



1. Project Data

Project ID P132621	Project Name Yunnan Highway Asset Management Project	
Country China	Practice Area(Lead) Transport	
L/C/TF Number(s) IBRD-84850	Closing Date (Original) 31-Dec-2020	Total Project Cost (USD) 141,990,431.01
Bank Approval Date 31-Mar-2015	Closing Date (Actual) 30-Jun-2022	
	IBRD/IDA (USD)	Grants (USD)
Original Commitment	150,000,000.00	0.00
Revised Commitment	141,990,431.01	0.00
Actual	141,990,431.01	0.00

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2. Project Objectives and Components

a. Objectives

The Project Development Objective (PDO) as stated in the Loan Agreement (Schedule 1, page 6) and in the Project Appraisal Document (PAD , page 5) is: "**to improve the efficiency and cost-effectiveness of highway asset management in Yunnan Province**".

For the purpose of this Implementation and Completion Results Report (ICRR) Review, the PDO is unpacked as follows:



PDO 1. To improve the efficiency of highway asset management in Yunnan Province.

PDO 2. To improve the cost-effectiveness of highway asset management in Yunnan Province.

b. Were the project objectives/key associated outcome targets revised during implementation?

No

c. Will a split evaluation be undertaken?

No

d. Components

There were four components (PAD, pages 5 -7).

1. Highway Asset Management Improvement. The estimated cost at appraisal was US\$58.28 million. The actual cost was US\$36.71 million. This component aimed to improve highway management in Yunnan by establishing an integrated asset management system. There were three sub-components: (i) establishing and operating an integrated management information system (a data management center, data exchange platform, road asset management system, monitoring and emergency response center, integrating existing database and business systems and improving Information Technology (IT) infrastructure); (ii) supporting data collection of the management system (data collection instruments, vehicles, software on paving condition, traffic recording and maintenance inspection); and (iii) technical assistance (TA) to Yunnan Highway Bureau (YHB) for adopting the asset management approach and operating the management system, applying asset principles to business processes and using the system outputs for decision-making and performance evaluation. Some adjustments were made in this component to reflect local reality and for meeting the requirements of new national on government vehicles through the project restructuring (discussed below).

2. Maintenance and Emergency Response Capacities Enhancement. The estimated cost at appraisal was US\$161.69 million (of which US\$46.81 was through Bank financing). The actual cost was US\$133.86 million (of which US\$51.50 million was through Bank financing). There were two sub-components: (i) TA to YHB to improve performance management and objectively measure efficiency and effectiveness of maintenance service delivery through management strategies and facilities, update YHB's evaluation system and indicators, performance monitoring and feedback mechanism to increase accountability; and (ii) equipment and facilities to maintenance stations and emergency centers. Some activities in this component were modified during implementation to reflect local reality and the central government's requirements on government vehicles.

3. Pilot of Cost-Effective Maintenance Technologies. The estimated cost at appraisal was US\$25.38 million. The actual cost was US\$39.74 million. This component planned to finance activities aimed at reducing life-cycle maintenance costs by piloting cost-effective maintenance techniques (such as, through cold recycling of asphalt pavement for base course, modified asphalt, chip seals and micro-surfacing at seven road segments with a total length of 290 kilometers (km).

4. Strengthening Institutional Capacities. The estimated cost at appraisal was US\$8.13 million. The actual cost was US\$5.14 million. This component planned to enhance YHB's management capacities. There were four sub-components: (i) TA for developing a highway asset valuation manual and



accounting guidelines for evaluating highway assets; (ii) developing a highway maintenance manual tailored to specific Yunnan's geographic and highway conditions; (iii) studying the road safety condition of the trunk highways and providing recommendations on road safety policy improvements; and (iv) training and overseas study tours to YHB staff to adapt to the new asset management approach and business systems. The activity of overseas study tours was replaced with inviting international experts to Yunnan, due to government policy constraints.

e. **Comments on Project Cost, Financing, Borrower Contribution, and Dates**

Project cost. The estimated cost at appraisal was US\$280.83 million. The actual cost was US\$224.35 million.

Project financing. The project was financed by an IBRD loan of US\$150.00 million. The amount disbursed was US\$141.99 million. Savings of US\$8.01 million were realized due to a combination of factors such as: (i) actual contract prices lower than estimated due to competitive bidding; (ii) changes in some project activities during implementation; and (iii) depreciation of the Renminbi relative to the US\$ during implementation. The team clarified that the Bank loan of US\$8.01 million was cancelled on October 30, 2022.

Borrower contribution. The borrower contribution was planned at US\$130.83 million at appraisal. The actual contribution was significantly less than planned at US\$82.35 million.

Dates. The project was approved on March 31, 2015, became effective on August 19, 2015, and scheduled to close on December 31, 2020. However, the project closed eighteen months behind schedule on June 30, 2022.

Other changes. The Bank supported the following changes through a Level 2 restructuring on September 2, 2020.

- As discussed above, some component one and two activities were modified.
- The Bank loan was reallocated among disbursement categories.
- An intermediate indicator regarding public engagement was added.
- The closing date was extended to June 30, 2022, for completing the ongoing activities which had been subject to delays in the initial years.

3. Relevance of Objectives

Rationale

Country context. Rapid, albeit uneven economic growth in the three decades before appraisal had resulted in large economic disparities in China. The gains of economic development accrued mainly to coastal areas, while inland areas in the western region lagged behind. Reducing economic disparities was an important part of the national development strategy. Yunnan Province, located in southwest China, was one of the least developed provinces in terms of Gross Domestic Product (GDP) per capita (with a GDP per



capita of US\$3,530, 58% of the national average). Yunnan's weak state of economic development was partially due to its less developed transport infrastructure that was costly to build and maintain, especially as 94% of Yunnan's territory is mountainous and vulnerable to landslides, floods and earthquakes.

Sector context. As a result of the strong need to expand the highway network, subnational governments in China like in Yunnan province had used a large share of the collected road maintenance fees for road construction in the years prior to appraisal. This led to resources for highway maintenance lagging behind highway development. Yunnan's highway system expanded from 42,000 kilometers (km) in 1978 to 222,940 km in 2013, reaching a density of 56.6 km per 100 square km. Comparing with the average of 101 km per 100 square km in the Eastern region, Yunnan had a strong demand to develop new highways. In addition, a large share of Yunnan's trunk highways (national and provincial highways) was in poor condition. Only 50% of the trunk highways were in good or fair conditions, 59% of them were below Class II highway standards and about 1,400 km were unpaved. Therefore, the PDO of improving road maintenance through road asset management reform was important to the YHB.

The key issues facing YHB included: (i) a lack of an asset management system for analyzing maintenance demands and optimizing maintenance strategies; (ii) an inadequate road network monitoring and emergency command system for dealing with the frequent natural disasters; (iii) lack of an integrated database and management system; (iv) inadequate equipment for the frontline staff to carry out maintenance works; (v) although YHB had piloted cost-effective maintenance technologies such as asphalt pavement recycling and chip seal in recent years, these technologies had to be adapted to improve quality of maintenance services, and lastly (vi) inadequate capacity of the YHB staff in using new technologies.

Government strategy. The PDOs were aligned with the Government strategy. The Government's priorities in the 12th Five-Year Plan (FYP, 2011 - 2015) were: (i) supporting economic development in the lagging western and central regions; (ii) providing more assistance to poor regions and regions with ethnic minorities; (iii) promoting green and low carbon development; (iv) enhancing capacity for resilience to natural disasters; and (iv) encouraging innovations in governance. China's 14th FYP for 2021 - 2025 aimed to achieve high-quality development by promoting green transportation, digitalization of transportation, and developing an efficient and economical modern integrated transportation system. The PDO was relevant to the Ministry of Finance's (MoF) new Government Accounting standards issued in April 2017, that set standards for general requirements on public infrastructure accounting.

Bank strategy. The PDO was well-aligned with the Bank strategy for China. At appraisal, the strategic theme two of the Country Partnership Strategy (CPS) for 2013 - 2016 highlighted the need for *"improving transport connectivity"*. The PDO was well-aligned with two of the three pillars of the Bank's current Country Partnership Framework (CPF) for 2020 - 2025. The first pillar of the CPF articulated the need for fiscal reform by introducing road asset valuation and accounting and improving public sector efficiency. The second pillar articulated the need for promoting green growth by utilizing asphalt materials.

Previous Bank experience. The Bank has financed several road projects in China. However, the asset management approach was relatively new in China, and this was the first Bank-financed project in Yunnan to introduce such an approach. The ambitious approach aimed to transition from conventional road maintenance to road asset management through life-cycle management and using engineering and economic principles for data-based decision making.

This project had a comprehensive Information and Communication technology (ICT) component and institutional strengthening activities aimed at improving YHB's highway asset management relating to policy



goals, data collection, planning and budgeting, emergency response and maintenance technologies and performance evaluation and monitoring. The results framework was clear and as discussed in the following section, the causal links between project outputs were likely to aid in realizing the outcomes of improving the efficiency and cost-effectiveness of managing highways in Yunnan. Therefore, the relevance of the PDO is rated as **high**.

Rating

High

4. Achievement of Objectives (Efficacy)

OBJECTIVE 1

Objective

PDO 1. To improve the efficiency of highway asset management in Yunnan Province.

Rationale

Theory of change. The outputs such as an integrated highway road asset management system (RAMS), instruments for data collection, improving the performance evaluation system, providing facilities to maintenance stations and emergency centers, were likely to help in improving the efficiency of highway asset management. The outputs were likely to aid in the long-term outcome of sustaining highways in Yunnan Province. The causal links between the activities, outputs and outcomes were logical and the intended outcomes were monitorable.

Outputs (ICR, pages 10 - 12).

These activities were completed as targeted.

- An integrated RAMS was developed. A road assets valuation manual and accounting guidelines were developed. Highway asset data collection guidelines were developed to enable the application of RAMS.
- YHB developed an annual asset management report for the first time. This report presented the profile of YHB's asset management in 2021, including the highways lengths, their value, their depreciation, the share of different assets by value, the maintenance works costs, and demand forecasts. This report also made recommendations about funding allocation options to road segments.
- YHB's highway assets were inventoried, and the assets were annually surveyed for making investment decisions. The YHB completed an initial valuation in December 2018 and carried out follow-ups in 2019, 2020 and 2021 respectively.



- The project aided in developing a road maintenance manual for improving maintenance decisions, enhancing the quality of maintenance and standardizing routine maintenance operations.
- 225 maintenance stations, 63 emergency response centers at county level and 15 emergency response centers at prefecture level were provided with facilities to deliver maintenance works and quickly respond to emergency events. YHB set up hotlines at the emergency centers to address public concerns. The time to respond to class 111 emergency events was reduced from four hours at the baseline in December 2013 to three hours in March 2022.
- The project provided 85 different training courses. Some 9,414 person-time training were provided to staff. This included 3,063 to female staff. The survey conducted at closure indicated that 92% of the participating staff were satisfied with the training.
- During implementation, contractors employed 3,316 local laborers, including 869 female laborers (470 of them ethnic minorities).
- The ICR (para 32) observed that with this project, Yunnan which was one of the least developed province in China, became a pioneer in adopting the road assets management approach. The ICR noted that the Ministry of Transport (MoT) organized a trunk highway inspection every five year and ranked provinces based on the inspection results. Of the 32 provinces/municipalities directly under the Central Government, Yunnan was at the bottom of the ranking at 28th place in 2013, After the project, Yunnan advanced to 19th place.

Outcomes (ICR, page 10).

The outputs described above were expected to have two outcomes: (i) an increase the percentage of national and provincial roads in Yunnan in good/fair condition; and (ii) equipment provided under the project to replace labor work and training for operation was expected to enhance the capacity of workers to maintain longer road segments using the same equipment.

- At the baseline in December 2013, 50% of the national and provincial highways in Yunnan were reported to be in good/fair condition. At project closure in March 2022, 81.95% of the national highways and 80.96% of the provincial highways were in good/fair condition, exceeding the target of 60.25% and 60% respectively. About 22,900 carbon dioxide emission was reduced due to the improvement of the road condition in Yunnan Province in 2021. According to the clarifications provided by the team, road transport which accounted for 90.9% and 90.6% of total passenger and freight transport respectively in 2019, was a major contributor of greenhouse gas emission (CHG) in the transport sector.
- By the end of the project, each worker could perform routine maintenance of 5.14 kilometers (km) on average, as compared to 3.70 km at the baseline and exceeding the target of 4.80 km.

Given that the outcomes were exceeded, the efficacy of this PDO is rated as **high**.

Rating



High

OBJECTIVE 2

Objective

PDO 2. To improve the cost-effectiveness of highway asset management in Yunnan Province.

Rationale

Theory of change. The outputs of activities described above together with the outputs of activities such as pilots of cost effective maintenance technologies were aimed at reducing highway maintenance costs. These activities were likely to help in the cost-effectiveness of highway asset management. The causal links between the project activities, outputs and outcomes were logical and the intended outcomes were monitorable.

Outputs (ICR, pages 13 - 14).

In addition to the outputs discussed above which were also relevant to this objective, the following activities were completed.

- The pilot technologies on 290 km of roads were completed as targeted for reducing maintenance costs. This included 50 km of recycling asphalt pavement for base course on roads, 80 km of modified asphalt chip roads and 80 km of micro-surfacing. In 2021, the YHB had recycled 98% and 80% of disposed asphalt pavement of national and provincial highways. According to the YHB, the lifecycle savings gained from preventive maintenance was about US\$50.15 million per km for the highway with 12m pavement width.
- The YHB started including preventive maintenance in annual maintenance plans in 2018 and scaled up preventive maintenance to 1,488 km, 1,500 km and 1,307 km of highways in 2019, 2020 and 2021 respectively.
- The YHB introduced risk-based safety management system and approved three new regulations, revised 21 regulations and integrated road safety with the RAMS.
- With the road assessment and performance evaluation study conducted under the project, the YHB developed the Highway Assets Management and the Highway Assets Management Performance Evaluation Policy.
- The project completed the reconstruction, expansion and development of 303 maintenance facilities and procured 747 units of maintenance instruments. In 2020 alone, natural disasters in Yunnan affected 11.3 million people in 128 counties. The YHB effectively responded to and successfully dealt with the major emergencies, such as the Mojiang earthquake and the Baige barrier lake of the Jinsha river.
- During implementation, contractors of the project employed a total of 3,316 local laborers, including 869 female laborers, accounting for 26.20% of the total laborers employed. Of the 869 female laborers, 470 persons were minorities.



- The project trained 358 persons from the project-affected households. Of which, about 44% were females. The training activities were aimed at improving their skills related to cultivation of cash crops, breeding of livestock, electrotechnics and welding.

Outcomes.

The outputs described above were expected to increase the funds allocated for road maintenance based on the recommendations of the RAMS.

- Based on the recommendations of the RAMS, the percentage of funds allocated for roads increased to 100% as compared to the baseline. This exceeded the target of 75%. The ICR noted that although Yunnan was a less developed province in China and government revenue was impacted by the COVID - 19 pandemic, the province provided more road maintenance funds than targeted.

Given that the intended outcome was surpassed, efficacy of this PDO is rated as **high**.

Rating
High

OVERALL EFFICACY

Rationale

Overall, efficacy is rated as high, given that all the intended outcomes (including targets of training people on road maintenance activities), were exceeded. The project outputs such as integrated highway road asset management system (RAMS), improvements in data collection, increased facilities for maintenance, and piloting of cost-effective technologies are likely to help in improving the efficiency and cost-effectiveness of highway asset management in Yunnan Province.

Overall Efficacy Rating

High

5. Efficiency

Economic analysis. At completion, an economic analysis was conducted for the four project components using the same appraisal methodology. The analyses focused on the economic impacts (through traditional cost-benefit analysis). The Road Asset Management System (RAMS) was expected to integrate most of the information equipment resources for road administration and maintenance in YHB and the following quantitative benefits were expected from the project activities: (i) reduction in duplicating system development costs; (ii) reduction in duplicating data collection costs; (iii) reduction in vehicle operating cost (VOC); (iv) passenger time



savings: (v) reduction in accident costs; (vi) reduction in maintenance costs and (vii) reduction in fuel consumption.

The Net Present Value (NPV) at 12% discount rate at project completion was Renminbi Yuan (RMB) 1,640 million, as compared to the NPV RMB 727 million at appraisal. The ex-post Economic Internal Rate of Return (EIRR) was 27.7% as compared to the ex-ante EIRR of 18.5%. The higher EIRR and NPV were due to the reduction in investment costs (from RMB 1,657 million at appraisal to RMB 1,442 at completion) and an increase in traffic volume (from 3,000 vehicle per day at appraisal to 4,555 vehicles at completion). (ICR, para 40).

The other benefits that were not factored into the quantitative analysis were: (i) shortened response time to emergency events would help in reducing losses of lives and properties due to extreme events (since Yunnan is vulnerable to natural disasters and 94% of its territory is mountainous); (ii) better maintained national and provincial highways would help in increasing their resilience to climate change: and (iii) the promotion of inclusive development (given that 33.12% of Yunnan's population are ethnic minorities and most of them lived in remote areas only accessible by road transport). (ICR, para 41)

Savings. Savings of US\$8.01 million were realized due to factors such as: (i) actual contract prices were lower than estimated due to competitive bidding; (ii) changes in some project activities; and (iii) depreciation of the Renminbi relative to the US\$ during implementation.

Administrative and operational issues. All the project activities were completed, although with an eighteen-month extension of the originally scheduled closing date.

In sum, the efficiency with which the project was implemented is rated as **substantial**.

Efficiency Rating

Substantial

a. If available, enter the Economic Rate of Return (ERR) and/or Financial Rate of Return (FRR) at appraisal and the re-estimated value at evaluation:

	Rate Available?	Point value (%)	*Coverage/Scope (%)
Appraisal	✓	18.50	100.00 <input type="checkbox"/> Not Applicable
ICR Estimate	✓	27.70	100.00 <input type="checkbox"/> Not Applicable

* Refers to percent of total project cost for which ERR/FRR was calculated.

6. Outcome

Relevance of the PDO to the Government strategy and the current Bank strategy for China is high. Efficacy is rated as high, given that the targets were exceeded. Efficiency is rated as substantial. There were no significant



shortcomings in the project's achievement of its objectives, in its efficiency or in its relevance. Overall outcome is therefore rated as **highly satisfactory**.

a. Outcome Rating
Highly Satisfactory

7. Risk to Development Outcome

Institutional risk. The ICR (para 83) notes that the Yunnan Highway Bureau (YHB) has officially put the integrated information management system and the road asset management system (RAMS) into routine operation and set up a mechanism to monitor the operation of the system. With support of the Yunnan Highway Science and Technology Research Institute, the Chief Engineer Office of the YHB coordinated the operation of the RAMS and set up six special teams for data collection, input and verification, monitoring road condition, data processing, decision-making analysis and recommendation, model and parameters review as well as updating. The YHB had also mainstreamed expenditures of operating the system in the annual budget plans. Given all this, the institutional risk to sustainability of the development outcome is rated as low.

8. Assessment of Bank Performance

a. Quality-at-Entry

The Bank prepared this project based on the experiences from the road maintenance and asset management projects financed by the Bank globally. Lessons incorporated at design included: (i) the use of "commercial-off-the-shelf" software for the asset management system, to reduce operational risk; and (ii) the inclusion of the operational costs of the system in YHB's annual budget, since the availability of funds was critical for collecting data and implementing the system (PAD, paragraphs 30 - 32).

This project was prepared alongside an Asian Development Project (ADB) (Sustainable Road Maintenance Project in Yunnan province, 2013). The ADB financed project supported rehabilitation of 890 km of the trunk road network, performance-based road maintenance pilot, Highway Development Management - 4 based road asset management system, and institutional capacity strengthening. To add value and complement the ADB-financed project, this project did not support road rehabilitation or other maintenance works except piloting selected innovative maintenance technologies. The project design included special attention to training and included a key outcome indicator for monitoring staff training programs.

The implementation arrangements were appropriate. These included: (i) YHB overall in charge of coordination: (ii) the Department of Highways (DoT) responsible for coordinating with the provincial government: (iii) a project management office (PMO) established in YHB was responsible for implementation: and (iv) Project Implementation Units (PIUs) were to be set up at each of YHB's



prefecture level units to implement the civil works under their jurisdiction (PAD, paragraphs 33, 35 and 36).

The Bank identified several risks at appraisal including substantial risks associated with design and weak implementation capacity, given that project entailed activities at a large number of small and dispersed sites and the Yunnan DoT and YHB had no experience with Bank projects. Mitigation measures included: training programs for DoT and YHB staff; and engaging experienced consultants to supervise construction. Even with mitigation measures, the overall implementation risk was rated as substantial at appraisal (PAD, page 11). The arrangements made at appraisal for M&E and safeguards and fiduciary compliance were appropriate (discussed in sections 9 and 10).

Quality-at-Entry Rating

Highly Satisfactory

b. Quality of supervision

The Bank's twice-a-year supervision missions, aided in facilitating communication with the YHB and ensuring continuity. Field supervision missions conducted by the Bank team aided in ensuring compliance with environmental safeguards and fiduciary compliance (discussed in section 10). According to the information provided by the team, the continuity of leadership was maintained, with two task team leaders during the project lifetime. The Bank supervision mission helped YHB helped in utilizing the loan savings realized during implementation. Despite the challenges in the wake of the COVID - 19 pandemic, the supervision team kept close contact with YHB through phone calls, emails and virtual meetings. These factors helped in completing all the project activities, albeit with an eighteen-month extension of the project closing date. The Borrower's ICR provided in Annex 5 (page 44) noted that the continuous commitment of the Bank team from approach to completion played an important and crucial role in successfully achieving the project PDO as well as to promote the transformation of the highway asset management system in YHB.

In sum, overall Bank performance is rated as **satisfactory**.

Quality of Supervision Rating

Satisfactory

Overall Bank Performance Rating

Satisfactory

9. M&E Design, Implementation, & Utilization

a. M&E Design

The PDO and the M&E were clearly defined at appraisal. The key outcome indicators discussed in section four, were appropriate for monitoring project performance. The indicators were measurable. The PMO was



responsible for collecting data for monitoring performance. The baseline data and end-of-project targets were clearly specified at appraisal (PAD, paragraph 38).

b. M&E Implementation

There was no change in M&E during implementation, with the exception of changing the dates of achieving the final target (to reflect the revised closing date) and adding an intermediate indicator on public engagement to reflect the change in government policy. The ICR (para 63) observed that the M&E mechanism functioned well during implementation. With support from the project management consultants, the YHB monitored implementation results, annually collected data and shared the results with the Bank and the relevant government agencies.

c. M&E Utilization

Overall, the M&E was utilized to monitor the project implementation progress, outputs and outcomes of the project.

In sum, the quality of M&E is rated as **substantial** considering the appropriateness of design, implementation and utilization of the M&E.

M&E Quality Rating

Substantial

10. Other Issues

a. Safeguards

The project was classified as a Category B (partial assessment) project under the World Bank safeguard policies. Four safeguard policies were triggered at appraisal: Environmental Assessment (OP/BP 4.01); Natural Habitats (OP/BP 4.04); Indigenous Peoples (OP/BP 4.10); and Involuntary Resettlement (OP/BP 4.12) (PAD, page viii).

Environmental Assessment and Natural Habitats. At appraisal, the potential environmental impacts were expected from construction activities (dust and noise and material processing). During implementation, environmental impacts were expected from waste management and processing of the maintenance materials. An Environmental Management Plan (EMP) was prepared and publicly-disclosed to address the environmental impacts (PAD, para 66). The safeguards on Natural Habitats was triggered, as the project entailed constructing 13 emergency centers and management stations in environmentally-sensitive areas. The EMP included mitigation measures to avoid the potential adverse impacts on sensitive areas.

The project's environmental performance was rated as highly satisfactory (ICR, para 66). There were no environmental issues or issues with natural habitats. Field supervision missions conducted by the Bank team constantly assessed the environmental performance on the project sites. External environmental



monitoring reports submitted on a six-month basis confirmed compliance of environmental safeguards throughout implementation.

Indigenous Peoples. A social assessment of the project area was conducted at appraisal and an Ethnic Minority Development Plan (EMDP) was prepared to address issues pertaining to indigenous peoples (PAD, para 59). There were no issues with indigenous peoples (ICR, para 67).

Involuntary Resettlement. Permanent land acquisition was not envisaged at appraisal, as land currently owned by the road authorities were to be used. A Resettlement Policy Framework (RPF) was prepared and publicly disclosed to address land acquisition and resettlement issues (PAD, para 61). Based on the RPF, the YHB developed a resettlement plan during implementation (ICR, para 67). The ICR observed that the PMO and the YHBs affiliated units fully compensated the project-affected households, and that implementation of resettlement was monitored by an independent monitoring institute twice a year.

b. Fiduciary Compliance

Financial management. The Bank conducted an assessment of YHB's financial management arrangements at appraisal. The assessment identified the following risks: (i) lack of experience of YHB staff with Bank operations; and (ii) uncertainty of counterpart funds, as counterpart funds were to be from the sectoral budget allocated to YHB on an annual basis. Mitigation measures incorporated at design included, training YHB's financial management staff, close Bank supervision, and stipulating that alternative measures to be worked out by YHB if the funds are not committed in the sectoral budget (PAD, para 53).

The project's financial management was rated as satisfactory (ICR, para 73). The YHB maintained a sound financial management system during implementation to ensure that the project funds were used for the intended purposes. The required interim reports and annual audit reports were submitted in a timely manner. The ICR noted that no significant financial management issues were noted either by external auditors or during the Bank's supervision missions. According to the information provided by the team, the Project Management Office (PMO) submitted six unqualified financial audit reports during implementation as required (including a final audit report).

Procurement. The Bank conducted a procurement assessment of the PMO at appraisal. The assessment identified the following risks: (i) the potential large workload of the PMO, and (ii) PMO's limited experience with the Bank's procurement procedures. The mitigation measures incorporated included, training the PMO staff and hiring a qualified procurement agent with experience in procurement of Information Communication Technology (ICT) equipment.

The ICR (paragraph 71) noted that there were procurement delays in the initial years due to the lack of procurement capacity. The contracts had an average 25% savings due to appropriate and sufficient pre-bid market surveys. However, there were frequent complaints about the bidding qualification criteria and key technical specification, including one Integrity Vice Presidency (INT) case. The ICR noted that the cases were investigated diligently and appropriately settled in a timely manner. The ICR does not report of any case of mis-procurement.



c. Unintended impacts (Positive or Negative)

The ICR (para 51) observed that the Road Routine Maintenance Manual and the Road Assets Collection Standard were upgraded to provincial technical standards, which benefitted the entire road sector in Yunnan Province.

d. Other

According to the ICR (para 46) the YHB effectively responded to and successfully dealt with the major emergencies, such as the Mojiang earthquake and the Baige barrier lake of the Jinsha Tiver,

11. Ratings

Ratings	ICR	IEG	Reason for Disagreements/Comment
Outcome	Highly Satisfactory	Highly Satisfactory	
Bank Performance	Satisfactory	Satisfactory	
Quality of M&E	Substantial	Substantial	
Quality of ICR	---	Substantial	

12. Lessons

The review draws the following lessons from the ICR, with some adaptation of language.

1. Management commitment help in successfully implementing the project. In this project, the Yunnan Highway Bureau (YHB) maintained a stable project management team during implementation and YHB's top management provided dedicated support in developing and operating the integrated management system, the Road Asset Management System (RAMS), the asset valuation manual and accounting guidelines. With this support, the consultants completed several rounds of large-scale consultation to identify business needs and procedures and carried out trial operations prior to roll-out.

2. Packaging contracts and conducting market surveys can help in managing procurement. This project packaged goods contracts in big size, which attracted large suppliers and aided in intensifying competition. The final prices of the contracts were much lower than the estimated costs. The lesson is that carrying out a market survey before preparing bidding contracts, can help in providing a solid base for setting technical and qualification requirements.

3, Comprehensive interventions may be required to achieve efficiency of road assets management. This project introduced the road assets management approach and included activities to strengthen YHB's weaknesses in service delivery. This approach incorporated value



management into YHB's asset management, the data collection instrument, monitoring value, demand analysis and fund allocation and training YHB staff on road maintenance. Given that this project was prepared alongside an ADB financed project, the Bank preparation team sought to add value by focusing on road asset management approach, rather than supporting road rehabilitation or other maintenance works excepts piloting selected innovative maintenance technologies. These interventions together improved the overall efficiency of the YHB's asset management.

13. Assessment Recommended?

No

14. Comments on Quality of ICR

The ICR is well-written. The theory of change articulated in the text shows clear and logical causal links between the project activities, outputs and the intended outcomes. The ICR provides adequate evidence and analysis to assess the outcomes. The photographs provided in the text enables the reader to visualize the changes made by the project. The Borrower's ICR provided in Annex Five provides useful information. The ICR for the most part adheres to the recommended page length. Overall, the quality of the ICR is **substantial**.

a. Quality of ICR Rating

Substantial