Document of
The World Bank

Report No: ICR00003722

IMPLEMENTATION COMPLETION AND RESULTS REPORT
(IBRD-76760)

ON A

LOAN

IN THE AMOUNT OF US$150 MILLION

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR A

HUBEI YIBA HIGHWAY PROJECT

June 21, 2016

Transport and ICT Global Practice
East Asia and Pacific Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective December 31, 2015)

Currency Unit = Renminbi (RMB)
RMB1.00 = US$0.154
US$1.00 = RMB6.489

FISCAL YEAR
January 1 - December 31

ABBREVIATIONS AND ACRONYMS

CNEN	China National Expressway Network
CPS	Country Partnership Strategy
EIA	Environmental Impact Assessment
EIRR	Economic Internal Rate of Return
EMP	Environmental Management Plan
ENPV	Economic Net Present Value
ESRP	Environmentally and Socially Responsible Procurement
E&M	Electrical and Mechanical
FM	Financial Management
FYP	Five Year Plan
GOC	Government of China
HEAB	Hubei Expressway Administration Bureau
HERO	Hubei Expressway Resettlement Office
HPTD	Hubei Provincial Transport Department
HPYECH	Hubei Provincial Yiba Expressway Construction Headquarter
NTHS	National Trunk Highway System
HYEMD	Hubei Yiba Expressway Management Division
IES	Independent Environmental Supervision
ICB	International Competitive Bidding
M&E	Monitoring and Evaluation
NTHS	National Trunk Highway System
PAD	Project Appraisal Document
PDO	Project Development Objective
QCBS	Quality and Cost Based Selection
SA	Social Assessment
SCMS	Safeguards Compliance Monitoring System
SEA	Strategic Environmental Assessment
RAP	Resettlement Action Plan
WBFPO	World Bank-Financed Project Office
YBE	Yichang-Badong Expressway

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CHINA
Hubei Yiba Highway Project

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A. Basic Information			
Country:	China	Project Name:	Hubei Yiba Highway
Project ID:	P101258	L/C/TF Number(s):	IBRD-76760
ICR Date:	6/21/2016	ICR Type:	Core ICR
Lending Instrument:	SIL	Borrower:	Ministry of Finance
Original Total Commitment:	USD 150.00M	Disbursed Amount:	USD 150.00M
Revised Amount:	USD 150.00M		
Environmental Category: A			
Implementing Agencies: Hubei Provincial Transport Department			
Cofinanciers and Other External Partners: NA			

B. Key Dates				
Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	12/13/2006	Effectiveness:		12/21/2009
Appraisal:	08/11/2008	Restructuring(s):		03/04/2011
Approval:	03/31/2009	Mid-term Review:	07/23/2013	07/23/2013
		Closing:	12/31/2015	12/31/2015

C. Ratings Summary	
C.1 Performance Rating by ICR	
Outcomes:	Satisfactory
Risk to Development Outcome:	Moderate
Bank Performance:	Satisfactory
Borrower Performance:	Satisfactory

C.2 Detailed Ratings of Bank and Borrower Performance (by ICR)			
Bank	Ratings	Borrower	Ratings
Quality at Entry:	Satisfactory	Government:	Satisfactory
Quality of Supervision:	Highly Satisfactory	Implementing Agency/Agencies:	Satisfactory
Overall Bank Performance:	Satisfactory	**Overall Borrower Performance:**	Satisfactory

C.3 Quality at Entry and Implementation Performance Indicators			
Implementation Performance	Indicators	QAG Assessments (if any)	Rating
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA):	None
Problem Project at any time (Yes/No):	Yes	Quality of Supervision (QSA):	None
DO rating before Closing/Inactive status:	Highly Satisfactory		

D. Sector and Theme Codes		
	Original	Actual
Sector Code (as % of total Bank financing)		
Rural and Inter-Urban Roads and Highways	100	100
Theme Code (as % of total Bank financing)		
Infrastructure services for private sector development	90	90
Other environment and natural resources management	10	10

E. Bank Staff		
Positions	At ICR	At Approval
Vice President:	Victoria Kwakwa	James W. Adams
Country Director:	Bert Hofman	David R. Dollar
Practice Manager /Manager:	Michel Kerf	Junhui Wu and Ede Jorge Ijjasz-Vasquez
Project Team Leader:	Xiaoke Zhai	Christopher R. Bennett
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F. Results Framework Analysis

Project Development Objectives (from Project Appraisal Document)
To improve passenger and freight flows in the Yichang-Badong corridor by construction of an expressway with enhanced environmental management practices.

Revised Project Development Objectives (as approved by original approving authority)
Not applicable.

(a) PDO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1:	Reduction in cost for a shipment by road from Yichang to Badong for a sample of products (Ore, Agricultural Products, and Bus) (Percent)			
Value (quantitative or Qualitative)	Ore 0% Agricultural 0% Bus 0%	Ore 25% Agricultural 25% Bus 18%		Ore 29.2% Agricultural 28.6% Bus 23.1%
Date achieved	02-Mar-2009	31-Dec-2015		30-Nov-2015
Comments (incl. % achievement)	Target exceeded by 14.4%-28.3%. The percentages of freight rate reduction for all three products are higher than targets.			
Indicator 2:	Travel time savings on expressway over existing road corridor (Hours)			
Value (quantitative or Qualitative)	0	2.5		3
Date achieved	02-Mar-2009	31-Dec-2015		30-Nov-2015
Comments (incl. % achievement)	Target exceeded by 20%. Travel time is 2.17 hours on YBE and 5.3 hours on existing roads.			
Indicator 3:	Accident rates on expressway over existing road corridor Accidents/year (Fatalities/year)			
Value (quantitative or Qualitative)	YBE: 0/(0) Existing Corridor: 425/(34)	YBE: 100/(8) Existing Corridor: 200/(18)		YBE: 53/(1) Existing Corridor: 153/(35)
Date achieved	02-Mar-2009	31-Dec-2015		30-Nov-2015
Comments (incl. % achievement)	Target partially achieved. Accident numbers on YBE and existing road corridor are all lower than the target. Fatalities are much lower on YBE, but increased on existing roads.			
Indicator 4:	Major EMP requirement non-compliance incidents by contractors (Number/year)			
Value (quantitative or Qualitative)	0	0		0
Date achieved	02-Mar-2009	31-Dec-2015		30-Nov-2015
Comments (incl. % achievement)	Target achieved. During implementation, only three incidents of non-compliance occurred and were corrected.			

(b) Intermediate Outcome Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1:	Available daily traffic (PCU/day)			
Value (quantitative or Qualitative)	YBE: N/A Existing Corridor: 5,700	YBE: 7,050 Existing Corridor: 3,500		YBE: 12,869 Existing Corridor: 1,530
Date achieved	02-Mar-2009	31-Dec-2015		31-Dec-2015
Comments (incl. % achievement)	Target exceeded. Traffic volume on YBE is 82.5% higher than target. Traffic on existing corridor is 56% lower than the target (more traffic diversion achieved).			
Indicator 2:	Completion and adoption for YBE of guides for environmental management during construction. (% complete)			
Value (quantitative or Qualitative)	0%	100%		100%
Date achieved	02-Mar-2009	31-Dec-2010		30-Nov-2015
Comments (incl. % achievement)	The guide for environment supervision of highway projects was developed in 2009 and adopted during project implementation.			
Indicator 3:	Adoption of improved safety practices for construction and operation of long tunnels (% complete)			
Value (quantitative or Qualitative)	0%	100%		100%
Date achieved	02-Mar-2009	31-Dec-2015		30-Nov-2015
Comments (incl. % achievement)	The guide for long tunnel construction and operation safety practices was developed and adopted during project preparation and closely monitored during implementation.			
Indicator 4:	Training and study programs			
Value (quantitative or Qualitative)	Number Trained: 0 Satisfied: 0	Number Trained: 900 Satisfied: 70%		Number Trained: 5,039 Satisfied: 98-100%
Date achieved	02-Mar-2009	31-Dec-2015		30-Nov-2015
Comments (incl. % achievement)	The number of people trained exceeded the target by 460%. The satisfaction rate of 98% plus also exceeded the target of 70%.			

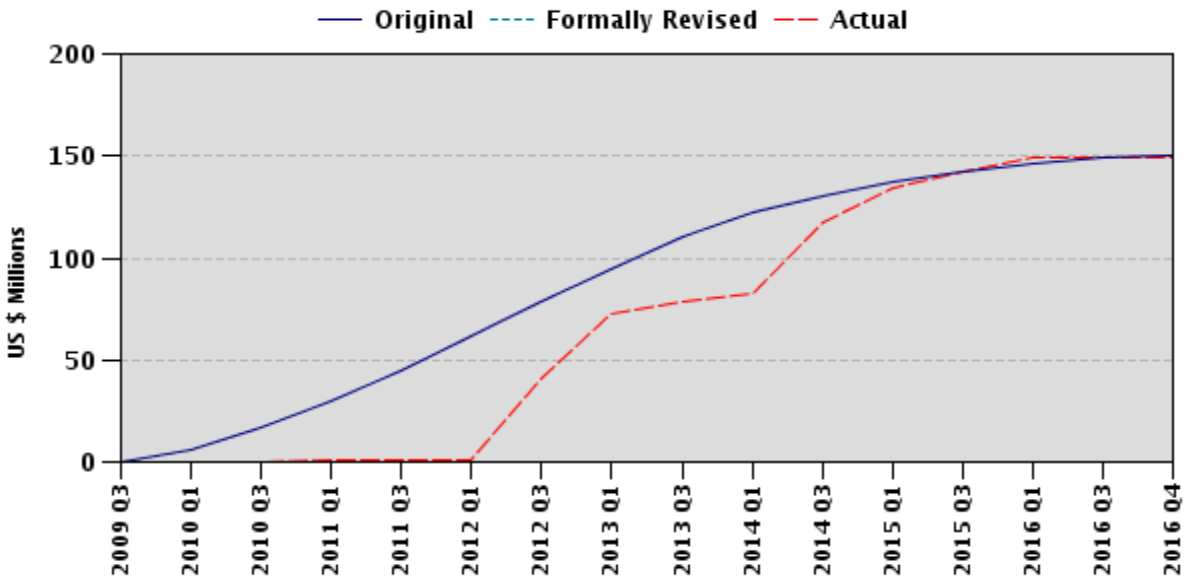
G. Ratings of Project Performance in ISRs

No.	Date ISR Archived	DO	IP	Actual Disbursements (USD millions)
1	02/12/2010	Moderately Satisfactory	Moderately Unsatisfactory	0.00
2	04/27/2010	Moderately Satisfactory	Moderately Unsatisfactory	0.00
3	02/12/2011	Moderately Satisfactory	Moderately Unsatisfactory	1.00
4	01/03/2012	Satisfactory	Satisfactory	16.58
5	12/20/2012	Satisfactory	Satisfactory	72.73
6	06/25/2013	Satisfactory	Satisfactory	82.12
7	12/18/2013	Satisfactory	Satisfactory	101.03
8	06/07/2014	Satisfactory	Highly Satisfactory	117.73
9	12/10/2014	Satisfactory	Highly Satisfactory	141.92
10	06/22/2015	Satisfactory	Highly Satisfactory	141.92
11	12/09/2015	Highly Satisfactory	Highly Satisfactory	149.63

H. Restructuring (if any)

Restructuring Date(s)	Board Approved PDO Change	ISR Ratings at Restructuring		Amount Disbursed at Restructuring in USD Millions	Reason for Restructuring & Key Changes Made
		DO	IP		
03/04/2011	N	MS	MU	1.00	Changed the percentage of expenditures to be financed in Category (1) “Civil Works for Eligible Activities under Part A of the Project” to 100%; revised the topics of studies under Capacity Building Component; expanded activities supported to include pavement construction and traffic facilities over the entire length of Yiba Expressway.

I. Disbursement Profile



1. Project Context, Development Objectives and Design

1.1 Context at Appraisal

Country and Sector Context

1. The Government of China (GOC) was committed to develop an efficient multimodal transport system to enhance competitiveness and promote development. At the core of the highway investment program was the National Trunk Highway System (NTHS), a 44,000 km network comprised of twelve major corridors (five north-south and seven east-west), completed in 2005. The initial NTHS backbone made great progress toward providing the core network connectivity, and prior to the project development was shifting toward linking poorer western regions with eastern China, the engine of China's economic growth. In 2004 GOC approved the China National Expressway Network (CNEN), comprised of 27 major expressway corridors (9 vertical and 18 horizontal). CNEN was designed to reach more than one billion people in China by linking all provincial capitals and large urban centers of more than 500,000 inhabitants with cities of more than 200,000 inhabitants.

2. Hubei, with a population of 58.2 million (2014), is a land-locked province in central China and one of the key industrial and agricultural production bases in the country. Despite its strategic location, Hubei's lack of transport accessibility, especially in the more landlocked mountainous areas in the west of the province, has hindered its social and economic development and prevented it from meeting its development potential. As a result, and in accordance with the State Council's National Expressway Network Planning mandate approved in December 2004, the province was significantly improving its highway network through building a comprehensive transportation system, consisting 12 major expressway corridors by 2020. This network would provide a main communication node for north–south and east–west traffic, as well as a gateway to the less-developed western provinces, thereby giving way to the full development of the area's regional and economic potential.

Rational for Bank Involvement

3. The east-west linkages of CNEN are critical for the development of China's lagging regions. The Yichang-Badong Expressway (YBE) is a key contributor to the development of CNEN and will stimulate trade-led growth in this part of China. It will further strengthen regional integration and the competitiveness of Hubei province as well as its neighboring land-locked provinces. Within Hubei, YBE expands communications to the region's natural and cultural resources promoting tourism and supporting economic growth. It also provides greater access to the 'Three Gorges National Geological Park'[1] and other area resources leading to growth in the tourism industry.

[1] The project has the full support of the National Park Authority, as well as the local governments. As described in the EIA, the development plans of the park were considered during project preparation and there has been no major negative project induced impact on the area.

4. The Bank was Hubei's development partner for over ten years and had provided financing for one inland waterway and four expressway projects. The Bank has added value through supporting the design, preparation, implementation, operation, and management of Hubei's infrastructure in an environmentally, socially and safety conscious manner. The Bank has supported the Hubei Provincial Transport Department (HPTD)[2] through a range of institutional strengthening and policy activities, which have enhanced HPTD's abilities on environmental management, traffic safety[3], road management and operations.

5. Passing through Yiling District, Xingshan County, and Zigui County, YBE traverses mountainous terrain in an environmentally sensitive area, through the Three Gorges National Geological Park and the Shennongjia Scenic Area. The Government of Hubei was particularly interested in the Bank's support to help properly manage the major challenges of this investment: (i) technical difficulties due to the very mountainous terrain; and (ii) the need to take special care during planning and construction due to the environmental and ecological sensitivity of the project area. Although previous experiences with Bank-financed highway projects have helped HPTD improve operations in a number of key areas (such as safety and road maintenance), environmental protection still remained an issue. This project adopted a number of innovative practices; some based on the Bank's experience in other countries, while others were being introduced for the first time. These include: (i) improved methods for environmental supervision; (ii) improved linkages between safeguards documents and the bid documents/contracts; (iii) introduction of an environmental compliance framework for contractors; (iv) pilot testing of environmentally and socially responsible procurement; and (v) pilot testing of a 'Safeguards Compliance Monitoring System' (SCMS).

Relation to High Level Objectives

6. Promoting linkages with the inland/western regions is a part of GOC's efforts to reduce regional development gaps. YBE runs along the northern bank of the Yangtze River from Yichang to Badong in western Hubei province. It was the last section of the expressway linking Wuhan to Chengdu that had not yet been opened to traffic. It also constitutes an important section of the Hurong (Shanghai-Chengdu) national trunk expressway, one of the 18 trunk expressways connecting China's eastern and western regions. As a major component of China's 'Western Development Strategy', this expressway network aimed to facilitate the growth of the non-coastal regional hubs by providing access from the developed eastern coastal area to the developing markets in central and western China such as Chengdu.

7. The project contributed to Pillar 2 of the Bank Group's 2006 China Country Partnership Strategy (CPS) 'Reducing Poverty, Inequality, and Social Exclusion'. The enhanced highway sector management and lower transportation costs would expand

[2] In PAD and earlier Aide-Memoires, the Transport Department was translated as Hubei Provincial Communications Department (HPCD). The translation was revised to HPTD after the institutional reform of Ministry of Transport in 2009. To avoid confusion, this report use HPTD when referring to this provincial government agency.

[3] The previous four highway projects in Hubei all undertook specific institutional strengthening activities. This work led to the HPTD establishing the 'Hubei Road Traffic Safety Training Centre' in 2007, with Bank support and financing through the Global Road Safety Facility. These efforts have contributed in 2000 - 2007 to a 44% reduction in the number of fatalities due to accidents, during which the number of vehicles grew by 148%.

economic opportunities for the rural poor by providing greater access and supporting the expansion of trade, as well as through opportunities created by the project itself[4]. The Project Development Objective (PDO) was consistent with the CPS, in particular its recommendations to: (i) reduce internal and external barriers to trade and investment; (ii) reduce poverty, inequality and social exclusion through expanding affordable access to basic social and infrastructure services; and (iii) manage resource scarcity and environmental challenges.

1.2 Original Project Development Objectives (PDO) and Key Indicators (*as approved*)

8. The **Project Development Objective (PDO)** in the Project Appraisal Document (PAD) was: to improve passenger and freight flows in the Yichang-Badong corridor by construction of an expressway with enhanced environmental management practices. The description in the Loan Agreement was slightly different: "to improve passenger and freight flows in the Yichang-Badong corridor by construction of an expressway and strengthening the institutional capacity for environmental management."

9. Key indicators listed in the Datasheet measure the PDO achievement from two aspects: traffic flow and environmental management. The performance of traffic flow on the Yichang-Badong corridor was measured from cost, efficiency, safety, and volume aspects by a strategic combination of outcome indicators and intermediate indicators. The outcome indicators include: (i) decreased freight and passenger tariffs (cost); (ii) decreased travel time from Yichang to Badong (efficiency); and (iii) decreased accident rates in the corridor (safety). An intermediate indicator of average daily traffic on the corridor (YBE and existing roads) complemented the outcome indicators by assessing road capacity and performance along the corridor after infrastructure improvement.

10. The effectiveness of the project's environmental management innovations was measured by the outcome indicator of improved compliance with the Environmental Management Plan (EMP). It gave project implementing entities, as well as the Bank a clear image of how well Independent Environmental Supervision (IES) performed its duty and how well each contractor ensured EMP compliance. In addition, intermediate indicators were created to monitor the effectiveness of institutional strengthening components with regard to environmental management guidelines and tunnel safety, as well as the performance of training programs.

1.3 Revised PDO (as approved by original approving authority) and Key Indicators, and reasons/justification

11. Project restructuring did not change either the PDO or the key indicators.

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[4] The technical note 'Using Involuntary Resettlement on Highway Projects to Alleviate Poverty: A Case Study from the Hubei Shiman Highway Project in China', shows how, by focusing on sustainable land development, improving housing standards, better access, and centrally-planned communities, an expressway project can lead to an improved quality of infrastructure and livelihoods for most affected residents. These activities were enhanced on the YBE project, and in conjunction with the work opportunities created by the project, led to increased wellbeing for many of the local poor.

1.4 Main Beneficiaries,

12. The PAD identified road users on the Yichang-Badong corridor as the main beneficiaries of the project. The average daily traffic volume on Yichang-Badong Expressway is 12,869 PCU/day in 2015. YBE connects four counties and county-level cities (totaling 1.58 million population in 2015) and stimulated local economy and industrial development with better logistics. Freight turnover of the four counties/cities and passenger services increased by 72% and 27% respectively from 2011 to 2014; during implementation, HPYECH also upgraded 110 km of village level roads. This road upgrading benefited about 500,000 local farmers in a mountainous area.

1.5 Original Components (*as approved*)

13. The project consists of two components: activities under Component A: YBE contribute to the achievement of both elements of the PDO, i.e., traffic flow and environmental management; and Component B: Institutional Strengthening contributes to enhanced environmental management practices.

14. **Component A: Yichang-Badong Expressway (YBE)**. Construction of a 173.6 km expressway, with a design speed of 80 km/hour connecting Yichang City and Badong County at the boarder of Hubei and Chongqing Municipality, including: (i) construction of tunnels, bridges and viaducts; (ii) construction of service areas, parking lots, toll plazas and buildings, seven interchanges and about 35.4 km of Class II interconnecting roads to improve integration with the local road network; (iii) acquisition and installation of electrical and mechanical equipment; (iv) carrying out supervision of construction activities; and (v) carrying out land acquisition required for this part of the project and resettlement and rehabilitation of people affected by the project.

15. **Component B: Institutional Strengthening.** Carrying out of a program to strengthen the capacity of HPTD in expressway construction and management through, *inter alia*: (i) carrying out training on expressway construction and management, including design, safety, maintenance, finance and the environment; (ii) preparation of guides to improve the environmental monitoring and management; (iii) carrying out a study on tunnel safety; (iv) carrying out a study on Hubei's comprehensive transport and logistics development plan; (v) carrying out a study on design approaches to reduce the risk of landslide and other geological disasters during construction and operation; and (vi) provision of equipment for expressway management and environmental monitoring.

1.6 Revised Components

16. The project restructuring in March 2011 replaced two studies ("a study on tunnel safety" and "a study on design approaches to reduce the risk of landslide and other geological disasters during construction and operation") by "a study on tunnel design and key construction technology in high stress region and soft rock area" and "a study on environment supervision and management system on highway construction projects" as the latter are considered to be more practical and useful for the immediate benefit of the Yiba Project and for future operations in Hubei Province.

1.7 Other significant changes

17. The project design, scope and scale were not changed during implementation, except for the revision of study topics (see above) and some design variations. Project restructuring in March 2011 also involved the reallocation of loan proceeds originally assigned to eight sub-grade contracts (approximately US$125 million) to finance other contracts, including pavement, traffic facilities, and electrical and mechanical (E&M) works. This reallocation was due to the bidding process of the sub-grade contracts not complying with the relevant provisions of the Loan Agreement and applicable World Bank Procurement Guidelines (See Para 25). As a result, the scope of works that are eligible for utilizing the Bank loan was revised from "(a) the carrying out of subgrade and pavement works over a selected portion of the road to be constructed under Part A.1 of the Project; and (b) the erection and installation of certain electrical and mechanical systems over the length of said road" to "the carrying out of pavement construction and traffic facilities over the entire length of Yiba Expressway to be constructed under Part A of the Project", and the percentage of expenditures to be financed in Category (1) "Civil works for Eligible Activities under Part A of the Project" was revised to 100%.

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design and Quality at Entry

18. **Adequacy of Project Concept and Design.** At the project concept stage HPTD and the Bank set the goal of developing an environmentally benign expressway. The alignment choice, financing plan, technical design and implementation procedures developed during project preparation maximized the opportunity of achieving the PDO. The final alignment of the expressway (which required a number of tunnels and bridges) was selected after a careful alternative analysis of geological and topographical conditions and minimized negative impacts on the environment and on cultural resources. In light of the relatively small contribution of the loan to total project costs (less than 8%), the project considered the options of financing either a small percentage of all sub-grade and civil works or to mainly finance only pavements. The decision was taken to finance several contracts located in particularly environmentally sensitive areas, so that the Bank could add value in environmental and capacity building. To focus project interventions on the construction of the expressway, this project did not include a local roads improvement program (which was included in previous highway projects). Local access was enhanced by HPTD through its own local road investment program, as well as by providing adequate connecting roads linking YBE to the local road network, and upgrading some access roads to a higher standard after their construction.

19. The project conducted sound background analysis and the design incorporated the extensive experience of previous Bank-financed highway projects in China and Hubei, particularly in regards to environmental management. The selection of the alignment took into account social and environmental impacts and avoided selecting road alignments based only on engineering considerations. Particular attention was paid during preparation to reduce the number of access roads and their impacts, pre-identify all disposal sites and carefully design toe walls, slope protection, and drainage facilities. Based on lessons of

experience, a number of innovations were adopted: key clauses of the EMP were incorporated in bidding documents and contracts; EMP compliance framework clearly identified obligations and enforcement procedures; having a separate environmental supervision consultant for monitoring and auditing; introduction of environmentally and socially responsible procurement (ESRP); and an integrated framework (reflecting issues ranging from sustainable source of materials to health and safety activities and inclusion of payment terms in the bill of quantities) implemented through appropriate clauses in the contract documents.

20. **Project Preparation**. Project preparation started in early 2007 with a well-defined project scope and progressed well towards appraisal in August 2008. Much attention was paid to route selection and engineering design to ensure that construction of YBE and interconnecting roads would have minimal negative environmental and social impacts. Detailed investigations were carried out on Karst areas and cave biodiversity[5], identification and design of waste disposal sites, pre-casting yards, and access roads. The 'Strategic Environmental Assessment' (SEA) for Hubei Road Network Plan (2002-2020) was carried out in parallel with project preparation and was completed in mid-2008. Though it had a focus on the province wide transport plan and not on the project itself, SEA's institutional adjustments and recommendations provided immediate assistance to HPTD to enhance the environment management of the project, which complemented and added value to the Environmental Impact Assessment (EIA). The Social Assessment (SA) and the Resettlement Action Plan (RAP) were well prepared and incorporated feedback from broad consultations. The Bank supported the development of the software application 'Safeguards Compliance Monitoring System' (SCMS) and demonstrated it to HPTD in early 2008. SCMS[6] allowed HPTD to enhance public involvement in the project and enabled rapid grievance redress during implementation. In addition, AusAID provided support for an HIV-AIDS education program for the project to increase awareness about the transmission of HIV/AIDS[7]. By project appraisal, the EIA, EMP, RAP, SA of satisfactory quality were disclosed and the preliminary engineering design was largely completed incorporating EMP recommendations. Implementation arrangements, including project management, financial management and procurement, were fully discussed and capacity enhancement activities were initiated. HPTD and related agencies showed strong commitment to the project and organized successful public consultations on various topics.

21. **Adequacy of Risk Assessment.** At appraisal the overall risk was assessed as "Modest". Risks identified include: (i) changes in work quantities, delays in construction, and increased costs (high); (ii) impacts on environmentally and ecologically sensitive locations

[5] The cave biodiversity surveys found a new anophtalmic cave-dwelling Trechini which was a new species and genus. The results of the surveys were used to guide the designers with water routed away from biodiverse significant caves, as well as protection provided to the entrances to protect them from intrusion by workers during construction.

[6] It not only monitor safeguard complaints, but also issues related to the compliance of labor law, the protection of vulnerable groups, and HIV/AIDS prevention.

[7] The YBE HIV/AIDS education program was built upon the success of previous similar programs in the Bank financed Hubei Shiman Highway' and Inland Waterway V projects. The program pilot tested the new HN/AIDS IEC Toolkit" 'The Road To Good Health', developed by EAP specifically to educate construction workers (about 80,000 people scattered in 146 construction camps), local residents, and commercial sex workers on HIV/AIDS risks and mitigation.

(modest); (iii) low traffic volume (modest); (iv) insufficient attention to safeguards (negligible or low); and (v) limited impacts from institutional strengthening (negligible or low). Most of the risks identified at appraisal did not materialize, except cost overrun. YBE was built in a very difficult topographic and geological region, and landslides were considered a big construction risk from the beginning. Despite considerable efforts during project preparation on geological data collection and review, particularly in the context of tunnel design, many unexpected landslides occurred during construction, which required additional geological investigation and increased construction costs. For the other risks identified, risk avoidance and mitigation measures were carefully designed and well implemented. At appraisal, fiduciary risk was assessed as low for Financial Management (FM) and modest (average) for procurement, based on previous experience of the province with Bank projects, and in particular with Bank procurement guidelines. However, a large value mis-procurement (Para 25) occurred during the initial implementation period[8], which affected project implementation and could have resulted in the cancellation of 80% of the Bank loan. In retrospect, stronger mitigation measures should have been designed and implemented, given the large value procurements.

22. **The loan was approved on March 31, 2009 and became effective on December 21, 2009.** Hubei Provincial Yiba Expressway Construction Headquarter (HPYECH) headquartered in Xingshan County with 120 staff, had been set up by HPTD to coordinate and supervise project implementation. By late September 2009, final designs had already been completed and approved; non-Bank financed contracts for access roads, YBE sub-grades, and construction supervision had been awarded; and resettlement activities had started. All project activities adopted improved environment management measures. ESRP and environmental clauses were included in the bidding documents. The independent environment supervision team had initiated its work and provided training to HPYECH, contractors and supervision engineers. The launch mission provided participatory training on environmental management, engineering, resettlement and procurement. Special training sessions were conducted for the innovative pilots – SCMS, independent environment supervision, and ESRP - and excellent feedback were received. Construction started immediately after the launch mission.

2.2 Implementation

23. **Implementation of YBE progressed well and major activities were completed one year ahead of project closing.** Implementation arrangements, despite being somewhat complex, were appropriate for such a large project with a tight schedule. The challenging topography and geology presented unprecedented engineering, environmental, and resettlement difficulties during construction. The project has demonstrated best practices in many creative and effective ways and implementation was carried out in a very tight

[8] At appraisal, eight International Competitive Bidding (ICB) sub-grade contracts (with an average value of about US$45.5 million), an ICB pavement contract and an ICB E&M contract were planned to be financed by the Bank loan. The eight ICB subgrade contracts would account for 80% of the Bank loan, and their procurement was carried out concurrently in mid-2009.

schedule[9], but achieved a very satisfactory outcome. The first ten contract segments, totaling about 62.72 km, were completed and opened to traffic on September 29, 2012. The remaining 112 km was completed and fully opened to traffic on December 27, 2014, one year ahead of the project closing date. In total, 37.6 km Class II interconnecting roads and 6.5 km Class III interconnecting roads were built to improve integration with the local road network. Institutional strengthening activities was carried out successfully, and study outputs informed the formulation of technical guidelines, management framework, and policies at the provincial level. Training on various topics regarding road construction, maintenance, and environmental management was delivered to more than 5,000 workers and staff.

24. **The brisk construction of YBE is also attributable to the design and implementation of a comprehensive resettlement program**. A dedicated resettlement office for expressways was established, with sub-offices levels staffed by qualified resettlement specialists at multiple governmental levels. A comprehensive resettlement program was carried out, and HPTD mobilized additional resources to adopt a lot of innovative measures (see the section on Lessons Learned) to restore and improve the livelihoods of project affected persons. Resettlement activities started in mid-2009 and most had been completed by April 2010 with highly satisfactory outcomes.

25. **Eight ICB sub-grade contracts were mis-procured during early implementation and the project was restructured to resolve the issue.** HPYECH, which was responsible for procuring the eight International Competitive Bidding (ICB) sub-grade contracts in a single batch in mid-2009, issued an Addendum to the bidding documents in Chinese, based on their (incorrect) understanding of the Bank's Procurement Guidelines[10]which contained the statement *"if bid prices exceed the employer's budget, all bids will be rejected";* this statement was not part of the English version cleared by the Bank. After a careful review of the circumstances surrounding the non-compliance, the Bank determined that HPYECH's actions were based on a genuine misunderstanding of the Procurement Guidelines. The Bank therefore declared mis-procurement without cancellation of the funds allocated to these contracts from the loan amount. Due to the severe time pressure faced by the project, it was agreed that these sub-grade contracts would be financed by the Borrower, but would remain a part of the project. In the follow up restructuring, loan proceeds originally assigned to these contracts (about USD120 million, accounting for about 80% of the Bank loan) were reallocated to finance other contracts, including pavement, traffic facilities, and E&M works.

26. **Project Performance Ratings and Mid-term Review**. The mis-procurement during the early stages of implementation had a substantial impact on disbursements from the

9 During the feasibility study stage, the province had expected to complete construction of YBE by end 2012, i.e., allowing only about 40 months of construction for an expressway, where bridges and tunnels comprised more than 70% of the alignment. HPYECH faced very high pressure for meeting deadlines and to open YBE as early as possible.

10 The Clause 2.61 (Rejection of All Bids) of Bank Procurement Guidance states that *"Bidding documents usually provide that Borrowers may reject all bids. Rejection of all bids is justified when there is lack of effective competition, or bids are not substantially responsive or when bid prices are substantially higher than existing budget"*. HPYECH assumed that this statement was intended to avoid bid prices coming in substantially higher than the budget. Announcing the upper limit bid price (the maximum acceptable bid price) is a common practice in public sector procurement in China and is endorsed by the Central Government.

Bank loan because of the time needed to resolve the issue, find alternatives, and procure and implement new packages. Project implementation progress (and procurement) were therefore rated Moderately Unsatisfactory until end 2011. Once civil works contracts financed by the Bank loan started in 2012, disbursement picked up very quickly; the rating of implementation progress was upgraded to Satisfactory in January 2012. The mid-term review, carried out in June 2013, confirmed that the project PDO remained appropriate and that the project was on track to achieve the PDO. Project design – including project components and the Results Framework (as well as end of project indicator targets) – was also considered appropriate to achieve the PDO. Progress towards achieving the PDO and implementation progress were both rated Satisfactory. At project closing in December 2015, both ratings were upgraded to Highly Satisfactory.

27. **Complicated geological conditions resulted in substantial design variations and cost overrun**. Project cost at completion was RMB19.51 billion, while at appraisal it was estimated at RMB15.14 billion. It was known from the beginning that YBE was being built in a very difficult topographic and geological region. During preparation the Bank team included a geotechnical advisor to help address this risk. Landslides[11] were recognized as one of the biggest risks and the project was expected to potentially have a high risk of cost overrun due to complicated geological conditions. Despite the geological investigations at the feasibility study stage being more detailed than usual and the special attention paid to the location of tunnels, cost estimates had gone up 10% at the preliminary design stage, and about 4,715 design variations were issued during construction. Cost overrun in excess of RMB1, 300 million occurred in sub-grade and pavement construction compared to estimates during preliminary design, due to: substantial volume of newly added landslide treatment works and stabilization of road embankment; pavement material in tunnels being changed to asphalt; and inflation and increase in unit costs of materials. The project planned and implemented specific technical studies[12] in parallel with construction, which provided guidance on the construction of the expressway. That so many unexpected landslides[13]

[11] The expressway crosses a specific geological formation known as Badong Geological Layer that stretches over 30 kilometers and was prone to landslide due to unusual water-rock interaction behavior. It also has very steep transversal slopes at many sections.

[12] Originally the institutional strengthening component included a study of 'Review design approaches to reduce the risk of landslide and other geological disasters during construction and operations'. Though the study was replaced in 2011 by other topics, HPTD carried out another study of 'Yiba Expressway major hazardous source safety monitoring system' that identified and analyzed different landslides, their causes and potential treatments. The research output supported the implementation of YBE and the information system established are serving safety enhancement during its operation.

[13] Several unexpected landslides and underground water encountered in the construction. At contract 8, some piles of Dengjiaping Extra Large Bridge were damaged by an unforeseen underground landslide after construction. An additional geological survey was carried out to identify the scope of landslide and the pile design was revised to increase its resistance to sheer force. Similar problems were encountered at contracts 24 and 25 in the Badong region, where mudstone, a sliding-prone formation of Triassic, was widely distributed. A landslide was encountered during the construction of viaduct. A total of 98 anti-slide piles, each over 30-meter length, were constructed in three rows to prevent the landslide development. Another landslide damaged the portal of Leijiawan Tunnel and deformed the entrance of left tube. About 0.7 million cubic meters of earth was removed above the portal in order to reduce the pressure exerted on the portal. The removed material was deposited at the foot of the slope to resist further development of the landslide, which led to the original viaduct design in the vicinity of the tunnel being replaced by 54 meters high embankment.

occurred during construction shows that carrying out even more geological investigations would have been prudent.

2.3 Monitoring and Evaluation (M&E) Design, Implementation and Utilization

28. **M&E Design**. Achievement of each aspect of the PDO was measured by well-designed outcome and intermediate indicators, which were appropriate and simple. The PDO element *Improve passenger and freight flows in the Yichang-Badong Corridor* is measured by reduced travel times on YBE over the existing road corridor, reduced freight rate, and reduced accident rates on YBE over the existing corridor, complemented by the intermediate outcome indicator of average daily traffic. The PDO element *Enhanced environmental management practices* is measured by incidents of major EMP non-compliance by contractors. In addition, intermediate indicators also monitor the completion of technical assistance and training. The M&E indicator on reduced fatalities on the existing road was designed to evaluate safety impact of YBE on the entire corridor, and targets were forecast with different reductions assumed for YBE and for the existing road, based on an assumption of reduced traffic on the existing road and better driving. However, fatality targets on the existing road were set without taking into account increased speeds resulting from traffic diversion to YBE and reduced congestion, and the consequent increase in more serious accidents and increase in fatalities.

29. **M&E implementation and utilization**. M&E indicators helped to monitor implementation progress and highlight problems, as well as evaluate the results of the completed project. M&E implementation was decentralized, with HPTD coordinating and the relevant agencies carrying out environment supervision and traffic monitoring. HPTD, HPYECH, and independent environmental supervision monitored indicators and updated them regularly in the semi-annual progress reports. M&E data was collected and recorded in ISRs on time, except for a period in 2014 due to staff turnover. Data collected helped relevant parties to take appropriate actions. For example, the number of EMP non-compliance incidents was reported and the cause was recorded in each of the progress report. In 2012 and 2013, three incidents of non-compliance issue was observed and recorded[14]; contractors were instructed to take immediate action to mitigate their impacts. With close supervision, environmental management was brought back on track and performed well thereafter.

2.4 Safeguard and Fiduciary Compliance

30. **Safeguard Compliance**. The project was classified as environmental Category A, since it involved the construction of a major expressway that traverses environmentally sensitive areas, increases noise and motor vehicle emissions, occupies farmlands and scenic

[14] In February 2012, the Contractor of Contract YBLM02 discarded wastes of the asphalt mixing plant in a nearby river course, which caused water pollution. The Contractor was instructed to clear the wastes and dispose them at the approved place. The pollution was eliminated and the asphalt mixing plant was demolished. In March 2012, the Contractor of Contract YBE31 discarded excavation wastes of the Chuyang Tunnel in the flood channel. After consultation with the local water authority, the deposit was removed to mitigate the impact. In October 2013, the Contractor of YBE27 added a new deposit at Liangshuijing without approval; measures were taken to mitigate the impact, including an environmental evaluation, environmental protection design, and land acquisition approval.

areas, causes soil erosion, and involves resettlement. The project triggered the following Bank safeguard policies: Environmental Assessment (OP/BP/GP 4.01), Physical Cultural Property (OP 4.11), Natural Habitats (OP 4.04), Involuntary Resettlement (OP 4.12), and Disclosure of Operational Information (BP 17.50). The required safeguard documents were prepared and disclosed in compliance with Bank requirements and issues that arose during implementation were addressed properly. Project environmental and social safeguards were further strengthened through a number of innovative approaches (see below) which were successfully carried out. This is a major advancement in safeguards application and these innovations are potentially replicable in other transport projects in China and elsewhere.

31. **Innovative and strong environmental supervision mechanism ensures effective environmental management**. HPYECH organized a number of interventions to promote environmental protection, including: incorporating key environmental requirements from the EMP into technical specifications; regular training; compliance framework; Green Award Competition[15]; Risk Management Fund[16]; and specific mitigation actions (river protection and vegetation restoration). Independent environmental supervision carried out routine inspections and spot checks, kept good records, verified payment certificate[17], issued notice and remedial action orders, and implemented training and awareness campaigns. The independent environmental supervision and compliance system that was put in place could well become an example for other highway projects in China, and perhaps internationally. Communications between HPYECH, independent environmental supervisors, and contractors were enhanced by the setting up of a dedicated environmental management webpage, where training material and good/bad practices were posted, and contractors could also post their environmental innovations and comments.

32. **Social Safeguards was carried out diligently and enhanced by SMCS**. The dedicated Hubei Expressway Resettlement Office (HERO), which was established by HPTD to manage operations and ensure compliance with the RAP, prepared the project Resettlement Action Plan (RAP). HERO supported a multilevel organizational framework to plan and implement resettlement, with resettlement offices at the project level and in local cities, counties and townships. Staff in local offices received additional training on resettlement. As shown in Annex 10, the resettlement program was very effective, with 81% of displaced families surveyed being highly satisfied with their living conditions after resettlement, and 80% satisfied with compensation. Some 69% considered themselves to be better off than before the project started.

33. SCMS, piloted under this project, enabled local residents and affected persons to lodge complaints with regard to the social aspects of the project. It ensured that resettlement information dissemination could be delivered to the displaced families and resettlement complaints could be received. It not only monitored safeguard complaints, but also issues related to compliance with labor laws, protection of vulnerable groups, and HIV/AIDS

[15] See lessons learned section, Para. 68

[16] See lessons learned section, Para. 68

[17] The Independent Environment Supervision was empowered to sign invoices payment certificates submitted by contractors, and only those who have met the minimum environmental management requirement will be paid.

prevention. By project completion 4,325 persons (1,038 families) were relocated, an increase of about 1,000 persons compared to the RAP in order to avoid impacting an environmentally sensitive area. The effectiveness of the resettlement program was assessed in terms of improvement of physical infrastructure, satisfaction with resettlement, and livelihood rehabilitation.

34. **Financial Management.** Project financial management was satisfactory. The project maintained an adequate project financial management system that provided accurate and timely information on project progress and the use of Bank loan proceeds. There were delays in the submission of the interim financial report and project audit reports due to turnover of key staff. The interim financial reports were prepared in the format agreed with MOF and the Bank. All audits reports were issued without qualifications.

35. **Procurement**. As discussed earlier, mis-procurement was declared early in project implementation. The Regional Vice President approved the use of the loan amount affected by the mis-procurement, without cancellation, through a project restructuring. Procurement performance was rated unsatisfactory until issues relating to the mis-procurment were resolved. HPYECH took immediate action, with enhanced training and established a quality assurance procedure for procurement. In subsequent procurements project implementing entities adhered to Bank procurement guidelines with full compliance. By project completion, 12 contracts were supported by the Bank loan: 11 civil works contracts through International Competitive Bidding (ICB), and a consulting service contract under Quality and Cost Based Selection (QCBS).

2.5 Post-completion Operation/Next Phase

36. Hubei has a well-structured highway operation and maintenance framework. HPTD established six decentralized highway management offices overseeing highway operation, tolling, road administration, and service areas. After construction, YBE was handed over to the E'xi Highway Management Office under Hubei Expressway Administration Bureau (HEAB) of HPTD for operation and maintenance (established in May 2010, which operates and maintains three expressways: Yiba, Huyuxi, and Yichang-Three Gorges Dam expressway. YBE is now piloting market operated maintenance and operation – routine maintenance is contracted to specialized companies based on a fixed unit rate; major maintenance will be carried out by contractors who will be selected through competitive bidding; and an independent supervision team will be recruited. With HEAB's frequent supervision and inspections, maintenance contractors are expected to sustain their good performance.

37. To enhance the operation and management of YBE, an operations center and emergency response centers were established in Xingshan and Badong respectively. YBE has established a road asset management database, and the country's first joint network for road administration and traffic police. Monitoring and information systems were installed at key points along YBE to give real-time traffic information and feed to navigating information panels on YBE. Emergency response systems are well established. A 24-hour emergency hotline is open to the public and is functioning well. Training has been provided to staff working in the expressway monitoring offices.

38. Landslides and scouring were serious threats faced by YBE during construction; while great efforts were made to investigate and treat these risks, they continue to exist after traffic opening. HPYECH is monitoring the stability of known landslides and is conducting stability analysis and evaluations based on monitoring results. Geological investigations and landslide monitoring are done by the E'xi office. Training has been provided to the maintenance team.

39. YBE is using a toll-by-weight system, supplemented by installing surveillance cameras at toll stations. Strong enforcement has helped control overloading, reduce pavement damage, and sustain the benefits of the expressway.

3. Assessment of Outcomes

3.1 Relevance of Objectives, Design and Implementation

40. **Relevance of objectives – High**. The project's development objectives capture the sectoral contexts at the time of appraisal and completion. They were clear and were consistent with the sectoral objectives of the Government of China, Hubei province and the Bank's CPS at appraisal (Para 6 and 7) and at completion. The PDO was stated appropriately and expressed concisely its two elements of improving traffic flows in the corridor and enhanced environmental management. The PDO is aligned with the second pillar of the Bank Group's China CPS for 2006-2010 to reduce poverty, inequality and social exclusion, and to improve China's competitiveness and investment climate. It is also in sync with the current CPS (2013-2016) and its two strategic themes: green growth and inclusive development, by supporting improved transport connectivity for more balanced regional development. The PDO remains relevant and consistent with government priorities, as the central and provincial 12th Five Year Plans (2011 – 2015) both specifically supported expanding the country's expressway network and regional integration through high quality transport connections, as well as promoting a green and environmental friendly transportation system. Hubei's total mileage of expressways in operation reached 6,204 km by the end of the 12th FYP period (exceeding the target of 6,000 km). Hubei's 13th FYP target is to build 1,300 km of additional expressways to improve passenger and freight flows in its expressway network, and enhance modern logistics and efficient transportation to support the new national strategy of developing the Yangtze River Economic Belt.

41. **Relevance of design and implementation – Substantial.** Project activities, as designed and implemented, contribute to the achievement of PDO and the sectoral objectives of China and the Bank. Construction of YBE sought to provide high quality connection between Yichang and Chongqing, and to complete a missing link of the CNEN. The choice of alignment was based on minimizing environmental impacts during construction and operation. The design adopted more tunnels and bridges instead of large cutting and filling, which have a big impact on the environment; all the slopes, temporary sites, deposit pits were to be (and were) restored with planting. Innovative measures on environmental management – piloting ESRP, inclusion of EMP compliance in bidding documents, and hiring independent environmental supervision – enhanced compliance during construction, and have set a good example for other expressway projects. Studies on logistics, environmental management, tunnel design and construction addressed the

urgent need to bridge the gap in these research areas in the province, and provided guidelines for similar projects. The overall project design was relevant and its smooth implementation enabled the successful achievement of the PDO.

42. The Results Framework captures the achievement of PDO through monitoring and evaluating achievement of the targets for freight rate, traffic volume, travel time savings, and compliance with the EMP. It required the assessment and monitoring of performance of YBE using the traffic and safety data; reporting of incidents of non-compliance through an outcome indicator helped highlight contractor performance of EMP implementation. Intermediate indicators designed complement the outcome indicators to monitor implementation progress well. The inclusion of fatality targets on the existing roads as an outcome indicator, without there being any project supported intervention of traffic safety enhancement measures, was not appropriate.

3.2 Achievement of Project Development Objectives
Rating: Substantial

43. The Project Development Objective of improving passenger and freight flows in the Yichang-Badong corridor by the construction of an expressway with enhanced environmental management practices has been achieved.

44. **Improved passenger and freight flows.** The PDO and intermediate level indicator targets that measure freight cost reduction, travel time savings, traffic volume, and accident rates were all exceeded. Freight rate reduced more than expected: freight rates for ore (RMB0.46/ton), for agricultural products (RMB0.5/ton), and for bus travel (RMB0.2/persons-km), are respectively 30%, 29%, and 23% lower than estimated at appraisal[18]. Travel time between Yichang and Badong through YBE is 2.17 hours, while it is 5.3 hours on the existing road, a saving of more than three hours. The expressway was more effective than expected at improving road safety, particularly as the accident rate decreased significantly on YBE and on the existing road. While YBE performed well on safety improvements and only one fatality occurred in the last year, the sub-indicator of fatalities on existing roads failed to achieve the target for the reasons highlighted in the section on M&E design. The traffic volume on YBE is 12,869 PCU/day, 82% higher than the target for the first year of YBE operation. The lower than target traffic volume on the existing road (1,530 PCU/day compared to the target of 3,500 PCU/day) indicates that traffic diversion to YBE has exceeded the target.

45. **Enhanced environmental management practices**. The outcome indicator recorded three incidents of major EMP non-compliance during implementation, which were immediately corrected and were highlighted to other contractors; as a result there was zero

[18] Based on traffic studies, these commodities were selected as two main ones expected to transit the corridor. Ore represents 20% of the commodities expected to be transported; agricultural products 11.8%. All other commodities are less than 8%. The surveyed base rates were 0.5 and 0.55 RMB/ton for the ore and agricultural products respectively; 0.2 RMB/passenger-km for bus passengers. These were forecast to increase to 0.65, 0.70, and 0.26 respectively in year 5. The trip cost was calculated based on the distances before (269.5km) and after (173.6km), loads (35 ton, 20 ton, and 30 passengers) and tolls to obtain the total costs for the trip. The reduction targets reflected the difference in these rates: -25% for ore and agricultural products; and -18% for bus passengers. The actual number was collected regularly through surveys of freight and passenger services.

non-compliance thereafter. These results demonstrated the effectiveness of the innovative environmental management measures piloted under this project. Implementation of the project's environmental management measures also provided practical knowledge to the PMO, contractors and consultants, and enhanced their awareness of environmental protection and other safeguard practices. Environmental management practices adopted in the YBE project have been summarized into a guideline for use in other highway projects. This guideline, coupled with the training provided, will have long-term benefits for highway constructions in Hubei.

46. The successful construction of YBE in an environmental-friendly manner will provide development opportunities to less advantaged areas and balance regional economic development in Hubei. The study on Hubei's comprehensive transport and logistics system development plan supported the provincial government in planning for the utilization of its road infrastructure network, and to seek opportunities to maximize long term benefits beyond the project. The training programs benefited many more people than planned; in particular, training on EMP compliance, delivered by the Independent Environment Supervisor, reached contractors on different construction sites, and has contributed to long-term behavior change.

3.3 Efficiency
Rating: High

47. An ex-post evaluation of the project was conducted and is reported in the Borrower's Implementation Completion Report. Observed traffic counts were compared with appraisal estimates and traffic forecasts for future years were revised accordingly. The main inputs for the ex-post evaluation were adjusted based on construction costs and current prices. The results of the ex-post evaluation are summarized below; more details are provided in Annex 3. Despite project costs at completion exceeding appraisal costs by 29%, the EIRR for the project is 22.4%, i.e., much higher than the 14.2% estimated at appraisal. Sensitivity tests based on a scenario of maintenance cost increase of 20% and benefit decrease of 20% yield an EIRR of 20.1%.

Table A3-5: Ex-ante and Ex-post Economic Evaluation of the Project

	EIRR (%)		ENPV (12%, RMB million)	
	At Appraisal	ICR	At Appraisal	ICR
YBE	14.2%	22.4%	3,442	21,973

48. YBE is a toll road. The Financial Internal Rate of Return (FIRR) and the Financial Net Present Value (FNPV) calculated under the ex-post evaluation exercise are summarized in the table below. With traffic volume increasing quickly, even with cost overrun the project would achieve an FIRR that is much higher than estimated at appraisal.

Table A3-8 Ex-ante and Ex-post Financial Evaluation for YBE

	FIRR (%)		FNPV (RMB million)	
	At Appraisal	ICR	At Appraisal	ICR
YBE	-1.9%	4.5%	-11,049	-0.9

49. **Administrative Efficiency.** The project was implemented efficiently and on time, in spite of the challenging topography. Most of the civil works were completed more than a year ahead of the project closing date. Resettlement and land acquisition activities started early and were completed with high efficiency. The institutional strengthening component was also completed promptly. The desire to start construction as quickly as possible may have contributed to the various design changes as a result of the additional landslide treatments; these also increased project costs, but did not materially affect the implementation schedule. Project activities were completed one year ahead of project closing date.

3.4 Justification of Overall Outcome Rating
Rating: Satisfactory

50. Based on discussions above and ratings of relevance (of objectives as well as design), achievement of the PDO, and efficiency, the overall outcome of the project is rated satisfactory.

3.5 Overarching Themes, Other Outcomes and Impacts

(a) Poverty Impacts, Gender Aspects, and Social Development

51. YBE passes five cities and counties in the western part of Hubei: Yichang City, Dangyang City, Xingshan County, Zigui County and Badong County. The geographical location and poor transportation facilities had limited opportunities for these cities/counties to share the benefits of rapid economic growth in the region. Seven interchanges on YBE connect to these counties and cities every 25 km for the benefit of these regions. Though the approved toll rate of YBE is above the average tolls in China (because of the high construction cost), YBE's benefits (time saving and safety improvement) have attracted more traffic to YBE. YBE has improved road service to more than four million people, and has stimulated the local economy through employment and new service opportunities (e.g., restaurants, accommodation). GDP growth of these counties/cities in 2010 (19-23%) was below the provincial average of 24%; GDP growth of these cities/counties in 2012 (in the 14%-19% range) and 2013 (in the 13%-16% range) exceeded the provincial average (15% and 12%). Similar trends were observed on freight and passenger turnover, as well as per-capita income. Badong County's residents (40% of whom are minority people) are now served by more frequent passenger services to and from Yichang. People affected by land acquisition and resettlement increased their family income by over 24%. Women were empowered to benefit equally from resettlement compensation. Specific training was provided to women for starting small businesses. (Annex 10).

(b) Institutional Change/Strengthening

52. The project contributed significantly to strengthening the institutional capacity of HPTD, HPYECH, contractors, and supervision engineers on environmental management during construction, construction safety, engineering techniques for tunnel construction, etc. Knowledge sharing activities and training benefited over 5,000 people, about five times the number planned at appraisal.

53. The emphasis on environmental management enhanced multi-agency collaboration and public participation from the design stage to bidding, implementation, and operation and maintenance. Good records were kept on routine inspections and spot checks, a framework for environment supervision and management for highway project was established, and relevant information has been transferred to maintenance entities upon completion of construction. Good practices under the project on environmental protection and impact mitigation can be replicated in other projects and other regions.

(c) Other Unintended Outcomes and Impacts (positive or negative)

54. Resettlement and land acquisition compensation and related programs directly impacted 9,845 people and improved living conditions in villages and counties along YBE. Displaced families got larger houses; house sizes increased by 33.6% on average. Farmers who lost their land were provided with employment training; they no longer rely on marginal farm land in the mountains, but on business and service opportunities in towns. In some resettlement sites near tourist attractions, training on marketing and accounting were provided to help villagers to start restaurant and hotel businesses. YBE improved living conditions, accessibility and increased opportunity for traveling outside for jobs. Retaining walls have been built to protect farmland in villages. Over 100 km of rural roads were upgraded to national standard. Electricity access at the start of the project, although very high was not stable. With the resettlement program, all households have access to electricity and stable electricity supply increased from 64% to 92%. Some 2,000 displaced persons received their pension insurance.

55. The increase in fatal traffic accidents on the existing corridor, as discussed earlier, is an unintended consequence of the project.

3.6 Summary of Findings of Beneficiary Survey and/or Stakeholder Workshops

56. NA

4. Assessment of Risk to Development Outcome

Rating: Moderate

57. The risk to the project's development outcome is rated Moderate. The quality and performance of YBE in terms of freight rate, travel time and safety make it a key segment of the important Shanghai-Chengdu expressway, a useful addition to Hubei's main expressway network, and a stimulator of the economy of lagging counties in western Hubei. The traffic volume at opening, its growth, and the absence of comparable highways in the region would ensure that passenger and freight flows will be sustained. The road and related facilities have been properly maintained and operated; vegetation and plantings are being properly taken care of. Measures have been adopted to mitigate faster road deterioration, risk of landslides, and to ensure maintenance funds to manage and operate the highway. These include: competitively procured maintenance contracts; communication of YBE's environment friendly measures and concepts to the public and to the maintenance team; provision of a knowledge base for designing specific maintenance plans for sub-grades, tunnels and bridges based on the thorough geological

investigations and records during construction; installation of monitoring instruments at the location of major landslides and structures; carrying out overloading control diligently and its enforcement through a good monitoring system; an emergency response framework in place; and the establishment of the provincial Transport Investment Company to oversee financing, repayment, and use of toll revenue in a coordinated manner.

58. The logistics plan is included in the next five-year plan. The results of the tunnel engineering study were applied during construction; and the environmental supervision and management study has provided an acknowledged innovation to highway construction and operation practices in Hubei.

5. Assessment of Bank and Borrower Performance

5.1 Bank Performance

(a) Bank Performance in Ensuring Quality at Entry
Rating: Satisfactory

59. Overall, Bank performance during preparation and appraisal was satisfactory. The project benefited from the experiences of and lessons learned from previous projects, mobilized additional trust funds for policy interventions, and carefully designed innovative measures for enhancing environmental management during construction and operation. Due to the sensitive and protected environment of the project area, the Bank ensured that the designers received clear guidance from environmental specialists on the alignment and to incorporate appropriate measures to reduce impacts on the environment. Independent Environment Supervision was deployed at an early stage and relevant training was provided during the launch workshop. The Bank provided appropriate guidance on the following aspects to ensure quality at entry: enhancing engineering design; conducting additional surveys for tunnel safety; developing the EMP compliance framework; designing an appropriate M&E framework; and planning technical assistance studies. The Bank advised government entities to carry out careful geological investigations prior to detailed designs; however the tight schedule, driven by the pressures to implement national and provincial Five Year Plans on schedule had an impact on the extent and quality of such work.

(b) Quality of Supervision
Rating: Highly Satisfactory

60. The Bank carried out diligent supervision of the project and worked effectively with the implementing agencies to deliver the project on time, with good construction quality, and helped achieve project outcomes. All major investments and TA activities were completed by 2014. Frequent supervision missions were conducted and ISRs were generally prepared on a six-monthly basis with candid and appropriate ratings. Bank experts provided support to address specific engineering supervision needs (bridge, tunnel, landslide, access road, etc.,), ensure EMP compliance, and guide resettlement activities. Innovative measures of ensuring EMP compliance were closely monitored by the Bank through reviews of specifications in bidding documents, supervision of IES work, regular

visits to construction sites, and close monitoring of follow-up actions. Restoration plans after construction were emphasized and carefully reviewed by the Bank team.

61. The Bank took proactive action to address the mis-procurement issue: it was detected at an early stage, Bank intervention was timely, and impacts on the construction schedule were minimized. Financial management and disbursement were supervised adequately through desk reviews and through visits to HPTD and HPYECH. Implementation of social safeguards was reviewed diligently and enhanced by SCMS. The Bank placed strong emphasis on measures to sustain development outcomes once YBE opened partially in 2012, and guided HPTD to enhance landscaping, improve signage on speed limits, educate nearby villagers, test the emergency response system, and equip maintenance contractors with advanced environmental management practices. With all aspects of project implementation supervised carefully, the quality of supervision is rated Highly Satisfactory.

(c) Justification of Rating for Overall Bank Performance
Rating: Satisfactory

62. Based on the Satisfactory rating for Bank Performance in Enhancing Quality at Entry and Highly Satisfactory rating for Quality of Supervision, overall Bank performance is rated Satisfactory.

5.2 Borrower Performance

(a) Government Performance
Rating: Satisfactory

63. Government performance is rated Satisfactory due to the strong ownership and commitment demonstrated towards the achievement of the project development objective. Hubei provincial government provided strong leadership and guidance during project implementation, especially on environmental management innovations and EMP compliance. It adopted innovative practices for environmental and social safeguards, mobilized sufficient counterpart funding, and utilized outputs from studies in provincial policies. The provincial and local governments and the Bank team developed a strong working relationship during project preparation. The fruits of this relationship are reflected in the final project design, which incorporated innovative environmental management, new pilots, and commitment to carry out provincial-level policies on SEA and logistics development. However, the importance of YBE for CNEN and as the last segment of Shanghai-Chongqing Expressway Corridor, led to government expectations of an early completion date, which made it difficult to allow sufficient time for adequate investigations and engineering designs. Provincial and local governments provided the necessary additional funds, both to address project cost increases and to finance the sub-grade contracts, once they were declared ineligible for Bank financing.

(b) Implementing Agency or Agencies Performance
Rating: Satisfactory

64. The consolidated performance of the implementing agencies is rated as Satisfactory because of their dedication and commitment to the achievement of the project development objective. Though Hubei had implemented four Bank financed highway projects before the Yiba project, regular staff turnover affected implementing agencies. However, they demonstrated a willingness to improve their capacity through training and communications with the Bank.

a. HPTD provided overall guidance and coordination for the project, and demonstrated strong commitment for creating a good policy environment for environmental friendly construction. It facilitated communications with cities and counties, and provided in-time support for issues that arose during supervision. HPTD supported 12 additional technical assistance studies and captured good practices for dissemination and scale up. HPTD recognized the importance of resettlement as a key part of the project and mobilized additional funds for increasing compensation rates, providing pensions and medical insurance to displaced families. WBFPO was diligent in project management and successfully implemented institutional strengthening activities. The performance of HPTD is rated Satisfactory.

b. HPYECH was the "employer" for all YBE contracts and managed construction works on a daily basis. It demonstrated strong capacity and overcame many engineering challenges to complete YBE construction on a tight schedule. HPYECH ensured that YBE construction had minimal negative environmental impacts through frequent supervision, sufficient training, motivating contractors to improve environmental management, and additional funding for the environmental risk management fund. HPYECH maintained the books of account, and submitted financial statements on time. The mis-procurement that occurred early in implementation did not significantly affect the overall project construction schedule. HPYECH subsequently established procurement quality assurance procedures and ensured full compliance with Bank procurement guidelines. On balance, HPYECH's performance is rated satisfactory.

(c) Justification of Rating for Overall Borrower Performance
Rating: Satisfactory

65. Based on the above ratings for government performance and implementing agencies' performance, overall Borrower Performance is rated Satisfactory.

6. Lessons Learned

66. ***For expressway projects in challenging typography, sufficient time should be allowed for investigations and design.*** Rapid economic growth in China has generated strong demand for enhancing connectivity and there is strong pressure to complete highway projects within very tight deadlines. As a result, trade-offs are often made between the time and cost of prior investigations and the cost of adjusting designs during implementation through contract revisions. YBE contractors experienced quite different geological conditions during construction compared to the conditions assumed during project design. As about 75% of YBE comprised bridges and tunnels, a large number of variations became

necessary, affecting costs. A combination of measures should have been taken during project preparation, including allowing sufficient time for investigations, realistic construction timeline, and enhanced communications and reviews of technical matters. Back-up plans should have been prepared in the event of unanticipated geological conditions materializing.

67. ***Successful procurement of large scale civil works contracts in compliance with Bank Procurement Guidelines requires good procurement planning, packaging, quality review, and sufficient advance training.*** The large scale mis-procurement under this project provides lessons for other projects. Firstly, it is essential to avoid procuring a number of large packages concurrently within a short time period. In this project, eight ICB packages totaling 80% of the loan amount were scheduled to be procured at the same time. Secondly, special attention should be paid to maintain continuity of key counterpart and Bank staff to the extent possible. The chief of the PMO, who was in charge of earlier World Bank projects, left the PMO just before procurement started and the new leader was not very familiar with Bank procurement. At about the same time the Bank task team leader also changed, resulting in the misunderstanding that caused mis-procurement to be detected too late. Finally, the Bank should carefully monitor procurement capacity prior to large procurements being undertaken and ensure that appropriate training is provided to the relevant counterpart staff.

68. ***Use of innovative measures to ensure EMP compliance and enhance environmental management focus during expressway construction***. The project has demonstrated that establishing a comprehensive environmental management framework can effectively mitigate the impacts of construction. In addition to the EMP, the project piloted a bundle of measures to ensure that each step of the project properly addressed environment issues. These pilots provide valuable lessons to enhance environmental management. (1) *Choose the alignment and adopt an engineering design that can minimize environmental impacts.* YBE design adopted a high tunnels and bridges ratio compared to conventional projects, and paid special attention to access road design, river protection, biodiversity, and vegetation restoration. (2) *Enhance procurement to improve the project's environmental impacts.* Unlike the usual practice of requiring the contractor to follow the EMP and relevant environment management regulations, the project adopted environmentally and socially responsible procurement (ESRP) to incorporate environmental aspects into purchasing choices and "translated" EMP clauses into technical specifications of bidding documents to clearly show contractors more detailed requirements for preserving the environment[19]. (3) *Involve independent environmental supervision to monitor and evaluate compliance.* A compliance framework was designed to support monitoring and enforcement of environmental safeguards through an Independent Environmental Supervision (IES) consultant to train and guide contractors closely, and who was empowered to perform environmental practice acceptance of contract payment. (4) *Create incentives for all parties involved to ensure good environmental management.* HPYECH launched a Green Award Competition among contractors and supervision engineers, and presentations by finalists on good examples of environmental

[19] In particular, contractors were required to minimize waste to landfills and describe landfilling methods, maintain vehicles and machinery at national level with regard to air and water emissions and leakage standards.

management measures increased the awareness level of the general public. HPYECH also created is an Environment Risk Management Fund, comprised of retention from contractors (0.4% of the contract value) and a 150% matching fund from HPYECH, to promote good practices in environmental protection and impact mitigation. IES verified compliance with EMP on a monthly basis for each contractor receiving the total 1% or losing its contribution of 0.4%. Another specific fund (comprising HPYECH contribution, non-compliance penalty and contractors' deposit lost from the Risk Management Fund) is also in place for various interventions to promote environment friendly and safe construction. The performance of EMP compliance is recorded as an outcome indicator in the M&E framework. (5) *Ensure timely rehabilitation after construction.* Due to the very difficult geological and topographical conditions of the project area, timely rehabilitation of the construction sites, including temporary works, was essential to achieve the project's environmental objective. Contractors were required to rehabilitate temporary sites and pass IES for contract completion acceptance; for access roads used during construction, landscaping and vegetation restoration were required before handover to local entities. In summary, the project demonstrated a successful case of adopting a holistic approach to minimize environmental impacts of highway construction, which is a lesson for other such environmentally complex projects.

Successful resettlement activities contributed to shared prosperity for project affected persons. Project resettlement activities were carried out under the principle of minimizing cultivated land acquisition because villagers rely on farming for survival and there is a scarcity of farmland in the mountainous terrain. In some areas the alignment was modified during design stage to protect farmland. As farmers were staying in earth-wood houses of little value and showed interest in building new houses, the project acquired more built land (though rates were higher than for cultivated land) to support villagers build new houses. The project also provided displaced families significantly improved local living conditions through rural road upgrading, new land reclamation, electricity supply, sanitation improvements, drinking water improvements, pension insurance, career development, and housing improvements. The experiences and lessons from the project have been summarized as a case study, *Transformative Potential of World Bank Safeguards Policies: Case Study Series 3 from Yichang-Badong Expressway Project in China*. (Annex 10).

7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners

(a) Borrower/implementing agencies

69. Summary of the Borrower's ICR is in Annex 7.

(b) Co-financiers

70. Not Applicable

(c) Other partners and stakeholders

71. Not Applicable

Annex 1. Project Costs and Financing

(a) Project Cost by Component (in USD Million equivalent)

Component	Appraisal Estimate (USD millions)	Actual Cost (USD millions)	Actual Counterpart (USD millions)	Actual WB (USD millions)	Percentage of Appraisal
[A] Yichang - Badong Expressway					
- Civil works	1,530.19	2,000.66	1,914.52	86.14	131%
- Electrical and Mechanical Facilities	114.28	125.29	64.14	61.15	110%
- Buildings, annex areas	15.45	41.67	41.67	-	270%
- Construction supervision (Domestic)	30.94	24.20	24.20	-	78%
- Construction supervision (Foreign)	2.00	2.11	0.09	2.01	105%
- Land acquisition and resettlement	82.86	137.86	137.86	-	166%
Subtotal	**1,775.72**	**2,331.79**	**2,182.49**	**149.31**	**131%**
[B] Institutional Strengthening					
- Studies (*)	0.65	0.80	0.80		124%
- Training	0.43	0.42	0.10	0.32	98%
- Equipment	4.20	8.64	8.64		206%
Subtotal	**5.28**	**9.87**	**9.55**	**0.32**	**187%**
Total Baseline Costs	**1,781.00**	**2,341.66**	**2,192.03**	**149.63**	**131%**
Physical Contingencies	111.73	55.15	55.15		49%
Price Contingencies	45.91	116.59	116.59		254%
Total Project Costs	**1,938.64**	**2,513.40**	**2,363.78**	**149.63**	**130%**
Project management fee, financial fee, and other fees	255.00	313.88	313.88		123%
Front-end fee	0.38	0.38		0.38	100%
Total Financing Required	**2,194.01**	**2,827.66**	**2,677.66**	**150.00**	**128.88%**

* The exchange rate was used the one specified in PAD: US$1 = RMB 6.90.

(b) Financing

Source of Funds	Type of Cofinancing	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
Borrower		2044.02	2677.66	131%
International Bank for Reconstruction and Development		150.00	150.00	100%

Annex 2. Outputs by Component

Component A : Yichang – Badong Expressway (YBE)	
Appraisal Plan	This component includes the construction of a 173.6 km expressway connecting Yichang City and Badong County at the border of Hubei and Chongqing Municipality, including land acquisition and resettlement, relevant electrical and mechanical (E&M) facilities, annex areas, toll plazas and buildings, seven interchanges, and 35.4 km of Class II interconnecting roads to improve integration with the local road network. The expressway is a four lane design with a design speed of 80 km/hour design speed. The total cost of the expressway was estimated at US$2189 million. Bank financing would be focused on the first 48.5 km of the project where the works are in particularly environmentally sensitive areas. The Bank would finance eight sub-grade and civil works contracts and one paving contract. It would also finance the tolling system and telecommunications equipment for the entire expressway. This component also includes the supervision of construction activities. The project adopted an innovative approach towards supervision through the appointment of a separate environmental supervision consultant, in addition to the usual practice of having the environment supervised by the same consultant as for civil works. Two domestic consulting teams will be procured to act as the 'Engineer' for civil works, and a third for E&M works. A foreign consulting firm would provide supervision support to the project office.
Actual Accomplishments at ICR and Any Variances	The project was implemented within a very tight schedule, but nevertheless achieved a satisfactory outcome. Due to the mis-procurement, the eight ICB works contracts that were originally to be supported by Bank financing were substituted by pavement and E&M contracts covering the entire YBE alignment. The first ten contract segments, totaling about 62.72 km, were completed and opened to traffic on September 29, 2012. The remaining 111 km was completed and fully opened to traffic on December 27, 2014, one year ahead of the project closing date. In total, 37.6 km Class II interconnecting roads and 6.5 km Class III interconnecting roads were built. Enhanced environmental management practices was adopted in all works contracts through the Independent Environmental Supervision. Innovative measures and the incentive framework were implemented as designed and achieved demonstrative impacts on ensuring EMP compliance in large works contracts. The environmental supervision consultant provided an EMP implementation guide for contractors and a guide for environmental

	supervisors on undertaking supervision, including monitoring of effectiveness. Training was provided to contractors on these guides. The completion cost of this component was US$2,331.79, i.e., a 31% cost overrun compared to appraisal estimates. Civil works (especially sub-grade works) caused the majority of the cost overruns due to the challenging geological topography and the lack of adequate time for more thorough investigations at the design stage. Land acquisition and resettlement costs had a 66% overrun, partly due to design changes and partly because HPTD provided benefits to displaced families.
Component B: Institutional Strengthening	
Appraisal Plan	This component strengthens the capacity of HPTD in expressway construction and management through: (i) carrying out training on expressway construction and management, including design, safety, maintenance, finance and the environment; (ii) preparation of guides to improve the environmental monitoring and management; (iii) carrying out a study on tunnel safety; (iv) carrying out a study on Hubei's comprehensive transport and logistics development plan; (v) carrying out a study on design approaches to reduce the risk of landslide and other geological disasters during construction and operation; and (vi) provision of equipment for expressway management and environmental monitoring.
Actual Accomplishments at ICR and Any Variances	As part of project restructuring, two studies envisaged at appraisal (i.e., "a study on tunnel safety", and "a study on design approaches to reduce the risk of landslide and other geological disasters during construction and operation") were substituted by "a study on tunnel design and key construction technology in high stress region and soft rock area" and a "study on environmental supervision and management system on highway construction projects" as the latter are considered to be more practical and useful for the immediate benefit of the project and for future operations in Hubei Province. Institutional strengthening activities were carried out successfully and research outputs advised the formulation of technical guidelines, management framework, and policies at the provincial level. • Research on ***Hubei's Comprehensive Transport and Logistics System Development Plan*** provided an analysis of the current status of Hubei's logistics development, issues faced and demand forecast. Based on the analysis, the study proposed recommendations to HPTD at planning and program levels to be incorporated into the province's 13th Five Year Plan.

	• The study on ***Tunnel Design and Key Construction Technology in High Stress Region and Soft Rock Area*** conducted in-lab tests, on-site detection, and optimization section design for tunnels and strut protection, and construction methodology. The proactive research is highly applicable to complex projects like Yiba Expressway. It has incorporated international experience and lessons to provide a standardized approach for design, technical specifications, and construction practices to address the particularly complex geological challenge. The project applied the proposed measures and other projects in Hubei also benefited from this research. • The study on ***Environment Supervision and Management System on Highway Construction Project*** has developed a framework for environment supervision and management, established performance indicators, and quantified and standardized the process of environmental supervision. A multi-criteria decision support methodology was developed to provide practical support to a highway project owner to decide whether or not to introduce independent environment supervision engineers, and how to do so. A practical manual for independent environment supervision engineers was also developed on how to undertake supervision, including organization, inspection frequency and protocols, reporting, training content and scheduling, compliance frameworks including award and penalty systems, awareness raising campaigns, and monitoring the effectiveness of environment supervision. The technical guidance was used as a learning material for the World Bank Regional Environmental and Social Practice Conference in June 2014 in Yichang. Aside from the three studies mentioned above, the project supported 18 other studies on bridges, tunnels, sub-grade, landslides, environment, construction materials, and project management. Of which, six were ministry-level research projects, and twelve were provincial level research projects. • Key Technology Research on Yiba Highway special soil and its impact on project construction. • Badong Landslide/soft rock slope deformation. • Tunnel Design and Key Construction Technology in High Stress Region and Soft Rock Area. • Comprehensive assessment of bridge risks in mountainous areas. • Yiba major safety hazard monitoring system design. • Yiba Expressway Karst hazard identification and risk prevention research. • Dangerous goods transport accidents and Environmental Risk Countermeasures for river bridges along Yiba Expressway. • Yiba highway construction safety assessment, alert and forecast technology research. • High pier large-span bridge aesthetics research.

	• A strategic research on comprehensive transportation system for Hubei to promote the development of modern logistics industry. • The Three Gorges area water bank rebuilding technology research. • Highway traffic safety technology based on drivers' visual perception in mountainous areas. • Environmental supervision and decision support system for highway construction project. • Index system for highway construction in the context of cleaner and greener economy. • Research on highway construction's ecological impacts and repair strategy. • Research on design and construction of soil disposal sites for highway construction in Three Gorges area. • Research on highway construction project management in Hubei province. • Research on safe construction evaluation and early warning and forecast in highway projects. • Research on the standardization of highway tunnel monitoring system network in mountainous area. • Research on multidimensional quality control for highway construction. • Research on development oriented resettlement during highway construction in the three gorges area. Training was delivered to more than 5,000 workers and staff on road construction, maintenance, and environmental management. The satisfaction rate was above 98%. Expressway management and maintenance equipment were financed by counterpart funding. HPTD invested 100% more than originally estimated on these equipment. Installation of this equipment provided functional modules of highway administration, maintenance, monitoring, emergency response, and communications in the operations center and in the emergency response center.

Annex 3. Economic and Financial Analysis

(Including assumptions in the analysis)

1. An ex-post evaluation of the project was carried out as part of the Borrower's Implementation Completion Report by updating the traffic forecast (based on traffic counts in YBE) and using completion costs and current prices.

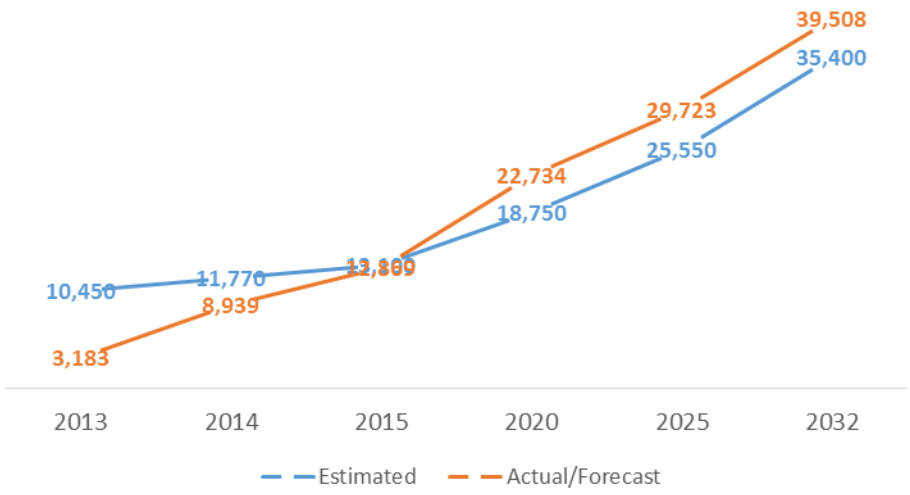
2. **YBE Traffic Volume**. At appraisal YBE was expected to commence operation by end 2012; however more than half of the route was completed two years later. The first segment (62.72 km) was opened in September 2012, and traffic volume increased in 2013 and 2014. Though traffic in 2013 was much lower than expected at appraisal, traffic volume caught up with appraisal estimates in 2015. The revised traffic forecast is shown in Table A3-1.

Table A3-1 Original and Revised Traffic Forecasts

	YBE Traffic Volume PCU/day	
2013	Original estimate	10,450
	Actual	3,183
2014	Original estimate	11,770
	Actual	8,939
2015	Original estimate	13,100
	Actual	12,869
2020	Original estimate	18,750
	Revised Forecast	22,734
2025	Original estimate	25,550
	Revised Forecast	29,723
2032	Original estimated	35,400
	Revised Forecast	39,508

Source: HPYECH, FSR, PAD, and domestic ICR.

Figure A3-1 Estimated and Actual YBE Traffic Volume (PCU/day)



3. **Ex-post Economic Evaluation**. The ex-post economic evaluation assumes the same kinds of benefits as at appraisal: (i) VOC savings on the project corridor; (ii) time savings through relieved congestion on the existing road; and (iii) lower accident costs. Hubei has experienced greater economic growth than expected at appraisal. Time savings and safety benefits were recalculated using the new inputs on traffic forecasts, the value of time, and accident/fatality costs.

4. The Economic Internal Rate of Return (EIRR) and Economic Net Present Value (ENPV) are summarized in Table A3-2 below.

Table A3-2 Results of Ex-ante and Ex-post Economic Evaluation

	EIRR (%)		ENPV (12%, RMB million)	
	At Appraisal	ICR	At Appraisal	ICR
YBE	14.2%	22.38%	3,442.41	21,972.93

5. The table below shows the impact of lower traffic volumes or higher maintenance costs on the EIRR/NPV. The worst case scenario of a combined maintenance cost increase of 20% and benefit decrease of 20% will lower the EIRR to a still acceptable 20.12%.

	EIRR (%)	ENPV (RMB million)
(a) Benefit (toll revenue) decrease 20%	20.15	15,607.84
(b) Maintenance Cost increase 20%	22.35	21,901.80
(c) Combine (a) and (b)	20.12	15,536.71

6. **Ex-post Financial Evaluation**. The ex-post evaluation was carried out using the same assumptions as at appraisal: 3% annual growth rate of maintenance costs and major maintenance to be carried out every 12 years at about 13 times routine maintenance costs. Other expenses, including interest payments on the loans, were also updated to reflect the current position.

7. The current toll rate is shown in Table A3-3. According to Hubei Provincial Transport Department, the toll rate would not change in the first five years and would thereafter increase by 3% every five years until 2032. Toll revenues in 2013 and 2014 are shown below in Table A3-4. Toll revenue increased substantially in 2015 and a higher growth rate expected in future years because of projected traffic volume increases.

Table A3-3 YBE Expressway Toll Rates

	Standard		Rate
	Trucks (Ton)	Passenger Vehicles (Seats)	(RMB/vehicle-km)
1		<5	0.836
2	<2t	6-17	1.254
3	2-5t	18-30	2.1
4	5-10t	31-50	2.519
5	10-15t	>51	2.937
6	15-20t	——	3.355
7	>20t	——	Every 5 ton, rate increase 0.836

Table A3-4 Annual YBE Toll Revenue

	2012	2013	2014	2015
Toll Revenue (RMB million)	8.69	48.00	66.76	317.91
Maintenance and Operation Cost (RMB million)	22.95	22.61	23.29	66.39
Capital Expenditure: Interest (RMB million)	363.95	485.27	576.26	866.17

8. The ex-ante and ex-post Financial Internal Rates of Return (FIRR) and Financial Net Present Values (FNPV) are shown in Table A3-5 below and indicate that the project would achieve a higher FIRR than expected at appraisal.

Table A3-5 Results of Ex-ante and Ex-post Financial Evaluation

	FIRR (%)		FNPV (RMB million)	
	At Appraisal	ICR	At Appraisal	ICR
YBE	-1.9%	4.46%	-11,048.97	-0.85

9. A sensitivity analysis on variation in toll charges shows that if toll revenue increases 10% and expenses decrease by 10%, the FIRR would increase to 5.15%. If toll revenue increases by 20%, and expenses reduce by 20%, the FIRR would increase to 5.79%.

Annex 4. Bank Lending and Implementation Support/Supervision Processes

(a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
Lending			
Christopher R. Bennett		GSDFO-HIS	
Jean-Marie Braun	HQ Consultant ST	GTI02	
Wenling Chen	Consultant	AFTTR - HIS	
Fei Deng	Senior Operations Officer	OPSPQ	
Hayato Kobayashi	Consultant	CPF - HIS	
Xiaofeng Li	Operations Analyst	GSUGP	
Teresita Ortega	Temporary	GTI02	
Xuan Peng	Program Assistant	EACCF	
Peter Roberts	Lead Infrastructure Specialist	TWITR - HIS	
Anil H. Somani	Consultant	GSURR	
Emily Tritsch	Consultant	GSU08	
Jian Xie	Senior Environmental Specialist	GENDR	
Dawei Yang	Consultant	EASTS - HIS	
Supervision/ICR			
Christopher R. Bennett	Lead Transport Specialist	GTIDR	
Jean-Marie Braun	HQ Consultant ST	GTI02	
Christopher J. De Serio	Transport Specialist	GTIDR	
Yi Geng	Sr Financial Management Specia	GGODR	
Zhefu Liu	Senior Social Development Spec	GSURR	
Aurelio Menendez	Practice Manager	GTIDR	
Juan D. Quintero	Consultant	OPSPF	
Anil H. Somani	Consultant	GSURR	
Emily Tritsch	Consultant	GSU08	
Peng Wang	Junior Professional Associate	EASIN - HIS	
Anthony J. Whitten	Sr Biodiversity Spec.	AFTN1 - HIS	
Dawei Yang	Consultant	EASTS - HIS	
Ning Yang	Senior Environmental Engineer	GENDR	
Xiaoke Zhai	Sr Transport. Spec.	GTIDR	
Shuai Ren	Transport Analyst	GTIDR	

(b) Staff Time and Cost

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of staff weeks	USD Thousands (including travel and consultant costs)
Lending		
FY07	13.41	90.40
FY08	38.39	295.99
FY09	27.84	161.49
Total:	79.64	547.88
Supervision/ICR		
FY10	29.15	152.51
FY11	20.14	97.39
FY12	13.15	48.28
FY13	6.00	31.53
FY14	9.98	62.87
FY15	3.38	9.10
FY16	8.25	27.90
Total:	90.05	429.58

Annex 5. Beneficiary Survey Results

Not Applicable

Annex 6. Stakeholder Workshop Report and Results

Not Applicable

Annex 7. Summary of Borrower's ICR and/or Comments on Draft ICR

Introduction

1. The Bank team received the Borrower's Implementation Completion Report (ICR) in March 2016 prepared by HPYECH, covering the full scope of the Hubei Yiba Highway Project. The ICR was prepared in Chinese and is in good quality, discussed the following aspects of the Project: (i) project background, (ii) description of project implementation, (iii) evaluation of project implementation, (iv) economic evaluation and financial evaluation, and (v) experience gained and lessons learned.

2. The domestic ICR conclude that, this project does not only achieved the PDO and the indicators, but also support the development of provincial expressway network, as well as CNEN, in a safe, high-quality, economically efficient and environmental friendly manner.

Key Messages

3. The domestic ICR conducted evaluations on different aspects regarding construction quality, supervision, environment management, training, monitoring and evaluation, researches, and social safeguards. Key messages are summarized below:

4. Ensuring construction quality is the key during implementation. It is not only about the safety of construction workers, but also about the life and property safety of road users. HPYECH took a number of measures to ensure the quality of construction projects, and good results were achieved. Supervision engineered was adequate and frequently guided quality insurance. Strict implementation of supervision was made and the main measures included: the establishment of quality assurance system; a clear division of responsibilities; strengthening the raw material testing; strict implementation of supervision procedures; strengthen routine inspections; sufficient laboratory test before construction.

5. Previous Bank projects demonstrated the effectiveness of trainings on enhancing technical and management capacities of local staff. This project developed a systematic, highly specialized training program to address the demands from technical and management staff regarding highway construction, operation, maintenance, and safety management. The training was provided to more than 5,000 people in total.

6. Yiba's resettlement work is challenging because of the large scale and tight schedule. Project implementing entities worked actively to communicate with people affected and provide training programs to enhance their capacity for getting employment opportunities. The resettlement went on smoothly with guidance from HPTD and local counties, and assured the construction start and complete in time. With this project being implemented, as well as the previous World Bank project, the local resettlement activities learned good practices from the Bank and changed the mindset from "one-time reallocation" to "resettlement towards development". External consultants were involved in the monitoring of resettlement, public consultations were held, system to receive and respond

complaints were established. The needs for construction of YBE and the demand from displaced families are properly addressed, and people got long term benefits from construction. The impacts includes: improved housing standards; more intensive land use, conservation and expansion of agricultural production and agro-processing resources; improved drainage, improved agricultural irrigation conditions, and better agricultural productivity.

7. With YBE construction completion and open to traffic, many industrial parks along the corridor benefited from improved traffic conditions and become powerful pusher to promote regional economic development. Driven by strong industrial parks, the economic growth rate of cities and counties have been rising, and further enhanced the industrial structure and economic spatial structure. The effects brought by YBE to the regional economy development include: the changes along the industrial and agricultural output value, the rise of export-oriented economy, the development of small towns along the route.

Cooperation with World Bank

8. The Bank plays a crucial role in the project. During preparation, World Bank played a decisive role on concluding the project cycle, project design, project evaluation, which had laid a solid foundation for the good implementation of the project. The work World Bank performed had ensured the quality of construction, provided the basis for macro decision-making, and ensured that the project achieve expected benefits and objectives.

9. The World Bank team had a good cooperation with HPYECH, HPTD, and relevant agencies in Hubei. During project implementation, the Bank team provided necessary assistance to HPYECH and supported it to handle restructuring issues, conduct supervisions, and monitoring performance of contractors and project indicators. The World Bank communicated with HPYECH frequently on project management, ensuring the project implementation to be consistent with original project scope and safeguards compliance.

Annex 8. Comments of Cofinanciers and Other Partners/Stakeholders

Not Applicable

Annex 9. List of Supporting Documents

1. Project Appraisal Document, March 2009;
2. The Project Implementation Status & Results Reports (ISR);
3. China - Country Partnership Strategy for the period FY13-FY16;
4. Borrower's Implementation Completion Report (ICR) in Chinese, draft version, March 18 2016;
5. Other project reports: Loan Agreement, Project Agreement, Aide-memoires, Training reports, Progress Reports, etc.

Annex 10. Resettlement Case Study

Transformative Potential of World Bank Safeguards Policies: Case Study Series 3 from Yichang-Badong Expressway Project in China

Liu Zhefu, Zhai Xiaoke, Panneer Selvam, Huang Jianguo

When properly designed and implemented, project prosperity from expressway projects can be shared by involuntary resettlement activities to improve their overall living conditions and sustainable development.

Rapid urban development and fast economic growth in cities requires fast and safe transport facilities to serve for population migrations and logistics from south to north and west to east in China. Shanghai to Chongqing expressway is the mostly important expressway section in national master plan to connect 8 provinces from Yangtze Delta to southwestern areas; such as, Shanghai, Jiangsu, Zhejiang, Anhui, Jiangxi, Hubei, Hunan and Chongqing, while, Yichang to Badong expressway section is the mostly challengeable section and the latest section that was not constructed due to geographical locations and geological challenges. This section becomes most expensive and difficult from environmental and social perspective.

This technical note describes how this was achieved on the Yichang-Badong expressway project in Hubei China. By focusing on sustainable farmers' livelihood development and land development, centralized resettlement communities and infrastructure access, better housing standards and career redevelopment from farming to non-farming, the project has improved living standards and raised incomes for most affected rural populations. Citizen engagement and continuous dialogue with affected parties throughout the project helped address farmers' concerns and contributed to the positive outcome. These practices can be applied elsewhere to help achieve satisfactory resettlement outcomes.

Involuntary Resettlement in the Project Area

Resettlement can be a challenge in any transport project, particularly in China with its high population densities and limited available unused land. However, when a project's resettlement activities are properly designed and have the full support of the client, it is possible to overcome the challenges and achieve a successful outcome for those affected by the project.

This note highlights the factors that contributed to the successful resettlement activities under the Hubei Yicahng-Badong Expressway (Yiba) project, with particular emphasis on how they contributed to share project prosperity for most affected persons. These practices can be applied in other projects to have similar successful resettlement outcomes.

Yiba Expressway Project

The Yiba expressway project is located in the deeply mountainous 'Three Gorges' area, the west of Hubei Province in central China. The following key statistics summarize why it was so special:

- 173.6 km of expressways and 44.1 km of connecting roads;
- over 74% of the expressway consisting of tunnels and bridges;
- 148 bridges for a total length of 70 km;
- 3.75 million m^3 of earthworks;
- US$ 13.4 million/km

Yiba expressway

Geological features

Key Institutional Factors Contributing To Successful Resettlement
• Recognition by the HPCD of the importance of resettlement as a key part of the project; • Establishing the organizational framework in the project area during RAP preparation; • HERO staff continuity throughout the project; • Appointment of an experienced consultant to guide RAP preparation and implementation; • Levels of staff learning by participating in RAP preparation and social assessment; • Assigned county staff supervising at weekly basis and township at daily basis as institutional requirement; • Disclosure of multi communication channels to public to receive their concerns, such as; resettlement information system, TV media, website, village information wall; • Resettlement information booklet, mobile phone call, etc. • Addressing complains while received; • Weekly resettlement progress reporting and solutions; • Computerized resettlement filing and hard copy of filing; • Assigned local bank to supervise fund flow; • Empowering Women equally as men to withdraw their compensation so as to ensure proper use of their compensation.

In accordance with the World Bank's safeguard policies, a Resettlement Action Plan (RAP) was prepared and disclosed prior to the project appraisal. The RAP described the extent of resettlement, identified affected persons and resources, defined how resettlement would be addressed and explained institutional arrangements. Furthermore, a social assessment was undertaken to better understand farmers' concerns and the demands of citizens' engagement, while, questionnaire survey to capture migrant workers' awareness to national labor law.

About 645 ha of land in four counties and one municipal district were required for the project, including 205 ha of cultivated land. An area of 288,000 m^2 of buildings were cleaned up, including about 92,000 m^2 of brick-concrete buildings, 196,000 m^2 of earth-brick and lower levels of buildings. Some 1,038 families were relocated, involving 3,736 persons. The collected data information at the resettlement impact survey, in general, presented that the living conditions of the displaced families in the project area were lower and the cultivated land resource were more limited than other regions in China.

Resettlement Organization

There are no detailed national requirements for resettlement in China and the resettlement activities are varied. A comprehensive resettlement program was designed and implemented by the provincial resettlement group. The group was led by a vice governor and comprised officials from the Hubei Provincial Communications Department (HPCD), specific to the fact that full-time experienced staff were assigned to be in charge of the environmental and social safeguards issues from the project preparation until the implementation on the safeguards.

In China, land acquisition/resettlement work is the responsibility of the Provincial Land Bureau, rather than the project owner (here, the HPCD). However, the HPCD appreciated from the beginning that the resettlement work needed to be treated as a part of the project component and that it would be the key to the project's success. Through their experience on four previous Bank-financed expressway projects, the HPCD had learned that ensuring effective resettlement would increase positive supports from the displaced families and lower the potential for legal action that might otherwise slow down project implementation.

The importance of effective resettlement was further strengthened by the province's commitment to reducing poverty and supporting the national government's New Socialist Countryside Plan as well as building harmonious social society for rural areas, which emphasizes poverty reduction, centralized village sites, land development, vocational training and career development favorable to local farmers for non-farming income generations.

The HPCD established the Hubei Expressway Resettlement Office (HERO) to manage operations and ensure compliance with the RAP. HERO supported a multilevel organizational framework to plan and implement resettlement, with resettlement offices at the project level and several levels of government in the project area, including city, county, and township. All local offices were staffed by qualified resettlement specialists who received additional training and equipped by cars, computer, mobile phone, and intranet assess, etc.

HERO was involved in all stages of resettlement, from project design, alignment analysis to minimize resettlement impacts, citizen engagement for the resettlement impacts and the confirmation of resettlement impacts prior to the implementation, selection and design of resettlement site and back-up, training for non-farming career development, information disclosure and management to safeguard the displaced families through implementation to completion. Retaining the same experienced and capable team throughout the project ensured the quality of resettlement activities.

Resettlement Planning

The key objectives of the resettlement plan was to ensure that the replacement houses were available prior to the demolition of existing houses and meet requirement to tourism development as other alternative family income in the future due to beautify landscape in the surrounding areas and demands by tourism. Another importance was to ensure that the project could be started at timely manner without delay caused by resettlement. To achieve this, citizen engagement in the villages were carried out after the project identification until the start of the resettlement. Six months prior to the project construction, design institutes were contracted to select the resettlement sites in the villages and design the resettlement sites. The back-up relocations of the displaced families were decided by their family internal discussions and fully supported by village committees. Overall, 35 % of the displaced families preferred to be relocated into resettlement centralized sites and 65% preferred to be back-up relocations in their original villages

8 resettlement centralized sites were designed

Resettlement Housing Construction & Monitoring

Housing construction is prioritized at the first in the displaced families. They realized that the housing construction is a fair opportunity in a remote rural village to improve their living standard and condition. In generally, the rural families rely on themselves to improve their housing standards and have very limited capacity to improve their living condition in surrounding areas, specific to connecting roads, public sanitation and facilities. The expressway project gives opportunities to those rural families to improve their living standards and conditions. There were one group of the displaced families who preferred to move into resettlement centralized sites and another as back-up nearby their original house lots.

The principal housing constructions were:

- The displaced families submitted their family's preliminary to the village committees as first consultation. Some preferred to buy their houses in larger city, some preferred to be back-up nearby their original housing lots, some were willing to be relocated into centralized resettlement sites.
- The resettlement sites for back-up and centralized sites would be investigated jointly by the village committee, design institute and the representatives of the villagers as second round of public consultation;
- Family internal discussions and their feedback collected by the village committee as third round of public consultation;
- Design institute presented their findings and sties feature analysis to the displaced families for information as fourth round of public consultation;

8 resettlement centralized sites were constructed

- For those displaced families who preferred to be relocated individually as back-up, village committee will play roles in leading public consultation and submitting housing lots application;

Individual housing

- Dissemination of the resettlement policy on housing leveling and compensation;
- HERO will coordinate the land approval to municipal department;
- Individuals could start their housing construction before they receive land formal approval.
- HERO advertised contractor bidding at municipal websites and chose three contractor winners based on the national requirement for the displaced family's selection;
- HERO contracted construction monitoring institute to supervise the housing construction to ensure the housing quality of the displaced families;
- If there were debates, HERO will support to the displaced families from legal perspectives or paid the lost to the displaced families by contractor deposit prior to the court sentencing;
- HERO paid the cost for contracting monitoring institute as institutional arrangement;
- HERO signed contracts to local housing material supplier so as to reduce the inflation of the materials prior to the peak season of housing construction;
- HERO provided rewards by cash, cement, and panting for those displaced families who followed up the plans of the resettlement sites and individual housing construction;
- The resettlement site planning was to meet the tourism development as long-term of strategies.

Management and Distribution of Resettlement Funds

Since in China land is collectively owned, the local villages played an important role in the resettlement activities. They were directly responsible for the determination to the use of land compensation and housing lots distribution, a process that followed these steps:

- Village committees confirmed the impacts on land and private properties at family basis.
- HERO reached agreements on land acquisition and private property compensation with each family.
- All of the affected villages published the resettlement impacts on the village information walls for public inspection and for further confirmation if needed.
- The resettlement organizations at all levels and the local governments carried out training for village-level administrative departments and directed them to formulate appropriate development plans and resettlement fund use plans in a transparent manner.
- The village-level administrative departments negotiated with the affected persons, establishing the final resettlement fund use plans. These plans were submitted to the county/district level re-settlement offices for review.
- The county/district level resettlement organizations reviewed the resettlement fund use plans and helped the villages to finalize them. No resettlement funds would be disbursed to a village without a feasible resettlement funds use plan.
- Once the county/district level resettlement organizations approved village-level resettlement fund use plans, they then disbursed the resettlement funds gradually according to the approved plans.
- The resettlement offices at all levels made copies of the compensation rates documents issued by HERO, sent them to each relocated household, and publicized them in public places.
- HPCD assigned Hubei Construction Bank to supervise the resettlement fund flow.
- Each family will receive deposit book.
- Without village leader signature and accompany of the family wife, the family husband could not withdrawal their money from the deposit book. This way was to empower women and ensure the use of the resettlement fund in a proper way.

Compensation for houses and structures was paid directly to the affected persons through assigned local bank. The county/district or township resettlement offices opened special accounts in local banking institutions for affected units, collectives and individuals and deposited funds directly into the accounts.

These deposit book approaches reduced the number of intermediate steps in receiving compensation, avoiding potential deductions and misappropriations. The relocated households took all their compensation as soon as possible to cover the costs of new house construction.

Pension and Medical Insurance

Farmers used to rely on their land or as job-hunters in cities. Once they are getting old or lose their labor force, they reply on their child. Few farmers preferred to join in pension and medical insurance due to limited family savings. HPCD is the first project authority in China to provide additional fund for those who are over 16 years of farmers as elders to join in pension insurance program. Over 2,000 persons joined into this program. They could receive monthly pension when they are retired as 60 years old for men and 55 years old for Women. All of the displaced families received medical insurance.

PAPs received pension

Public Participation

The project carried out an extensive public consultation program throughout the entire project. Sixty-five village committees and 50 community neighborhood committees were involved in resettlement land development plans. Members of the 46 villages affected by the project had the opportunity to participate in the planning and decision-making process for land acquisition and resettlement.

The consultation process proved to be of great value in improving not only the effectiveness of resettlement active-ties, but also the quality of project design. The public made useful suggestions on the expressway alignment, the selection of centralized resettlement sites prior to relocation, the allocation of housing lots at these sites, land reclamation, the allocation and use of collective compensation, and the location and design of culverts and underpasses. Where appropriate, these suggestions were incorporated into the project design. For example, additional underpasses were provided to give farmers access to their land or villages.

Consultation with villagers

The gentleman in the right of the photo is Mr. Kailong Xu, Vice Mayor of Xingshan County. He participated into the entire resettlement processes from the RAP preparation to the completion of the resettlement activities. He visited every displaced family and solved all of the resettlement issues. For instance; one displaced family invited a respected elder in the village as witnesses to prove his trade business with RMB40,000 (about US$7,000) for selling his land, earth and wood houses to anther villager and received the half as prepayments at the period of resettlement impact survey. Mr. Xu visited this displaced family after he heard the story and disclosed the resettlement policy to this family. Finally, this family received RMB 195,000 (about US$ 32,000) as compensation. Mr. Xu also helped this family selecting a good location of housing lots nearby highway and this family has been opening its business for repairing vehicles just after the completion of the housing construction.

> *"…I feel guilty to Mr. Xu for my bad words to him when he visited my family…I knew him from TV program on the resettlement... Frankly speaking, I did not believe such good things happened to my family…I could not go outside at raining day and never dreamed I could open my business beside of a highway… my wife is so happy."*
>
> *Villager*

The project adopted the following communications measures to help ensure transparency of resettlement.

- Before land acquisition and relocation began, announcements were made in public places in all townships and villages along the expressway, giving an overview of the Yiba project and the main policies and measures for resettlement.
- The RAP was publicized at all areas along the expressway so the affected residents would have access to its content.
- The HERO printed and issued a Resettlement Information Booklet to each affected household.
- The booklet contained the overview of the project, national and local policies and laws, compensation rates for structures and other affected possessions, and the number of affected family members in the

household entitled to compensation, and grievance channels.

- Village committee disclosed resettlement impacts and compensation rates on the village information walls for public inspection.
- RAP and the summary were disclosed at the project website.
- A resettlement information management system was set up to receive text message from mobile phone and public concerns.
- Mobile phones at levels of resettlement staff were published to receive the concerns and consultations from public.
- When the implementation of land acquisition and relocation began, the resettlement organizations at all levels issued resettlement information to affected persons by television, radio, leaflets, wall-newspapers and village conferences.

Addressing Grievances

The project put in place procedures for receiving and addressing complaints, establishing grievance channels at all levels of resettlement offices. Villagers could complain directly to HERO or the resettlement office at each county, or to their village leaders. Village leaders would report complaints to the resettlement office by phone calls or written reports. Independent monitoring also played a role in monitoring complaints. Complaints were dealt with in a timely manner, for example, by authorizing county level officials to immediately deal with issues costing less than RMB50,000 (about US$8,000) and then report to HERO, rather than wait for HERO's authorization.

It is quite important to communicate to the public at timely manner to release the trust. For example, the resettlement information system received a letter prior to the resettlement implementation from a villager's son outside of the village as a migrant worker for years. He wrote it was impossible that the project authority provided such good resettlement policy for the displaced families, it was a cheating, they wanted people to move out of the project area, and did not trust it. HERO staffs sent a letter off to this person and welcome him to be the volunteer to inspect the resettlement and left mobile phone number to him for further communication if his parents would not receive their proper compensation as stated in project website or the resettlement information management system.

The first year of the project implementation is the most critical year since every displaced family must be relocated well prior to their housing demolition and all of the compensation must be allocated into the hands of the displaced families prior to their housing reconstruction, and the land for the project civil works must be provided available for the contractors. In order to make the resettlement progress efficiently and to address the grievances prior to becoming issues, every Hero was equipped by motor vehicle to supervise the resettlement progress in each village at weekly basis, including the supervisions to townships, villages and individual families.

HPCD visited the displaced family jointly by Hero

The principal complaints were:

- inconvenient or delayed provision of sewers, roads, electricity and water to resettlement sites;
- landslides around resettlement sites;
- inadequate funding for basic facilities at centralized resettlement sites;
- damage to irrigation systems;
- using land compensation fees to pay debts;
- dissatisfaction with village assignment of housing lots;
- blasting damaging to nearby structures and windows;
- Insufficient land allocated to residents; and
- Project area widening so as to be the displaced families.

When grievances were identified, specific actions were taken to ensure that they were addressed to the satisfaction of all parties.

Resettlement Strategy

From the very start, the project adopted a number of specific objectives with regard to resettlement.

Minimize cultivated land acquisition: The road alignment was optimized at the design stage, and when possible during construction, to minimize the resettlement impact, specific to the cultivated land in mountainous areas.

Share the project prosperity: On this mountainous terrain, cultivable land is scarce. As villagers in the area rely on farming for survival and also a sort of social security, the project sought to limit the road's impact on cultivated land. In some areas the alignment was modified during the design stage to protect farmland. At the same time, many of the houses had little value, especially the earth-wood houses, and many farmers dreamed of building new houses. After broad public consultation, the HPCD decided to acquire more built land and less cultivated land. Compensation rates for house demolition were increased by the HPCD for this purpose.

Rural road upgrading: Better road in rural area is prioritized at first among the rural infrastructures. In order to meet the demand of local farmers and also the needs of the project goods transportation during the project implementation, HPCD combined rural road planning into the project civil works and upgraded 101 km of rural roads upper to nationally standardized roads. Over 100,000 farmers in 70 villages in 6 township in 3 cities are benefited from the road upgrading. Farmers could develop their transportation business and sell their products in cities.

Road upgrading

New land reclamation: Over 17 ha of new lands were created by utilizing the waste materials from tunnels. The expressway passes through deep ravines. Most of the flat grounds had been already developed as cultivated land or housing lots. There are three steps; built up retailing walls gradually, filling crushed rocks into ravines and then levelling. All of the new lands were offered to local communities for local agricultural production market, logistic park and bus terminal.

New land in Xinshan

Centralize resettlement sites: The ravines were developed by hundreds and thousands of years and most of the flat terrain had already developed as cultivated land or housing lots. Where back-up resettlement was not realistic, centralized resettlement sites were established to make efficient use of village infrastructure and services. Over 8 centralized sites were established and over 35% of displaced families were relocated into the new sites and 65% were relocated in their original villages. Their living conditions were improved significantly.

Electricity: The HPCD invested 257 km of high voltage of electricity along the expressway. This electricity could be not only used by the project management but also the farmers for their agricultural product processing and irrigation.

Monitoring and Evaluation

Resettlement monitoring was used as third eyes to ensure the success of the resettlement program. Several methods were used for monitoring and evaluation of resettlement activities twice a year including (i) resettlement baseline survey; (ii) standard field inspection prior to the Bank missions; (iii) join in the Bank supervisions; (iv) provide training courses, exchange of experience and solutions adopted; (v) lead public consultation and women development; (vi) post-evaluation to the resettlement implementation and provide remedy solutions if needed; (vii) draft implementation completion report on the resettlement. Six monitoring indicators were adopted by the independent consultant to monitor resettlement effectiveness.

Monitoring institute visited the displaced family in field

- Knowing every displaced families at the initiative of the resettlement;
- regular submission and availability of monitoring reports to the HEROs at all levels;
- regular visits to HEROs to get work progress;

- collecting comments from affected families;
- leading community meetings in villages to collect first-hand of information and feedback;
- regular visits to resettlement sites;
- evaluating resettlement activities and providing recommendations to HPCD and all HEROs; and,
- Communicating to displaced families through media, public meetings, individual interviews, telephone, text messages and email so as to release project and resettlement information, and increase the trust and transparency.

Finally, at the completion of the project, the World Bank arranged for a detailed survey to assess the effectiveness of the resettlement effort and completed implementation completion report on the resettlement.

Effectiveness of the Resettlement Program

The resettlement activities can be divided into five stages:

- **Resettlement information disclosure and public consultation at primary implementation:** Starting from April to November, 2009, focusing on the mobilization meetings with HEROs, resettlement fund allocations, resettlement baseline survey, public awareness to Labor Law, and agreements on land acquisition and resettlement relocations;
- **Housing and infrastructure:** Year 2010 was the peak year for housing demolition and reconstruction in three counties. The construction of 5 among 8 resettlement centralized sites were completed, 80% of back-up resettlement almost completed their housing reconstruction. The first two resettlement monitoring was carried out.
- **Resettlement site modification:** Year 2011 was the tough year in Xinshan city. The locations of the resettlement centralized sites were modified since more displaced families requested to be settled down in resettlement centralized sites and nearby highways. The displaced families had to spend their transitional period over two years since the waste materials from tunnel could not meet the demands of filling the ravines in the resettlement sites.
- **Wind-up:** All of the resettlement activities were completed up to Year 2012 and the boarders of the project were widened from 30 meters to 100 meters, as the result, 537 families become the displaced families to be relocated and benefited from the resettlement policies.
- **Wrap-up:** The expressway was opened to public by October 1, 2014. After four years of the resettlement implementation, the resettlement were essentially completed in late 2013, the focus was on identifying any oversights or leftover problems to ensure that livelihoods were restored.

In late 2014, on behalf of the World Bank, the independent resettlement consultant assessed the overall performance of the resettlement program. The assessment randomly sampled 25% of the displaced families. Some 81% of displaced families expressed their high satisfaction to their living conditions after the resettlement. Family income above average reached 57% in comparison to 45% in Year 2008. Some 80% of displaced families presented their satisfaction to the compensation. 69% of the displaced families realized they have better living condition in comparison to Year 2008.

The effectiveness of the resettlement program was assessed in terms of improvement of physical infrastructure, satisfaction with resettlement, and livelihood rehabilitation.

Livelihood Improvement

In principle, the displaced persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them. The following was undertaken to satisfy to the displaced families.

Improvement in Housing Standards: Based on the resettlement data information collected in Year 2008, less 32% of the buildings were brick and concrete and their living space were 181 square meters. After the resettlement, all of the displaced families live in brick-concrete houses and their living space are 242 square meters per family in average, increased 34%, specific to the poor families increased 60%.

Earth-wood house

New brick-concrete house

***Career development**:* The displaced families in Xingshan County have no longer to rely on their pieces of farming land in the mountains but more relying on professional business in cities. After physical relocations, some of the displaced families preferred to stay with their families and opened their business in the project areas for two reasons; one is their new houses are located along tourism highway available to open their family based business; and second is that two national parks nearby their villages and hundreds and thousands of tourists visit the national parks every year. Currently, over 100 families received business training and opened their business as family based hotels, restaurants and shops.

Business training

Travel: The travelling distance after the resettlement was the indicator to show the convenience or better design of the resettlement sites. The distance to hospital, shopping center and local market were shortened and to child care center and farming land were kept the same before the resettlement, but the distance to primary school was increased 1.5 km and high school 5 km. 71% of the displaced families realized their traveling are more convenient and safe.

Road improvements: *all of the village inside roads and connecting roads to main highways were concrete roads. Some 101 km of rural road networks were upgraded to national standardized roads.*

Sanitation Improvements: Before the project, there were 27% of the families using flushing toilets and taking shower. After the project, the percentage reached to 86% and the waste could be sanitized.

Drinking Water Improvements: At the start of the project, there were two different sources of water available: (i) water from mountain, (ii) tap water. The access to tap water was high, some 64% of the families could use tap water. After the project every family could use tap water.

Access to Electricity: Electricity access at the start of the project was very high, but not stable. By the end of the project all households had access to electricity and stable electricity supply upper from 64% to 92%.

Income rehabilitation: Based on the resettlement monitoring report in Year 2014, the family income was increased over 24% and the family income above average reached 57% in comparison to 45% in Year 2008. Lower income families were reduced about 12%.

Structural variations of family income: The non-agricultural income was lower than 46% in Year 2008 and reached 92% in Year 2014.

Pension insurance: Some 2,000 displaced persons received their pension insurance and they could enjoy their retirement. HPCD supported two third of the investment.

Medical insurance: Every displaced family joined in local medical insurance with HPCD's helps.

Job positions: By the local government supports, 42 job positions in local enterprises were provided for the displaced persons after receiving trainings.

Local markets: Four local agricultural product markets were developed by filling water material into ravines and return local communities without any charge to the resettlement funds. The affected people and surrounding villages could come to the fairs.

The resettlement program was therefore successful in real terms because (i) most relocated families lived in better quality, larger and safer houses; (ii) there was better access to better quality roads; (iii) more opportunities to open their family business; (iv) all families had access to stable electricity and better quality water than before; (v) most of the persons received their pension insurance; (vi) all of the displaced persons received medical insurance; (vii) some received training for their career development and some had their jobs in local enterprises.

Conclusions

Despite many challenges, including the limited supply of arable land, the resettlement efforts associated with the Yiba expressway project are considered to be a success both in terms of physical infrastructure provision and overall satisfaction with the resettlement outcome. All of displaced families have better standard of living, 34% have a better quality of living environment, 64% of families could use tap water, and lower income families were reduced about 12%, with average incomes having increased by 24%. This was achieved by adopting resettlement strategies of sharing project prosperity and reducing poverty at the onset of the project.

The success of the resettlement program can be contributed by (i) effective leadership by the HPCD; (ii) efficient management and distribution of resettlement funds; (iii) citizen active engagement throughout the entire project and responsiveness to village issues and concerns; (iv) effective procedures for receiving and addressing complaints; (v) dealing with complaints in a timely manner; (vi) sharing the project prosperity to local farmers, such as; integrating local road, electricity, water supply and sanitation access improvement into the project design.

For Further Information

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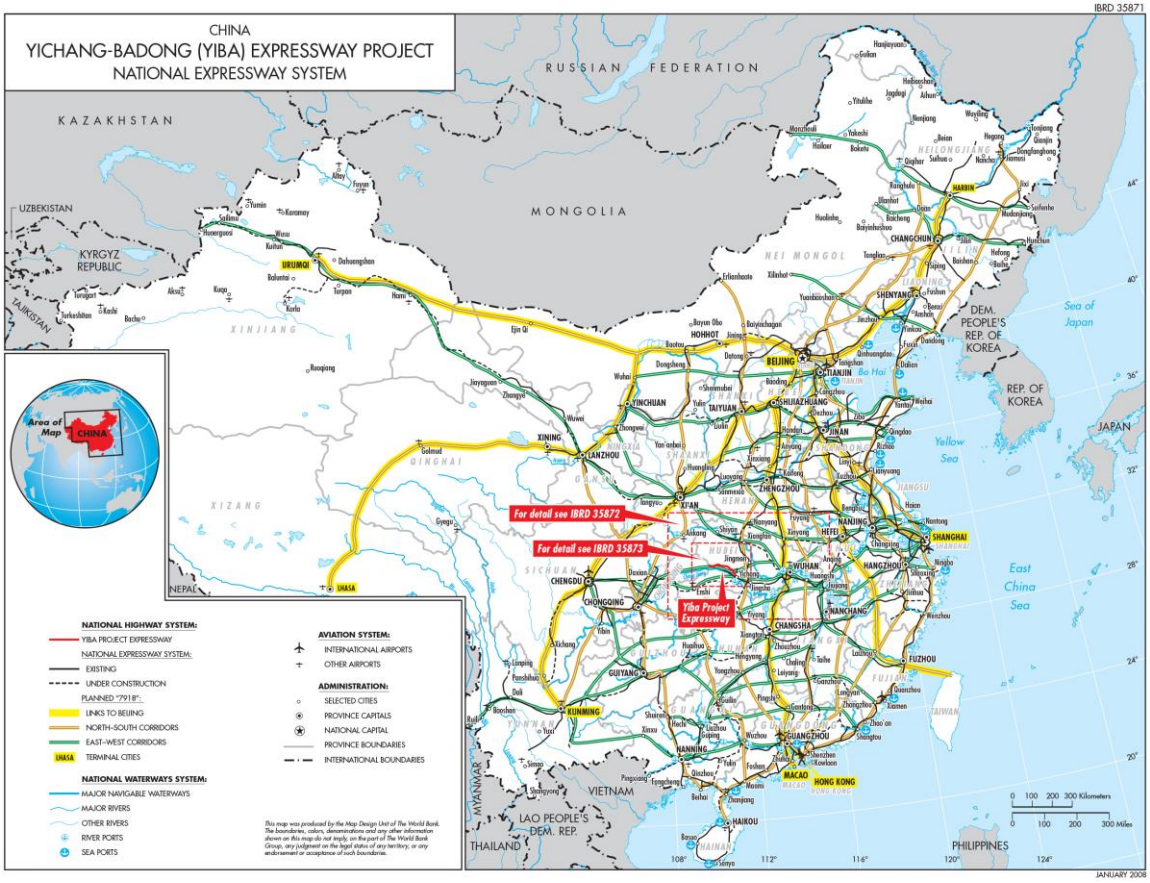
MAP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RUSSIAN FEDERATION
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KYRGYZ REPUBLIC
TAJIKISTAN
NEPAL
MYANMAR
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THAILAND
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CHANGSHA
NANCHANG
HANGZHOU
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HEFEI
FUZHOU
GUANGZHOU
HANNING
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MACAO
HONG KONG
For detail see IBRD 35872
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Yiba Project Expressway
Area of Map
CHINA
NATIONAL HIGHWAY SYSTEM:
YIBA PROJECT EXPRESSWAY
NATIONAL EXPRESSWAY SYSTEM:
EXISTING
UNDER CONSTRUCTION
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LINKS TO BEIJING
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OTHER RIVERS
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SEA PORTS
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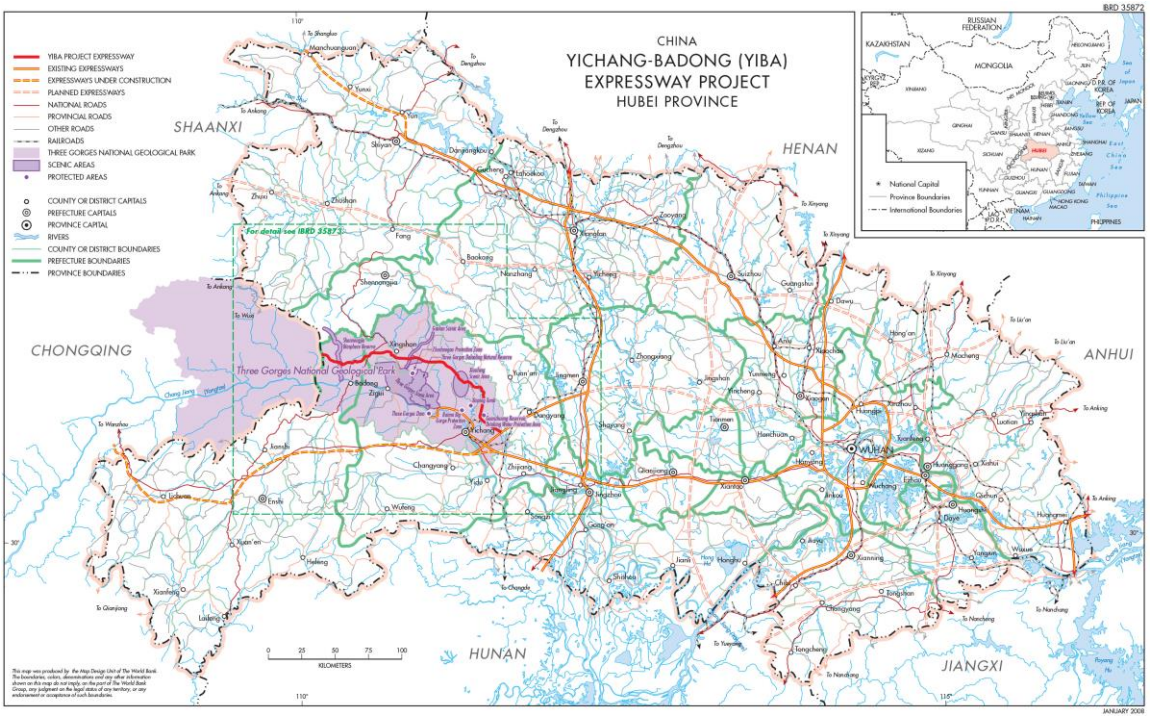
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EXISTING EXPRESSWAYS
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PLANNED EXPRESSWAYS
NATIONAL ROADS
PROVINCIAL ROADS
OTHER ROADS
RAILROADS
THREE GORGES NATIONAL GEOLOGICAL PARK
SCENIC AREAS
PROTECTED AREAS
COUNTY OR DISTRICT CAPITALS
PREFECTURE CAPITALS
PROVINCE CAPITAL
RIVERS
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PREFECTURE BOUNDARIES
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HENAN
CHONGQING
ANHUI
HUNAN
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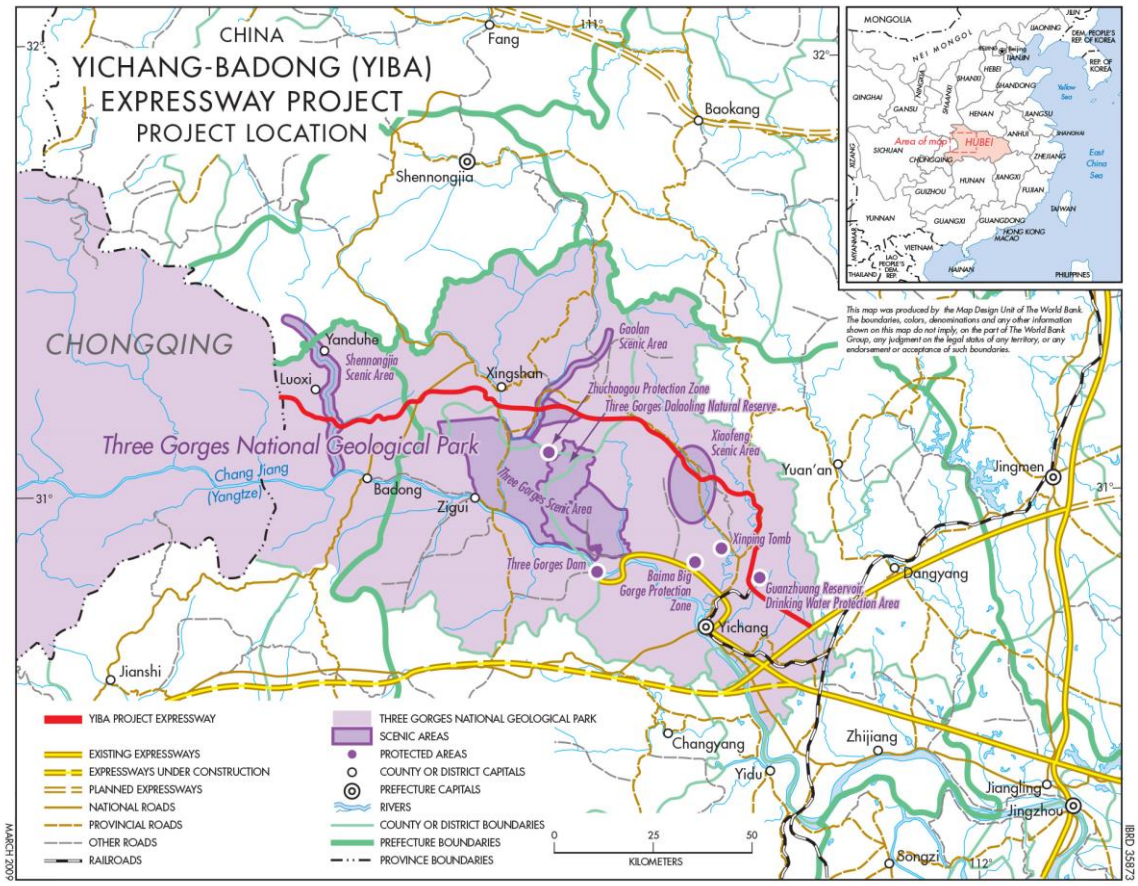
CHINA
YICHANG-BADONG (YIBA)
EXPRESSWAY PROJECT
PROJECT LOCATION
CHONGQING
Three Gorges National Geological Park
Chang Jiang
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Fang
Baokang
Shennongjia
Yanduhe
Shennongjia Scenic Area
Luoxi
Xingshan
Gaolan Scenic Area
Zhuchaogou Protection Zone
Three Gorges Dalaoling Natural Reserve
Xiaofeng Scenic Area
Yuan'an
Jingmen
Badong
Zigui
Three Gorges Scenic Area
Xinping Tomb
Three Gorges Dam
Baima Big Gorge Protection Zone
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THAILAND
PHILIPPINES
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YIBA PROJECT EXPRESSWAY
EXISTING EXPRESSWAYS
EXPRESSWAYS UNDER CONSTRUCTION
PLANNED EXPRESSWAYS
NATIONAL ROADS
PROVINCIAL ROADS
OTHER ROADS
RAILROADS
THREE GORGES NATIONAL GEOLOGICAL PARK
SCENIC AREAS
PROTECTED AREAS
COUNTY OR DISTRICT CAPITALS
PREFECTURE CAPITALS
RIVERS
COUNTY OR DISTRICT BOUNDARIES
PREFECTURE BOUNDARIES
PROVINCE BOUNDARIES
0
25
50
KILOMETERS
MARCH 2009
IBRD 35873