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8. Comprehensive Urban Environmental Renovation in Chengdu, China
Comprehensive Urban Environmental Renovation
--The Fu & Nan Rivers Project
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I. Brief Introduction of the City of Chengdu
Chengdu, located in southwestern China, is the capital of Sichuan Province and one of the important cities in the inland area of western China. As early as 2,300 years ago, the Emperor of Shu Kingdom, Kaiming IX made Chengdu his capital. The history of Chengdu may date back 3,000 years ago, which is proved by some unearthed cultural relics from the ruins of the ancient city of Jinsha found in the western suburb of Chengdu. The civilization of Shu Kingdom enjoyed a long history and rich culture. The well-known Dujiangyan Irrigation System listed in the World Cultural Heritage was built by Li Bing, governor of Shu Kingdom in 256 BC, for the purpose of controlling water disasters. It was this great project that completely turned Chengdu Plain into a fertile and prosperous land. From then on, people on Chengdu Plain didn’t suffer from floods, droughts or famine any longer and the Plain was crowned with “the Land of Abundance”. Ancient Chengdu attracted a large number of businessmen and scholars in its external exchanges. The Southern Chinese Silk Road started from Chengdu who was famous for its silk brocade, chinaware, lacquerware and spices. Today’s Chengdu has developed to become the centre of science and technology, business and trade as well as the hub of transportation and telecommunications for southwestern China. In 2000, Chengdu' GNP reached US$15.821 billion. Its total area was 12,400 km² and its population over 10 million, among which about 3.4 million were city dwellers.

Encircling the centre of Chengdu City, Fu & Nan Rivers, with another name of Jin Jiang, flow through the urban district of Chengdu. Derived from Min River by the ancient Governor Li Bing, Fu & Nan Rivers belong to Dujiangyan Irrigation Area and Yangtse River System. With the functions of flood control, transportation, irrigation, fire fighting and drinking water supply, Fu & Nan Rivers were the golden waterway linking ancient Chengdu with the coastal area of China in the history. Bringing prosperity to the people of Chengdu from generation to generation, they are called as the Mother Rivers of Chengdu.

II. Establishment of the No. 1 Priority Project
In the late 1970s, with rapid industrialization, accelerated urbanization, population explosion, sharp increase in water usage and environmental deterioration, Fu River seasonally dried out while the Nan River dried up completely. Moreover, flood disasters caused by silt sedimentation resulted in heavy economic losses. There were more than 650 wastewater outlets along the both sides of the rivers. These outlets discharged a large amount of wastewater into the rivers and turned Fu & Nan Rivers into a dirty and smelly ditch. About 30,000 families with some 100,000 members settled along the banks in damp, low-lying shelters with few sanitation facilities for a
long time. This had adverse impact on the daily life of these people and the surrounding environment. Since most of the shanty residents were very poor, the area became a breeding ground for diseases and crimes. The state of the rivers not only restrained the social and economic development in Chengdu and western areas of Sichuan, but also heavily polluted the basins of Min River and the upper reaches of the Yangtze River.

In 1985, the students in Long Jiang Lu Primary School, which is situated on the banks of the river, wrote a petition letter to the Mayor appealing for rescuing the Fu & Nan Rivers and bringing back clear water. This letter evoked strong repercussions in the city and drew great attention from the municipal government. The government took immediate actions and organized experts to draw up a plan. As a result, the Program for the Comprehensive Renovation of Fu & Nan Rivers was created as the No. One Project of the municipality, which aimed at the overall revitalization focused on the control of water and the improvement of urban infrastructure and environment.

Clear targets were set in the project. In Short-term, the capacity of anti-flooding of the city should be increased. In medium and long term, flood and pollution should be brought under control, and the rivers should become clean and clear. The expected social, environmental and economic objective included the provision of new housing for slum-dwellers, restoration of the river flow, improvement of the water quality, and development of housing and other related industries.

The project was initiated in 1993. The renovation of the central part of the river was finished after 5 years of hard work. To ensure the smooth running of the project, the municipal government put the project schedule into its administration objectives, and established the Project Headquarter led by the Mayor and joined by chiefs from various departments responsible for construction, planning, land, parks and gardens, environmental protection and supervision. With the legislative, policy and financial support, all these efforts guaranteed the successful implementation of this project.

III. Implementation of the Action Plan

A comprehensive plan was worked out by taking both the short-term and medium and long-term targets into consideration, including environmental improvement and urban renovation. This plan translates the principles of the Habitat Agenda into concrete actions. Six sub-projects were decided as follows:

1. Flood Prevention Project

   Efforts were made to restore the functions of the rivers and to enlarge their flood diversion capacity. About 16 kilometers of the river courses were dredged, and 750,000 cubic meters of silt removed. About 42 kilometers of embankments were newly erected. 18 bridges were built and renovated. 12 docks were constructed. The rivers’ capacity of diverting flood doubled and inundation was eliminated in the urban area.
2. Pollution Control Project
Fu & Nan Rivers were mainly polluted by industrial and domestic wastewater discharged into the river without any treatment. Therefore, the work began in the two fields at the same time: reducing polluting sources and treating pollutants in order to realize the integration of prevention with treatment. In the process of pollution control, 1,006 factories were forced to take drastic control measures, among them 488 were closed, 478 undertook technical renovations to reduce their pollution levels, and 40 were relocated in suburban industrial parks. Over 100 public toilets along the rivers were transformed. As a result, the amount of industrial and domestic wastewater discharged into the rivers decreased by 85% and 19% respectively. Separate systems were built for rainy water and sewage water with drainage pipelines installed along the rivers. The urban wastewater is intercepted and pipelined to a treatment plant. Wastewater was not allowed to flow into the rivers unless having met required standards. For this reason, one associated wastewater treatment plant was set up with a daily treating capacity of 300,000 tons. Efforts were also exerted in planning to reuse the treated wastewater in order to reduce the cost of pollution control.

3. Greening Project
Green areas are usually regarded as the lung of a city. The green belts along the rivers, in particular, can help not only to conserve the water but also to purify the city environment. However, every inch of the urban land is very precious, and consideration should be given to both economic returns and environmental results. Chengdu Municipality was determined to transform the land emptied by pulling down old buildings into green areas at the cost of losing short-term economic returns from renting the land. About 25 hectares of newly cultivated green land with trees and grass along the rivers formed 13 open landscapes, providing the citizens with relaxing and recreation places. As a result, the plots in the periphery of the rivers rose in value because of the increased green space and improved environment. Thanks to the implementation of the Greening Project, both economic and environmental returns were achieved.

4. Housing Project
The relocation of 30,000 families with more than 100,000 people was the most important part of the project. The local government carefully organized meetings to listen to relocated families. Deputies from the People’s Congress, members from the Political Consultative Conference and representatives from all walks of life contributed to the formulation of the policies. Cooperating with developers, the local government allocated land to build up 24 well-equipped residential areas to house the relocated families. All these areas and housing buildings were completed with high standards. The relocation work was understood and supported by the relocated people since full consideration was given to them and preferential policies were made available to them. Meanwhile, cooperating with the media, the government publicized related plans, targets and policies as well as the significance of the Project. The resettlement was completed within 18 months without one judicial case. All the families in this area
were moved to 24 well-equipped residential areas with new, spacious and bright apartments. Their per capita floor area was increased by 1.4 times.

5. Cultural Project
Along the rivers there are many interesting historic buildings and bridges with unique features such as He Jiang Pavilion, Thousand Mile Bridge and Old South Gate Bridge. These historic sites were well protected when the old areas were reconstructed. Following the principle of maintaining the unique scenery “a city embraced by two rivers”, a number of bridges were built or rebuilt in traditional styles. A cultural and scenic corridor was created with these newly built gardens, squares and public areas that reflect the history and culture of the city, and those existing historic sites such as Wang Jiang Pavillion, Wuhou Temple and Du Fu Thatched Cottage.

6. Road and Underground Pipeline Project
The project was located in the central area of the city where the population is dense. However, public facilities such as roads were neglected for years suffered heavy traffic congestion. Therefore, the improvement of infrastructures was also targeted in the project. Water and gas pipelines, electric cables and telecommunications lines were built underground when the embankment was being built up. In the past, the city was divided into three independent sections, namely Huang City, Da City and Shao City. These sections were linked together by the construction of 36 kilometers of the new inner ring road. The road transport efficiency was increased whilst the traditional patterns of the road system was retained.

In addition, to ensure the smooth implementation of the project, the municipality offered some preferential policies and subsidies to the relocated citizens and building enterprises.

a. Resettlement Policies
- Old housing was exchanged for new housing with the same size free of charge, and the relocated families were given the opportunity to purchase extra space at prime cost.
- Consideration was given to neighborhood relations. Old neighborhoods were arranged if possible to live together in the same new areas as desired.
- Families of disabled and elderly people were given first priority when selecting new accommodation, and were provided with home moving assistance.
- Children of the relocated families were helped to register in new schools.
- Disabled people and women were given priority in finding jobs in the new communities.

b. Construction and Development Policies
- Tax reduction and exemption were practiced for the development of the new resettlement housing, and developers could purchase land at a low cost.
- Service was provided to assist developers with the necessary procedures and formalities.
- Priority was given to the availability of water and gas, and fees were reduced.
The above-mentioned policies won the support from the relocated families and developers. The supervision system was set up to guarantee fairness, transparency and completion of the project.

IV. Experience of the Project

1. Sustainable Development Strategies

The 2200-year-old Dujiangyan Irrigation System sets an example of the tradition of the Chengdu people in water control, while Fu & Nan Rivers Comprehensive Renovation Project serves as a case of the further development of the tradition. The initial plan was to control pollution and flood. But with the progress of the project, it was expanded to the improvement of the city’s urban infrastructure. With the active participation and support of the general public, to improve the urban environment became the common objective of both the government and the citizen. The idea of sustainable growth was clearer than ever, and was used not only as the guideline of the project but also the strategic policy for guiding the urban planning, construction and management in the municipal development. Chengdu was the first provincial capital city that made and carried out the local Chengdu Agenda 21. After the completion of this project, efforts were made to start with new environmental projects of larger scale, including the Wenjiang-Pixian-Dujiangyan National Ecological Demonstration Zone.

2. Integrated Planning

Instead of a single-targeted plan, an original and comprehensive plan was put forward covering pollution control, road construction, riverside environmental improvement and urban renovation. This plan, placing emphasis on the multi-functions of the project, met not only the needs of the urban development, but also the requirements of environmental improvement, and the maintenance of the beauty of the city. The project was a major step forward towards creating an ecologically friendly city.

3. Public Participation

Without the participation and co-operation of the partners and stakeholders of the project, it would have been impossible to complete such an expensive and complicated project in a less developed area in a developing country like China. The most important resource of the project was the participation of the people, and the most important result was the increase of people’s environmental awareness of the importance of sustainable development.

The project plan was made on the basis of the comments and opinions of experts and general public, who were deeply involved in the project from the beginning to the end. Planning departments organized excellent technicians and engineers to draw out the plan and consulted with experts from universities and scientific institutions. The community committees such as the Liuyinjie Neighbourhood Committee, Shangheba Neighborhood Committee and Linjiangdonglu Neighborhood Committee offered their support to the resettlement programs in various ways such as promoting the project, publicizing policies made by the government, organizing donation of cash and materials, and mobilizing voluntary workers for the project. The public participation
gave people a sense of pride and made them feel in charge. Many activities and associations were organized to back the project. People throughout the city voluntarily organized activities such as the “Declaration of Determination to Clean Up the River”, “Thank-You-River Festival”, “Make the City Greener” and “Spring Is Coming Back to the Fu & Nan Rivers”. Environmental protection societies and river protection teams were established in universities and neighborhoods. In fact, the Fu & Nan Rivers Comprehensive Renovation Project has increased and strengthened the environmental awareness of the citizens.

4. Continuous fund Mobilization
Funding was the biggest problem for the project. The investment budget totaled about 360 million US dollars, which was equal to the annual government revenue. However, the municipal government established partnerships with different investors in order to get social funds. The funding mainly came from social bodies, community associations, schools and universities, scientific institutions, private real estate developers, state-owned enterprises as well as construction companies. The municipal government called off or postponed some other important projects including the construction of some office buildings in order to allocate a bout 40 million US dollars for the project. At the same time, joint–venture real estate companies were set up for housing construction and their returns were reinvested in the project. The total fund from this sector amounted to 250 million US dollars (over 40 million US dollars came from direct investment). Over 3 million people donated money and goods, which added up to a value of more than 5 million US dollars. After the successful improvement of the central section of the river, the conducive result led to the contribution of a sum of 18 million US dollars from the central government which was used to expand the project at the upper and lower reaches.

5. Combination of government planning and market Operation
As the organizer of the project, the local government reasonably allocated social resources by taking administrative, economic and legal measures. Apart from preferential policies, special working agencies and operation systems were established. Led by the mayor, the headquarters were set up, consisting of dynamic personnel and experts responsible for the implementation of the engineering work. Leaders from municipal departments and district governments were appointed to be responsible for the coordination of the project. The headquarters ensured the timing and quality of the project by employing market-oriented principles according to international standards to conduct their business, including fair competition, public bidding, strict management, complete openness to the public, and increased public participation.

V. Wide Recognition and Further Actions
The Fu & Nan Rivers Project was highly praised by the central government and state leaders. Representatives from over 20 cities such as Beijing, Shanghai, Chongqing, Nanjing, Kunming, Shenzhen and Nanning came to study the experience of the project for the renovation work of their own cities. They believed that the Fu & Nan Rivers model was useful and efficient.
The project was also recognized by the international community. Guests and experts from UN organizations, the World Bank and over 20 countries including UK, Germany, Japan and USA visited and highly praised the project. Co-designed by Ms. Besty Damon, an Environmental artist, Ms. Margie Ruddick, a landscape gardener from USA and some Chinese experts, the Running River Water Park was built along the side of the river. Today, as an example for environmental protection, this park demonstrates the harmonious relationships between the people, city and river. In 1998 the Fu & Nan Rivers Comprehensive Renovation Project won the ’98 Habitat Scroll of Honor from UNCHS (Habitat).

The experience drawn from the Fu & Nan Rivers Project has been shared and applied elsewhere. In the construction of Tianfu Square and new urban roads and bridges as well as the extension of the Fu & Nan Rivers Project, the methods of engineering operation, urban renewal, resettlement and fund mobilization used in the Fu & Nan Rivers Project have also been successfully followed and developed. Some of the policies are still being used to date.

The strategic planning and its implementation for the improvement of human settlements have been done mainly by the local governments. The central government has played a guiding and regulating role in the same field and supported the local governments with policies and funds. In recent years, projects such as the Fu & Nan Rivers Extension Project, Wenjiang-Pixian-Dujiangyan National Ecological Demonstration Zone, and Conversion of Arable Land into Forest Land have been listed as the national key projects for ecological and environmental improvement. The central government has provided the local governments with transfer payments and made its contributions to these projects. The strategy for the development of the western regions reinforces the support from the central government towards less developed regions and has assured our confidence in improving our human settlements in a sustainable way.

There is only one earth for our mankind, and that earth is now facing a series of environmental problems that affect our existence. Every country and region should take actions to protect the environment and encourage the sustainable development. Chengdu, as a developing city in a developing country, has made great efforts to realize the commitments made by the Chinese government at the World Conference on Environment and Development, and at the second United Nations Conference on Human Settlements (Habitat II).