

# Exploring the Mode of Industrial Restoration and Development Under the View of Natural Disasters

Based on the Decade of Reconstruction After Dujiangyan 5.12 Earthquake

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**Abstract**—Natural disasters are inevitable, and they have a very destructive impact on the environment in which humans and humans live. The impact of natural disasters on economic growth is one of the important issues in the study of disaster economics. For the disaster area, how to quickly carry out post-disaster recovery and development, and form a unique development model is particularly important. As one of the most severe disaster areas in the Wenchuan earthquake, Dujiangyan actively cooperated with the public after the disaster, accelerated the innovation of management system, actively built international cooperation, accelerated the construction of new business styles based on the advantages of natural and humanities, and continuously optimized and improved the construction of supporting facilities based on the needs of industrial development. In the decade after the disaster, the economic recovery and development of the region showed fluctuations, stabilization and year-on-year improvement. Regional economic output continued to increase. This study uses the theory of economic growth to analyze from the perspective of industrial recovery and development, and explore the development model of the region in the next decade after the disaster, for reference by other disaster areas.

**Keywords**—*post-disaster reconstruction; economic development; three major industries*

## I. INTRODUCTION

Due to natural factors such as geographical location and meteorological conditions, China is one of the most frequent natural disasters in the world, and the frequency and intensity of disasters are among the highest in the world. In addition, as a country with a large population and a large agricultural country, China's economic losses due to natural disasters and major accidents are at least hundreds of billions. Natural disasters have become an important factor restricting the

development of the national economy. The frequent occurrence of social and economic development in the disaster areas has brought many difficulties. According to relevant statistics, there have been nearly 800 earthquakes of magnitude 6 or above in China. Since 1900, the number of people who died in the earthquake in China has reached 550,000. Since 1949, more than 100 devastating earthquakes have hit 22 provinces and autonomous regions. The municipality directly under the Central Government has an area of more than 300,000 square kilometers and houses collapsed to 7 million. The severity of the earthquake, a natural disaster, has become one of China's national conditions, causing huge losses to the national economy.

On May 12, 2008, a large earthquake with a magnitude of 8.0 Ms in the Wenchuan County of the Aba Prefecture of Sichuan Province, Sichuan Province, and the Wenchuan Earthquake severely damaged more than 100,000 square kilometers, causing economic losses of 845.125 billion yuan [1]. Dujiangyan is one of the ten most severely affected areas, and all aspects of production and life of the people in the disaster area have been hit hard. After the Wenchuan earthquake, with the help of the state, the government, and all walks of life, the Dujiangyan disaster area gradually recovered and rebuilt. So far, compared with other disaster areas, Dujiangyan has been recovering rapidly after the disaster.

Therefore, this study takes the recovery and development of Dujiangyan industrial economy in the decade as a research perspective, through empirical research to explore the development model of Dujiangyan's post-disaster economic recovery, and provides reference paths for other disaster areas to help the development of social economy.

## II. LITERATURE REVIEW

In the context of frequent disasters in China and the world, more and more scholars have carried out theoretical and empirical research on post-disaster recovery and reconstruction, and reviewed the literature on post-disaster recovery and reconstruction, and found that different scholars have studied it from multiple perspectives.

For example, from the perspective of social work, post-disaster reconstruction studies, such as Wake Difficulty and Chen Jinghuan, based on social work in the disaster area to form embedded development, from social work as a research perspective, formed a social mutual structure co-variation relationship, and proposed that this is a society The co-construction and governance sharing of governance[2]; Liu Huan analyzed the space of social work intervention from the perspective of the needs of the victims, the reconstruction of social relations, the allocation of resources and the contradiction between the government and the people, and emphasized the importance of social work in post-disaster reconstruction from various aspects. Finally, in view of the institutional problems and developmental stages of social work in China, it points out the current situation of social work and emphasizes the need to further exert the effectiveness of social work at the macro level [3]. Some scholars have also studied disasters from an economic perspective. For example, Lu Qingfang, Zhao Haicheng, and Cao Yu conducted in-depth analysis of the development gaps in the disaster area in the past ten years, and used the concept of convergence and analysis of economic growth theory to explore the development of the disaster area in the past ten years. Regional differences are inherently trending. And the study found that after the "5·12" Wenchuan earthquake, the economic development differences between Sichuan counties (cities, districts) showed an overall trend of shrinking year by year [4]; Tang Yandong, Yu Wei, Liu Chunping explored nature based on neoclassical growth theory The relationship between disasters and economic growth. The impact of disasters on per capita capital, investment rate and technological progress was expounded, and the per capita output dynamics after the disaster was analyzed [5].

Previous studies have produced different conclusions based on different research methods, but few scholars focus on the perspective of industry to study the recovery and development of post-disaster economy. Therefore, this study focuses on industrial structure and explores post-disaster economic recovery and reconstruction from post-disaster industrial development mode.

## III. EMPIRICAL ANALYSIS OF INDUSTRIAL RECOVERY AND DEVELOPMENT IN THE NEXT DECADE AFTER THE DISASTER

### A. Overview of Industrial Scale and Environment in the Decade After the Disaster

After the 5.12 Wenchuan earthquake, Dujiangyan suffered serious losses in agriculture, industry and service

industries. How to make full use of existing resources to develop the industry has become a top priority. With the help of all walks of life, the Dujiangyan government insists on one-handed efforts to resist earthquakes and disasters, and spares no effort to restore and rebuild after the disaster; to grasp economic and social development with one hand and to maintain the good momentum of economic and social development [6]. The major construction entities of Dujiangyan City rely closely on the resource advantages and green ecological background of Dujiangyan City, focus on the development strategy of "West Control" development, closely focus on the actual production of Dujiangyan industry, transform the development concept and development mode, and build "double heart two District" global spatial development pattern. In addition, Dujiangyan combined with the actual situation of the industry to build a characteristic industrial ecological circle, and launched the Daqingcheng Kangyang Tourism Industry Ecology Circle, the Binjiang New Area Cultural and Entertainment Industry Ecology Circle and the Economic Development Zone to cultivate the three special industrial ecosystems of the special medical use formula food industry ecological circle. The construction of the park (aggregate area) will strive to build a green development demonstration area of the national central city that fully reflects the new development concept [7].

### B. Three Major Industry Development Models and Profiles in the Decade After the Disaster

1) *Grasping the opportunity of agricultural modernization and restoring development in rural revitalization:* As the foundation of industrial development, agriculture plays an important role in social and economic development. The Wenchuan earthquake caused extensive damage to agricultural acreage and the destruction of forest vegetation. After the disaster, Dujiangyan established a 100,000-mu modern ecological agriculture cluster, formed an industrial concentration development zone, demonstrated and led the formation of industrial development clusters, and actively shifted traditional agriculture to modern agriculture. Dujiangyan strongly emphasizes the development of agricultural product brand economy, highlights characteristic industries, and enhances the market competitiveness of superior agricultural products. For example, Dujiangyan's kiwifruit is sold throughout the country, which not only stimulates the development of the internal economy, but also promotes agricultural modernization and enhances the influence of China's agricultural product brand. This time, we will record the total number of vegetables, slaughter pigs, live pigs, and total grain output in the past ten years (see "Fig. 1"), and achieve a comparative analysis of time and space. It can be seen from the statistics that vegetable yield, live pig stocks, and grain total production has basically recovered to the level of development a decade ago, and production will continue to grow steadily in the future.

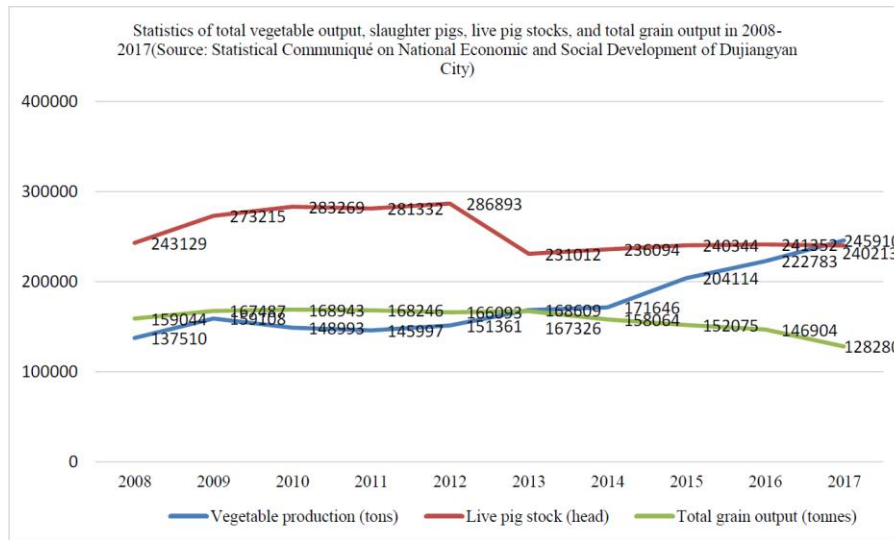


Fig. 1. Statistical graph of total vegetable output, live pig stocks, and total grain output in 2008-2017.

2) *Adopting a new model of industrial development to achieve a new leap in economic growth:* According to the unified planning of Chengdu and the requirements for industrial development, Dujiangyan City established an industrial development zone after the disaster and concentrated on the development of medicines, new materials and other industries. New economic activities such as new technologies, new models, new industries, and new formats have developed rapidly, and the investment in scientific and technological innovation has continuously

increased. It closely follows the development opportunity of “the Belt and Road”, actively carries out international exchanges and cooperation, and continuously introduces and develops. In the past ten years, the total utilization of foreign capital, patent applications, and total output value of high-tech industries in Jiangyan City have generally shown an upward trend (see “Fig. 2”), which not only promotes The recovery and development of the local industry has also transformed the development model, developed into a high-tech industry, and further optimized the industrial structure.

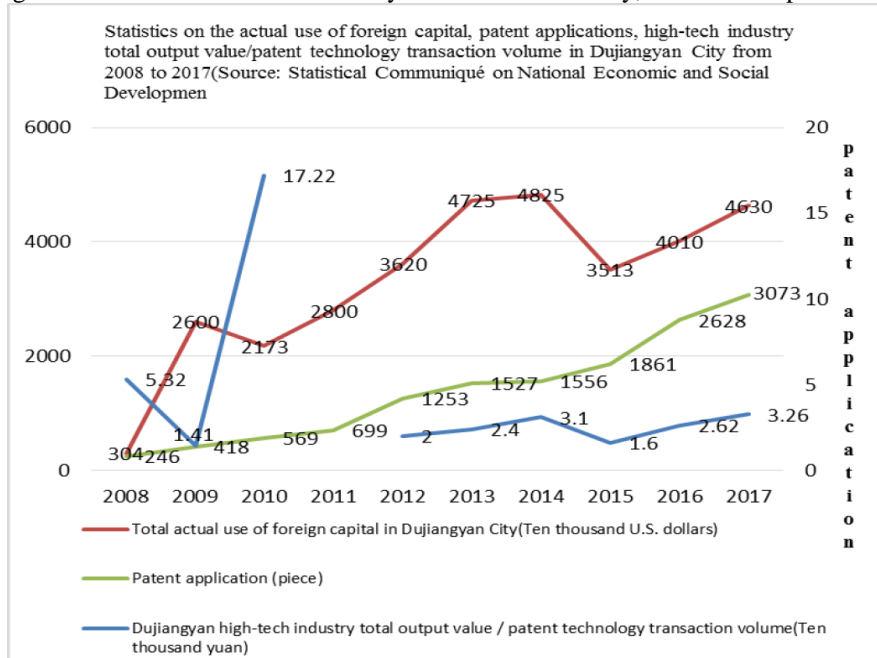


Fig. 2. Statistical graph of the actual use of foreign capital, patent applications, high-tech industry total output value/patent technology transaction volume in Dujiangyan City from 2008 to 2017.

3) *Integrating and utilizing superior resources to create a new city of cultural tourism:* Dujiangyan City is a historical and cultural city that has risen due to the rise of

water. It has a history of more than two thousand years of construction. Tourism is its pillar industry [8], and its contribution to the economy has exceeded 10%. However,

after the earthquake, all scenic spots in Dujiangyan were severely damaged, which had a huge impact on the tourism industry in Dujiangyan City, causing countless losses.

After the disaster, Dujiangyan took advantage of its unique natural resources to the extreme, enabling the tertiary industry represented by tourism to develop rapidly. Due to its location in the upper reaches of the Minjiang River, Dujiangyan is one of the birthplaces of the ancient Shu Kingdom. It is also famous for the world famous water conservancy project Dujiangyan and the Qinghai Mountain, the birthplace of Chinese Taoism. It has the layout features of “Guancheng Water Color Half City Hill”, known as the reputation of Qingcheng Mountain [9]. The main body of tourism construction in Dujiangyan aims at the changing trend of tourists' consumption demand, and deeply explores the connotation of world-class cultural tourism resources of “mountain, water, road and panda”, and makes fine heritage

sightseeing tourism products with the standard of “5A+”; adheres to “tourism+”+ Tourism, highlighting the creation of tourism and health care, fashion amusement, mountain sports and other tourism product systems, the creation of Chengdu Cultural Tourism City, Anzhen International Tourism Resort, Blu-ray Fruit Heroes and other major tourism projects have been landing[10]. Dujiangyan takes the construction of an international eco-tourism city as its development goal, continuously gathers new resources, and vigorously develops green tourism and health care industry[11], enhances the core competitiveness of natural tourism brands, and promotes local economic recovery and development. According to statistics, it can be seen that Dujiangyan's tourism-oriented tertiary industry recovered and developed during the decade after the disaster, and will continue to increase its contribution to economic growth compared to a decade ago (see “Fig. 3”).

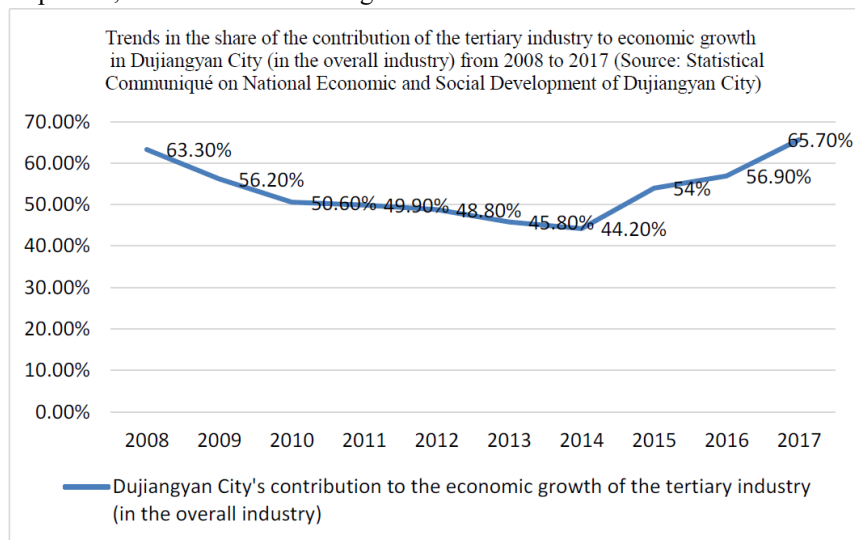


Fig. 3. Statistical chart of the share of the contribution of the tertiary industry to economic growth in Dujiangyan City (in the overall industry) from 2008 to 2017.

### C. Analysis of Economic Recovery and Development in the Decade After the Disaster

After the 5.12 earthquake, Wenbai's innovative 100 billion investment industrial cluster is being formed, 1,245 catering enterprises are included in the credit system, agricultural product brand construction, kiwifruit is sold to the Netherlands, and more than 200 industrial enterprises adapt to the green economy to transform and upgrade. Social fixed assets investment, Dujiangyan City At the end of the year, the balance of various deposits of financial institutions and the balance of various loans of Dujiangyan continued to increase. For the development of preferential policies, Dujiangyan City can mobilize enterprises to participate in the vitality of post-disaster economic recovery and construction. New enterprises can enjoy a series of preferential policies of the state, the province and Chengdu, and implement active financial return and incentive policies; and agricultural comprehensive development projects, in addition to

exemption from income tax for two years, and then halved income tax for three years, after the application of the enterprise, can also be halved for two years of income tax [12]; for young entrepreneurs, you can get entrepreneurial subsidies and startup parks, etc. It can be seen that after the earthquake, Dujiangyan City focused on restoring and developing the economy, the economic development momentum is getting stronger and stronger, and the economic vitality is continuously enhanced.

This study carried out dynamic statistics on the added value of the three major industries in Dujiangyan during the decade (see “Fig. 4”). It can be seen from the figure that the secondary and tertiary industries show a continuous growth trend, which is a big improvement compared with ten years ago. As a basic industry, agriculture has a slower growth rate. This is because Dujiangyan is vigorously optimizing the industrial structure and realizing the optimization and upgrading of the industry.

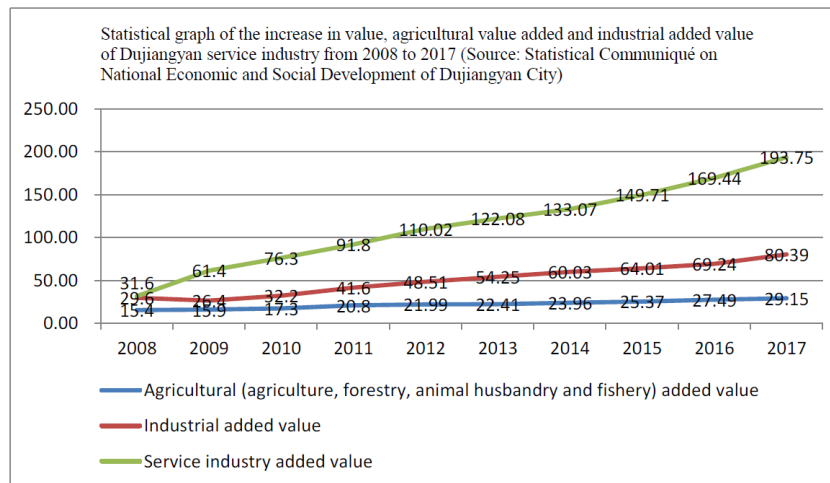


Fig. 4. Statistical chart of the increase in value, agricultural value added and industrial added value of Dujiangyan service industry from 2008 to 2017.

In addition, this time, the total retail sales of social consumer goods was also used as a general indicator of economic development in the post-disaster period. The objective data for the ten-year period were counted (see “Fig. 5”). According to the data, the total retail sales of Dujiangyan City continued to rise. In 2017, the total retail sales of consumer goods reached 1,350,677, an increase of 347.72% from 2008. Behind this larger growth, thanks to Dujiangyan’s use of high-quality geographical resources,

vigorously develop agriculture and service industries, build kiwifruit industry base, Qingchengshan tourism equipment industry function park, Li Bing culture creative creative function area, Dujiangyan essence irrigation area Kangyang industry Wait. From the continuous increase in the total retail sales of consumer goods, it can be concluded that Dujiangyan has developed rapidly after the disaster, its economic vitality has been significantly enhanced, and the quality of life of the people has continuously improved.

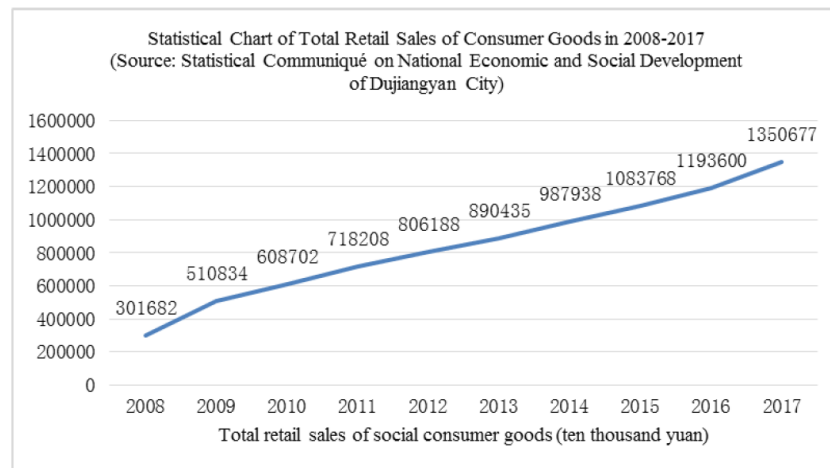


Fig. 5. Statistical graph of changes in total retail sales of consumer goods from 2008 to 2017.

#### IV. CONCLUSION

In 2019, it was the year of decisive warfare in the post-disaster reconstruction of Dujiangyan City. It was the key year for economic recovery and development, and it was the breakthrough year for the overall expansion. The city's post-disaster reconstruction has achieved major victories, and economic growth has shown a strong recovery trend. All major economic indicators have reached or exceeded the 2007 level, and economic vitality has been significantly enhanced. Behind the success of post-disaster economic recovery and reconstruction, it is the country's strong support, continuous help from all walks of life, the participation of the people in the disaster-stricken areas, and the rich

experience of the economic recovery and development of Dujiangyan after ten years of disasters. Other disaster areas can be integrated with the actual situation of the region. Use to achieve development within the region.

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