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## Analysis of the effectiveness of ecological protection work in Dujiangyan area after 5.12 earthquake

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# Analysis of the effectiveness of ecological protection work in Dujiangyan area after 5.12 earthquake

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**Abstract.** Dujiangyan, a county-level city in Chengdu, is located at the outskirts of the Minjiang River on the northwestern edge of the Chengdu Plain. As a national health city, the ecological protection status of Dujiangyan City has received much attention. From the five aspects of ecological economy, ecological environment, ecological awareness, ecological governance and landscape maintenance, we will make a comprehensive consideration and evaluation of the ecological protection status of Dujiangyan area, so that the area can make more obvious achievements in ecological aspects.

## 1. Introduction

Dujiangyan City is a combination of mountains, water, forests, rafts and bridges. It reflects the layout features of water and water in the city. For this reason, it has the reputation of “visiting the Dujiang weir, ask for the way of life at Mont Qingcheng”. Received honors such as "China's Excellent Tourism City" and "National Historical and Cultural City". As a famous tourist city, the ecological environment has become one of the key tasks of Dujiangyan governance.

## 2. Overview of Dujiangyan area

Dujiangyan city is located at the northwest edge of chengdu plain in the central part of sichuan province. The city is bounded by pengzhou city, pixian county and wenjiang district in the east, wenchuan county in the west and north, and chongzhou city in the south. It is 48 kilometers from chengdu. The maximum horizontal distance from east to west is 34 kilometers, and the maximum vertical distance from south to north is 68 kilometers, with a total area of 1208 square kilometers.

Dujiangyan city has two world cultural, natural heritage and irrigation engineering heritage of qingcheng mountain-dujiangyan and giant panda habitat. It is one of the first national excellent tourist cities and one of the rare "three heritages" cities. It has national AAAAA scenic spot.

In 2017, dujiangyan's regional GDP reached 34.85 billion yuan, up 8.7 percent from the previous year. The added value of the primary industry reached 2.717 billion yuan, up by 5.1%. The added value of the secondary industry reached 12.758 billion yuan, up by 6.9%. The added value of the tertiary industry reached 19.375 billion yuan, an increase of 10.5 percent.

## 3. Regional ecological protection analysis

### 3.1 Ecological economic policy tends to be significant

As the core area of Chengdu's “West Control” strategic deployment, Dujiangyan City adheres to the “green development” concept of harmonious coexistence between man and nature. In the two aspects



of ecological protection and economic development, it has found a coincidence point and focuses on the development of light pollution economic sectors. Actively transform and upgrade the secondary industry<sup>[1]</sup>. In the innovation section of the CMB, we have gradually absorbed dozens of major projects worth more than 100 million, including the “Fruit Man Trolltech World” with an investment of nearly 2 billion yuan and the “Wanda International Travel City Industry Project” with a total investment of about 55 billion yuan. In the modern service industry sector, we will focus on building a tourism industry, optimizing tourism public services, and promoting the transformation of the tourism industry. In the urban modern agricultural sector, we will build high-end products based on characteristics such as kiwi, tea, Sichuan and Chongqing, and high-quality agricultural products. Ecological agriculture. In the manufacturing industry, with high-tech industries, clean energy, high-end equipment manufacturing as the direction, the economic and ecological benefits will be doubled.

### 3.2 The ecological environment needs urgent attention

#### 3.2.1 Air quality is significantly affected by the environment

In 2009, the air quality of Dujiangyan experienced abnormal fluctuations, and air pollution at each monitoring point was serious. In 2010, with the gradual end of post-disaster reconstruction and the strengthening of pollution prevention and control work, the pollution concentration began to decrease and the air quality began to improve<sup>[2]</sup>. According to Liu Wei and Li Xingping, the changes in the comprehensive pollution index and pollution load factor are related to post-disaster reconstruction and governance.

In recent years, the air quality compliance rate of Dujiangyan has dropped significantly, but it is still at a relatively good level in the whole Chengdu area. It shows that under the background that Chengdu's overall air quality is not optimistic, Dujiangyan still has enough efforts to prevent and control air pollution.

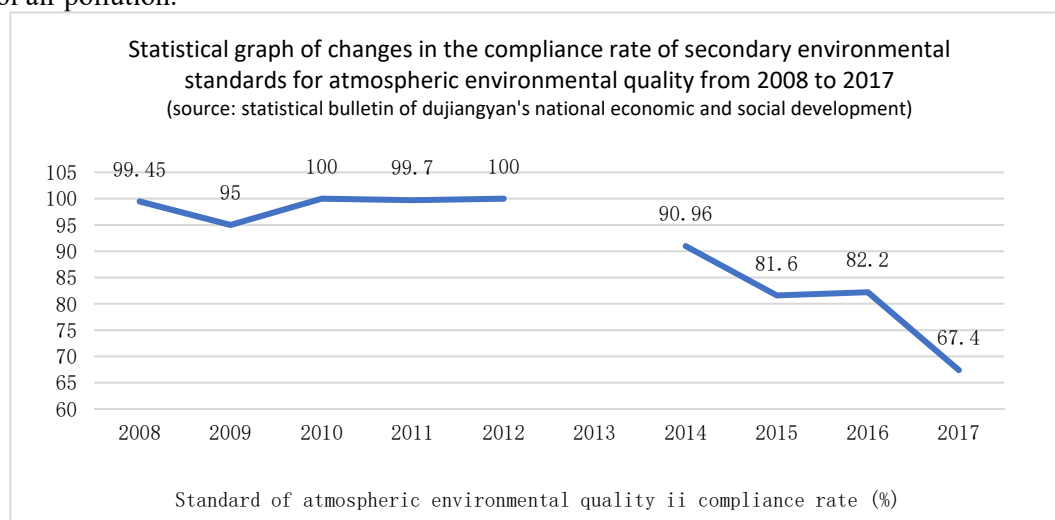


Figure1 Statistical graph of changes in the compliance rate of secondary environmental standards for atmospheric environmental quality from 2008 to 2017

#### 3.2.2 Noise problem needs to be solved

In terms of noise, Dujiangyan residents do not agree that the proportion is high, the main feedback is traffic whistle, construction noise. As a tourist city, Dujiangyan has a large number of entertainment facilities and places such as mahjong halls and open-air audio, and the noise generated by it has a great impact on residents.

### *3.2.3 Water pollution control has achieved remarkable results*

Around 2013, the Dujiangyan Municipal Party Committee and the Municipal Government continued to increase the construction of environmental infrastructure focusing on the water environment. It has invested nearly 2 billion yuan to build a water supply plant in the western district and 33 centralized water supply stations to solve the problem of drinking water for the villagers. 129 kilometers of sewage treatment plants and sewage pipe network and 129 domestic sewage treatment facilities in permanent concentrated residential areas were built to solve the problem of domestic sewage treatment and achieve full coverage of all domestic sewage treatment in the city<sup>[3]</sup>. After 2016, five sewage treatment plants were built, using more advanced sewage treatment technology, and repeated optimization and expansion in the next few years, which greatly improved the water environment of Dujiangyan, and protected water pollution and protected local areas. The water quality and ecological balance of the basin have a significant impact.

## *3.3 Ecological awareness enhancement*

### *3.3.1 Implement ecological policies and strengthen supervision and publicity*

Dujiangyan City highlights the protection of ecological resources. Adhere to the functional division of “85% natural ecological environment zone and 15% ecological economic zone”, strictly from urban and rural construction zones, limited construction zones, suitable construction zones and green lines, water body blue lines, cultural relics purple lines, infrastructure yellow lines. Three districts and four lines "control. Implement stricter environmental protection systems and environmental access standards, and fully implement energy conservation and emission reduction<sup>[4]</sup>.

Secondly, in 2017, Dujiangyan launched the whole city greening operation, and built the “One Heart, Four Rings, Nine Corridors and Multi-Group” urban ecological green space system<sup>[5]</sup> with Dujiangyan Scenic Area and Tianfuyuan Wetland as the core, so that it is in the forefront of Sichuan Province. The urban green area of Dujiangyan has been further improved, but the greening in the built-up area has still not been effectively covered, resulting in residents generally agreeing that the community greening effect is insufficient and still needs to continue to deepen.

### *3.3.2 Policy-driven multi-agents practice environmental protection together*

The implementation of the "river system", "mountain system", "street length system", the government and the surrounding areas to promote pollution prevention and control, and jointly build an important ecological barrier upstream of the Yangtze River. On the one hand, it strengthens mutual supervision of residents, and multi-subjects participate in ecological protection; on the other hand, it strengthens propaganda, and above, it uses the propaganda column to persuade non-performing behaviors such as free discharge of sewage and classification and recycling of domestic garbage.

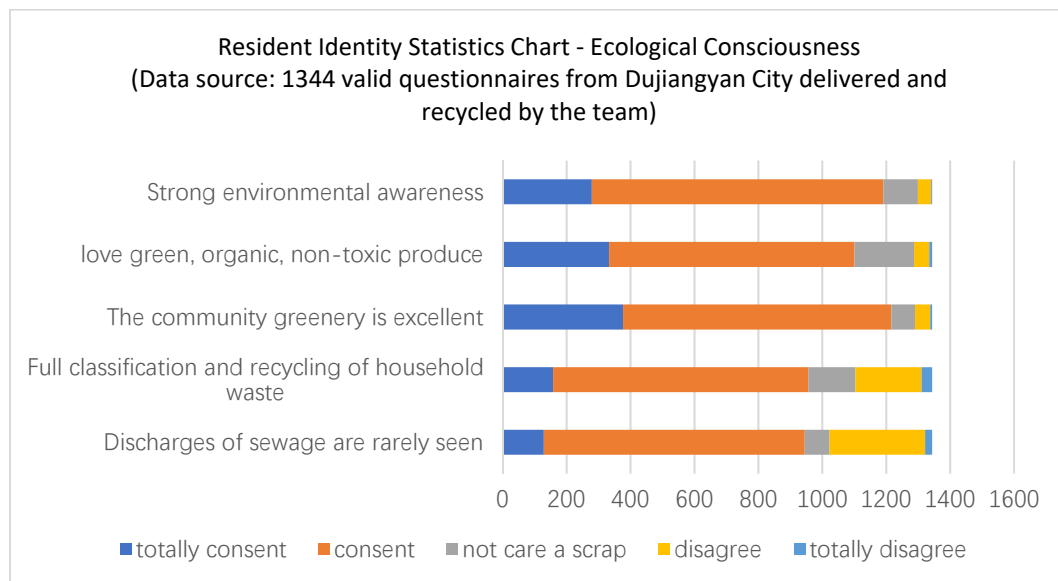


Figure2 Resident Identity Statistics Chart - Ecological Consciousness

### 3.4 Ecological Good Governance

#### 3.4.1 Ecological governance has become a focus of work

In order to build a high-quality international eco-tourism city, Dujiangyan has continuously introduced ecological management related policies, organized ecological governance theme activities, and strengthened the implementation of ecological control measures, especially water ecological management, such as Dujiangyan City water ecological management work. Report, 2018 China Dujiangyan Water Ecological Civilization Summit Forum, etc. , and in 2018, there is also a Dujiangyan section with a total investment of about 520 million yuan to provide a more comfortable living environment, protect river ecological functions, and effectively curb water pollution. Jinjiang and Lancang River water ecological environment comprehensive treatment projects have been carried out one after another.

#### 3.4.2 Large funds and multiple projects promote ecological good governance

At the same time as all aspects of investment increase, Dujiangyan is also increasing the number of implementation of relevant ecological governance projects. In 2013, in order to give full play to the role of ecological barriers and water conservation functions, in accordance with the “Dujiangyan City Ecological City Construction Plan”, Dujiangyan City invested heavily in the implementation of ecological construction and environmental protection projects, and organized the implementation of ecological agriculture construction, rural energy construction, and ecological industrial construction. 67 key projects in 10 fields, including ecotourism construction, ecological town construction, water source and water environmental protection construction, biodiversity conservation, special regional construction, ecological restoration and reconstruction, and ecological cultural system construction, with a total investment of more than 13 billion yuan. In 2018, the key signing ceremony of key projects in Dujiangyan City was held. A total of 14 key projects were contracted, involving key national laboratories, tourism, tourism agriculture, modern service industry, and headquarters economy. The contracted amount reached 48 billion yuan. It has injected new impetus into the ecological management of Dujiangyan<sup>[6]</sup>.

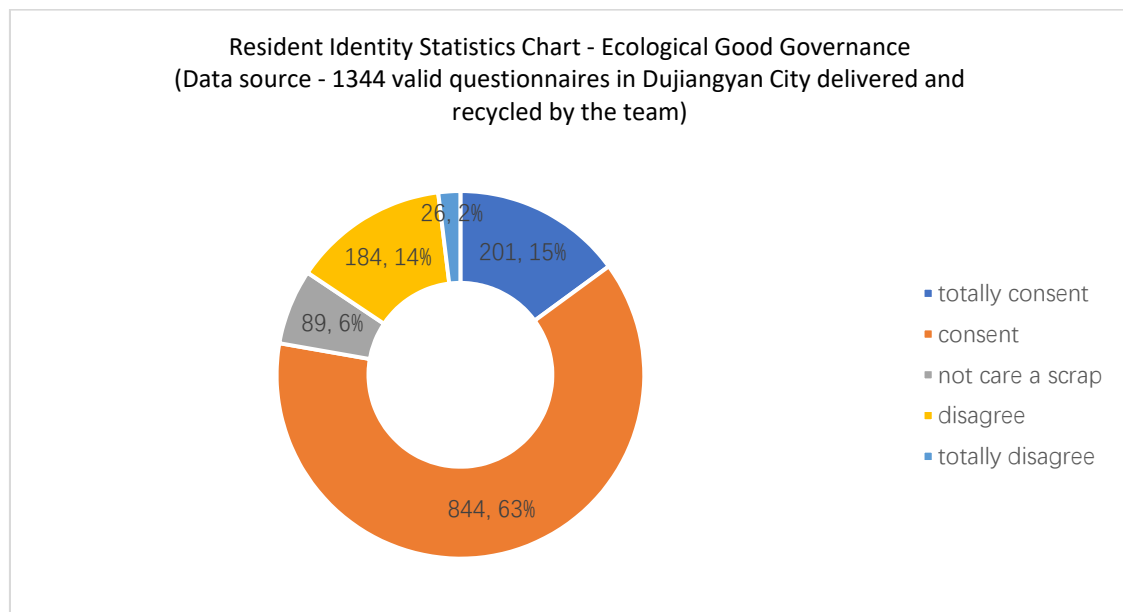


Figure3 Resident Identity Statistics Chart - Ecological Good Governance

Residents still agree to occupy a large proportion of ecological good governance, close to 40%, and the selection rate of “consent” is far greater than “very agree”. It can be seen from this that residents have a high evaluation of the effects of ecological governance, but there is still room for improvement.

### 3.5 Landscape from rescue repair to operational maintenance

The service industry led by tourism is the pillar industry of Dujiangyan City, which accounts for almost half of the city's gdp. After the earthquake, Dujiangyan invested a large amount of funds for landscape restoration, and the funds, manpower and material resources were also stable in the following years. At the same time, in recent years, Dujiangyan insisted on building a high-quality international eco-tourism city, which not only increased spending on landscape maintenance, but also sought to optimize expansion. In 2016, the master plan of Qingcheng Mountain-Dujiangyan Scenic Spot was revised, which explained the landscape classification protection in detail. For example, the protection and management of scenic spots should meet the requirements of the Regulations on Scenic Spots, and it is forbidden to open mountains, quarrying, mining, and destroying natural vegetation; Ecological restoration and vegetation tending should be strengthened, which directly indicates that landscape maintenance is highly valued and continuously strengthened. Dujiangyan has a large area of natural landscape and human landscape, and residents also have a more intuitive feeling of strengthening the landscape maintenance.

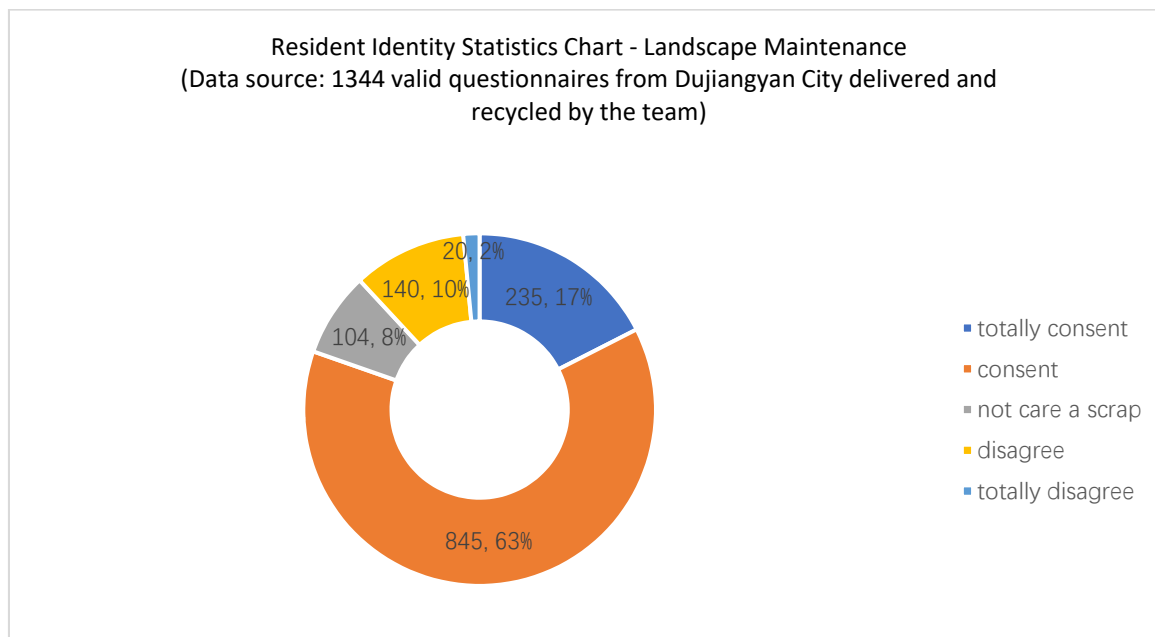


Figure4 Resident Identity Statistics Chart - Landscape Maintenance

#### 4. Conclusion

Due to its special geographical location and historical culture, the Dujiangyan area is valued by the society. Throughout the historical development of Dujiangyan, its cultural heritage is profound, the city has a long history, and it is also a famous tourist destination. The regional government has invested a lot in the regional ecological construction and has obvious guidance.

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