

Document of  
The World Bank

Report No: ICR00003484

IMPLEMENTATION COMPLETION AND RESULTS REPORT  
(IBRD-7880-CN)

ON A  
LOAN  
IN THE AMOUNT OF US\$250 MILLION  
TO THE  
PEEOPLE'S REPUBLIC OF CHINA  
FOR A  
NINGXIA HIGHWAY PROJECT

December 8, 2015

Transport and ICT Global Practice  
East Asia and Pacific Region

## CURRENCY EQUIVALENTS

(Exchange Rate Effective June 30, 2015)

Currency Unit = RMB  
US\$ 1.00 = RMB 6.11

## FISCAL YEAR

January 1 - December 31

## ABBREVIATIONS AND ACRONYMS

|      |                                   |       |  |
|------|-----------------------------------|-------|--|
| AADT | Annual Average Daily Traffic      | MOT   | Ministry of Transport                                  |
| CPS  | Country Partnership Strategy      | NHCAB | Ningxia Highway Construction and Administration Bureau |
| EA   | Environmental Assessment          | NTD   | Ningxia Transport Department                           |
| EIRR | Economic Internal Rate of Return  | NTHS  | National Trunk Highway System                          |
| EMP  | Environmental Management Plan     | PAD   | Project Appraisal Document                             |
| ENPV | Economic Net Present Value        | PCU   | Passenger-car Unit                                     |
| FIRR | Financial Internal Rate of Return | PDO   | Project Development Objectives                         |
| FM   | Financial Management              | PMD   | Project Management                                     |
| FNPV | Financial Net Present Value       | PMO   | Project Management Office                              |
| GDP  | Gross Domestic Product            | RAP   | Resettlement Action Plan                               |
| GoC  | Government of China               | RNIP  | Rural Network Improvements Program                     |
| GQE  | Guyaozi-Qingtongxia Expressway    | RPF   | Resettlement Policy Framework                          |
| ICR  | Implementation Completion Report  | TA    | Technical Assistance                                   |
| LA   | Loan Agreement                    | WIM   | weigh-in-motion  |
| LRCD | Local Road Construction Division  |       |  |
| LRIP | Local Road Improvement Program    |       |  |
| M&E  | Monitoring and Evaluation         |       |  |

|                                  |                             |
|----------------------------------|-----------------------------|
| Regional Vice President:         | Axel van Trotsenburg, EAPVP |
| Country Director:                | Bert Hofman, EACCF          |
| Senior Global Practice Director: | Pierre Guislain, GTIDR      |
| Sector Manager:                  | Michel Kerf, GTIDR          |
| Project Team Leader:             | Xiaoke Zhai, GTIDR          |
| ICR Team Leader:                 | Xiaoke Zhai, GTIDR          |

**CHINA**  
**NINGXIA HIGHWAY PROJECT**

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| A. Basic Information  |             |                   |                                  |
|---|-------------|-------------------|----------------------------------|
| Country:  | China       | Project Name:     | Ningxia Highway Project          |
| Project ID:   | P096920     | L/C/TF Number(s): | IBRD-78800                       |
| ICR Date:   | 06/15/2015  | ICR Type:         | Core ICR                         |
| Lending Instrument:   | SIL         | Borrower:         | PEOPLE'S<br>REPUBLIC OF<br>CHINA |
| Original Total Commitment:  | USD 250.00M | Disbursed Amount: | USD 250.00M                      |
| Revised Amount:   | USD 250.00M |                   |                                  |
| <b>Environmental Category: A</b>  |             |                   |                                  |
| <b>Implementing Agencies:</b><br>Ningxia Highway Construction Administration Bureau |             |                   |                                  |
| <b>Cofinanciers and Other External Partners:</b>                                    |             |                   |                                  |

| B. Key Dates    |            |                   |               |                          |
|-----------------|------------|-------------------|---------------|--------------------------|
| Process         | Date       | Process           | Original Date | Revised / Actual Date(s) |
| Concept Review: | 09/13/2007 | Effectiveness:    | 08/27/2010    | 10/27/2010               |
| Appraisal:      | 11/17/2009 | Restructuring(s): |               |                          |
| Approval:       | 05/13/2010 | Mid-term Review:  |               |                          |
|                 |            | Closing:          | 06/30/2015    | 06/30/2015               |

| C. Ratings Summary            |                   |
|-------------------------------|-------------------|
| C.1 Performance Rating by ICR |                   |
| Outcomes:                     | Satisfactory      |
| Risk to Development Outcome:  | Negligible to Low |
| 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:  | Satisfactory | Implementing Agency/Agencies:        | Satisfactory |
| <b>Overall Bank Performance:</b>                               | Satisfactory | <b>Overall Borrower Performance:</b> | Satisfactory |

| <b>C.3 Quality at Entry and Implementation Performance Indicators</b> |                   |                                 |               |
|---|-------------------|---------------------------------|---------------|
| <b>Implementation Performance</b>                                     | <b>Indicators</b> | <b>QAG Assessments (if any)</b> | <b>Rating</b> |
| Potential Problem Project at any time (Yes/No):                       | No                | Quality at Entry (QEA):         | Not done      |
| Problem Project at any time (Yes/No):                                 | No                | Quality of Supervision (QSA):   | Not done      |
| DO rating before Closing/Inactive status:                             | Satisfactory      |                                 |               |

| <b>D. Sector and Theme Codes</b>                  |                 |               |
|---|-----------------|---------------|
|   | <b>Original</b> | <b>Actual</b> |
| <b>Sector Code (as % of total Bank financing)</b> |                 |               |
| Rural and Inter-Urban Roads and Highways          | 100             | 100           |

| <b>Theme Code (as % of total Bank financing)</b>       |    |    |
|--|----|----|
| Infrastructure services for private sector development | 92 | 92 |
| Regional integration                                   | 5  | 5  |
| Rural services and infrastructure                      | 3  | 3  |

| <b>E. Bank Staff</b>      |                      |                          |
|---------------------------|----------------------|--------------------------|
| <b>Positions</b>          | <b>At ICR</b>        | <b>At Approval</b>       |
| Vice President:           | Axel van Trotsenburg | James W. Adams           |
| Country Director:         | Bert Hofman          | David R. Dollar          |
| Practice Manager/Manager: | Michel Kerf          | Ede Jorge Ijjasz-Vasquez |
| Project Team Leader:      | Xiaoke Zhai          | Fei Deng                 |
| ICR Team Leader:          | Xiaoke Zhai          |                          |
| ICR Primary Author:       | Antti P. Talvitie    |                          |

## **F. Results Framework Analysis**

### **Project Development Objectives (from Project Appraisal Document)**

The project's development objective is to provide high-capacity and quality transport connections between targeted development zones and urban areas in Ningxia, Autonomous Region of the Borrower, as well as develop all-weather road access in selected rural areas of Ningxia Autonomous Region.

**Revised Project Development Objectives (as approved by original approving authority)**

The PDO was not changed.

**(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                    |
|------------------------------------|---|--|--------------------------------|--|
| <b>Indicator 1 :</b>               | Traffic volume along GQE.   |  |                                |  |
| Value quantitative or Qualitative) | 0   | 13,170   |                                | 14,487   |
| Date achieved                      | 04/30/2010  | 06/30/2015   |                                | 12/31/2014   |
| Comments (incl. % achievement)     | Target achieved, The traffic volume in 2014 exceeds the target by 10%.  |  |                                |  |
| <b>Indicator 2 :</b>               | Traffic volume along the existing roads.  |  |                                |  |
| Value quantitative or Qualitative) | Guyaozi-Lingwu 6967<br>Lingwu-Wuzhong 1548<br>Wuzhong-Qingtongxia 14254   | Guyaozi-Lingwu 5500<br>Lingwu-Wuzhong 1400<br>Wuzhong-Qingtongxia 8600 |                                | Guyaozi-Lingwu 4815<br>Lingwu-Wuzhong 1127<br>Wuzhong-Qingtongxia 8385 |
| Date achieved                      | 04/30/2010  | 06/30/2015   |                                | 12/31/2014   |
| Comments (incl. % achievement)     | Target achieved. Traffic diversion from the existing road to GOE Expressway was (3-15%) greater than anticipated. |  |                                |  |
| <b>Indicator 3 :</b>               | Increased number of rural people with access to all-weather road in project affected areas.                       |  |                                |  |
| Value quantitative or Qualitative) | 0   | 240,000  |                                | 240,000  |
| Date achieved                      | 04/30/2010  | 06/30/2015   |                                | 12/31/2014   |
| Comments (incl. % achievement)     | Target achieved (100% achievement).   |  |                                |  |

**(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 |
|----------------------|----------------------------|--|--------------------------------|---|
| <b>Indicator 1 :</b> | Travel Time on GQE (hours) |  |                                |   |

|   |   |            |  |            |
|---|---|------------|--|------------|
| Value<br>(quantitative<br>or Qualitative) | 2.00  | 0.80       |  | 0.63       |
| Date achieved                             | 04/30/2010  | 06/30/2015 |  | 12/31/2014 |
| Comments<br>(incl. %<br>achievement)      | The actual travel time reduced from 120 minutes to 38 minutes. The reduction exceeded the target by 14%.  |            |  |            |
| <b>Indicator 2 :</b>                      | Accidents (Fatalities) along GQE corridor. (Lingwu-G307.)   |            |  |            |
| Value<br>(quantitative<br>or Qualitative) | 12 (3)  | 9 (2)      |  | 6 (0)      |
| Date achieved                             | 04/30/2010  | 06/30/2015 |  | 12/31/2014 |
| Comments<br>(incl. %<br>achievement)      | Target achieved in 2014. The number of fatalities at completion is 50% (100%) less than the target value. |            |  |            |
| <b>Indicator 3 :</b>                      | Accidents (Fatalities) along GQE corridor. (Wuzhong-Wulingqing)   |            |  |            |
| Value<br>(quantitative<br>or Qualitative) | 8 (1)   | 6 (1)      |  | 4 (0)      |
| Date achieved                             | 04/30/2010  | 06/30/2015 |  | 12/31/2014 |
| Comments<br>(incl. %<br>achievement)      | Target achieved in 2014. The number of fatalities at completion is 50% (100%) less than the target value. |            |  |            |
| <b>Indicator 4:</b>                       | Traffic volume on rural road 1 - Shabatou-Nongchang2.   |            |  |            |
| Value<br>(quantitative<br>or Qualitative) | 227   | 350        |  | 511        |
| Date achieved                             | 04/30/2010  | 06/30/2015 |  | 12/31/2014 |
| Comments<br>(incl. %<br>achievement)      | Target exceeded (46% greater than the target).  |            |  |            |
| <b>Indicator 5:</b>                       | Traffic volume on rural road 2 - Majiatanzhen-dayangqicun.  |            |  |            |
| Value<br>(quantitative<br>or Qualitative) | 180   | 280        |  | 437        |
| Date achieved                             | 04/30/2010  | 06/30/2015 |  | 12/31/2014 |
| Comments<br>(incl. %<br>achievement)      | Target exceeded (56% greater than the target).  |            |  |            |
| <b>Indicator 6:</b>                       | Traffic volume on rural road 3 - Wanglejing-Niumaojing.   |            |  |            |
| Value<br>(quantitative<br>or Qualitative) | 400   | 640        |  | 921        |
| Date achieved                             | 04/30/2010  | 06/30/2015 |  | 12/31/2014 |

|  |   |            |  |            |
|--|---|------------|--|------------|
| Comments<br>(incl. % achievement)      | Target exceeded (44% greater than the target).            |            |  |            |
| <b>Indicator 7:</b>                    | Traffic volume on rural road 4 - Daodunzi - Wangchaoling. |            |  |            |
| Value<br>(quantitative or Qualitative) | 180   | 280        |  | 423        |
| Date achieved                          | 04/30/2010  | 06/30/2015 |  | 12/31/2014 |
| Comments<br>(incl. % achievement)      | Target exceeded (51% greater than the target).            |            |  |            |
| <b>Indicator 8:</b>                    | Traffic volume on rural road 5 - Nanliang-Lizhuangzi.     |            |  |            |
| Value<br>(quantitative or Qualitative) | 340   | 520        |  | 768        |
| Date achieved                          | 04/30/2010  | 06/30/2015 |  | 12/31/2014 |
| Comments<br>(incl. % achievement)      | Target exceeded (48% greater than the target).            |            |  |            |
| <b>Indicator 9:</b>                    | Traffic volume on rural road 6 - Liujiapu-Lijiagou.       |            |  |            |
| Value<br>(quantitative or Qualitative) | 200.00  | 310.00     |  | 457.00     |
| Date achieved                          | 04/30/2010  | 06/30/2015 |  | 12/31/2014 |
| Comments<br>(incl. % achievement)      | Target exceeded (47% greater than the target).            |            |  |            |
| <b>Indicator 10:</b>                   | Traffic volume on rural road 7 - Hongxing-Yangliu.        |            |  |            |
| Value<br>(quantitative or Qualitative) | 220   | 340        |  | 497        |
| Date achieved                          | 04/30/2010  | 06/30/2015 |  | 12/31/2014 |
| Comments<br>(incl. % achievement)      | Target exceeded (46% greater than the target).            |            |  |            |
| <b>Indicator 11:</b>                   | Traffic volume on rural road 8 - S101 - Yujialiang.       |            |  |            |
| Value<br>(quantitative or Qualitative) | 360   | 550        |  | 798        |
| Date achieved                          | 04/30/2010  | 06/30/2015 |  | 12/31/2014 |
| Comments<br>(incl. % achievement)      | Target exceeded (45% greater than the target).            |            |  |            |
| <b>Indicator 12:</b>                   | Traffic volume on rural road 9 - Gaoxing-Xinsheng.        |            |  |            |



|   |  |            |  |            |
|---|--|------------|--|------------|
| Value<br>(quantitative<br>or Qualitative) | 300  | 460        |  | 632        |
| Date achieved                             | 04/30/2010   | 06/30/2015 |  | 12/31/2014 |
| Comments<br>(incl. %<br>achievement)      | Target exceeded (37% greater than the target).                         |            |  |            |
| <b>Indicator 13:</b>                      | Average Travel Time (mins) on rural road 1 - Shabatou-Nongchang2.      |            |  |            |
| Value<br>(quantitative<br>or Qualitative) | 18   | 15         |  | 9          |
| Date achieved                             | 04/30/2010   | 06/30/2015 |  | 12/31/2014 |
| Comments<br>(incl. %<br>achievement)      | Target achieved (Travel time reduction is 40% more than the target).   |            |  |            |
| <b>Indicator 14:</b>                      | Average Travel Time (mins) on rural road 2 - Majiatanzhen-dayangqicun. |            |  |            |
| Value<br>(quantitative<br>or Qualitative) | 33   | 23         |  | 16         |
| Date achieved                             | 04/30/2010   | 06/30/2015 |  | 12/31/2014 |
| Comments<br>(incl. %<br>achievement)      | Target achieved (Travel time reduction is 30% more than the target).   |            |  |            |
| <b>Indicator 15:</b>                      | Average Travel Time (mins) on rural road 3 - Wanglejing-Niumaojing.    |            |  |            |
| Value<br>(quantitative<br>or Qualitative) | 60   | 47         |  | 30         |
| Date achieved                             | 04/30/2010   | 06/30/2015 |  | 12/31/2014 |
| Comments<br>(incl. %<br>achievement)      | Target achieved. (Travel time reduction 23% more than the target).     |            |  |            |
| <b>Indicator 16:</b>                      | Average Travel Time (mins) on rural road 4 - Daodunzi - Wangchaoling.  |            |  |            |
| Value<br>(quantitative<br>or Qualitative) | 50   | 42         |  | 24         |
| Date achieved                             | 04/30/2010   | 06/30/2015 |  | 12/31/2014 |
| Comments<br>(incl. %<br>achievement)      | Target achieved (Travel time reduction is 43% more than the target).   |            |  |            |
| <b>Indicator 17:</b>                      | Average Travel Time (mins) on rural road 5 - Nanliang-Lizhuangzi.      |            |  |            |
| Value<br>(quantitative<br>or Qualitative) | 33   | 25         |  | 16         |
| Date achieved                             | 04/30/2010   | 06/30/2015 |  | 12/31/2014 |

|  |   |            |  |            |
|--|---|------------|--|------------|
| Comments<br>(incl. % achievement)      | Target achieved (Travel time reduction is 35% more than the target).              |            |  |            |
| <b>Indicator 18:</b>                   | Average Travel Time (mins) on rural road 6 - Liujiapu-Lijiagou.                   |            |  |            |
| Value<br>(quantitative or Qualitative) | 30  | 25         |  | 15         |
| Date achieved                          | 04/30/2010  | 06/30/2015 |  | 12/31/2014 |
| Comments<br>(incl. % achievement)      | Target achieved (Travel time reduction is 40% more than the target).              |            |  |            |
| <b>Indicator 19:</b>                   | Average Travel Time (mins) on rural road 7 - Hongxing-Yangliu.                    |            |  |            |
| Value<br>(quantitative or Qualitative) | 36  | 30         |  | 18         |
| Date achieved                          | 04/30/2010  | 06/30/2015 |  | 12/31/2014 |
| Comments<br>(incl. % achievement)      | Target achieved (Travel time reduction is 40% more than the target).              |            |  |            |
| <b>Indicator 20:</b>                   | Average Travel Time (mins) on rural road 8 - S101 - Yujialiang.                   |            |  |            |
| Value<br>(quantitative or Qualitative) | 19  | 16         |  | 9          |
| Date achieved                          | 04/30/2010  | 06/30/2015 |  | 12/31/2014 |
| Comments<br>(incl. % achievement)      | Target achieved (Travel time reduction is 44% more than the target).              |            |  |            |
| <b>Indicator 21:</b>                   | Average Travel Time (mins) on rural road 9 - Gaoxing-Xinsheng.                    |            |  |            |
| Value<br>(quantitative or Qualitative) | 22  | 15         |  | 10         |
| Date achieved                          | 04/30/2010  | 06/30/2015 |  | 12/31/2014 |
| Comments<br>(incl. % achievement)      | Target achieved (Travel time reduction is 50% more than the target).              |            |  |            |
| <b>Indicator 22 :</b>                  | Accident rate (injury accidents/year) on NH211.                                   |            |  |            |
| Value<br>(quantitative or Qualitative) | 13  | 10         |  | 6          |
| Date achieved                          | 04/30/2010  | 06/30/2015 |  | 12/31/2014 |
| Comments<br>(incl. % achievement)      | Target achieved in 2012. The accident rate at completion is 40% less than target. |            |  |            |
| <b>Indicator 23:</b>                   | Fatal accidents (per year) on NH211.  |            |  |            |

|   |   |  |  |   |
|---|---|--|--|---|
| Value<br>(quantitative<br>or Qualitative) | 5   | 3  |  | 2   |
| Date achieved                             | 04/30/2010  | 06/30/2015   |  | 12/31/2014  |
| Comments<br>(incl. %<br>achievement)      | Target achieved in 2012. The number of fatal accident at completion is 33% less than the target.                        |  |  |   |
| <b>Indicator 24:</b>                      | Establishment of traffic safety improvement action plan and application in selected corridors.                          |  |  |   |
| Value<br>(quantitative<br>or Qualitative) | NA  | Actions applied<br>in selected<br>corridors                          |  | The report was applied<br>in selected corridors<br>by local projects.                             |
| Date achieved                             | 04/30/2010  | 06/30/2015   |  | 12/31/2014  |
| Comments<br>(incl. %<br>achievement)      | Target achieved. Action plan applied.   |  |  |   |
| <b>Indicator 25:</b>                      | Establishment of Framework and Action-plan to improve the efficiency of transport services.                             |  |  |   |
| Value<br>(quantitative<br>or Qualitative) | NA  | Framework and<br>Action plan<br>established                          |  | The studies was<br>incorporated in the<br>Guidelines of the 12th<br>Five-Year Plan of<br>Ningxia. |
| Date achieved                             | 04/30/2010  | 06/30/2015   |  | 12/31/2014  |
| Comments<br>(incl. %<br>achievement)      | Target achieved. Action plan included in Ningxia's Five Year Plan   |  |  |   |
| <b>Indicator 26:</b>                      | Completion of Road Maintenance Assessment and long-term Road Maintenance Strategy.                                      |  |  |   |
| Value<br>(quantitative<br>or Qualitative) | NA  | Will apply the<br>strategy and<br>provide timely<br>recommendations. |  | The study was<br>completed and<br>approved.   |
| Date achieved                             | 04/30/2010  | 06/30/2015   |  | 12/31/2014  |
| Comments<br>(incl. % j<br>achievement)    | Target achieved. Ongoing implementation of the study  |  |  |   |
| <b>Indicator 27:</b>                      | Training and Study Tour: Domestic Training-# of staff received the training;<br>Domestic Training-Satisfaction Rate (%) |  |  |   |
| Value<br>(quantitative<br>or Qualitative) | NA  | 990 (85%)  |  | 1,060 (98%)   |
| Date achieved                             | 04/30/2010  | 06/30/2015   |  | 12/31/2014  |
| Comments                                  | Target achieved (7% greater than the target).   |  |  |   |

|                                     |  |            |  |            |
|-------------------------------------|--|------------|--|------------|
| (incl. % achievement)               |  |            |  |            |
| <b>Indicator 28:</b>                | Training and Study Tour: Overseas Training- # of staff received the training; Overseas Training-Satisfaction Rate (%)  |            |  |            |
| Value (quantitative or Qualitative) | NA   | 360 (85%)  |  | 135 (100%) |
| Date achieved                       | 04/30/2010   | 06/30/2015 |  | 06/30/2015 |
| Comments (incl. % achievement)      | Target partially achieved (38% achievement). The number of overseas training was reduced because of more stringent requirements and control from national and provincial governments on oversea study tours. |            |  |            |

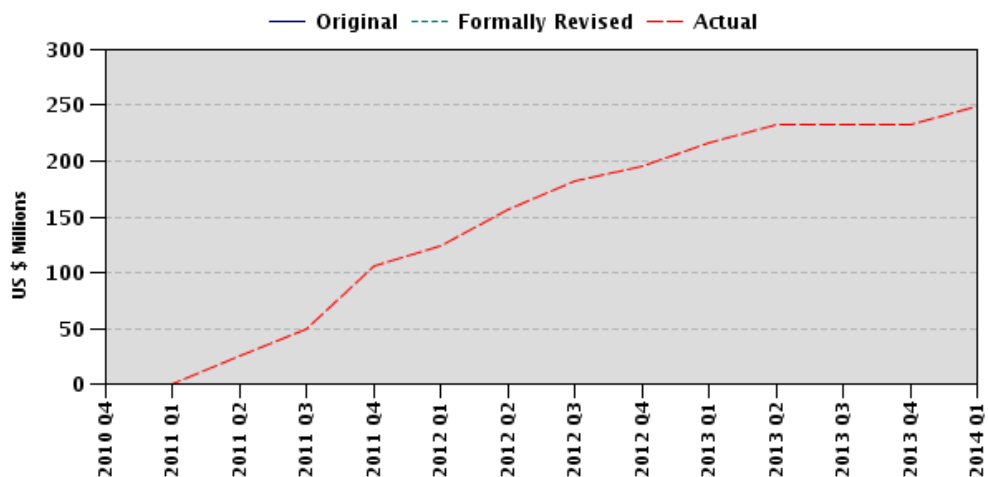
### G. Ratings of Project Performance in ISRs

| No. | Date ISR Archived | DO           | IP                  | Actual Disbursements (USD millions) |
|-----|-------------------|--------------|---------------------|-------------------------------------|
| 1   | 06/27/2011        | Satisfactory | Highly Satisfactory | 106.24                              |
| 2   | 03/24/2012        | Satisfactory | Highly Satisfactory | 181.64                              |
| 3   | 04/22/2013        | Satisfactory | Highly Satisfactory | 232.56                              |
| 4   | 12/13/2013        | Satisfactory | Highly Satisfactory | 249.38                              |
| 5   | 06/07/2014        | Satisfactory | Highly Satisfactory | 249.38                              |
| 6   | 12/09/2014        | Satisfactory | Satisfactory        | 249.38                              |
| 7   | 06/19/2015        | Satisfactory | Satisfactory        | 249.38                              |

### H. Restructuring (if any)

Not Applicable

### I. Disbursement Profile



## 1. Project Context, Development Objectives and Design

### 1.1 Context at Appraisal

#### *Country and Sector Context*

1. **Ningxia Hui Autonomous Region is one of China's poorest provinces.** At Appraisal 10 percent its 6 million population lived below the poverty line. Population was also dispersed, 64 percent lived in rural areas. It was believed that Ningxia's lack of transport accessibility and geography hindered its socioeconomic development. In the twelve years before Appraisal in 2010 Ningxia had experienced rapid growth. The per capita Gross Domestic Product (GDP) had increased six-fold (from US\$584 in 1997 to US\$3,194 in 2009). The corresponding figures for China are US\$779 in 1997 and US\$4,515 in 2010. In spite of the rapid growth, Ningxia was still behind China's average per capita GDP. There also was disparity between urban and rural residents; the urban per capita income was three times higher than of the rural residents, who were poorly connected with the employment centers.

2. **Coal and manufacturing have a major role in Ningxia's economic growth.** The main industries are coal, electrical, metallurgical, chemical, food processing, textile and paper industries. Ningxia has large coal reserves and coal is a major revenue source. The metallurgical industry is also developing rapidly and contributed over 50 percent of the region's GDP. The integrated development and connection of the industrial areas at Guyaozi and Quintongxia is important to Ningxia's development strategy

3. **Traffic had increased rapidly, especially in the industrial areas, creating needs for logistics services, better access, mobility and safety.** Although the 44,000km National Trunk Highway System (NTHS) was completed, rapid traffic growth between Ningxia's industrial development zones, and wants for improved access and mobility of the rural population necessitated further road investments. On the "soft side" both industry and agriculture needed better logistics services; road safety and truck overloading also presented challenges in the Region. This was the Appraisal context for investments and technical assistance to ensure sustainability of the investments and quality of rural life.

#### *Rationale for Bank Involvement*

4. **Sustainability of the development agenda since completion of Tri-Provincial Highway Project (Loan No. 4356-CN) in 2005.** The Tri-Provincial Highway project focused on three areas: (a) development of the road network and its safety; (b) institutional capacity; and (c) access to poor rural areas. Although that project and the accelerated road development since then created added value, both economically and transport-wise, these concerns remained on the development agenda. The difference was that they could now be addressed and worked through with more specifically. Ningxia Government requested the Bank to support the construction of the missing link in the road network, Expressway between Guyaozi and Qingtongxia industrial zones; the rehabilitation of a key national highway to serve developing areas and important connection to Gansu Province; and to support Ningxia's Local Road

Improvement Program to disadvantaged villages to foster rural growth and equity. Road safety, transport and logistics: road maintenance; and training and technical guidance in engineering design, environment impact management, and road asset management were natural complements to the investments.

#### Contribution to Higher Level Objectives

5. **The Ningxia Highway Project supports the objectives of Ningxia, of the Central Government, and of the Bank.** The first consists, inter alia, of improvements to the transportation system, ecological construction, environmental protection, and development of social programs in Ningxia. The second supports the Western Development Plan and the objectives of the Government's (GoC) 11<sup>th</sup> Five Year Plan. And for the third, both Ningxia's and the State's objectives are reflected in the Bank's Country Partnership Strategy (CPS), particularly its second pillar for 2006-2010 to reduce poverty, inequality and social exclusion, and to improve China's competitiveness and investment climate through the financing of infrastructure in key corridors, particularly those serving poorer regions and communities.

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

6. **Project Development Objective:** To provide high-capacity and quality transport connections between targeted development zones and urban areas in Ningxia, Autonomous Region of the Borrower, as well as develop all-weather road access in selected rural areas of Ningxia Autonomous Region. The PDO is the same in the Project Appraisal Document (PAD) and the Loan Agreement (LA).

7. **Indicators to measure PDO achievement are listed in the Data Sheet.** The outcome indicators quantify the traffic volume on the Guyaozi and Qingtongxia (GQE) Expressway corridor and the number of rural population with access to all-weather road. These indicators allow assessment the effectiveness of road network improvements on traffic capacity and its quality, and transfer of benefits to road users. They are consistent with the CPS objectives to improve China's competitiveness and reduce poverty and social exclusion. The intermediate indicators give a richer picture of the PDO. They are measurements of travel times and accidents on GQE corridor; traffic volumes and travel times on the rural roads; traffic safety plans; road asset management system; logistics of transport services; and completion of the planned training programs, and define in more detail the project's aims to support the PDO. .

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

8. The PDO and the monitorable indicators were not changed.

### **1.4 Main Beneficiaries**

9. The direct beneficiaries are Ningxia's economic and industrial development zones, Ningxia's commerce and industry for better logistics, the residents along the improved rural roads (altogether 240,000 people) for all-weather access and mobility, and the Ningxia Transport Department (NTD) for managing road safety, road maintenance and engineering

services. Indirectly the beneficiaries are all the people of Ningxia for better, safer and well-maintained roads and transport services.

## 1.5 Project Design and Project Components

10. The project was organized into three components, which required no revisions during implementation.

11. **Component A: Guyaozi-Qingtongxia Expressway<sup>1</sup>.** Construction of the four-lane Guyaozi-Qingtongxia Expressway (GQE) with a total length of about 75.68km, including carrying out earthworks, acquisition and installation of electrical and mechanical equipment for, inter alia, traffic surveillance, communication and toll collection, and design and installation of traffic safety facilities.

12. **Component B: Road Network Improvements Program (RNIP).** RNIP component had two parts. The first, Local Roads Improvement Program (LRIP) would improve 38 (523.8 km) rural county, township and village roads of which the Bank would finance 9 (99.3 km) in the poorest counties of Ningxia serving 240,000 villagers<sup>2</sup>. The second part of this component was rehabilitation of three sections of National Highway NH211 (about 65 km). The second section included construction of a new roadway along the existing alignment; the other two sections were rehabilitations. Engineering measures to improve traffic safety conditions were included in the road works.

13. **Component C: Institutional Strengthening.** This component had three parts. All financed by the Borrower. The activities consisted of provision of technical assistance to strength the institutional capacity of Ningxia in the transport sector through, inter alia: (a) carrying out a study on road safety, a study for developing an optional long-term strategy for road maintenance, and a study for developing a comprehensive plan for the transport logistics industry in Ningxia; (b) carrying out of training on issues related to the transport sector in Ningxia; and (c) acquisition and utilization of equipment required for carrying out road maintenance in Ningxia.

## 2. Key Factors Affecting Implementation and Outcomes

### 2.1 Project Preparation, Design and Quality at Entry

14. **Adequacy of Project Concept and Design.** The project design was adequate in view of the experiential knowledge in road construction and rehabilitation of roads, both expressways and rural roads, and supported the PDO. Early technical discussions considered other alternatives to serve the same objectives as the expressway component. A multimodal

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<sup>1</sup> It also included non-Bank financed land acquisition and resettlement, environmental monitoring, greening works, project supervision and building and annex areas for a total of US\$67.83 million. The GQE connects the two important industrial zones at the east and west ends of the GQE, it bisects nine national and provincial roads providing links to Wuzhong and Lingwu urban areas.

<sup>2</sup> The Loan Agreement only described the activity as “Carrying out the Local Roads Improvement Program (LRIP) of Ningxia”. The information presented here is from PAD.

alternative with a road and a railway was infeasible because the distance between the two industrial zones was too short for an intermodal option. The kinds of chemical and metallurgical commodities that would be transported also buttressed the road option. The rural roads improvement program supported the government's goal of serving every village with an all-weather road. It was consistent with the Bank's CPS and expanded the project's impact beyond NTD's jurisdiction to municipalities and counties. Institutional strengthening activities focused on NTD's development needs, particularly maintenance, road safety and training.

15. ***Project Preparation.*** Project preparation started in May 2008 and the loan was approved two years later and project formally launched in August 2010. In May 2008 agreement was reached on GQE and NH211; the feasibility study for GQE was available, the environmental assessment consultant and the other safeguard consultants were also engaged by the executing agency. The Bank mission made requests and clarifications with regard to technical issues in the alternative analyses such as alignment alternatives, number of GOE interchanges, traffic forecasts, and accident experience on Ningxia's national and provincial roads. Environmental Assessment (EA) consultant was briefed on the Bank procedures and requirements for Environmental Management Plan (EMP). A large part of the ensuing 2-year preparation time was applied to persuade the Client to accommodate the CPS objectives and prepare the rural roads component of the project—roads which are not under NTD's jurisdiction. The executing agency and its Project Management Office (PMO) had prior experience with Tri-Provincial Highway project and knowledge of Bank policies and processes. Knowing the difficulties, the project preparation missions (Jan and March 2009) and pre-appraisal (May and July 2009) spent much time in dialogue to inform the affected interests (the implementing entities, local working groups for resettlement and beneficiaries) of the Bank's Resettlement and Land Acquisition policies and policy frameworks, which required public consultations, consideration of minority people, and disclosure of documents. Procedures applicable to the Local Roads component were made known (e.g. Environmental Management Framework). Information and examples were given on Financial Management. Project details (Disbursements, the Procurement Plan and Procurement of Goods, Works and Selection of Consultants, and the Implementation Arrangements) were honed down during appraisal (Nov 2009). After the Appraisal everything was ready and the PMO was anxious to start and procure contracts in early 2010 with granted retroactive financing.

16. *Project preparation had two minor blemishes.* The first was unfamiliarity with NTD's practice of phased implementation of pavements. The project design simply says the 'earthworks' of the GQE will be financed by the Bank, including three pavement contracts. The three pavement contracts were completed in 2012 when the road was partially opened for traffic. However, the pavement's wearing course was laid in May-August 2015 by NTD (see para. 24 below).<sup>3</sup> The second blemish, probably an afterthought, was the placement of *Assessment of the social impacts of the LRIP by December 2014* in the Loan Covenants and not in the studies component of the project. Ultimately the assessment of social impacts was carried out by the PMO at the closing of the project in 2015, but without other baselines than the travel times and traffic volumes on the chosen rural local roads.

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<sup>3</sup> The cost of the asphalt wearing course is not included in the PAD cost estimates. Likewise, the cost of the laying the surface layer and repairing the pavement cracks in 2015 are not included in the economic analyses.



17. ***Adequacy of Risk Assessment.*** Risk assessment adequately identified the important issues of implementation. The first risk (moderate) was low traffic and fiscal sustainability of the GQE. At closing the traffic volume was higher than anticipated; early opening of the expressway allowed the traffic to build up. The second risk, cost overruns (moderate), was associated with inadequate design, procurement capacity and project management, as was the third risk of inadequate balance between expressway and non-expressway components (moderate). Neither occurred. However, the fourth risk of work quality and design and safeguard compliance of *domestic financed contract sections* (moderate) did partially occur. There was pavement cracking on both GQE (co-financed) and NH211 (Bank- financed only), probably due to phased implementation, corrected later in the spring of 2015, after the defect liability period of the original construction contracts. For these risks the key mitigation measures were a careful review of the road designs during preparation and appraisal, and diligent works supervision. These were done but in insufficient detail early in the project. The safeguard risks (moderate to low) were emphasized during preparation, and the means and measures for their mitigations assigned were appropriate. The application of these measures, which caused minor delays in contract implementation due to learning process with parties with no prior experiences with Bank policies, actually helped smooth project implementation later on.

18. ***Overall Quality at Entry.*** The Bank's Quality Assessment Group did not conduct Entry Assessment for this project. At appraisal the project supported the objectives of Ningxia, GoC, and the Bank. The infrastructure investments added value to the Region and beneficiaries, and the TA responded to the institutional and industry's needs in Ningxia. The Safeguards, EA, EMP, Resettlement Policy Framework (RPF) and RAP, were ready and timely disclosed and complied with Chinese laws and regulations and Bank policies, and were reviewed by the local authorities and the Bank team. The engineering design was prepared by a recognized Chinese design institute and complied with the prevailing design standards and construction specifications. The safeguard effects on the Expressway alignment were recognized and taken into account, particularly to protect the Baijitan Nature Reserve. The beneficiaries were consulted and their support and acceptance were received. The somewhat lengthy project preparation made the project better aligned with the CPS and allowed dialogue with and preparation of the local working groups for RAP and other Bank policies. The project construction started before the date of loan effectiveness with retroactive financing and there is no exception requirement from Bank policies.

## **2.2 Implementation**

19. ***Implementation Arrangements.*** Ningxia Transportation Department (NTD) executed the project. NTD has layered functional offices for administration of all aspects of project development, execution and operation. Its Project Management Office (PMO) had prior experience and competencies for permits, implementation and supervision of the project agreement, and communication with the World Bank. The PMO was responsible for overall project management and coordination. NTD's office of Highway Construction and Administration Bureau (NHCAB) was the day-to-day implementing agency. Other offices of NHCAB were responsible for resettlement and land acquisition, social assessments, and

financial management. NHCAB's Project Management Division (PMD) implemented Component A and Local Road Construction Division (LRCD) implemented Component B. PMD hired and coordinated the procurement agency, design institutes, social and environment consultants to prepare project feasibility studies, engineering designs, procurement and safeguard documents, and managed and monitored project implementation with the assistance of supervision engineers and independent social and environment monitoring consultants. Similar arrangements were organized at LRCD.

20. The project was not at risk at any time. Once GQE was built and NH211 rehabilitated they were handed over to NTD's NHCAB for operation and maintenance. For the rural local roads, their owners, the municipalities and counties, took over operation and maintenance.

21. **Implementation Progress.** Implementation started briskly early 2010 with retroactive financing. Project launch-supervision mission was held in August 2010 and the project became effective in late October after Board approval on May 13, 2010. By the project launch mission, the project investment works were well underway; 20-55% of the 9 GQE subgrade contracts were completed; 6 supervision engineers with laboratories had mobilized; and NTD had established branch offices along the GQE. Construction management systems procedures, quality and safety management were generally good, but some corrective actions were required. Twenty-one of the thirty-eight local road contracts were in progress with supervisors in place. Land acquisition and compensation for land loss for GQE was almost completed by the end of June 2010, and restoration of access to farmland and irrigation were 80% complete in July 2010<sup>4</sup>.

22. The project continued its brisk implementation schedule. Domestic and foreign training and the three technical assistance studies started in early 2011, which included traffic safety, logistics and trade facilitation, and road maintenance. The first segment of GQE Expressway was opened to traffic in November 2011, and the remaining segment, except for a 3 km segment next to the Qingtongxia railway, was opened a year later. Training was provided on local road maintenance, its technologies and mitigation environmental impacts<sup>5</sup>. By mid of 2012, paving and rehabilitation of Bank-financed local roads and over 200 km of non-Bank financed local roads were also completed. Land acquisition for NH211 and two of the three sections were completed. There continued to be isolated issues in social safeguard preparation and implementation. Though the project preparation was delayed by the different views between the Bank and PMO on the fair compensation rates for affected households, PMO and local governments satisfactorily implemented the resettlement in compliance with the RAP and coordinated with other domestic projects to solve the lack of water and sewer services to new housing, which was affected by the other projects. Both procurement and financial management had been satisfactory and managed problem free throughout the project.

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<sup>4</sup> Compensation was paid to all relocated households, and housing and necessary infrastructure—paved roads, water and sewage—were in progress. The same notion applied to works to restore or minimize land loss impacts and to rehabilitate the livelihood vulnerable (low income, disabled, or land loss) households

<sup>5</sup> A unique characteristic of the GQE is that it connects industrial zone and many trucks are loaded with coal, industrial, chemical or even dangerous goods. Accordingly environmental protection and emergency response training were held by the PMO when the GQE was open to traffic.

23. For all practical purposes, with one exception discussed in the next few paragraphs, the project was completed by April 2014; 94% of the loan was disbursed a year earlier; land acquisition and house demolition for the project was completed in 2013 and water and sewer services to relocated households were restored in 2014. GQE traffic volume at opening was less than predicted. On the local roads and NH211 traffic volumes were more than predicted. Travel time reductions were more than anticipated on all the project roads. The logistics and trade facilitation results found their way in the 12<sup>th</sup> five-year plan; the traffic safety study had very successful and well-attended training. A road safety audit manual was written and road safety auditors were trained for NTD needs. A safety auditing group was established at NTD. The implemented traffic safety measures were effective in the project corridors, and it had a wider impact through the traffic safety action plan and the institutionalized safety audit procedures. The road maintenance study provided valuable information and techniques for dealing with pavement deterioration. The domestic training programs were completed as planned in excess of the target.

24. *Final Wearing Course of GQE pavement.* Earlier in project launch mission in 2010, the Bank supervision team found the median of expressway was not at the same level of the road. The PMO informed the Bank that Ningxia (as approved by MOT) applied phased construction of asphalt pavements and that the final wearing course would be implemented over several years and this would allow to correct cracks that might develop due to compaction, heavy traffic or other reasons. Some cracking was observed during 2013 mission. The Bank was informed that the surface layer would be finished in 2015. During the ICR mission in April 2015, the final surface layer was being asphalted by NTD at its expense, to bring the median and the asphalt surface to the same level as the Bank recommended in 2010. Each roadway was closed for 2 months at the time and the surface layer was completed 2 months after the loan closing date<sup>6</sup>.

25. *Work Quality of Construction.* Some cracks were observed on the GQE (opened in late 2012) and the eastern side of the second segment of NH211 (opened in 2011). The reasons for the cracks are likely to be different. Though the pavement of the GQE was built stepwise as other expressway projects in Ningxia, the pavement structure is designed for cumulative axle loads and the first few years of low traffic on the GQE could not reach the designed cumulative axle load. A lapse in quality assurance is possible, but a more likely cause is overloading since heavy vehicles transport coal and other materials between the two industry zones connected by the GQE. On the second segment of NH211 where longitudinal cracks were found, there was no paved shoulder like on the third segment where no cracks were found even though that road segment was widened. The cracks likely cause is water penetration through the unpaved shoulder and the temperature changes and freeze and thaw cycles. Overloaded trucks added to the damage. An unforeseen consequence of the stepwise completion of the pavements was cracking over 2 years after acceptance and beyond the contractor's defect liability period.

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<sup>6</sup> The final wearing course construction required the closure of one roadway for two months after the project closing date. The effect of two month closing one roadway will be minor on the EIRR and the FIRR. In the long run it is inconsequential compared to better durability and maintainability of the road.

26. *Overloading.* It was noted in the PAD that truck overloading is a serious problem in China. Based on visual observation, truck overloading remains a problem on other roads than the expressways, where weighing is done at entrance and a payment (for overloads <10%) is issued and the higher excess loads off-loaded. The inadequacy of weight control on non-Expressway is likely to cause migration of heavy trucks to such roads with destructive and costly consequences. In 2014, a weigh station built on NH211 in 2012 to control overloading was relocated to a nearby location – Huianpu, where NH211 intersect with Highway S304. The new weigh station can monitor overloading on both highways—especially those trucks coming into NH211 from S304 that were not monitored before. Ningxia has been optimizing weigh station locations throughout its highway and expressway network, and its performance of overloading control has been improved. This is a *Lessons Learned*.

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

27. *M&E Design.* All the M&E indicators are measurable and aligned with the intentions of the project interventions. The PDO indicator (1) traffic volume along GQE and (2) the existing roads directly measured the achievement of the first half of PDO – to provide high-capacity and quality transport connections between targeted development zones and urban areas in Ningxia. The traffic volume data, as monitored, would present how GQE impacted the traffic behavior along the corridor through attracting traffic from existing roads. The intermediate indicators on travel times and accidents along GQE corridor and the rural roads measure safety improvement and the service quality aspects of transport connections. The PDO indicator (3), the number of rural people with access to an all-weather road in project affected areas directly measures the achievement of the latter half of PDO - to develop all-weather road access in selected rural areas of Ningxia. The intermediate indicators of traffic volume on the 9 sample rural roads provide data for the quantity of people who have access to all-weather roads in Ningxia’s rural area. Together with travel times and accident reductions they are indicators about the quality of such access.

28. *M&E Implementation and Utilization.* Reporting of the directly observable M&E data was organized. Although utilization of these data was not evident, it probably was because the project met or exceeded its planned targets on time. For the M&E indicators that occur over a longer time period because of their institutional complexity, concrete steps were taken: traffic safety action plan was implemented in project corridors and province wide applications are expected to follow; traffic safety manual and auditors were trained at NTD and a safety audit unit was established at NTD; action plan to improve transport efficiency was incorporated in Ningxia’s five-year plan; maintenance study results have been accepted but recouping its benefits will require time as discussed in *Lessons learned*; and finally, time lags will apply to the effects of training to be observable. As a minor handicap in reporting, measurement of some of M&E indicators in the Implementation Status & Results Reports (ISRs) was not consistent with the definitions in the PAD. Traffic volumes were reported as ADT (Average Daily Traffic in Vehicles) in the first few ISRs, when the PAD used PCUs (Passenger Car Units).

### **2.4 Safeguard and Fiduciary Compliance**

29. **The project was classified in environmental Category A.** Three safeguard policies were triggered: OP4.01 Environmental Assessment, OP4.12 Involuntary Resettlement, and OP4.04 Natural Habitats. For GQE, key environmental concerns included potential impacts on the Baijitan National Nature Reserve with vulnerable steppe ecosystem, and community impacts in the western section where intensive farmland and irrigation facilities were in place. GQE also crosses Yellow River on an extra-long bridge. Careful alternative analysis was conducted and mitigation measures developed in preparation ensured that negative impacts were avoided.

30. **Supervision and training in environmental management helped the contractors improve and adhere to codes of practices.** Preparation for the execution and supervision of the Bank safeguard policies took time for those with no prior experience in Bank-financed projects. At project launch, although excellent work was already done in the Baijitan nature preserve segment, the need for additional training and corrective actions was detected. PMO was requested to organize and supervise a training program for all workers, both contractors and consultants, within two months. Later specialized one-week training was held to disseminate international experiences on the best environmental practices for low volume roads. For rural roads, the execution of the EMP and the application of Environmental Management Framework and the associated environmental design and specifications were included in the bidding documents.

31. **Careful preparation and diligent supervision ensured smooth land acquisition and resettlement.** In 2009 and early 2010, the Bank's safeguard professionals and PMO had done the necessary surveys and statistical work to identify all affected households and individuals that fell within the scope of the social safeguard policies. With the limitation of relatively low resettlement compensation rate in Ningxia, the project adopted a set of supporting measures endorsed by NTD's officials and by Mayors of affected cities. NTD and NHCAB established resettlement coordination offices, assigned dedicated staff for affected villages by each expressway segment, and mobilized additional funding for low-income households affected. The project launch-supervision mission held follow-up workshops and seminars on all the safeguard issues for NTD and NHCAB staff, the affected cities' resettlement offices, and township resettlement working groups on the details of Bank policies and practices on urban pension program for land loss farmers; resettlement implementation and house rehabilitation in the three affected cities; and resettlement monitoring and evaluation. During implementation, resettlement fund was timely provided and disbursed; external monitoring was effective during implementation. The results were satisfactory to all affected.

32. **Financial Management performance during implementation was satisfactory.** FM was in compliance with Bank fiduciary policies. The project had adequate FM systems that provided accurate and timely information on project implementation progress and that the loan was being used for the intended purposes. Unaudited Interim Financial Reports (IFR) were satisfactorily submitted. Audit reports raised FM related issues from time to time, and these were addressed by the borrower.

33. **Procurement performance was satisfactory.** Procurement staff was sufficient and with rich experience; there was a sole executing agency responsible for all project procurement.

The procurement agent provided technical support for smooth functioning. The issues identified during the daily interaction and the supervision missions were addressed and timely feedback received. There were occasional non-compliances resulting from difference between local practice and Bank policies and procedures. Necessary corrective actions were taken. In general, the procurement followed the Bank procedures and policies.

34. **Overall there were no unusual issues in safeguard compliance during the project.** The executing agency and its safeguard and fiduciary staffs were experienced and capable to use the provided training effectively. The resolutions to problems in safeguard matters—early lack of statistics about affected population, delays in infrastructure provision or compliance with the EMP, unfair or unreasonable compensations, the latter two beyond the control of the Bank team—were resolved with negotiations, rectification and persuasion with appropriate entities and officials. In brief, the environment and resettlement were managed according to Bank and Chinese requirements. Fiduciary compliance, procurement and financial management, had minor delays in reporting or omitted justifications for decisions, but on the whole there were no noteworthy problems.

## **2.5 Post-completion Operation / Next Phase**

35. Transition to the use of the new investments is occurring uneventfully. Results of the logistics study have already been incorporated in the next five-year plan and are likely to be useful for the local manufacturing industries and agriculture. The road and traffic safety study and training occasioned institutional restructuring and capacity building in the road administration with province-wide positive results. According to NTD there has been an increase in maintenance funding and increase in knowledge about maintenance. In traffic safety better coordination and cooperation would be beneficial between the road management organizations and the police in accident analyses and in enforcement. Work remains in maintenance management such as organizing, procuring and executing maintenance works competitively to realize all the benefits of the maintenance study. The same applies to truck overloading. What has been accomplished in the project is to lay a good knowledge base for maintenance and its technological and material options. Maintenance and overloading issues are discussed again in *Lessons learned*.

## **3. Assessment of Outcomes**

### **3.1 Relevance of Objectives, Design and Implementation**

36. **Relevance of objectives – High.** The project's development objectives were clear and realistic. They were consistent with the expressed road sector objectives of Ningxia, the Central Government, and the Bank's CPS, and designed and supported these objectives (para 6). They remain relevant and consistent with the development priorities of the central and provincial governments as stated in their 12th Five-Year Plans (FYP) (2011-2015) and the Western Development Plan. Specifically, they support (1) expansion of the country's road network (expressway, highways and rural roads) and passenger services to villages and towns with an emphasis on the western region; (2) regional integration and urbanization in Ningxia through high quality transport connections; and (3) development of modern logistics and efficient

freight transportation in Ningxia. The PDO is aligned with the Bank Group's CPS second pillar 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 modern logistics, improved rural transport and better roads in general. In short, the PDO captured the important themes in Ningxia's context at the time of appraisal and completion.

37. ***Relevance of design and implementation - Substantial.*** The project activities, as designed and implemented, contribute to the achievement of PDO and the current development priorities of the governments and the Bank. The GQE expressway and NH211 aimed at providing high-capacity and quality connection between important industrial zones and urban areas. The rural road improvements sought to provide all-weather road access in selected rural areas of Ningxia. The project also aimed to support Ningxia's goals of highway network expansion (with a target of 1,600 km additional mileage between 2011 and 2015) and accessibility improvement to rural villages and towns (with a target of 8,600 km additional rural roads between 2011 and 2015). The purpose of the study on road maintenance was to initiate a long-term road maintenance strategy for the province; and the study on logistics and trade to become a part of Ningxia's 12<sup>th</sup> FYP. The Results Framework captures the traffic volume and rural accessibility improvements from the project shown by the outcome indicators and their measurements. The indicators also allow the assessment of implementation progress of road network improvements, their quality, and transfer of benefits to road users. The overall project design was relevant, but there were moderate shortcomings in the engineering design, the safeguards, (late) implementation of the final pavements and the social assessment.

### **3.2 Achievement of Project Development Objectives**

#### ***Achievement of PDO –High***

38. Project Development Objectives of high capacity quality transport connections between targeted development zones and all-weather road access to selected rural areas were achieved. Measurements for traffic volumes, travel times and traffic safety on GQE and NH211 were 10-50 percent better than targets set at appraisal. The number of rural population with access to an all-weather road met the target of 240,000 and the indicators for traffic safety and travel times were 25-56 percent better than targeted at appraisal. The expressway component, added an important missing expressway link between two industrial development areas and cities of the province and the rehabilitated national highway serves an important connection to Gansu province. The indicators confirm that the high capacity roads have improved quality of service to the users. As recorded in the Data Sheet in detail, and noted just above, the traffic volume increases and travel time and accident reductions on the rural roads have significantly improved on the targeted values at appraisal. This is important to the provision and quality of social programs services in poor areas and has led to social and economic progress in selected rural areas in Ningxia (para. 45).

39. The implementation of the road works also gave experiential knowledge to the PMO, the contractors and consultants, and enhanced their awareness of improving ecological construction, environmental protection, and other safeguard practices in Ningxia. The institutional strengthening components, especially the road safety and transport logistics have

already found their way into daily work routines and the establishment of traffic safety audit unit at NTD and logistics center in Yanchi. The maintenance study and procurement of maintenance equipment, and staff training will have long-term effects as benefits from new maintenance practices and techniques are adopted to increase the effectiveness and efficiency of maintenance operations.

### 3.3 Efficiency

Rating: Substantial

40. An ex-post evaluation of the project was conducted and reported in the Borrower's Implementation Completion Report. Traffic analyses were carried out using the observed traffic counts and compared them with appraisal estimates. The traffic forecasts for future years were revised accordingly. The ex-ante economic evaluation and the ex-post economic evaluation covered the three main project components. The financial evaluation covers only the GQE.

- a. Construction of 75.68 km expressway between Guyaozi and Qingtongxia (GQE)
- b. Improvement of 65.0 km of National Highway 211 between Lingwu and Jiajiajuan
- c. Upgrading of 38 rural roads, totaling 523.8 km, to paved Class IV standard.

41. The adjusted total cost and benefits streams, Economic Internal Rate of Return (EIRR) and Economic Net Present Value (ENPV) for each component were re-calculated and are summarized in Table 1. The EIRR for overall project is 17.37%, which is higher than the 12.90% estimate at appraisal. The ENPV is RMB 3,413.35 million. In the recalculation the value of travel time savings (VOT) is higher than at appraisal due to the rapid GDP growth in Ningxia. The cost of NH211 is slightly higher at completion than anticipated at appraisal but the EIRR and ENPV are in line with the appraisal estimates. Details are in Annex 3.<sup>7</sup>

Table 1 Ex-ante and Ex-post Economic Evaluation for Each Component of the Project

|                 | EIRR (%)     |        | ENPV (8%, RMB million) |          |
|-----------------|--------------|--------|------------------------|----------|
|                 | At Appraisal | ICR    | At Appraisal           | ICR      |
| GQE             | 12.0%        | 15.88% | 1,460.0                | 2,385.50 |
| NH211           | 25.9%        | 24.31% | 282.7                  | 231.04   |
| Rural Roads     | 18.00%       | 38.37% | 319.1                  | 796.81   |
| Overall Project | 12.90%       | 17.37% | 2,061.8                | 3,413.35 |

42. The Financial Internal Rate of Return (FIRR) and the Financial Net Present Value (FNPV) calculated in ex-post evaluation exercise are summarized in table 2. It bears to mention that the actual financial costs were higher than estimated at appraisal because of the cost and amount of commercial counterpart financing. Details are in Annex 3.

Table 2 Ex-ante and Ex-post Financial Evaluation for GQE

|  | FIRR (%) | FNPV (RMB million) |
|--|----------|--------------------|
|  |          |                    |

<sup>7</sup> The cost of the surface layer is not included in the calculations, ex-ante or ex-post. It is unlikely that it would materially affect the efficiency results, but remains a blemish in otherwise well-managed and implemented project.



|     | At Appraisal | ICR   | At Appraisal | ICR    |
|-----|--------------|-------|--------------|--------|
| GQE | 5.34%        | 6.35% | 1,196.0      | 573.02 |

43. **Administrative Efficiency -- Substantial.** The project was implemented efficiently. Most of the civil works scheduled in the PAD were completed more than one year ahead of project closing date. The costs of civil works were estimated well and the actual costs have only minor variations (Annex 1 and 2). The project started briskly with retroactive financing. The whole alignment of GQE was open to traffic in December 2012, at the same time when NH211 rehabilitation and all rural roads construction had completed. The institutional strengthening component was also completed timely. There were two administrative oversights. The first was the late completion of social assessment as a covenant without clear accountability. The second was the lack of clarity regarding the final surface layer on the GQE, completed 2 months after project closing at Borrower expense. Delays in addressing these issues reduced the otherwise deserved ‘high’ administrative efficiency rating to ‘substantial’.

### 3.4 Justification of Overall Outcome Rating

Rating: Satisfactory

44. The PDO remained highly relevant and their achievement was high from the perspectives of all the parties: the central government (the 11<sup>th</sup> and 12<sup>th</sup> FYP, the Western Development plan), the Ningxia province (modern transport system to support and serve economic and social development), and the Bank (Country Partnership Strategy). The planned project was completed on time and on planned cost with prescribed quality. There were moderate shortcomings in implementation as noted. All the road works, the GQE Expressway, NH211, and the rural road projects all have as high economic rates of return as calculated at appraisal. The overall efficiency is substantial. The combination of project relevance, achievement of PDO and efficiency justify an overall outcome rating of Satisfactory.

### 3.5 Overarching Themes, Other Outcomes and Impacts

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

45. GQE serves as the east-west bound trunk line connecting cities and industrial zones in the central part of Ningxia. GQE diverted freight transport from the existing G307 to the new expressway. The cities and counties along the GQE benefited from the expressway and their GDP, particularly from the manufacturing industry, enjoy a more rapid growth than other part of the province. For example, Wuzhong and Qingtongxia, two cities located at the terminus of GQE, had GDP growth rates around 11% in 2013, while the average of Ningxia Province was 9.8%. These benefits are broadly distributed among the affected population

46. Rural roads supported by the project connect the villages at edge of deserts with market towns and counties. The improved road condition and reduced travel times make it more convenient for villagers to travel about, and to markets and services in towns. Women in the villages, especially the younger age group, have more opportunities to change employment from agriculture to full-time or part-time jobs in towns and counties. Transport costs of agriculture products and inputs to and from markets have declined enabling the villagers’

earnings increase. Delivery of services, including health care, postal service, and education can now reach or be reached from each village with lower cost. Statistics show that in a short time, in the surveyed villages, the reconstructed rural roads have reduced poverty by 33%, from 3,859 people to 2,580 people. The average annual per-capita income has increased 41%, from RMB 3,464 to RMB 4,873. The details are summarized in the beneficiary survey results, para. 48 and Annex 5.

#### **(b) Institutional Change/Strengthening**

47. Institutional strengthening had three parts: (C1) studies on road safety, transport and logistics, road maintenance; (C2) training; and (C3) procurement of maintenance equipment. With regard to C1, road safety practices have been institutionalized and a unit for road safety audit programs and accredited safety auditors has been established at NTD. Road safety has improved; the logistics study has been adopted by Ningxia to serve the industries; road maintenance practices are being gradually restructured and new equipment (C3) is employed in the new practices. However, future organization and performance-based maintenance practice development require several years to be mainstreamed. Training (C2) did have positive effects; especially the focused and well-attended training events for road safety and maintenance of local roads. Long-term impacts and effectiveness of the entire training program is too early to assess. Overall, institutional change/strengthening scored clear successes in traffic safety and logistics. Partial successes were achieved training and in road maintenance, but experience from the developed countries informs that both of them take long time and, in Ningxia, such works are in progress.

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

48. At project conclusion no unintended outcomes or impacts, positive or negative, were identified.

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

49. For the rural road improvement component, a social impact survey was conducted in 134 households in 16 affected villages along 14 rural roads, which included all 9 rural roads financed by the IBRD loan; the other 5 roads were part of Ningxia's LRIP program. The survey results show that: (i) rural road (re)construction augmented the network and improved travel conditions; travel times and costs from villages to towns and counties have been reduced around 40%; (ii) the villagers travel to towns and counties more frequently, and the number of people who travel to towns more than 20 times each month (almost daily) has increased 150%; (iii) rural roads have improved people's incomes, alleviated poverty and revitalized agriculture and rural industry; and (iv) facilitated the 'last-mile' delivery of public services including health and education to remote villages in Ningxia. Details are in Annex 5.

## **4. Assessment of Risk to Development Outcome**

Rating: Negligible to Low

50. Risk to the project's development outcome is low. The service and the acknowledged quality of GQE in terms of travel time and safety will prove to be a useful addition to Ningxia's main highway network. GQE traffic volume already exceeds the projection at appraisal. This trend will be reinforced when the connecting expressway (S27) is completed late 2015. The local roads have reached their targeted population and are providing access and better than targeted quality of service to new employment opportunities and social services. Of the three TA studies, the Logistics and Trade facilitation study has been included in the next five-year plan; the results of accident study and training have been institutionalized and the accident rates in the target corridors have declined. The road maintenance study has provided an acknowledged addition to the knowledge base and practices in Ningxia. Maintenance funding has reportedly been increased. Maintenance of the rural roads has been transferred to sub-provincial governments with increased support. Nonetheless, experience from the developed countries shows that in order to get the full benefits from restructuring maintenance operations require a multi-year effort, including securing sustainable funding for it. Finally, the training program (its domestic component in excess and international component with minor deficit) was completed as planned.

## **5. Assessment of Bank and Borrower Performance**

### **5.1 Bank Performance**

#### **(a) Bank Performance in Ensuring Quality at Entry**

Rating: Satisfactory

51. The project preparation started in May 2008, was appraised in November 2009, approved by the Board on May 2010, and launched in August 2010. The Bank's project preparation was thorough and covered all the bases. It took a long time because intensive dialogue was required to gain acceptance to the project's local road component and bring it to the state of readiness. Another time consuming set of issues was the structuring and carrying out training for implementing the Environmental Management Plan (for GQE) and Environmental Management Framework (for the rural roads), and Bank policies for resettlement, land acquisition, and other safeguards. After the appraisal mission, when the project components were fixed, the Bank team worked closely with the PMO to prepare the contracts, public consultations, and application of the safeguard policies. With approved retroactive financing, Ningxia and the implementing agencies were anxious and ready to start and procure contracts in January 2010. At project launch mission in August 2010, the retroactively financed sub-grade road works, which had commenced eight months earlier, were 20-50% complete with concurrent implementation of the EMP. Identification and compensation was nearly completed for those impacted by the safeguard policies, but additional training needs and dialogue with the safeguard teams and beneficiaries were detected. There were moderate difficulties and shortcomings in fulfilling the EMP requirements and delays in infrastructure provision for resettled households. As experience was gained during implementation all these were rectified to satisfaction. The shortcomings in preparation were moderate, which justifies a Satisfactory' rating for Performance of Quality at Entry.

**(b) Quality of Supervision**

Rating: Satisfactory

52. After the combined Project Launch-Supervision mission in August 2010, supervision gained traction quickly. Minor issues in procurement and fiduciary reporting were corrected, and remedial actions were taken in EMP implementation and resettlement process. For the EMP excellent performance was observed in the Baijitan nature preserve, and now new contractors and consultants were trained promptly. In resettlement there were local offices in three cities and several more in the affected towns. There were different kinds of interests in all jurisdictions: those to be resettled, those whose land holdings were significantly reduced, and the vulnerable persons (old or with low income). All this was sorted out effectively by the Bank team and the local offices dealing with the different aspects of resettlement and compensation. With some delays in water and sewer hook-ups to new residences, all issues were resolved to the satisfaction and with praise of the affected persons, and no complaints were filed.

53. On the engineering side, the implementation proceeded at rapid pace. There was infrequent supervision (one supervision mission in 2012, 2013 and 2014), after most of the Bank-financed parts were already completed. The Client accepted the Bank-financed investments in GQE and NH211 with no defects, but apparently after the lapse of the 2-year defect liability period cracks appeared. The expressway, the national highway and local roads were completed on cost and time, early in fact, and as discussed earlier, with better than targeted results. The institutional components were also completed early and on cost. Fiduciary aspects were supervised adequately through desk reviews and visits to NTD. Financial management and disbursement were closely monitored. The associated safeguard and fiduciary compliance tasks of all the components were completed satisfactorily.

54. Most ISRs were prepared on a six-monthly basis except when there was one annual supervision mission matching the project's implementation schedule. The ratings were Satisfactory for PDO from the beginning to the completion of the project. The implementation progress ratings was Highly Satisfactory from 2011 to 2014 when major constructions were completed; after June 2014 the rating was changed to Satisfactory on account of lesser implementation activity, except laying the final wearing course and the assessment of social impacts of LRIP; both activities experienced some delays, for the reasons discussed earlier.

55. In summary, there were moderate shortcomings in supervision of the project components. But the project was completed on time and on cost, and the final completed outcomes are satisfactory.

**(c) Justification of Rating for Overall Bank Performance**

Rating: Satisfactory

56. The Bank delivered a successful project. The planned road works were done ahead of schedule. There were issues with a learning curve, but with satisfactory outcome. The efficiency of the road links is approximately as predicted. There was two month delay in laying the final wearing course and a probable 4-month later connection with interacting road links

in the network, both outside the project and the Bank's control. All the safeguard policies were successfully implemented. The local roads are likely to reach more than the planned beneficiaries. The institutional strengthening component was completed as intended. Overall, the overall Bank performance in Ningxia Highway Project was Satisfactory.

## **5.2 Borrower Performance**

### **(a) Government Performance**

Rating: Satisfactory

57. Government performance was satisfactory. Both Central and Provincial governments ensured that their broad objectives were served within the framework of the Bank's CPS. The structure of the implementing organizations and their responsibilities, including O&M, were specified, the NHCAB for the Expressway and NH211 and the LRCD and the local governments for the local roads after project completion. Sufficient counterpart funds were made available. Though NTD retained the final responsibility, the implementing hierarchy was led by a PMO with prior experience in a Bank project.

### **(b) Implementing Agency or Agencies Performance**

Rating: Satisfactory

58. The implementing agencies, NHCAB and LRCD, performed satisfactorily under the guidance of the PMO. The project components were completed on time and cost. Both agencies complied with the Bank policies for the, environment and social safeguards, procurement, and financial management. There was a minor lapse of attention to supervision in implementation during retroactive financing—or for not asking the Bank earlier for support and training of new actors in consulting, contracting, and safeguard policy coverage. The PMO should also have informed the Bank more clearly about the phased pavement works. Institutional strengthening—studies and training and their utilization—were completed as planned and are being well employed according to the institutional processes. The final products, completed in August, are satisfactory. LRCD implemented the rural road component satisfactorily. Again, there were minor early hiccups in supervising the EMP implementation, but at the end all was well. It is to the PMO's merit that it coordinated and managed well the procurement, fiduciary, and safeguards policy implementation in a complex environment, and succeeded in involving and motivating the rural road beneficiaries to protect and maintain *their* road.

### **(c) Justification of Rating for Overall Borrower Performance**

Rating: Satisfactory

59. The project objectives were fitting. There was an appropriate management structure. Counterpart funds were provided on time. Both implementing agencies implemented the components under their responsibility satisfactorily and time and cost, necessary quality rectifications were made during the project or slightly after the closing date. The Bank's policies for the safeguards, procurement and financial management and domestic rules (provided not in conflict with Bank policies) were diligently observed.

## 6. Lessons Learned

60. *Importance of dialogue on all project components during preparation.* This project benefited from dialogue and persuasion during the long preparation period. This was useful and necessary for including and structuring the rural road component in the project design, critical to the Bank's mission and the PDO. Flexibility in the time allocated to project preparation is often beneficial.

61. *Public participation in rural roads enhanced the residents' ownership.* Prior to this project many rural roads had gravel or dirt surface and the villagers had little interest to protect and maintain *their* roads. In this project, the villagers became involved during construction; public consultations and local promotions of road maintenance also raised the rural residents' awareness of benefits of protecting *their* roads. Some villages were innovative and increased benefits from the roads by using locally available materials to good results.

62. *Application of local experiences on ecological protection is good practice.* For example, at the GQE section crossing Baijitan, extensive "grass-squares" were used to stabilize sands and slopes through fixing straw squares into sandy ground, followed by planting local grass seeds inside the squares. After several years of special maintenance, vegetation could gradually developed and persist inside these squares. This technique has been practiced in *northwestern* China steppe areas for several decades and proved effective in controlling mobile sands. It is considered a good environmental practice and can be applied in similar steppe areas elsewhere. There also were other examples of the ecological benefits from using the residents' ideas in construction and maintenance of the rural roads.

63. *Supervision of retroactive works and review of engineering design and its follow-up.* The Bank should ensure that resources are given to project supervision when the (retroactive) works implementation starts, and strengthen the review of engineering design and its follow-up. In the present project supervision of the retroactive works was insufficient. There also should be mutual understanding of paving practices as they may affect the project completion date. To round out the design review and its follow-up, the Bank should consider having presence at road acceptance—even if it is after project completion—in spite that the retention monies are counterpart funds and road acceptance outside the project closing time frame.

64. *Truck overloading.* Overloading of trucks is important to the economics of road management in China, not restricted to Ningxia. Expressway companies in China control truck loads at entrance. On public roads where no entrance controls exist, attract overweight trucks. To control truck overloading, Ningxia increased the number of weigh stations from 10 in 2009 to 70 in 2015. Of which, 34 stations are on expressway, national and provincial highways, and 36 are on rural roads. The optimization of weigh station locations, like what NTD did for the weigh station on NH211, increase the coverage of overloading control, improved the administrative efficiency and reduced the cost of operating redundant stations. Overloading is a complex issue and cannot be solved alone by the road agency. A multi-agency approach is necessary. Ningxia already has a provincial government level leading group to address the issue beyond overload monitoring. In addition to building weigh stations more strategically, Ningxia could also consider adopting overloading control measures that applied successfully

in other countries. Many developed countries have tackled the issue with multiple measures: publicizing the WIM monitoring; working with the trucking industry and with the industries having or leasing truck fleets; lapse of insurance coverage in accidents of overweight vehicles; waybill payments only up to maximum allowable weight; tire and axle regulations; design parameters of heavy truck routes; and many other means. In general, cooperation and self-policing have proved to be effective means to control overloading.

65. *Experimentation with road maintenance practices.* Procuring road maintenance from the market is more complex than procurement of one maintenance operation for a road segment. Road agency organization, maintenance standards and funding requirements by road (functional) classes, assurance of maintenance quality, contract sizes and duration, scaling up to network wide coverage, contractor skills, job security of the existing staff, and possibly other circumstance-specific issues need to be addressed. A promising start has been made in Ningxia, but experience from the developed countries shows that in order to realize the benefits of contract maintenance will take a decade of sustained work and learning by experimentation. A follow-up project covering several provinces is recommended.

66. *Project effectiveness and closing dates.* The closing date of infrastructure projects should not be in the middle of the construction season. There always are unforeseen events, complications from seemingly unrelated projects, especially in regions where cold climate restricts construction during winter season. Therefore the project closing date should be at the end of the construction season to permit dealing with unforeseen events. For example, in Ningxia, if the project closing would have been 4 months later (in October) then also laying of the final wearing course would have taken place before the closing date.

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

### **(a) Borrower/implementing agencies**

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

### **(b) Cofinanciers**

N.A.

### **(c) Other partners and stakeholders**

N.A.

## Annex 1. Project Costs and Financing

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

| Components                                | Appraisal Estimate (USD millions) | Actual/Latest Estimate (USD millions) | Non-Bank Finance (USD millions) | Bank Finance (USD millions) | Percentage of Appraisal |
|---|-----------------------------------|---------------------------------------|---------------------------------|-----------------------------|-------------------------|
| A. Guyaozi-Qingtongxia Expressway         | 446.73                            | 419.73                                | 195.55                          | 224.18                      | 93.96%                  |
| B. Road Network Improvements (RNIP)       | 70.02                             | 51.99                                 | 26.79                           | 25.20                       | 74.24%                  |
| B1. Local roads (LRIP)                    | 51.85                             | 33.22                                 |                                 |                             | 64.06%                  |
| B2. Rehabilitation of National Road NH211 | 18.17                             | 18.77                                 |                                 |                             | 103.30%                 |
| C. Technical Assistance                   | 4.95                              | 4.13                                  | 4.13                            | -                           | 83.48%                  |
| C1. Studies                               | 0.40                              | 0.40                                  | 0.40                            | -                           |                         |
| C2. Training                              | 0.73                              | 0.80                                  | 0.80                            | -                           |                         |
| C3. Maintenance Equipment                 | 3.82                              | 2.93                                  | 2.93                            | -                           |                         |
| <b>Total Baseline Cost</b>                | 521.70                            | 475.84                                | 226.47                          | 249.38                      | 91.21%                  |
| Physical and Price Contingencies          | 25.60                             | -                                     | -                               | -                           |                         |
| <b>Total Project Costs</b>                | 547.30                            | 475.84                                | 226.47                          | 249.38                      | 86.94%                  |
| Interest During Construction              | 25.76                             | 20.10                                 | 20.10                           | -                           | 78.03%                  |
| Front-end fee IBRD                        | 0.63                              | 0.63                                  | -                               | 0.63                        | 100.00%                 |
| <b>Total Financing Required</b>           | 573.68                            | 496.57                                | 246.57                          | 250.00                      | 86.56%                  |
|   |                                   |                                       |                                 |                             |                         |

Note: Exchange rate of US\$ 1 = RMB 6.818 was used in project appraisal document, and the same exchanged rate was used here for the latest estimation of project cost.

### (b) Financing

| Source of Funds                                       | Type of Cofinancing | Appraisal Estimate (USD millions) | Actual/Latest Estimate (USD millions) | Percentage of Appraisal |
|---|---------------------|-----------------------------------|---------------------------------------|-------------------------|
| Borrower  |                     | 323.68                            | 246.57                                | 76.2%                   |
| International Bank for Reconstruction and Development |                     | 250.00                            | 250.00                                | 100%                    |



## Annex 2. Outputs by Component

|  | Appraisal Plan  | Actual Accomplishments at ICR and Any Variances   |
|--|---|---|
| <b>Component A : Guyaozi-Qingtongxia Expressway</b>  |   |   |
|  | GQE is 75.68 km long and its construction on a new alignment included earthworks, acquisition and installation of electrical and mechanical equipment for traffic surveillance, communication and toll collection, and design and installation of traffic safety facilities. It also included non-Bank financed land acquisition and resettlement, environmental monitoring, greening works, project supervision and building and annex areas for a total of US\$67.83 million. | GQE was built as designed Land Acquisition of GQE affected 261 households (49 households fewer than expected).<br>The first segment of GQE Expressway was opened to traffic in November 2011 and the second segment a year later, both with only one base layer of asphalt surface completed, and the final surface asphalt layer was completed in August 2015. The cost of GQE, as of September 2015, is 93.96% of estimated at appraisal in local currency terms. |
| <b>Component B: Road network Improvements (RNIP)</b> |   |   |
| NH211  | Rehabilitation of three sections of National Highway NH211 (estimated at US\$17.05, all financed by the Bank). The second section included construction of a new roadway along the existing alignment; the other two sections were rehabilitations. Engineering measures to improve traffic safety conditions were included in the road works.  | Constructions of all three sections (totaling 82.57 km) were completed by end of 2012. The actual cost of NH211 is 103.30% of estimated at appraisal in local currency terms.   |
| Local Roads Improvement Project (LRIP)               | LRIP (estimated at US\$51.85 million of which US\$8.15 million financed by the Bank) would improve 38 (523.8 km) rural county, township and village roads of which the Bank would finance 9 (99.3 km) in the poorest counties of Ningxia serving 240,000 villagers.   | The construction of the 9 roads financed by the Bank was carried out in 2010 and 2011. All of the 38 rural roads (totaling 506.53 km) were completed and opened to traffic by end of 2012, serving more than 240,000 villagers. The cost of the rural roads is 64.06% of estimated at appraisal, while the mileage completed is 97% of what proposed at appraisal, mainly due to the actual unit cost of RMB 0.45   |

|  |  |   |
|--|--|---|
|  |  | million/km was much lower than the estimated RMB 0.56 million/km at appraisal.  |
| <b>Component C: Technical Assistance</b> |  |   |
| Study                                    | This component is all financed by the Borrower (US\$0.4 million), supports three studies: (1) studies and training on road safety; (2) a plan for the transport logistics industry; and (3) a long term strategy for road maintenance in Ningxia.  | (1) Completion of Ningxia Road Safety Guidelines and Safety Audit Manuals. Established traffic safety improvement action plan, which was applied in selected corridors with good results. (2) Completed logistics and trade study; the output of the study was incorporated in the Guidelines of the 12 <sup>th</sup> Five-Year Plan of Ningxia. (3) Completion of Road Maintenance Assessment and long-term road maintenance strategy. |
| Trainings                                | This component supports domestic and overseas training (US\$0.73 million, all financed by the Borrower) that would cover a range of topics related to the transport sector in Ningxia, including inter alia: network planning, engineering design, project management and post-evaluation, road asset management, road maintenance, and logistics. | During 2010-2015, domestic training on the identified topics was delivered to 1060 people, with the satisfaction rate of above 95%. 135 people participated in overseas trainings with the satisfaction rate of 100%. The training program was completed as planned, at 109.6% of estimated costs in local currency terms, with its domestic component in excess and international component with minor deficit.                        |
| Maintenance Equipment                    | This is counterpart financed activity (US\$ 3.82 million) to support the road maintenance work along the project roads.  | 42 maintenance equipment (costing RMB 20 million) was procured by early 2015 and put into service along selected corridors. The actual cost is about 82.5% in local currency terms.   |

### Annex 3. Economic and Financial Analysis

1. An ex-post evaluation of the project was conducted in the Borrower's Implementation Completion Report. A traffic analysis was fulfilled by using the actual traffic counts and by comparing them with appraisal stage estimates. The traffic forecast for future years was revised accordingly. The ex-ante economic evaluation and the ex-post economic evaluation both covered the three main project components below. The financial evaluation only covers the GQE activity below.

- a. Construction of 75.68 km expressway between Guyaozi and Qingtongxia (GQE)
- b. Improvement of 65.0 km of National Highway 211 between Lingwu and Jiajiajuan
- c. Upgrading of 38 rural roads, totaling 523.8 km, to paved Class IV standard

#### *Traffic Analysis and Forecast*

2. *GQE Traffic Volume.* Since the commencement of service (partially) in late 2012, the traffic volume of GQE has increased in 2013 and 2014. Though the traffic volume of the first year of operation (2013) was much lower than expected in feasibility study stage, in 2015 traffic volume increased substantially and kept up with the estimates at appraisal. With the first two years traffic volume number, the future traffic forecast was revised and the number for key years are listed in Table A3-1. The optimistic forecast relies on: (1) GQE was open to traffic before all construction works were completed, and the final asphalt-concrete surface layer was carried out in 2015 with half of the carriageways closed at a time; however the traffic volume in 2014 had already increased substantially and exceed the previous estimations; and (2) the road network connecting western terminal point of GQE will be completed within the year and hence the traffic generation and attraction will be achieved.

Table A3-1 Estimated and Actual GQE Traffic Volume

| GQE<br>Traffic Volume | 2013   |        | 2014   |        | 2025   |          | 2032   |          |
|-----------------------|--------|--------|--------|--------|--------|----------|--------|----------|
|                       | FSR    | Actual | FSR    | Actual | FSR    | Forecast | FSR    | Forecast |
| AADT                  | 7,657  | 5,068  | 8,209  | 7,753  | 14,895 | 17,750   | 18,855 | 22,222   |
| PCU/day               | 13,170 | 9,160  | 14,386 | 14,487 | 28,478 | 33,082   | 37,238 | 42,191   |

Source: Ningxia Transport Department

3. *NH211 Traffic Volume.* The travel speed along NH211 after the national highway improvement has increased from 20-30 km/h to 50-60 km/h and the travel times were reduced by more than 50%. The traffic volume of the improved sections of NH211 is in Table A3-3. The actual traffic volume in 2013 and 2014 exceeded the traffic estimates at appraisal. The forecasts for 2020, 2015, and 2032, with adjusted growth rate based on actual volume are lower than at appraisal, but conservative considering the capacity of Class II roads.

Table A3-3 Traffic Volume of NH211 Improved Sections

|      | AADT (FSR) | AADT (Actual and Forecast) | PCU(Actual and Forecast) |
|------|------------|----------------------------|--------------------------|
| 2010 | --         | 2513                       | 3608                     |
| 2012 | --         | 3308                       | 5683                     |
| 2013 | 2314       | 3620                       | 5886                     |
| 2014 | --         | 3280                       | 4889                     |
| 2020 | --         | 4171                       | 5980                     |
| 2023 | 4649       | --                         | --                       |
| 2025 | --         | 4971                       | 6891                     |
| 2032 | 7090       | 6094                       | 8044                     |

4. Rural Roads component funded the upgrading of 38 rural roads totaling 523.8 km to paved Class IV standard. The economic evaluation was based on the average road characteristics, unit costs of road works and traffic of the Bank financed 9 roads, extrapolating to the entire component. The traffic volume data were recorded in this project's result framework, which was summarized in Table A3-4 below.

Table A3-4 Traffic Volume and Travel Time for 9 Rural Roads

|                          | Traffic Volume (PCU) |      |      | Length (km) | Cost (RMB million) | Beneficiaries |
|--------------------------|----------------------|------|------|-------------|--------------------|---------------|
|                          | 2012                 | 2013 | 2014 |             |                    |               |
| Shabaotou-Nongchang      | 378                  | 440  | 511  | 6.0         | 6.2                | 2,000         |
| Majiatanzhen-Dayangqicun | 303                  | 357  | 437  | 11.3        | 6.6                | 5,000         |
| Wanglejing – Niumaojing  | 693                  | 840  | 921  | 12.0        | 7.16               | 8,000         |
| Daodunzi-Huangcaoling    | 315                  | 368  | 423  | 20.0        | 11.6               | 15,000        |
| Nanliang-Liuzhuangzi     | 563                  | 675  | 768  | 11.0        | 5.66               | 10,000        |
| Liuyangbao-Lijiagou      | 333                  | 390  | 457  | 10.0        | 5.11               | 5,000         |
| Hongxing – Yangliu       | 365                  | 429  | 497  | 16.0        | 9.27               | 3,000         |
| S101-Yujialiang          | 594                  | 690  | 798  | 6.0         | 3.34               | 4,000         |
| Gaoxing-Xinsheng         | 525                  | 566  | 632  | 7.0         | 3.61               | 1,000         |
| Total                    |                      |      |      | 99.3        | 55.6               | 53,000        |

#### *Ex-post Economic Evaluation*

##### *(1) Project Costs and Benefits*

5. The actual project construction cost was adjusted to economic costs and used in the ex-post evaluation. In terms of RMB, the actual project cost of GQE was lower than what was estimated at appraisal, at about 93.96% using the local currency. The actual project cost of NH211 has increased, and is about 103.30% of the estimated cost at appraisal. The actual cost of rural roads (38 km totaling 506.5 km) was only 64.06% of the estimates at appraisal, mainly due to the actual unit cost of RMB 0.45 million/km was much lower than the estimated RMB

0.56 million/km at appraisal. The maintenance cost provided by Ningxia Transport Department is RMB 115,000/km for the expressway (compared to RMB 60,000/km estimated at appraisal), and RMB 70,000/km for the national highway NH211 (compared to RMB 40,000/km estimated at appraisal). For future forecast, the same assumptions as appraisal were made: 3% annual growth rate of maintenance costs, major maintenance to be carried out every 9 years (11 years assumed at appraisal).

6. The ex-post economic evaluation includes same kinds of benefits as at appraisal: (a) VOC savings due to improved ride quality, passenger time savings through lesser congestion, lower accident costs and distance savings on the expressway/highway/rural roads; (b) congestion relief and improvement of traffic flows on the existing roads due to the diversion of traffic to the new expressway. Since 2009, Ningxia has experienced greater economic growth than expected at appraisal. The value of passenger time was adjusted at RMB 36 per passenger-hour with 2013 GDP, much higher than the RMB 20.5 per passenger-hour for 2013 used at appraisal.

## (2) Results

7. The EIRR for overall project is 17.37%, higher than the 12.90% estimate at appraisal. The ENPV is RMB 3,413.35 million. The adjusted total cost and benefits streams, Economic Internal Rate of Return (EIRR) and Economic Net Present Value (ENPV) for each component was re-calculated and summarized in Table A3-5 below.

Table A3-5 Ex-ante and Ex-post Economic Evaluation for Each Component of the Project

|                 | EIRR (%)     |        | ENPV (8%, RMB million) |          |
|-----------------|--------------|--------|------------------------|----------|
|                 | At Appraisal | ICR    | At Appraisal           | ICR      |
| GQE             | 12.0%        | 15.88% | 1,460.0                | 2,385.50 |
| NH211           | 25.9%        | 24.31% | 282.7                  | 231.04   |
| Rural Roads     | 18.00%       | 38.37% | 319.1                  | 796.81   |
| Overall Project | 12.90%       | 17.37% | 2,061.8                | 3,413.35 |

8. *Explanations.* (1) EIRR and ENPV of GQE and Rural Roads were recalculated with actual cost (lower than estimated, especially for the rural roads) and traffic volume (higher than estimated). Both EIRR and ENPV are higher than the ex-ante evaluation results at appraisal. (2) EIRR and ENPV of NH211 is slightly lower than estimated at appraisal because of higher actual cost (both construction and maintenance), and lower traffic volume forecast in future years.

## *Ex-post Financial Evaluation for GQE*

9. The ex-post financial analysis focuses on the GQE. The financial of capital for the project is 4.24 percent at project completion (compared to 3.17 percent assumed at appraisal). The counterpart funding composition has changed during project implementation: the share of self-raised funding reduced and reliance on local bank increased from 14.4% to 30.0%. The operating cost of the expressway provided by Ningxia Transport Department is RMB 115,000/km for the expressway (compare to RMB 60,000/km at appraisal). For future forecast, the same assumptions as appraisal were made: 3% annual growth rate of maintenance costs,

major maintenance to be carried out every 9 years (11 years assumed at appraisal), and the cost is about 14 times of the routine maintenance costs. Overheads mostly comprise administrative fees, are about RMB 100,000/km each year, with a 3% growth rate. Other expenses, including interest payments on the loans, are also updated to reflect the actual numbers.

10. The revenue of GQE comes from tolls. Currently the toll rate of GQE is set by the *Ningxia Toll Fee Charging Standard [2005]*<sup>130</sup> shown in Table A3-6. According to Ningxia Transport Department, a conservative assumption was made that the toll rate would not change in the first 5 years and with a growth rate of 15% every five years until 2032. The actual toll revenue in 2013 and 2014 and the adjusted forecast numbers are summarized in Table A3-7. The rate is lower than the assumed toll charges at appraisal, which expected the toll rate between 2013-2015 is between 0.40 and 1.10 for different car types, and assumed a 15% increase 2016-2020 period – both of which would not likely to be achieved in the upcoming years.

Table A3-6 Expressway Toll Rate Standard in Ningxia

|   | Standard                    |                            | Rate (RMB/vehicle-km) |
|---|-----------------------------|----------------------------|-----------------------|
|   | Trucks (Ton)                | Passenger Vehicles (Seats) |                       |
| 1 | <2t                         | <7                         | 0.30                  |
| 2 | 2.30                        | 8.30                       | 0.50                  |
| 3 | 5.50t                       | 2050t                      | 0.70                  |
| 4 | 1070tn<br>20 feet container | >40                        | 0.85                  |
| 5 | >15t<br>40 feet container   | —                          | 1.00                  |

Table A3-7 GQE Expressway Toll Revenue Forecast

| Year | Toll Revenue (RMB 10,000) |
|------|---------------------------|
| 2013 | 5777                      |
| 2014 | 11751                     |
| 2015 | 14218                     |
| 2016 | 16250                     |
| 2017 | 17841                     |
| 2018 | 19158                     |
| 2019 | 23596                     |
| 2020 | 25068                     |
| 2021 | 26175                     |
| 2022 | 27330                     |
| 2023 | 28536                     |
| 2024 | 34540                     |
| 2025 | 36063                     |
| 2026 | 37385                     |
| 2027 | 38754                     |
| 2028 | 40173                     |

| <b>Year</b> | <b>Toll Revenue (RMB 10,000)</b> |
|-------------|----------------------------------|
| 2029        | 48276                            |
| 2030        | 50043                            |
| 2031        | 51874                            |
| 2032        | 53318                            |

11. The Financial Internal Rate of Return (FIRR) and the Financial Net Present Value (FNPV) calculated through this ex-post evaluation exercise are summarized in the table below.

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

|     | FIRR (%)     |       | FNPV (RMB million) |        |
|-----|--------------|-------|--------------------|--------|
|     | At Appraisal | ICR   | At Appraisal       | ICR    |
| GQE | 5.34%        | 6.35% | 1,196.0            | 573.02 |

12. A sensitivity analysis on variation in toll charges is carried out to test how the FIRR and EIRR would change if the toll revenue changes (also taking into account traffic volume changes cause by toll rate changes). The sensitivity analyses show that increasing tolls 50% of the proposed toll increases the FIRR to 7.22%, but reduces the EIRR to 12.53%. With that substantial change the project would still be economically justified. Reducing tolls by 50% of the proposed tolls increases the EIRR to 16.77%, but turns the project to be financially unjustified with a FIRR of 2.59%.

Table A3-9 Sensitivity Test for different Toll Rate Scenarios

| Toll Level Scenarios | Toll Multiplier | Traffic Multiplier | FIRR(%) | EIRR(%) |
|----------------------|-----------------|--------------------|---------|---------|
| -50%                 | 0.50            | 1.08               | 2.59%   | 16.77%  |
| -25%                 | 0.75            | 1.05               | 4.74%   | 16.42%  |
| 0%                   | 1.00            | 1.00               | 6.35%   | 15.88%  |
| 25%                  | 1.25            | 0.88               | 7.05%   | 14.31%  |
| 50%                  | 1.50            | 0.75               | 7.22%   | 12.53%  |

#### Annex 4. Bank Lending and Implementation Support/Supervision Processes

##### (a) Task Team members

| Names                  | Title                           | Unit      | Responsibility<br>/ Specialty |
|------------------------|---------------------------------|-----------|-------------------------------|
| <b>Lending</b>         |                                 |           |                               |
| Simon David Ellis      | Lead Transport Specialist       | GTIDR     |                               |
| Andres Liebenthal      | Consultant                      | IEGCC     |                               |
| Zhefu Liu              | Senior Social Development Spec  | GSURR     |                               |
| Jacques M. Tollie      | Consultant                      | EAPDE     |                               |
| Juan Quintero          | Environment Specialist          | GENDR     |                               |
| Peishen Wang           | Consultant                      | GENDR     |                               |
| Han-Kang Yen           | Research Analyst                | EASTE-HIS |                               |
| <b>Supervision/ICR</b> |                                 |           |                               |
| Jean-Marie Braun       | Consultant                      | GTIDR     |                               |
| Fei Deng               | Senior Operations Officer/TTL   | OPSPQ     |                               |
| Imogene B. Jensen      | Consultant                      | GTIDR     |                               |
| Xiaofeng Li            | Operations Analyst              | GSUGP     |                               |
| Siele Silue            | Senior Transport Specialist     | GTIDR     |                               |
| Emily Tritsch          | Consultant                      | GSU08     |                               |
| Peishen Wang           | Consultant                      | GENDR     |                               |
| Xiaoke Zhai            | Senior Transport Specialist/TTL | GTIDR     |                               |
| Ning Yang              | Senior Environmental Engineer   | GENDR     |                               |
| Youxuan Zhu            | Consultant                      | GSURR     |                               |
| Antti P. Talvitie      | Consultant                      | GTIDR     |                               |
| Shuai Ren              | E T Consultant                  | 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) |
| <b>Lending</b>         |  |   |
| FY07                   | 10.25                                  | 52.02   |
| FY08                   | 32.27                                  | 137.11  |
| FY09                   | 31.19                                  | 97.31   |
| FY10                   | 40.11                                  | 178.03  |
| FY11                   | 0.00                                   | 1.29  |
| <b>Total:</b>          | 133.82                                 | 465.76  |
| <b>Supervision/ICR</b> |  |   |
| FY11                   | 9.76                                   | 85.30   |
| FY12                   | 12.92                                  | 79.44   |



|               |       |        |
|---------------|-------|--------|
| FY13          | 3.13  | 7.04   |
| FY14          | 3.58  | 34.98  |
| FY15          | 3.98  | 30.29  |
| <b>Total:</b> | 33.37 | 237.05 |

## Annex 5. Beneficiary Survey Results

1. For the rural road improvement component, a social impact survey was conducted in 134 households in 16 affected villages along 14 rural roads out of the 38 roads supported by this project, including all 9 rural roads financed by IBRD loan. The impacts are summarized below:
2. Rural road construction can complete the local rural road network, improve travel condition and stimulate travel demand.
  - a. Trips to towns and townships increased and connections between towns and villages were improved. Before rural road construction, about 41% of people went to towns and townships less than three times each month, and 1/3 of them made one trip or less per month. After rural roads were built, this percentage reduced to 23%. Number of people who traveled to towns more than 20 times each month (almost daily) has increased 150%.
  - b. Travel time to towns and counties has been reduced substantially. Before rural road construction, average travel time to towns was 45 minutes and average travel time to counties (county towns) was 75 minutes. After road conditions improved, the average travel time went down to 26 minutes and 46 minutes, respectively, or a reduction of 42% and 38% respectively.
3. Rural road construction can improve people's incomes, alleviate poverty and stimulate agriculture and rural industry development.
  - a. Survey statistics showed that all 7 villages benefited from the construction of their access roads. As shown in Table A5-1, the number of people in poverty in these villages declined 33% from 3859 people to 2580 people. The average annual per-capita income increased 41% from RMB 3464 to RMB 4873.
  - b. The price of agriculture products increased because of better rural roads. Before, when the road conditions were poor, traders visited the villages to buy lamb at 20% discount of market value and transport it to big cities to sell. With the completion of rural roads, transport costs were reduced and the market price of purchases in the villages increased to the same level as in big cities. Perishable agriculture products could also be transported fresh to markets in cities timely. The cost of transporting fertilizers and other agriculture inputs also declined.
4. Rural roads enhanced provision of public services in villages. Rural roads facilitated the last-mile delivery of public services including health and education to remote villages in Ningxia. Many of the villages are located at edge of deserts and are more than one hour drive from the nearest town. Rural roads made it possible for doctors to come to the villages, provide rural bus service in key locations, and, in some cases, get bank and postal services without having to travel to the nearest town for them.

**Table A5-1 Rural Roads Impacts on Villages Surveyed**

| Village   | Poverty Population |       | Per-capita Income (RMB) |       |
|-----------|--------------------|-------|-------------------------|-------|
|           | Before             | After | Before                  | After |
| Zengjipan | 890                | 481   | 2400                    | 4800  |

| Village      | Poverty Population |       | Per-capita Income (RMB) |       |
|--------------|--------------------|-------|-------------------------|-------|
|              | Before             | After | Before                  | After |
| Niujijuan    | 570                | 600   | 2400                    | 4050  |
| Mengchengcun | 1200               | 570   | 4600                    | 4910  |
| Siguquan     | 127                | 101   | 3793                    | 4884  |
| Lizhuangzi   | 404                | 301   | 4028                    | 5366  |
| Lijigou      | 384                | 287   | 3350                    | 5300  |
| Yangliupu    | 284                | 240   | 3680                    | 4800  |
| Average      | 551                | 369   | 3464                    | 4873  |
| Total        | 3859               | 2580  | 24251                   | 34110 |
| Percentage   | -33%               |       | 41%                     |       |

## **Annex 6. Stakeholder Workshop Report and Results**

N.A.

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

1. The borrower's ICR was prepared by the Ningxia Transport Department in September 2015 with the latest information available. For highway projects, the domestic experience is to complete final financial completion report after two years of project activity completion. Therefore the relevant information in this ICR version, while also referred by the Bank's ICR, only records the latest information available.
2. Much of the domestic ICR focuses on engineering side, including engineering technologies, construction quality, and construction management. Several sections provide some useful observations from borrower's side, as summarized below.
3. *Phased construction of pavement.* In Ningxia, phased construction of pavement is a usual practice for highways. Highway construction in northwestern provinces in China often faces low traffic volume issue in the first few years after opening to traffic, mostly due to the road network is less dense and under-developed. The innovative solution Ningxia applying is to open highways to traffic after basic pavement (first-layer) completed, and to construct the final wearing course after two to three years depending on the traffic volume increase and road condition. Phased pavement construction has following benefits: (1) reducing capital demand and financial cost during construction, thus limited project funds can be concentrated on the major construction works; (2) reducing maintenance cost since the pavement can be completed in the first 4-6 years, pavement maintenance cost during these years would be reduced; and (3) highways can open to traffic in an early time and the life of pavement would be longer, though traffic volume would be slightly affected by the construction of final wearing course.
4. *Environment Protection.* In an under-developed region, the practice of "damage first, restore later" is very common. The construction of GQE had strong emphasis on environment protection and followed the principle of "Maximizing Protection and Minimizing Damage" during construction, through: (1) strictly apply the construction "red line" and avoid damage to the environment outside the right-of-way; (2) protecting the trees within redline by transplanting; (3) adapting designs and landscapes with the natural environment; and (4) timely restoring the environment of sites for borrowing pit and waste banks.
5. *Resettlement.* Efficient coordination between agencies, timely information dissemination and public consultation, and adequate funding supports are the keys for smooth resettlement. The World Bank team has emphasized the importance of land acquisition and resettlement for the project and assigned experts guiding Provincial PMO and all related agencies. The Bank team, and leaders from Ningxia Transport Department, Ningxia Highway Construction and Administration Bureau, and counties/districts provided supervision and visited project sites and resettlement site regularly. The land acquisition and resettlement funding are 100% provided by counterpart funding. Ningxia has mobilized various resources to support the resettlement work, including NHCAB's contribution to county-level governments for coordination (RMB 1 million) and local Civil Administration's subsidies to low income households affected (RMB 18,000/households in Qingtongxia).
6. *Frequent supervisions and site visits had helped ensure the site management and construction safety management and enhanced contractor's capacity.* During implementation,

the World Bank team and NTD team had conducted frequent site visits and pointed out issues observed on sites. For instance, it was observed during supervision the safety management was not strict (workers not wearing helmets, deep excavation pits were not fenced, .etc) in one time, and the raw material storage was not well enforced in another time of visit. Once such issue was observed, contractors were requested to make timely corrections, educations and trainings were also provided on time. The frequent supervisions also enhanced the capacity and awareness of better site/safety management for contractors, and led to the overall improvement in Ningxia's other projects.

7. *Road Safety Awareness Raising.* The World Bank and NTD co-organized workshops on Road Safety Audit training and introduced international best practices of road safety engineering and auditing, which improved capacity of officials and technical staff in transport sector, and effectively embedded the work of road safety audit into the daily operations.

8. *Public participation in rural roads enhanced rural resident's ownership of local roads.* Prior to this project, many rural roads were still in gravel and dirt pavement conditions, and as such there's no awareness from villagers to protect and maintain the roads. For the roads under this project, many villagers got involved during construction; public consultations and local promotions of road maintenance also raised the rural residents' awareness of better protection of their own roads, which effectively reduced the cases of garbage dumping into drainage facilities and occupying road space for drying agricultural products. Some villages applied innovative approach to increase local participation for road construction. For example, the Majiatan – Dayangqicun road, was designed to use brick pavement. The bricks were mostly produced locally, which created employment opportunities and utilized local materials.

## **Annex 8. Comments of Cofinanciers and Other Partners/Stakeholders**

N.A.

## **Annex 9. List of Supporting Documents**

1. Project Appraisal Document, April 2010
2. The Project Implementation Status & Results Reports (ISR)
3. ICR of the Tri-provincial Highway Project (Loan 4356-CHA)
4. Project Performance Assessment Report CHINA Tri-Provincial Highway Project (Loan 4356-CHA) and Hubei-Xiaogan-Xiangfan Highway Project (loan 4677-CHA)
5. Research Report on *Framework and action-plan to improve the efficiency of transport services in Ningxia*.
6. Research Report on *Road Maintenance Assessment and long-term Road Maintenance Strategy* (Compressed in English)
7. China - Country Partnership Strategy for the period FY13-FY16
8. Borrower's Implementation Completion Report (ICR) in Chinese, draft version, October 2015.
9. *Social Impact Assessment Survey*, draft version, September 2015
10. Other project reports: Loan Agreement, Project Agreement, Aide-memoires, Training reports, Progress Reports, etc.



**MAP**

