

Experiences and Challenges of Watershed Eco-compensation in the People's Republic of China

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Contents

01

Context to Implement Eco-compensation in the River Basins

02

Progress and Experiences of Eco-compensation in the River Basins

03

Challenges Faced by Eco-compensation in the River Basins

04

Key Issues of Eco-compensation in the Near Future

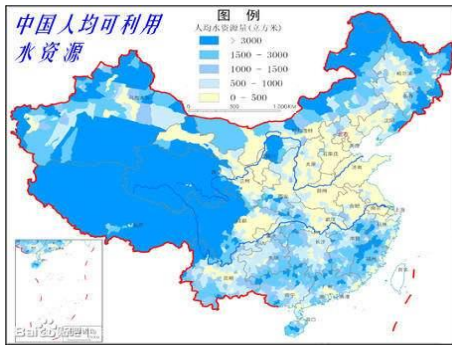
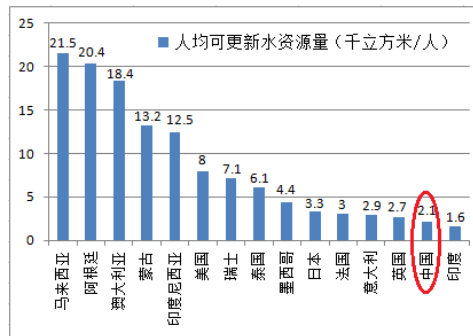
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1. Context to Implement Eco-compensation in the River Basins



Balance the Beautiful Scenery and Resources Development

Social economy and current environmental demands



- Serious water pollution
- Frequent flood disasters
- Serious shortage of water resources
- Serious degradation of water ecosystem
- Great social and economic disparity





A Multi-level Decision-making and Deployment Made on the Watershed Eco-compensation in the People's Republic of China

Time	Important decision-making and deployment
2011	<ul style="list-style-type: none">☉ An important instruction was made/// It was required to study the coordinated management of pollution control between the upstream and downstream of Xin'an River.
2012	<ul style="list-style-type: none">☉ Opinions and Suggestions on Supporting Treatment of Water and Soil Erosion in Changting, Fujian/// To establish an eco-compensation mechanism between the upstream and downstream in Ding River as soon as possible
2015	<ul style="list-style-type: none">☉ Opinions on Speeding up the Construction of Ecological Civilization (ZhF [2015] No. 12)/// To establish a trans-regional eco-compensation mechanism, and guide compensation to be implemented between the upstream and downstream
	<ul style="list-style-type: none">☉ The Master Plan for Reform of the Ecological Institutions (ZHF [2015] No. 25)/// Encourage all regions to carry out the pilot eco-compensation, continuously promote the compensation pilot for water environment of Xin'an River, promote the trans-regional eco-compensation pilots in the Beijing-Tianjin-Hebei water conservation area, Jiuzhou River in Guangxi and Guangdong, and Ding River–Han River in Fujian and Guangdong; and explore the eco-compensation pilot in the water environment-sensitive area of Yangtze River Basin



A Multi-level Decision-making and Deployment Made on the Watershed Eco-compensation in the People's Republic of China

Time	Important decision-making and deployment
2016	<p>☞ Opinions on Improvement of the Eco-compensation Mechanism (GBF [2016] No. 31)</p> <ul style="list-style-type: none">/// To systematically and comprehensively deploy the eco-compensation;/// Issue the Letter of Consent on Setting up an Inter-ministerial Meeting for Eco-compensation;/// Establish a communication & consultation mechanism for eco-compensation; encourage to establish the lateral compensation relationship between the downstream and upstream; encourage to carry out the lateral eco-compensation pilots in some typical watersheds with important ecological functions, prominent contradiction between supply and demand of water resources, or serious threats to all kinds of pollution;
	<p>☞ Guidance on Speeding up the Establishment of Eco-compensation Mechanism Between the Upstream and Downstream (CaiJian [2016] No. 928)</p> <ul style="list-style-type: none">/// Define the guiding ideology, basic principles and work goals for the eco-compensation mechanism between the upstream and downstream;/// Put forward the concrete measures on compensation basis, compensation way, compensation criteria, joint control mechanism and the signing compensation agreement;/// Explicitly stipulate that the Central Finance will award key watersheds with compensation agreement reached;/// Define the division of responsibilities for each relevant sector, and objectives and tasks of the local governments on the upper and lower reaches

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2. Progress and Experiences of Eco-compensation in the River Basins



Quantitative Development of Watershed Eco-compensation Theory

At the end of 1990s

It mainly focused on the theory and policy of watershed eco-compensation.

- /// Definition of the compensation principle
- /// Analysis on the influencing factors of compensation
- /// Theoretical framework of compensation
- /// Compensation-related institutional construction



Current Research Progresses

It mainly focuses on qualitative analysis and quantitative evaluation of key links in watershed eco-compensation

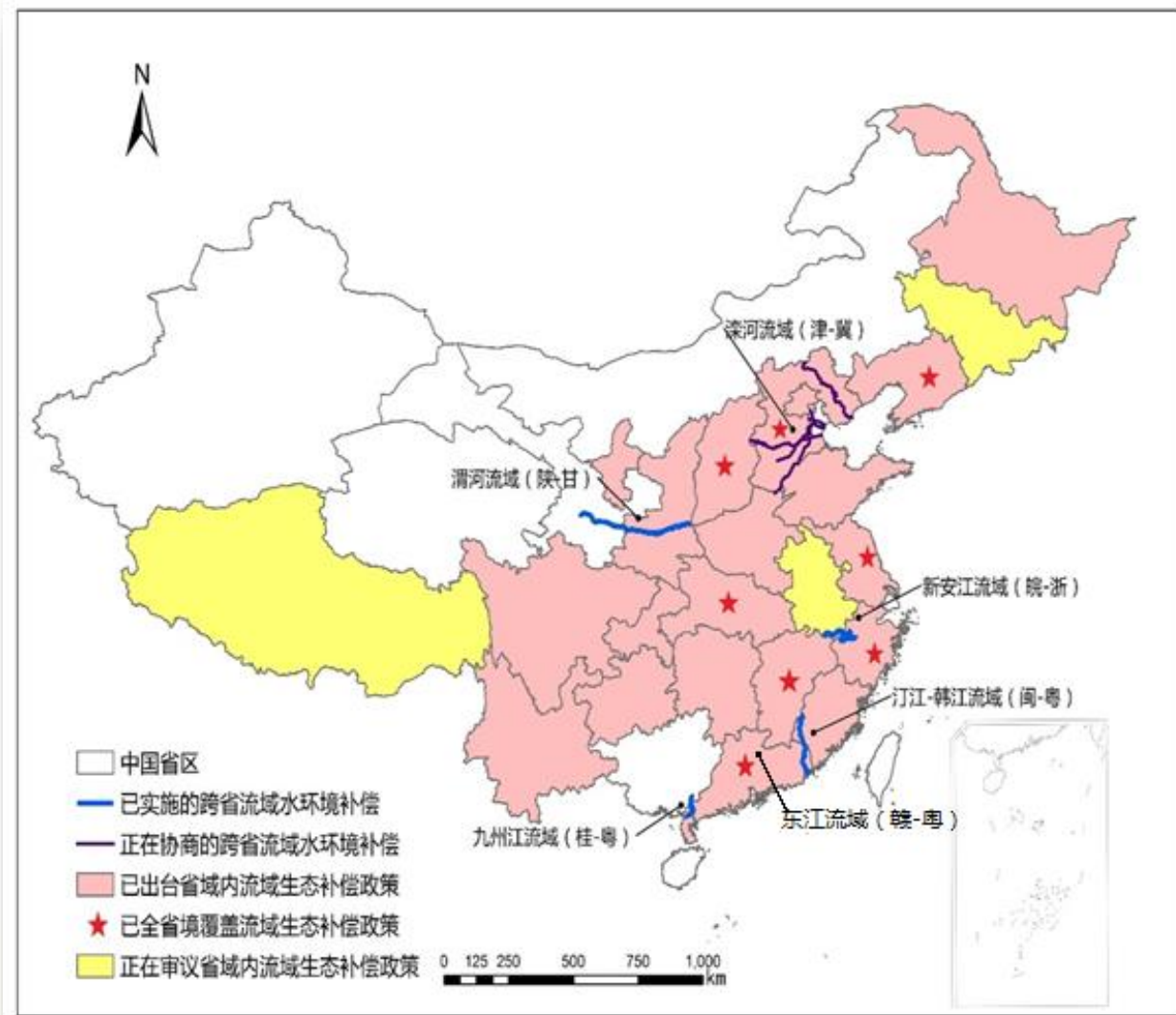
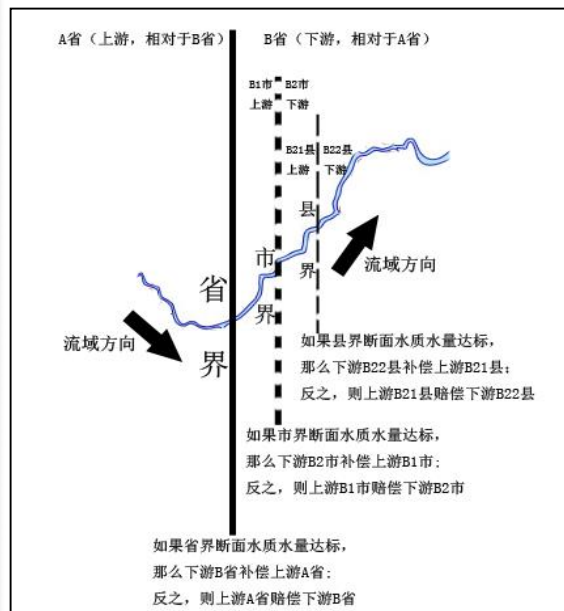
- /// Stakeholder analysis
- /// Definition of compensation object and scope
- /// Compensation criteria accounting
- /// Compensation fund raising and allocation
- /// Construction of supporting compensation mechanism
- /// Evaluation on compensation effect



Multi-level Eco-compensation Mode Formed at the Levels of Province, City and County

At present, above 20 provinces in the PRC have promulgated the eco-compensation policies in succession to explore the different compensation modes, which have achieved good results.

In 2016, the Central Finance allocated a total of CNY1.9 billion to award watershed eco-compensation, and CNY1.199 billion in 2017, which is mainly used in some engineering projects, such as pollution source control, ecological protection, comprehensive improvement of the rural environmental, and environmental risk prevention.



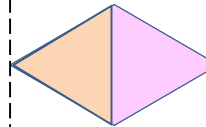


Approaches: Spontaneous Practice + National Promotion

Combine the bottom-up exploration and top-down promotion

Spontaneous practice

- /// Eco-compensation in Weihe Basin of Shaanxi and Gansu provinces
- /// Eco-compensation in Ziyahe Basin of Hebei Province
- /// Eco-compensation in Taihu Basin of Jiangsu Province
- /// Water rights trade between Yiwu and Dongyang, Zhejiang Province
- /// Eco-compensation in Aojiang Basin, Fujian Province
- /// Eco-compensation in Xiaoqinghe Basin, Shandong Province
- ///



National promotion

- /// The ***Guidance on Speeding up the Establishment of Eco-compensation Mechanism Between the Upstream and Downstream*** was issued.
- /// Eco-compensation in the middle route of South-to-North Water Diversion Project
- /// Eco-compensation in the upper and lower reaches of the Xin'anjiang Basin
- /// Eco-compensation in the upper and lower reaches of Minjiang Basin
- ///



Implementation Scale: Provincial Compensation + Inter-provincial Compensation

Type of compensation mechanism	Representative Province
Compensation mechanism between the upstream and downstream in terms of compliance of water quality	Jiangsu, Zhejiang, Jiangxi, Shandong, Henan, Hubei, Sichuan, Guizhou and Yunnan etc.
Financial withholding mechanism on the basis of assessment of water quality objective	Beijing, Hebei, Shanxi, Liaoning, and Hunan etc.

Provincial compensation



Inter-provincial compensation

Compensatory parties	Name of agreement
Zhejiang–Anhui	Water Environment Compensation in Xin'anjiang Basin
Guangdong–Guangxi	Lateral eco-compensation in the upstream and downstream of the Jiuzhoujiang Basin
Guangdong–Fujian	Lateral eco-compensation in the upstream and downstream of the Dingjiang–Hanjiang Basin
Guangdong–Guangxi	Lateral eco-compensation in the upstream and downstream of the Dongjinag Basin
Tianjin–Hebei	Lateral eco-compensation in the upstream and downstream of the Luan River-to-Tianjin Diversion Project
Shaanxi–Gansu	Framework Agreement on City Alliance for Environmental Protection in Weihe Basin



Progress of the Provincial Watershed Eco-compensation: A Case of Jiangsu Province

Thoughts of compensation

- /// **The water quality is not up to standards:** if the outgoing water quality under monitoring of the cities or counties is not up to the standards, the upstream cities and counties shall pay the compensation funds to the provincial finance according to the actual noncompliance in terms of the water quality target value and compensation criteria as stipulated by Jiangsu Province, and then compensate the downstream cities and counties through the provincial finance.
- /// **The water quality is up to standards:** if the upstream water quality is better than the target value, the downstream cities and counties shall pay the compensation funds to the provincial finance according to the actual compliance in terms of the water quality target value and compensation criteria as stipulated by Jiangsu Province, and then compensate the upstream cities and counties through the provincial finance.

Accounting standards

- /// **The water quality is not up to standards:** if the water quality at the monitoring sections is worse than the target value, the compensation fund is calculated for each assessment factor in terms of its noncompliance according to “noncompliance multiplier x compensation base.”
- /// **The water quality is up to standards:** if the water quality at the monitoring sections meets the criteria, the monthly compensation fund is calculated as CNY200,000 per assessment section.

Programme revision

- /// After the **Action Plan for the Prevention and Treatment of Water Pollution** was introduced at the national and provincial level, the Jiangsu Provincial Department of Environmental Protection and the Finance Department jointly revised and improved the original plan and supporting measures, increased the compensation sections from 66 to 112, and raised the compensation criteria accordingly.

Fund allocation

- /// In 2015, the compensation fund in the whole province amounted to CNY400 million, of which the forward compensation was CNY320 million, and the reverse compensation was CNY80 million. In 2016, the compensation fund in the whole province was CNY290 million, of which the forward compensation was CNY220 million, and the reverse compensation was CNY70 million.



Progress of the Provincial Watershed Eco-compensation: A Case of Fujian Province

Thoughts of compensation

The eco-compensation is implemented according to the idea of “fund apportioning, proportional compensation and two-way incentive.”

- /// **Fund apportioning:** When the compensation funds are raised, they are apportioned according to a certain fraction of local financial revenue and a certain criteria of water consumption in each district and city.
- /// **Proportional compensation:** the compensation fund is allocated according to the factors of water environment quality, forest ecological factors, control factors of total water consumption, and compensation coefficient of each region.
- /// **Two-way incentive:** The more the upstream invested in the ecological management and protection, the more obvious the water quality is improved, and the greater the compensation amount will be. Once the water quality at the administrative interface is beyond the criteria, and even cause cross-border water pollution events, the upstream shall make economic compensation for the downstream.

Programme revision

In 2017, Fujian provincial government revised the *Measures of Fujian Province for Eco-compensation in Key Watershed*.

- /// Its scope of application was expanded from 3 rivers (Min River, Jiulong River, and Ao River) to 12 main rivers in Fujian Province.
- /// The provincial fund was increased during fund raising.
- /// The regional compensation coefficient was adjusted in the fund allocation scheme.
- /// The compensation range was expanded for Minjiang Basin.



Progress of the Inter-provincial Watershed Eco-compensation



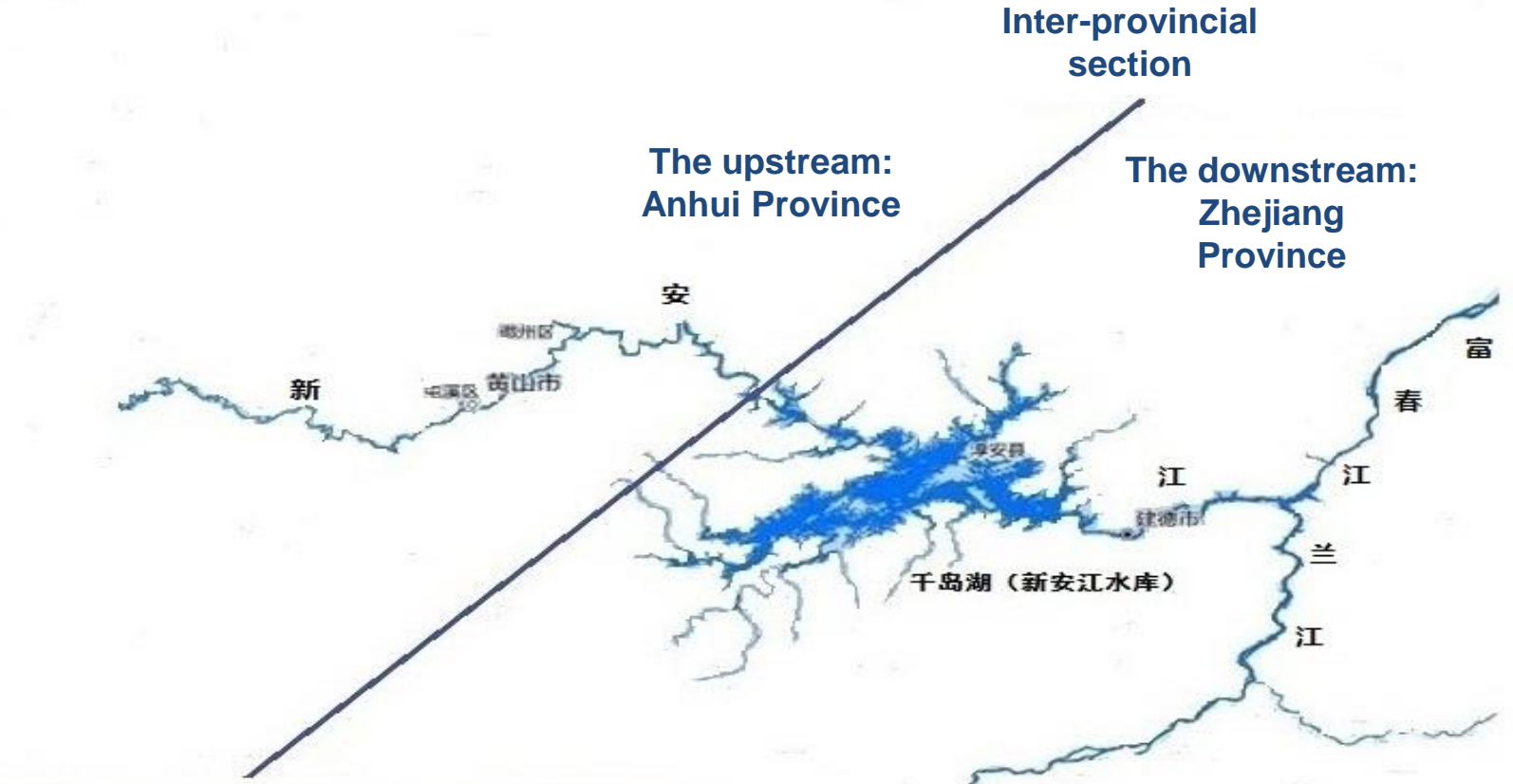
- ▼ **Determination of compensation liability:** according to the principle of "the polluter shall be responsible for restoration, and the beneficiary shall be responsible for compensation," it can be determined in view of the assessment on water quality at the cross-border section.
- ▼ **Compensation criteria accounting:** it is determined according to the compliance rate of water quality at inter-provincial section.
- ▼ **Compensation fund raising:** it is mainly based on the special funds and guide the social capital and international capital to participate in through some financing channels.



Progress of the Inter-provincial Watershed Eco-compensation: A Case of Xin'anjiang Basin

Key points:

1. **Funds:** all contributed from the finance
2. **Objective:** focus on water quality
3. **Range:** Anhui and Zhejiang Provinces
4. **The upstream:** motivated to control pollution
5. **The downstream:** willingness to pay

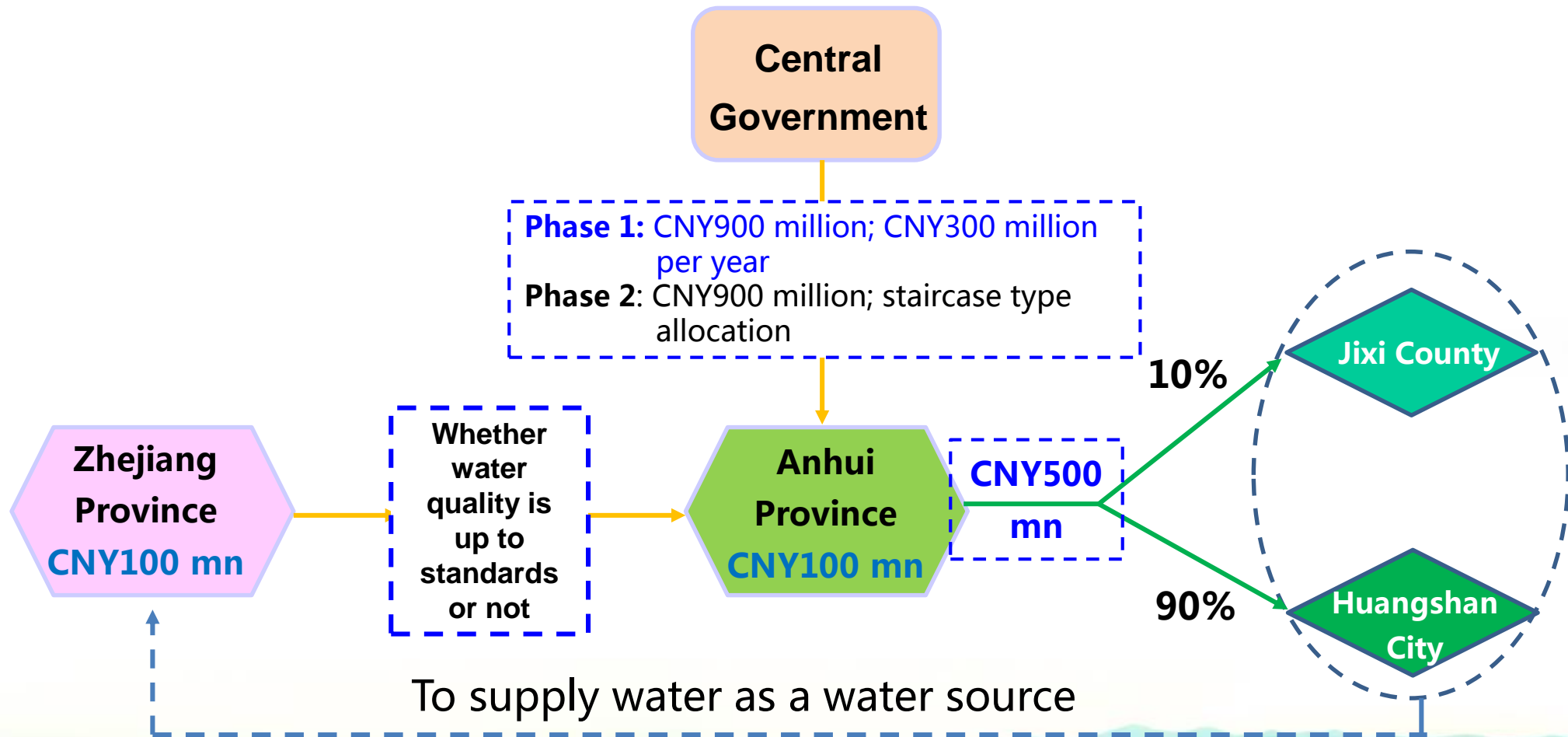


If water quality at the inter-provincial section meets the criteria agreed by both provinces, Zhejiang Province shall compensate Anhui Province, vice versa.



Progress of the Inter-provincial Watershed Eco-compensation: A Case of Xin'anjiang Basin

Compensation fund raising and allocation





Summary of Experiences in Watershed Eco-compensation

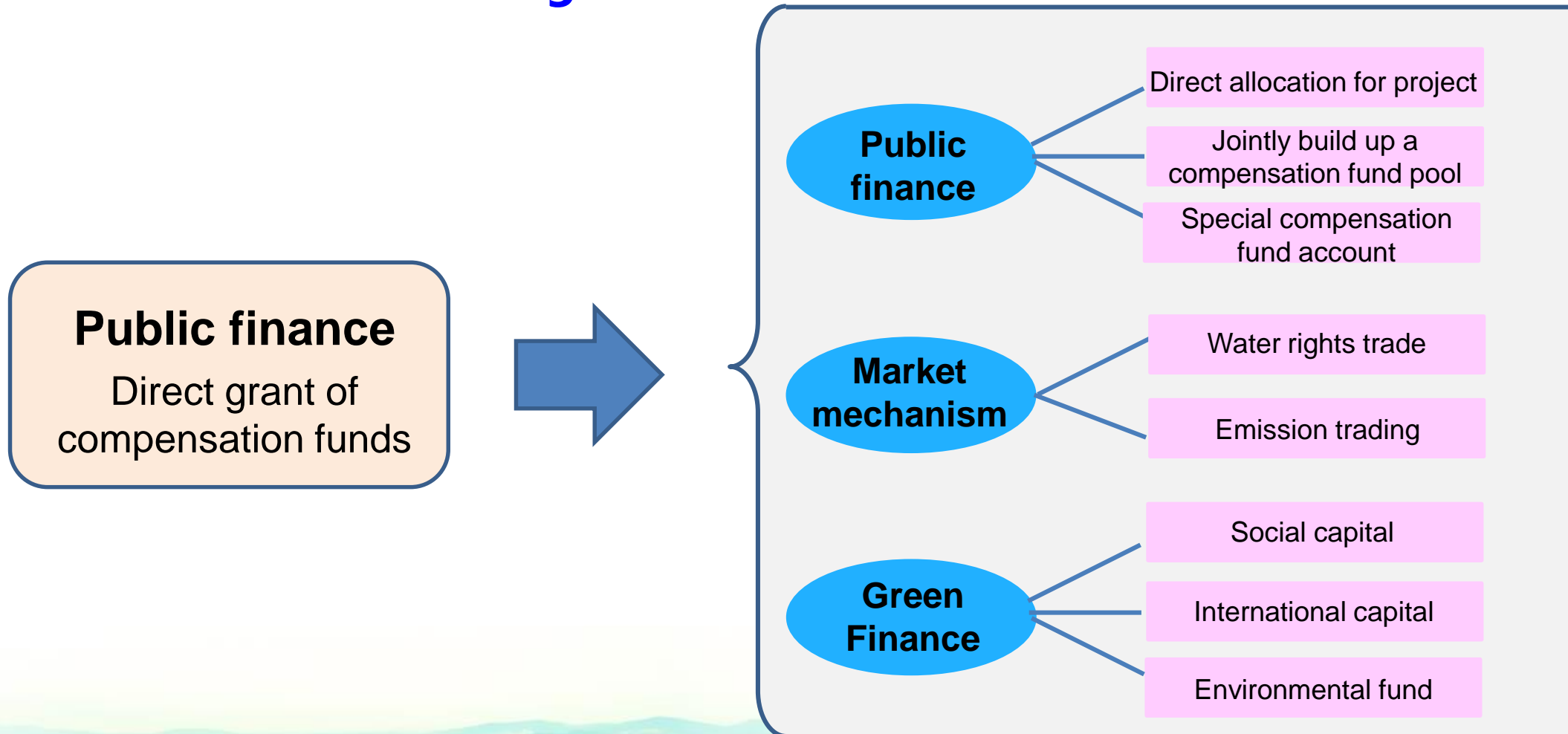
- ▼ **A consensus is gradually reached on the accounting factors of the compensation standards or criteria.**

Accounting factor	Accounting method
Pollutant concentration	Withheld compensation fund in a fixed amount in certain gradient according to the noncompliance rate of characteristic pollutants at the assessment section
	Calculate compensation fund according to the specific compensation fund and noncompliance rate of characteristic pollutants at the assessment section
Pollutant flux	Calculate compensation funds according to the pollutant flux at the examination section and the fixed unit cost of pollutant treatment
Total emission of pollutants	Calculate compensation funds according to the pollutant emission or emission reduction targets
Compliance rate or change rate of water quality	Reward or fine compensation fund in a fixed amount in certain gradient on the basis of the compliance rate of water quality at the examination section
	Reward or fine compensation fund in a fixed amount in certain gradient on the basis of conditions of water quality at the examination section in comparison with the upstream water quality or water quality in the previous year
	The compensation fund is a fixed amount, which is allocated according to the water quality at the examination section
Eco-function coefficient	Set up compensation criteria or coefficients according to the ecological function area



Summary of Experiences in Watershed Eco-compensation

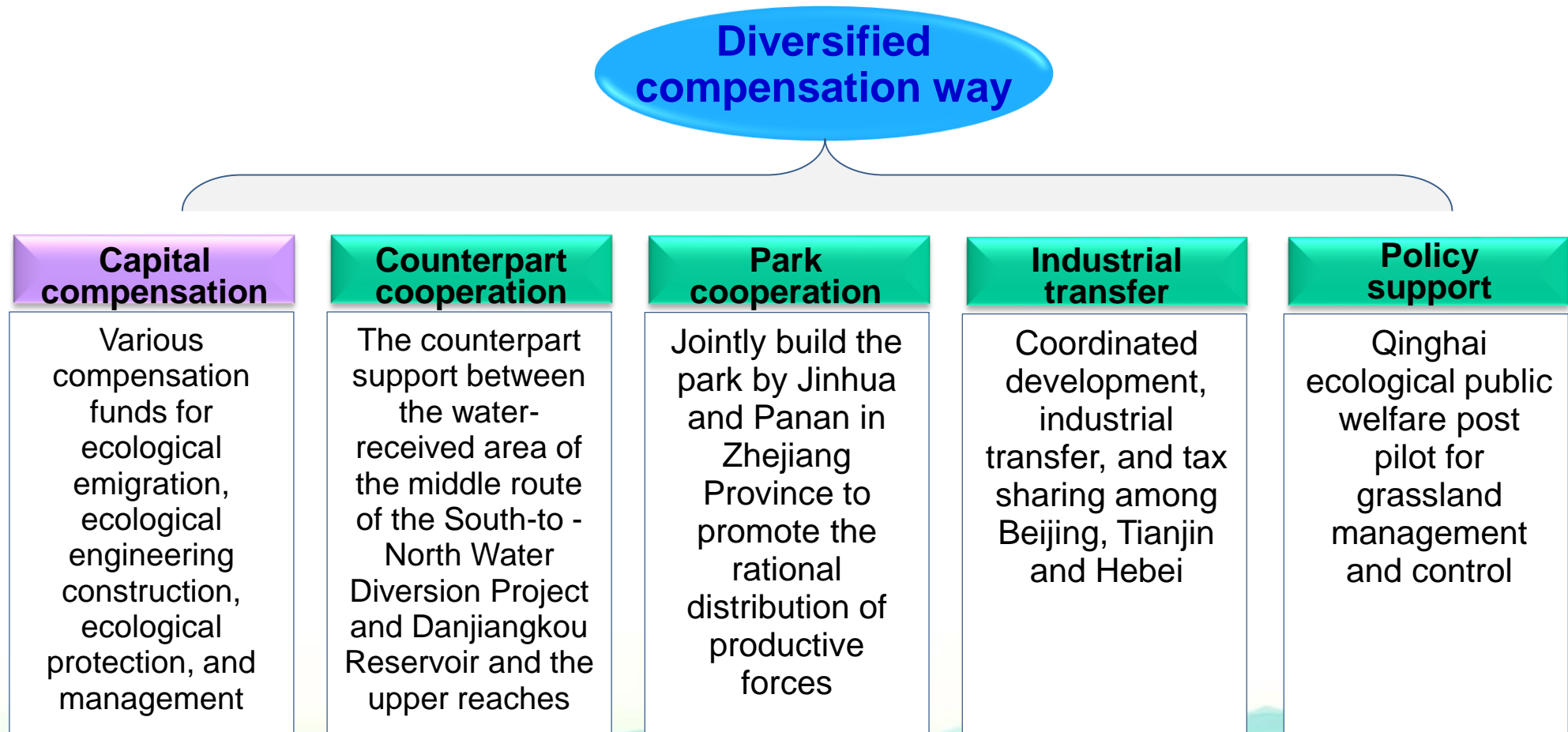
- ▼ Compensation funds are raised from the public finance to multichannel financing.





Summary of Experiences in Watershed Eco-compensation

- ▼ **The compensation way transits from capital compensation to diversified compensation.**



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3. Challenges faced by Eco-compensation in the River Basins



Main Characteristics of Current Watershed Eco-compensation

Key links	Current progress	Existing problems
Compensation criteria accounting	<ul style="list-style-type: none">⌚ Practical operation: accounting index (pollutant concentration, pollutant flux, water quality compliance rate, and change rate)⌚ Theoretical study: accounting index (ecosystem service value, socioeconomic adjustment coefficient, input cost for environmental control, opportunity development cost)	<ul style="list-style-type: none">⌚ Practical operation: it focuses on water quality factor, but not neglect water factors; especially in the water-deficient area, the accounting results obtained by this method deviate greatly from the actual situation. It does not adequately consider the function of ecosystem services and weaken the compensation to key ecological functional areas.⌚ Theoretical research: the compensation criteria based on ecosystem service value often bring significantly large amount of compensation for actual application. The differences exist in the accounting on the basis of environmental management input cost and opportunity development cost due to the deviation standard accounting from the statistical data .
Source of compensation funds	<ul style="list-style-type: none">⌚ Government financial funds are the main source of funds.⌚ Individual basin tries to absorb the social capital into the field of eco-compensation by means of financial discount or green industry fund.	<ul style="list-style-type: none">⌚ There is primarily just a single source of funds.⌚ It is still in the initial stage to broaden the source of compensation funds in combination with the green financial mechanism; the related financial products and policies are not yet sound.



Main Characteristics of Current Watershed Eco-compensation

Key links	Current progress	Existing problems
Compensation method	<ul style="list-style-type: none">☞ Mainly based on the capital compensation.☞ Mainly based on the government financial transfer payment.☞ Try to expand the other innovative compensation methods.	<ul style="list-style-type: none">☞ Market-based trading mechanism has not been completely established.☞ It is still in the exploratory stage for the park cooperation and the supports by virtue of the scientific and technological project.
Supporting monitoring mechanism	<ul style="list-style-type: none">☞ Apply the setting of environmental monitoring point.☞ Site equipment is obsolete.☞ Mainly rely on equipment and artificial sampling and analysis, ground monitoring and inspection.☞ Supervision is still under the original institutional system.	<ul style="list-style-type: none">☞ The monitoring point is not reasonably distributed which cannot satisfy the requirement of compensation.☞ Site equipment has a low degree of automation which cannot monitor and send data in real time.☞ The "3-in-1" monitoring network has not been formed yet.☞ The supporting system is still not in place for data supervision and risk early warning, and etc.
Evaluation of compensation effect	<ul style="list-style-type: none">☞ Practical operation: take the situations of institutional construction and fund use as the basis for evaluation.☞ Theoretical research: it is still in the stage of theoretical exploration.	<ul style="list-style-type: none">☞ The index is selected partially, and the evaluation results need to be discussed.☞ A sound evaluation index system has not been formed yet.



Ecological Civilization and Eco-compensation in the New Stage also Need to Break Through

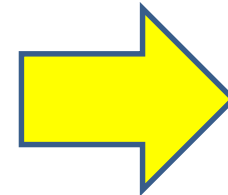
Traditional watershed eco-compensation

Competition and confrontation relationship between the upper and lower reaches

Watershed eco-compensation under new stage

Cooperation and co-prosperity between the upper and lower reaches

- ▼ Go out of the cost dilemma and step into the blue sea of value
- ▼ Shift from blood transfusion to hematopoiesis
- ▼ Transit from environmental protection to green development



Post-compensation Era



Ecological Civilization and Eco-compensation in the New Stage also Need to Break Through

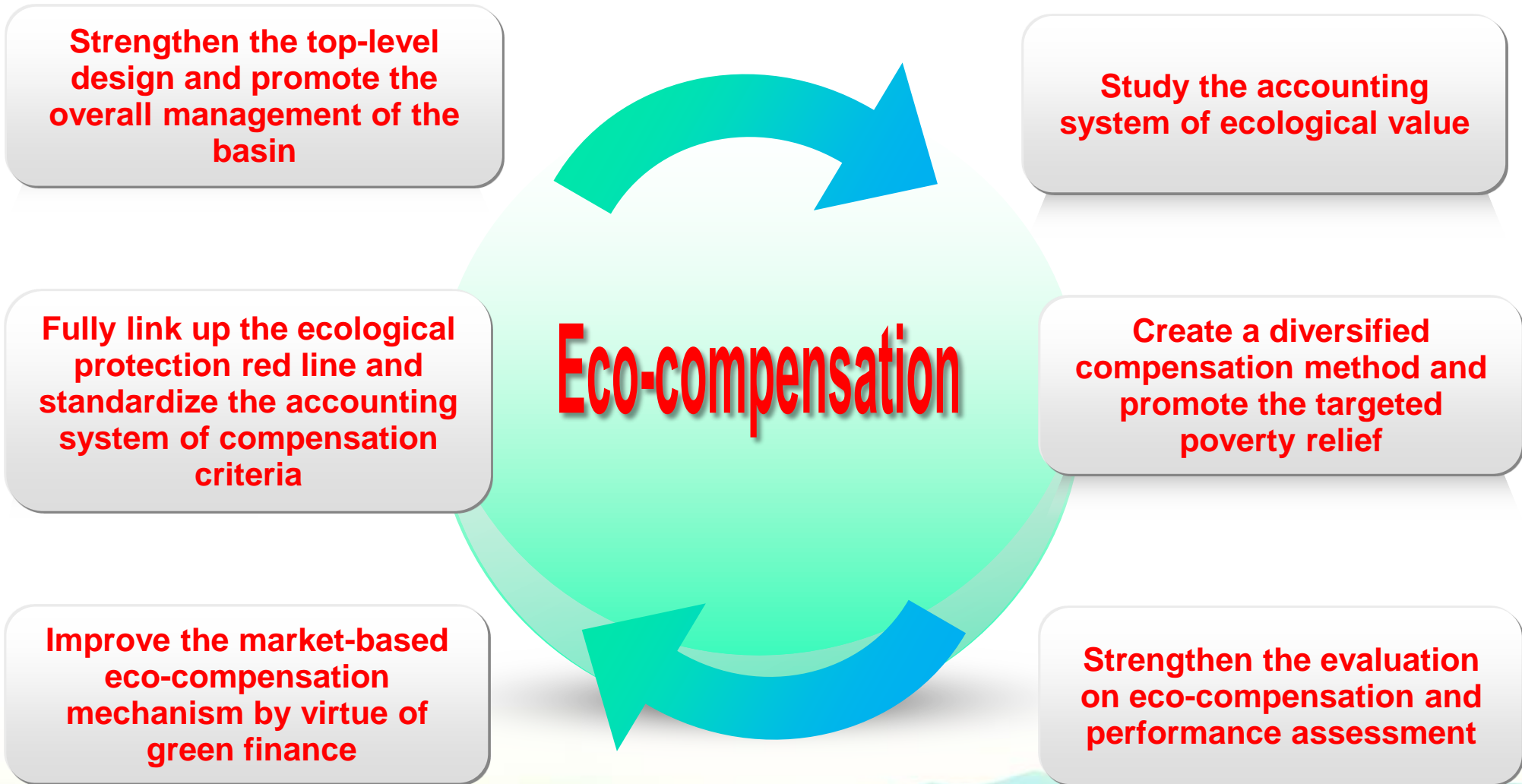
- ▼ Only when the notion that “the ecology is a free lunch” is broken will it be possible to promote the whole basin to form a community for joint development.
- ▼ How to calculate the potential ecological value on the basis of the prices of natural resources, and transform the negotiable and compromised “compensation” behavior into the incremental “value” behavior through cross-regional cooperation?
- ▼ How to transfer the watershed eco-compensation pattern from the single administrative means to the administrative + market-based means?
- ▼ How to fully make use of capital and market to promote the systematized and maximized ecological protection of the whole basin?

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4. Key Issues of Eco-compensation in the Near Future



Key Issues of Eco-compensation in the Near Future





The End
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