grassland Eco-Compensation).

4.3 Using Interregional Eco-Compensation Payments

The individual projects that provide the funding for eco-compensation payments in interregional arrangements define what the payments may be used for (see the chapters on Forest and Grassland Eco-Compensation).

4.4 Administering Interregional Eco-Compensation

There is no independent administration of interregional eco-compensation. Each project that provides eco-compensation payments in interregional arrangements has authorities at all levels of government that administer the programs and the payments (see the chapters on Forest and Grassland Eco-Compensation).

4.5 Key Challenges for Interregional Eco-Compensation

The 2011–2013 study found that interregional eco-compensation under the Beijing–Tianjin Sandstorm Source Control Program and in the Shaannan–Qinba Biodiversity Ecological Function Area faces two common challenges:

Ecosystem protection and restoration require substantial resources, yet project subsidies are insufficient and existing eco-compensation rates are too low to cover the costs of ecosystem restoration and conservation.

- (i) Ecosystem protection and restoration require substantial resources, yet project subsidies are insufficient, which results in significant funding gaps for the local governments whose limited financial resources dictate that they are not able to contribute to eco-compensation.
- (ii) Existing eco-compensation rates are too low to cover the costs of ecosystem restoration and conservation.

Challenges that are specific to the Beijing–Tianjin Sandstorm Source Control Program are the following:

- (i) There is limited awareness of interregional eco-compensation among potential participants in both provinces and cities, and the distribution of responsibilities among existing participants is not clearly defined.
- (ii) It is difficult to raise farmers' income in the project areas due to inadequate overall financial support and lack of local government capacity to follow up on how payments are used.
- (iii) The basis for eco-compensation is relatively simple, there is no market-oriented participation, and existing eco-compensation mechanisms are not designed for the long term.
- (iv) The scope of eco-compensation is limited and the existing eco-compensation projects are not flexible enough to adjust to the varying conditions of different localities.
- (v) The regulatory regime is inadequate and enforcement is lax.

Challenges that are specific to interregional eco-compensation in the Shaannan–Qinba Biodiversity Ecological Function Area are the following:

- (i) The technical and physical requirements of managing ecosystem conservation and restoration and controlling pollution are significant in this mountainous area that frequently experiences natural disasters.
- (ii) Existing projects have not yet resolved long-term problems, including responses to natural disasters, support for ecological migrants, and the conflicts between conservation and local interests in using natural resources for economic development.

4.6 Key Lessons Learned for Interregional Eco-Compensation

The central government has indicated that interregional eco-compensation will play a major role in the implementation of the National 13th Five-Year Plan for Environmental Protection and in coordinating economic development across the country. The 2011–2013 study revealed that the experience to date with projects that provide interregional eco-compensation offers many lessons for developing the national eco-compensation regulation:

- (i) establishing a long-term national interregional eco-compensation mechanism based on governmental financial transfer payments and supplemented by market-oriented schemes;
- (ii) enabling and implementing interregional eco-compensation on the basis of location, distribution, and spatial organization of economic activities as well as environmental conservation to alleviate poverty and support coordinated sustainable development across all provinces;
- (iii) clearly defining development zones and their corresponding restrictions and prohibitions so that it is possible to determine who must contribute to eco-compensation and who is eligible to receive it;
- (iv) using interregional eco-compensation to provide support for ecological function areas where development is restricted in order to develop competitive, environment-friendly industries including, but not limited to, eco-tourism;
- (v) clearly defining the responsibilities of all institutions at all levels of government that are involved in implementing interregional eco-compensation;
- (vi) establishing an interprovincial coordination mechanism, chaired by the central government, to supervise interregional eco-compensation and resolve disputes;
- (vii) stipulating that interregional eco-compensation is based on the “polluter pays,” “user pays,” and “beneficiary pays” principles;
- (viii) harmonizing measures governing interregional eco-compensation with related laws and regulations;
- (ix) enabling horizontal transfer payments;
- (x) enabling a range of sources of funding for interregional eco-compensation including, but not limited to, special funds, resource taxes and fees, environmental certification and eco-labeling, and donations from domestic and international sources to reduce the financial burden on government;
- (xi) including provisions to ensure that fees and charges to support interregional eco-compensation can be collected from those who benefit from transboundary ecosystem services;
- (xii) providing guidance on determining site-specific interregional eco-compensation standards and rates that take into account aspects including, but not limited to, costs that are specific to key ecological function areas, costs of ecosystem management and restoration, costs of maintenance to conserve ecosystems, opportunity costs of ecosystem conservation, participants’ willingness to pay, and cost of living adjustments; and enabling subnational jurisdictions to use that guidance to set standards and rates that are adequate to cover the costs of eco-compensation under their own local conditions;
- (xiii) enabling a range of monetary and nonmonetary options for interregional eco-compensation payments including, but not limited to, cash payments, project investments, tax incentives, in-kind payments, follow-up industrial support, technical

- training, assistance with industrial planning, personnel training, and partnership assistance;
- (xiv) reforming the performance appraisal mechanism for local government cadres in key ecological function areas to focus on achievements in environmental protection and restoration, including targets for maintaining and increasing ecosystem value, and giving less weight to economic performance;
 - (xv) requiring monitoring and evaluation of the institutions responsible for implementing interregional eco-compensation and of the activities carried out with interregional eco-compensation funds, and auditing of the use of those funds;
 - (xvi) providing for continuing research on interregional eco-compensation to refine the way the law stipulates who pays, who receives payments, and what the basis for interregional eco-compensation should be; and
 - (xvii) requiring awareness raising, education, and dissemination of knowledge on interregional eco-compensation.

Watershed Eco-Compensation

5

The PRC described watershed eco-compensation, in a 2009 policy paper, as a mechanism that is used when the upstream part of a watershed gives up development opportunities and/or invests in environmental protection in order to provide the downstream part of the watershed with good quality water and an acceptable quantity of water.⁴⁸ In such cases, the downstream area of the watershed must compensate the upstream area of the watershed for providing the watershed's ecosystem services. Under existing watershed compensation mechanisms, authorities use established water quality standards as the basis for controlling water resource use and pollutant discharges.

Most of the PRC's experience with eco-compensation is directly or indirectly related to watersheds. Over the 10-year period beginning 1999, the PRC significantly increased the number of watershed eco-compensation projects and the amount of investment in them—from 8 watershed eco-compensation schemes in 1999, with an estimated value of annual transactions of \$860 million, to 47 programs by 2008, with annual transactions estimated at \$7.8 billion.⁴⁹ A global review of 205 schemes for payments for watershed ecosystem services in 2011 found that the PRC was managing 61 of them. For 2011–2013, the PRC's investments in watershed services initiatives rapidly expanded with the addition of 28 new programs.⁵⁰

As per latest report on the global state of watershed investment, the PRC continues to lead Asia and the world in watershed investment both in terms of program count and transaction values.⁵¹ With total government spending reaching almost \$11.5 billion in 2013, the PRC's watershed eco-compensation programs accounted for 94% of all investments in watershed services in the world in 2013 (Figure 2), and over 99% of all payments made in Asia.⁵²

As of 2014, watershed eco-compensation in the PRC is being implemented through intraprovincial mechanisms for watershed eco-compensation within one province, and interprovincial mechanisms for watershed eco-compensation arrangements between two or more provinces. Water quality assessments at agreed target sites are the usual basis for determining watershed eco-compensation payments. Eco-compensation payments from downstream beneficiaries of watershed ecosystem services support water conservation measures in upstream areas around the sources of rivers and the sources of drinking water. Each watershed eco-compensation project or program reflects the specific conditions of that watershed. The 2011–2013 study examined watershed eco-compensation mechanisms in the Xin'an and Huaihe river basins.

The People's Republic of China continues to lead Asia and the world in watershed investment both in terms of program count and transaction values.

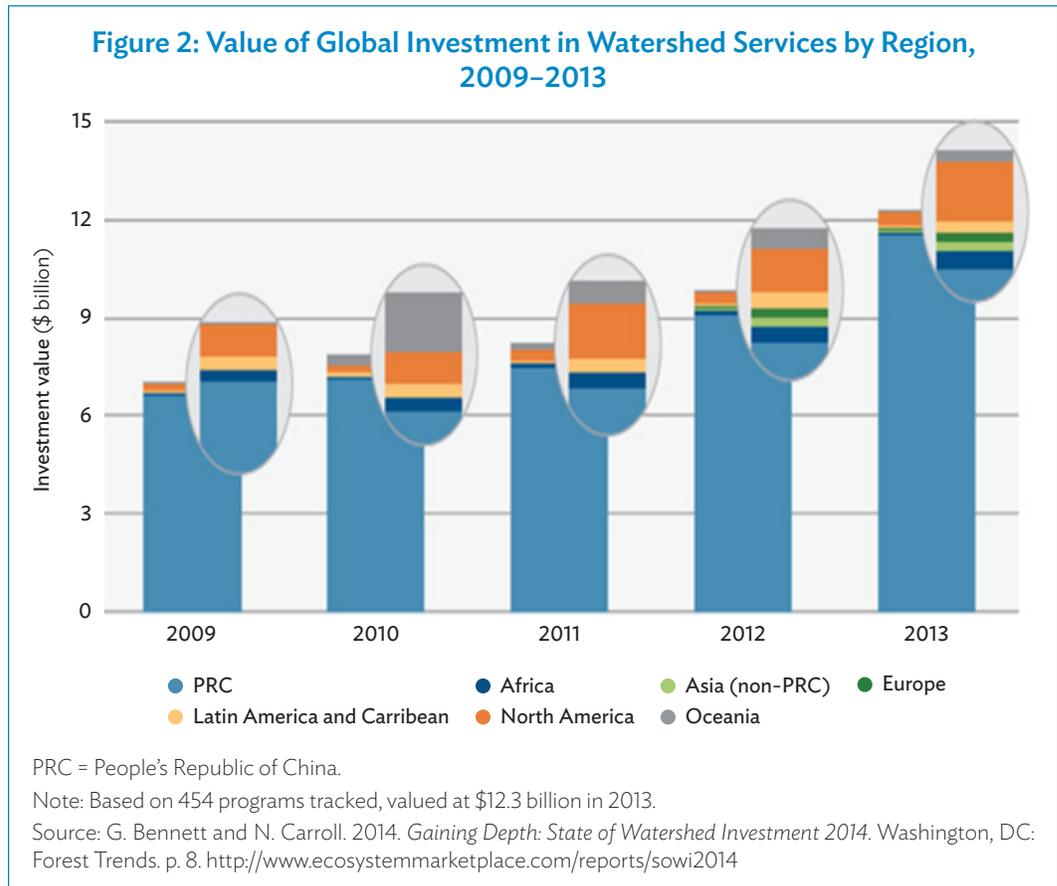
⁴⁸ Chinese Academy for Environmental Planning of MEP, Research Institute for Fiscal Science of MOF, and Policy Research Center for Environment and Economy of MEP. 2009. Framework Report on Watershed Eco-Compensation and Pollution Indemnity Policy Design. 30 July.

⁴⁹ T. Stanton, M. Echavarría, K. Hamilton, and C. Ott. 2010. *State of Watershed Payments: An Emerging Marketplace*. Ecosystem Marketplace. p. 26. http://www.forest-trends.org/documents/files/doc_2438.pdf

⁵⁰ G. Bennett and N. Carroll. 2014. *Gaining Depth: State of Watershed Investment 2014*. Washington, DC: Forest Trends. <http://www.ecosystemmarketplace.com/reports/sowi2014>

⁵¹ Footnote 50, p. 44.

⁵² Footnote 50, pp. viii and 41.



Recipients of watershed eco-compensation payments include those who protect and maintain ecosystem services and those who mitigate any degradation of ecosystem services. There are three categories of potential contributors of funding for watershed eco-compensation payments: (i) those who benefit from using the watershed and its resources, including industries, the agriculture sector, urban areas, hydropower infrastructure, tourism, and aquaculture, among others; (ii) those who impact water quality and/or quantity in a watershed, including industries and commercial businesses, cities, individual households, water recreation facilities, and other tourism activities; and (iii) the state.

The government at all levels is the principal source of watershed eco-compensation payments and also the main beneficiary of watershed eco-compensation. Under existing laws, regulations, and ongoing watershed eco-compensation programs, governments use two primary means to provide the funds for watershed eco-compensation: transfer payments and project subsidies. These payments and subsidies are mainly used for treating pollution and restoring and rehabilitating ecosystems in watersheds. Subnational governments are the primary recipients of transfer payments and subsidies for watershed eco-compensation, especially governments in the upstream areas of watersheds and those that have jurisdiction for areas that are sources of drinking water. Other beneficiaries of watershed eco-compensation include project contractors that invest in watershed conservation and treatment of polluted water.

Watershed eco-compensation is one aspect of overall water resources management. Responsibility for water resources management is divided among multiple central government ministries and subnational authorities. For example, two central government ministries—the Ministry of Environmental Protection (MEP) and the Ministry of Water Resources (MWR)—have separate watershed eco-compensation pilot projects.⁵³

5.1 Relevant Policies and Regulations

Several national laws, regulations, rules, and other legal documents govern water resources, particularly water quality and pollution control, reflecting the fact that responsibility for water resources management is divided among central and subnational government authorities. The China Council for International Cooperation on Environment and Development (CCICED) in 2006 noted that the National People’s Congress and the Chinese People’s Political Consultative Conference had identified eco-compensation for transprovincial river basins as the most urgent issue for eco-compensation to address.⁵⁴ In 2008, amendments to the Water Pollution Prevention and Control Law specifically included a provision enabling eco-compensation for rivers.⁵⁵ A 2010 amendment to the Water and Soil Conservation Law specified that an eco-compensation mechanism should be applied to conserve sources of drinking water, headwaters, and other sources of fresh water.⁵⁶ These laws provide the strong legal basis for the establishment of watershed eco-compensation in the PRC.

In 2011, the State Council issued the Regulation on the Administration of Taihu Lake Basin,⁵⁷ which requires upstream–downstream eco-compensation on the basis of water quality.⁵⁸ Also in 2011, the Ministry of Finance (MOF) and MEP issued a policy paper on establishing an eco-compensation mechanism for the Xin’an River between upstream Anhui Province and downstream Zhejiang Province. The Xin’an River Basin eco-compensation pilot was the first transprovincial watershed eco-compensation pilot in the PRC.⁵⁹

At the local level, various sectors at the provincial or municipal levels also have conducted research and pilot activities on transprovincial and/or transboundary watershed eco-compensation. Many provinces (including Fujian, Hebei, Henan, Liaoning, and Zhejiang) have promulgated local policies and regulations on watershed eco-compensation (Table 1), thereby effectively promoting the establishment of either a two-way or a one-way eco-compensation mechanism.

⁵³ Footnote 12, p. 3.

⁵⁴ CCICED. 2006. *Eco-Compensation Mechanisms and Policies in China*. Beijing, p. 78. <http://www.caep.org.cn/english/paper/CCICED-TF-Summary-Report-on-Eco-compensation-Policy-in-China.pdf>

⁵⁵ Footnote 43, Article 7.

⁵⁶ Footnote 44, Article 31.

⁵⁷ Taihu Lake is the third largest freshwater body in the PRC. Its watershed includes parts of Jiangsu, Zhejiang, and Anhui provinces, and Shanghai municipality (footnote 9, p. 758).

⁵⁸ M. You. 2012. Annual Review of Chinese Environmental Law Developments: 2011. *Environmental Law Reporter*. 42, p. 10486. Washington, DC: Environmental Law Institute. <http://www.epa.gov/ogc/china/you2011.pdf>

⁵⁹ Xinhua News Agency. 2011. Xin’an River Basin Launches the First Trans-provincial Water Environmental Compensation Pilot in the PRC. 22 March. http://news.xinhuanet.com/society/2011-03/22/c_121217326.htm (in Chinese).

Table 1: Policies and Regulations on the Watershed Eco-Compensation in the People's Republic of China

Province	Name of Policies and Regulations	Year Effective	Main Contents
Fujian	Implementation of the Forest Ecological Benefit Compensation from the River Downstream to the Upstream Region	2007	Provide compensation amount for forest ecological benefits from the downstream river area to the upstream region
	Administrative Measures of Special Fund for Fujian Min River and Jiulong River Basin Water Environment Protection	2007	Regulate how to use and manage a special fund for the Fujian Min River and Jiulong River Basin water environment protection
	Administrative Measures of Fujian Province for River Clean Water Engineering Project	2007	Clean water engineering construction
	Guidelines of Fujian Province on Preliminary Design Preparation for Small- and Medium-Sized Rivers Treatment Project	2011	Guide construction of river management project
	Plan of Fujian Province on Implementing "River Principal System"	2014	Improve the phenomenon of "four kinds of disorder," and strengthen river monitoring
Guangdong	Administrative Scheme of Guangdong Province on Water Quality of the River Section Meeting the Standard for Transcity above Prefecture Level	2008	Testing standards and methods for transboundary water quality
	Measures of Guangdong Province Eco-Compensation	2012	Include eco-compensation mechanism for water sources and capital accounting standards
	Measures for the Comprehensive Governance, Water System Connection Project and Fund Management in the Key Counties Related to Small- and Medium-Sized Rivers	2014	Administrative measures for the funds of a water body
Hainan	Interim Measures of the People's Government of Hainan Province on Establishing and Improving Eco-Compensation Mechanism in the Central Mountains	2008	Establish the principle, scope, goals, and main measures of an eco-compensation mechanism in the central mountains
	Regulations of Hainan Province on Ecological Environment Protection in Wanquan River Basin	2009	Protect the ecological environment of Wanquan River
Hebei	Notice on Measures for Assessment of Target Water Quality at Trans-City River Sections in the Major Rivers of the Ziya River System and Provisional Policy for Withholding Ecological Compensation.	2008	Pilot eco-compensation

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Table 1 *continued*

Province	Name of Policies and Regulations	Year Effective	Main Contents
Hebei	Circular on Several Issues about Eco-Compensation Fund Management of Ziya River System	2008	Regulate fund management
	Circular on the Transboundary Section Water Quality Target Responsibility Appraisal	2009	Eco-compensation applies when water pollutants go beyond acceptable levels as set in the water quality target
	Circular on Further Strengthening the Transboundary Section Water Quality Target Responsibility Appraisal	2012	Monitor and evaluate transboundary water quality
Henan	Interim Measures of Henan Province on Eco-Compensation of Water Environment	2008	Provide implementation rules on eco-compensation of the surface water environment
	Measures on Henan Province for Eco-Compensation of Haihe Watershed Water Environment (trial)	2009	Haihe watershed eco-compensation measures
	Interim Measures of Henan Province on Eco-Compensation Fund Management for Shaying River Basin Water Environment	2010	Regulate management of the funds
	Implementation Plan of Henan Province on Small- and Medium-Sized Rivers Improvement	2011	Strengthen management of small- and medium-sized river basins
	Administrative Measures of Henan Province on River Sand Excavation	2012	Manage river sand excavation
	Henan Urban River Clean Action Plan	2014	Strengthen management of an urban river
Hunan	Methods for River Eco-Compensation in Changsha (trial)	2012	Specify subject and object, scope of compensation, compensation criteria, and accounting method
Jiangsu	Methods of Jiangsu Province on Regional Compensation of Environment and Resources (trial)	2007	Implementation measures for water environment and eco-compensation
	Pilot Plan of Jiangsu Province on Taihu Watershed Regional Compensation of Environment and Resources	2009	Specific implementation methods on eco-compensation in Taihu watershed
	Methods of Jiangsu Province on the Construction and Management of Small- and Medium-Sized River Treatment Works	2011	Specify methods of river management
	Implementation Plan of Jiangsu Water Resources Department on Establishing a "River Principal System"	2011	Methods for long-term protection of rivers
	Circular on Issuing the Methods of Jiangsu Province on Management and Assessment of Key Rivers	2012	Specify assessment methods

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Table 1 *continued*

Province	Name of Policies and Regulations	Year Effective	Main Contents
Jiangsu	Interim Measures of Jiangsu Province on Evaluating Performance of Finance Special Fund for Small- and Medium-Sized River Improvement	2012	Put forward the methods to regulate the fiscal expenditure and performance evaluation
	Interim Measures of Jiangsu Province on Comprehensive Improvement Projects and Funds Management for Small- and Medium-Sized Rivers in Key Counties	2013	Manage project funds
Jiangxi	Measures of Jiangxi Province on Managing the Reward Fund of Ecological Environment Protection for Area "Five Rivers" and Dong River Source Protective Areas	2008	Specify scope of reward, method of reward, fund calculation, and method of usage
	Circular on Further Accelerating Governance Work of Small- and Medium-Sized Rivers	2010	Measures to speed up management
Liaoning	Circular on Issuing Implementation Measures on Eco-Compensation Policy of the Eastern Key Area in Liaoning Province	2008	Key eastern areas start the pilot watershed eco-compensation
	Methods of Liaoning Province on Outgoing Section Water Quality Target Evaluation and Compensation of Trans-Administrative Area Rivers (for discussion)	2008	Requirements for outgoing section water quality target evaluation of transadministrative area rivers
	Circular on Issuing Target Values for Outgoing Section Water Quality Evaluation in 2008	2008	Regulate assessment methods for water quality evaluation of 27 transadministrative region river sections
	Opinions on Implementing the Ecological Engineering Construction of Key River and River Way of Whole Province	2008	Define the opinions on next construction
	Circular on Issuing Target Values for Outgoing Section Water Quality Evaluation in 2009	2009	Define target values for outgoing section water quality evaluation of 9 main streams of Liao River and 18 other rivers
	Implementation Plan on Special Governance to Dumping Behavior toward River Way for Whole Provincial River Ecological Protection	2012	Ensure that the river environment is kept in good condition
	Circular on Water Pollution Control of Liaohe Basin and Ensuring River Water Quality Meet the Criteria and Agricultural Water Supply Safety	2013	Strengthen management of various pollutant-discharging units, strengthen regulation of river water quality, effectively ensure river water quality meets criteria and agricultural water supply safety

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Table 1 *continued*

Province	Name of Policies and Regulations	Year Effective	Main Contents
Shaanxi	Measures of Shaanxi Province for Ecological Environment Protection in Weihe Basin	2009	Principle of watershed eco-compensation
	Implementation Rules of Shaanxi Province on the Performance Evaluation for Fiscal Special Funds of Small- and Medium-Sized Rivers	2012	Put forward the specific measures for fund management
	Methods of Shaanxi Province for Management of River Sand Excavation	2012	Manage sand excavation
Shandong	Opinions on Implementing Eco-Compensation in the South of Yellow River at the South-to-North Water Diversion Project, Huaihe Basin and Xiaoqinghe Basin within Jiangsu	2007	Goals, principles, and methods of eco-compensation specific to pollution reduction
	Interim Measures of Eco-Compensation between the Upstream and Downstream Xiaoqinghe Basin	2010	Promote eco-compensation pilot in Xiaoqinghe Basin
	2014 Key Points of the Provincial Water Conservancy Work	2014	Implement requirements of the 18th National Congress of the Communist Party of China, protect the environment of rivers
	Interim Measures of Eco-Compensation for Water Environment Quality of Daguhe Basin	2014	Form the provincial compensation fund, set up 16 monitoring points
Shanxi	Circular on Further Strengthening the Planning and Implementation of Water Pollution Control for the Upstream and Midstream of Hai River and Yellow River Basin	2009	Each region of the Upstream and Midstream Basin of Hai River and Yellow River embark on eco-compensation
	Implement Eco-Compensation Mechanism of the Transboundary Section Water Quality Assessment for Surface Water	2009	Requirements and methods for eco-compensation of the transboundary section water quality assessment
	Guidance of Shanxi Province on Governance Engineering Design for Small- and Medium-Sized Rivers	2011	Guide governance of small- and medium-sized rivers
	Work Scheme of Shanxi Province on Implementing the Strictest Water Resources Management System	2014	Provide the strict use methods of water resources
Zhejiang	Interim Procedures of Zhejiang Province Financial Transfer Payment for Ecological Environmental Protection	2008	Financial transfer payment for environmental protection of city and county (city) at the sources of main water systems

continued on next page

Table 1 *continued*

Province	Name of Policies and Regulations	Year Effective	Main Contents
Zhejiang	Assessment Methods of Zhejiang Province for the Trans-Administrative Region River Section Water Quality Protection and Management (trial)	2009	Assessment system as well as rewards and punishment measures for the transcity, county (city) river section water quality protection and management within Zhejiang Province
	Regulation of Zhejiang Province on Rivers	2011	Strengthen river management, ensure flood control and unobstructed drainage, improve water quality and the environment, and play a comprehensive oversight function for rivers
	Regulations of Zhejiang Province on Wenruiang River Protection and Management	2011	Protect the historical culture of Wenruiang River, promote harmony between humans and nature
	Rules of Zhejiang Province on Treatment Projects of Small- and Medium-Sized Rivers and Fund Management	2011	Speed up the river improvement
	Scheme for Comprehensive Improvement of Pollution in Hangzhou Bay	2013	Strengthen water pollution control for Hangzhou Bay
	Plan of Zhejiang Province on Coastal Pollution Control	2013	Control coastal water pollution
	Circular on Further Strengthening Construction and Management of Treatment Project for Small- and Medium-Sized Rivers	2014	Intensify the watershed basin coordination, and guide the works of the next phase

Source: Compiled from the database of eco-compensation projects and programs in the People's Republic of China (Knowledge Hub on Green Development and Eco-Compensation. <http://www.ecocompensation.org>).

5.2 Funding for Watershed Eco-Compensation

Sources of funding for watershed eco-compensation may be divided into six categories: (i) fees levied on factories and other stationary sources of pollution; (ii) project subsidies; (iii) vertical financial transfer payments from the central government to provincial, county, and city governments; (iv) horizontal transfer payments between upstream and downstream governments at the same administrative level (e.g., province/municipality to province/municipality, county to county, and city to city);⁶⁰ (v) government revenues from other sources that each government has the discretion to choose; and (vi) market inputs under governments' guidance. Under existing laws, regulations, and watershed eco-compensation pilot projects, financial transfer payments

⁶⁰ Beijing Municipality and Hebei Province have a horizontal transfer payment arrangement for their Jing-Ji Water Resources Cooperation Project. The central government is not involved in this project.

and project subsidies that all levels of government provide are the primary funding sources for watershed eco-compensation.

Project-specific subsidy funding for watershed eco-compensation is usually used to rehabilitate and restore ecosystems and specific natural resources. The central government has invested substantially in building wastewater treatment plants and rehabilitating small watersheds in the upstream areas of the Han River, which provides the source water for the South–North Water Diversion Project. Shandong Province uses project subsidies to fund watershed eco-compensation (footnote 7).

The central government may make a vertical financial transfer payment to a provincial or municipal, county, or city government for watershed eco-compensation. In 2010, for example, MOF and MEP authorized a transfer payment of CNY46.2 million (\$6.9 million) to Huangshan City in the Xin’an River watershed in Anhui Province to establish and operate its watershed eco-compensation fund, which was formally launched in 2011.

Provincial governments also make vertical financial transfer payments to county and city governments, particularly those in the upstream areas of watersheds. Fujian, Guizhou, Hainan, Henan, Hebei, Liaoning, Jiangsu, Jiangxi, Shaanxi, Shandong, Shanxi, and Zhejiang provinces all have earmarked provincial eco-compensation funds and use vertical financial transfer payments for watershed eco-compensation. Deqing County in Zhejiang Province, Quanzhou City in Fujian Province,⁶¹ and Suzhou City in Jiangsu Province are among the subprovincial jurisdictions that also have earmarked eco-compensation funds.

Some provincial governments withhold financial transfer payments to encourage compliance with water quality standards.⁶² Liaoning Province, for example, withholds financial transfer payments to governments in upstream watershed areas when water quality in the Liao River does not meet standards. The province uses the funds it withholds to support eco-compensation payments to downstream areas. Hebei Province in 2008 began using the disincentive method of withholding eco-compensation payments to encourage compliance with water quality standards.⁶³ The province monitors two water quality factors—chemical oxygen demand (COD) and ammonia nitrogen (NH₃-N)—where the Ziya River enters and exits the province. When water quality where the river leaves the province is worse than water quality where the river enters the province, the provincial government withholds eco-compensation payments to the municipalities and districts along the river whose excessive discharges have degraded water quality.

In addition to financial transfer payments and project subsidies, provincial, county, and city governments have used a variety of other means to raise the funding necessary for their own eco-compensation programs. In February 2005, Deqing County in Zhejiang Province issued Implementation Opinions on the Establishment of Eco-Compensation Mechanisms in Western Towns. The county raises funds for eco-compensation by raising raw water charges to reservoirs

Some provincial governments withhold financial transfer payments to encourage compliance with water quality standards.

⁶¹ MEP. 2005. Quanzhou City Established Eco-Compensation Mechanism for the Jin River. 22 June. http://www.zhb.gov.cn/zhxx/gzdt/200506/t20050622_67930.htm (in Chinese).

⁶² Dai (footnote 9, p. 763) describes “using government-to-government transfer payments to address non-compliance with compulsory standards” as more akin to a legal liability approach, rather than eco-compensation.

⁶³ Hebei Province People’s Government. 2008. Notice on Measures for Assessment of Target Water Quality at Trans-City River Sections in the Major Rivers of the Ziya River System and Provisional Policy for Withholding Ecological Compensation. <http://www.hebei.gov.cn/article/20080616/998910.htm> (in Chinese).

or by allocating a portion of its water resource fees, annual land transfer fees, sewage charges, and agricultural development fund. Fujian Province in March 2007 initiated the Forestry Eco-compensation Program for Downstream Regions by Upstream Regions.⁶⁴ Quanzhou City in Fujian Province collects funds from hydropower revenues for eco-compensation for the Shanmei, Longmen Tan, and Nanping Dongfeng reservoirs. For Putian Dongzhen and Quanzhou Shibi reservoirs, Quanzhou City raises funds for eco-compensation by increasing raw water fees. Sanming City in Fujian Province charges an additional fee per liter of water used to fund eco-compensation for Dongyaxi Reservoir.

Existing programs and projects for forest eco-compensation contributed an estimated 73% of all funding for watershed eco-compensation in 2011; the Conversion of Cropland to Forest and Grassland Program (CCFGP) alone provided almost half of all funding for watershed eco-compensation in 2011 (see the Forest Eco-Compensation chapter).

Government financial allocations for watershed eco-compensation should reflect the difference between actual water quality and the target water quality standard, and should be determined based on costs of watershed management and pollution control in each watershed, in accordance with the local economic and social development situation.

5.3 The Basis for Watershed Eco-Compensation

The 2007 guidance for pilot eco-compensation projects, issued by the State Environmental Protection Administration (now MEP), recommends that government financial allocations for watershed eco-compensation should reflect the difference between actual water quality and the target water quality standard, and should be determined based on costs of watershed management and pollution control in each watershed, in accordance with the local economic and social development situation.⁶⁵ The legal instruments that Quanzhou City in Fujian Province and Deqing County in Zhejiang Province issued prior to 2007 do not specify the basis for eco-compensation.

Under the measures that Liaoning Province issued in 2008, the amount of eco-compensation is based on the costs for river water quality management and pollution control. Liaoning Province monitors monthly one water quality indicator, i.e., COD. The compensation rate is based on the degree to which the COD concentration exceeds water quality standards. In the Liao River, if the COD concentration is greater by up to 50% than the standard, the upstream city government must pay compensation of CNY500,000 (\$74,200). For each additional 50% increase above the standard, the upstream city government must pay additional compensation of CNY500,000 (\$74,200). In all other rivers in Liaoning Province, the compensation rate is CNY250,000 (\$37,100) when the COD concentration exceeds the standard by 50%.⁶⁶

Henan Province in 2010 issued Interim Measures for Eco-compensation for Water Environment, which applies to all watersheds in the province.⁶⁷ These provincial measures set standards for water quality and provide that the province must monitor two factors (COD and NH₃-N) to determine the basis for watershed eco-compensation. Henan Province uses two rates for calculating watershed eco-compensation: one based on the cost of pollution control and the other based on the cost of protecting the sources of drinking water. In implementing the eco-

⁶⁴ The 2007 Fujian Province People's Government policy paper entitled "Fund Management Methods for Water Environmental Protection in the Min and Jiulong Rivers" endorsed this mechanism.

⁶⁵ Footnote 13, p. 1. The experience from Henan and Hebei provinces is the basis of this 2007 SEPA Guiding Advice.

⁶⁶ Footnote 7, pp. 144–145.

⁶⁷ Henan Province People's Government. 2010. Interim Measures for Eco-Compensation for Water Environment. Zhengzhou.

compensation program, the provincial government guides upstream and downstream businesses and individuals on how to equitably share responsibility for water resources protection and liability for watershed eco-compensation.

In 2011, MOF and MEP's Department of Nature and Ecological Protection issued the Pilot Project Implementation Plan for Watershed and Aquatic Environment Compensation in the Xin'an River Basin and initiated the first interprovincial pilot watershed eco-compensation project.⁶⁸ The pilot project involves upstream Anhui Province and downstream Zhejiang Province. The project uses one transprovincial section of the river as the basis for assessing the amount of eco-compensation and monitors four water quality factors: total phosphorus (TP) and total nitrogen (TN), in addition to COD and NH₃-N. The basis for eco-compensation is determined through negotiations between upstream Anhui and downstream Zhejiang. The two provinces implement the project with central government supervision. For upstream Anhui, the basis for negotiation is the cost of protecting water sources. For downstream Zhejiang, the basis for negotiation is the cost of pollution control and water quality management. The pilot project's basic principle is "conservation first" to monitor, maintain, and improve water quality. Its objectives are to compensate reasonably and to use compensation to promote better environmental governance.

Under Fujian Province's 2007 Administrative Method for the Min River Basin and the Jiulong River Basin Water Environmental Protection Special Funds, the basis for calculating eco-compensation payments is similar to what Henan Province does.

Shandong Province in 2007 issued Suggestions on Promoting Eco-Compensation Pilot Projects in the Southern Yellow River for the South-to-North Water Transfer Project. This legal instrument governs watershed eco-compensation in the provincially administered Huaihe and Xiaoqinghe river basins. The basis for calculating watershed eco-compensation in Shandong Province is similar to what Henan Province uses. In both provinces, upstream users that pollute the water must compensate downstream users. Shandong Province pays eco-compensation for five types of activities that improve watersheds' capacity to provide ecosystem services: (i) converting cultivated land or fisheries into wetlands, (ii) relocating industries that have reached national discharge standards, (iii) implementing projects to enhance urban sewage treatment, (iv) building sewage and garbage disposal facilities in accordance with pollution control plans, and (v) adopting technology to reduce and prevent pollution. Shandong Province uses cash and in-kind payments for eco-compensation. In-kind payments include discounted loans and conservation awards.

Since 2007, the Jiangsu Provincial Department of Environmental Protection adjusts water quality objectives annually in accordance with national and provincial management requirements for Taihu Lake. The province issued an eco-compensation work plan for the Taihu Lake catchment in 2009 and is piloting a market for emissions trading.⁶⁹ In 2011, a State Council regulation

⁶⁸ Footnote 7, pp. 161–166.

⁶⁹ Jiangsu Province has established a "discharge paid-use" scheme as one measure to control pollution in Taihu Lake. A polluter must buy a permit from the appropriate government agency at a price the government sets. This differs from "cap and trade" schemes in which pollution permits are awarded or acquired through a bidding process. The provincial government established a limit on pollutant discharges, established prices for emission credits for different industries, and allows polluters to buy and trade these discharge permits. There are, however, no legal guidelines that exempt polluters that participate in the discharge paid-use scheme from also paying pollution discharge fees, and it is not clear how the government has managed this in practice. It is also not clear how the provincial government adjusts its pollutant discharge targets, and how it sets prices for the credits. As of 2014, Jiangsu Province's discharge paid-use scheme uses only chemical oxygen demand to measure pollution. Jiangsu Province set prices for total phosphorus and total nitrogen credits in 2011, but has not yet regulated a market for trading them (footnote 9, pp. 761–765).



Jim Leshan

Water source area in Longwu, Zhejiang Province

obliged the other jurisdictions in the Taihu Lake watershed—Zhejiang Province and Shanghai Municipality—to participate in eco-compensation for the Taihu Lake catchment as well.⁷⁰ The amount of eco-compensation paid in the Taihu Lake catchment under the Jiangsu Province work plan is based on the costs of water quality management and pollution control.

Zhejiang Province took the lead in making intraprovincial general transfer payments for watershed eco-compensation. In 2008, the provincial government initiated the Zhejiang Province Pilot Scheme of Financial Transfer Payments for Eco-environmental Protection in cities and counties that are located near major water sources. The provincial finance department uses water quality and air quality as indicators and uses two different methods to calculate and distribute payments.

Local governments below the provincial level are also actively exploring special transfer payments. Guangdong, Zhejiang, and other provinces have included funds for local forest eco-compensation in provincial government budgets. In addition, Guangdong has implemented eco-compensation

⁷⁰ State Council of the PRC. 2011. Regulation on Tai Lake Watershed Management. 24 August. <http://baike.baidu.com/view/6484787.htm?fr=aladdin> (in Chinese).



for the upstream area of the Dong River within its provincial jurisdiction by providing special funds for conserving the river's water resources and protecting its water quality.⁷¹

5.4 Using Watershed Eco-Compensation Payments

In general, provinces, counties, and cities that are implementing watershed eco-compensation programs use eco-compensation payments to cover the costs of ecosystem conservation and additional pollution treatment as well as to offset any losses of development opportunities in upstream watershed areas. Governments, however, also use watershed eco-compensation funds for purposes other than compensating upstream watershed areas, and local practice varies from place to place. All legal instruments on eco-compensation specify how payments are to be used.

Henan Province's 2010 Interim Measures, for example, provide that watershed eco-compensation payments are to be used for monitoring water quality and quantity and for capacity building, in addition to compensating upstream watershed areas and covering the

costs of water pollution treatment. The Henan Provincial policy paper on eco-compensation also stipulates that eco-compensation funds must be used only for the purpose of eco-compensation and must not be used to balance local government budgets.

Fujian Province's 2007 administrative measures for the Min and Jiulong river basins specify four uses for eco-compensation funds: (i) mitigation of industrial pollution, (ii) mitigation of the impacts of intensive animal farms, (iii) conservation of drinking water source areas, and (iv) other pollution control. Fujian's 2007 document includes an entire chapter on supervising the use of eco-compensation funds; i.e., the fifth chapter specifies the responsibilities of financial bureaus and environmental protection bureaus of all levels of the upstream governments at city and county levels, and assigns to local bureaus the task of assuring the actual implementation of projects funded by the eco-compensation scheme. If any of nine conditions listed in the document occur, the eco-compensation funds can be withdrawn. One of those conditions, for example, is if the proposed project does not start within 3 months after it is approved.

⁷¹ A. Zhou. 2011. The Dilemma of Dong River Eco-Compensation. *The First Finance and Economy Daily*. 20 July. <http://www.yicai.com/news/2011/07/946975.html> (in Chinese).

Deqing County in Zhejiang Province has used eco-compensation payments under its 2005 regulation to shut down 98 small but heavily polluting factories and to fund the establishment of domestic wastewater treatment facilities in the upstream water source areas.

5.5 Administering Watershed Eco-Compensation

At all levels of government, the environmental protection department and the fiscal authority jointly administer watershed eco-compensation. The fiscal authority is in charge of making transfer payments and withholding watershed eco-compensation funds, while the environmental protection department is in charge of reviewing and approving watershed eco-compensation projects and supervising how funds are used.

5.6 Key Challenges for Watershed Eco-Compensation

The 2011–2013 study identified the following challenges to effective watershed eco-compensation:

- (i) lack of legal support for watershed eco-compensation, which means that there is no long-term stability for eco-compensation mechanisms;
- (ii) lack of clarity about the relationships between funds for eco-compensation, charges for water use, and charges for sewage;
- (iii) inadequate theoretical basis and technical methods for calculating eco-compensation payments;
- (iv) oversimplified use of eco-compensation funds by governments at all levels;
- (v) lack of incentives for watershed eco-compensation; and
- (vi) insufficient financial management system.

5.7 Key Lessons Learned from Watershed Eco-Compensation Pilot Projects

ADB published two reviews in 2011 that presented observations about watershed eco-compensation and made recommendations for regulating it.⁷² One of the reviews, which focused on environmentally sustainable development in the PRC, noted that the central government has been promoting eco-compensation to solve environmental problems including catchment protection and rehabilitation of degraded watersheds.⁷³ This review highlighted the risk that, with government at all levels as the primary buyer of watershed ecosystem services, the private sector would be crowded out. The other review, which focused on watershed eco-compensation, recommended that a national regulatory framework should focus on principles and desired outcomes, rather than on operational details.⁷⁴ Doing this would allow policy makers and administrators the discretion to use eco-compensation in combination with other regulatory

A national regulatory framework [on watershed eco-compensation] should focus on principles and desired outcomes, rather than on operational details.

⁷² Q. Zhang, R. Crooks, and Y. Jiang. 2011. *Environmentally Sustainable Development in the People's Republic of China: Visions for the Future and the Role of the Asian Development Bank*. Manila: ADB; footnote 12.

⁷³ Footnote 72, p. 17.

⁷⁴ Footnote 12, p. 23.

approaches that support the conservation and sustainable use of ecosystems and the natural resources they contain. This recommendation is consistent with the findings of the 2011–2013 study. Following the recommendations of the 2011 ADB reviews and the 2011–2013 study would mean that the national eco-compensation regulation should complement and strengthen existing regulatory frameworks and institutions, not create regulatory and administrative conflicts, and be flexible enough to allow authorities to adapt on the basis of the country's evolving experience with watershed eco-compensation.⁷⁵

The 2011–2013 study found that provincial, county, and city regulations governing watershed eco-compensation and experience with implementing them provide several lessons that should be considered in developing the national eco-compensation regulation. Some of the issues addressed by subnational regulations that are of particular interest for national regulations include procedures for approving project subsidies and provisions on how to use eco-compensation funds and how to supervise their use. One example of such a subnational project is the Jing-Ji Water Resources Cooperation Project between Beijing Municipality and Hebei Province (footnote 60). This project is based on horizontal transfer payments. Beijing Municipality and Hebei Province jointly identify watershed protection projects; the Beijing municipal government provides funding for these projects; Hebei Province implements the projects; and Beijing and Hebei jointly monitor the impacts of the projects.

The lessons for watershed eco-compensation that the 2011–2013 study identified indicate that the national eco-compensation regulation should do the following:

- (i) Distinguish between intraprovincial mechanisms for watershed eco-compensation within one province and interprovincial mechanisms for watershed eco-compensation arrangements between two or more provinces. Interprovincial watershed eco-compensation should be based on an agreement between the provincial governments that stipulates the standards for water quality and/or quantity. Under such agreements, upstream and downstream governments should have equal rights and responsibilities.
- (ii) Clearly define who is eligible to receive watershed eco-compensation payments and who should contribute funds to support them.
- (iii) Provide guidance for determining the eco-compensation rate. Several recognized valuation methodologies make it possible to calculate eco-compensation costs on a monetary basis. These methodologies include the market value method, the opportunity cost method, recovery and protection cost method, shadow project method, human capital approach, and the willingness-to-pay method. Environmental cost-benefit analyses can be used to formulate a rate for intraprovincial watershed eco-compensation. The national eco-compensation regulation should provide that rates for interprovincial watershed eco-compensation must be determined through consultation between the upstream and downstream governments, and must include consideration of costs of pollution control, water quality management, development, sewage treatment, and erosion control. The national regulation should specify that upstream and downstream governments have the flexibility to use other appropriate valuation methodologies and to base eco-compensation rates on other types of costs that may be specific to a particular watershed.

Environmental cost-benefit analyses can be used to formulate a rate for intraprovincial watershed eco-compensation.

⁷⁵ Footnote 12, pp. 19 and 25.

- (iv) Permit the use of a range of eco-compensation modes, including monetary payments, preferential policies, and market-based mechanisms. The national eco-compensation regulation should provide flexibility for authorities to use the eco-compensation modes that are most appropriate for each watershed.
- (v) Clearly define funding sources.
- (vi) Provide a range of options for how eco-compensation funds may be used. Options include, but should not be limited to, watershed conservation, environmental rehabilitation and restoration, and provision of specified watershed ecosystem services.
- (vii) Specify implementation arrangements including management and oversight authorities, monitoring the quality of watershed ecosystem functions, reporting requirements, and monitoring and evaluating the effectiveness of decisions about eco-compensation and their implementation.
- (viii) Provide for establishing interregional river section water quality assessment systems. The national eco-compensation regulation should require that MEP coordinate with the MWR and provincial, county, and city governments to designate interregional river sections. National regulations should also stipulate that MEP coordinate quarterly water quality assessments in transprovincial river areas, and that provincial governments be fully responsible for assessing water quality within their jurisdictions. In addition, national regulations should require the central government and provincial governments to publish the results of their water quality assessments.
- (ix) Establish online pollutant monitoring systems to complement watershed eco-compensation. Provincial environmental protection departments should be responsible for monitoring river water quality. Provincial water resource departments should be responsible for monitoring river water quantity and flow. Provincial environmental protection departments should approve monthly water quality indicators and post them online. For areas of rivers without online monitoring systems, provincial, county, and city environmental monitoring agencies should jointly monitor water quality indicators once a week. Monthly water quality indicators should be averages of all valid monitoring data.
- (x) Establish a watershed eco-compensation arbitration system to deal with disputes concerning eco-compensation decisions. The system should provide the right to initiate an administrative review, set time limits for an administrative decision on the review, set time limits for the People's Courts to issue any decisions that may be required, and provide for enforcing those time limits.
- (xi) Provide for liability including civil, administrative, and criminal liability for illegal behavior.

Forest Eco-Compensation

6



Daweishan Nature Reserve, Yunnan Province

Jin Leshan

The PRC has developed its forest eco-compensation policy and practice gradually over more than 30 years through a series of large-scale projects; the earliest was the North-Northeast-Northwest Protection Forest Project, which the Ministry of Forestry (now the State Forestry Administration or SFA) launched in 1978. This afforestation project covers almost half of the PRC's territory and will continue until 2051. In 1999, the SFA initiated the Beijing-Tianjin Sandstorm Source Control Program for the period 2000–2011, which aimed to increase forest cover and reduce soil erosion in an area of 458,000 square kilometers. The project began its second phase in 2013, which will continue until 2022, with a total investment of CNY87 billion (\$12.9 billion).⁷⁶ In 1998–1999, the SFA piloted the Natural Forest Protection Project (NFPP), which was designed to protect the upper reaches of the watersheds of the Yangtze River and the Yellow River using commercial forest operations to decrease deforestation.

Forest eco-compensation in the People's Republic of China is still principally in the form of financial subsidies rather than compensation.

⁷⁶ Xinhua News Agency. 2012. Beijing-Tianjin Sandstorm Source Control Program Phase II with Investment of CNY87 Billion. http://www.gov.cn/jrzq/2012-10/07/content_2238556.htm (in Chinese).

In December 2000, the NFPP was formally launched in 17 provinces, autonomous regions, and Chongqing Municipality.⁷⁷ The project area covers 70 million hectares (ha) of natural forests, which constitute more than half of the country's total 119.69 million ha of natural forests.⁷⁸ In 2010, the NFPP entered its second phase, which will continue until 2020, with a total investment of CNY144 billion (\$21.4 billion).⁷⁹ In January 2002, after 3 years of piloting, the State Council launched the Conversion of Cropland to Forest and Grassland Program (CCFGP). The objective of the project is to control soil erosion and desertification through afforestation.

Forest eco-compensation in the PRC is still principally in the form of financial subsidies rather than compensation. Nonetheless, forest eco-compensation may include combinations of monetary subsidies and one or more of the following nonmonetary support: (i) preferential policies, such as subsidized or low interest loans, tax relief, and increasing government investment particularly in underdeveloped areas; (ii) in-kind payments, such as food supplies, saplings and seeds, forest fire prevention equipment, and forest management and conservation facilities for farming households that convert their farmlands to forests; and (iii) technical training and other capacity-building assistance.

6.1 Relevant Policies and Regulations

Policies and related legal norms governing forest eco-compensation developed over time—from early practice, to policy preparation, to pilot trials, and then expanded implementation. The process has accompanied a gradual change in people's understanding of the role of forests in development, particularly the idea of sustainable development, and the establishment of scientific forest management systems.

In 1984, the central government formally promulgated the Forest Law of the People's Republic of China to make regulations regarding issues such as the right of using forest land and the ownership of forests, and to highlight the protection of interests for forest land users and forest owners. The 1998 amendment to the Forest Law clearly pointed out that the country set up its forest eco-compensation fund for the protection of ecological benefits and forest resources of special use, as well as for the creation, tending, protection, and management of forests. Hence, the Forest Ecological Benefit Compensation Fund was established, which the central government piloted beginning in 2001 and formally established in December 2004.

Subsequent measures stipulated fundamental rules and conditions for making subsidy payments. MOF and the SFA in 2009 issued the most recent legal instrument governing the fund called the Central Government Forest Ecological Benefit Compensation Fund Management Approach.⁸⁰

⁷⁷ Xinhua News Agency. 2003. The Natural Forests Protection Project. http://news.xinhuanet.com/ziliao/2003-05/29/content_891711.htm (in Chinese).

⁷⁸ SFA. 2011. *China National Progress Report to the UNFF Secretariat on the Implementation of NLBI and Other Relevant Resolutions*. For the period July 2006 to December 2010. 20 January. p. 8. http://www.un.org/esa/forests/pdf/national_reports/unff9/China.pdf

⁷⁹ State Council of the PRC. 2011. Implementation of the 2nd Phase of the Natural Forests Protection Project. http://www.gov.cn/jdhd/2011-05/20/content_1867876.htm (in Chinese). See also D. Liang. 2012. *Payment Schemes for Forest Ecosystem Services in China: Policy, Practices and Performance*. Wageningen, Netherlands: Wageningen Academic Publishers. p. 66.

⁸⁰ MOF and SFA. 2009. Central Government Forest Ecological Benefit Compensation Fund Management Approach. Entered into force on 1 January 2010. <http://xzly.forestry.gov.cn/8275/59540.html> (in Chinese).

National laws and regulations, however, do not have provisions that clearly define the concept and principles of forest eco-compensation. By 2011, 25 provinces, autonomous regions, and municipalities had established a forest ecological benefit compensation fund system in their jurisdictions to channel financial resources for eco-compensation from the Forest Ecological Benefit Compensation Fund.⁸¹

In 2012, the Management Regulations on the Forestry Subsidy Fund of the Ministry of Finance stipulated the average compensation standard for state-owned national public benefit forests and for those owned by collectives and individuals. In 2013, the Guidance about the Management and Protection of Public Benefit Forests in Natural Forest Protection Project Areas was introduced to adjust and improve the subsidy policy for the management and protection of forests. In 2014, the overall plan for the new round of returning farmland to forests was introduced, with the proposal of returning 5 million *mu* (about 333,333 ha) of farmland to forests.⁸² It marked the start of a new round of government efforts of returning farmland to forests.

In response to the relevant call and regulations of the CCCPC and the State Council about protecting and achieving sustainable development of forests, local governments have subsequently established regulations and procedures for forest eco-compensation based on the actual situation in the specific province. However, due to differences in conditions, such as the local economy and cultures, the time of launch and standards for the forest eco-compensation systems of different regions vary.

Since 1994, Guangdong Province has released various rules and regulations to facilitate and ensure the improvement of its forest eco-compensation mechanism, including the Guangdong Provincial Regulations on Forest Protection, Regulations of Guangdong Province on the Construction Management and Benefit Compensation of Ecological Public Benefit Forests, and Regulations of Guangdong Province on the Adjustment of Ecological Public Benefit Forests. In 2004, Beijing issued the Decision of the Communist Party of China (CPC) Beijing Municipal Committee and the People's Government of Beijing City to position the forestry sector of Beijing as public benefit forestry with ecological enhancement as the main purpose, to support sustainable development and the comprehensive development of the mountainous areas. In 2010, Fujian Province released the Interim Regulations of Fujian Province on the Management of the Forest Ecological Benefit Compensation Fund to determine that the same compensation standard would be implemented for public benefit forests at both provincial and national levels.

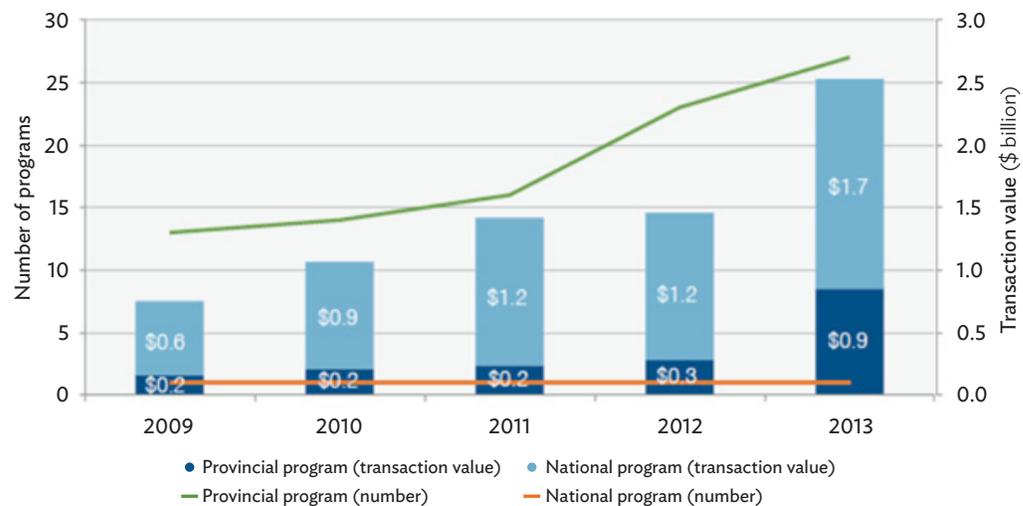
6.2 Funding for Forest Eco-Compensation

Forest eco-compensation in the PRC is central government-led, with MOF providing most of the funding. Contributions of the subnational government finance departments to forest eco-compensation vary from place to place. Sources of government funding for eco-compensation include collection of eco-compensation taxes and fees, collection of nationwide voluntary tree planting fees, financial subsidies, dedicated eco-compensation funds, project investments, and concessional loans, among other measures.

⁸¹ C. Li. 2011. 25 Provinces Have Established Their Forest Ecological Benefit Compensation. *China Finance and Economy*. 12 March. http://www.cfen.com.cn/web/cjb/2011-12/03/content_819359.htm (in Chinese).

⁸² A *mu* is a Chinese unit of measurement corresponding to 0.067 hectares; 1 hectare = 15 *mu*.

Figure 3: National and Provincial Forest Ecological Benefit Compensation Fund Programs in the People's Republic of China, 2009–2013



Source: G. Bennett and N. Carroll. 2014. *Gaining Depth: State of Watershed Investment 2014*. Washington, DC: Forest Trends. p. 47. <http://www.ecosystemmarketplace.com/reports/sowi2014>

Support for forest eco-compensation also comes from (i) entities and individuals who use and/or degrade forest resources and who must pay to restore and conserve them; (ii) civil society and the private sector; and (iii) market mechanisms. With the lack of an official definition of eco-compensation, civil society and private sector support for forest eco-compensation also includes, among other things, individual voluntary tree planting, nongovernment organizations (NGOs) providing capital and technology, and corporate social responsibility contributions in cash and in kind. The scope of the civil society and private sector support for forest eco-compensation is relatively limited.

Market mechanisms for forest eco-compensation include transactions between a buyer and a provider of forest ecosystem services, including quota trading and contractual arrangements. Market-oriented forest eco-compensation in the PRC is still in its start-up phase.⁸³

In the PRC, forest eco-compensation is essentially the implementation of the Forest Ecological Benefit Compensation Fund, which provides subsidies for designated national ecological forests,⁸⁴ or national public welfare forests, under the Forest Ecological Benefit Compensation, Natural Forest Conservation Program, and Grain to Green Program. The Central Government Forest

⁸³ Y. Wen. 2013. Theories and Practice of Forest Eco-Compensation. In Y. Qin et al., eds. *Developing Eco-Compensation Regulations in China: The Way Forward*. Beijing: Peking University Press. p. 107 (in Chinese).

⁸⁴ In 2003, the PRC completed a forest reform process and created a two-class system of classification-based forest management. The two classes are (i) commodity forests and (ii) ecological forests. Each class has different functions and provides different services. In 2006 and 2007, the SFA designated approximately a quarter of the forestland in the PRC as national ecological forests. Logging is prohibited in ecological forests, and their owners or managers receive subsidies from the central government. See L. Dai, F. Zhao, G. Shao, L. Zhou, and L. Tang. 2009. China's Classification-based Forest Management: Procedures, Problems, and Prospects. *Environmental Management*. 43 (6). pp. 1162–1173. June. <http://www.ncbi.nlm.nih.gov/pubmed/19030924>

Ecological Benefit Compensation Fund Management Approach provides a form of financial incentive conditioned on how each province performs in protecting its forests. The central government penalizes provinces that do not meet targets for maintaining forest ecosystems by reducing their financial transfer payments by 1% for the following fiscal year. Funds the central government saves by reducing subsidies to poorly performing provinces are used to reward provinces with better management performance.

The number and transaction values of programs protecting public benefit forests under the Forest Ecological Benefit Compensation Fund, particularly provincial-level programs, have grown significantly since 2009 (Figure 3).⁸⁵ These programs are in keeping with the stipulation of the amended Forest Law (1998) which states that compensation should be made to areas classified as “ecological public benefit forests,” or those forests managed primarily for their ecological functions such as protection of water source areas, prevention of soil erosion, and nature reserves.⁸⁶

6.3 The Basis for Forest Eco-Compensation

The underlying principle of forest eco-compensation is that anyone who benefits from forests and the products and services they provide, and anyone who destroys or degrades forests, must compensate those who conserve, restore, and maintain them.

Different sources of funding for forest eco-compensation subsidies use different rates. Forest eco-compensation subsidies from the Forest Ecological Benefit Compensation Fund under the NFPP are paid at different rates depending on whether the forest is state-owned or collectively or individually owned.⁸⁷ The Central Government Forest Ecological Benefit Compensation Fund Management Approach stipulates that subsidies in a state-owned national ecological public benefit forest are CNY75 (\$11) per ha per year. In collectively or individually owned national ecological forests, subsidies are CNY150 (\$22.30) per ha per year (footnote 87). For local-level ecological forests, the subsidy rate is CNY45 (\$6.70) per ha per year. Some provinces or local governments set up their own fund for local-level eco-forest compensation.

MOF and the SFA have also issued the Interim Measures on Management of Afforestation Pilot Subsidies under the CCFGP, which provides that the afforestation subsidy rate be CNY1,500 (\$223) per ha per year. Subsidies for returning degraded farmland to forest under the CCFGP include both cash payments and in-kind subsidies in grain. The cash subsidy standard is CNY300 (\$44.50) per ha per year, while the grain subsidy standard is 100 kilogram (kg) of grain per year for the Yellow River Basin and 150 kg of grain per year for the Yangtze River Basin. The subsidy rates, which the central government adjusted only once—in 2008—have not kept pace with rising costs.

The underlying principle of forest eco-compensation is that anyone who benefits from forests and the products and services they provide, and anyone who destroys or degrades forests, must compensate those who conserve, restore, and maintain them.

⁸⁵ Footnote 50, p. 46.

⁸⁶ Ecological public benefit forests are strictly protected; hence, logging and harvesting of forest products are heavily regulated. Central and local governments need to compensate owners of ecological benefit forests for their loss of opportunity to collect forest products. See C. J. Pierce Colfer, G. Dahal Ram, and D. Capistrano, eds. 2008. *Lessons from Forest Decentralization: Money, Justice and the Quest for Good Governance in Asia-Pacific*. London, UK: Earthscan.

⁸⁷ Z. Gu. 2012. Ecological Compensation Policies for the Public Welfare Forest in China. Presentation given at Chifeng. April. <http://hmfz.forestry.gov.cn/portal/zsb/dyxm/download/px01/%282%29Ecological%20Compensation%20Policies%20for%20the%20Public%20Welfare%20Forest%20in%20China.pdf>

Under the Beijing–Tianjin Sandstorm Source Control Program, the subsidy rates vary depending on the type of plant used to revegetate degraded areas. The highest rate is CNY3,000 (\$445) per ha. The actual costs of planting to rehabilitate degraded areas are greater than CNY15,000 (\$2,223) per ha.

6.4 Using Forest Eco-Compensation Payments

The Central Government Forest Ecological Benefit Compensation Fund Management Approach specifies that payments from the fund must be used to remunerate expenditures for planting, tending, protecting, and managing national ecological forests. Forest eco-compensation payments may be used in national ecological forests for afforestation, reforestation, conservation of forest resources, and restoration of forest ecosystem functions and services.

Recipients of forest eco-compensation include forest businesses and individuals who afforest or reforest, conserve forest resources, and restore forest ecosystem functions. Other users of forest eco-compensation funds include individuals and households whose interests are restricted because they participate in returning farmland to forests or in ecological migration.⁸⁸

Forest eco-compensation payments may be used in national ecological forests for afforestation, reforestation, conservation of forest resources, and restoration of forest ecosystem functions and services.

6.5 Administering Forest Eco-Compensation Funds

Since the principal disbursement method for forest eco-compensation funds is special financial transfer payments from the central government to subnational governments, MOF and the subnational departments of finance administer forest eco-compensation payments. Finance, forestry, and audit departments at all levels of government jointly supervise the use of the payments.

The departments of finance and forestry in most provinces, autonomous regions, and municipalities have issued measures for administering the use of the Forest Ecological Benefit Compensation Fund and have launched forest eco-compensation programs. The process of securing forest eco-compensation usually requires subnational forestry authorities to draft a proposal and submit it to the central government for approval and fund allocation.

6.6 Key Challenges for Forest Eco-Compensation

The 2011–2013 study found that, to date, the PRC's forest eco-compensation projects have generated ecological, economic, and social benefits. The study, nevertheless, found that there is a lack of comprehensive legal support for forest eco-compensation and that there is no well-established institutional system across all levels of government to define, manage, and supervise it. The challenges the study identified include the following:

⁸⁸ There is no official definition of “ecological migration,” but, in practice, it means resettling people living in areas where the environment is extremely fragile or heavily degraded to make possible intensive efforts to rehabilitate and restore those ecosystems and lift the people out of poverty as well.

- (i) Eco-compensation rates are low. Under the CCFGP, for example, the subsidy covers farmers' direct costs and opportunity costs, but not the cost of the risk they assume in converting their farmland to forest. Also, subsidy rates under each major forest project are the same for all areas each project covers, even though there are differences in the amount of income land can generate in different places. The Forest Ecological Benefit Compensation Fund pays subsidies at lower rates for state-owned forests than for collectively or individually owned forests, discriminating against individuals and entities that carry out forest rehabilitation and conservation in state-owned forests. These subsidy rates are the same for state-owned forests in the entire country.
- (ii) Funding sources are limited. Financial resources for forest eco-compensation come primarily from central government-funded projects, although provincial governments also do provide eco-compensation for province-level ecological forests.
- (iii) Eligibility for forest eco-compensation payments is not clearly defined. Under existing laws and regulations and the practices of the major national projects that are providing subsidies for forest conservation, it is difficult to clearly define the supply side of forest eco-compensation—the individuals and entities that maintain forest ecosystem services and are entitled to compensation for doing so, their property rights, and the amount of compensation they should receive. There is also no guidance for defining the scope of forest ecosystem services they should provide.
- (iv) Forest eco-compensation relies on project implementation; there is no long-term eco-compensation mechanism. Although farmers are enthusiastic about projects like CCFGP, they worry about what they will do when the project ends. If they cannot realize economic benefits from forests once the project finishes, problems like deforestation are likely to recur.
- (v) There are few options for channeling forest eco-compensation. Different financial conditions in different parts of the country require different approaches to forest eco-compensation. In some places, recipients of forest eco-compensation need technical assistance and other types of nonmonetary support more than they need cash subsidies, which do not necessarily provide the same opportunities for development that technical assistance does.
- (vi) A few market-based mechanisms for forest eco-compensation have emerged in practice in some areas, but they are completely unregulated.
- (vii) The lack of efficient supervision and evaluation mechanisms leads to inefficient use of funds. Procedures for administering forest eco-compensation, including fund management and mechanisms for supervision, investigating irregularities, and appealing decisions, among others, need to be created or strengthened.
- (viii) There is a lack of monitoring mechanisms. These are needed to systematically measure the improvement or enhancement in the delivery of the targeted ecosystem services.

The 2011–2013 study also identified several administrative problems with forest eco-compensation projects that all provinces, counties, and cities share, albeit at varying degrees: (i) allocation of the compensation fund is not timely; (ii) some subnational governments make payments to people and entities that are not eligible; and (iii) compensation is not transparent—although subnational governments are supposed to disclose who received payments, the amount of the payments, and the purpose of the payments, they seldom do. These problems greatly reduce the efficiency of forest eco-compensation, increase the cost of forest eco-compensation to the central government, and make it more difficult to ensure that forests continue to provide ecosystem services.

6.7 Key Lessons Learned from Forest Eco-Compensation Pilot Projects

To address these challenges, the PRC's national eco-compensation regulation should establish a long-term forest eco-compensation mechanism, which should (i) be based on a fundamental understanding of the complexity and diversity of the PRC's forest eco-compensation system, (ii) provide specific and detailed provisions on forest eco-compensation rather than broad ones, and (iii) better integrate eco-compensation into forest conservation and management.

In particular, the lessons for forest eco-compensation that the 2011–2013 study identified indicate that the national eco-compensation regulation should provide the following for forest eco-compensation:

- (i) Clarify the principles and basis for forest eco-compensation.
- (ii) Clearly define who is eligible for forest eco-compensation payments.
- (iii) Clearly identify a range of funding sources.
- (iv) Define rates for forest eco-compensation and provide the flexibility to adapt them to local contexts.
- (v) Specify how forest eco-compensation will be managed, supervised, evaluated, and adjusted, and what institution or institutions will be responsible for each function.

The national eco-compensation regulation should, in particular, enable a variety of different ways in which forest eco-compensation can be delivered. These may include, but are not limited to the following:

- (i) **State purchase of rights to forests and forest resources.** The central government should gradually implement this for small but key areas of national ecological significance, for example, nature reserves. Where outright purchase is not possible, the state should make arrangements to secure long-term use rights, with payments based on the income the land produces for the rights holders.
- (ii) **Contributions from subnational governments.** For areas that are important for local forest conservation and economic development, such as watersheds, subnational governments should also contribute to forest eco-compensation to complement and supplement the support the central government provides.
- (iii) **Market-based mechanisms.** Markets for forest ecosystem services are currently being piloted and should be established gradually. One type of market should enable payments for forest ecosystem services that are voluntary transactions between those who invest in maintaining forest ecosystem services (providers or “sellers” of those services) and those who want to use those services (beneficiaries or “buyers”). Carbon trading mechanisms are the other principal type of market that should be established and regulated.
- (iv) **Loosening restrictions on using forest resources.** This should be enabled where subsidies are not sufficient to mitigate conflicts between forest conservation and exploiting forest resources. For example, national regulations could enable provincial governments to allow managed logging in specified ecological forests.
- (v) **Preferential policies.** The national eco-compensation regulation should enable offsets that facilitate forest resource use in the context of sustainable forest development.

Grassland Eco-Compensation

7

The ecosystem services that grasslands provide contribute to the social welfare of a large number of people; hence, when grasslands are allowed to degrade, many people suffer the impacts. Grassland eco-compensation is used as an incentive for conserving grasslands. Those who use grasslands and consume grassland resources must compensate those who contribute to grassland conservation and/or forego development opportunities to ensure grassland protection. Those who adversely impact grassland ecosystems must pay to restore and rehabilitate those ecosystems. The central government, therefore, regulates grassland eco-compensation in an effort to ensure equity in the ways grasslands are conserved and used. Grassland eco-compensation is the second eco-compensation mechanism established in the PRC based on ecological elements, after the establishment of the forest ecological benefit compensation mechanism.

In 2003, the central government launched the Returning Pastureland to Grassland Project in eight western provinces and autonomous regions: Gansu, Inner Mongolia Autonomous Region, Ningxia Hui Autonomous Region, Qinghai, Sichuan, Tibet Autonomous Region, Xinjiang Uygur Autonomous Region, and Yunnan. The project regulates grazing in three ways in order to limit

Grassland in Tianzhu, Gansu Province



grassland degradation: (i) by banning it, (ii) by delaying it, and (iii) by introducing rotation grazing. Moreover, the project offers not only a feed grain subsidy for herders implementing a whole-year grazing ban and seasonal no-grazing, but also a subsidy for the construction of fences in grassland (to allow grasslands to recover).

Effective in 2011, the PRC launched a new eco-compensation program for grassland ecosystems, the Subsidy and Rewards for Ecological Protection of Grasslands Program, in eight provinces and autonomous regions. There were few grassland eco-compensation schemes prior to 2011 because the cost of operating them was high. In October 2010, the State Council decided to establish a subsidy for grassland conservation and ordered that the central government allocate CNY13.64 billion (\$2.0 billion) annually beginning in 2011 (the amount of funds increased year by year) to fund the subsidy in eight provinces and autonomous regions with major expanses of prairie grasslands. Implementation of the subsidy is supposed to combine short-term and long-term measures to ensure the effectiveness of grassland eco-compensation.

7.1 Relevant Policies and Regulations

The national legal instrument that governs grassland eco-compensation is the Subsidy and Rewards for Ecological Protection of Grasslands Program, which the State Council issued in 2010 and launched in 2011.

In January 2012, MOF and the Ministry of Agriculture issued the Interim Measures for the Management of Subsidy and Reward Fund of the Ministry of Finance for Grassland Ecological Protection to clarify the concepts and mechanisms of the subsidy and reward fund for grassland ecological protection. The measures also had specific regulations on aspects such as the scope and standard for the subsidy and reward, the disbursement and distribution of the fund, and the fund management and supervision, which enabled the policy of subsidy and rewards for grassland ecological protection to take a big step forward in the direction of the legal system for grassland eco-compensation.

In April 2012, the General Office of the Ministry of Agriculture and the MOF General Office also jointly issued the Notice on Further Promoting the Implementation of the Mechanism of Subsidy and Rewards for Grassland Ecological Protection to make arrangements for problems such as the imperfect grassland management and protection system in the process of implementing the subsidy and reward fund for grassland ecological protection; the incomplete basic information about people, grass, and livestock; regulation measures not being in place; subsidy and reward fund not being disbursed (or deposited) into accounts in a timely manner; and poor implementation of other related policies.

In November 2012, in order to strengthen the management of the fund and the project of subsidy and rewards for grassland ecological protection of MOF, establish and improve the reward and restraint mechanism, ensure the practical implementation of various polices for subsidy and rewards for grassland ecological protection, and effectively improve the efficiency of fund use, MOF and the Ministry of Agriculture issued the Measures for Performance Evaluation of the Subsidy and Reward Fund of the Central Finance for Grassland Ecological Protection. MOF carries out a performance evaluation based on elements such as the effect of grassland ecological

protection, local financial investment, and the progress of work, and then arranges reward funds every year to reward provinces with outstanding work and achievement.

In June 2014, MOF and the Ministry of Agriculture jointly issued the Regulations on the Management of the Subsidy Fund of the Central Finance for Agricultural Resource and Ecological Protection to make regulations regarding the purpose, scope of area, contents of expenses, compensation standards, timing and method of fund distribution, and performance evaluation of the subsidy and reward fund for grassland ecological protection.

There are no subnational legal instruments that govern grassland eco-compensation.

7.2 Funding for Grassland Eco-Compensation

The subsidy and reward fund for grassland ecological protection refers to the special fund established by MOF to enhance grassland ecological protection, transform the development mode of animal husbandry, promote the continuous income increase of herders, and maintain national ecological security. It includes the subsidy for the grazing ban, the reward for balanced grassland–livestock, the subsidy for improved varieties of forage grass, the comprehensive subsidy for the means of production for herders, and the reward for performance evaluation.

The main source of funding for grassland eco-compensation is financial transfer payments from the central government. In 2011, MOF allocated CNY13.64 billion (\$2.0 billion) for the subsidy and reward fund for grassland ecological protection in the eight major grassland grazing provinces, which involved a total of 3.75 billion *mu* (250 million ha) of grassland, accounting for more than 80% of the PRC's grassland area. In 2012, MOF further increased the investment and allocated CNY15 billion (\$2.2 billion) to expand the scope of policy implementation to 36 grazing and semi-grazing counties in five provinces, including Hebei. In 2013, MOF allocated almost CNY16 billion (\$2.4 billion) for the subsidy and reward fund for grassland ecological protection.⁸⁹

Provincial governments also provide funding which they raise by levying fees and other payments, which include grassland utilization fees, grassland operation and management fees, grassland cultivation fees, and grassland vegetation recovery payments. The fees are deposited into specific accounts that the financial departments of subprovincial governments administer, but which are not earmarked as eco-compensation accounts.

7.3 The Basis for Grassland Eco-Compensation

The central government is implementing grassland eco-compensation progressively to gain experience with levying compensation fees and collecting payments and then to review their experience and make any necessary adjustments. Grassland eco-compensation is based first on qualitative assessments of what is required before calculating the amount of eco-compensation

The subsidy and reward fund for grassland ecological protection refers to the special fund established by the Ministry of Finance to enhance grassland ecological protection, transform the development mode of animal husbandry, promote the continuous income increase of herders, and maintain national ecological security.

⁸⁹ The Department of Agriculture of the Ministry of Finance. 2013. The Policy of the Central Finance Supporting the Subsidy and Rewards for Grassland Ecological Protection. 30 October. http://nys.mof.gov.cn/zhengfuxinxi/bgtGongZuoDongTai_1_1_1_3/201310/t20131029_1004737.html (in Chinese).



Grassland in Chenbahe, Inner Mongolia Autonomous Region

payments. In addition to cash payments, grassland eco-compensation may include preferential policies and other incentives, technical assistance, and materials.

Under the Subsidy and Rewards for Ecological Protection of Grasslands Program, the central government sets the eco-compensation rate, but each participating province has the option whether or not to adopt that rate. The Inner Mongolia Autonomous Region, for example, uses three rates—for the eastern, central, and western parts of the province. The rate for the central part is approximately the same as the central government rate; the rate for the eastern part is higher; and the rate for the western part is lower. In Wulanchabu City, where grazing is prohibited, the eco-compensation rate is CNY90 (\$13.40) per ha per year. Incentives for rational grazing are CNY22.50 (\$3.30) per ha per year. The central government provides an annual subsidy of CNY150 (\$22.30) per ha for herders who plant a piece of land with pasture that produces hay for winter use.

The following are general standards for subsidy rewards for grassland ecological protection:

- **Subsidy for the grazing ban.** For grassland that is extremely or seriously degraded, or not suitable for grazing, the grazing ban and enclosure is implemented and MOF offers

a subsidy for the grazing ban to the herders at the standard amount of CNY6 (\$0.90) per *mu* per year for a 5-year subsidy cycle. After the expiration of the grazing ban cycle, the decision to continue implementing the grazing ban or transferring to the balanced grassland–livestock system and rational use is based on the status of recovery of the ecological function of the grassland.

- **Reward for balanced grassland–livestock.** The balanced grassland–livestock system is to be implemented in available grassland outside the grazing ban area. Based on calculations of the livestock carrying capacity of the grassland, the balance point between the grassland and livestock is rationally determined to ensure sustainable grassland use. MOF offers a reward for balanced grassland–livestock to herders who do not overgraze according to the standard subsidy of CNY1.50 (\$0.20) per *mu* per year. On the basis of balanced grassland–livestock, herders implement seasonal no-grazing and rotational grazing regimes. The reward for balanced grassland–livestock will be continued until the long-term mechanism for rational use of grassland is internalized by the herders, and they adopt best use practices as the norm.
- **Production subsidy for herders.** There are three types of subsidies:
 - (i) Subsidy for planting improved varieties of forage grass. To improve the initiative of herders planting forage grass and encourage areas suitable to carry out grass planting to enhance the capacity of supplying forage feed, MOF implemented the subsidy for planting improved varieties of forage grass at the standard amount of CNY10 (\$1.50) per *mu* per year.
 - (ii) Comprehensive subsidy for acquiring the means of production for herders. For herders who have contracted grassland to implement a grazing ban or balanced grassland–livestock and engage in the production of grassland animal husbandry, MOF offers a subsidy for the means of production such as diesel and forage grass used by herders at the standard amount of CNY500 (\$74.20) per household per year.
 - (iii) Subsidy for increasing the number of improved varieties of livestock in the grazing district. To encourage herders to transform their traditional methods of production and to enhance operational efficiency, MOF, which previously offered a subsidy only for cattle and sheep, has now expanded the coverage to include yaks and goats.

7.4 Using Grassland Eco-Compensation Payments

Most grassland eco-compensation payments are used for restoring degraded grasslands and providing direct subsidies to herders. Grassland ecological subsidy and rewards for herders cover subsidies when grazing is prohibited, incentives for balanced grassland–livestock, herders' production subsidies, and subsidies for educational development in pastoral areas including pastoral training.

There are a range of other purposes for which grassland eco-compensation payments may be used, including (i) subsidies for rational grazing and rest rotation grazing, (ii) constructing livestock shed and herding fence, (iii) training herders for alternative employment, (iv) establishing and maintaining forage grass reserves, (v) improving natural grasslands, (vi) subsidies for fine grass seed, (vii) grassland vegetation restoration, (viii) grassland fire prevention, (ix) control of rats and other pests, and (x) other grassland rehabilitation and conservation projects.

7.5 Administering Grassland Eco-Compensation

The finance departments, animal husbandry departments, and agricultural bureaus at the provincial, county, and city levels are responsible for administering grassland eco-compensation. The operation mechanism of disbursing the subsidy and reward fund for grassland ecological protection is to be arranged by the finance departments with the fund budget, whereas the allocation plan is determined by the finance departments, agricultural departments, and animal husbandry departments for allocating and disbursing the fund, supervising and inspecting the management of the fund use, and organizing the implementation of performance evaluation.

The agricultural and animal husbandry departments are responsible for organizing the implementation of the management, joining hands with the finance departments to formulate implementation plans, improving grassland contracting, dividing areas designated for the grazing ban and balanced grassland-livestock, verifying the area and herders receiving the funds, implementing the responsibilities of the grazing ban and balanced grassland-livestock, carrying out grassland ecology monitoring and regulation, regulating the process of implementation, proposing opinions on performance evaluation, etc.

7.6 Key Challenges for Grassland Eco-Compensation

The 2011–2013 study identified the following challenges to effective grassland eco-compensation:

- (i) The regulation system is weak. On the one hand, the local government is incapable of providing alternative livelihood support to herders who abandon grazing. In the grazing ban area, the subsidy only compensates for the value of the grassland; support measures to help herders change their careers and be reemployed successfully are lacking. On the other hand, regulatory work entails high cost (e.g., traveling expense, salary of grassland administrators) yet has low efficiency (i.e., when herders violate the regulation, grassland administrators can do nothing but impose a relatively low penalty, as stipulated in the Grassland Law).
- (ii) The compensation rate is low. With market prices for sheep continuously increasing over the past several years, herders who reduce flock size in the grasslands face substantial albeit short-term losses. Some herders cannot resist the high market price and short-term profits.
- (iii) Monitoring flock size is expensive. The pastures are oftentimes too large, and herders are widely scattered. Moreover, the number of animals raised by the herders can change drastically in a year. Some herders even herd their sheep at night to escape monitoring for overgrazing.
- (iv) The continuity of the grassland eco-compensation policy is uncertain. The grassland eco-protection subsidy and reward mechanism takes 5 years to complete a cycle. As such, the herders doubt the continuity of the grassland eco-compensation policy. If the subsidy and reward mechanism cannot be implemented continuously and effectively after 2015, the herders will not support it, and the effect and gains achieved by the policy will be adversely affected.

Wetland Eco-Compensation

8

The PRC has the largest area of wetlands in Asia, which stands at 53.6026 million ha (excluding the areas of paddy field), and with areas of natural wetlands and artificial wetlands accounting for 87.37% and 12.64%, respectively. It has protected approximately 44% of its wetlands with more than 570 wetland nature reserves, 46 Ramsar sites,⁹⁰ and over 700 wetland parks, including around 429 national wetland parks.⁹¹

Clear definitions of wetlands and who owns them are the foundation for wetland conservation and wetland eco-compensation. However, the PRC's existing land use classification does not include wetlands.⁹² Some wetlands are clearly state owned, but ownership of many wetlands is unclear and there is not yet any direction on how to resolve many questions about their ownership. The primary beneficiaries of wetland ecosystem services are the central government and provincial people's governments.

Several sectors are responsible for managing different types of wetlands. The Ministry of Agriculture administers meadow wetlands, the Department of Forestry administers shrub wetlands, and the Ministry of Water Resources manages lakes and wetlands associated with rivers. It is not clear which ministry or department should be responsible for wetland eco-compensation transfer payments. Glaciers are not considered wetlands; whether glacier protection will become a conservation priority is not yet known.

The PRC uses two criteria as the basis for monitoring the outcome of wetland eco-compensation: (i) whether the area of wetlands increases or at least does not decrease; and (ii) whether the biodiversity of wetlands increases or at least does not decrease. The biodiversity indicator usually includes the number of protected birds staying or stopping over in the wetland and the species of birds staying or stopping over in the wetland. If a wetland provides habitat for other protected wildlife, those species are also monitored. The results of monitoring have been used to assess the outcomes of wetland eco-compensation, but there is no independent, third-party monitoring yet. The wetland eco-compensation bureaus, which receive and use the eco-compensation payments, also conduct the monitoring and report results.

The People's Republic of China has the largest area of wetlands in Asia. However, the country's existing land use classification does not include wetlands.

⁹⁰ The Ramsar Convention is an international treaty for the conservation and sustainable use of wetlands. It is also known as the Convention on Wetlands. It is named after the city of Ramsar in Iran, where the convention was signed in 1971 (<http://www.ramsar.org>). The PRC National Report on the Implementation of the Ramsar Convention on Wetlands was submitted to the 12th Meeting of the Conference of the Contracting Parties, Punta del Este, Uruguay, 1–9 June 2015 (http://www.ramsar.org/sites/default/files/documents/2014/national-reports/COP12/cop12_nr_china.pdf).

⁹¹ SFA. 2014. *China Forestry Development Report 2014*. Beijing: China Forestry Press. <http://www.forestry.gov.cn/> (in Chinese).

⁹² China Land Use Status Classification. 2007. GB/T21010-2007. <http://www.tymy.gov.cn/show.aspx?id=224&cid=24> (in Chinese).



Jin Leshan

Xiaojiahe Wetland, Heilongjiang Province

8.1 Relevant Policies and Regulations

The government is still exploring wetland eco-compensation. As of 2014, the PRC does not have a wetland eco-compensation policy, or even national wetland protection regulations, although the central government is drafting a National Wetland Conservation Ordinance. The NDRC, in April 2010, officially launched the legislation process for the Eco-compensation Ordinance and, by December 2012, an outline of the ordinance had been drafted. The outline clarified the basic principles, main areas, compensation methods, rights and obligations, and safeguard measures for implementing eco-compensation; put forward specific implementation rules for various areas in ecological environment; and included wetlands in the scope of eco-compensation legislation, indicating that the establishment of wetland eco-compensation system in the PRC had entered a new stage of legislative preparation.

The central government issued the first national measure on wetland conservation in 2004.⁹³ In 2009, the CCCPC proposed launching pilot wetland eco-compensation projects.⁹⁴ In response,

⁹³ State Council of the PRC. 2004. Notice on Strengthening Wetland Conservation. Document No. 50. 5 June.

⁹⁴ CCCPC and the State Council of the PRC. 2008. Some Opinions on Promoting Steady Growth of Agriculture and Sustained Increases in Rural Incomes. 31 December. http://www.ce.cn/xwzx/gnsz/szyw/201201/30/t20120130_23027593.shtml (in Chinese). This document is usually referred to as “Document No. 1 2009.” One of the subheadings of this document is “Launching Proposed Pilot Projects on Wetland Eco-Compensation.”



Jin Leshan

Sanjiang Plain Wetlands, Heilongjiang Province

the central government first took measures to support wetland conservation. In May 2010, MOF and the SFA jointly issued the Implementation Opinions for Wetland Protection and Subsidy Work for 2010,⁹⁵ and they also established the Funds for Supporting the Conservation of Wetlands under the State Treasury, with the funds incorporated into MOF's annual budget. Also in 2010, the state set up the Central Financial Wetland Conservation Subsidy Fund and included it in the central government's budget for that fiscal year. Granting subsidies for wetland protection began in the same year. In October 2011, MOF and the SFA jointly issued the Interim Measures for the Administration of the Central Financial Wetland Conservation Subsidy Fund, which laid a solid foundation for strengthening wetland protection and establishing a wetland eco-compensation system.⁹⁶

The provisions on wetland conservation in existing laws and regulations are scattered and unsystematic, which makes them relatively ineffective. To fill this vacuum, 19 provinces have introduced their own wetland protection regulations, starting with the implementation of the Regulations of Heilongjiang Province on Wetland Protection in 2003, the first wetland-related

⁹⁵ MOF and SFA. 2010. Implementation Opinions of Wetland Protection and Subsidy Work for 2010. *Finance and Forestry*. Document No. 114. 31 May. http://www.gov.cn/zw/gk/2010-07/21/content_1660094.htm (in Chinese).

⁹⁶ MOF and SFA. 2011. Interim Measures for the Administration of the Central Financial Wetland Conservation Subsidy Fund. *Finance and Forestry*. Document No. 423. http://nys.mof.gov.cn/zhengfuxinxi/czpjZhengCeFaBu_2_2/201202/t20120220_629141.html (in Chinese).

regulation to be promulgated in the PRC. Some local governments have likewise begun to establish and implement their own system of wetland eco-compensation. These were Gansu, Hunan, Shaanxi, Guangdong, Inner Mongolia Autonomous Region, Sichuan, Tibet Autonomous Region, Jilin, Jiangxi, Zhejiang, Shandong, Beijing, Qinghai, and Yunnan. Other provinces subsequently followed suit.

The 2011–2013 study examined wetland eco-compensation mechanisms in two provinces: in Zhangye, Gansu Province, and in Yancheng, Jiangsu Province. Gansu Province, in the PRC's arid northwest, is economically underdeveloped and its wetland ecosystems are fragile. Jiangsu Province is an east-coast economic powerhouse that is reclaiming wetlands for agricultural development and faces severe challenges for conserving its wetland ecosystems. The conflicts between wetland conservation and economic development are conspicuous in Jiangsu Province and other relatively developed eastern areas. In Gansu Province and other provinces of the central and western regions, however, wetland conservation and economic development are being developed to be mutually reinforcing.⁹⁷

Jiangsu Province began wetland conservation efforts in 2004, issuing a provincial Notice on Strengthening Wetland Conservation after the State Council issued the national measure.⁹⁸ Jiangsu Province has not yet issued a provincial wetland conservation regulation, but is planning to develop one. Suzhou City in Jiangsu Province established its own eco-compensation fund in 2010 on a trial basis⁹⁹ and issued a municipal wetland protection regulation in 2011.¹⁰⁰

8.2 Funding for Wetland Eco-Compensation

Financial transfer payments from the central government are the major source of funding for wetland eco-compensation. Provincial, municipal, county, and city governments rely on these financial transfer payments for eco-compensation in key wetland ecological function areas. Wetland management agencies, farmers, and other people who live around wetlands depend on eco-compensation payments that local governments disburse from wetland eco-compensation funds they create with the financial transfer payments from the central government.

As of 2014, funding for wetland eco-compensation depends mainly on central government transfer payments; local governments can provide only partial funding. Commercial units and individuals also benefit from wetland ecosystem services and should provide funds for eco-compensation. The recipients of wetland eco-compensation are primarily local governments,

⁹⁷ A 2014 study concluded that forest and grassland ecosystems have been and will continue to be the main focus for implementing eco-compensation in Gansu Province. See HJI Group Corporation. 2014. Supplement Report II: Regulations, Policies and Institutional Framework of Eco-Compensation in Gansu Province. In *Building a Framework for Regulation and Policy Support System for Eco-Compensation in Gansu*. Technical assistance consultant's report. Manila: ADB.

⁹⁸ Jiangsu Provincial Government. 2004. Notice on Strengthening Wetland Conservation. Document No. 123. 30 December.

⁹⁹ Communist Party of China (CPC) Suzhou Municipal Committee, Suzhou People's Government. 2010. Opinions on the Establishment of an Ecological Compensation Mechanism (for Trial Implementation). Document Su Fa No. 35. 12 October; CPC Suzhou Municipal Committee, Suzhou People's Government. 2010. Interim Measures for the Administration of the Suzhou Ecological Compensation Special Fund. Document Su Cai Gu No. 35. 12 July.

¹⁰⁰ CPC Suzhou Municipal Committee, Suzhou People's Government. 2011. Wetland Protection Regulation. Document No. 22. 2 December.

individuals (in particular, farmers who live near wetlands), and conservation agencies that protect wetlands in nature reserves.

To secure funding for wetland eco-compensation, provincial finance departments submit applications to MOF, which determines the amount of funding it will make available for wetland eco-compensation subsidies and issues a budget document. Provincial and local governments provide supplemental funds. For example, in 2011, the central government allocated CNY7 million (\$1.0 million) for wetland conservation in Gansu Province, of which the provincial government allocated CNY4 million (\$594,000) for the national Dunhuang Nature Reserve and CNY3 million (\$445,000) for the national Zhangye Wetland Park. The central government allocates funding for wetland conservation in Gansu Province annually.

8.3 The Basis for Wetland Eco-Compensation

Since there are no specific operational wetland eco-compensation measures in the PRC, local governments who have actively piloted wetland eco-compensation made their own appropriate arrangements according to type of wetlands and adapted to local conditions. Gansu Province, for example, uses different eco-compensation rates for different types of wetlands. The compensation rate for marshes and swamps is CNY225 (\$33.40) per ha per year, and the rate for river and lake wetlands is CNY150 (\$22.30) per ha per year.¹⁰¹

There are about 46.8 million ha of natural wetlands in the PRC. If the central government were to use the Gansu Province wetland eco-compensation rates as a basis, it would have to allocate approximately CNY7.0 billion (\$1 billion) per year for wetland eco-compensation nationwide.

Suzhou City in Jiangsu Province has an arrangement under which villages with lakes receive CNY0.5 million (\$74,200) per year to protect their wetlands and control water pollution. Farmers who live in key wetlands and whose annual net income is below the average local net income receive wetland eco-compensation in accordance with standards established by the Suzhou city government for its eco-compensation fund.

8.4 Using Wetland Eco-Compensation Payments

Under a wetland eco-compensation system, taxes and fees are imposed on wetland development and utilization activities that cause destruction of wetland ecosystems. The system aims to eliminate the negative economic externalities caused by wetland development and utilization activities, limit the occurrence of wetland destruction, and raise funds for wetland ecosystem restoration, while offering financial, technical, and physical compensation as well as policy benefits to those stakeholders who either suffer loss of development opportunities due to wetland protection and/or incur costs for wetland protection. In so doing, a fair wetland conservation is promoted, the public and communities are encouraged to participate in wetland conservation and management, and a system for facilitating wetland ecosystem restoration is established.

A wetland eco-compensation system aims to eliminate the negative economic externalities caused by wetland development and utilization activities, while offering compensation as well as policy benefits to those stakeholders who either suffer a loss of development opportunities due to wetland protection and/or incur costs for wetland protection.

¹⁰¹ Gansu Province does not have a legal document that specifically governs wetland eco-compensation.

In the PRC, Ramsar sites have priority for central government subsidies for wetland conservation, followed by wetland nature reserves and national wetland parks in areas where the local governments emphasize wetland conservation, have adequate wetland management agencies, and have demonstrated that they have made progress with wetland conservation.¹⁰² The subsidies are designed to be used primarily for wetland restoration and for monitoring and surveillance.

In Gansu Province, funds allocated for marsh and swamp wetlands are used to make eco-compensation payments primarily for grazing restrictions and bans and maintenance expenses, and also for wetland restoration. The province uses funds allocated for river and lake wetlands for maintenance expenses. The province allocates CNY10.50 (\$1.60) per ha per year of provincial funds for expenses related to advertising, training, inspections, and reviews for all types of wetlands.

8.5 Administering Wetland Eco-Compensation

The management of wetland eco-compensation is handled by various departments, including the water resources departments, forestry departments, agriculture departments, and environmental protection bureaus, among others. Departments involved in wetland resources management and their main responsibilities are shown in Table 2. Since wetland resources are not under a unified management, there is unclear division of rights and responsibilities and low coordination ability. As various management departments usually act in their own ways, this has triggered confusion and conflicts in departmental interests and objectives. In order to achieve effective management, each department should clarify their respective rights and responsibilities and perform their duties.

The management of compensation funds requires that financial departments and wetland departments at all levels establish a separate account. Compensation fund users should have a special account and account for revenue and expenditures independently.

Table 2: Wetland Resources Management Departments in the People's Republic of China and Their Responsibilities

Wetland Resources Management Departments	Responsibilities
Water resources departments	Flood storage and regulation, construction and maintenance of water conservancy facilities
Forestry departments	Terrestrial flora and fauna, waterfowl
Agricultural departments	Aquatic flora and fauna
Public security departments	Security situation around wetlands
Environmental protection bureaus	Wetland water quality monitoring
Land and resources departments	Sand acquisition from wetlands

Source: Information is compiled by the author, Jin Leshan, based on (i) knowledge from work experiences with the People's Republic of China's State Forestry Administration, Ministry of Agriculture, and Ministry of Environmental Protection; and (ii) web search on the official website of other sectors.

¹⁰² This is a national policy for the use of central government funds. This policy does not apply to provinces and municipalities that do not have Ramsar sites but which have established their own wetland conservation funds, such as Suzhou City in Jiangsu Province.

8.6 Key Challenges for Wetland Eco-Compensation

The 2011–2013 study highlighted the following challenges in the design and implementation of wetland eco-compensation. These challenges have not created significant problems thus far because, unlike forests and grasslands, there is no large-scale wetland eco-compensation program. Before wetland eco-compensation can be implemented at the national scale, these challenges will have to be resolved:

- (i) The PRC's existing land use classification does not include wetlands. Ownership rights in wetlands that are not state owned are unclear, and there is no guidance on how to clarify them. Even though wetlands are not categorized in the national land use classification, eco-compensation could apply to wetlands according to the State Council and CCCPC documents, but there is no guidance on how this could be done.
- (ii) The PRC lacks systematic and operational laws and regulations on wetland eco-compensation. It still has no specific eco-compensation legislation, and existing wetland ecological benefit compensation still does not have a completely developed system. The absence of laws and regulations leads to the lack of effective legal protection; thus, the needs of ecological protection and construction cannot be met.
- (iii) In wetlands, multiple government agencies are responsible for managing the same piece of land. The lack of unified and centralized management has caused confusion in management, resulting in the emergence of many problems (such as conflicting management objectives or goals, inefficient management due to inappropriate segmentation of wetlands into separate management units, and unregulated ecosystems that become degraded due to poor management).
- (iv) Wetland eco-compensation will need to be differentiated for developed and less developed parts of the country.

The basic principle of wetland eco-compensation should be that the beneficiaries of wetland ecosystem services pay the costs of wetland eco-compensation. The central government will have to provide the greatest share of the funding for wetland eco-compensation.

8.7 Key Lessons Learned from Wetland Eco-Compensation Pilot Projects

The 2011–2013 study found that, although there is very limited experience with wetland eco-compensation, there are nevertheless lessons that should be considered in developing the national eco-compensation regulation:

- (i) The basic principle of wetland eco-compensation should be that the beneficiaries of wetland ecosystem services pay the costs of wetland eco-compensation. In the early stages of implementing wetland eco-compensation, the central government, as the representative of most of the beneficiaries of ecosystem services, will have to provide the greatest share of the funding for wetland eco-compensation. The central government should always provide funding for eco-compensation related to national wetland natural reserves.
- (ii) Provincial governments should be allowed to adjust the rates for wetland eco-compensation based on actual conditions in the province and should have the discretion to use differentiated rates that can be applied in different parts of a single province. There can be a unified rate for wetland eco-compensation as there is for forest eco-compensation and grassland eco-compensation, but provincial governments should be given the flexibility to adjust the rates for each wetland within the province according

- to its development status, its actual conservation status, the degree of difficulty in managing it, the human and material resources needed to manage it, and the value of the wetland ecosystem services.
- (iii) Administrative responsibility and a management framework for wetland eco-compensation should be clearly defined. One option would be that subnational forestry departments could manage wetlands. Another option would be to establish an interdepartmental committee that would be responsible for coordinating and managing all aspects of wetland eco-compensation across all of the departments that are responsible for different types of wetlands.
 - (iv) Whatever administrative entity is given responsibility for wetland eco-compensation, that entity and the financial department should maintain a separate account for it. Wetland eco-compensation fund users should also have dedicated accounts so that revenue and expenditure can be accounted for and audited independently.
 - (v) The three types of wetland eco-compensation recipients should be explicitly recognized: subnational governments; wetland management agencies; and farmers and others who live in and around wetland areas. It should be clearly stated that subnational governments should receive funds for wetland eco-compensation in the form of financial transfer payments for key wetland ecological function areas. The national eco-compensation regulation should enable the establishment of wetland eco-compensation funds at subnational government levels, and those funds should be the source of wetland eco-compensation payments for wetland management agencies and the people who live in and around wetland areas.
 - (vi) Wetland eco-compensation for subnational governments will be needed to promote local governments' commitment to conserving wetlands because key wetland ecological function areas are usually classified as restricted development areas, which means that industrialization and urbanization in those areas will be restricted, which, in turn, will decrease local revenue. Similar to the regulations under the National Main Function Zoning Plan, the national eco-compensation regulation should enable several different kinds of wetland eco-compensation, including tax rebates, as well as changes in the performance appraisal systems for local officials which focus on assessing progress with conservation and environmental protection in addition to criteria that measure progress with industrialization and urbanization. Nonmonetary wetland eco-compensation should be particularly enabled for economically developed areas where the opportunity cost of wetland conservation is high.
 - (vii) Wetland eco-compensation for wetland management agencies should emphasize enhancing the agencies' capacity for wetland conservation and management, and allow funding for the construction of wetland infrastructure, including research and monitoring systems, and for promoting wetland conservation through education and other means.
 - (viii) Wetland eco-compensation for local people should focus on off-site transfer or ecological migration, providing incentives for people to gradually move completely out of the core areas of wetland nature reserves and to also reduce the population in the buffer zones. Eco-compensation for off-site transfer should be long term in nature. It should focus on resolving all issues the ecological migrants would face in resettling and assuring their long-term survival and development. The national eco-compensation regulation should also enable "local transfer," under which people would receive a fee for participating in

the sustainable management of the wetland. In economically developed areas, where opportunity costs of wetland conservation are higher, monetary eco-compensation may not be a sufficient incentive for farmers in wetland areas to modify their agricultural practices or the financial investment required would be too costly for the government. In such areas, preferential policies to promote eco-agriculture, including providing farmers with technical assistance to adopt environment-friendly agricultural practices, could also ultimately reduce their dependence on eco-compensation payments.

- (ix) In addition to financial transfer payments and preferential policies, the national eco-compensation regulation should enable project-based wetland eco-compensation and facilitate the development of market mechanisms for wetland eco-compensation.

Implementation of wetland eco-compensation is not just about providing fund sources for the protection and management of wetland resources, but more about recognizing the value of wetlands' ecological benefits and solving the major problem in wetland utilization and development.¹⁰³ Implementing wetland eco-compensation will be a gradual, step-by-step process. It should give priority to wetlands that are Ramsar sites, nationally important wetlands, and wetland natural reserves and parks at or above the provincial level.

Implementing wetland eco-compensation will be a gradual, step-by-step process.

¹⁰³ Z. Li. 2007. On the Establishment of Eco-Compensation System from the Perspective of Wetland. *New Thinking*. 4. pp.114–119.

Marine Area Eco-Compensation

The People's Republic of China suffers serious problems from marine habitat degradation and frequent environmental hazards, huge pressures from land-based pollution and sewage, and serious coastal pollution.

The PRC is rich in marine biodiversity, with numerous marine and coastal ecosystems, including mangroves, coral reefs, coastal wetlands, seagrass beds, islands, bays, and estuaries. The marine environment and its resources provide an important foundation for the country's sustainable economic and social development, particularly the coastal regions. In 2008, the marine ecosystems of the PRC's coastal seas provided services valued at CNY1.034 trillion (\$153.5 billion),¹⁰⁴ or approximately 3% of the country's total gross domestic product for the year.¹⁰⁵ However, the PRC suffers serious problems from marine habitat degradation and frequent environmental hazards. There are huge pressures from land-based pollution and sewage, as well as serious coastal pollution in certain sea areas.

The PRC has been experimenting with marine eco-compensation for less than 10 years, however, and practical experience is limited. To date, marine eco-compensation initiatives have focused mainly on inland and coastal seas where ecosystems are seriously degraded.

9.1 Relevant Policies and Regulations

In 2006, the State Oceanic Administration issued the Opinions on Further Standardizing the Management of Development Activities in Marine Natural Reserves that first introduced the concept of marine eco-compensation. In 2008, the State Council adopted a national plan for marine affairs development that specifically called for research on marine eco-compensation. Until 2014, there was no national law that governed marine eco-compensation. The amended Environmental Protection Law does not specifically mention marine eco-compensation.

Relevant national policies and regulations on marine eco-compensation are divided into three categories:

- (i) **Policies on marine ecological environment construction and opportunity compensation.** In 2009, the State Oceanic Administration issued Several Opinions on Further Strengthening Marine Ecology Protection and Construction Work, and underscored the stipulation that government at all levels of the coastal areas, as the liability subject of marine ecological protection and construction, is responsible for the quality of the marine environment under its respective jurisdiction.

¹⁰⁴ S. Chen. 2013. Marine Ecological Capital Assessment: Methods and Application in China Seas (abstract). October. http://www.mitin-network.org/files/1148/4_symposium_Qingdao_2013/6_Abstracts/123_CHEN_Shang.pdf

¹⁰⁵ The PRC's 2008 GDP was CNY30.1 trillion (\$4.5 trillion). See Xinhua News Agency. 2009. China's GDP Grows 9% in 2008. 22 January. http://www.china.org.cn/business/news/2009-01/22/content_17169174.htm.

- (ii) **Policies on charges on marine exploitation and utilization and compensation for damages.** The Marine Environmental Protection Law of the People's Republic of China (1983 and revised 2014) indicates that responsible subjects causing damage and pollution to the marine environment should tackle the damage and compensate for the losses. Whoever causes heavy losses to the state by the destruction of marine ecosystems, marine aquatic resources, and marine reserves is requested to compensate for the losses by departments performing the right of supervision and administration of the marine environment on behalf of the state according to the Environmental Protection Law. As the department of comprehensive marine management, the State Oceanic Administration, on the basis of a lot of preliminary work, specially enacted and issued in 2014 the Procedures of Claim for National Losses of Marine Ecological Damages. This was done in order to effectively implement the Marine Environmental Protection Law and perform the relevant duties bestowed by the State Council on the claim for national losses of marine ecological damage.
- (iii) **Monitoring policies.** The Opinions on Further Strengthening the Monitoring and Evaluation of Marine Environment, issued by the State Oceanic Administration on 26 March 2009, pointed out that dynamic monitoring of projects in the ocean should be implemented, especially the reclamation projects, evaluation of changes in marine ecological environment, and the determination of the extent of ecological damage, thereby laying the foundation for ecological restoration and compensation.

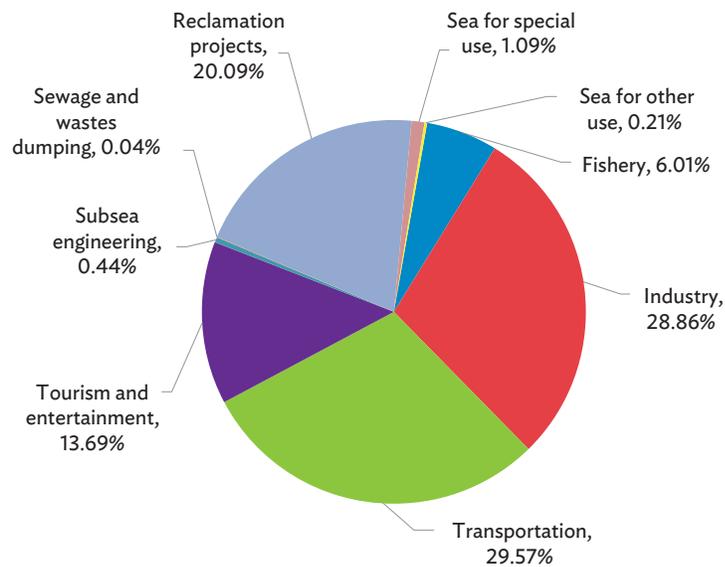
At the local front, Shandong Province is relatively comprehensive in terms of policies and regulations on marine eco-compensation. In 2010, Shandong issued the Interim Measures for the Management of Marine Ecological Damages and Loss Compensation. These measures are still provisional, but they have nevertheless been a significant contribution to the practice of regulating compensation for damage to marine ecosystems in the country. Fujian Province's 2002 Regulation on the Protection of Marine Environment and Hainan Province's 2008 Provisions on the Protection of the Marine Environment explicitly require the provincial governments to implement marine eco-compensation. Xiamen City in Fujian Province bases its marine eco-compensation initiatives on the 2009 Municipal Provisions on Marine Environmental Protection. Tianjin Municipality in Tianjin Province has a 2012 Regulation on the Protection of the Marine Environment that requires marine eco-compensation. Shenzhen City does not have a legal framework for marine eco-compensation, but the municipal government makes grants for marine eco-compensation projects.

In 2008, the State Council selected Weihai City in Shandong Province, Lianyungang City in Jiangsu Province, and Shenzhen City in Guangdong Province as pilot cities for marine eco-compensation. Of the three cities, Weihai is the most active in exploring and implementing marine eco-compensation.

9.2 Funding for Marine Area Eco-Compensation

Funding sources for marine eco-compensation are relatively limited. The primary source is fees that national government departments collect on behalf of the state from parties that damage marine ecosystems. There is no dedicated fund or account for these fees; they are deposited to the central government treasury. At the national level, however, the relationship between fees for marine eco-compensation and other marine administrative charges (such as the Charge for Sea

Figure 4: Percentage of Levy Charged for Each Type of Marine Use in the People's Republic of China, 2013



Source: China Oceanic Information Network. 2014. Communiqué on the Management of Marine Use 2013. 20 March. http://www.coi.gov.cn/gongbao/nrhaiyu/nr2013/201403/t20140320_30664.html (in Chinese).

Area Utilization, the Ocean Dumping Fee, and the Sewage Charge for Ocean Engineering) is not clear.¹⁰⁶ Individual provinces and cities have allocated local funds and partnered with the private sector to fund marine eco-compensation.

Based on the data available, the total levy of the marine use fee across the country increased from CNY7.9 billion (\$1.2 billion) in 2009 to CNY10.9 billion (\$1.6 billion) in 2013. The top five types of marine use were transportation, industry, reclamation, tourism and entertainment, and fishery (Figure 4).

9.3 The Basis for Marine Area Eco-Compensation

Shandong's provincial measures stipulate that fees to support marine eco-compensation must be determined on the basis of the environmental impact assessment (EIA). The government calculates the eco-compensation rate based on the degree of impact the EIA estimates the activity will have. Developers of projects and other activities that will affect the marine environment must pay the eco-compensation fee before the project can be approved. If the developer does not pay the eco-compensation fee, the provincial government terminates the project approval process. Weihai City implements Shandong's provincial measures. Shandong Province also annually allocates CNY15 million (\$2.2 million) from the provincial budget to develop six artificial fish reefs.

¹⁰⁶ The Marine Environment Protection Law of the PRC established these charges.

Shenzhen City also uses the EIA as the basis for determining marine eco-compensation fees. In Shenzhen, the municipal government, Yantian Port Group, and 31 other enterprises whose businesses rely on marine ecosystems have, since 2008, equally shared the costs of measures to restore marine ecosystems and enhance fisheries.

The text box presents an example of a project charged a marine eco-compensation fee.

The Xinglin Highway–Rail Bridge Marine Eco-Compensation

Xinglin Bridge is one of the few combined highway and railway bridge in the People's Republic of China. The 8.53-kilometer bridge, 7.48 kilometers of which span across the sea, is located to the west sea area of northern Xiamen and next to Xiamen Bridge. It is the longest and the fourth sea bridge to connect Xiamen Island to other parts of the country. Xinglin Bridge crosses over the marine protected area for white dolphins. It was opened to traffic on 1 September 2008.

The construction of the Xinglin Highway–Rail Bridge to Xiamen Island through a marine protected area was the first time marine eco-compensation was used for a protected area. In this case, the rate was not based on an estimate of environmental damage. Instead, the bridge developer and the provincial marine department agreed on a lump sum of CNY6 million (\$0.9 million), which the developer considered to be part of its corporate social responsibility contribution. The corporate payment was the first deposit to an eco-compensation fund, which continues to function. The municipal government supervised the use of the funds and, in so doing, strengthened its own authority and credibility because it used the eco-compensation funds transparently and effectively.

Sources: Shared Encyclopedia. Xinglin Bridge. <http://www.et97.com/view/1107060.htm>; What's On Xiamen. 2008. How to Get on Xiamen's Newest Bridge—Xinglin Bridge. 4 September. <http://www.whatsonxiamen.com/xiamen-info-380.html>

Marine eco-compensation refers to the payments from marine users or beneficiaries, in the course of lawful use of marine resources, to owners of the marine resources or parties that have incurred costs for the protection of the marine environment with the intent of supporting and encouraging behaviors that protect the marine environment.

9.4 Using Marine Area Eco-Compensation Payments

Marine eco-compensation refers to the payments from marine users or beneficiaries, in the course of lawful use of marine resources, to owners of the marine resources or parties that have incurred costs for the protection of the marine environment with the intent of supporting and encouraging behaviors that protect the marine environment.¹⁰⁷

Presently, the PRC's marine eco-compensation mechanism consists of four parts: (i) compensation for the marine environment itself—habitat compensation and resources compensation, such as the construction of artificial reefs and the establishment of marine nature reserves for the restoration and improvement of the marine environment as well as the increase and optimization of fisheries resources; (ii) compensation for individuals, groups, or regions for the protection of marine environment, and to reimburse them for lost development opportunities (e.g., subsidies granted to fisherfolk to reduce the number of fishing vessels, shift occupation, reduce production, or move fishing activities) and to implement the fishing vessel scrapping policy, among others;

¹⁰⁷ M. Wang and Z. Duan. 2008. An Exploration of Establishing the Marine Eco-Compensation System. *Chinese Fisheries Economics*. 26 (3). pp.12–15.

(iii) charging relevant fees, including marine use fees, fees for the increase and conservation of fishery resources on legitimate marine exploitation and utilization which lead to changes in the marine environment, such as ocean engineering, coastal construction, and dumping of waste into sea; and (iv) charging fees for marine pollution accidents, illegal exploitation, and utilization of marine resources and other activities which lead to damage of the marine ecosystem, such as compensation for oil spill pollution accidents.

Weihai City uses marine eco-compensation primarily for three activities: (i) releasing artificially hatched larvae into the sea; (ii) carrying out projects to restore the coastal environment in general and coastal wetlands in particular, marine ecosystem restoration, and sea island protection; and (iii) designating marine nature reserves. Shenzhen City uses marine eco-compensation payments mainly to enhance fisheries, but has also used them to fund the construction of artificial reefs and to carry out pilot projects that plant mangroves in suitable tidal flats.

Xiamen City also makes marine eco-compensation payments to offset development damage to mangroves by planting an equivalent area of mangroves at another suitable site. In Xiamen, where the government capitalized an eco-compensation fund with corporate payment, the funds were used to create a national nature reserve for rare marine species and for science education. Fujian Province, where Xiamen City is located, also makes eco-compensation payments to upstream users in the Jiulong River Watershed who ensure that the water flowing into the sea meets water quality standards.

Shandong's 2010 interim measures specifically provide that marine eco-compensation funds may be used for marine environment surveys, marine environment pollution control, damage mitigation, litigation regarding damages, and research and other related activities.¹⁰⁸

9.5 Administering Marine Area Eco-Compensation

The Shandong provincial oceanic and fisheries departments are jointly responsible for administering marine eco-compensation in the province. In Shenzhen City, the municipal oceanic department is responsible for monitoring and approving the use of marine eco-compensation funds, in accordance with the requirements of the respective approved EIA report. Likewise, in Xiamen City, the municipal oceanic department is responsible for supervising, monitoring, and evaluating projects carried out with marine eco-compensation funds.

9.6 Key Challenges for Marine Area Eco-Compensation

The 2011–2013 study found that Xiamen City and Shenzhen City face common challenges related to the inadequacy of the legal regime governing marine eco-compensation that include

- (i) the lack of standards for collecting fees to support marine eco-compensation and the need to clarify the relationship between fees for using the sea and marine resources and the fee for marine eco-compensation to avoid duplication in charging the fees;

¹⁰⁸ Shandong Province Department of Oceanic and Fishery. 2010. Notice on Issuing the Interim Measures for the Management of Marine Ecological Damages and Loss Compensation. 1 January. Sections 14, 15, and 17–21.

- (ii) the need to clarify the basis for eco-compensation payments; and
- (iii) the fact that the municipal governments have the power to collect fees to support marine eco-compensation only from projects that are related to the marine area.

In Xiamen City, an additional challenge is that there are no regulations for managing the marine eco-compensation fund.

9.7 Key Lessons Learned from Marine Area Eco-Compensation Pilot Projects

The 2011–2013 study identified many lessons from provincial and municipal experiences that should be taken into account in developing the national eco-compensation regulation:

- (i) Clearly define marine eco-compensation to distinguish it from existing fees and other administrative charges for activities that affect the marine environment, and specify how to administer marine eco-compensation in conjunction with the existing fees and charges.
- (ii) Clearly define the potential beneficiaries of marine ecosystem services and the potential recipients of marine eco-compensation payments. Due to the number of individuals and entities that carry out land-based, as well as marine-based, activities that potentially impact the marine environment, it is advisable to determine an equitable basis for limiting the number of potential recipients.
- (iii) Establish the legal basis for sources of funding for marine eco-compensation and expand the range of potential financing sources. Sources of funding should include, but should not be limited to, financial transfer payments, national bonds, fees for land-based as well as offshore activities that impact the marine environment, marine resources taxes, preferential credit, and grants and other donations from domestic and international sources. Because policy changes can affect the government subsidy component of marine eco-compensation, the national eco-compensation regulation should create mechanisms to ensure sustainable sources of funding.
- (iv) Establish a system to receive and manage funds for marine eco-compensation, including a national marine eco-compensation fund. The national eco-compensation regulation should require governments at subnational levels to open a special account to receive funds and disburse marine eco-compensation payments.
- (v) Establish clear standards and rules to use as basis for calculating marine eco-compensation payments, enable a range of activities for which they can be used, and provide the flexibility for subnational governments to adapt them to local situations. This should include, but should not be limited to, enabling the use of EIA as a basis for determining the amount of eco-compensation fees that projects and activities should pay, similar to the measures Shandong Province has adopted. Marine eco-compensation payments should aim to cover the opportunity cost of maintaining marine ecosystem services and should be flexible so that they can be adapted to the social, economic, and environmental conditions of each area where they are made.
- (vi) Establish a system to monitor and evaluate the effectiveness of the legal measures governing marine eco-compensation, the effectiveness of the institutions that administer marine eco-compensation, and the use of marine eco-compensation payments.

Marine eco-compensation payments should aim to cover the opportunity costs of maintaining marine ecosystem services and should be flexible so that they can be adapted to the social, economic, and environmental conditions of each area where they are made.

- (vii) Clearly define the authorities that will be responsible for administering marine eco-compensation at all levels of government, and create mechanisms to promote and maintain vertical and horizontal marine eco-compensation arrangements between all levels of government.
- (viii) Require economic valuation of marine ecosystem services, establish a national system to carry it out, and designate an institution to be responsible for administering the valuation system. The designated institution should also be responsible for establishing standards and procedures for valuing damage to the marine environment.
- (ix) Create and maintain a central database on marine eco-compensation that is accessible to those who are responsible for implementing it. The database should include information on valuation of marine ecosystem services and how to value damage to the marine environment.
- (x) Require planning and budgeting for marine eco-compensation at the provincial level, standardize procedures for managing expenditures, and require regular audits of all marine eco-compensation funds.

Mineral Resources Eco-Compensation

10

In terms of production value, the PRC's mineral sector is the second-largest in the world, after Australia.¹⁰⁹ The PRC has been the world's largest coal producer since the 1990s, producing nearly 3.9 billion tons of coal in 2014, representing 47% of global total coal yield.¹¹⁰ It is also the largest coal consumer, consuming more than half of the world's total coal.¹¹¹ Moreover, the country is the world's largest producer of tin¹¹² and produces 90% of the world supply of rare earth minerals, which are used in manufacturing mobile telephones and other electronic equipment.¹¹³ As of 2008, the PRC had more than 8,000 state-owned mining companies and more than 200,000 private ones.

The development of mineral resources is one of the driving forces for economic growth in the PRC, and mining has become a pillar industry in some provinces and municipalities. However, the unsustainable practice of mineral development will eventually lead to irreversible consequences such as resource depletion, environmental pollution (including water pollution and soil contamination), and ecological destruction (e.g., landslides and mudflows). The social cost of mineral exploration and extraction is often greater than the operational costs. A case study of coal mining in one district in Beijing, for example, found that the environmental loss from mining was far greater than the economic benefits it generated.¹¹⁴

In this context, despite the role of mineral development in the promotion of national income growth, it is necessary to consider providing eco-compensation for the problems due to mineral development in the process of income redistribution. Mining eco-compensation has not only become an important component of the national eco-compensation system in the PRC, but it has become one of the most difficult and complex parts as a result of the slow legal development of its framework, differing implementation approaches and methodologies at local areas, and the complex relationship between and among relevant stakeholders.

In terms of production value, the People's Republic of China's mineral sector is the second-largest in the world. The country has been the world's largest coal producer and coal consumer and is the world's largest producer of tin and rare earth minerals.

¹⁰⁹ International Council on Mining and Metals. 2012. *The Role of Mining in National Economies*. October. 20 pp. <http://www.google.co.th/url?sa=t&rct=j&q=&esrc=s&source=web&cd=6&ved=0CFEQFjAF&url=http%3A%2F%2Fwww.icmm.com%2Fdocument%2F4440&ei=1-psUo3jEciKrQfu3YGoCA&usg=AFQjCNEftErbSGk7sZfnlPLfYDFCmgXwxA&bvm=bv.55123115,d.bmk>

¹¹⁰ World Atlas. The Top 10 Coal Producers Worldwide. <http://www.worldatlas.com/articles/the-top-10-coal-producers-worldwide.html> (accessed 22 October 2016).

¹¹¹ BP. 2016. *Statistical Review of World Energy*. <https://www.bp.com/content/dam/bp/pdf/energy-economics/statistical-review-2016/bp-statistical-review-of-world-energy-2016-full-report.pdf>

¹¹² InfoMine. Mining in China. <http://www.infomine.com/countries/china.asp>

¹¹³ H. Lazenby. 2013. Rare Earths Producers on the Up as China Is Likely to Buy Next Month. *Mining Weekly*. 24 September. <http://www.miningweekly.com/article/rare-earths-producers-on-the-up-as-china-is-likely-to-buy-next-month-2013-09-24>

¹¹⁴ F. Li, X. Liu, D. Zhao, B. Wang, J. Jin, and Dan Hu. 2011. Evaluating and Modeling Ecosystem Service Loss of Coal Mining: A Case Study of Mentougou District of Beijing, China. *Ecological Complexity*. 8 (2). pp. 139–143.

10.1 Relevant Policies and Regulations

The PRC began in the 1980s to experiment with policy and legal measures governing eco-compensation in the context of mineral resources. After years of theoretical research and practical application, the central government developed several policies for mineral resources development including systems for compensating for the use of mineral resources, security deposits for mine rehabilitation, and eco-compensation payments. Since 1986 when the Mineral Resources Law of the People's Republic of China was issued, the central government has been regulating the development of mineral resources and eco-compensation in the context of mineral resources exploration and exploitation.

At the local levels, the local governments have adopted innovative measures ahead of the central policies to protect the eco-environmental conditions in mines, and these measures have gone through three stages: (i) collection of eco-compensation fees, (ii) placement of guarantee deposit, and (iii) comprehensive compensation.

In 1993, the State Council introduced an eco-compensation policy for the border regions of Shanxi and Shaanxi provinces, Inner Mongolia Autonomous Region, and the city of Baotou in Inner Mongolia Autonomous Region. By the mid-1990s, the State Council extended the policy to 145 counties in 14 areas, including Guangxi Zhuang Autonomous Region, Fujiang, and Jiangsu. The central government is developing an environmental management and ecological restoration mechanism for mining areas.

The State Council, in April 2006, approved pilot policy measures for the sustainable development of the coal industry in Shanxi Province.¹¹⁵ One important component of this scheme was to establish the Coal Sustainable Development Fund which was to be used, in part, for ecosystem restoration. Shanxi Province has since adopted a series of policies, regulations, and pilot projects on eco-compensation in the coal industry, in particular the 2007 Implementation Measures for the Collection and Use Management of Coal Sustainable Development Fund.

10.2 Funding for Mineral Resources Eco-Compensation

Following the 1993 State Council policy, subnational governments began the same year to levy eco-compensation fees for mineral exploration and exploitation activities. Provincial and city governments have invested financial resources in establishing mineral resource eco-compensation mechanisms, primarily by channeling funding for environmental restoration and protection projects. Mining companies also use their own funds to establish eco-compensation mechanisms including paying for the use of resources through resource taxes and land reclamation investments, post-closure mine rehabilitation, charges for mining waste, vegetation recovery payments associated with the productive life of a mine, compensation for trees and woodlands, and compensation for resettlement, among other measures.

Under the central government eco-compensation program for the border regions of Shanxi and Shaanxi provinces, Inner Mongolia Autonomous Region, and the city of Baotou, mining companies

¹¹⁵ W. Han. 2007. Shanxi Province Is to Levy the Fund for Sustainable Development of Coal Industry. *Shanxi Economic Daily*. 22 March. <http://www.daynews.com.cn/sxjrb/147552.html> (in Chinese).



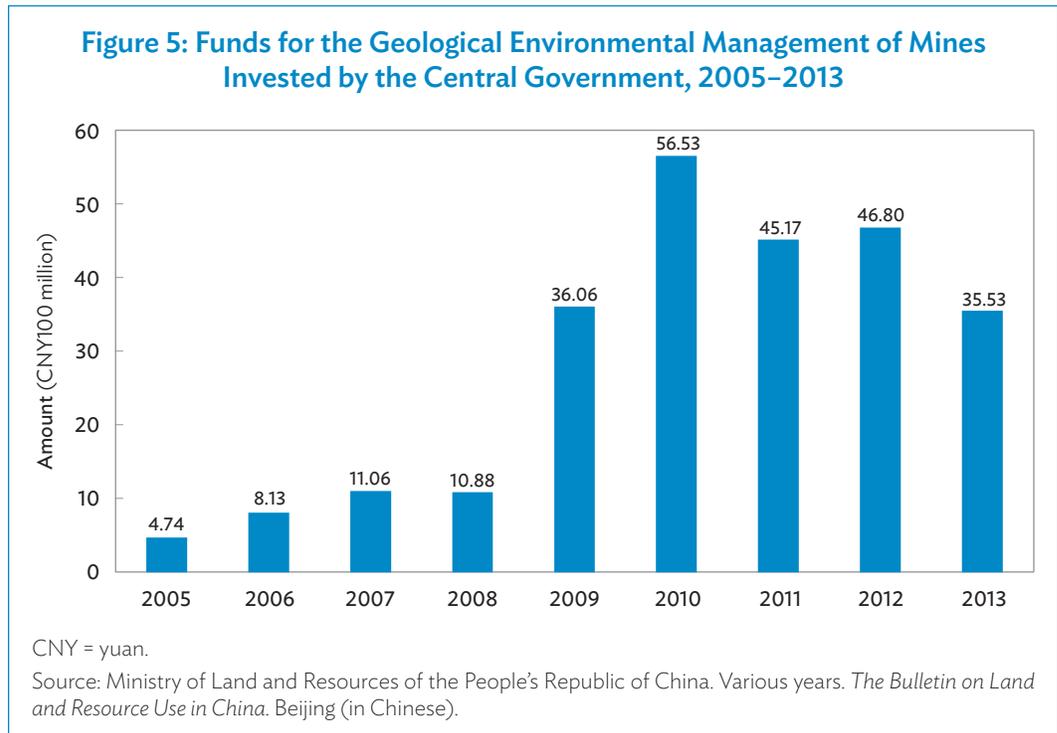
Lead zinc ore mining, Shaanxi Province

must contribute CNY0.45 (\$0.07) per ton of coal to an environmental restoration fund. Monthly contributions of mining companies to the Shanxi Province Coal Sustainable Development Fund are based on the quality of the coal being mined and the production coefficient of the mines.¹¹⁶

Kelamayi City in Xinjiang Uygur Autonomous Region established an eco-compensation mechanism for oil exploration, using revenues from resource taxes for petroleum exploitation, forest compensation fees, forest vegetation recovery payments, resettlement fees, and other income from taxes and fees, as well as investments from oil companies.

Since 2000, MOF has worked with the Ministry of Land and Resources to set up a special fund for the geological environmental management of mines using the license fee and price on the use of exploration and mining right. The funds for the geological environmental management of mines invested by the central government between 2005 and 2013 are presented in Figure 5,

¹¹⁶ The formula is: *fund collection per month* = [*coal quality criteria*] × [*mine production coefficient*] × [*coal production per month*]



with funds allocated increasing substantially in 2009 following the shock of the financial crisis in the United States in 2008.

10.3 The Basis for Mineral Resources Eco-Compensation

As required by national regulations, the Shanxi Province Coal Sustainable Development Fund annually allocates expenditures at a strict ratio of 5:3:2—that is, 50% for interregional ecosystem management, 30% for transformation of resource-based cities or areas and the development of key industries, and 20% to address social problems caused by coal mining. Proposed annual expenditures from the fund must be incorporated into the budgets and investment plans of county and city governments and submitted to the respective governments for approval.

Kelamayi City uses monetary and nonmonetary eco-compensation modes, including transfers of resource tax revenues to projects for environmental protection and ecosystem conservation and restoration, transfers of revenues from administrative fees to key projects, and encouraging oil companies to solve oil production pollution problems through third-party outsourcing, among other measures.

10.4 Using Mineral Resources Eco-Compensation Payments

In general, subnational government support for eco-compensation in the context of mineral exploration involves, among other activities, funding for consolidation and reclamation of mined

land, including reforestation; protection of groundwater from mining impacts; environmental monitoring of mining operations; and industrial development in resource-exhausted cities.

The Shanxi provincial fund is mainly used to solve problems that mining companies cannot address independently, particularly to compensate for transregional environmental and social damage that mines cause. Kelamayi City has used its eco-compensation mechanism for a series of ecosystem restoration and environmental protection projects including afforestation, construction of disposal facilities for domestic sewage and household waste, and pollution control of oil extraction and processing. Forest vegetation recovery payments, in particular, are mainly used to support forest vegetation recovery in oil extraction and processing areas.

10.5 Administering Mineral Resources Eco-Compensation

In Shanxi Province, the provincial Department of Finance has overall responsibility for administering the Shanxi Province Coal Sustainable Development Fund, and county and city taxation authorities are responsible for collecting monthly contributions of mining companies.

In Kelamayi City, the city government collects forest land compensation fees, forest compensation fees, and resettlement fees, which are deposited to the municipal treasury. The autonomous region's forest department collects forest vegetation recovery fees, which are deposited to the autonomous region's treasury. The fees are returned to the Kelamayi City government by the autonomous region's government through transfer payments over 3 years.

10.6 Key Challenges for Mineral Resources Eco-Compensation

While there are good examples at the provincial and municipal levels of positive experience with eco-compensation in the context of mineral resources exploitation, the 2011–2013 study found that there are challenges for implementing similar mechanisms nationwide. These challenges include the following:

- (i) Existing laws and regulations do not clearly provide for eco-compensation rates for different types of mining enterprises, stakeholder liability, how funds should be collected and used, and how their use should be supervised.
- (ii) The increasing need for eco-compensation in the context of mineral exploitation is surpassing mining companies' willingness and capacity to pay. On the one hand, the fees that individual mining companies pay are low and do not fully compensate for the environmental damage mines cause. On the other hand, most mining companies say that if eco-compensation rates are set at a level that will actually cover the costs of restoring ecosystems, they will not be able to bear such costs without passing them on to consumers by raising prices.
- (iii) Markets for mineral resource eco-compensation are undeveloped and rely mainly on government financing, especially from the central government, which is creating a growing financial burden on governments at all levels.

In general, subnational government support for eco-compensation in the context of mineral exploration involves funding for consolidation and reclamation of mined land, protection of groundwater from mining impacts, environmental monitoring of mining operations, and industrial development in resource-exhausted cities.

10.7 Key Lessons Learned from Mineral Resources Eco-Compensation Pilot Projects

The 2011–2013 study learned that a national eco-compensation mechanism governing mineral resources exploration and exploitation should take into account the need for

- (i) prices of mineral resources to internalize the environmental and social costs of exploration and exploitation;
- (ii) a tax regime for mineral resources development which includes a consumption tax based on the value of mineral resource reserves and a resource tax which is based on the market value of the resources;
- (iii) incentives to develop third-party agencies to evaluate and assess the ecological footprint of extractive industries and monitor eco-labeling of mineral resources;
- (iv) a mineral resources exchange to promote reasonable distribution and use of mineral resources;
- (v) supporting policies, grants, subsidies, and tax breaks for environmental services agencies that specialize in extractive industries; and
- (vi) harmonizing existing subnational eco-compensation schemes with a national mechanism.

Toward a National Eco-Compensation Regulation for the People's Republic of China

Most of the PRC's existing national-scale forest eco-compensation projects, which provide the majority of the funding for watershed eco-compensation as well, have adopted a “blood transfusion” type of compensation, which primarily focuses on subsidies and other financial payments while ignoring the socioeconomic factors that are important influences on the behavior of the individuals receiving eco-compensation payments. The national grassland eco-compensation mechanism, launched in 2011, provides for taking the local socioeconomic context into account. Subnational eco-compensation projects have generally proven more flexible in adapting eco-compensation to the requirements of the jurisdictions involved. As the PRC develops the national eco-compensation regulation, it will need to capture the diversity the subnational projects have tapped while integrating its experience with eco-compensation at all levels of government into a coherent national regulatory framework.

Most of the existing national-scale forest eco-compensation projects have adopted a “blood transfusion” type of compensation, which primarily focuses on subsidies and other financial payments while ignoring the socioeconomic factors that are important influences on the behavior of the individuals receiving eco-compensation payments.

11.1 Lessons Learned for the National Eco-Compensation Regulation

The overall recommendation from the 2011–2013 study is that the national eco-compensation regulation should create a long-term eco-compensation mechanism that

- (i) differentiates eco-compensation for individual ecosystem types and activities;
- (ii) is primarily funded through government financial transfer payments; and
- (iii) is supplemented with market-based mechanisms (e.g., emission trading schemes and water funds)

Lessons learned from the field studies of eco-compensation in different ecosystem types provide guidance on specific issues the national eco-compensation regulation should address. Many of these lessons are related to issues for which the National Main Function Zoning Plan requires supporting measures. Incorporating provisions based on these lessons into the draft national eco-compensation regulation would contribute significantly to the implementation of the National Main Function Zoning Plan.

The lessons learned from studying experiences with eco-compensation, which are common for two or more types of eco-compensation schemes, indicate that the national eco-compensation regulation should do the following:

- (i) Clearly define administrative responsibility for eco-compensation at all levels of government (watersheds, forests, wetlands, marine areas, and interregional).

- (ii) Enable nonmonetary compensation as well as monetary payments (watersheds, forests, wetlands, marine areas, and interregional).
- (iii) Enable supplementary market mechanisms (watersheds, forests, wetlands, and interregional).
- (iv) Create institutions and/or enable third-party entities that are responsible for assessing and valuing ecosystems and environmental damage, create criteria and procedures for certifying them, and develop a valuation index system (watersheds, marine areas, and mineral resources).
- (v) Require regular and comprehensive monitoring and evaluation on the basis of objective indicators of all aspects of eco-compensation, particularly, but not limited to, the effectiveness of legal measures and administration (watersheds, forests, marine areas, and interregional).
- (vi) Clearly define who is eligible to receive eco-compensation payments (watersheds, forests, marine areas, and mineral resources).
- (vii) Set standard rates for eco-compensation that take conservation costs and development opportunity costs into account, but give subnational governments the flexibility to adapt the standard rate to the local context (forests, wetlands, and interregional).
- (viii) Establish clear standards and rules for calculating eco-compensation payments (watersheds, marine areas, and interregional).
- (ix) Harmonize the national eco-compensation regulation with the laws and regulations that govern each type of ecosystem and activity for which eco-compensation will apply (mineral resources and interregional).
- (x) Clearly define the scope of eco-compensation (forests and interregional).
- (xi) Clearly define the principles of eco-compensation (forests and interregional).
- (xii) Clearly stipulate funding sources: who should pay fees and charges and otherwise contribute to funding eco-compensation (watersheds and interregional).
- (xiii) Require that governments at all levels create separate accounts for eco-compensation funds and that eco-compensation accounts be audited regularly (wetlands and marine areas).
- (xiv) Create a central database on eco-compensation and environmental damage assessment (watersheds and marine areas).
- (xv) Change performance appraisal systems for subnational government officials to reward progress with conservation and eco-compensation (wetlands and interregional).
- (xvi) Provide for dispute settlement (watersheds and interregional).

Experience with eco-compensation in individual ecosystem types indicate the following additional lessons that the national eco-compensation regulation should incorporate:

- (i) Clearly define eco-compensation and distinguish it from other fees and charges (marine areas).
- (ii) Establish a system and/or a dedicated fund or funds to receive and disburse financial resources for eco-compensation (marine areas).
- (iii) Link eco-compensation to planning processes, including strategic environmental assessment and environmental impact assessment (EIA), require ecosystem assessment as part of EIA, include similar assessments in environmental audits of ongoing operations, and create mechanisms that require all levels of government to cooperate in planning for and implementing eco-compensation (marine areas).
- (iv) Clearly stipulate procedures for approving project subsidies (watersheds).

- (v) Clearly stipulate how eco-compensation payments may be used (watersheds).
- (vi) Enable horizontal financial transfer payments (interregional).
- (vii) Require all levels of government to plan and budget for eco-compensation (marine areas).
- (viii) Establish a system for environmental certification and eco-labeling (interregional).
- (ix) Clearly distinguish between intraprovincial and interprovincial eco-compensation (watersheds).
- (x) Provide for building capacity in the institutions that are responsible for implementing eco-compensation (wetlands).
- (xi) Enable third-party entities to monitor the implementation of eco-compensation programs (mineral resources).
- (xii) Enable eco-compensation for environmental migrants (wetlands).
- (xiii) Enable eco-compensation for local people who participate in managing natural resources (wetlands).
- (xiv) Ensure that prices of natural resources internalize the cost of eco-compensation (mineral resources).
- (xv) Ensure that tax regimes reflect the value of natural resources (mineral resources).
- (xvi) Ensure that interregional eco-compensation is implemented on the basis of economic geography as well as conservation requirements (interregional).
- (xvii) Provide support for environment-friendly industries in ecological function areas, where development is restricted (interregional).
- (xviii) Establish an interprovincial coordination mechanism (interregional).
- (xix) Provide for research on eco-compensation (interregional).
- (xx) Require awareness raising, education, and dissemination of information on eco-compensation (interregional).
- (xxi) Provide for administrative, civil, and criminal liability (watersheds).

The 2011–2013 study also noted that it will be important to ensure that the legal regime governing natural resources taxes and other environmental taxes is harmonized with the national eco-compensation regulation, taking eco-compensation into account, and adequately providing that environmental and natural resources taxes and eco-compensation are complementary (wetlands, marine areas, mineral resources, and interregional).

11.2 Questions for Further Research and Consultation

The 2011–2013 study also identified some of the following questions that require further research and consultation as the PRC continues the process of developing a national regulatory framework for eco-compensation:

- What should be the relationship between a general national regulatory framework for eco-compensation and existing legal measures governing eco-compensation in specific ecosystems and for specific activities?

The PRC has established national eco-compensation mechanisms for forests and grasslands, which contribute the majority of the support for watershed eco-compensation as well. The primary national legal instruments for these mechanisms have been harmonized, but the implementation of many existing eco-compensation programs at subnational levels is not

consistent with the national measures. The PRC will need to decide whether the national eco-compensation regulation should govern forests, grasslands, and watersheds, or whether it should only govern those ecosystems and resources not yet regulated at the national level.

- What should be the relationship between vertical and horizontal eco-compensation?

Most of the PRC's experience to date with eco-compensation is under vertical arrangements that depend on financial transfer payments, particularly from the central government to subnational governments but also from provincial governments to lower levels of local government. Some subnational governments are successfully piloting vertical eco-compensation arrangements, particularly in the context of watershed eco-compensation. The PRC will need to decide whether, or to what degree, the national eco-compensation regulation should regulate horizontal as well as vertical eco-compensation. Whether the central government regulates horizontal eco-compensation or whether provincial governments continue to do that, the national eco-compensation regulation should create or enable mechanisms to coordinate vertical and horizontal eco-compensation.

Prior studies have recommended that the PRC also consider the following issues in developing its national regulatory regime for eco-compensation:

- (i) Clarify property rights in natural resources to protect the welfare of individual land users who participate in eco-compensation programs and to determine who has responsibility for ensuring that ecosystems in which those natural resources occur continue to provide ecosystem services.¹¹⁷
- (ii) In addition to clarifying property rights, include other measures designed to ensure that eco-compensation supports poverty alleviation.¹¹⁸
- (iii) Create a framework that will allow the role of all levels of government in eco-compensation to evolve from being the primary buyer of ecosystem services to enabling the participation of other actors, including the private sector and individuals.¹¹⁹
- (iv) Enable eco-compensation in the agriculture sector as well as the mining and hydropower sectors.¹²⁰
- (v) Focus on the outcomes the central government wants to achieve by conserving ecosystems and ensuring that they continue to provide the services people need, rather than on simply setting standards.¹²¹
- (vi) Enable incentive-based eco-compensation to encourage subnational governments and other recipients of eco-compensation to achieve the outcomes the central government targets and to encourage government at all levels to coordinate in implementing eco-compensation.¹²²
- (vii) Include measures to ensure that eco-compensation functions as a tool for strengthening management of natural resources and ecosystems as well as a means to channel funding for conservation and sustainable use.¹²³

Ensure that eco-compensation functions as a tool for strengthening management of natural resources and ecosystems as well as a means to channel funding for conservation and sustainable use.

¹¹⁷ Q. Zhang, T. Lin, M. T. Bennett, and L. Jin. 2010. *An Eco-Compensation Policy Framework for the People's Republic of China: Challenges and Opportunities*. Manila: ADB. p. 23; footnote 12, pp. 25–26.

¹¹⁸ Footnote 117, p. 27.

¹¹⁹ Footnote 117, p. 26.

¹²⁰ Footnote 12, p. 26.

¹²¹ Footnote 12, pp. 23–24.

¹²² Footnote 117, pp. 23–25; footnote 12, pp. 25–26.

¹²³ Footnote 117, p. 26; footnote 12, p. 21.

Conclusion

12

The PRC's efforts to develop the policy and practice of eco-compensation are internationally recognized.¹²⁴ Other countries, as well as international analysts, will be watching how the PRC ultimately regulates eco-compensation at the national level and how successfully it applies the lessons it has already learned from pilot projects and other initiatives at national, provincial, and subprovincial levels.

The 2011–2013 study concluded that, even after decades of experimenting, eco-compensation is still in an exploratory stage in the PRC. There is a wealth of recent case studies, primarily available in Chinese but also in English, which examine and critique practice with eco-compensation to date and make positive recommendations for adjustments. The evolving policy basis for eco-compensation requires a continual cycle of scientific monitoring, research, and implementation in practice coupled with adaptation on the basis of experience. Because of the inherent spatial, temporal, and technical complexities, consolidating the lessons already learned through eco-compensation pilot projects and programs must be done systematically and thoroughly ground-truthed before moving to next steps. The amended Environmental Protection Law provides the legal basis for an eco-compensation mechanism that will function over the long term, and not only on a project or program basis. Other policies, laws, and regulations governing all aspects of eco-compensation need to be harmonized, implemented, and adapted progressively, so that they provide a stable basis for effective ecosystem conservation and sustainable development in the country.

Now that the PRC has legally mandated eco-compensation in the amended Environmental Protection Law, it must continue its efforts to develop the national eco-compensation regulation on the basis of its extensive past experience, while at the same time looking ahead and anticipating what the country needs eco-compensation to achieve for the future. The key will be to determine and provide regulatory support for the optimal combination of government-mandated eco-compensation in the form of subsidies and direct payments, a range of market-based economic tools, and mechanisms for managing ecosystems to ensure the sustainability of the services they provide.

Eco-compensation still lacks a sufficiently strong regulatory foundation. This has hindered the effective development of programs at both national and provincial level for all potential sectors where eco-compensation could be applied. The national eco-compensation regulation should create a framework that integrates measures to prevent pollution, restore degraded ecosystems, and protect ecosystems that are not degraded.¹²⁵ It must provide legal certainty for all who participate in eco-compensation and, at the same time, must allow all participants the flexibility to continue to innovate and adapt as their experience with eco-compensation increases. The regulatory framework for eco-compensation will need to establish procedures that enable the

Now that the People's Republic of China has legally mandated eco-compensation in the amended Environmental Protection Law, it must continue its efforts to develop the national eco-compensation regulation on the basis of its extensive past experience, while at the same time looking ahead and anticipating what the country needs eco-compensation to achieve for the future.

¹²⁴ S. Reardon. 2012. China Leads March for Green Economy. *New Scientist*. 2869. pp. 8–9. 16 June.

¹²⁵ E. Gray and C. Jones. 2012. *Eco-Compensation in China: Opportunities for Payments for Watershed Services*. Washington, DC: World Resources Institute. 15 May.

central government to coordinate vertically with subnational governments, and subnational governments to coordinate horizontally with each other.

The Government of the PRC needs to put greater effort into clarifying and rationalizing rights and responsibilities over key ecological functions and services, both regionally and by agency. Interagency overlap of responsibilities for many key ecosystem services and functions has created ongoing conflicts. Responsibilities over different components of water resources management, for example, are distributed across no less than nine national agencies. Similarly, at least six national agencies have responsibilities over various aspects of wetlands management. While the state has ownership of land and water resources on paper, in reality, however, the lack of clear stipulations in the current system has given rise to significant conflicts, or de facto open access over limited resources, leading to unsustainable use and management. Clarifying and strengthening enforcement of ownership and use rights over ecosystem services and functions are critical foundations for market-based approaches toward environmental management, if not for effective management in general.

The national eco-compensation regulation should create a framework that integrates measures to prevent pollution, restore degraded ecosystems, and protect ecosystems that are not degraded. It must provide legal certainty for all who participate in eco-compensation and allow all participants the flexibility to innovate and adapt as their experience with eco-compensation increases.

Related to the issue of rights, the current management of key ecosystem services and functions—e.g., the maintenance of water quality standards in watersheds and the protection and restoration of key natural components of water systems such as wetlands and forest ecosystems—all suffer from significant ongoing gaps in the government's monitoring and enforcement capacity for preexisting laws and policies. Reforms and refinements to the government performance assessment mechanism to include more environmental targets and indicators should be continued. Part of these indicators should also be process-based rather than only outcome-based, for example, by tracking indicators of the effectiveness of local environmental monitoring systems (e.g., how many monitoring stations exist, how well key watersheds are covered by these, how often observations are taken) and in reforms and improvements to local environmental regulatory frameworks.

Sector reports on eco-compensation all found that current funding fell short of what was needed. Thus, channels for greater diversification of funding sources must be explored so as to increase the level and sustainability of financial support for eco-compensation. Moreover, to better understand socioeconomic and environmental outcomes of particular interventions, the basis for eco-compensation should be continually strengthened via ongoing scientific research and pilots and demonstrations.

The PRC has laid the foundation for a virtuous circle of research, policy development, pilot testing, and reviewing the implementation of eco-compensation. Now it needs to build on that foundation and regulate eco-compensation so that the entire country can benefit from its own continuing experience, and so that other countries can continue to learn from it as well.

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Toward a National Eco-Compensation Regulation in the People's Republic of China

The Asian Development Bank and the National Development and Reform Commission of the People's Republic of China (PRC) undertook a study on eco-compensation regulations development in the country, on which this publication is based. The study examined the PRC's theory, practice, and legislation governing eco-compensation in selected ecological areas to map out the scope and content of a national eco-compensation regulation. Pursuit of its higher agenda of ecological civilization and development of its national eco-compensation regulation will require the PRC to capture the diversity that subnational projects have tapped, integrate its experience with eco-compensation at all levels of government into a coherent national regulatory framework, and harmonize this framework with existing laws and other legal instruments.

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