

# PROJECT INFORMATION DOCUMENT (PID) CONCEPT STAGE

Report No.: PIDC35659

<b>Project Name</b>	Lushan Earthquake Reconstruction and Risk Reduction Project (P153548)
<b>Region</b>	EAST ASIA AND PACIFIC
<b>Country</b>	China
<b>Sector(s)</b>	Other social services (20%), General education sector (20%), Rural and Inter-Urban Roads and Highways (20%), Sanitation (20%), Water supply (20%)
<b>Theme(s)</b>	Natural disaster management (60%), City-wide Infrastructure and Service Delivery (20%), Rural services and infrastructure (10%), Other environment and natural resources management (10%)
<b>Lending Instrument</b>	Investment Project Financing
<b>Project ID</b>	P153548
<b>Borrower(s)</b>	People's Republic of China
<b>Implementing Agency</b>	Sichuan PMO
<b>Environmental Category</b>	B-Partial Assessment
<b>Date PID Prepared/ Updated</b>	08-Oct-2015
<b>Date PID Approved/ Disclosed</b>	09-Jul-2015
<b>Estimated Date of Appraisal Completion</b>	31-Dec-2015
<b>Estimated Date of Board Approval</b>	10-Mar-2016
<b>Concept Review Decision</b>	Track II - The review did authorize the preparation to continue

## I. Introduction and Context

### Country Context

Over the past three decades, China has witnessed remarkable economic and social development, with Gross Domestic Product (GDP) growth averaging about 10 percent a year, lifting more than 600 million people out of poverty. All Millennium Development Goals have been reached or are within reach. China has become the world's largest exporter and second largest economy. Yet, with a population of 1.3 billion, China is also home to the second largest number of poor in the world. In 2011, China's gross national income per capita of US\$4,930 ranked 114th in the world, with over 170 million people living below the US\$1.25-a-day international poverty line.

Disaster risks pose a serious challenge to reducing poverty and promoting shared prosperity in

China. In the recent decades, frequent natural disasters have caused high loss of life and damage to property in China, endangering the country's impressive development gains. Based on 10 years of historical loss data from Swiss Re (2002-2011), on average, China incurs US\$27.4 billion or 0.4% of GDP of damage each year, with significant variability across years peaking in 2003, 2008 and 2010. Official statistics show that in 2012 alone natural disasters killed 1,338 people, displaced over 11 million citizens, damaged over 5 million homes, and caused economic damage valued at over US \$66 billion.

China is one of the countries most exposed to natural hazards. Earthquake risk is particularly high in a number of areas, with some of the largest historical events having occurred in densely populated locations in China. As the southeastern margin of the Tibetan Plateau, the Sichuan-Yunnan region is transected by several active faults, such as the Xianshuihe, Anninghe, Zemuhe, Xiaojiang, Honghe, Lancangjiang, Jiali, and Longmenshan fault systems. Many powerful earthquakes have struck in the past, and according to official records, more than 283 events exceeding magnitude 5.5 occurred in the region since 1970. In 2008, the magnitude 8.0 event in Wenchuan became one of the costliest natural disasters in Chinese history, leveling nearly 7 million buildings and damaging another 24 million. In April 2013, a magnitude 6.9 earthquake struck the Lushan County in the Sichuan province (about 70 miles west-southwest of Chengdu), affecting 2.84 million people in 117 counties, with 196 dead, 21 missing, 14,000 injured and 832,000 people evacuated. The Lushan earthquake caused significant damage to property, urban and rural infrastructure, as well as economic losses in the amount of CNY 65.94 billion (approximately US\$10.64 billion).

Rapid and unplanned urbanization is a major driver of disaster risk due to the increasing concentration of people and assets in hazardous areas, compounded by vulnerable infrastructure. With rapid urbanization underway in seismically active regions, disaster prevention and response has become more serious and complicated in China. In order to address this, the Government of China has increasingly put the protection of people's lives and property from natural disasters on the top of its agenda and has mainstreamed natural disaster risk reduction into its economic and social development plans as an important condition for sustainable development.

In the context of climate change, China's risk is expected to increase. The observed frequency and severity of extremely heavy rain storms in the country since the 1950s have significantly increased across the South and Southwest. The destructive potential of cyclones was demonstrated most recently in 2012. Seven storms made landfall, and three typhoons Saola, Damrey, and Haikui struck during a single week in August. Typhoon Damrey caused economic losses of US\$3.28 billion, followed by Saola 10 hours later, and Haikui five days later which caused US\$2.04 billion in economic losses. Typical for typhoons in the Asia-Pacific region is that even those with relatively low wind speeds can be accompanied by catastrophic flooding.

In the coming decades, it will be crucial to balance the socio-economic gains from agglomeration economies with appropriate disaster risk management measures to prevent urban areas from becoming disaster hotspots. China's urbanization process offers an opportunity to systematically mainstream disaster resilience into infrastructure and networks, through risk-informed land use planning, upgrading and proper maintenance of existing infrastructure. Increased risk awareness, institutional coordination with local governments, and engagement of communities in disaster prevention can help China face the increasing risk from natural hazards.

## **Sectoral and Institutional Context**

a. Comprehensive Disaster Reduction in the Government's Development Agenda

China has integrated disaster reduction and relief into its sustainable development strategy both at national and local levels. In 1998, the government issued the first Disaster Reduction Plan of the People's Republic of China (1998-2010), which proposed guidelines, development goals, major tasks and measures for disaster risk reduction. In 2007, the government issued the Comprehensive Disaster Reduction plan for the 11th Five-year planning period (2006-2010), with specific requirements for local governments to mainstream disaster risk reduction into their economic and social development plans. In 2011, China integrated disaster prevention and reduction into the National 12th Five-year Plan, promulgated and implemented the corresponding Comprehensive Disaster Reduction Plan (2011-2015), and revised the National Natural Disaster Relief Contingency Plan to add and strengthen early-warning systems, emergency response including inter-departmental coordination, and drought relief, among others.

As a strong proponent of proactive and comprehensive disaster reduction and disaster risk management, China has been strengthening relevant legislation and disaster risk management systems and mechanisms. Under the leadership of the State Council, key central government agencies responsible for coordination and organization of disaster reduction and relief include the National Commission for Disaster Reduction (NCDR), State Flood Control and Drought Relief Headquarters, Earthquake Resistance and Disaster Relief Headquarters of the State Council, and State Forest Fire Prevention Headquarters. The NCDR is the highest coordinating entity for disaster reduction and relief, composed of 34 disaster-related ministries or agencies in China. The general office of NCDR is set up under the Ministry of Civil Affairs. Local governments have units corresponding to the central-level structure with similar functions in coordinating disaster reduction and relief.

b. Lushan Earthquake Reconstruction Master Plan

The Lushan Earthquake Reconstruction Master Plan was approved by the State Council in July 2013 as the guiding document laying out key policies and strategies for the recovery of the disaster-affected areas. The plan emphasizes prevention of geological disasters, capacity building for integrated disaster prevention and mitigation, and improvement of the disaster relief and emergency rescue system in Sichuan province. It covers a severely hit area of 10,706 square kilometers that includes six counties in Ya'an Municipality and six towns in Chengdu. As of now, approximately 50 percent of the total estimated reconstruction cost associated with this Master Plan (CNY 86 billion or US\$13.87 billion) has been reached. In terms of ex-ante disaster risk management, the Master Plan includes elements such as: i) establishment and improvement of a comprehensive emergency response system, ii) improving monitoring, early warning and forecasting, iii) improving disaster prevention, iv) improving disaster information management, v) introduction of an educational component to popularize the knowledge of disaster prevention and mitigation, vi) reconstruction of meteorological observation stations and emergency response systems, vii) construction of new emergency broadcasting platforms, and viii) establishment of the Sichuan satellite disaster reduction application center.

The proposed IBRD financing of US\$300 million will not only support the ongoing reconstruction efforts following the Lushan earthquake, but also contribute to the long-term disaster risk reduction

goals of the Master Plan, as well as strengthen technical and institutional capacity for both ex-ante disaster risk management and emergency management in project municipalities.

### **Relationship to CAS**

The Country Partnership Strategy for the People's Republic of China (CPS, Report No. 67566-CN) for the period FY2013 - FY2016 is fully aligned with the priorities of China's 12th Five Year Plan (2011-2015) which emphasizes natural disaster risk reduction as an important condition for the country's sustainable development. To support China's goals as articulated in the 12th Five Year Plan, the CPS focuses on three main areas of engagement: i) Supporting greener growth, by helping China shift to a more sustainable energy path; enhancing urban environmental services; promoting low-carbon urban transport; promoting sustainable agriculture practices; piloting sustainable natural resource management approaches; demonstrating pollution management; and strengthening mechanisms for managing climate change; ii) Promoting more inclusive development, by increasing access to quality health services and social protection; strengthening skills development programs, including for migrant workers; enhancing opportunities in rural areas and small towns; and improving transport connectivity for more balanced regional development; and iii) Advancing mutually beneficial relations with the world, by supporting China's South-South cooperation and China's role as a global stakeholder.

The project directly contributes to the Government's overarching goal of building a harmonious society and the World Bank's twin goals of reducing extreme poverty and boosting shared prosperity. Based on international experience, recurrent disasters have the greatest impact on the poorest populations who generally live in higher-risk areas. Disasters restrict people's ability to exit from poverty, and acting as serious external shocks, they inhibit economic growth. Disasters cause damage to houses, property and infrastructure, thereby affecting different aspects of economic productive capacity. The Lushan Earthquake caused extensive structural damage, leaving many communities cut off from rescue and early recovery efforts. Designing the proposed project's multi-sector interventions to the appropriate standards of resilience would reduce the vulnerability of the Lushan earthquake-affected population to future disasters. The poor are typically more reliant on public infrastructure so that these efforts will contribute to supporting poverty reduction over their lifecycle. Project activities will be informed by a social assessment that identifies and takes into account the particular needs of target male and female beneficiaries, as well as vulnerable groups. By enhancing urban environmental services, helping cities "build back better" in the wake of disasters, and building long-term resilience to natural hazards, the proposed project contributes the first CPS engagement area related to greener growth.

## **II. Proposed Development Objective(s)**

### **Proposed Development Objective(s) (From PCN)**

The proposed objective is to build disaster resilient infrastructure and strengthen risk reduction and emergency preparedness.

### **Key Results (From PCN)**

The proposed PDO-level results indicators are:

1. Rural roads rehabilitated incorporating landslide risk reduction measures (km).
2. People in urban areas provided with access to all-season roads within a 500 meter range under the project (number; disaggregated by gender) [core sector indicator].
3. Population provided with improved drainage conditions (number; disaggregated by gender).
4. Population with access to improved evacuation spaces and emergency facilities (number; disaggregated by gender).

5. Number of functioning evacuation shelters with protocol for evacuation and staging in emergency situations.

### III. Preliminary Description

#### Concept Description

- a. Overview

On April 20, 2013, almost five years after the 2008 Great Wenchuan Earthquake, the magnitude 7.0 Lushan earthquake struck China's Sichuan province, with its epicenter in the Lushan County in the Ya'an Municipality. Thirty-two counties (cities, districts) in Ya'an, Chengdu, Leshan, Meishan, Ganzi, Liangshan, Deyang of Sichuan Province were impacted, with a total 2.184 million people affected. Compared to the Wenchuan earthquake, while the scale of the Lushan earthquake was smaller, the 2013 earthquake caused similar type of damage, disruptions to infrastructure and impact on the province's population, including collapsed and severely damaged infrastructure, public service facilities and municipal services. Multiple landslides and damages damaged key roads. Frequent aftershocks of high magnitude caused further damages.

- b. Impact of the Lushan Earthquake on Critical Infrastructure

Efforts to rescue people from collapsed buildings in the affected region were hindered as more remote communities in the mountains were cut off due to blocked roads and collapsed bridges. Similar to the Wenchuan earthquake, there were many landslides and rockslides in the Longmen Mountains, where Ya'an is located. During the emergency and relief period, traffic had to be regulated by restricting most roads to one-way traffic which resulted in long round-trips for emergency responders and rescue workers, delaying provision of emergency help. It was reported that parts of Baoxing County, Ya'an, were isolated by landslides and rescue teams were delayed for 33 hours. Water service, electrical power, and telecommunications were interrupted by the Lushan earthquake. More than one month after the disaster, their restoration was still in progress. The underground water system was severely damaged and temporary above-ground pipes had to be laid to provide emergency water service.

The proposed project targets Qionglai City (Chengdu Municipality) and Ya'an Municipality. These areas are exposed not only to earthquake hazard but also other geological hazards such as landslide and slope instability, as well as flooding. Being located between Chengdu Plain and Qinghai-Tibet Plateau, also on an intersection where three seismic fault zones (Longmen Mountain, Xianshui River, Anning River) meet, the area is covered with high and steep mountains, deep valleys and fragmented rock formations. Located 15km from the epicenter of the Lushan earthquake, Qionglai City has a population of 660,000. Qionglai City covers an area of 1,384 sq. km with jurisdiction of 24 towns, 6 of which were severely affected by the earthquake. The road network in Qionglai's western regions suffered serious damage (350 km of rural roads), resulting in economic losses of approximately US\$48.4 million. Landslides crippled traffic and severely hampered the emergency response after the disaster. The Ya'an Municipality is a prefecture-level city in the western part of Sichuan province, with an area of 15,300 sq. km. and population of 1.57 million (1.52 million of whom were affected by the Lushan earthquake). There were 176 fatalities and 12,136 injured as a result of the 2013 earthquake. Urban and rural infrastructure was significantly damaged by the earthquake. This vulnerability demonstrates the need for the

infrastructure investments under this project to be designed in consideration of the prevalent hazards to which the project localities are exposed to.

In order for the proposed rural road investments to contribute to the objective of improved emergency management, detailed landslide risk assessment is proposed to be conducted along the planned alignments. This will inform the prioritization and design of upgraded slope protection measures. To mitigate the impacts of delays in relief operations in future events, emergency management facilities are planned for incorporation into the proposed evacuation spaces/shelter sites. These may include emergency communication facilities, storage for non-perishable food and water for emergency use, temporary medical and first-aid facilities, emergency power supply, temporary storage and supply of tents and prefab mobile buildings, emergency helicopter landing pads, toilets and temporary firefighting facilities.

c. Lessons learned from the Wenchuan Earthquake Reconstruction Project

The proposed project will draw on and incorporate lessons learned from the ongoing Wenchuan Earthquake Reconstruction Project.

i. The technical design and capacity of investments should carefully consider the current and future demand for the services to be delivered by the infrastructure investments. Infrastructure investments should be integrated with the existing service delivery networks and bridge current gaps in service provision. It is critical to balance direct investments in reconstruction with long-term infrastructure development needs based on the prevailing local city/town master plan.

ii. The relevant network and demand analyses should be conducted in order to select the appropriate capacity and sizing of urban infrastructure (e.g., capacity of the proposed wastewater treatment plant, and road width). In view of the major proposed investments both by the World Bank and the Chinese National Authority for the Lushan Earthquake Reconstruction Program, sustainable operation and maintenance of infrastructure assets for project cities/towns should be enhanced. In line with this, the O&M of infrastructure investments should be specifically considered in the technical design, including cost estimations. This will optimize the returns and benefits derived from the capital investments.

iii. The distribution of ground-shaking hazard should be a primary consideration for site selection and design of infrastructure. Hazard maps are available for the project localities, however, the level of resolution of hazard information (1:50,000 or 1:100,000) is not appropriate for project site selection. Higher-resolution hazard zoning maps are necessary (at least 1:10,000) to inform more resilient planning at the urban scale. Similarly, landslide risk assessment along the alignment of the proposed rural road investments will also be necessary to ensure that the appropriate risk reduction measures are included in the investments. All technical codes and standards to be utilized should ensure that risk reduction features are incorporated into the detailed engineering design of infrastructure investments.

iv. Leveraging the capacity of project management units and implementing agencies established in the aftermath of the Wenchuan Earthquake. The capacity of the existing units and agencies should be utilized and further enhanced as necessary to support the management of the Lushan Earthquake Reconstruction and Risk Reduction Project. This will ensure that good practices and lessons learned from the Wenchuan Earthquake Reconstruction Project will be carried forward in the proposed project.

d. Global Lessons Learnt and World Bank's Value Added

The proposed project will also draw on lessons learnt globally from earthquake reconstruction projects, including:

- i. Critical infrastructure deserves special attention. Roads and bridges serve as lifelines for evacuation and access for post-disaster response, and designs should be sufficiently resilient to ensure key routes remain operational and secondary routes can be quickly restored based on their strategic classification. For schools, hospitals, evacuation shelters, and municipal buildings, reconstruction and repair are opportunities to implement cost-effective resilience measures and a strong quality control and enforcement mechanism.
- ii. Successful upgrading programs identify public assets (such as buildings, utilities, roads, and bridges) that are vulnerable to natural hazards, develop preparedness plans for them, and based on the results, initiate a phased upgrading strengthening program focusing on priority assets and systems that show the highest cost-benefit ratios.
- iii. Integrate disaster and climate resilience into development by raising awareness, capacity and mainstream risk management into planning and investments. Following the 1999 Marmara earthquake in Turkey, local-level decision makers were targeted by a national training program on urban development processes and risk management through urban planning and building regulation. Experience from Indonesia shows that involving communities in improving emergency response systems, evacuation spaces and emergency facilities, plays an important part in increasing collective resilience and facilitates the work of public authorities preparing for and responding to disasters.

The World Bank has global expertise in the area of earthquake recovery, for example in Turkey, Indonesia, Colombia, Mexico, as well as risk reduction, including upgrading of infrastructure, and is therefore well-placed to provide technical assistance and facilitate knowledge transfer as part of this project. The Bank can also support coordination among stakeholders and dissemination of Lushan's experience to other cities in China and beyond.

e. Proposed Components

Component 1. Upgrading and risk reduction of rural roads.

This component will finance upgrading and rehabilitation of Rural Roads in the Chengdu and Ya'an Municipalities.

Component 2. Upgrading of Priority Urban Infrastructure and Strengthening the Emergency Preparedness.

This component will finance critical urban infrastructure including evacuation areas, emergency shelter, flood protection, water treatment plant and urban roads with associated water supply, storm water and sewerage pipelines .

Component 3. Technical Assistance for Strengthening of Disaster Management and Preparedness.

This component will pilot the development of integrated multi-hazard (seismic, flood, landslide) risk information systems to support early warning, disaster emergency contingency planning, and

risk based asset management and urban infrastructure planning.

#### Component 4. Project management and capacity building.

The component will finance training, capacity building, survey and design, and construction supervision costs of sub-projects

Since 2008, strong earthquakes in Sichuan have diminished the stability of slopes throughout the Longmen Mountains, which increases the province's exposure to secondary geological disasters like landslides. Similarly, the integrity of infrastructure that was not visibly damaged during the Wenchuan and Lushan earthquakes may have been compromised by the strong ground motions associated with these events. The municipalities' exposure to flood hazard also needs to be considered in the technical design of the proposed investments. In order to improve the resilience of critical urban and rural infrastructure and design risk reduction measures, it is crucial to conduct a comprehensive, multi-hazard assessment of the risk to infrastructure in the project areas. This is proposed as a project component, which is pending confirmation by the Sichuan authorities. Developing a risk reduction investment plan and feasibility studies for the selected sectors and facilities, this component would also serve to inform and prioritize future risk reduction investments in the project municipalities.

The project areas are located in western Sichuan Province, with the urban infrastructure component to be implemented in 5 counties and 2 districts of the Ya'an Municipality, and the rural road component to be implemented in Qionglai City (Chengdu Municipality) and two counties (Tianquan and Yingjing) of Ya'an. Qionglai City is located in the west of Chengdu Plain and borders Ya'an to the southwest. While Qionglai's topography transitions from plain to mountains from east to west, Ya'an is mostly mountainous.

The specific investments currently proposed by the project municipalities are:

i) Qionglai City, Chengdu Municipality: 1) the 23.1-km Daozuo-Huojing Rural Road Reconstruction Project (23.1km), and 2) Ya'an Municipality, in Tianquan County (17km), and in Yingjing County (6km). The proposed infrastructure investments comprise 3 roads of 46.1km.

ii) Ya'an Municipality: Lushan County, Baoxing County, Tianquan County, Yingjing County, Shimian County, Yucheng District, and Mingshan District. The proposed infrastructure investments comprise 47.709km of urban roads, 2 bridges, 1.12km of embankment, 3.3km of floodway, 1 water supply plant, and 11 emergency shelters.

The project area experiences strong monsoonal influences, with rainfall heavily concentrated in the summer, classified as a humid subtropical climate with long, hot, humid summers and short, mild to cool, dry and cloudy winters. Water resources are abundant. Annual average temperatures range from 14.1~17.9 degrees Celsius, while annual average precipitation is about 1,800mm.

The project area has a long history of human development, with agricultural production as the predominant economic activity. The population is concentrated in small towns that are mostly located in valleys or small plains in the mountainous area. Given its natural conditions, the project areas are in good ecological condition, with extensive and robust surface vegetation. For example, Ya'an has a surface vegetation of 63%. However, the project localities are exposed not only to earthquake hazard, but also other geological hazards such as landslide and slope instability, as well as flooding.



f. Selection Criteria

These proposed investments will be finalized according to the following selection criteria, as discussed and agreed with Sichuan authorities: i) all proposed investments should form an integral part of the Lushan Earthquake Reconstruction Master Plan, the Project of Overall Planning and Implementation Covering Reconstruction after Lushan Earthquake (Sichuan Development and Reform Commission Investment No. 315), and relevant sectoral plans; ii) all infrastructure investments should enhance urban infrastructure service quality and comply with relevant local urban development plans; iii) investments should address both reconstruction needs (building back better) and long-term socio-economic development, and iv) investments should contribute to risk reduction in the project municipalities as well as build local capacity for long-term disaster risk management.

#### IV. Safeguard Policies that might apply

Safeguard Policies Triggered by the Project	Yes	No	TBD
Environmental Assessment OP/BP 4.01	x		
Natural Habitats OP/BP 4.04			x
Forests OP/BP 4.36		x	
Pest Management OP 4.09		x	
Physical Cultural Resources OP/BP 4.11			x
Indigenous Peoples OP/BP 4.10		x	
Involuntary Resettlement OP/BP 4.12	x		
Safety of Dams OP/BP 4.37		x	
Projects on International Waterways OP/BP 7.50		x	
Projects in Disputed Areas OP/BP 7.60		x	

#### V. Financing (in USD Million)

Total Project Cost:	327.50	Total Bank Financing:	300.00
Financing Gap:	0.00		
<b>Financing Source</b>			<b>Amount</b>
Borrower			27.50
International Bank for Reconstruction and Development			300.00
Total			327.50

#### VI. Contact point

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