



# **Exploring the Establishment of Eco-compensation Mechanism Across Provinces: Trans-provincial Eco-compensation Schemes in the Chishui River Basin**

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**Environmental Protection Department of Guizhou Province**  
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**8 December 2017**

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Basin Eco-compensation**





# 1. Overview of the Chishui River Basin

# 1.1

## Overview of Physical Geography

The primary tributary of the upstream right bank of the Yangtze River, with a total length of 436.5 km

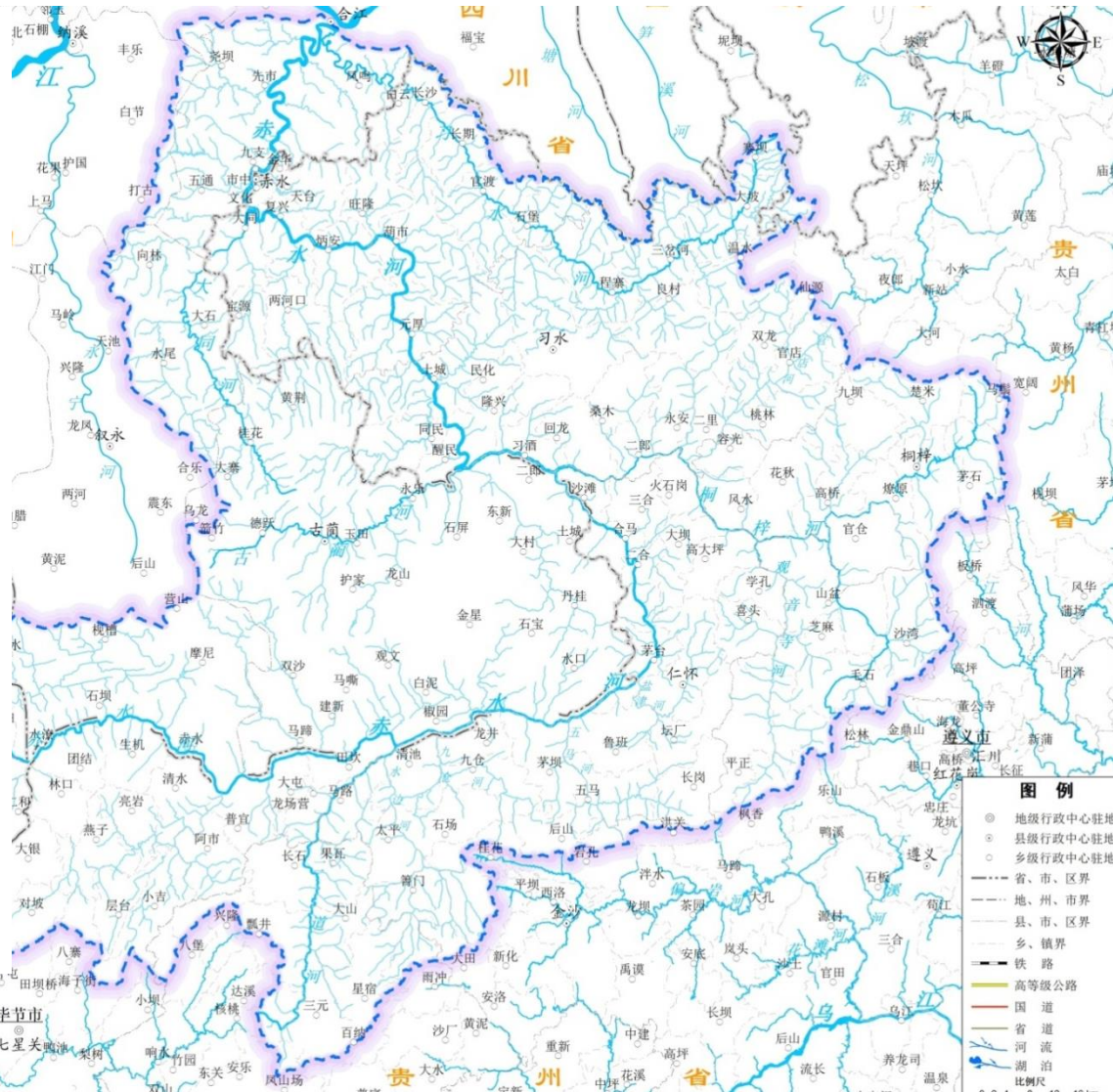
3 provinces, 4 cities, 13 counties (cities) involved

Main tributaries: Erdao River, Tongzi River, Xishui River, Gulin River, Datong River

Yunnan: 10.4%

Guizhou: 59.8%

Sichuan: 29.8%





## 1.2

Social and Economic Development  
Conditions

Province	City	County (city, region)	Total Population (10,000)	GDP (CNY10,000)	Primary Industry (CNY10,000)	Secondary Industry (CNY10,000)	Tertiary Industry (CNY10,000)
Yunnan	Zhaotong	Weixin	44.13	327,948	69,829	103,852	154,267
		Zhenxiong	162.18	1,021,680	249,452	343,988	428,240
Guizhou	Bijie	Qixingguan	115.55	<b>3,334,000</b>	660,000	1,060,000	1,614,000
		Dafang	98.13	1,748,300	324,000	672,700	751,600
		Jinsha	69.53	<b>2,055,500</b>	292,000	1,103,500	660,000
	Zunyi	Huairan	70.98	<b>5,608,300</b>	263,500	3,871,200	1,473,600
		Bozhou	94.39	<b>3,151,200</b>	690,600	1,451,600	1,009,000
		Tongzi	52.54	1,387,000	297,300	477,300	477,100
		Xishui	51.96	1,279,500	275,900	557,400	446,100
		Chishui	24.21	841,100	152,600	366,500	321,900
Sichuan	Luzhou	Xuyong	72.34	1,002,500	202,600	471,300	328,700
		Gulin	70.29	1,280,767	203,607	752,324	324,836
		Hejiang	70.87	1,617,427	337,089	700,181	580,157

## 1.2

## Social and Economic Development Conditions

### Development Features of Basin Division

- **Upstream area:** poorer, ecologically fragile; coal mining industry, coal chemical industry, coal power industry, and brewing industry.
- **Midstream area:** brewing industry, coal industry, characteristic agricultural products processing industry, and tourism.
- **Downstream area:** chemical industry, brewing industry, coal power industry, paper-making industry, shipbuilding industry

**Economic development is urgent; poverty alleviation is daunting.**



## 1.2

## Social and Economic Development Conditions

### Advantage:

- abundant natural resources
- abundant tourism resources
- special liquor production base
- red education base

### Constraint:

- less forest resources, land rocky-desertification
- low road standard, difficulties in transportation
- economic layout imbalance, irrational industrial structure
- location and outside contact relatively isolated



## 1.3

### State of the Ecological Environment

- ★ **Aquatic Organism:** 131 species of fish, 37 species are endemic fish in the upstream of the Yangtze River, including the white turtle, the Chinese barbs, and the rocks; rare and unique fish spawning grounds and concentrated distribution points: the core zone-9; the trunk buffer-7
- ★ **Nature Reserve:** Chi shuisuo, Xishui, Hua gaoxi National Nature Reserves, National Nature Reserves of Endemic Fish in the Upstream of the Yangtze River
- ★ **Natural Landscape:** Chishui Landscape and Famous Scenery, Huairan Maotai Landscape and Famous Scenery, Xishui Landscape and Famous Scenery, Yan ziyan National Forest Park, Zhuhai National Forest Park





## 1.3

## State of the Ecological Environment

### ★ Problems:

- serious soil erosion (coal mining and pyrite mining)
- development of polluting industries (coal chemical industry, coal power industry, paper-making industry, etc.)
- development of tributary hydropower (fragmentation of the habitat of fish)
- overfishing



## 1.4

## State of Chishui River's Water Environment

### \* Polluting Source Status

- **Upstream:** living pollution and agricultural pollution
- **Midstream:** brewers and coal companies
- **Downstream:** paper-making industry, bamboo machine enterprises, etc.

### \* Current Situation of Water Quality

- **Chishui River–Qijiang River system:** 16 monitoring sections of the 8 rivers
- **Water quality comprehensive assessment:** excellent; I-III level water quality section 100%





## 2. Importance of the Chishui River Basin Ecological Environment

## 2.1

### Strategic Resources Advantage

- ✱ Special wine resources (Maotai)
- ✱ Hydrodynamic resources
- ✱ Coal mine, pyrite, potassium, natural gas, etc.; mining value high
- ✱ Abundant biological resources: more than 1,700 species of plants, 131 species of fish
- ✱ Unique red tourism resources; abundant natural geographical resources





## 2.2

## Importance of the Ecological Environment

- ★ “Ecological River, Scenic River, Wine River, Hero River”; important ecological barriers of the upstream Yangtze River
- ★ National river water function area (rare and unique fish nature reserve)
- ★ Important national biodiversity conservation area
- ★ The important channel of the development strategy of the PRC’s Yangtze River economic zone
- ★ Typical “old, minority, border, poor” regions





# 3. Environmental Protection of the Chishui River Basin

## 3.1

### Establishment of the Environmental Protection Cooperation Group

- ✱ Pilot Scheme of the Environmental Supervision and Administrative Law Enforcement Agencies in the Chishui River Basin
- ✱ **Purpose:** implementation of strategic deployment
- ✱ **Institutional setting:** Environmental Protection Cooperation Group of the Chishui River Basin
- ✱ **Operating mechanism:** information sharing mechanism; environmental impact assessment consultation mechanism; monitoring and warning mechanism; environmental emergency response system; union law enforcement system



## 3.2

## Conservation Regulation of the Chishui River Basin (2011)

★ In 2013-2020:

- Comprehensive Protection Plan of the Chishui River Basin
- Planning of the Industrial Development of the Chishui River Basin
- Environmental Protection Planning in the Chishui River Basin
- Work Plan for the Environmental Special Rehabilitation of the Chishui River Basin
- Rehabilitation Plan of the Resultant Agricultural and Rural Pollution in the Chishui River Basin
- Work Plan for the Ecological Environment Management & Restoration of the Chishui River Basin





## 3.2

### Conservation Regulation of the Chishui River Basin (2011)

- ✱ **Ban, shut down, relocate** polluting enterprises and scale farms in restricted areas
- ✱ **Forbidden to** build heavy polluting enterprises
- ✱ **Forbidden to** build dams on the main stream and tributary with rare fish
- ✱ **Guide** farmers to rationally use chemical fertilizers, pesticides, and membrane, and promote the use of phosphor-free detergent
- ✱ **Increase** the construction of sewage and waste treatment facilities
- ✱ **Build** the water quality automatic station, **vigorously implement** the ecological forest project, **carry out** ecological rehabilitation。



## 3.2

### Conservation Regulation of the Chishui River Basin (2011)

- ✱ By 2016, more than 200 pollution enterprises and scale farms in restricted areas have either been banned, closed or relocated.
- ✱ Most of the villages and towns have achieved complete coverage of sewage treatment and garbage collection system.
- ✱ They have completed more than 3.5 million *mu* of forest and land for afforestation and reforestation, more than 138,000 acres of mineral green, 350 square kilometers of rock desertification.



### 3.3

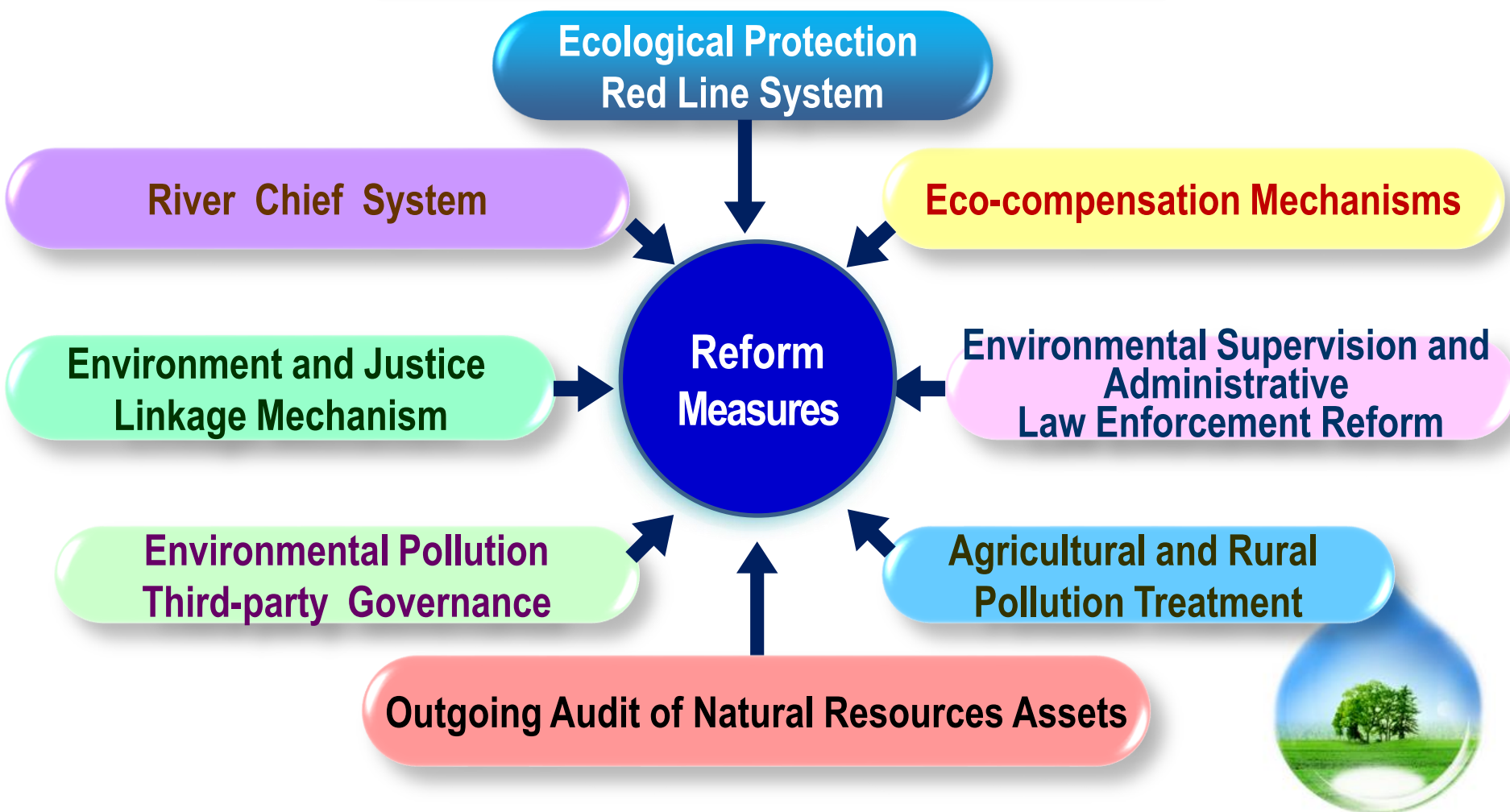
## Reform of the Ecological Civilization System

- ✱ During visit to Guizhou, General Secretary Xi Jinping demanded that the two bottom lines of development and ecology must be firmly maintained, and should explore a new way of development different from the eastern and western provinces.
- ✱ In December 2013, the then Party Committee Secretary of Guizhou Province Chen Min'er required the achievement of the ecological environment protection in the Chishui River Basin through reform measures.
- ✱ In April 2014, 12 ecological civilization system reform measures were implemented in the Chishui River Basin.



### 3.3

## Reform of the Ecological Civilization System





## 3.4

### Increasing Investment in Pollution Treatment in Guizhou Province

- ✱ From 2013 to 2016, more than CNY7 billion were invested in ecological environment protection. From 2012, the provincial government of Guizhou have invested CNY50 million per year for the protection of the ecological environment of the Chishui River Basin.
- ✱ From 2014, the Maotai Group donated CNY50 million per year (for a total of CNY500 million) for the pollution control in the Chishui River Basin.



## 3.5

### Joint Law Enforcement of Three Provinces (Yunnan, Guizhou, Sichuan)

Sign an environment joint law enforcement agreement of the three provinces

**Guiyang**

Agree to promote eco-compensation, clear pattern

**Luzhou**

Study the eco-compensation mechanism in the upstream of Chishui River Basin

**Zhenxiong**

Discuss the *Scheme of Eco-compensation in the Chishui River Basin*, carry out the pilot work of horizontal compensation in the three provinces

**Huairen**

**July 2013**

**October 2014**

**August 2015**

**December 2016**

**Environment Joint Law Enforcement Association**



改善生态环境就是



Environment and Justice  
Linkage Mechanism

Administrative  
Law Enforcement Reform





River Chief System

Joint Law Enforcement  
Association







Eco-compensation Consultation





# 4. Exploring Eco-compensation of the Guizhou Province

## 4.1

### The Case of Eco-compensation

September 2012  
Hongfeng Lake  
Guiyang & Anshun

January 2016  
Wu River  
Anshun, Bijie, Guiyang,  
Zunyi, Qiannan,  
Tongren

Exploration of Eco-compensation in Guizhou

July 2009  
Qingshui River  
Qiannan &  
Qiandongnan

January 2014  
Chuishui River  
Bijie & Zunyi





## 4.1

## The Case of Eco-compensation

### 贵州省人民政府办公厅

黔府办函〔2014〕48号

#### 省人民政府办公厅关于转发省环境保护厅等部门 《贵州省赤水河流域水污染防治生态补偿 暂行办法》的通知

各市、自治州人民政府，贵安新区管委会，各县（市、区、特区）人民政府，省政府各部门、各直属机构：

省环境保护厅、省财政厅、省水利厅制订的《贵州省赤水河流域水污染防治生态补偿暂行办法》已经省人民政府同意，现转发给你们，请认真贯彻执行。



（此件公开发布）

### 贵州省人民政府办公厅

黔府办函〔2015〕208号

#### 省人民政府办公厅关于转发省环境保护厅 等部门《贵州省乌江流域水污染防治 生态补偿实施办法（试行）》的通知

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（此件公开发布）

## 4.2

## The Compensation Scheme

### (1) Qingshui River

- ★ **Assessment section:** Qiannan and Qiandongnan cross section; Qiandongnan boundary section
- ★ **Assessment index:**  $\text{NH}_4^+\text{-N}$ , F
- ★ **Qiannan and Qiandongnan cross section:** If the value of water quality measured (month)  $>$  control objective, Qiannan pay compensation funds (30% provincial public finance, 70% Qiandongnan public finance).
- ★ **Qiandongnan boundary section:** If the value of water quality measured (month)  $>$  control objective, Qiandongnan pay compensation funds to provincial public finance (total of CNY123 million).



## 4.2

## The Compensation Scheme

### (2) Hongfeng Lake

- ★ **Assessment section:** Jiaojia bridge of Yangchang River, Luoja bridge of Taohuayuan River
- ★ **Assessment index:** COD,  $\text{NH}_4^+\text{-N}$ , TP
- ★ **Upstream Anshun section:** If the main pollutants meet or are better than (GB 3838-2002) III level, downstream Guiyang pay compensation funds to Anshun.
- ★ **Upstream Anshun section:** If the main pollutants exceed the standards, upstream Anshun pay compensation funds to Guiyang (total of CNY122 million).



## 4.2

## The Compensation Scheme

### (3) Chishui River

- ★ **Assessment section:** Bijie and Zunyi cross section
- ★ **Assessment index:**  $\text{COD}_{\text{Mn}}$ ,  $\text{NH}_4^+\text{-N}$ , TP
- ★ **Upstream Bijie boundary section:** If the water quality is better than (GB 3838-2002) II level, downstream Zunyi pay compensation funds.
- ★ **Upstream Bijie boundary section:** If the water quality is inferior to (GB 3838-2002) II level, Bijie pay compensation funds.
- ★ **Cross section of the Chuishui River Basin (8 sections):** If the water quality is inferior to the level of prescribed water quality, pay compensation funds (total of CNY38 million).



## 4.2

## The Compensation Scheme

### (4) Wu River

- ★ **Assessment section:** main stream of Wu River, Liuchon River and Wengan River cross section
- ★ **Assessment index:** TP, F
- ★ **Boundary section of middle-upper stream cities:** If the main pollutants exceed the standards, pay compensation funds to downstream cities.
- ★ **Boundary section of downstream cities:** If the main pollutants exceed the standards (deducted upstream), pay compensation funds to provincial public finance (total of more than 50, ten thousand yuan).



## 4.3

### The Compensation Effect

- ★ **Qingshui boundary section:** Overall getting better; the TP concentration decreased from 0.59 mg/L in 2009 to 0.08 mg/L in 2016, down 86.4%.
- ★ **Hongfeng Lake:** better than (GB 3838-2002) III level
- ★ **Chishui River:** From 2010, overall achieved (GB 3838-2002) II level
- ★ **Wu River boundary section:** Overall getting better; the TP concentration decreased from 0.61 mg/L in 2010 to 0.13 mg/L in 2016, down 78.68%.



- The Chishui River Basin has important ecological and environmental functions, especially in the typical revolutionary old areas, ethnic areas, remote areas, and poor areas.
- In order to protect the ecological environment of the Chishui River Basin, the implementation of the cross-provincial horizontal eco-compensation has very important implication and demonstration effect.



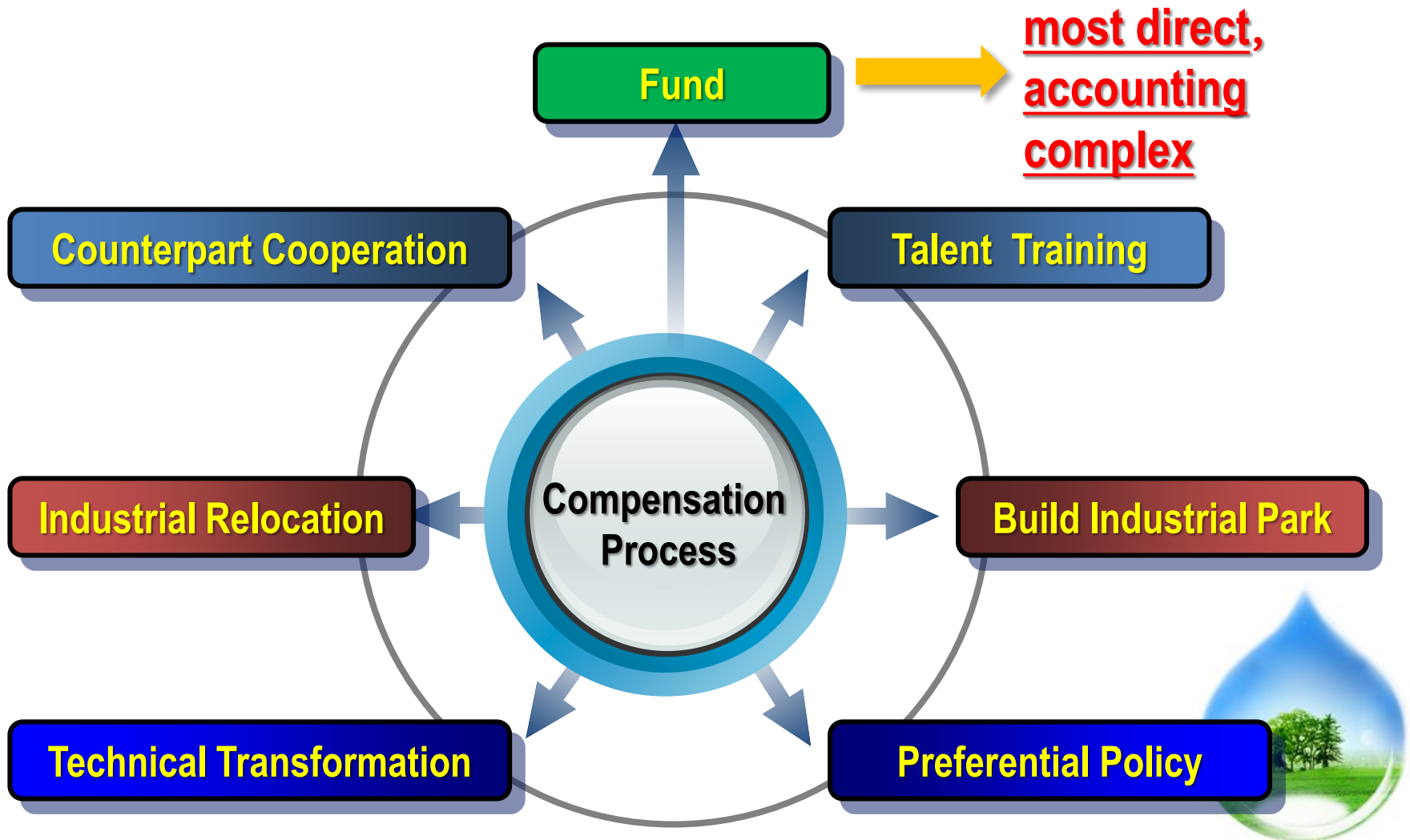




# 5. Development of the Chishui River Basin Eco-compensation

## 5.1

### The Compensation Process



## 5.2

## The Compensation Standard

**Involved the interests of all parties**

**How to  
Determine?**

**Determination  
Method**

Based on ecosystem services quantification,  
opportunity cost accounting, and game between  
supply and demand

**Recommend  
Ways**

Simplify the process:  
Negotiation—Start first—Then refine



## 5.3

### The Preliminary Development

■ Principle: Water quality does not degrade.

(1) Assessment indicators included in the compensation scope

高锰酸盐指数 ( $\text{COD}_{\text{Mn}}$ )

氨氮 ( $\text{NH}_4^+-\text{N}$ )

总磷 (TP)



## 5.3

## The Preliminary Development

### (2) Assessment section

- Yunnan-Guizhou border section: Qing shuipu
- Guizhou-Sichuan border section: Lian yuxi
- Guizhou-Sichuan boundary river section:  
Erdao River entry section, upstream main  
stream section of Gulin River entry, section  
of Gulin River entry, section of Datong River  
entry



## 5.3

### The Preliminary Development

#### (3) Compensation scheme

**Funded M million by the central government each year**

- a. **Principles of prioritizing upstream protection:** assign 0.3M to Yunnan first
- b. **For the remaining 0.7M:** Yunnan, Guizhou, Sichuan—basin area ratio (1: 6: 3)

Contribution proportion of water flow (1: 1.9: 1.8),  
50% of the weight distribution, Yunnan  $0.16 \times 0.7M$ ,  
Guizhou  $0.50 \times 0.7M$ , Sichuan  $0.34 \times 0.7M$ ,  
CNY10,000

- c. **M final allocation:** Yunnan 0.41M, Guizhou 0.35M,  
Sichuan 0.24M



## 5.3

### The Preliminary Development

**Yunnan–Guizhou, Guizhou–Sichuan: each invested CNY50 million**

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Water quality indicators of the assessment section, the annual average is the basic limit, 3 years before the compensation year

Estimated fund raising index:

$$P = k_0 \times \sum_{i=1}^3 a_i \frac{C_i}{C_{i0}}$$

$P$  — Compensation index of the border section of Chishui River of two provinces

$k_0$  — Water quality stability factor;  $k_0 = 1$

$a_i$  — Water quality index weight coefficient; Equal weight coefficient = 1/3

$C_i$  — Average annual concentration of an indicator

$C_{i0}$  — Basic limits of an indicator





## 5.3

### The Preliminary Development

#### Yunnan-Guizhou:

- ☼ If  $P \leq 1$ , Guizhou pays CNY50 million to Yunnan
- ☼ If  $P > 1$ , Yunnan pays CNY50 million to Guizhou

#### Guizhou-Sichuan:

Considering the river boundary problem, responsibility should be shared according to the length of the river.

- ☼ If  $P \leq 1$

The water quality of upstream (Guizhou and Sichuan) did not degrade, both provinces have made their contribution, downstream (Sichuan) pays compensation of CNY50 million to the upstream.

Base on river length ratio  
(Guizhou : Sichuan = 71 : 29)



Guizhou allocated CNY35.5 million  
Sichuan allocated CNY14.5 million

## 5.3

### The Preliminary Development

 If  $P > 1$

The water quality of the upstream (Guizhou and Sichuan) degraded, the upstream pays CNY50 million to the downstream (Sichuan).

According to the monitoring results of the main tributaries, the amount to be appropriated by Guizhou and Sichuan of upstream:

- Guizhou tributary water quality: Exceed, Guizhou pays CNY50 million  
----->
- Sichuan tributary water quality: Exceed, Sichuan pays CNY50 million  
----->
- Guizhou and Sichuan tributary water quality: Both Exceed, according to the length of the river under their respective jurisdiction, Guizhou pays CNY35.5 million, Sichuan pays CNY14.5 million  
----->
- Guizhou and Sichuan tributary water quality: Both Meet, according to the length of the river under their responsibility, Guizhou pays CNY35.5 million, Sichuan pays CNY14.5 million  
----->

Lian yuxi  
Water quality  
degradation



## 5.3

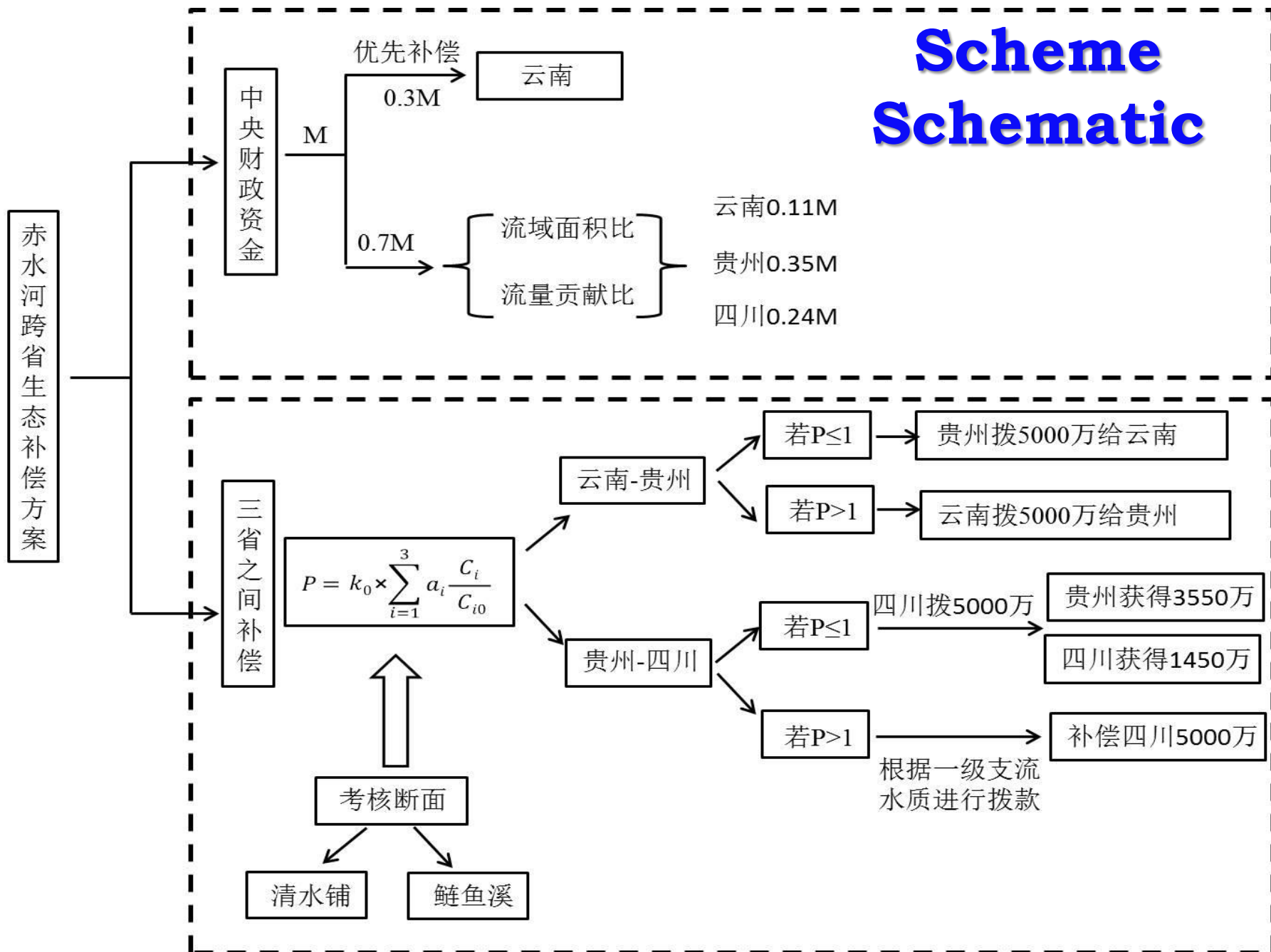
### The Preliminary Development

#### Major pollution accident (defined by MEP)

- ✱ If accident takes place in Guizhou, Guizhou pays CNY50 million to Sichuan;  
If it happens in Sichuan, Sichuan pays CNY50 million to Guizhou.
- ✱ If accident takes place in Yunnan, resulting in exceeding of assessment section of Guizhou and Sichuan, Yunnan pays all the compensation amounting to CNY100 million, with Guizhou and Sichuan receiving CNY50 million each.



# Scheme Schematic





***THANK YOU !***