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Report No: PAD125267-CN

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROGRAM APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF
US\$200 MILLION

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR A

ANHUI RURAL ROAD RESILIENCE PROGRAM FOR RESULTS

September 6, 2018

Transport Global Practice
East Asia and Pacific Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective February 4, 2018)

Currency Unit	=	Renminbi (RMB)
RMB1.00	=	US\$0.15
US\$1.00	=	RMB6.58

FISCAL YEAR

January 1 – December 31

ABBREVIATIONS AND ACRONYMS

APDOT	Anhui Provincial Department of Transport	IBRD	International Bank for Reconstruction and Development
AHMSC	Anhui Highway Management and Service Center	IVA	Independent Verification Agent
APFYCTP	Anhui Province 13th Five-Year Comprehensive Transport Plan	MOT	Ministry of Transport
APP	Anhui Province Program	MTB	Municipality Transport Bureau
BIP	Bridge Improvement Program	NVRP	Natural Village Road Program
		OPRC	Operational Procurement Review Committee
CPS	Country Partnership Strategy	PAP	Program Action Plan
CTB	County Transport Bureau		
DLI	Disbursement-linked Indicator	PDO	Program Development Objective/s
EIRR	Economic Internal Rate of Return	PforR	Program for Results
ESSA	Environmental and Social System Assessment	PMO	Program Management Office
FSA	Fiduciary System Assessment	PQI	Pavement Quality Index
FIPO	Foreign Investment Promotion Office	RED	Road Economic Decision model
GBV	Gender-Based Violence	RMP	Road Management Program
GDP	Gross Domestic Product	SORT	Systematic Operations Risk-Rating Tool
GIS	Geographic Information System	SRP	Safe Road Program
GRS	Grievance Redress Service	STP	Smooth Traffic Program
		TOR	Terms of Reference

Regional Vice President:	Victoria Kwakwa
Country Director:	Bert Hofman
Senior Global Practice Director:	Jose Luis Irigoyen
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Task Team Leader(s):	Jacques Buré

CHINA

Anhui Rural Road Resilience Program for Results

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PAD DATA SHEET

China

Anhui Rural Road Resilience Program for Results

PROGRAM APPRAISAL DOCUMENT

East Asia and Pacific Region

Basic Information

Date:	09-04-2018	Sectors:	Rural and Inter-Urban Roads and Highways (80%), Sub-national government administration (20%)
Country Director:	Bert Hofman	Themes:	Other rural development (100%)
Senior Global Practice Director:	Jose Luis Irigoyen		
Practice Manager	Binyam Reja		
Program ID:	P158733		
Team Leader(s):	Jacques Buré		

Program Implementation Period: Start Date: February 21, 2018 End Date: December 31, 2022

Expected Financing Effectiveness Date: December 1, 2018

Expected Financing Closing Date: June 30, 2023

Program Financing Data

<input checked="" type="checkbox"/>	Loan	<input type="checkbox"/>	Grant	<input type="checkbox"/>	Other
<input type="checkbox"/>	Credit				

For Loans/Credits/Others (US\$M):

Total Program Cost: 545.20 Total Bank Financing: 200.00

Total Cofinancing: 345.20 Financing Gap:

Financing Source	Amount
BORROWER/RECIPIENT	345.20
IBRD/IDA	200.00
Total	545.20

Borrower: People's Republic of China

Responsible Agency: Anhui Provincial Transport Department

Contact: Mr. Jie Luo Title: Director
Telephone No.: 8613805696789 Email: apcdpeo@vip.163.com

Responsible Agency:

Contact: Title:
Telephone No.: Email:

Expected Disbursements (in USD Million)

Fiscal Year	2019	2020	2021	2022	2023				
Annual	50	70	40	20	20				
Cumulative	50	120	160	180	200				

Program Development Objective(s)

The Program Development Objective (PDO) is to improve the rural road network connectivity, safety, quality, and its management in the Participating Counties of Anhui Province.

Compliance

Policy

Does the program depart from the CAS in content or in other significant respects?	Yes [<input type="checkbox"/>]	No [<input checked="" type="checkbox"/>]
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Does the program require any waivers of Bank policies applicable to Program-for-Results operations?	Yes [<input type="checkbox"/>]	No [<input checked="" type="checkbox"/>]
---	----------------------------------	--

Have these been approved by Bank management?	Yes [<input type="checkbox"/>]	No [<input checked="" type="checkbox"/>]
--	----------------------------------	--

Is approval for any policy waiver sought from the Board?	Yes [<input type="checkbox"/>]	No [<input checked="" type="checkbox"/>]
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Overall Risk Rating: Moderate

Legal Covenants

Name	Recurrent	Due Date	Frequency
Program Action Plan	√		

Description of Covenant

Loan Agreement, Schedule 2, Section I, 3. The Borrower shall take, and shall cause the Program Implementing Entity to take, all measures necessary to comply with, or all measures necessary to enable the Program Implementing Entity to comply with, the provisions of Section I.B.2 of the Schedule to the Program Agreement.

Name	Recurrent	Due Date	Frequency
Program Institutions	√		

Description of Covenant

PA. Schedule. Section I.B.1. The Program Implementing Entity shall maintain, and cause to be maintained, the Program Management Office (PMO) and the Anhui Highway Management and Service Center (AHMSC), with composition, powers, functions, staffing, facilities and other resources acceptable to the Bank. The PMO and AHMSC shall remain responsible for the overall coordination, carrying out, management and supervision of the Program.

Name	Recurrent	Due Date	Frequency

Annual Work Plans, Targets and Fund Utilization Plans	√		Annual
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Description of Covenant

Program Agreement, Schedule, Section I. B. 3. Annual Work Plans, Targets and Fund Utilization Plans

The Program Implementing Entity shall cause the Participating Counties to:

(a) carry out activities under the Program during each fiscal year in accordance with Annual Work Plans, Targets and Fund Utilization Plans; each of these plans shall, at a minimum: (i) include a summary of the Program activities to be undertaken throughout the relevant calendar year; (ii) describe the projected targets for the year, including the overall annual fund utilization plans and expenditure plans for the Program; and (iii) be endorsed by the PMO and AHMSC;

(b) prepare and furnish to the Bank by December 31 in each year, beginning in 2018, the Annual Work Plan, Targets and Fund Utilization Plans, summarizing the Program activities to be undertaken and projected targets for the following calendar year, including the proposed overall annual fund utilization plans for the Program; and

(c) thereafter, ensure the implementation of the Program during the following calendar year in accordance with the Annual Work Plan, Targets and Fund Utilization Plans, in a manner acceptable to the Bank.

Name	Recurrent	Due Date	Frequency
Consolidated Mid-term Review Report		December 1, 2020	

Description of Covenant

Program Agreement, Schedule, Section III. 2. Without limitation to the provisions of paragraph A.1 above, the Project Implementing Entity, through the PMO, shall prepare, under terms of reference acceptable to the Bank, and furnish to the Bank not later than December 1, 2020 a consolidated mid-term review report for the Program, summarizing the results of the monitoring and evaluation activities carried out from the inception of the Program, and setting out the measures recommended to ensure the efficient completion of the Program and to further the objectives thereof.

Team Composition

Bank Staff

Name	Role	Title	Specialization	Unit
Jacques Buré	TTL	Lead Transport Specialist	Transport	GTR10

Xiaoke Zhai	Co-TTL	Senior Transport Specialist	Rural Transport	GTR10
Aliya Karakulova	Team Member	Senior Operations Officer	Technical	GTR10
Anita Shrestha	Team Member	Transport Analyst	Expenditure Framework Review	GTR10
Dong Yi	Team Member	Senior Financial Management Specialist	Financial Management	GGOEA
Jianjun Guo	Team Member	Senior Procurement Specialist	Procurement	GGOPP
Feng Ji	Team Member	Senior Environmental Specialist	Environmental	GEN2A
Aimin Hao	Team Member	Social Development Specialist	Social	GSU02
Alejandro Alcala Gerez	Team Member	Senior Counsel	Legal	LEGES
Zhuo Yu	Team Member	Finance Officer	Disbursement	WFACS
Rodrigo Archondo-Callao	Team Member	Senior Highway Engineer	Economic Analysis	GTR03
Geoffrey John Kurgan	Team Member	Road Safety Specialist	Road Safety	GTR10
Xuan Peng	Team Member	Program Assistant		GTR10
Shanshan Ye	Team Member	Program Assistant		EACCF
Non-Bank Staff				
Name		Title	City	
Peishen Wang		Environmental Safeguards Consultant	Calgary	
Youxuan Zhu		Social Safeguard Consultant	Washington DC	
Yuan Shao		Transport Consultant	Beijing	

I. STRATEGIC CONTEXT

A. Country Context

1. **In the past 40 years China has achieved remarkable development result.** GDP growth has averaged almost 10 percent a year and has lifted more than 850¹ million people out of poverty. Per capita gross income (Atlas method) reached US\$8,260 in 2017, making China an upper middle-income country. With its population of 1.4 billion, China's economy has global importance—it is the world's second largest economy (the largest in terms of comparable prices) and the largest single contributor to global growth since 2008. Yet China remains a developing country with economic and institutional challenges. Its per capita income is less than one quarter of the average of OECD countries. China is home to the fourth largest number of poor in the world, mainly living in rural areas with limited transport access. Continued institutional strengthening, especially at the provincial and local government levels, will help China meet poverty reduction, shared prosperity, and environmental goals.

2. **China's 13th Five-Year Plan (FYP) and policy commitments made at the 19th National Congress of the Communist Party of China promote a move towards a more sustainable economic development path.** The main objectives of the 13th FYP (2016-2020) include pursuing productivity and innovation-driven development; continuing to rebalance towards consumption and services and further opening up the economy; improving equitable access to basic public services; and reversing environmental degradation and curtailing carbon emissions. The 19th Party Congress (October 2017) established that achieving *quality* growth while maintaining a reasonable level of growth is the major challenge for China.

3. **Sustainable infrastructure development remains a top priority for the Government of China, as it enters a new economic growth model.** The Government of China has long recognized that a strong economy runs on reliable roads and rails, electricity, and telecommunications. Since 2000s, millions of Chinese have benefited from upgrades in these critical sectors. Infrastructure investment had led to rapid economic growth. It reduced poverty, and put in place the necessary environment to transform the Chinese economy. China's leadership has charted equally ambitious plans for the future. Its goal is to bring the entire nation's infrastructure up to the level of infrastructure in an upper middle-income country, while using increasingly efficient transport logistics to tie the country together.

4. **The rapidly implemented infrastructure investment-led growth strategy had some negative consequences in the past.** Development of human capital to efficiently plan and manage resources, both financial and natural, was not catching up with the high pace of investment spending. Soft infrastructure development was not at par with hard infrastructure development. The quality of the infrastructure, operations and maintenance plans, safety, and climate resilience call for new technics, institutions, and innovations. In addition, inefficiencies in planning led to fragmentations in the infrastructure coverage, as well as to the overdesign of infrastructure facilities, which consume unnecessary natural and financial resources. Significant disparities in infrastructure quality remain between coastal and inland regions, as well as between urban and

¹ World Development Indicators

rural areas. The Government of China, understanding this situation, recognizes that future infrastructure investment should bring in innovation, proper maintenance and resilience, safety, and preserve the environment. The institutions in charge would need to adapt and gain additional knowledge to reach those objectives.

5. **China needs to move from infrastructure ‘asset builder’ to ‘asset manager’.** China has been spectacularly successful in developing and expanding its infrastructure physical stock. Yet it doesn’t have modern institutions, technical tools, and sustainable funding mechanism to deliver quality service to users, and to maintain and operate its large infrastructure network. Many of the infrastructure agencies were created with the sole purpose of developing the physical asset, and most do not have modern asset management practices and institutions for maintenance and operations. Yet, the infrastructure assets created require continuous upkeep and maintenance. Lack of timely and proper maintenance would mean that the infrastructure assets would deteriorate, large investment for repair and rehabilitation. Given the size of China’s infrastructure this will have a large negative impact on natural and financial resources. A shift is therefore required in policy, institutional capability and skills to transition from simply construction of assets, to managing infrastructure assets, optimizing asset life and providing services to users through fit-for purpose institutions and technicians.

6. **Anhui province has endorsed the new agenda for a sustainable infrastructure development, and has requested the Bank’s support** to improve the institutional mechanism governing the maintenance and operation of its rural road network. Anhui plans to introduce new methods and innovative practices so that the infrastructure becomes safer, more resilient, of good quality, with limited footprint on environment and supports communities accessing growth opportunities. Through the proposed project, the Bank will support Anhui to address the weakness in the institutional and financing framework governing the maintenance and operation of the road network.

B. Sectoral and Institutional Context of the Program

7. **China has expanded its transport infrastructure, including rural roads, in a very significant way over the past decades,** adding over one million kilometers (km) of rural roads to its network between 2001-2010 alone. This effort came in response to mobility needs emerging from a surge in motorization and economic growth in rural areas. By the end of 2015, the total length of rural roads in China reached 3.98 million km, with paved road access to 98.6 percent of towns/townships and 94.5 percent of administrative villages. While paved roads greatly facilitated mobility for rural populations, many of these roads were built to low technical and safety standards. In addition, many ‘natural’ villages² are not yet accessible by all-weather paved roads. To address these challenges, the 13th Five-Year Plan of the Ministry of Transport called for connecting all towns and administrative villages by paved roads, widening about 250,000 km of narrow rural roads, improving the safety features of 650,000 km of risky rural roads, and rehabilitating around 15,000 damaged rural bridges. The policy framework and technical guidance were provided by the Ministry of Transport in the form of policies, directives and technical standards, such as the ‘13th

² Natural village means a small village formed naturally over time

Five Year Transport Plan for Poverty Reduction’, ‘Guidance on Rural Roads Development’, ‘Safe Road Program’, and ‘Technical Standards for Class I to IV roads’.

8. **In line with national trends, Anhui Province increased its stock of rural roads (comprising county, township and village roads) significantly from 34,000 km in 2000 to 172,000 km in 2015.** The expansion in rural road connectivity, while critical for poverty alleviation, was implemented without adequate consideration for quality, operations and maintenance plans, safety, and climate resilience. About 168,000 km are Class IV or above, whereas the remaining roads are sub-standard roads. Many roads are in fair to poor condition due to lack of maintenance, as well as perennial damage from traffic, flooding, and landslides. The latter is due to the climate change. According to the climate change analysis conducted in the most recent transport project in Anhui³, some parts of the province are exposed to climate change risk as the increase in temperature and precipitation is likely to continue or worsen over the coming decades, which could lead to more flooding, landslides, and traffic accidents. Reliable access to poor and disaster-prone areas remains an issue.

9. The 13th Five-Year Comprehensive Transport Plan for Anhui Province aims to improve rural roads infrastructure and the level of transport service by implementing several programs, including the Smooth Traffic Program, Safe Road Program, Damaged Bridge Improvement Program, and Road Maintenance Program. Those activities cover each of the 56 counties of the province. The proposed Program for Results operation (PforR) will focus on a subset of ten counties that are part of the flat and densely populated Huai River watershed, the Huanghuai Plain in the north, and the rugged Dabie Shan mountain range along the Yangtze River in the southwest. The ten counties have a combined population of about 12 million (88 percent rural) in 2015, and about 905,000 registered rural poor.

10. The 13th Five-Year Comprehensive Transport Plan for Anhui Province also promotes the notion of ‘Four-Excellence’, i.e., excellence in construction, management, maintenance and operation. The objective is to eliminate transport bottlenecks, reduce poverty and allow villagers to prosper. By 2020, all administrative townships and villages should be connected by a paved road, maintenance budget should be available, and bus services should reach villages together with basic logistics. The Bank is considered a Partner of choice to help with the implementation of the concept, ensuring that the construction and maintenance is made with quality, safety, and with resilience aspects in mind, whilst innovations are brought to management and operation. The new technologies that will be introduced to plan, implement, and operate the infrastructure are presented in the last section of Annex 4.

11. **Bank Value-Added.** Bank support for Rural Roads in Anhui Province will be the first PforR that will help a Chinese province to transition managing the vast rural road network with potential to be replicated across China. The Bank has decades of experience in the Chinese rural roads sector as well as in Anhui Province, and has been instrumental in introducing important technical and institutional innovations to help in the construction and expansion of the rural road network. Moving forward, the Bank will help the Anhui government to develop innovative ways to support better maintenance, resilience and safety and to ensure that the roads will be environment-friendly. The Bank will support this new paradigm by helping local authorities

³ Project Appraisal Document of China Anhui Road Maintenance Innovation and Demonstration Project (P153173)

explore new concepts and help them implement innovation. The Bank is well positioned to support the introduction of technical and institutional innovations because of its global knowledge and a long and fruitful cooperation with Anhui Province. Some of the innovations that the Bank will assist Anhui Province in introducing through this operation are:

- *Innovations in institutional reform to introduce performance management and accountability of rural road agencies at the county level.* The Bank will advise on institutional reforms at the county level by including the construction, management and maintenance of rural roads in the government's annual performance evaluation criteria, which will draw more attention from government on rural road development, its quality, and its sustainability.
- *Innovations in Monitoring and Evaluation using new apps and web-based tools.* Following experiments conducted during the preparation of the Program, the Bank will help the Program Management Office (PMO) to implement pilot, web-based rural accessibility tools with street-view mapping app and road roughness measurement app in the Anhui Provincial Department of Transport (APDOT) and in the transport bureaus of the 10 counties. The Bank will provide technical support to local agencies to establish the web-based rural accessibility tool on their servers and help the PMO to use the web-based rural accessibility tool to generate results indicators for the PforR.
- *Innovations in bridges reconstruction and maintenance.* The Bank will work with Anhui agencies to increase the resilience and safety of bridge designs. This approach may lead to modifications to the layout of bridges, the dimensions of spans, abutments, existing foundations or embankment protections to accommodate new parameters such as more demanding hydraulic constraints. The superstructure may also be modified to increase safety (e.g., better protection for pedestrians, safer access to the bridges through the use of guardrails and signaling, and replacement of handrails). New technologies and new materials will be introduced, such as polymer resins to repair reinforced concrete beams or use of self-compacting high-strength concrete to limit the requirements for concrete vibration during construction. Bridge maintenance will also be modernized by the introduction of a bridge database recording the current condition, periodic inspections, and routine and periodic interventions. Such technologies are not yet in place at the county level.
- *Innovations in road management and operation.* APDOT has built a comprehensive inventory of roads and has surveyed road conditions based on Geographic Information System (GIS) database. The Bank will provide additional support in the use of the GIS database to prioritize investments. The Bank will also support the deployment of additional strategies to assess the performance of the existing rural road assets in term of resilience and road safety, and to carry out economic analysis on resilience and road safety investments at the county level. This approach will have a positive impact on county officials' capacity to support the maintenance and operation of rural roads.
- *Replicability of the PforR experience.* Embarking on a very decentralized program of rural road development based on PforR principles will become an innovation that can be shared

with other provinces in China, as well as other countries. The Bank will help the regional administration to roll out the successful experiences to the entire province, and to disseminate them to other provinces and countries. The joint World Bank-Ministry of Transport TransFORM knowledge platform will be used for that purpose. In addition, seminars will be organized during implementation in order to reach other provinces and other countries in the sub-region, in Africa, and in other countries with inadequate management of their rural road network.

C. Relationship to the CPS and Rationale for Use of Instrument

12. *Relationship to the CPS.* The proposed PforR is aligned with the 2013-2016 World Bank Group Country Partnership Strategy (CPS) for China (Report 67566-CN), discussed by the Board on November 6, 2012. The 2013-2016 CPS focuses on three main pillars: support greener growth, promote more inclusive development, and advance mutually beneficial relations with the world. The proposed PforR supports the second pillar by reducing transport costs for rural road users and increasing accessibility for the rural people of Anhui Province. The Program will focus on increasing shared prosperity, which is one of the two World Bank Group development goals. Investing in infrastructure and human capital is needed to address disparities between rural and urban areas. Rural roads have received less attention than highways, but as the highway network has developed, the marginal returns from rural roads are now larger (Shenggen Fan and Connie Chan-Kang 2004). They also have a larger impact on agriculture and on rural non-farm GDP (one RMB invested yields more than five RMB of rural nonfarm GDP).

13. *PforR rationale.* The People's Republic of China has requested the Bank to test the PforR instrument to support Anhui and Guizhou Provinces in improving their rural road network. The two provinces are preparing their programs in parallel. While Anhui PforR will be focusing on managing rural roads so that they contribute to growth and reduce wealth disparity within the province, the Guizhou PforR (under preparation) will focus on poverty alleviation through the demonstration of 'Four Excellence Rural Road' implementation. The Program will enable Anhui province to: (i) focus on institutional capacity to manage rural roads with longer term, more sustainable impacts than a standard investment lending operation; (ii) provide more autonomy to the province by using the PforR disbursement-linked indicator (DLI) mechanism; (iii) use limited borrowing as well as systems that are already in place to reach a larger set of investments and policies; and (iv) provide the province with more flexibility to adjust implementation timing and activities as the need arises. The Program will result in a better network of rural roads that will be safer, more resilient and of a better quality. It will only support activities that will not have significant adverse environmental or social impacts. The preparation of the Program revealed that the existing project management, fiduciary, environmental, and social systems in Anhui Province meet the PforR requirements. Anhui Government and Program agencies are committed to a results-based approach, which represents an innovation in itself. The Program Action Plan, agreed with the Bank during Project preparation, has been designed by the local agencies who will be implementing it.

II. PROGRAM DESCRIPTION

A. Government Program

14. The Government program and its objectives can be described using the Anhui Province 13th Five-Year Comprehensive Transport Plan (APFYCTP) to be implemented over the 2016-2020 period. The objectives are ambitious, aiming at: (i) improving rural transport infrastructure; (ii) enhancing the connectivity and accessibility of rural areas; (iii) improving road safety of the rural road network; (iv) increasing the reliability of the rural road network and its resilience to natural disasters; (v) extending rural road service life through maintenance; and (vi) strengthening capacities by deepening institutional reforms, improving program implementation mechanisms, and developing and implementing policies. These objectives represent significant challenges to the county administrations which need additional technical and administrative support to achieve them.

15. The APFYCTP is a continuation of on-going national and provincial programs, some launched during the 12th FYP period. The APFYCTP includes: (i) the Smooth Traffic Program (STP) to upgrade and rehabilitate rural roads, which ends in 2018 and will be followed by the Natural Village Road Program to be implemented from 2019-2022 to strengthen the rural road network until the completion of the PforR; (ii) the Safe Road Program (SRP) to improve the safety of township and higher level roads and enhance the capacity of road safety governance by 2020; (iii) the Damaged Bridge Improvement Program (BIP) to eliminate hazardous bridges on rural roads; (iv) the Road Maintenance Program (RMP) to reach 100 percent coverage on rural road maintenance; and (v) institutional capacity building.

B. Program Development Objective/s (PDO) and key results

16. The Program Development Objective (PDO) is to improve the rural road network connectivity, safety, quality, and its management in the Participating Counties of Anhui Province. Results will be monitored along three areas:

Result Area 1: Improve rural road connectivity and safety

Program: STP and SRP

Activities: Upgrade or rehabilitate rural roads / Improve pavements / Widen or pave access to remote villages / Improve traffic safety facilities of rural roads

Intermediate outcomes: Km of roads rehabilitated or improved with resilience and safety features.

Outcome: County and township roads in excellent and good condition reaching 75%.

Result Area 2: Maintain good quality rural roads

Program: BIP and RMP

Activities: Rehabilitation of damaged bridges / maintenance activities

Intermediate outcomes: Linear meters of bridges reinforced, demolished and/or reconstructed with resilience and safety features/ Km of rural roads maintained with resilience and safety features

Outcome: Rural roads maintenance coverage rate reaching 98%.

Result Area 3 Strengthen institutional capacity

Program: Institutional Capacity Building

Activities: Capacity building program for municipal- and county-level transport bureaus to manage rural road and bridge assets, road safety, and climate resilience infrastructure

Intermediate outcomes: Number of counties with established performance assessment system for county-level aiming at three of the “Four-Excellence” program (excellence in construction, management, and maintenance) / Number of counties where the “Four-Excellence” program is rolled out beyond 10 Program counties / Number of counties with rural roads database established.

Outcome: Improve rural road network management capacity through institutional reform, and the results of the Program are rolled out to other counties.

17. A detailed Results Framework is presented in Annex 2.

C. PforR Program Scope

18. The proposed PforR Program (the “Program”) will finance a portion of the government programs (10 counties out of total 56 counties, covering 12 million population of Anhui Province’s total population of 69 million). None of the activities financed under the Program is financed either by the Bank or any other International Financial Institution. The ten participating counties in eight municipalities are: Lixin (Bozhou Municipality); Xiao and Si (Suzhou Municipality); Linquan and Funan (Fuyang Municipality); Shou (Huainan Municipality); Dingyuan (Chuzhou Municipality); Shucheng (Lu’an Municipality); Hanshan (Ma’anshan Municipality); and Yuexi (Anqing Municipality). The participating counties are selected because: (i) rural roads in these counties are seriously damaged; (ii) the impact of rural accessibility is larger than average; (iii) the economic impact of having an enhanced rural road network would be larger than average; and (iv) road safety is a marked issue in each of these counties.

19. The Program overlaps with government programs in the 10 participating counties. The design of the PforR limits the number of local counterparts, allowing lessons to be learned from pilot activities in the 10 counties. The PMO has designed a three-stage plan to gradually roll out successful activities to the entire Province: (i) during 2018 to late 2020 the PMO will identify and prepare institutionalization of successful experiences in terms of construction, management, maintenance and operation of rural roads; (ii) in 2021, which will be the last full year of the Program, the results of the Program will disseminated to 20 additional counties; (iii) comprehensive dissemination to all 56 Anhui counties will start one year later, based on the experience of the second phase and leading to a sustainable development of rural roads construction and management in Anhui Province. The Provincial authorities have confirmed that once the Smooth Traffic Program is completed by 2018, the Province will implement a Natural Village Road Program (NVRP) under the government program, which is planned to be implemented from 2019-2022 to strengthen the rural road network. The NVRP represents the continuation of the Smooth Traffic Program during the 2019-2022 period. Other activities under the Government program will continue until the closing date of the PforR.

20. The PforR scope is outlined in Table 1 and 2 below. The detailed Program description is provided in Annex 1.

Table 1: Scope of Program for Results

Item	Government Program	Programs Supported by PforR
Title	(i) Smooth Traffic Program, then Natural Village Road Program; (ii) Safe Road Program; (iii) Damaged Bridge Improvement Program; (iv) Road Maintenance Program; and (v) Institutional Capacity Building. The Province will continue to strengthen the rural road network, including county, township, and village roads, until the completion of the PforR.	Same as Government Program, but with limited geographic scope.
Geographic scope	Anhui Province ⁴	Ten participating counties in eight municipalities
Implementation period	2016-2022.	2018-2022
Objective	To improve rural transport infrastructure and complete the rural road network; enhance the connectivity and accessibility of rural areas; improve road safety of the rural road network; increase the reliability of the rural road network and its resilience to natural disasters; extend rural road service life through maintenance; and strengthen institutional capacities.	PDO: to improve the rural road network connectivity, safety and quality and quality and its management in selected counties in Anhui Province
Activities or outputs	Upgrade and rehabilitate a total of 72,000 km of rural roads; improve the safety of a total of 31,287 km of rural roads; improve damaged bridges with safety and resilience features; 160,000 km of rural road maintenance coverage rate reaching 100 percent; and institutional capacity building activities.	Same as the Government program, but limited to 10 out of 56 counties and excluding activities with possible significant/irreversible impact on the environment and/or affected people.
Program expenditure	RMB93 billion (2016-2022)	RMB3.59 billion (2017-2022)
Financing	Provincial and national subsidies and other subsidies, local fiscal revenue, commercial banks, and IFIs.	Provincial and national subsidies and other subsidies, local fiscal revenue, and the World Bank loan.

⁴ Anhui Province has 16 municipalities, sub-divided into 56 counties and 1845 townships (China Statistical Yearbook 2015 - <http://www.stats.gov.cn>)

Table 2: Government programs vs. PforR Program

Program	Government program		PforR Program	
	Targets (km)	Investment (RMB billion)	Targets (km)	Investment (RMB billion)
Smooth Traffic Program	72,000	48	10,299	1.83 ¹
Safe Road Program	31,287	5.5	3,457	0.31
Damaged Bridge Improvement Program	1,000 (number)	0.9	341 (number)	0.40
Road Maintenance Program	160,000	5.5 (Annual)	27,952	0.98
Institutional Capacity Building		-		0.07
Total		93		3.59

Source: Government programs for Rural Road Development in Anhui and the Feasibility Study Report.

(1) This amount is associated with 2017-2018 activities (2,332km)

21. **Program Financing Plan.** Program expenditures will be fully financed by a combination of internal resources (mainly provincial and national subsidies and local fiscal revenue), as well as IBRD financing of US\$200 million; see Table 3 below.

Table 3: Program Financing

Source	Amount (RMB million)	Amount (US\$ million)	% of Total
Provincial and National Subsidies	816	124	23
Local Fiscal Revenue	1,454	221	40
IBRD	1,315	200	37
Total Program Financing	3,586	545	100

22. The PforR Program will provide support to five sets of activities that are part of the Government program, as summarized below (*Details in Annex 1*).

23. **Program A - The Smooth Traffic Program and Natural Village Road Program** covers the following activities:

- *Smooth county-and-township road sub-program* – (a) upgrading and reconstruction of selected county or township roads to enable each town and township in the province to have at least one Class III or above road connecting to county centers or national and provincial trunk highways; and (b) pavement improvement of selected county or township roads to enable each town and township in the province has at least one Class IV or above road connecting to neighboring towns and townships.
- *Smooth village road sub-program* - widening or paving of selected village roads, especially the most disadvantaged villages in the 10 Program counties.
- *Natural Village Road Program (NVRP)* - paving of selected village roads to provide access for all large natural villages to existing highways (a minimum width of 3.5 meters on a minimum platform width of 4.5 meters). The NVRP will take over the STP starting 2019.

24. **Program B - The Safe Road Program** aims to address infrastructure safety hazards along the rural roads. It will support the activities including improvement of rural road signs, markings, installation of guardrail and roadside hazard management, as well as other safety facilities aimed at speed calming or improving conditions for vulnerable road users.
25. **Program C - The Damaged Bridge Improvement Program** covers the activities of improvement and/or reparation of rural bridge assets.
26. **Program D - The Road Maintenance Program** aims to maintain the whole rural road network in 10 Program counties annually. The maintenance activities include routine maintenance, small maintenance, periodic maintenance, rehabilitation, and improvement.
27. **Program E - Institutional Capacity Building Program** supports a series of activities to address the challenges identified during the preparation of the Program:
- a. *Reform of the various institutions involved in road management at the municipal and county levels.* Anhui provincial authorities are committed to assess the performance of their local authorities based on the first three objectives under the “Four-Excellence” program.: (i) construction; (ii) management; and (iii) maintenance. The last objective (operation) will be addressed separately at a later stage. The PMO has designed an evaluation framework to measure progress on construction, management and maintenance for each county. The framework is translated into DLI#3 against which USD10 million will be disbursed.
 - b. *Provision of technical assistance.* (i) *Training:* technical and institutional management trainings; (ii) *Research:* the development and application of project management system; and rural road condition evaluation standards; (iii) *Monitoring and Evaluation:* the web-based rural accessibility tool, the street-view mapping app, and the road roughness estimation app were introduced by the Bank to be tested further during the implementation of the Program to measure results; (iv) *Impact Analysis:* report to assess the impact of rural road programs on poverty reduction.
28. To enable Anhui to meet the current and future challenges of climate change, investments in the above activities will contribute to climate adaptation co-benefits; see section on Technical Assessment.
29. **PforR Beneficiaries.** The Program beneficiaries are the communities along the PforR roads, who will benefit from reduced travel times, safer road conditions, and more reliable access. The 11 million rural population living in the 10 participating counties (including 10 percent are below the national and provincial poverty line⁵) should benefit from improved access to employment, social services and economic opportunities. Staff of all agencies involved will also benefit from capacity building activities under the institutional strengthening activities.

⁵ Source: 2015 Anhui Provincial Statistics Yearbook

D. Disbursement Linked Indicators and Verification Protocols

30. The proposed DLIs are designed to provide financial incentives to improve both infrastructure and institutions, with an emphasis on resilience and safety. The DLIs are measurable and will be assessed by the Independent Verification Agent (IVA). The three results areas and the associated DLIs are presented in Table 4 below. Details are provided in Annex 2.

Table 4: Result Areas and DLIs

Result Area	DLIs
Result Area 1: Improve rural road connectivity and safety	DLI 1: Rural roads improved with resilience and safety features (km)
Result Area 2: Maintain good quality rural roads	DLI 2.1: Bridges reinforced, demolished and/or reconstructed with resilience and safety features (linear meter) DLI 2.2: Rural roads maintained with resilience and safety features (percent of a number of km)
Result Area 3: Strengthen institutional capacity	DLI 3: Institutional improvements in the rural roads sector at the county level (number of counties) along the following three criteria: (i) excellence in construction; (ii) excellence in management; and (iii) excellence in maintenance. See Annex 3 for a detailed description.

31. DLI#1, DLI#2.1 and DLI#2.2 call for the resilience and safety of the infrastructure to qualify for payment. The TOR of the IVA will detail the protocol that will be used to assess whether the resilience and safety requirements are met. The following principles will apply:

- *For resilience.* The IVA will check if the design considers technical solutions, such as proper dimensions for drainage systems, bridge spans and foundations, moving the road alignment away from risk (riverbed or placing the road on higher ground) etc. For construction, the IVA should be satisfied with the number of crossing structures/culverts/small bridges improved/reconstructed/ rehabilitated to climate/disaster resilient standards.
- *For road safety.* The IVA will check if the design includes pre-agreed road safety countermeasures for critical locations, including: (i) in and around villages, (ii) steep sections, (iii) sharp curves, (iv) landslide prone areas, (v) segments with poor visibility, (vi) sudden changes in cross sections, and (vii) junctions. In addition, designs should be checked for safety of roadside conditions, which, if unsafe, should be treated (e.g., guardrails). The IVA should be satisfied that one or more road safety countermeasures are included, if any of the seven critical location criteria are met or if roadside conditions are not safe.

32. DLI#3 is linked to the strengthening of institutions. Rural road development and maintenance results are currently not included by municipalities in Anhui in the annual performance assessment for county-level governments. This DLI will reward counties with improved performance and responsibility in the rural road sector, especially in terms of

“construction, management, and maintenance excellence” to be incorporated in government annual performance assessment criteria. See Annex 3 for a detailed description of how the IVA will assess progress of each county. The recommendations of the IVA will be discussed during Bank implementation support missions and agreed between the Bank and the PMO before payments are made.

E. Capacity Building and Institutional Strengthening

33. Weaknesses in institutional capacity for rural roads construction, rehabilitation, and asset management were identified by the technical, fiduciary and environmental and social assessments and align with the findings of the PMO during its comprehensive review of the capacities of county level administrations. As a result, institutional capacity building is one of the four result areas of the Program. Activities under this result area are described in the previous section.

III. PROGRAM IMPLEMENTATION

A. Institutional and Implementation Arrangements

34. The PforR will be implemented by Anhui Highway Management and Service Center (AHMSC), the Transport Bureaus of the eight municipalities (MTBs), and the Transport Bureaus of ten counties (CTBs) and related Township Governments. The Rural Road Administration Division of AHMSC will provide sectoral administration, instructions, and supervision of program activities. The eight municipalities’ Transport Bureaus and the ten counties’ Transport Bureaus will each be jointly responsible for day-to-day program implementation in their respective jurisdictions, including project management, procurement, safeguards, monitoring and reporting. The existing Program Management Office (PMO)⁶, which is housed at Anhui Foreign Investment Promotion Office (FIPO), will be responsible for overall coordination and communication with the Bank.

35. An IVA will provide independent confirmation of the results reported by the AHMSC, the bureaus of eight municipalities and the 10 counties to the Ministry of Finance and the Bank. The IVA will carry out the verification of the achievement of the DLIs in accordance with the agreed verification protocol detailed in the IVA TOR. The IVA will be hired by the PMO and may be a third-party audit/consulting firm, a NGO, or a government agency.

36. The PMO and AHMSC will chair quarterly progress meetings with all stakeholders. In addition, meetings will be conducted as needed to share knowledge and learning between the participating municipalities and counties, and to undertake workshops and training.

B. Results Monitoring and Evaluation

37. The Provincial Department of Finance (in collaboration with the provincial Department of Transport) will commission third-party organizations to carry out performance evaluation of rural

⁶ The PMO has been implementing other roads projects financed by IFIs (including the World Bank) in Anhui Province

roads improvement and maintenance projects, and will assist municipal and county governments in addressing problems identified by the technical and financial audits. These evaluations will be used for the allocation of subsidies for rural highways and roads. For the PforR, AHMSC which has a specialized unit for quality monitoring and evaluation as well as for safeguards monitoring, will coordinate with the ten counties to develop and implement their Program-specific monitoring and evaluation plans. The findings of the reports on the impact of rural road development on poverty reduction will be disseminated locally and at the provincial level.

C. Disbursement Arrangements

38. Disbursements will be made against achieved and verified DLIs, following Bank review, based on the verification protocols (see Annex 3). Up to 25 percent of the loan may be provided as an advance upon effectiveness of the loan; this advance will be adjusted against subsequent payments.

IV. ASSESSMENT SUMMARY

A. Technical

39. China has responded to rural connectivity and mobility needs by adding over one million kilometers of paved rural roads to its road network between 2001-2010. These roads have greatly facilitated mobility in rural areas, but many of them were built to low technical and safety standards. The Anhui province program for transport development continues to focus on rural road network development because it has strong justification in terms of transport, social, and economic benefits. The PforR will support Anhui province in this endeavor.

40. *Program Technical Soundness.* The design and scope of the Program bring technical and institutional innovations in the areas that are currently constraining rural road authorities from delivering high-quality service, such as: more efficient planning of road maintenance activities; strengthening the capacity of local staff; factoring in safety and climate resilience; and more efficient supervision and monitoring practices.

41. *Expenditure Framework.* Rural road projects in Anhui are funded by provincial and national subsidies, local fiscal revenue and borrowing. Poor counties receive more subsidies. In line with national regulations, funds are managed under the government treasury system and maintained by the financial bureaus at the provincial and county levels. Subsidies are set according to the county designation and by type of road. Subsidy transfers are based on implementation progress, which is monitored and evaluated by the Provincial Highways Bureau.

42. In 2016, the ten participating counties completed their rural roads projects within the estimated budget. The county governments' total outstanding debt to GDP ratio in 2016 ranged between 7 percent to 35 percent. However, eight of the ten counties had budget surplus in 2016. While Funan and Shucheng counties had deficits of RMB500 million and RMB800 million respectively, their total debt as shares of GDP in the same year were low at 7 percent and 9 percent respectively.

43. The expenditure framework assessment shows that Anhui Province has effective budget allocation. It also confirms that implementation and the overall expenditure framework are both adequate. The Program budget allocations are aligned with the government's priorities. Counties' transport program expenditures are also aligned with the Provincial transport program expenditures. However, the Program may be affected as prioritized rural roads do not always match with the approved budget, road maintenance is underfunded compared to expansion in rural road connectivity, and program expenditures are not cost effective. The county governments aim to address these shortcomings and further enhance efficiency by taking measures discussed in the detailed Program Expenditure Framework.

44. *Results Framework.* The existing Monitoring and Evaluation system in Anhui Province is deemed adequate. Anhui defines the responsibilities of provincial, municipal and county governments during program implementation. For the PforR, the AHMSC will coordinate with the ten counties to monitor program implementation results based on the existing monitoring mechanism and a Program-specific monitoring and evaluation action plan.

45. *Economic Justification.* An economic analysis of the proposed Program was carried out using the Bank's Roads Economic Decision (RED) model. The analysis shows that the Program brings substantial economic benefits to the participating counties. The Program's economic rate of return (EIRR) is 49 percent, which is consistent with the EIRRs of similar rural road rehabilitation and upgrade programs/projects in other countries, and is well above the Bank's recommended economic opportunity cost of capital (6 percent). Sensitivity analysis carried out indicates that the EIRR remains higher than 6 percent even for the worst-case scenario of 15 percent increase in costs and 15 percent reduction in benefits. A Greenhouse Gas emission analysis indicates that the road improvement works will result in a very small CO₂ emission increase, about 5 percent, due to the increase in vehicle speeds and the additional traffic that will derive from a set of new roads. The detailed economic analysis is included in the Technical Assessment.

46. *Climate vulnerability.* Climate resilience does not appear to take center stage in the government program. However, rural roads constructed under this Program will be designed with climate resilience in mind. Actions related to making road assets more resilient to climate change are included in the Program Action Plan (PAP).

B. Fiduciary

47. The Program's fiduciary system provides reasonable assurance that financing proceeds will be used for the intended purposes, with due attention to the principles of economy, efficiency, effectiveness, transparency, and accountability. The Program's fiduciary system is considered broadly adequate to meet the requirements set in the Bank's PforR Policy and Directive.

48. *Procurement Overview.* PforR procurement activities will primarily include small and medium-value civil works and goods for rehabilitation and upgrading of rural roads and bridges in the ten participating counties. Consulting services and goods procurement for institutional strengthening activities would be of low value. No large contracts valued at or above Operational Procurement Review Committee (OPRC) thresholds are envisaged. The regulations and procurement systems in Anhui Province provide assurance that procurement under the PforR will

be executed with adequate levels of transparency, accountability, competition, efficiency and fairness.

49. Procurement practice in Anhui Province is competitive and efficient. The number of participating bidders per contract usually ranges between nine to 50, and the timing between publishing the procurement notice and contract signing is 60 days. To date, there has been no indication or historical precedent that any of the participating agencies or their staff in Anhui province have engaged in mismanagement or malpractice leading to a record of fraud or corruption. The procurement system at the participating counties has two tiers of complaint mechanism, which are handled by the implementing agencies and the relevant government authorities. The World Bank's Anti-Corruption Guidelines will apply to activities within the PforR boundary. The following mitigation have been identified during the fiduciary assessment: (i) cost estimates shall be based on market analysis; and (ii) the evaluation criteria shall include a proper check of the qualifications and adequacy of key staff.

50. *Financial Management Overview.* Financing of the Program expenditures is mainly comprised of: (i) Subsidies appropriated from national and provincial government; (ii) Counties' general budget funds; and (iii) IBRD loan proceeds. These funds all flow through the government treasury system managed by the finance bureaus at provincial and county level. Program implementation and associated financial management are carried out by the provincial finance department, provincial transport department, provincial highway bureau, county finance bureaus, county transport bureaus and county transport investment companies. Overall, the participating agencies have the basic public financial management systems in place to support the PforR activities. The assessment identified the following risks: (i) there are no existing government requirements or practice in preparing consolidated program financial reports thus creating a PforR compliance risk; (ii) nine of the ten Program counties are poor counties, and may encounter the pressure in raising the required funds and paying the contractors timely; (iii) there is currently no annual financial audit of the existing government program thus creating a PforR compliance risk; and (iv) although a database has been established by the highway bureaus at provincial and county levels for the rural roads built by them, information being stored in the database is incomplete and financial information is not included in the database.

51. To address the above risks, the following actions will be taken: (i) the budget execution report for government general budget and government funds would be used as the financial report of the PforR and the CTBs should present expenditures of the PforR Program as a note to the financial report; (ii) China National Audit Office and Anhui Provincial Audit Office will agree on audit terms of reference (TOR) with the Bank and conduct an annual Program financial statement audit that will be publicly disclosed; and (iii) to strengthen capacity on fixed assets management, the highway bureaus should maintain a complete fixed assets registration book with the value of fixed assets recorded properly, and present it in the financial reports, once they are required by the related policies and regulations.

C. Environmental and Social

52. Environmental and social screening has been incorporated in the Program design to exclude activities with significant/irreversible impacts on the environment and/or affected people.

The Program is designed to support the rehabilitation, improvement and upgrading of existing rural roads (including small-scale bridges on these roads) in a non-sensitive environmental and social context. It does not include new construction of rural roads or any rehabilitation and upgrading of existing rural roads that fall within the boundary of environmentally sensitive areas (e.g., nature reserve, protected areas, reservoirs, natural habitats, and physical cultural resources). Program activities typically limit works to the existing right-of-way and footprint, and do not create new lanes or involve significant slope cutting/filling. The Program's environmental and social risks are considered "Moderate" and the PforR instrument is appropriate.

53. *Environmental and Social Review.* An environmental and social systems assessment (ESSA) was conducted during PforR preparation, through a legal framework review, assessment of the institutional setup and implementation mechanisms, several rounds of public consultations at sites visited, consultations with relevant government departments, and field visits to similar rural road projects being developed under domestic procedures. The assessment concluded that national and provincial regulations for environmental and social safeguards are in principle consistent with Bank policy and directives. However, there are inadequacies in effective implementation of the local system, and enforcement and capacity building are necessary. Recommendations to improve these practices have been integrated into the PAP.

54. The Bank conducted consultations with relevant government departments in the ten participating counties during ESSA preparation. Consultation on the draft ESSA was organized in Hefei in January 2018 to solicit comments and feedback on the findings and recommendations of the draft ESSA from a range of stakeholders. The draft ESSA has been disclosed by the Bank and locally in the Project counties following the consultation.

55. *Gender.* The ESSA noted that the China Women's Federation has offices at provincial, municipal, and county levels (as well as focal points at the township level) for gender related issues, in particular, equal access for women to social services and economic resources. The county level women's federations manage standalone programs with women as targeted beneficiaries. For vulnerable groups, such as those without the capacity to work, the disabled, and those identified as low-income households, local county civil affairs bureaus are responsible for providing assistance, including the minimum rural living allowance.

56. *Gender-Based Violence.* The Bank conducted an Gender-Based Violence (GBV) Risk Assessment through GBV Risk Assessment Tool, which concluded that the overall GBV risk is low. To further address and monitor the risks during the implementation, the implementation support missions will continuously review and ensure the project implementing agencies' capacity to prevent and respond to GBV.

57. *Grievance Redress Service.* Communities and individuals who believe that they are adversely affected by a Bank supported PforR operation, as defined by the applicable policy and procedures, may submit complaints to the existing program grievance redress mechanism (GRM) or the WB's Grievance Redress Service (GRS). GRM should have specific procedures for GBV including confidential reporting with safe and ethical documenting of GBV cases. The implementation support missions will review that the GRM receives and processes complaints to ensure that the protocols are being followed in a timely manner, referring complaints to an

established mechanism to review and address GBV complaints. The GRS ensures that complaints received are promptly reviewed to address pertinent concerns. Affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur because of non-compliance with World Bank policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), one can visit <http://www.worldbank.org/GRS>. For information on how to submit complaints to the World Bank Inspection Panel, one can visit www.inspectionpanel.org

D. Risk Assessment

58. The overall risk to achieving the objectives of the proposed Program is assessed as "Moderate", see Annex 7. Among the risk categories, institutional capacity for implementation and sustainability is rated "substantial", as the county administrations have much to learn during implementation. To mitigate this risk, the Bank has been providing, and will continue to provide, training to all participating agencies. The Bank will also guide the participating agencies to implement the mitigation measures to address the risks identified in the technical, fiduciary and safeguards assessments, as well as to implement the PAP.

E. Program Action Plan

59. The PAP has been developed based on the recommendations of the technical, fiduciary and environmental & social assessments. It is built around six main themes and their associated actions. Theme 1 (improve resilience) will focus on the use of innovative and preventive maintenance technologies to make rural roads and bridges more resilient; review current engineering designs for rural roads and promote the benefits of added resilience and conduct vulnerability assessments and response; and establish a contingency fund for emergency interventions. Theme 2 (toward "Green rural roads") will introduce the concept of green rural roads by opening and populating a catalog of green initiatives implemented during the project. Theme 3 (integrate road safety features) will take advantage of the ChinaRAP strategy to improve safety along rural roads. ChinaRAP survey and analysis will be conducted over 270 km, leading to the preparation of a catalog of suitable road safety measures. Design stage and prior operation audits will also be implemented. Theme 4 (improve planning and implementation capacity) aims to strengthen county level institutional activities in construction, management, maintenance and operation of rural roads and roll out successful activities to 20 other counties in 2022 (the last year of the project). Themes 5 and 6 will focus on strengthening environmental and social safeguards systems and improving fiduciary capacity. A detailed description of the PAP is provided in Annex 8.

ANNEX 1: DETAILED PROGRAM DESCRIPTION

1. China's 13th Five-Year Plan (2016-2020) recognizes that improvement of rural road networks is a prerequisite for economic development in the lagging regions. Accordingly, the government of Anhui Province has developed the Anhui Province Program (APP) for transport development, which aims at welfare improvement by providing access to markets and livelihood opportunities in all its counties. The APP aims at improving maintenance, all-weather mobility, safety and climate resilience of rural roads in the province, while providing engineered road access to hundreds of poor and isolated villages.

2. The proposed PforR operation will support Anhui Province by improving rural road network connectivity, safety, and quality in a subset of ten selected counties of the province to ensure that all communities in those counties are provided opportunities to fully participate to the economic growth of the region. This strategy benefits from the existing mix of capacity and knowledge of Anhui province administrations in preparing and implementing large scale infrastructure projects. An assessment of the strategic relevance of the Government programs that the World Bank aims to support demonstrates that they are technically sound and have a strong justification in terms of transport and economic benefits. Implementation of the Government programs is well advanced, including in the ten (of a total of 56) counties selected for the proposed Program.

PROGRAM STRATEGIC RELEVANCE

A. Overall Context

3. The objectives of the APP for transport development under the 13th Five-Year Plan (2016-2020) are to: (i) improve rural transport infrastructure and complete the rural road network; (ii) enhance the connectivity and accessibility of rural areas; (iii) improve climate resilience and road safety of rural road networks; (iv) extend rural road service life through maintenance; and (v) strengthen capacity to manage the rural road networks. The APP is a continuation of four on-going national and provincial level programs, some launched during the 12th FYP period. These are described below.

- **Smooth Traffic Program (STP).** Adopted in December 2015, STP is the key program under APP to improve rural transport infrastructure. The STP also constitutes the transport section of the Anhui 13th FYP of Poverty Reduction to help achieve the national goal for eradication of absolute poverty by 2020 and improving welfare and promoting economic growth in rural areas of China. This program covers the upgrade and rehabilitation of a total of 72,000 km of rural roads in Anhui Province for an estimated cost of RMB48 billion (equivalent of US\$6.98 billion, with an estimated cost of about US\$96,944 per km) over a three-year period (2016-2018). The STP will be followed by the Natural Village Road Program (NVRP) for the period 2019-2022. The NVRP will also strengthen the rural road network by connecting all large natural villages to existing highways with a paved road.

- **Safe Road Program (SRP).** The Government of China launched a national SRP in November 2014, which aims to substantially improve the safety of township and higher-level roads, complete the treatment of potential safety hazards, significantly increase the safety of road infrastructure, and comprehensively enhance the capacity of road safety governance by 2020.
- **Damaged Bridge Improvement Program (BIP).** Anhui Provincial Government initiated BIP as a public welfare program in 2011 to avoid bridge collapses caused by technical failures. During the 12th FYP, about 5,454 unsafe bridges were reconstructed or retrofitted, with total investment of RMB4.9 billion. The Provincial Government is continuing the program in the 13th FYP to eliminate 1,000 hazardous bridges. It aims to complete the overhaul of damaged bridges on national, provincial, county and township-level roads by 2022, mitigate inconsistency between bridge capacity and traffic capacity of highways, and ensure better management of bridge safety.
- **Road Maintenance Program (RMP).** RMP has been implemented for many years in Anhui province. In December 2015, the Ministry of Transport of China launched the “Rural Road Maintenance Management Guidelines” to further promote standardization, mechanization, and marketization of rural road maintenance. Based on these guidelines, Anhui Department of Transport set the target for periodic maintenance coverage rate at 100%, the ratio of excellent & good road condition of county and township roads to be higher than 75%, and the pavement quality index (PQI) increasing yearly.

4. APP places renewed emphasis on institutional capacity building, encompassing: technical inspection and audits; monitoring and evaluation systems; protection of road assets (vehicle overload control, prevention of Right of Way encroachments, and application of environmental safeguards); and staff training in innovative technologies for road and bridge upgrading and maintenance, project management, and quality control.

5. In order to achieve the objectives of the program, the government of Anhui Province has estimated the following needs and related expenditures during 2016-2022 (Table 1):

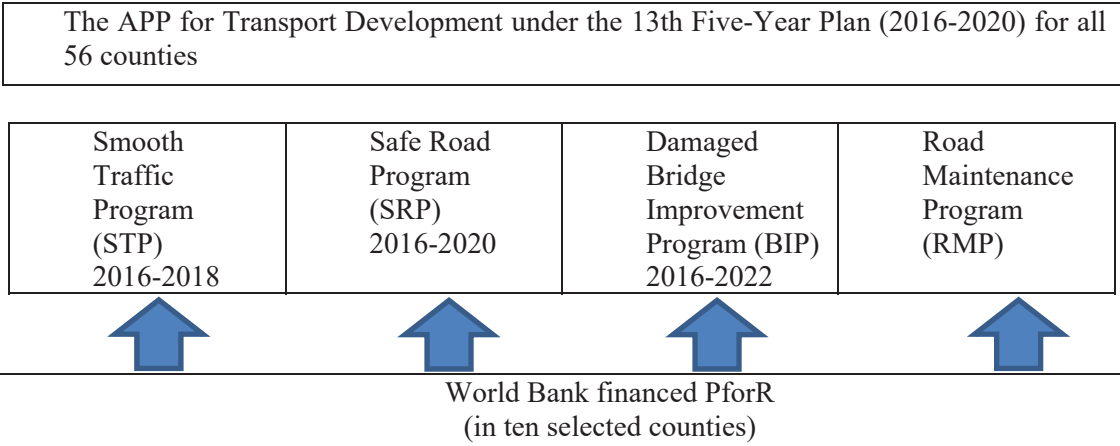
Table 1: Government Program Implementation Targets during 2016-2022

Program	Targets (km)	Budget Projection (RMB billion)	Budget Projection (USD billion)
Smooth Traffic Program	72,000	48	7.3
Road Safety Program	31,287	5.5	0.8
Damaged Bridge Improvement Program	1,000 (number)	0.9	0.14
Road Maintenance Program	160,000	5.5 (Annual)	0.8
Institutional Capacity Building			

Program-for-Results Operation (the PforR)

6. The proposed PforR operation will support the Government of Anhui province over a period of four years to improve rural road network connectivity, safety, and quality in the selected counties. It will provide vital improvements in the rural road network in ten counties, including better access for farm-based communities, townships and villages to provincial and national roads that reach market centers. It will directly support the government programs (listed above and presented schematically in Table 2), aimed at improving welfare and promoting economic growth in rural areas of China, and the World Bank’s shared prosperity goals. Roads are lifelines for rural communities, linking them to markets, education, health, and other facilities. Better roads will provide improved market access, which in turn will result in favorable input and output prices and improve the economic conditions of the rural communities.

Table 2: Overview of the Government program and the World Bank support



7. The Program will finance a geographical slice of the government program and target ten of the 56 rural counties. The government of Anhui Province has prioritized improvements in rural road networks and in the management of road and bridge assets in 10 counties based on the following criteria: (i) poverty level; (ii) climate vulnerability; (iii) condition of the road network; (iv) number of potential beneficiaries; (v) expected traffic volume; and (vi) contribution towards 13th Five-Year Plan connectivity targets. The population of the selected ten counties in eight municipalities (Figure 1) is about 12 million people (88 percent rural). About 9% (952,400) of the 12 million live below the poverty line. Eight of the ten counties (Yuexi, Shucheng, Funan, Linquan, Lixin, Si, Shou and Xiao) are designated as national poverty counties; one (Dingyuan) is a provincial poverty county, and the tenth (Hanshan) has high climate vulnerability resulting in recurring loss of rural livelihoods. Some of the ten counties rely entirely on road infrastructure in the absence of railways, air, or water transport.

Figure 1: Map of 8 municipalities of Anhui Province participating in the PforR



8. In order to improve aggregate economic development through better access to markets and livelihood opportunities, the Program is designed as a results-based approach with the three Result Areas supported by the five Programs described below.

Result Area 1: Improve Rural Road Safety and Connectivity

9. This Result Area will be supported by the activities under STP, SRP, and NVRP. The proposed scope will include upgrade, rehabilitation and pavement improvement of selected roads in the ten participating counties: Dingyuan, Funan, Hanshan, Linquan, Lixin, Shucheng, Si, Shou, Xiao, and Yuexi. Based on preliminary estimates Bank support to STP will finance the upgrade and reconstruction of about 10,299 km of the rural roads (of the 72,000 km of rural roads in the entire Province). The total length of the rural road network planned for improvement under the SRP in Anhui Province is about 31,287 km, at an estimated cost of RMB5.5 billion; of this, 3,457km is planned to be completed in the ten counties by 2020 and 775 km has been completed in 2016 (22.4% of the total length planned for the ten counties).

10. **Program A – STP and NVRP.** The government’s Smooth Traffic Program was 77 percent completed as of June 2017. The Program A covers the following activities:

- *Smooth county-and-township road sub-program* – (a) upgrading and reconstruction of selected county or township roads to enable each town and township in the province to have at least one Class III or above road connecting to county centers or national and provincial trunk highways; and (b) pavement improvement of selected county or township roads to enable each town and township in the province has at least one Class IV or above road connecting to neighboring towns and townships.
- *Smooth village road sub-program* - widening or paving of selected villages, especially the most disadvantaged villages in the 10 Program counties.

- *Natural Village Road Program (NVRP)* - paving of selected village roads to provide access for all large natural villages to existing highways (a minimum width of 3.5 meters on a minimum platform width of 4.5 meters). The NVRP will take over the STP starting 2019. Provincial authorities are still debating the size of the NVRP. There are two options. The first option is to connect natural villages with 50 households or more in plain areas located in the north of Anhui Province; 40 households or more in hilly areas located in the Yangtze River and Huai River; and 30 households or more in Dabie Mountain and mountain areas in the South of Anhui Province. Under this option, the NVRP would need to finance 45,000 km at an estimated cost of RMB22.5 billion, of which RMB9.9 billion would be from provincial subsidies. The second option is to connect all-natural villages with 40 households or more in plain areas located in the north of Anhui Province; 30 households or more in hilly areas located in the Yangtze River and Huai River; and 20 households or more in Dabie mountain area and mountain areas in the South of Anhui Province. Under the second option, the NVRP would need to finance 56,000 km at an estimated cost of RMB32.5 billion, of which RMB14.3 billion would be from provincial subsidies.

11. **Program B - SRP** aims to address infrastructure safety hazards along 3,450 km of rural roads. It will support the activities including improvement of rural road signs, markings, installation of guardrail and roadside hazard management, as well as other safety facilities aimed at speed calming or improving conditions for vulnerable road users. The PforR will also support collection of data on traffic crashes, operating speed, road and roadside conditions, etc.; as well as safer road designs based on a catalogue of ChinaRAP recommended road safety countermeasures for critical locations.

12. The participating counties together with relevant departments will conduct on-site investigations and develop and verify the designs of road safety interventions. Interventions will introduce road safety countermeasures at critical locations, such as the addition of lanes, the widening of narrow road sections, reinforcement of dangerous bridges, improvement of road signs and marking, installation of guardrails, introduction of village gateway treatments aimed at calming speeds and protecting vulnerable road users, traffic management, and speed limits. The Program will strengthen the current approach that employs the Ministry of Transport's (MOT) "*Technical guidelines for road safety program implementation*" by integrating the ChinaRAP (China Road Assessment Program, under the Ministry of Transport Research Institute of Highway) methodology. Compared to the current approach, which is based on visual condition assessment and is more subjective, the ChinaRAP methodology is a data-driven approach that uses international good practice adapted to the Chinese context.

Result Area 2: Maintain Good Quality Rural Roads

13. This Result Area will be supported through the activities under the BIP and RMP. The proposed scope will include the rehabilitation of 341 bridges (about 9,838 linear meters) and maintenance of about 27,952 km annually in the ten counties. The proposed Program support to the BIP would represent about 34% of the entire Provincial program. Similarly, support to the RMP would represent about 17.5% of the entire Provincial program. Results will be captured by the indicators "linear meters of bridges rehabilitated with safety and resilience features" and "km of road maintained"; these comprise bridges of the rural network where rehabilitation has been carried out and all sections of roads where maintenance activities have been recorded.

14. **Program C – BIP** plans to improve and/or repair 341 rural bridges representing 9,838 linear meters by 2022. Most of the bridges are old, some of them date back to 1950s and 1960s, and were built based on obsolete standards. A number of rural bridges were also built by local farmers without any design. The condition of the bridges has further deteriorated due to lack of repairs and maintenance.

15. **Program D – RMP** aims to maintain 27,952 km of the whole rural road network in 10 Program counties annually. The PforR will support the rural road maintenance activities comprising of: (a) routine maintenance (grass cutting, ditch cleaning, culvert cleaning, slopes, etc.); (b) small maintenance (crack and fog sealing, etc); (c) periodic maintenance (thin asphalt/cement overlays, etc); (d) rehabilitation (surface rejuvenating, etc); and (e) improvement (reconstruction of the whole pavement structure, etc). The situation on the maintenance of rural roads is similar to that of the bridges. However, the rural road maintenance industry is catching up, and has mastered relevant techniques, including cold asphalt patching, milling and in-situ recycling, as well as modern sealing procedures and material. Each of the ten counties has prepared a set of detailed interventions.

Result Area 3: Strengthen Institutional Capacity

16. This Result Area will provide support to the Program E - Institutional Capacity Building for the municipal- and county-level transport bureaus in better management of rural road and bridge assets, road safety, and climate resilience infrastructure.

- a. *Reform of the various institutions involved in road management at the municipal and county level.* This activity will put in place an assessment of the performance of the local authorities based on the “Four-Excellence” program initiated in 2014. The reform wants rural roads to develop in accordance with the local context, being human-centered, and adapted to the layout of villages and towns. Anhui provincial authorities are committed to assessing the performance of local authorities based on the first three objectives: (i) construction, i.e., all townships and administrative villages should have paved roads to access the main network by 2020; (ii) management, i.e., county and township level governments should be solely responsible to manage rural roads and rural road management finance should be incorporated into local budgets; and (iii) maintenance, i.e., all rural roads should receive maintenance and the cumulative percentage of county and township roads in excellent and good condition should be above 75%. The last objective (operation, i.e., all administrative villages should be provided with bus services) will be addressed separately a later stage. The PMO has designed an evaluation framework to measure progress on construction, management and maintenance for each county. The framework is translated into DLI#3 against which USD10 million will be disbursed.
- b. *Training.* This activity will help local staff in the counties to deal with the preparation and implementation of bridge reconstruction works, as well as county-level and township-level road upgrading projects. Technical training will cover activities such as asset management and monitoring, preparation of upgrading and maintenance plans

- together with the financial aspects of these activities, introduce new construction technologies and new materials. In terms of institutional management, training will focus on departing from the current traditional management methods and introduce data collection, management of GIS and open source data, and provision of information to the users on road condition and traffic interruption. Training would also help in organizing routine maintenance better.
- c. *Research.* The Program will allow further exploration of the use the GIS database to prioritize interventions and help decision makers in supporting resilience and road safety. Further work is needed to factor climate change monitoring techniques and adaptation strategies into the rural road asset management system. The Program will also support research of (i) the development and application of project management system; and (ii) rural road condition evaluation standards to investigate and analyze existing shortcomings in terms of standards, depending on parameters such as traffic, geological and geographical conditions, and economic development forecast.
 - d. *Innovations in Monitoring and Evaluation.* The web-based rural accessibility tool, the street-view mapping app, and the road roughness estimation app were introduced by the Bank to the APDOT and to the transport bureaus from the ten counties. These tools will be tested further during the implementation of the Program. The PMO would use the web-based rural accessibility tools to measure results.
 - e. *Impact of the Program on poverty reduction.* Institutional capacity building activities will include the preparation of a report assessing the impact of rural road programs on poverty reduction. The report will be based on a GIS analysis of accessibility improvement as a result of the expanded and more reliable rural road network built during the 13th Five-Year Comprehensive Transport Plan. The Bank will provide support to the PMO in this analysis.

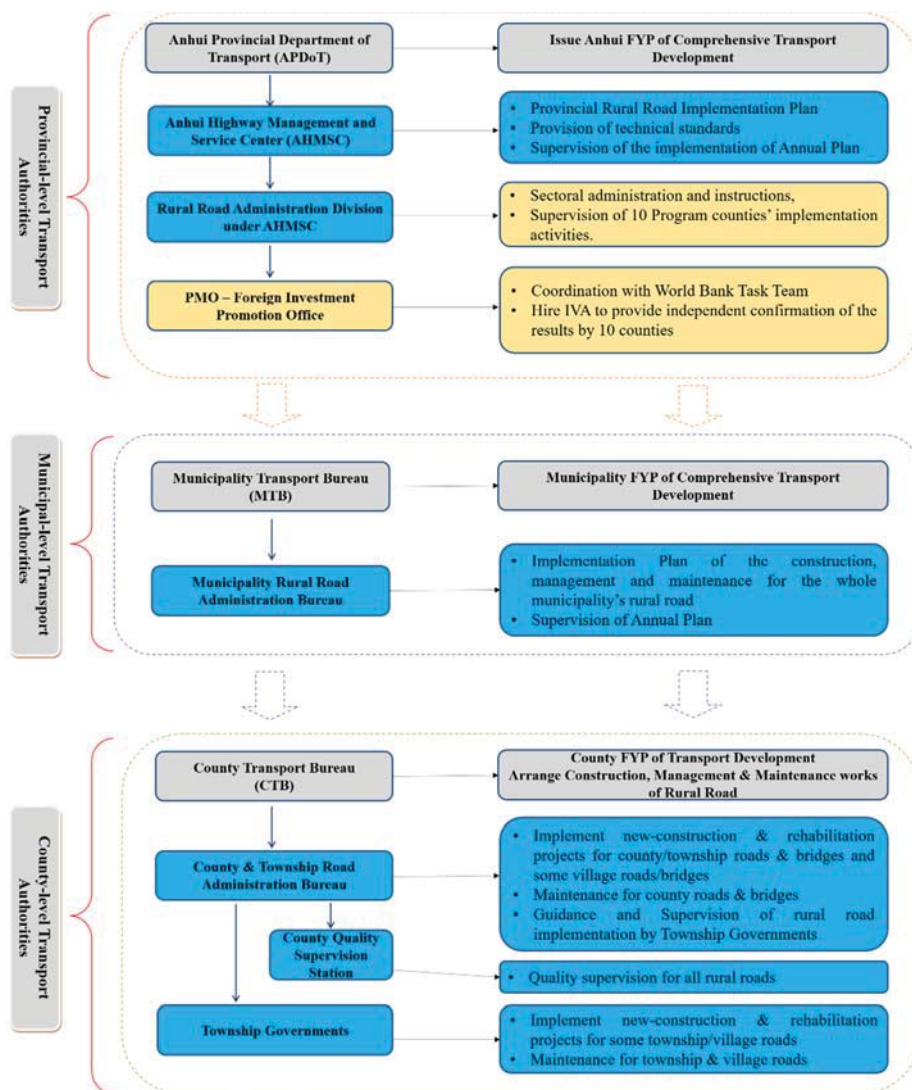
17. The PMO has prepared a three-stage plan to roll out successful pilot activities to cover the entire Province: (i) during 2018 to late 2021, the PMO will identify and prepare institutionalization of successful experiences in construction, management, maintenance and operation of rural roads; (ii) in 2021, the last full year of the Program, dissemination will be expanded to an additional 20 counties; (iii) comprehensive dissemination will start one year later, based on the experience of the second phase and leading to a sustainable development of rural road construction and management in Anhui province. Embarking on a very decentralized program of rural road development based on PforR principles will also be an innovation worth sharing with other provinces, as well as outside China. The World Bank “knowledge platform” will be used for dissemination. In addition, seminars will be organized during implementation to reach other provinces and other countries in the sub-region, in Africa, and in other countries still coping with inadequate management of their rural road network.

Implementation Arrangements

18. Based on the existing implementation arrangements of the government program, the Program will be implemented by AHMSC, eight MTBs, ten CTBs and related Township

Governments, as shown in Table 3. The Rural Road Administration Division of AHMSC will provide sectoral administration, instructions, and supervision of program activities. The eight MTBs and ten CTBs will be jointly responsible for day-to-day program implementation, including for Program management, procurement, safeguards, monitoring and reporting.

Table 3: Institutional Arrangements for Program Implementation



19. To better support the PforR, the Program Management Office (PMO) will be housed at FIPO under APDOT. The PMO will be responsible for overall coordination and communications with the World Bank. The PMO has successfully implemented several projects co-financed by the World Bank, and has demonstrated strong capacity for overall coordination and smooth delivery of projects financed by IFIs.

20. The PMO and AHMSC will chair quarterly progress meetings with all stakeholders. In addition, meetings will be conducted on an ‘as needed’ basis to share knowledge and learning

between the participating municipalities and counties, and to conduct workshops and training on focused topics.

21. **Independent Verification Agent.** An IVA will be hired by the PMO to verify the achievement of the DLIs. The IVA will provide independent confirmation of the results reported by the AHMSC, the bureaus of eight municipalities and the ten counties to the Ministry of Finance and the Bank. The verification of the DLIs will be conducted in accordance with the agreed verification protocol detailed in the TOR for the IVA.

22. **Fraud and Anticorruption Arrangement.** To date, there has been no indication or historical precedent that any participating agencies, or their staff members in Anhui province have been engaged in mismanagement or malpractice leading to a record of fraud or corruption. Potential fraud and corruption at all government levels are closely monitored and investigated by the special investigation group of the central government for further legal procedures.

ANNEX 2: RESULTS FRAMEWORK

PDO Indicators by Objectives / Outcomes		DLI #	Unit of Measure	Baseline	Intermediate Targets (IT)					End Target
					CY2018	CY2019	CY2020	CY2021	CY2022	
Objective/ Outcome 1	PDO Indicator 1 County and township roads in excellent and good condition (Percentage)		%	60	65	70	75	75	75	75
Objective/ Outcome 2	PDO Indicator 2 Rural roads maintenance coverage rate (all rural roads)		%	50	62	74	86	98	98	98
Objective/ Outcome 3	PDO Indicator 3 Rural road network management capacity improved through institutional reform		#	0	0	10	10	10	10	10

Intermediate Results Indicators by Results Areas		DLI #	Unit of Measure	Baseline	Intermediate Targets (IT)					End Target
					CY2018	CY2019	CY2020	CY2021	CY2022	
Results Area 1	IR Indicator 1.1: Rural roads improved with resilience and safety features	1	km	0	3,207	4,112	5,014	5,014	5,014	5,014
Results Area 2	IR Indicator 2.1: Bridges reinforced, demolished and/or reconstructed with resilience and safety features	2.1	linear m	0	-	3,308	7,540	8,899	8,899	8,899
	IR Indicator 2.2: Rural roads maintained with resilience and safety features	2.2	km	0	-	13,720	16,771	19,566	22,360	22,360
Results Area 3	IR Indicator 3.1: Number of counties that have incorporated 'Construction, management and maintenance excellence' criteria into annual performance assessment conducted by	3	#	0	0	10	10	10	10	10

	corresponding municipality									
	IR Indicator 3.2: Number of counties that the “Four-Excellence” program is rolled out beyond 10 Program counties	#	0	0	0	0	20	20	20	
	IR Indicator 3.3: Number of counties with routine rural roads database updates	#	0	0	10	10	10	10	10	

Monitoring & Evaluation Plan: PDO Indicators	
PDO Indicator I	County and township roads in excellent and good condition (Percentage)
Definition/Description of Indicator	This indicator comprehensively assesses the road condition improved through road upgrading, rehabilitation and maintenance. It measures PDO aspects of “rural road network connectivity, safety, and quality”.
Frequency	Annual
Data Source	10 CTBs
Methodology for Data Collection	The data is included in annual reports of 10 CTBs. Road condition is measured according to Chinese National Standards, Highway Technical Condition Evaluations Standard (JTG H20-2007) issued by the MOT. The core indicator is Pavement Quality Index (PQI). PQI is measured by certified agency using professional pavement quality evaluation devices. CTBs conduct PQI measurement for all county and township road annually.
Responsibility for Data Collection	AHMSC, 10 CTBs
PDO Indicator II	Rural roads maintenance coverage rate (all rural roads) (Percentage)
Definition/Description of Indicator	This indicator reflects Result Area II - Maintain good quality rural roads and measures the “quality” aspect of the PDO. It covers all maintenance aspects: (a) routine maintenance; (b) small maintenance; (c) periodic maintenance; (d) rehabilitation; and (e) improvement. Rural roads maintenance coverage rate = (km of rural roads maintained / km of rural road network in 10 counties) * 100%
Frequency	Annual
Data Source	10 CTBs
Methodology for Data Collection	Annual reports of 10 CTBs include the km of rural roads maintained annually and km of rural road network in 10 counties.
Responsibility for Data Collection	AHMSC, 10 CTBs
PDO Indicator III	Rural road network management capacity improved through institutional reform
Definition/Description of Indicator	This indicator reflects the Result Area III – Strengthen institutional capacity and measures the “management” aspect of the PDO.
Frequency	Annual

Data Source	Progress report by PMO, and review by WB during missions
Methodology for Data Collection	If the intermediate indicators 3.1, 3.2, 3.3 targets are achieved annually, this PDO indicator target would be evaluated as achieved as a “YES”.
Responsibility for Data Collection	PMO & AHMSC
Monitoring & Evaluation Plan: Intermediate Results Indicators	
IR Indicator 1	Rural roads improved with resilience and safety features
Definition/Description of Indicator	Cumulative kilometers of completed road rehabilitated or improved from the government program pool, with safety and resilience features (<i>detailed in DLI 1 description</i>)
Frequency	Annual
Data Source	10 CTBs
Methodology for Data Collection	Progress reports produced by CTB on the basis of information from contractors and supervision consultants
Responsibility for Data Collection	AHMSC, 10 CTBs
IR Indicator 2.1	Bridges reinforced, demolished and/or reconstructed with resilience and safety features
Definition/Description of Indicator	Cumulative linear meters of bridges reinforced or reconstructed from the government program pool with safety and resilience features (<i>detailed in DLI 2.1 description</i>)
Frequency	Annual
Data Source	10 CTBs
Methodology for Data Collection	Progress reports produced by CTB on the basis of information from contractors and supervision consultants
Responsibility for Data Collection	AHMSC, 10 CTBs
IR Indicator 2.2	Rural roads maintained with resilience and safety features
Definition/Description of Indicator	Cumulative kilometers of roads maintained with safety and resilience features (<i>detailed in DLI 2.2 description</i>)

Frequency	Annual
Data Source	10 CTBs
Methodology for Data Collection	Progress reports produced by CTB on the basis of information from contractors and supervision consultants
Responsibility for Data Collection	AHMSC, 10 CTBs
IR Indicator 3.1 – 3.3	Number of counties that have incorporated “Construction, management and maintenance excellence’ criteria into annual performance assessment conducted by corresponding municipality
Definition/Description of Indicator	The description is self-explanatory (<i>detailed in DLI 3 description</i>)
Frequency	Annual (starting from 2019)
Data Source	8 municipalities
Methodology for Data Collection	Official documents from 8 municipalities as references and review by AHMSC and WB during missions
Responsibility for Data Collection	AHMSC
IR Indicator 3.2, 3.3	The “Four excellence” program is rolled out beyond 10 counties (Yes/No to how many counties) Number of counties with routine rural roads database updates
Definition/Description of Indicator	The description is self-explanatory. The assessment is qualitative, leading to a fail or pass result.
Frequency	IR indicator 3.2 – Once IR indicator 3.3 - Annual
Data Source	AHMSC, CTBs
Methodology for Data Collection	Progress report by PMO and review by WB during missions
Responsibility for Data Collection	PMO, AHMSC

ANNEX 3: DISBURSEMENT LINKED INDICATORS, VERIFICATION PROTOCOLS AND BANK DISBURSEMENT

	Total Financing Allocated to DLI	As % of Total Financing Amount	DLI Baseline	Indicative timeline for DLI achievement (calendar years)				
				Year 2018	Year 2019	Year 2020	Year 2021	Year 2022
DLI 1: Rural roads improved with resilience and safety features (STP, NVRP, SRP /km) ⁷			0	3,207	905	902	--	--
Allocated amount:	USD79,722,600	39.8613		USD50,991,300	USD14,389,500	USD 14,341,800	--	--
DLI 2.1: Bridges reinforced, demolished and/or reconstructed with resilience and safety features (linear m)			0	0	3,308	4,232	1,359	If any left
Allocated amount:	USD35,596,000	17.7980		0	USD13,232,000	USD16,928,000	USD5,436,000	If any left
DLI 2.2: Rural roads maintained with resilience and safety features (km)			60% of annual target km	--	13,720	16,771	19,566	22,360
Allocated amount:	USD74,681,400	37.3407		--	USD18,670,350	USD18,670,350	USD18,670,350	USD18,670,350
DLI 3: Number of counties that have incorporated "Construction, management and maintenance excellence" criteria into annual performance assessment conducted by corresponding municipality			0	0	10			
Allocated amount:	USD10,000,000	5		0	USD10,000,000			
Total Financing Allocated:	USD 200,000,000	100		USD 50,991,300	USD 56,291,850	USD 49,940,150	USD 24,106,350	USD 18,670,350

⁷ For the activities after CY 2018, the WB will review the NVRP that will take over the current ongoing STP to make sure that this program and the related activities that will cover the implementation after CY2018, will still align with the objectives of the project. If this is not the case, the PforR would need to be adjusted, probably through a restructuring of the original project.

Disbursement Linked Indicators: Verification Protocol Table	
DLI 1	Rural roads improved with resilience and safety features (STP, NVRP, SRP /km)
Description	Cumulative kilometers of completed road rehabilitated and/or improved from the government program pool, with safety and resilience features (e.g., traffic signs and markings, speed bumps, guardrail, village gateway treatments/speed calming, drainage, and retaining wall)
Data source/ agency	10 CTBs
Verification Entity	IVA
Procedure	<p>Twice a year, IVA collects project completion and transfer reports prepared by the CTBs, via the PMO. The report will include (but not be limited to): (a) working start date and end date; (b) statement on safety features included and corresponding standard; (c) statement on surface thicknesses and applied standard; and (d) statement on drainage and retaining wall placement and design standard applied.</p> <p>IVA will prepare a memo and include the relevant documentation for the Bank verification for disbursement. For the activities after CY 2018, the WB will review the program that will take over the current ongoing Smooth Traffic Program to make sure that this program and the related activities that will cover the implementation after CY2018, will still align with the objectives of the project. If this is not the case, the payments will be halted until the PforR is adjusted, probably through a restructuring of the original Program.</p>
DLI 2.1	Bridges reinforced, demolished, and/or reconstructed with resilience and safety features (linear meter)
Description	<p>Twice a year, IVA collects project completion and transfer reports prepared by the CTBs, via the PMO. The report will include (but not be limited to): (a) working start date and end date; (b) statement on safety and resilience features included and corresponding standard.</p> <p>IVA will prepare a memo and include the relevant documentation for the Bank verification for disbursement.</p>
Data source/ agency	10 CTBs
Verification Entity	IVA
Procedure	<p>Twice a year, IVA collects project completion and transfer reports prepared by the CTBs, via the PMO. The report covers 13,720km that are to be maintained annually in the 10 counties. The report will include (but not be limited to): (a) working start date and end date; (b) statement on safety and resilience features included and corresponding standard. IVA will review maintenance activities reported by each county and will visit a minimum of 100km and 10 sites per county together with representatives of maintenance units.</p>

	IVA will prepare a memo and include the relevant documentation for the Bank verification for disbursement. The report will state the proportion of the network that is maintained according to the above standards.
DLI 2.2	Rural roads maintained with resilience and safety features (km)
Description	Cumulative kilometers of roads maintained with safety and resilience features for all maintenance aspects: (a) routine maintenance; (b) small maintenance; (c) periodic maintenance; (d) rehabilitation; and (e) improvement. (the road is safer after the maintenance intervention; no hazard and proper signalization during works; proper drainage and good evenness of road surface after maintenance activities; proper patching and proper compaction of potholes repairs; periodic lab tests of surface treatment and road overlay works; replacement of obsolete routine and periodic maintenance equipment).
Data source/ agency	10 CTBs
Verification Entity	IVA
Procedure	<p>Once a year, IVA collects project completion and transfer reports prepared by the CTBs, via the PMO. The report covers the extension of the road network that is to be maintained annually in the 10 counties. The report will include (but not be limited to): (a) working start date and end date; (b) statement on safety and resilience features included and corresponding standard. IVA will review maintenance activities reported by each county and will visit a minimum of 100km and 10 sites per county together with representatives of maintenance units.</p> <p>IVA will prepare a memo and include the relevant documentation for the Bank verification for disbursement. The report will state the proportion of the network that is maintained according to the above standards. 100% satisfactory maintenance over each year's target km will result in the disbursement of the full allocation for the year. Otherwise, the disbursement will be equivalent to the share of target km actually maintained in the given year equal or above the minimum threshold. The minimum threshold to trigger disbursements is 60% satisfactory maintenance over each year's target km. If the minimum threshold is not reached, the loan allocation for such year will be cancelled. If the minimum threshold is complied with, any remainder of the loan allocation for that year will be rolled over to the next year, added to the allocation for that year, and disbursed according to actual targets achieved.</p> <p>The formula to calculate the Percentage of Achievement: $\text{Actual Achievement of the year (km) / FY Target (km) x Allocation amount per FY.}$</p>

DLI 3	Number of counties that have incorporated “Construction, management and maintenance excellence’ criteria into annual performance assessment conducted by corresponding municipality
Description	The description is self-explanatory.
Data source/ agency	10 CTBs
Verification Entity	IVA
Procedure	<p>IVA will prepare a report per county once that a county believes an evaluation mechanism has been officially established by county government to assess the rural road sector performance. The areas of performance evaluation should at least include the followings:</p> <p>(a) Excellence in construction: At least four of the five following objectives are met on a regular basis: (i) 80 percent of the planned construction task for the year is executed; (ii) appropriate technical standards are applied for county and township roads; (iii) procedures from the initial design to the completion of the works are applied in a satisfactory manner; (iv) the engineering addresses quality and safety in the construction; and (v) ancillary facilities such as drainage systems, bus stops and parking are built along with the main infrastructure.</p> <p>(b) Excellence in management: (i) The county and township-level rural road management organizations should be operational and capable of performing standard management operations; (ii) recurrent costs for those organizations are part of the budget of the county administrations; (iii) management of rural roads is part of the evaluation of county governments; and (iv) expenditures related to rural roads are disclosed.</p> <p>(c) Excellence in maintenance: (i) routine maintenance activities for county and township levels should be fully funded and taking place on, at least, 70 percent of the respective networks; (ii) promotion of market-based maintenance; and (iii) periodic maintenance and rehabilitation should be fully funded and suffice to repair at least 4 percent of the county and township roads annually.</p> <p>The IVA will recommend, and the PMO and WB will review and agree on whether a performance evaluation mechanism is established and be consistent with the above criteria. Payment will be processed based on the outcome of the review.</p>

Bank Disbursement Table (Template)

<i>#</i>	<i>DLI</i>	<i>Bank financing allocated to the DLI</i>	<i>Of which Financing available for Prior results</i>	<i>Deadline for DLI Achievement</i>	<i>Minimum DLI value to be achieved to trigger disbursements of Bank Financing</i>	<i>Maximum DLI value(s) expected to be achieved for Bank disbursements purposes</i>	<i>Determination of Financing Amount to be disbursed against achieved and verified DLI value(s)</i>
DLI 1	Rural roads improved with resilience and safety features	USD79,722,600	USD50,000,000	2021	n-a	5,014	Linear (based on KM)
DLI 2.1	Bridges reinforced, demolished, and/or reconstructed with resilience and safety features	USD35,596,000	0	2022	n-a	8,899	Linear (based on Linear Meter)
DLI 2.2	Rural roads maintained with resilience and safety features	USD74,681,400	0	2022	60% of annual target km	n-a	Percentage of Achievement: Actual Achievement of the year (km) / FY Target (km) x Allocation amount per FY.
DLI 3	Number of counties that have incorporated "Construction, management and maintenance excellence" criteria into annual performance assessment conducted by corresponding municipality	USD10,000,000	0	2021	1	10	Pass or fail

¹If the DLI is to be achieved by a certain date before the Bank Financing closing date, please insert such date. Otherwise, please insert the Bank Financing closing date.

² If the DLI has to remain at or above a minimum level to trigger Bank disbursements (e.g. DLI baseline), please indicate such level.

³ Please insert the DLI value(s) above which no additional Bank financing will be disbursed.

⁴Specify the formula determining the level of Bank financing to be disbursed on the basis of level of progress in achieving the DLI, once the level of DLI achievement has been verified by the Bank. Such formula may be of various types, including pass/fail, linear, or other types as may be agreed between the Bank and the borrower.

ANNEX 4: TECHNICAL ASSESSMENT SUMMARY

INSTITUTIONAL CONTEXT AND CAPACITY ASSESSMENT

1. At the provincial level, AHMSC under APDOT leads the government program and provides strategic guidance and advice during its implementation. AHMSC is also the technical lead for rural road standards, specifications, and cost norms for road and bridge rehabilitation, maintenance, and safety.
2. At the municipal level, Municipal Rural Road Administration Bureaus under Municipality Transport Bureaus (MTBs) are responsible for the planning and supervision of all the rural road activities around the municipality.
3. At the county level, County Transport Bureaus (CTBs) are the main implementing agencies for the development of the rural road network, which consists of county, township, and village roads.
 - **County Roads:** CTBs are responsible for the construction, rehabilitation and maintenance of county roads. County Quality Supervision Stations (CQSS) conduct quality control.
 - **Township and Village Roads:** Depending on the County governments' arrangements, the construction and rehabilitation can be implemented by either a county CTB or Township government. The maintenance of township and village roads is conducted by Township governments. The CTBs and CQSSs are required to provide technical guidance and quality supervision for above activities.

A. General Project Cycle for Rural Road Project

4. **Project Planning.** County governments are responsible for managing the rural road network, and CTBs prepare the annual implementation plan of rural road development, including under the four programs.
 - **STP:** In late 2015, after public consultation, the CTBs submitted to the MTBs the proposed project pool and funding requests for STP 2016-2018. After review, in January 2016 the MTBs submitted the proposal to APDOT. APDOT conducted sampling field survey, finalized, approved, and issued the STP project pool in March 2016.
 - **SRP:** In 2015, APDOT asked the MTBs and CTBs to inspect all the rural road sections with potential safety issues, and establish a *Road Safety Issues Database*. MTBs collect annual SRP implementation plans from all counties, and compile the Municipality SRP Plan.
 - **BIP:** Each October during the 13th FYP period, the CTB submits the bridge rehabilitation plan and funding requests for the following year to the MTB. The MTB summarizes the counties' plans and submits to APDOT for review and approval. APDOT organizes panel review, conducts a 7-day public disclosure, then finalizes and approved the BIP plan.
 - **RMP:** CTBs compile annual RMP plan based on the subsidies received from APDOT and Municipality governments.

5. **Project Design Approval.** For county roads, Municipal RRABs are responsible to review the preliminary design and construction drawings, and submit for approval to the MTBs. For township and village roads, CTBs are responsible to provide approval.
6. **Bidding.** The CTBs or township governments organize the bidding and award the contracts to qualified contractors and contract supervision agencies.
7. **Implementation.** The CTBs/Township Governments are responsible for routine supervision of project management, quality monitoring, safeguard, and project progress. The CQSSs carry out routine/selective inspection on the ongoing projects.
8. **Supervision.** Provincial, Municipal and County level authorities (Transport and Finance bureaus) conduct annual supervision of program implementation to verify its completeness and compliance with basic implementation protocols and engineering quality. The county authorities are required to conduct 100% supervision of all projects.
9. **Quality Control.** Quality supervision is the most crucial part of rural road implementation. Currently the adopted protocol for project acceptance is Self-inspection(contractor) → Selective inspection by contract supervision agencies → Third-party inspection (hired by CQSS) → Municipal/County QSSs → Inspection by Provincial & Municipal level transport authorities.
10. **Engineering Acceptance and Completion Acceptance.** For county /township roads and medium-size bridge rehabilitation, there are two-stage acceptance. For villages roads and small bridge rehabilitation, the two stages acceptance could be combined.
 - Engineering acceptance, conducted by the related transport authorities and QSSs, mainly evaluates the engineering quality and contract implementation;
 - Completion acceptance is conducted one or two years after engineering acceptance to evaluate the engineering quality, related agencies performance, and project completeness. It is done jointly by related transport authorities, finance bureaus, and auditing bureaus. CTBs issue the project completion report afterwards.

B. Capacity of the Implementation Agencies

11. During the last decade, the Anhui Province administration has developed strong skills to deal with the highways in terms of construction, asset management, periodic and routine maintenance, however, the situation regarding rural roads, and its management by the county administrations remains far more problematic. Rural roads development in Anhui province still lacks adequate planning and management, as the need for national highways remained a priority in the past.
12. The current rural roads management strategy and the organizational chart are not optimal. Counties lack skilled staff, equipment and financing to meet periodic and routine maintenance needs. The coordination at county and regional levels remains weak. Small township and villages are responsible for a small network and therefore they cannot afford to employ the technically qualified staff they need (i.e., they lack any economies of scale). Those administrations are also missing sufficient revenues and - in deep rural areas - may also have difficulty finding labor to carry out the road works. Moreover, the roles and responsibilities of the CTBs and township governments are not always clearly defined. The decentralization reform has resulted in some

uncertainties about roles, accountability, and coordination between different stakeholders and has also delegated road asset management to administrative levels that are less developed compared to the provincial levels, which was previously assuming these obligations.

13. The lack of connectivity for villages has been only addressed through new constructions. Provision for maintenance of the road network was not considered a priority. The focus on maintenance is recent, which explains that the capacity for road maintenance is lower than for the road development. Some Road Asset Management System (RAMS) is in place in most of the municipalities, and data for the main roads are collected on a two-year cycle; however, the system output is not fully used in decision making, and business processes have not been reformed to take advantage of the capabilities linked to RAMS. Rehabilitation and periodic maintenance works are delivered effectively. However, the data used for their design is very basic, which raises concerns on the efficiency of those activities. There are many shortcomings in most asset management–related capabilities.

14. Although routine maintenance is applied with low efficiency, the road authorities find it difficult to improve it, mainly because the work is done in-house, the work force is ageing, and there are constraints in hiring replacements to retiring staff. For the above reason, it is important that the staff at county level be trained to strengthen their technical knowledge and maintenance management skills.

TECHNICAL SOUNDNESS

Status of Implementation of STP, SRP, BIP, and RMP and proposed contribution by the Bank

15. Implementation results delivered so far under the STP, SRP, BIP, and RMP are quite impressive and are summarized below.

16. STP: Implementation of Smooth Traffic Program is well underway (Table 1). The total length of the rural road network planned under the STP in 10 Program counties is about 10,299km with total cost estimation as RMB7.2 billion. Since STP is being implemented already, areas for improvement have been identified. PforR will address significant shortage in the county-level financing, where rural roads continue being constructed based on a relatively low-quality standard and fail the requirement of a fast-growing traffic volume.

Table 1: Targets and Status Implementation of Smooth Traffic Program in 10 counties

County	Unit	Completed in 2016	Targets for 2017-2018
Ten Counties	Length of Roads (km)	7,967	2,332
	Cost (RMB million)	5,655	1,509

17. SRP: The total length of the rural road network planned for improvement under the SRP in Anhui Province is about 31,287 km with total cost estimation of RMB5.5 billion. About 3,457km out of 31,287 km is planned to be completed in the 10 counties by 2020, and out of which 775km has already been completed in 2016 (22.4% of the total length planned in 10 counties). The

proposed World Bank activities for the support to the SRP will represent about 11% of the entire Province program.

Table 2: SRP Implementation Targets and Schedule of Completion in 10 counties

County	Unit	Completed in 2016	Targets for 2018-2020
Ten Counties	Length of Roads (km)	775	2,682
	Cost (RMB million)	65	254

18. **BIP:** Authorities in the 10 counties have implemented rehabilitation of about 939 linear meters of bridges out of the planned 9,838 linear meters of bridges to be completed by 2022 (Table 3). The proposed World Bank activities for the support to the BIP will represent about 34% of the entire Province program.

Table 3: BIP implementation Status and Targets in 10 counties

County	Unit	Completed in 2016	Targets for 2017-2021
Ten Counties	Number of Bridges	18	323
	Linear Meter	939	8,899
	Cost (RMB10,000)	3,328	32,901

19. **RMP:** The total length of the rural road network planned for maintenance under the RMP in Anhui Province is about 160,000 km with total cost estimation as RMB5.5 billion, out of which 27,952km is in the 10 counties. The proposed World Bank activities for the support to the RMP will represent about 17.5% of the entire Province program, the targets are presented in Table 4.

Table 4: Status of RMP implementation in 10 counties

County	County Road Length	Township Road Length	Village Road Length	2014-2016 Annual Road Maintenance Cost (RMB million)	2014-2016 Annual Road Maintenance (KM)
Ten Counties	2,617	5,687	18,918	799	13,720

Technical Standards

20. **General technical standards.** Although a system of standards and specifications for road works including design, construction, supervision, and acceptance aspects exists for all rural road works in Anhui (as listed in Table 5), the issues related to the quality of infrastructure, its resilience and safety are still a common concern. Therefore, the PforR would target addressing the gaps in this regard.

Table 5: General Technical Standards

Overall	Implementation Guidelines of Smooth Traffic Program in Anhui Province; Rural Road Regulations of Anhui Province (Announcement No.48, the Standing Committee of Anhui Provincial People's Congress, October 19, 2012)
Design	Highway Engineering Technical Standards (JTGB01-2014); Class IV roads: National Technical Standard of Highway Engineering (JTGB01-2003)
Implementation	Engineering Construction Standards - Mandatory Provisions (Highway Engineering Section) (Construction Standard No. 99, 2002)
Acceptance	Regulations on the Acceptance for Highway Projects (No. 65, 2010)

21. **Road Safety Design Standards.** Due to funding constrains, some of the existing roads are not designed to meet the road safety standards nor are they equipped with sufficient road safety facilities. The World Bank team requested the client to conduct the surveys on select government program roads during Program preparation to identify particularly high-risk components. The Program will mitigate these risks through targeted road safety infrastructure and facilities investments based on recommendations of the MOT’s ChinaRAP team through the creation of a road safety intervention catalog for critical locations. Interventions will be linked to “*Technical guidelines for road safety program implementation*” issued by the MOT in 2015.

22. **Damaged Bridge Rehabilitation Design & Implementation Standards.** The system of standards and specifications for bridge works including design, construction and acceptance aspects comply with national standards. The main documents to be used for the BIP are specified in following Table 6.

Table 6: Bridge Rehabilitation Design & Implementation Standards

Overall	Engineering Construction Standards - Mandatory Provisions (highway engineering part); Highway Engineering Quality Inspection and Evaluation Standards (JTGF80)
Design	Code for Foundation Design of Highway, Bridges and Culverts (JTGD63-2007); Code for Design of Highway and Bridge (JTGD61-2005); Code for Design of Highway and Bridge Reinforcement (JTGTJ22-2008)
Implementation	Technical Specifications for Highway, Bridge and Culvert Construction (JTGTJ50-2011)
Acceptance	Methods of Completion and Acceptance Works of Rural Roads Projects in Anhui Province (Anhui DoT [2007] No 19)

23. **Maintenance Quality Standards.** The maintenance quality evaluation is based on Road Maintenance Quality Supervision and Evaluation Standard (JTJ075-94). The core indicator of maintenance quality is Pavement Quality Index (PQI), which is measured by certified agency using professional pavement quality evaluation devices. In general, the maintenance contractors are paid at the beginning of the maintenance work by the county government. If the maintenance quality does not meet the requirement, the funding allocation for new roads constructions in the corresponding county is lowered the following year as a penalty. Responsible personnel are also supposed to receive administrative penalty as well.

24. **Climate Resilience Design Standards.** The Program area is located in the Northern, Western, and Eastern part of the Province's main rain areas (Dabie and Hanshan Mountains), with average annual rainfall of 750-1700 mm. There are great variations of rainfall in the northern part of the Province with frequent drought during the spring and floods during the summer. The PforR project roads will be designed to address such issues. Drainage will be designed for a flood frequency of 25 years and the road surface drainage designed for flood frequency of 3 years. The design will also include other standard drainage facilities, such as culverts, gutters, intercepting ditches, etc., to provide a comprehensive road drainage system. Also, the Program will reinforce the protection measures for land slide in the Program area (e.g., use of anchored retaining walls).

Risks

25. All previous, and ongoing Bank projects in Anhui province are successful in achieving their objectives. There are, however, there are two areas of concern identified during the preparation of the current project:

- **Data reliability:** Rural road condition data is missing and at township and village levels. The Project team has offered solutions for prioritization assessment, using direct assessment of pavement condition (RoadLabPro smartphone application). Such solution can be fast, low-cost, and yet reliable. The data that needs to be collected by visual survey in terms of pavement type and condition, to process planning and prioritization should be crosschecked.
- **Local Road Bureaus' human capital.** Human capital is a concern for the Project. Effective annual road data collection may be difficult to carry due to low staff resources and weak capacity at county, township and village levels, especially where the road networks or bridges are widespread or complex. This may lead to incorrect maintenance demand and wrong selections and prioritizations of work. Moreover, the same capacity assessment of the implementing agency reveals a risk of having contract management issues because of the widespread location of the activities.

EXPENDITURE FRAMEWORK

26. The expenditure framework assessment was carried out to assess: (i) fiscal sustainability and funding predictability; (ii) alignment between budget allocation and execution; and (iii) efficiency of program expenditures. The assessment was conducted based on a review of the budget law, budget reports, and fiscal revenues and expenditures of the 10 participating counties.

27. China's inter-budgetary system consists of the central government and 34 province-level divisions. The provincial level consists of four layers of authority between prefecture-level cities, districts, counties, and townships. Tax revenues are shared between those different levels of governments. Significant shares of revenues are transferred from the Central Government to provinces, and from provinces to local governments, both in earmarked and general forms. These transfers are generally adequate to cover the gap between revenues and current expenditures at the subnational level. Subnational governments finance investment largely through borrowing and revenues from land. Until 2015, subnational governments could not borrow explicitly, but have borrowed significantly off budget through Local Government Financing Vehicles (LGFVs),

effectively using future land revenues as collateral. Since 2015, the Budget Reform allows explicit subnational for the first time for investment finance, while restricting the former off-budgetary schemes⁸.

28. Although upper level governments in China prepare a three-year Medium-Term Expenditure Framework (MTEF) on a rolling term, county governments are not yet used to this new practice. County governments still develop annual program based on annual budget allocations, function of the previous year's expenditure adjusted for inflation. Provincial government has high discretion in managing its relations with county governments in terms of revenue sharing and assignment of expenditure responsibility.

29. Government's high priority to invest in rural roads is evident in the current APFYCTP (2016-2020) and other policy documents and supported by annual allocations of the government budget to rural roads. Usually, rural road projects in Anhui are funded by provincial and national subsidies, local fiscal revenue and borrowing. Poor counties receive more subsidies. Following the national regulations, the funds are managed by government treasury system and maintained by the financial bureaus at provincial and county. Table 7 below presents the overview of Anhui rural transport program expenditures of the whole Province and of 10 participating counties from 2016 to 2022. The assessment of the Anhui rural transport program expenditures show that 10 participating counties' transport program expenditures are aligned with the Provincial transport program expenditures. The Province as well as counties plan to increase its capital investments in rural transport program in 2018, then gradually decrease it in the following years. With regards to operation and maintenance of rural roads, both plan to maintain its expenditures at the same level or invest more in the next five years.

Table 7: Overview of Anhui Rural Transport Program Expenditure (RMB billion)

	2016 (Actual)	2017 (Budgeted)	2018 (Projected)	2019 (Projected)	2020 (Projected)	2021 (Projected)	2022 (Projected)
Transport Expenditures							
Of the Whole Province	84.2	83.2	117.5	71.4	65.6	58.9	55.4
Of 10 Participating Counties	7.2	7.7	10.9	6.6	6.1	5.5	5.1
Rural Transport Expenditures							
Of the Whole Province	25.2	23.0	45.1	21.9	16.9	15.3	15.3
Of 10 Participating Counties	4.9	3.7	7.2	3.5	2.7	2.5	2.4
Rural Transport Expenditures - Capital Expenditure							
Of the Whole Province	24.4	22.2	45.7	21.7	14.1	12.0	12.2
Of 10 Participating Counties	3.9	3.3	6.8	3.2	2.1	1.8	1.8
Rural Transport Expenditures - Operating and Maintenance							
Of the Whole Province	0.8	0.8	1.2	1.4	1.5	1.6	1.7
Of 10 Participating Counties	0.1	0.1	0.2	0.2	0.3	0.3	0.3

Source: Anhui Province and 10 participating counties' budget reports. Provincial data from 2018 to 2022 is the Bank's estimates based on Counties data.

30. To achieve the objectives of the programs, the government of Anhui Province has estimated the following financing plan during 2016-2020.

⁸ China Chongqing-Dadukou District Fiscal Sustainability Development Policy Financing Program Document, December 13, 2016

Table 8: Government Program Financing Plan during 2016-2020

Program	Targets (km)	Budget Projection (RMB billion)	Financing*		
			Provincial and National Subsidies (RMB billion)	Local Fiscal Revenue (RMB billion)	IFIs (RMB billion)
Smooth Traffic Program	72,000	48	11.5	13.2	23.2
Safe Road Program	31,287	5.5	1.3	1.5	2.7
Damaged Bridge Improvement Program	1,000 (Number)	0.9	0.2	0.3	0.4
Road Maintenance Program	160,000	5.5*7 years	1.3*7	1.5*7	2.7*7
Total		93	22.1	25.5	45.2

Source: Anhui Province 13th Five-Year Plan for Rural Road Development and PMO.

* The Bank's estimates based on PforR financing plan provided by the PMO

31. The PforR Program will support a portion of the government programs that will be implemented by 10 participating counties. Based on each county's annual development program, total Program expenditures are estimated at RMB3.586 billion. The county governments will support the expenditure framework through annual budgets executed by Provincial government. As the 2015 Budget Law imposes a hard budget constraint on subnational governments in China, the subnational governments will not be able to borrow from the commercial banks through off-budget financing vehicles. Table 9 presents the budget and financing plan of the Program from 2018 to 2022. The Program will be financed through provincial and national subsidies (about 23 percent), IBRD loan (about 37 percent) and local government's financing (about 40 percent).

Table 9: PforR Budget Projection and Financing Plan during 2018-2022

	Program	Provincial and National Subsidies (RMB million)	Local Fiscal Revenue + WB Loan (RMB million)	Total Investment (RMB million)
A	Smooth Traffic Program	516	1,313	1,829
B	Safe Road Program	300	1,391	308
C	Damaged Bridge Improvement Program			399
D	Road Maintenance Program			984
E	Institutional Strengthening		66	66
	Total	816	2,770	3,586

32. The participating counties spent the following cost per kilometer of rural roads in 2015 and 2016 (Table 10). However, expansion in rural roads connectivity has not been matched with road maintenance, which has been underfunded and exposed to challenges such as budgetary allocations

for maintenance being well below the required level, little modernization, lack of performance culture and accountability for results.

Table 10: Cost of Rural Roads per km (RMB million)

Participating County	County-level roads		Township-level roads		Village-level roads		Road Safety works		Maintenance works	
	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
Dingyuan*	1.50	1.50	1.00	1.00	0.40	0.40	0.10	0.08	0.85	0.85
Funan	1.57	1.60	1.00	1.05	0.30	0.35	0.10	0.08	0.96	1.04
Hanshan	3.50	4.00	1.80	2.00	0.70	0.80	0.08	0.08	1.30	1.50
Linquan	2.30	2.80	2.30	2.80	0.50	0.60	0.08	0.14	0.56	0.59
Lixin	1.50	1.60	1.00	1.00	0.23	0.25	0.10	0.82	0.73	1.00
Shou	1.96	2.00	1.69	1.80	0.50	0.50	0.07	0.09	0.77	0.76
Shucheng**	3.60	3.87	1.80	1.92	0.60	0.67	0.10	0.10	0.52	0.49
Si	2.80	2.89	2.13	2.25	0.57	0.60	0.08	0.07	1.25	1.27
Xiao	1.80	2.01	1.05	1.19	0.50	0.50	0.07	0.09	1.15	1.20
Yuexi	1.57	1.60	1.00	1.05	0.30	0.35	0.09	0.08	0.63	0.65
Average of 10 Counties	2.21	2.39	1.48	1.61	0.46	0.50	0.09	0.16	0.87	0.94

Source: Participating Counties

Note: Dingyuan* is a flat area, Shucheng** is a mountainous area.

33. The subsidy provision is graduated according to the county designation (15-20 percent more for provincial and national poverty counties) and by type of road. Subsidy disbursements are based on implementation progress, which is monitored and evaluated by the Provincial Highways Bureau. Brief description of source of funding of each sub-program and the subsidy standards are provided below in Table 11:

- i) **The Anhui Smooth Traffic Program** is funded by: (a) subsidies from national government; (b) subsidies from provincial government; (c) subsidies allocated by municipal and county governments; and (d) loans from commercial banks based on government approval level.
- ii) **The Road Safety and Bridge Improvement Program** is subsidized by provincial and national governments from vehicle purchase tax revenue.
- iii) **The Road Maintenance Program.** Special funds (about RMB450 million) are earmarked in the provincial budget for rural road maintenance in the form of fixed and comprehensive subsidies. The fixed annual subsidy is a function of road mileage - RMB7,000 per km for county, RMB3,500 for township and RMB1,000 for village roads. The comprehensive subsidy is allocated according to the proportion of rural road mileage in a given

jurisdiction, the relative weight of township and village roads, and the results of performance evaluation in the use of funds. The main sources of maintenance funds are transfer payments of fuel taxes and fiscal revenue of provincial, municipal and county governments.

Table 11: Subsidy standards set for rural roads programs in Anhui

Sub-Program	Source of funds	Standards
County level smooth traffic program	Central and provincial subsidies; and funds raised by the respective municipal and county governments	RMB600,000 per km to regular (non-poverty) county; RMB700,000 per km to provincial-level poor county; RMB800,000 per km to national-level poor county; and the remaining funds will be raised by the respective municipal and county governments in the proportion determined by the municipal governments.
Township-level smooth traffic program	Central and provincial subsidies; and funds raised by the respective municipal and county governments	RMB400,000 per km to regular county; 15% to 20% more subsidies to national-level and provincial-level poor counties; and the remaining funds will be raised by the respective municipal and county governments in the proportion determined by the municipal governments.
Existing village-level road widening and reconstruction program	Central and provincial subsidies; and funds raised by the respective county governments	RMB100,000 per km to regular county; 15% to 20% more subsidies to national-level and provincial-level poor counties; and the remaining funds will be raised by the respective county governments.
Pavement improvement program	Central and provincial subsidies; and funds raised by the respective county governments	RMB200,000 per km to regular county; 15% to 20% more subsidies to state-level and provincial-level poor counties; and the remaining funds will be raised by the respective county governments.
Road improvement program	Central and provincial subsidies; and funds raised by the respective county governments	RMB200,000 per km to regular county; 15% to 20% more subsidies to state-level and provincial-level poor counties; and the remaining funds will be raised by the respective county governments.
Road safety improvement program	Subsidized by provincial and national governments from vehicle purchase tax revenue	RMB50,000 per km to county and township roads in regular county; RMB70,000 per km to village roads in regular county RMB70,000 per km to county and township roads in national-level poor, undeveloped and remote area; RMB100,000 per km to village roads in national-level poor, undeveloped and remote area
Bridge improvement program	Subsidized by provincial and national governments from vehicle purchase tax revenue	Bridge reinforcement - RMB1,200 per m2 to regular county; RMB1,600 per m2 to national-level and provincial-level poor county, mountainous and remote area. Bridge reconstruction – RMB2,800 per m2 to regular county; RMB3,800 per m2 to national-level and provincial-level poor county, mountainous and remote area

Source: PMO

The County Governments' Fiscal Sustainability

34. Most of the participating counties' fiscal revenues substantially increased over the last seven years. Sources of local fiscal revenue are: (a) fiscal revenue, including tax and non-tax revenue; and (b) non-fiscal revenue, including land-use rights. Local fiscal revenue of each county also increased from 2011 to 2016, at an average annual growth rate of 31 percent, 15 percent, 19 percent, 78 percent, 36 percent, 8 percent, 31 percent, 34 percent, 9 percent and 13 percent in Dingyuan, Funan, Hanshan, Linqun, Lixin, Shou, Shucheng, Si, Xiao and Yuexi counties respectively. As many Chinese cities, land concession revenue has decreased in 2014 and 2015 in some of the participating counties in Anhui. Local fiscal revenues of the participating counties are expected to increase by about 8 percent to 15 percent per year from 2017 to 2022.

35. Upper-government transfers/subsidies constitute another important source of counties' disposable funds. Each county receives earmarked, general, and other transfers and subsidies to meet the needs of infrastructure development and operating expenses. Most of the counties received higher general transfers/subsidies than earmarked and other transfers. All participating counties received upper-level transfers at increasing growth rates during 2011 to 2013 then at a decreasing rate from 2013. Nevertheless, total upper-level transfers still accounted for 45 percent to 80 percent of total revenues of the participating counties in 2016. Transfers and subsidies are expected to increase by about 6 percent to 12 percent per year from 2017 to 2022.

36. Similar to fiscal revenue, local fiscal expenditures of the participating counties have increased substantially over the last six years. The participating counties invested between 1 to 4 percent of their total fiscal expenditures in rural roads in 2016. Rural roads investment compared to transportation investment, accounted for much higher e.g. 47 percent to 79 percent depending on the county. This affirms the counties' commitments to improve its rural roads, but with a bias on capital investment that the Program intends to address. It is expected that local fiscal expenditures in the participating counties will increase by about 7 percent to 18 percent per year during 2017–2022.

37. Most of the participating counties' annual expenditures are higher than annual budgets. Nine, out of 10, participating counties being poor at provincial and national levels cannot meet their expenditures demand from their fiscal ability. As a result, those counties depend on transfer subsidies to cover their fiscal deficits.

38. Civil works and maintenance costs of rural roads, and salaries are generally funded by general budget revenue and different subsidies, including car tax and fuel subsidies. In terms of year by year expenditure in each category by each county, no specific trend is noticed in the last seven years. Dingyuan and Yuexi counties spent more between 2012 to 2014 and spent about the same or less in the following 2-3 years. In contrary, Hanshan and Lixin counties started spending more since 2014. Among three categories, all counties have been spending more on civil works.

County Governments' Debt

39. The participating counties have borrowed substantially to finance various infrastructures in the last several years. As stated above, investments were done mostly through off-budget financing vehicles (LGFVs), although such practices are prohibited since the enactment of new budget law in 2015. None of the participating counties, except Linqun, have arrears in the last six

years. Linquan county has not been able to pay part of its principal and interest payments on its outstanding debt since 2011. However, Linquan county managed to reduce its arrears over the years (in 2011 the county had arrears of RMB158 million on its debt of RMB432 million but arrears had reduced to RMB85 million on its debt of RMB 2,712 million in 2016). The county governments' total outstanding debt to GDP ratio in 2016 range between 7 percent to 35 percent. This will not impose risk to most of the counties' ability to finance the program because out of 10, eight counties had budget surplus in 2016. Only Funan and Shucheng counties had deficit of RMB500 million and RMB800 million respectively in 2016. While in deficit, Funan and Shucheng counties' total debt as a share of GDP is modest, 7 percent and 9 percent respectively. Table 12 presents a summary of government fiscal revenues, expenditures and accumulated debts in the 10 participating counties for 2016 and the average annual growth rate from 2011 to 2016.

Table 12: Participating County Governments' Fiscal Revenues and Expenditures in 2016 and Average Growth Rate for 2011–2016

-> County	Dingyuan		Funan		Hanshan		Linquan		Lixin		Shou		Shucheng		Si		Xiao		Yuexi	
	2016 (RMB mil)	Growth %*	2016 (RMB mil)	Growth %*	2016 (RMB mil)	Growth %*	2016 (RMB mil)	Growth %*	2016 (RMB mil)	Growth %*	2016 (RMB mil)	Growth %*	2016 (RMB mil)	Growth %*	2016 (RMB mil)	Growth %*	2016 (RMB mil)	Growth %*	2016 (RMB mil)	Growth %*
Total Fiscal Revenue	5,563	16%	5,053	8%	2,731	10%	8,346	17%	8,918	18%	7,652	11%	6,317	17%	5,697	18%	6,941	13%	3,678	17%
Local fiscal revenue	2,145	31%	1,030	15%	1,381	19%	3,513	78%	4,888	36%	2,327	8%	3,338	31%	2,786	34%	2,277	9%	706	13%
Upper level transfers and subsidies	3,418	12%	4,023	8%	1,350	8%	4,833	10%	4,030	9%	4,032	6%	2,979	9%	2,911	12%	3,368	7%	2,145	11%
- Earmarked transfers	1,447		1,045		526		1,240		2,689		1,296		1,098		1,023		1,036		731	
- General transfers	1,824		2,915		757		3,467		1,127		2,632		1,773		1,888		2,332		1,369	
- Other transfers	147		63		67		26		12		104		109		-		-		44	
Other revenue	147		-		-		-		-		1,293		-		-		1,296		828	
Total Fiscal Expenditure, excluding debt	5,002	14%	5,583	14%	1,973	7%	6,268	14%	5,448	10%	5,114	10%	7,116	18%	4,160	16%	4,951	11%	3,673	17%
Public budgetary expenditure	5,001	14%	5,573	14%	1,973	7%	6,268	14%	5,448	10%	5,114	10%	7,116	18%	4,160	16%	4,951	11%	3,658	17%
General public expenditure	337		240		221		464		353		450		391		341		320		245	
Transportation	262		132		109		404		101		143		207		135		136		191	
- Rural roads expenses	122		-		-		-		-		103		-		-		98		150	
- Other road expenses	44		-		1.5		333		-		41		-		-		79		20	
- Road maintenance	14		-		8		10		-		-		9		-		11		6	
Other expenditure	2		10		-		-		-		-		-		-		-		15	
Surplus/(Deficit)	561		(530)		758		2,078		3,470		2,537		(800)		1,537		1,990		5	
Government debt	3,278	23%	1,028	9%	3,973	49%	2,712	48%	1,850	-1%	5,000	24%	1,480	36%	1,480	25%	4,987	23%	2,014	32%
Arrears, if any	-		-		-		85		-		-		-		-		-		-	
Outstanding Debt as share of GDP (%)	20%		7%		36%		16%		12%		35%		9%		9%		21%		24%	

Source: Finance bureaus of the participating counties.

Note: * Average annual growth rate from 2011 to 2016.

Assessment of the Expenditure Framework

40. **Effectiveness.** The Anhui Province has established relatively robust budget allocation and execution systems. The county governments support the expenditure framework through annual budgets executed by Provincial government. The systems allow the proper tracking of expenditures according to functions as well as to assess the government’s overall fiscal situation in a multi-year prospective. Anhui provincial transport department issued a detailed implementation guidance as well as established the subsidy standards for rural roads program. A result-based disbursement mechanism is used to deliver the subsidy to the county once the roads are completed and verified. The funds flow system is automated and effective.

41. **Efficiency.** The Program may be affected as prioritized rural roads do not always match with approved budget, road maintenance is underfunded compared to expansion in rural road connectivity, and the program expenditures lack cost effectiveness in the absence of scientific basis for asset maintenance planning and programming. Also, eight of the 10 counties are designated as national poverty counties, one a provincial poverty county, and, therefore, their financial sustainability relies heavily on provincial and national subsidies and to some extent on borrowing from commercial banks. The county governments aim to address the shortcomings and further enhance efficiency by: (a) properly including the investments into the county government approved budget so that the budget is allocated to all rural roads program; (b) better aligning the program expenditure plan with subsidy allocation plan so that contractors’ payments are not being delayed; (c) regularly assessing and making the necessary changes to the priority list of program so that in case of budget shortfall borrowing from commercial banks (through off budget financing vehicles) does not remain as the last option and arrears do not incur; and (d) increasing capacity for coordinating, supervising and monitoring the program.

42. **Adequacy.** The overall expenditure framework can be deemed adequate for the following reasons: (a) the Program budget allocations are aligned with the government’s priorities as stipulated in the APFYCTP that aims to eradicate the extreme poverty by 2020; and (b) the investment priorities are shifting from new constructions to upgrading and maintenance of rural roads, strengthening of road safety infrastructure, and improvement of rural bridges.

43. **Program Financing Plan.** It is expected that most of the Program expenditures will be financed by internal resources, mainly provincial and national subsidies and local fiscal revenue. In case of external resources, IBRD will finance US\$200.00 million as presented in Table 13 below. As the 2015 Budget Law imposes a hard budget constraint on subnational governments in China, the subnational governments will not be able to borrow from the commercial banks through off-budget financing vehicles.

Table 13: Program Financing

Source	Amount (RMB million)	Amount (US\$ million)	% of Total
Provincial and National Subsidies	816	124	23
Local Fiscal Revenue	1,454	221	40
IBRD	1,315	200	37
Total Program Financing	3,586	545	100

ECONOMIC EVALUATION

44. The operation will finance a program of road works for which the list of the roads to be rehabilitated or improved under the project is not available at appraisal, thus the economic analysis was done evaluating some representative roads that exemplify the average characteristics of the roads to be rehabilitated or improved under the project and the type and average costs of the proposed road works. The economic analysis was done using the Roads Economic Decision model (RED) develop by the World Bank for the economic evaluation of low volume roads. RED performs the economic comparison of project-alternatives evaluating benefits in terms of reduction of vehicle operating costs, travel time costs and accident costs and changes in future maintenance costs brought about by a project-alternative. RED computes unit vehicle operating costs and vehicle speeds needed to compute travel time costs based on the Highway Development and Management Model (HDM-4) equations for computing vehicle speeds and vehicle operating costs, which are a function of the country vehicle fleet characteristics and the road condition.

Project Roads and Road Works

45. The evaluation considered representative roads for the following project components: (i) Smooth Traffic Program; (ii) Safe Road Program, (iii) Road Maintenance Program, and (iv) Bridge Improvement Program. For each project component, one to six roads were selected to exemplify the average characteristics of the network and the different proposed road work types, totaling 15 roads with a total length of 141.63 km. The table below presents the representative roads evaluated including the corresponding road work types and estimated financial costs. For the roads under the Safe Roads Program, benefits were computed in terms of a reduction in accident costs, while for the other roads, benefits were computed in terms of reduction of vehicle operating costs and travel time costs.

Table 14: Representative Roads Defined for Economic Evaluation

Road Code	Program	Subproject	Road Work Type	Length (km)	Cost (US\$ M)	Cost per km (US\$/km)
ST1	Smooth Traffic	County-level Road Smooth Highway	Mill and Replace	7.67	1.92	250,679
ST2		County-level Road Smooth Highway	Widening	8.43	1.62	192,288
ST3		Township-level Road Smooth Highway	Mill and Replace	8.77	1.57	179,260
ST4		Widening of Existing Village Road	Widening	1.62	0.24	146,988
ST5		Hardening of Village Roads	Paving	1.13	0.15	133,503
ST6		Hardening of Natural Village Roads	Paving	5.38	0.58	107,214
SR1	Safe Road	Township Road Safety Facilities	Road Safety Improvements	7.60	0.15	19,461
SR2		Village Road Safety Facilities	Road Safety Improvements	4.30	0.10	24,077
RM1	Road Maintenance	Asphalt Pavement Maintenance	Major & Intermediate Maint.	13.70	2.29	167,333
RM2		Asphalt Pavement Maintenance	Minor Repair Maintenance	16.00	1.12	70,253
RM3		Asphalt Pavement Maintenance	Routine Maintenance	15.70	0.18	11,493

RM4		Cement Pavement Maintenance	Major & Intermediate Maint.	16.50	2.07	125,491
RM5		Cement Pavement Maintenance	Minor Repair Maintenance	20.00	0.59	29,580
RM6		Cement Pavement Maintenance	Routine Maintenance	14.80	0.12	7,995
BR1	Bridges	Bridge Rehabilitation	Bridge Rehabilitation	0.025	0.12	4,642,857
Total				141.63	12.83	90,570

46. The table below presents the average current characteristics of the roads in terms of width, surface type, road class, pavement condition and car speeds. Most roads are in poor to very poor pavement condition in need of pavement rehabilitation or improvement in the form of upgrading or widening. The roads under the Safe Roads Program are in good to fair pavement condition but in need of road safety measures. Roughness measurements are not available on the project roads; thus, average roughness values were estimated based on the pavement condition rating and the type of the roads defined by the surface type and traffic.

Table 15: Representative Roads Current Condition

Road Code	Width (m)	Surface Type	Terrain Type	Road Class	Pavement Condition	Car Speed (km/hr)	Estimated Roughness (IRI)
ST1	6.5	Asphalt	Hilly	III	Poor	40	6.0
ST2	4.5	Concrete	Flat	III	Fair	35	4.0
ST3	6.5	Asphalt	Hilly	IV	Poor	20	6.0
ST4	4.5	Unpaved	Flat	IV	Fair	20	10.0
ST5	4.5	Unpaved	Flat	IV	Poor	20	12.0
ST6	4.5	Unpaved	Flat	IV	Very Poor	20	14.0
SR1	6.5	Concrete	Hilly	IV	Good	30	3.0
SR2	4.5	Concrete	Flat	IV	Fair	30	4.0
RM1	6.5	Asphalt	Hilly	III	Very Poor	45	8.0
RM2	6.5	Asphalt	Flat	III	Poor	50	6.0
RM3	6.5	Asphalt	Flat	III	Fair	45	4.0
RM4	4.5	Concrete	Flat	IV	Very Poor	20	8.0
RM5	4.5	Concrete	Flat	IV	Poor	30	6.0
RM6	4.5	Concrete	Flat	IV	Fair	20	4.0
BR1	6.5	Concrete	Flat	IV	Fair	15	4.0
Total	5.5					33	

47. The table below presents the current average traffic of the representative roads. The total annual average daily traffic (AADT) varies from 161 to 2,267 vehicles per day and the trucks percent from 13% to 31%.

Table 16: Representative Roads Current Daily Traffic (vpd)

Road Code	Bus				Truck	Truck	Truck	Total
	Motorcycle	Car	Large	Van	Medium	Heavy	Trailer	
ST1	63	894	363	375	202	232	138	2,267
ST2	54	997	364	334	265	286	141	2,441
ST3	49	276	105	142	136	131	—	839
ST4	28	72	6	39	26	3	—	174
ST5	21	61	5	35	20	2	—	144
ST6	15	55	6	32	22	3	—	133
SR1	36	286	116	159	146	154	121	1,018
SR2	34	63	6	34	21	3	0	161
RM1	70	912	376	385	232	256	141	2,372
RM2	69	903	365	372	223	249	136	2,317
RM3	62	886	346	365	213	225	124	2,221
RM4	46	234	121	105	108	111	0	725
RM5	34	209	111	96	95	98	0	643
RM6	40	198	95	84	81	82	0	580
BR1	36	286	116	159	146	154	121	1,018
Total	49	511	210	215	151	159	65	1,361
Percent	3.6%	37.6%	15.4%	15.8%	11.1%	11.7%	4.8%	100.0%

48. The table below presents the estimated condition of the roads after the proposed road works are implemented. Overall the condition of the pavements will improve substantially reducing vehicle operating costs and increasing vehicle speeds, thus, reducing travel time costs. The bridge improvement program will increase vehicles speeds from 15 to 25 km per hour at the bridge location. The roads under the Safe Roads Program will maintain their current pavement condition and car speeds, but a reduction in the cost of road traffic injuries is expected as measured by the estimated fatality rate with and without the project. Without the project, the estimated average fatality rate of the project roads is 10 fatalities per 100 million vehicle-km traveled and the expected fatality rate with the project is expected to reduce to 7 fatalities per 100 million vehicle-km traveled. The adopted economic cost of a fatality was US\$600,000 per fatality based on the GDP per capita of China.

Table 17: Representative Roads After Works

Road Code	Width (m)	Pavement Condition	Car Speed (km/hr)
ST1	6.5	Good	60
ST2	6.5	Good	60
ST3	6.5	Good	35
ST4	6.5	Good	30
ST5	4.5	Good	30
ST6	4.5	Good	30
SR1	6.5	Good	30
SR2	4.5	Fair	30
RM1	6.5	Good	60
RM2	6.5	Good	55
RM3	6.5	Fair	50
RM4	4.5	Good	35
RM5	4.5	Good	35
RM6	4.5	Fair	25
BR1	6.5	Good	25
Total	5.6		42

Road User Costs

49. The economic analysis computed benefits in terms of reduction in road user costs (vehicle operating costs plus travel time costs) brought about the road works over an evaluation period of 20 years. Road user costs were computed based on the vehicle fleet economic costs and characteristics given on the table below. The value of time of a car passenger was defined based on an average income of 14.39 yuan/hour in the project area, work related trips are 50%, and leisure time cost is valued at 20% of work trips cost. Bus and motorcycle passengers time costs were valued at half the value for car passengers.

Table 18: Vehicle Fleet Characteristics

	Motorcycle	Car	Bus	Van	Truck Medium	Truck Heavy	Truck Trailer
Economic Costs							
New vehicle price (US\$)	1,000	20,000	153,846	23,077	30,769	55,385	61,538
Replacement tire (US\$)	38.00	230.77	384.62	123.08	384.62	384.62	384.62
Fuel/liter (US\$)	0.97	0.97	0.85	0.91	0.91	0.85	0.85
Lubricant/liter (US\$)	2.00	7.62	4.54	3.08	2.75	2.75	2.75
Maintenance labor costs (US\$/hour)	1.00	4.00	4.92	4.00	4.92	4.92	4.92
Crew costs (US\$/hour)	0.00	4.92	8.92	4.92	8.92	8.92	8.92
Annual interest (%)	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Passenger time (US\$/hour)	0.65	1.30	0.65	0.00	0.00	0.00	0.00
Cargo delay time (US\$/hour)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Basic Characteristics							
Annual Vehicle Utilization (km)	14,000	20,000	70,000	40,000	50,000	60,000	75,000
Annual Working Hours (hours)	500	850	1,750	1,300	1,750	1,750	2,050
Vehicle life (years)	9	12	12	6	10	14	8
Passengers (number)	1	1.5	25	0	0	0	0
Gross Vehicle Weight (ton)	0.20	0.45	4.05	2.00	6.00	10.00	25.00

50. The table below shows the resulting unit vehicle operating costs, in US\$ per vehicle-km, for different pavement road condition classes.

Table 19: Typical Unit Vehicle Operating Costs, in US\$ per vehicle-km

Road Condition	Roughness (IRI)	Motorcycle	Car	Bus	Van	Truck Medium	Truck Heavy	Truck Trailer
Very Good	2	0.039	0.218	0.680	0.306	0.463	0.708	0.884
Good	3	0.039	0.219	0.685	0.307	0.466	0.713	0.893
Fair	4	0.040	0.225	0.727	0.313	0.479	0.739	0.922
Poor	6	0.041	0.237	0.821	0.335	0.509	0.792	0.982
Very Poor	12	0.045	0.280	1.121	0.431	0.622	0.976	1.208

51. The economic analysis considered a normal traffic annual growth rate that varies over the evaluation period and vehicle type, as shown on the table below, based on the expected GDP growth on the project area and an elastic coefficient for passenger and freight transportation of 0.9 and 0.7 respectively. Generated traffic was included in the analysis considering a price elasticity of demand equal to one. The social discount rate adopted was 6% based on World Bank guidelines.

Table 20: Traffic Annual Growth Rates

Time Period	Passenger Vehicles	Freight Vehicles
2018-2022	9.0%	7.0%
2023-2027	6.4%	4.8%
2028-2032	4.9%	3.9%
2033-2037	4.9%	3.9%

Economic Evaluation Results

52. The table below presents the resulting Net Present Value (NPV), at 6% discount rate, and Economic Internal Rate of Return (EIRR) for the roads for which the economic analysis was done. All road classes yield an NPV greater than zero, the total NPV of the representative roads is US\$ 75.63 million, and the overall EIRR is 49%. A sensitivity analysis shows that if the road work costs increase by 15 percent and the adopted normal traffic annual growth rates reduce by 15%, the overall EIRR of the program is 43%, thus the program has a robust economic justification.

Table 21: Economic Evaluation Results

Road Code	NPV at 6% (US\$ Million)	EIRR (%)	EIRR Sensitivity (%)		
			A: Costs+15%	B: Traffic-15%	C: A & B
ST1	8.45	40%	35%	38%	34%
ST2	7.31	40%	36%	39%	34%
ST3	4.97	32%	28%	30%	27%
ST4	0.04	8%	6%	7%	5%
ST5	0.04	9%	7%	8%	6%
ST6	0.60	16%	14%	15%	13%
SR1	1.08	62%	54%	60%	53%
SR2	0.02	9%	7%	8%	6%
RM1	24.07	80%	70%	78%	69%

RM2	13.41	87%	77%	85%	75%
RM3	0.33	14%	13%	11%	10%
RM4	9.38	41%	36%	39%	35%
RM5	4.93	61%	54%	58%	52%
RM6	0.38	21%	19%	17%	16%
BR1	0.53	42%	37%	40%	36%
Total	75.63	49%	44%	47%	43%

GHG Analysis

53. The table below present the estimated total baseline and gross CO₂ emissions (without and with the project) over evaluation period and the net emissions (gross emissions minus baseline emissions). Without the project the total CO₂ emissions on all roads over the evaluation period is 936,635 tons (46,832 tons per year), while with the project is 985,333 tons (49,267 tons per year), representing a 5% increase in CO₂ emissions with the project, or total net emissions of 48,698 tons over the evaluation period or net emissions per year of 2,435 tons per year. The increase in emissions brought about by the project is due to the increase in vehicle speeds and the generated traffic brought about by the project road works. This increase remains very limited.

Table 22: CO₂ Emissions

Road Code	Total Over Evaluation Period Total (tons)		
	Baseline Without Project	Gross With Project	Net Emissions
ST1	80,777	88,252	7,475
ST2	102,816	103,423	607
ST3	43,521	39,800	-3,721
ST4	1,148	1,315	168
ST5	662	839	176
ST6	3,086	4,150	1,064
SR1	47,881	47,881	0
SR2	2,244	2,244	0
RM1	147,425	173,230	25,805
RM2	165,278	182,042	16,763
RM3	155,109	154,520	-589
RM4	64,487	66,049	1,562
RM5	64,327	66,745	2,419

RM6	49,607	47,989	-1,619
BR1	8,266	6,855	-1,412
Total	936,635	985,333	48,698

Overall Program Benefits

54. Extrapolating the results obtained for the representative road sections to the overall program impacted by the project, the NPV, at 6% discount rate, of the overall program is US\$ 23,893 million, and the overall EIRR is 49%. With the project, the total gross CO₂ emissions of the overall program during the evaluation period is 225.644 million tons (11.282 million tons per year), resulting on total net emissions of 15.530 million tons over the evaluation period or net emissions per year of 0.776 million tons per year.

Public Sector Financing

55. Public sector financing is the appropriate vehicle for financing the rehabilitation and improvement of the proposed roads because these investment costs cannot be recovered through tariffs or with private sector financing due to the low and moderate traffic on the roads. The Bank's financing is justified because of the project's robust economic benefits and because of the value added it brings beyond financing in areas such as: construction quality control, sustainability of road maintenance, transport planning, environmental risk management, safeguards, procurement, and financial management.

SUMMARY OF RECOMMENDED ACTIONS FOR RESILIENCE, MAINTENANCE AND ROAD SAFETY

Definitions

56. It is necessary to adopt clear definitions of key technical terms related to climate and disaster resilience (Table 23), maintenance (Table 24), and road safety (Table 25).

Table 23: Climate Related Definitions

Issue	Definition
Climate Resilience	The ability of a structure or entity to resist physical climatic related factors such rainfall, flooding, wind or temperature. It may also be used in an adjectival sense (climate-resilient) to indicate the ability of structures, or the designs and procedures used in their construction or maintenance, to withstand climate impacts.
Climate Strengthening	The process or processes of making engineering structures climate resilient.
Climate Vulnerability	The extent to which engineering structures, populations or regions are susceptible to climate impacts.
Climate Adaptation	The process or processes, by which climate impact mitigation measures are adopted, modified or used to reduce the vulnerability and increase the resilience of engineering structures, populations or regions.

Climatic Impact	The effects that climate may have on people, their livelihoods, physical structures and environments
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Table 24: Maintenance Related Definitions

Issue	Definition
Routine maintenance	These are the maintenance activities that are likely to be required somewhere on a road link every year. Many of the tasks may be carried out manually, although mechanised or equipment based alternatives are required for some tasks. Activities may be divided into: roadside (off carriageway); drainage; road surface; structures.
Periodic maintenance	These are the maintenance activities that are required on a section of road after a period of a number of years. They are normally large scale and require specialist equipment and skilled resources to implement, and usually necessitate the temporary deployment of those resources on the road section. These operations are costly and require specific identification, management and planning for implementation.
Emergency maintenance	Activities that are required to repair a road or bridge that has been impacted by a natural or man-made disaster, for example flood, landslide or bridge damaged by river traffic.
Rehabilitation	The reinstatement of a road or bridge that has deteriorated (commonly through lack of maintenance) to such a level that its principal functions are significantly impaired. These works may be a structural or functional enhancement of a road and/or bridge on the road to produce a substantial extension in their service life.
Upgrade	The rehabilitation of a road or bridge to a level of service above that for which it was originally designed.

Table 25: Road Safety Related Definitions

Issue	Definition
ChinaRAP	The iRAP ⁹ -adapted platform for the context of China, which takes into account specific road attributes, crash modification factors, and other influences that may be unique to China; ChinaRAP is a government agency within the Research Institute of Highway under the Ministry of Transport
Countermeasure	An action or intervention aimed at countering or offsetting risk to road users that will prevent injury from occurring or reduce its severity if it does occur by adding new or upgrading existing infrastructure or removing roadside hazards
Clear zone	The area adjacent to the road that should be kept free from roadside hazards that would be potentially hazardous to errant vehicles
Roadside hazard	A fixed object that has a diameter of at least 100mm and which is located in the clear zone of a road
Road safety audit	A formal examination of an existing or future road or traffic project by an independent qualified team that reports on the project's crash potential and safety performance

⁹ Abbreviation for the International Road Assessment Programme, which is a registered charity dedicated to preventing road deaths worldwide and a member of the United Nations Road Safety Collaboration.

57. **Climate Resilience.** The Bank team recommended the Anhui transport department to navigate the options for improving the climate resilience of this operation by taking into account climate risks, the economic and social costs and benefits of the interventions, and the risk-weighted damage that each action could help avert. While engineering/transport infrastructure and maintenance aspects are discussed below in their respective recommendations sections, interventions in the following two inter-linked areas to increase resilience were discussed:

- **Systems planning for strategic construction and network development.** Network resilience requires a combination of measures to increase the robustness of particular segments and measures to build redundancy. Screening can help identify risks and design proactive planning responses: (i) conduct structured vulnerability assessments to identify priority cost-effective resilience measures; and (ii) develop strategies to build redundancy in their road networks to reduce the impact of disruptions on critical links. Spatial planning can be a powerful tool to avoid or protect vulnerable areas and even relocate existing infrastructure in some circumstances.
- **Contingency Programming for better response mechanisms.** Other measures are related to better preparedness for system response to incidents: coordination with other lifeline sectors; aligning with early warning systems and emergency preparedness needs; institutional protocols for post-incident response; procurement and budgeting arrangements that allow responsiveness to incidents without compromising public finance accountability.

Recommendations Specific to Smooth Traffic Program, Natural Village Road Program and Bridges Program

Monitoring and Evaluation

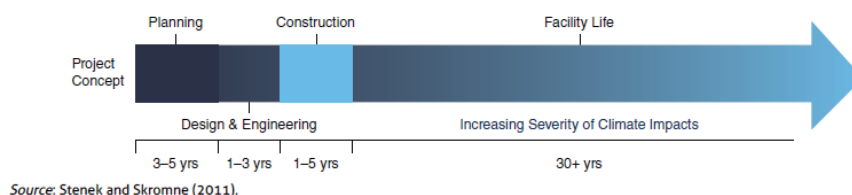
58. **Innovations in Monitoring and Evaluation.** During the preparation missions, the Bank team introduced the web-based rural accessibility tool (Street-view mapping app and road roughness estimation app) to the APDOT and transport bureaus from 10 counties. Those tools will be tested further during the implementation of the project. It was agreed that PMO would use the web-based rural accessibility tool to support the generation of results framework indicators for the PforR program. The World Bank will provide technical support for the local agencies to establish an internal web-based rural accessibility tool on their own server. In addition to conventional monitoring system, a special database with multi-parameters for each participating county will be established to assure achievement of results.

59. **Innovations related to bridges reconstruction and maintenance.** Sensors in control nodes or interfaces of reconstructed bridges will be pre-embedded in advance to collect data on bridge stress when in operation. Those sensors will be monitored via wireless transmission technology. Some concrete bridges with high density of armature will use self-compacting high-strength concrete to limit the requirement for concrete vibration during construction. Some of the steel bridges will be built with galvanized pre-stress method to improve the resilience of the structure. A cloud-based bridge database will be prepared to monitor the condition of the bridges and improve the management of the counties' bridge asset.

Climate Resilience

60. A transport system that cannot withstand the emerging impacts of climate change will impose high costs for maintenance and repair; limit community access to jobs, schools and hospitals; and cause large economic losses. Integrating climate risks into the decision-making process is made even more complex by the fact that the useful lifetime of transport infrastructure is generally long and spans several decades from design to the end of its operational life. During that period, the climate may go through considerable change. Dealing with these (deeply uncertain) changes in climate requires to build flexibility in transport systems in order to avoid underperforming assets as the years go by (Figure 2).

Figure 2. Climate Change in the Context of the Useful Life of Transport Infrastructure



61. **Engineering & design standardization for improved capacity.** Climate stressors most directly affecting road networks include temperature (pavement performance, freeze-thaw cycles), increased precipitation and flooding (which affects the design of subgrades, cross drainage structures), impacts on river flows (that significantly affect the design of bridges and bridge abutments). Innovation in materials and construction methods is becoming increasingly important. The Program will consider climate resiliency along road sections with potential rapid depreciation linked to weather conditions and natural disasters. Climate resilience of infrastructure is a priority for China, as stated in the Intended Nationally Determined Contributions submitted in 2015 to the UNFCCC. In order to address the vulnerability of the road network, the designers have adopted some climate resilient design standards, with specific measures for road pavement construction to better withstand extreme seasonal temperature differentials. In the areas with larger temperature change an elevated concrete road formation approaches will be used to ensure the road performs better during landslide and floods. In addition, new materials such as high modulus asphalt mixture with better high-temperature performance will be used in areas subject to extreme temperatures. Efficient drainage system for the sections with larger precipitation will be constructed and specific technics for asphalt overlay will be adopted to reduce freezing and accidents in shadowy mountainous areas. These features will help the resilience of roads vis-a-vis extreme conditions such as landslide, floods, and large seasonal temperature gradient. Moreover, modern road-side service facilities will provide emergency services and evacuation points for road-users caught in extreme events. It is suggested to test a landslide early warning system for some of the landslide prone sections in mountainous area. Climate resilience-related actions and indicators will be reflected in the corresponding PAP or DLI.

Recommendations Specific to Maintenance Program

62. **Maintenance and asset management for climate resilience.** Adequate road maintenance is the most critical and most efficient way of reducing the impact of climate change on the road

system. In the absence of an adequate maintenance regime, the damage caused by climactic events is exacerbated. Climate change monitoring techniques and adaptation strategies can be factored into an asset management system in several ways. Table 26 describes the experience with such approaches in the United Kingdom and New Zealand.

Table 26: Climate-Resilient Asset Management System

Asset Management System Component	Monitoring Techniques and Adaptation Strategies
Goals and Policies	Incorporate climate change considerations into asset management goals and policies. These could be general statements concerning adequate attention of potential issues, or targeted statements at specific types of vulnerabilities (e.g., sea level rise).
Asset Inventory	Mapping of infrastructure assets in vulnerable areas, potentially using GIS. Inventory critical assets that are susceptible to climate change impacts.
Condition Assessment and Performance Modelling	Monitor asset conditions with environmental conditions (e.g., temperature, precipitation, winds) to determine if climate change affects performance. Incorporate risk appraisal into performance modelling and assessment. Identify high risk areas and highly vulnerable assets. Use “smart” technologies to monitor the health of infrastructure assets.
Alternatives Evaluation and Program Optimization	Include alternatives that use probabilistic design procedures to account for the uncertainties of climate change. Possible application of climate change-related evaluation criteria, smart materials, mitigation strategies, and hazard avoidance approaches.
Short- and Long-Term Plans	Incorporate climate change considerations into activities outlined in short and long-range plans. Incorporate climate change into design guidelines. Establish appropriate mitigation strategies and agency responsibilities.
Program Implementation	Include appropriate climate change strategies into program implementation. Determine if agency is actually achieving its climate change adaptation/monitoring goals.
Performance Monitoring	Monitor the asset management system to ensure that it is effectively responding to climate change. Possible use of climate change-related performance measures. Use “triggering” measures to identify when an asset or asset category has reached some critical level.

Source: Meyer, Amekudzi, and O’Har (2009).

63. The Bank team acknowledged the work done by the APDOT to build a comprehensive inventory of the roads and survey road condition. A consulting firm hired by APDOT had developed a series of applications allowing local transport bureaus to upload data on the surveyed rural roads that are integrate into a GIS database. The GIS database could provide a solid basis for project prioritization and help decision makers. Further works needs to be done to factor climate change monitoring techniques and adaptation strategies into this rural road asset management system.

Recommendations Specific to Road Safety Program

64. **Infrastructure risk assessment:** ChinaRAP (a network-level road infrastructure safety surveying and analysis tool) will be aligned with the existing “Technical Guide on Implementing Life Protection Project of Road Safety” to support a detailed technical assessment, which is otherwise accomplished through a visual approach. The risk assessment will be demonstrated on approximately 10 percent of the 2,682 km of the Bank’s road safety sub-program (Program 2), specifically at “critical sections”, including in and around villages, steep sections, sharp curves, landslide prone areas, segments with poor visibility, sudden changes in cross sections, as well as junctions. In addition, the assessment would evaluate roadside hazards, including a clear zone of at least 3 m and side slopes of 1:4 (vertical to horizontal) or greater to determine the need for removal of hazards, introduction of barrier to shield fixed objects or steep slopes, or introduction of slope reduction measures. ChinaRAP capacity building could therefore be provided in all ten counties (with invitation to the other jurisdictions in the province as interested) with physical assessments in one or two demonstration counties. ChinaRAP support for the initial 10 percent and for capacity building could be provided through a grant managed by the Bank- this would be a free service to the PMO. Based on the outcome of the demonstration assessments, the province could choose to roll-out the evaluation process across other counties, with the counties themselves providing the manpower for surveying and coding road segments. In the long-term, this could establish a systematic method for assessing road infrastructure risk regardless of county or individual while simultaneously supporting the MOT’s guidelines on implementing road safety infrastructure. This approach would also be aligned with the State Council’s recently released 13th five-year plan on road safety, which refers to conducting network risk assessments and improving rural road safety facilities.

65. **Standard design process for implementation of road safety countermeasures:** The key outcome of the ChinaRAP demonstration would be a “catalog” of road safety infrastructure countermeasures for the aforementioned critical sections. These designs could then be implemented in all sub-programs, including resilience and maintenance. Standard designs would enhance the road user’s experience by ensuring road safety infrastructure applied in a systematic manner regardless of county, thus creating continuity across the province and helping to eliminate an uneven road environment.

66. **Potential for establishment of systematic monitoring and long-term evaluation:** A key element of a road safety infrastructure management program is systematic monitoring and long-term evaluation. The monitoring support provided by the Program could therefore be application of road safety assessments on existing roads and road safety audit of the design and civil works phases. Long-term evaluation could be accomplished through the systematic annual evaluation of road incident data (crash or fatality and serious injury data) or the periodic (three to five year) star rating of the rural road network on a rolling basis. Depending on confidence on crash data, the province would ultimately have the capacity to roll-out a rural road network-level inventory of risk assessments, which would complement crash data or could be used on its own for policy and decision-making purposes.

67. **Budgetary allocation based on road safety performance:** In a road safety infrastructure management approach, budget is generally allocated using performance measures, which are linked to the long-term evaluation framework. ChinaRAP star ratings or provincial wide crash data

could therefore be used as a policy tool, whereby increases in star rating or reduction in casualty crashes (crashes resulting in a fatality and/or serious injury) are used to establish where budget support is needed for road safety infrastructure improvements. If there are concerns with crash data reliability due to accuracy or underreporting, which is a common problem in many countries (including developed countries) on the rural road network, then ChinaRAP is a viable tool for the rural road network. In fact, such an approach would be more proactive at eliminating hazardous road safety infrastructure and road environments compared to a crash data only approach.

ANNEX 5: FIDUCIARY SYSTEMS ASSESSMENT SUMMARY

1. Pursuant to the World Bank policy and directives for Program-for-Results Financing (July 10, 2015) and the earlier Interim Guidance Note (June 18, 2012), the World Bank Program fiduciary team conducted an integrated Fiduciary Systems Assessment (FSA) of the fiduciary systems in Anhui Province and ten selected counties. The overall objective of the assessment was to determine whether the fiduciary systems of the Program provide reasonable assurance that the Program financing proceeds will be appropriately used, with due attention to the principles of economy, efficiency, effectiveness, transparency, and accountability. The full fiduciary systems assessment is available on demand.
2. The World Bank fiduciary team assessed the PforR financial management and procurement systems to determine the degree to which the relevant planning, budgeting, internal controls, treasury management and funds flow, accounting and financial reporting, as well as the auditing arrangements, provide reasonable assurance on the appropriate use of Program funds and the safeguarding of its assets, and the degree to which planning, bidding, evaluation, contract award and contract management arrangements and practices provide reasonable assurance that the Program will be adequately supported through its procurement processes and procedures.
3. The Fiduciary Assessment concluded that with the implementation of the proposed mitigating measures and actions included in the Program Action Plan, the Program's financial management systems are broadly adequate and provide reasonable assurance on the appropriate use of the Program funds and safeguarding of its assets and the current procurement legal framework comprising the Tendering and Bidding Law of 1999 and its regulations and the procurement systems of Anhui Province and the ten counties provide sufficient assurance that procurement under this Program will be executed with adequate levels of transparency, competitiveness, efficiency and fairness. The Program's fiduciary systems are therefore considered adequate to meet the requirements of Bank Policy: Program-for-Results and Bank Directive: Program-for-Results.
4. The works and goods to be procured in the Program will be rehabilitation and upgrading works to rural roads in the 10 counties which include construction of asphalt concrete and cement concrete pavement, road widening in selected sections, improvement of traffic signs, road marking, guardrails, deceleration facilities, sight guiding facilities, and structuring reinforcement to old bridges, improvement of connectivity of the whole road net, and road maintenance. There will be consulting services and goods with small value for capacity building and institutional strengthening. None of the expected procurement activities is considered of large value. It is not envisaged that the Program will finance any contract for consulting, works or goods above the OPRC thresholds.
5. The overall fiduciary risk is rated as Moderate and the main agreed actions to improve existing government systems are presented in the Program Action Plan (PAP).

Fiduciary Risks and Measures to Mitigate Fiduciary Risks

Risk	Mitigation Measures
<p>There are no existing government requirements or practice in preparing consolidated program financial reports thus creating a PforR compliance risk.</p>	<p>The budget execution report for government general budget (involving three accounts) and government funds (only for 2120804) would be used as the financial report of the proposed Program. Since expenditures recorded in these four accounts are more than the total expenditures of the Program, budget execution reports for these four accounts prepared by the county finance bureaus, the county highway bureaus would collect the information on Program expenditures and present it as a note to financial report.</p>
<p>For the smooth traffic program, the counties were required to complete all activities within three years (from 2016 to 2018). Fund allocation and delivery of provincial subsidies would be carried out over five years (2016-2020). The physical work plan does not match the financing plan. In addition, according to MoF decree #87, the local government is not allowed to use local financing vehicles to finance Program activities. Given that nine of the ten Program counties are poor, they may encounter difficulties in raising the required funds and paying the contractors timely.</p>	<p>Related government entities will strengthen their communication and coordination to work out a realistic financing plan so that Program funds could be committed properly and Program activities are implemented as planned.</p>
<p>There is currently no annual financial audit of the existing government program thus creating a Program compliance risk.</p>	<p>The China National Audit Office and Anhui Provincial Audit Office will agree on audit terms of reference (TOR) with the Bank and conduct an annual Program financial statement audit that will be publicly disclosed. The audit report will be submitted to the Bank within nine months after calendar year-end.</p>
<p>Although the database for the rural roads built has been established by the highway administrations at provincial and county level, the information being stored in the database is incomplete and the financial information is not included in the database.</p>	<p>To strengthen the capacity on fixed assets management, the highway bureaus were recommended to maintain a complete fixed assets registration book to ensure the value of fixed assets could be recorded properly and be presented in the financial reporting once they are required by related policies and regulations.</p>

<p>The procurement will be implemented by the implementation agency as established by each county at county level, with assistance of the procurement agent company. The procurement activities will be carried out in the platform of the public resources transaction center in each center. These parties may not have knowledge about the lists of the debarred and temporarily suspended firms and individuals declared by the World Bank and other Multilateral Development Banks. Therefore, there is potential risks that contracts may be awarded to firms or individuals which are debarred or under temporary suspension by the Bank or other Multilateral Development Banks.</p>	<p>Anhui Province will, upon Program loan effectiveness, issue an official letter or official instruction to cause the implementation agencies at county levels to ensure that no contract will be awarded to a firm or individual which is in the debarred list or under temporary suspension. Implementation agencies and the procurement agent companies will check and share the updated lists of the debarred and temporarily suspended firms and individuals on a regular basis and whenever the list is updated. The TOR for annual audit includes the selection of awarded contracts on a random basis and checking whether any contract has been awarded to an ineligible firm or individual.</p>
<p>The Bank may not be informed of any credible and material allegations of fraud and corruption issues during Program implementation.</p>	<p>The client is required to inform the Bank of any credible and material allegations of fraud and corruption issues on a regular basis in the Program progress report as stated in the loan agreement. The Bank’s right to conduct an inquiry into such allegations or other indications, independently of (or in collaboration with) the Borrower regarding activities and expenditures supported by the Program and the related access to the required persons, information and documents will be observed in accordance with the standard arrangements for this purpose between the Government of the People’s Republic of China and the Vice President, Integrity Department (“INT”) of the Bank.</p>
<p>Since the cost estimate of the contract will be disclosed in the bidding document and any bid which offers a price higher than the cost estimate will be rejected, there may be a potential risk that the bids may be rejected without justification because the cost estimate was prepared earlier and is not reliable and is obsolete.</p>	<p>The implementation agencies shall carry out market analysis when the procurement plan is prepared, check the historic records for works, goods, and equipment, and prepare a reliable cost estimate for the packages. Before approving the procurement plan, relevant government administration offices should check the cost estimate against market prices to ensure that the cost estimate is reliable. Prior to issuing the bidding document, the implementation agencies should also update the cost estimate based on the latest market information.</p>
<p>The assessment identified that in some counties key site staff of the Contractor’s side had insufficient experience. This may jeopardize successful implementation of the contract.</p>	<p>The Program manual will require that during bid evaluation the client will check the qualifications of the key site staff proposed by the winning bidder. During contract implementation, the client will monitor and confirm that changes of the key contractor staff is acceptable.</p>

<p>All contracts in the Program are expected to be of small value. The scope of works can be easily identified and the quantities of works can be easily estimated before invitation for bids. The probability of substantial design changes during contract implementation is minimal. Substantial cost overrun should not normally be expected. However, about 8% of contracts executed by the implementation agencies had cost overruns exceeding 15%.</p>	<p>Report deviations during supervision missions.</p>
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Integrated fiduciary risk

6. The overall fiduciary risk is rated as **moderate**.

Fiduciary Input to the Implementation Support Plan

7. The proposed fiduciary implementation support includes:
- Work with the team to review implementation progress, examine the achievement of Program results and implementation of the proposed action plan.
 - Work with the team to assess the timeliness and adequacy of Program fund appropriation as approved budget.
 - Continually assess and monitor the performance of the financial management and procurement systems (including transaction centers) under the Program and provide suggestions for enhanced efficiency and effectiveness.
 - Monitor implementation of the application of the PforR anti-corruption guidelines.
 - Monitor the Program financial statement reporting process and assist clients as necessary.
 - Provide advice to the client in resolving implementation issues and in carrying out institutional capacity building.
 - Assist the provincial audit offices and CNAO in strengthening audit arrangements.
 - Deliver regular training to national and provincial audit offices, particularly in respect of procurement post audit capacity.
 - Monitor changes in fiduciary risks of the Program and, as relevant, compliance with the fiduciary provisions of legal covenants.
 - The Bank will assist the PMO in setting up a reporting mechanism to monitor the sources and usage of Program funds, and its timely availability. The Program financial audit report and completion audit of individual roads will also be used to monitor fiduciary performance.

ANNEX 6: SUMMARY ENVIRONMENTAL AND SOCIAL SYSTEMS ASSESSMENT

1. This annex summarizes the key findings and recommendations of the Environmental and Social System Assessment (ESSA) of the proposed Program. The Program will support the rehabilitation and upgrading of existing rural roads in ten counties¹⁰ in Anhui Province. The purpose of the ESSA is to provide a comprehensive review of relevant environmental and social safeguards systems and procedures in China and Anhui, identify the extent to which the national and provincial systems are consistent with Bank Policy and the Bank PforR Directive, and recommend necessary actions to address any gaps as well as to enhance performance during implementation.

2. The assessment concluded that national and provincial rules and regulations for addressing environmental and social impacts are principally consistent with the Bank's policy and directive. The overall environmental and social risk rating of this Program is considered moderate. The ESSA noted that capacity building would be needed to strengthen Program implementation efficiency and effectiveness. Based on the ESSA, a number of actions are included either in the Program Action Plan (PAP) or in the disbursement linked indicators (DLI).

Environmental and Social Effects

3. **Environmental Benefits and Risks.** The proposed Program is expected to have significant benefits of improving rural transport connectivity and safety in ten project counties in Anhui, and contribute to poverty alleviation in those counties (which are either national or provincial level poverty counties in Anhui province). The Program is designed to only include the rehabilitation and upgrading existing low-class rural roads which meet the Program environmental and social screening criteria. The anticipated adverse environmental effects of the Program are not expected to be significant, given the nature of the Program activities and the non-sensitive environmental and social context.

4. Based on initial environmental screening, the potential environmental impacts of the Program will likely include: loss of surface vegetation and soil erosion; impact on the ecological system and wildlife; drainage and hydrological impact on rivers; impacts on water quality and aquatic life; nuisance of dust and noise; disposal of waste materials; traffic disturbance; labor influx and community disturbance; potential impacts on chance-find physical cultural resources; and road safety. Such potential impacts are not considered to be significant and can be adequately managed with known mitigation measures and proper construction management practices.

5. **Social Benefits and risks.** The proposed Program will have significant social benefits by providing many rural communities with better and safer connectivity to urban areas and services, e.g., markets, hospitals, schools, and banks. A total of 1661 villages and a population of 11 million will directly benefit from these road improvements. These roads are an integral part of local development and will therefore provide local communities with more resources and work opportunities, and contribute to their socioeconomic growth.

¹⁰ Ten counties include: Yuexi, Shucheng, Funan, Linqun, Lixin, Sixian, Shouxian, Xiaoxian, Dingyuan and Hanshan.

6. Gender-Based Violence. The Bank conducted an Gender-Based Violence (GBV) Risk Assessment through GBV Risk Assessment Tool, which concluded that the overall GBV risk is low. The ESSA also observes the in-house working mechanism targeted to women beneficiaries. Thus, the China Women’s Federation, which has offices at provincial, municipal, and county levels (as well as focal points at the township level) deals with gender related issues, in particular, equal access for women to social services and economic resources. The county level women’s federations manage standalone programs with women as targeted beneficiaries. For vulnerable groups, such as those without the capacity to work, the disabled, and those identified as low-income households, local county civil affairs bureaus are responsible for providing assistance, including the minimum rural living allowance. To further address and monitor the risks during the implementation, the implementation support missions shall continuously review and ensure the project implementing agencies’ capacity to prevent and respond to GBV. Moreover, the existing Grievance Redress Mechanism (GRM) should have specific procedures for GBV including confidential reporting with safe and ethical documenting of GBV cases. The implementation support missions will review that the GRM receives and processes complaints to ensure that the protocols are being followed in a timely manner, referring complaints to an established mechanism to review and address GBV complaints.

7. Based on careful assessment of (i) local policy framework, (ii) operational systems for managing social impacts from development projects and overseeing well-being of vulnerable groups, and (iii) capacity and experience of local institutions in dealing with the above aspects, and after extensive consultations with key stakeholders, it is concluded that Program activities will not result in substantive negative impacts and social risks. Most improvements will be carried out within the existing rights-of-way; only minimal land acquisition might be needed for limited widening or alignment improvements and there is a well-established system to manage their impacts. Local communities were involved in selecting the rural roads for improvement and view them as a means to improve their access to markets and the world outside. As a result, social conflicts are not expected from the Program. The assessment found that issues of proper compensation and rehabilitation for the limited land acquisition, equal benefits for concerned minority communities, special assistance for vulnerable groups, and potential influx of labor have been well managed by competent local agencies through appropriate measures. Local practices in the Program counties in Anhui Province are in line with the World Bank social safeguards requirements under Program-for-Results Financing.

Consultations and Information Disclosure

8. The Bank team conducted a number of consultations with relevant stakeholders during ESSA preparation, including government departments and local communities in the project counties. A consultation on the draft ESSA was organized during January 11-12, 2018, with the participation of multi-stakeholders to solicit comments and feedback on the findings and recommendations of the draft ESSA. Minutes of the consultation, including description of the workshop, participants, and main issues raised are provided in Annex of the ESSA. The draft ESSA in Chinese was locally disclosed on November 15, 2017 and was disclosed in the Bank InfoShop on January 30, 2018. The final ESSA was disclosed on August 29, 2018.

Recommendations for Environmental and Social Actions

9. The following actions are proposed to enhance the capacity and implementation effectiveness of the existing system:

- i. **Strengthening the performance of the supervision consultant.** Environmental performance is not adequately reflected in supervision reports, and is even absent in some cases. Environmental supervision should be explicitly incorporated in the bidding documents and in the contracts of the supervision consultant. On-site supervision of the environmental performance of contractors should be adequately reflected in the regular supervision reports from the consultants to the Program implementation units.
- ii. **Capacity Training.** Capacity building efforts for CTB staff (CRMS, QSS), VSCs, as well as contractors and supervision consultants, should be strengthened to enhance the effective management and supervision of environmental performance of the Program.
- iii. **Land Acquisition and Compensation.** The PMO will support normalization of the village consultation and compensation mechanism to ensure equitable and transparent outcomes. In cases where land is voluntarily donated, the process will be clearly documented in writing. In cases where compensation (in kind or in cash) is given to affected families by village committees, clear records of such provisions will be documented to improve transparency.
- iv. **Monitoring and Evaluation.** The PMO, in collaboration with the participating counties, will establish a third-party monitoring mechanism, which will work directly with county implementation agencies and the concerned township governments, to document the process and outcomes of any land acquisition in project counties, and submit them to the PMO and the Bank semi-annually.

The full ESSA is available online at

<http://documents.worldbank.org/curated/en/996341535642860128/Final-Environment-and-Social-Systems-Assessment>

ANNEX 7: SYSTEMATIC OPERATIONS RISK RATING (SORT)

Systematic Operations Risk-Rating Tool (SORT)	
Risk Category	Rating (H, S, M, L)
1. Political and Governance	L
2. Macroeconomic	M
3. Sector Strategies and Policies	M
4. Technical Design of Project or Program	L
5. Institutional Capacity for Implementation and Sustainability	S
6. Fiduciary	M
7. Environment and Social	M
8. Stakeholders	-
9. Other	-
OVERALL	M

ANNEX 8: PROGRAM ACTION PLAN

Six Main Themes and their actions	DLI #*	Responsibility	Recurrent	Frequency	Due Date	Completion Measurement**
<p>Theme 1: Improve resilience: (a) use innovative and preventive maintenance technologies to make rural roads and bridges more resilient; (b) review current engineering designs for rural roads and promote the benefits of added resilience (cost benefit analysis) and conduct vulnerability assessment and response;</p>		PMO/CTBs		Annual		Annual report by Engineer bureaus, reviewed by PMO describing for any given year the technologies used for rural roads and bridges that could bring value added in theme of resilience of the infrastructure. Forum on innovation with Local administration and PMO once a year during WB supervision mission.
<p>Theme 2: Toward “Green rural roads” strategy: Open a catalog maintained by the PMO documenting any initiative by 10 counties in introducing efficient, low impact green activities in relation with maintenance and construction of rural roads.</p>		PMO/CTBs		Annual		One submission each calendar year of the catalog by PMO seeking WB comments.
<p>Theme 3: Integrate road safety features in PforR design: (a) With ChinaRAP, select 270 km of roads that contain a sampling of one or more of the seven critical location criteria and roadside hazard conditions (approximately 170 km of existing roads and 100 km of recently rehabilitated/upgraded roads will be selected) and implement ChinaRAP survey and analysis of the 270 km;</p>		PMO			Prior to completion of detailed designs	ChinaRAP survey completed by effectiveness. Catalog of suitable measures completed and submitted to the Bank 6 months after effectiveness.

Six Main Themes and their actions	DLI #**	Responsibility	Recurrent	Frequency	Due Date	Completion Measurement**
<p>(b) The PMO and ChinaRAP will then work together to prepare a “catalog” of suitable countermeasures (one or more) for each of the seven critical location criteria and for roadside hazard conditions</p> <p>(c) conduct design stage audits to ensure proper inclusion of road safety infrastructure.</p>						Report by IVA during assessment of DLI 1 about inclusion of road safety infrastructure during the design of rural road.
<p>Theme 4: Improve planning and implementation capacity: (a) launch periodic assessment of the local authorities’ performance.</p>		PMO/CTBs		Annual	Project closing date	PMO to send a report to the WB before the end of each calendar year reporting on the performance of the local authorities.
<p>Theme 5: Strengthen environmental and social safeguards systems: incorporate environmental supervision into the bidding documents and contracts of supervision consultants, as well as reflect environmental performance of contractors in the supervision reports.</p>		PMO/CTBs		Annual		IVA to report on progress on environment and social safeguards systems within each bi-annual report about DLI 1.
<p>Theme 6: Improve fiduciary capacity: <u>Procurement</u> (a) the cost estimates shall be based on market analysis and updated on a regular basis; (b) the evaluation criteria shall include proper check of the qualifications and adequacy of key staff. <u>Financial Management</u> (a) prepare program financial report and furnish to external auditors for annual audit.</p>		Anhui Province County finance bureaus (CFBs), CTBs		Annual	Upon PforR effectiveness	IVA to report on procurement actions a) and b) within each bi-annual report about DLI 1. Prepare the budget execution report for government general budget (3 accounts) and government funds (only for account #2120804);

Six Main Themes and their actions	DLI #*	Responsibility	Recurrent	Frequency	Due Date	Completion Measurement**
<p>(b) agree an audit terms of reference (TOR) with the Bank and conduct an annual Program financial statement audit that will be publicly disclosed;</p> <p>(c) maintain fixed assets registration book to ensure the value of fixed assets could be recorded properly and be presented in the financial reporting once they are required by related policies and regulations.</p>		<p>and provincial highway bureau</p> <p>China National Audit Office and Anhui Provincial Audit Office</p> <p>CTBs</p>		Annual	End of year 2021	<p>Submit program annual audit report to the Bank within 6 months after the end of each fiscal year.</p> <p>A complete fixed assets registration book is maintained by CTBs for the assets they manage.</p>