

CASE STUDY

Connecting Remote Ancient Cultures by Train



A train arrives at Dali Railway Station from Kunming in Yunnan province of the People's Republic of China. Photo credit: ADB.

Built through strong partnerships, a railway links two ancient Chinese cities, boosts tourism and jobs, and opens a remote province to a wider market.

Overview

A Train for Two Cities

The railway between the cities of Dali and Lijiang has increased connectivity, incomes, and tourist volumes, waking up the sleeping economy of remote Yunnan province, People's Republic of China (PRC).

Mountainous northwestern Yunnan, where lie the historic cities of Dali and Lijiang, is home to more than one million people. The remote region features many tourist destinations of environmental and historical significance, such as nature reserves, ancient temples, and the old Lijiang town, a UNESCO World Heritage Site. Unfortunately, it was difficult and expensive to travel to these cities.

In 2004, the Asian Development Bank (ADB) and the Agence Francaise de Developpement (AFD) combined resources to build a 167-kilometer single-track railway through the mountains of northwestern

Yunnan to connect the Dali and Lijiang. Completed and operational in 2009, the railway also connects the northwestern region to the provincial capital Kunming and to Shanghai and Beijing through links with the national rail corridors.

Project snapshot

Dates	<ul style="list-style-type: none"> • December 2004: Approved • July 2012: Completed
Cost	<ul style="list-style-type: none"> • \$800.65 million: Total cost • \$180 million (loan): Asian Development Bank • \$40 million (loan): Agence Francaise de Developpement
Institutions and Stakeholders	<p>Financing</p> <ul style="list-style-type: none"> • Asian Development Bank : Loan • Agence Francaise de Developpement : Loan <p>Executing agency</p> <ul style="list-style-type: none"> • West Yunnan Railway Company

Challenges

Bringing Modern Transport to Ancient Cities

Northwestern Yunnan was among the least developed areas in the PRC. Two major factors hindered economic growth: lack of connectivity and high transport costs. The area's road network was limited and in poor condition.

Travel to the northwestern region involved a 17-hour bus trip from Kunming, and between Dali and Lijiang, a further 8-hour drive. The arduous trip discouraged tourists and left the region cut off from mainstream development.

The Dali–Lijiang Railway Project took on the challenge of building an efficient, safe, reliable, and affordable railway system over the difficult terrain and fragile geography of northwestern Yunnan, careful to protect and preserve cultural heritage spots and ethnic communities.

Solutions

Railroad Infrastructure over Fragile Geography

The Dali–Lijiang Railway was built over the Yunnan–Guizhou plateau and Hengduan mountains with elevations ranging from 1,900 to 2,300 meters. These mountains, rising from east to west and from south to north, huddle over two major river systems and their tributaries. The riverbeds are deep and the slopes surrounding them are steep.

The railway was built on the shortest possible route between Dali and Lijiang, and offered a picturesque journey along Erhai Lake. There were fewer mountains that the railway had to go through and less farmland, and businesses would be affected. Construction entailed extensive excavation of earth and rocks as the railway would traverse through mountains, rivers, and watersheds. It involved building five steep embankments with heights over 20 meters and 77 bridges with a total length of 26.3 kilometers, and burrowing through mountains to create 45 tunnels with a total length of 78.6 kilometers.

In a large part of the project area, the terrain was unstable and prone to severe soil erosions. As the project entailed deep excavations and construction works, vegetation might be affected and result in further soil erosion. Measures taken included optimized design and regulated earthwork to reduce the need for excavation, immediate filling and revegetation for every completed construction segment or earthwork, and safeguarding the slopes of the roadbed with retaining walls.

Eleven railway stations were designed to promote ethnic architecture. Railway safety was ensured with modern equipment for signaling, a dispatch management information system, operational safety equipment, and mechanized maintenance of tracks.

The project built about 139 kilometers of access roads to connect the railway stations to the nearest counties or townships, providing people access to hospitals, schools, markets, and other services.

Numbers and facts

167 kilometers Length of railway

77 Number of bridges

45 Number of tunnels

8 hours Travel time from Dali to Lijiang before the railway

2 hours Travel time from Dali to Lijiang when railway started

Results

Development on Track

The railway has improved connectivity from northwestern Yunnan province to Kunming and the rest of the country. It reduced travel time from Dali to Lijiang to 2 hours from 8 hours. The project also contributed to lowering the cost of living in Lijiang. For instance, since the railway became operational, a wider range of products became available at competitive prices, with some priced only slightly higher than those in Kunming.

The railway did not compromise local culture in northwestern Yunnan in favor of progress. Before the project started, rapid growth and tourism posed serious risks. With training on tourism and cultural preservation, the people grew more aware of these risks and the need to preserve their cultural heritage.

The railway supported the local tourism industry, by providing a lower-cost and faster option to visit the province.

Lessons

Minimize Negative Impact

Careful planning and design ensured minimal impact on the natural environment.

The route for the railway was chosen after careful study and planning so that construction would not harm the environment and residents.

The railway route improved access to markets and services and helped push tourism, which is a pillar of Yunnan's economy.

Get Everyone on Board

Large infrastructure projects demand a huge amount of development finance. For the construction of the Dali-Lijiang Railway, ADB and AFD funded the civil works and capacity building. The cofinancing partnership also allowed ADB and AFD to share the financial, environmental, and other risks involved in such a huge undertaking.

Extensive consultations among more than 4,000 stakeholders, including ethnic minorities, showed widespread support for the project. People were looking forward to the benefits and opportunities the project would bring. The consultations ensured that the railway was well integrated with not just the terrain but also with the way of life of ethnic minorities and cultures in northwestern Yunnan.

Resources

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Manmohan Parkash has been with ADB since 2002, holding various positions including as advisor for the Operations Services and Financial Management Department and head of the Operations Management Unit.



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Ms. Xiaohong Yang joined ADB's Pakistan Resident Mission as Country Director in April 2017. Ms. Yang's experience in development work spans over three decades, during which she led numerous ADB operations across the East and Central and West Regions, most recently overseeing a portfolio of investment projects totaling \$8 billion across 10 countries.



Asian Development Bank (ADB)

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