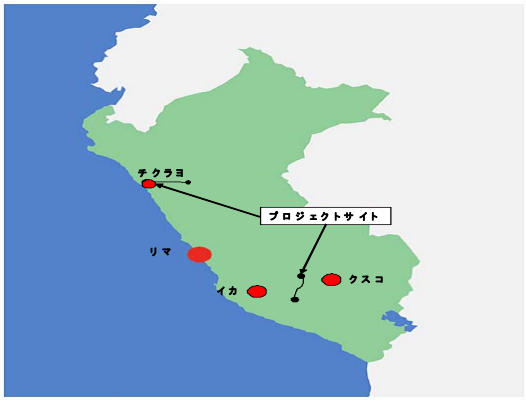
Peru

Rural Highway Rehabilitation & Improvement Project (II)

External Evaluator: Kenji Momota (IC Net Ltd.)

Field Survey: April – May 2008

1. Project Profile and Japan's ODA Loan



Map of the project area

Northern arterial road

1.1 Background

In Peru, 71% of all freight was transported by road in 1992, and so roads were vital to freight transport. Even so, 70% of the 70,000 km of roadway in Peru was unpaved; and of the remainder, 11% was paved and 19% was asphalted. The roads which were paved deteriorated substantially during the 1980s because necessary maintenance was prevented by a lack of funds, inadequate operation and maintenance capability, and public security problems.

The Fujimori Administration from the beginning emphasized operation, maintenance, and rehabilitation of the transportation system as part of its "New Economic Policy." During Fujimori's first term (1990–1995), the Pan-American Highway which runs along the Pacific coastal area, the economic heart of Peru, was rehabilitated using funds from the Inter-American Development Bank (IDB). During Fujimori's second term which began in July 1995, Peru undertook the "10-Year Program for the Rehabilitation of the Transportation Network" with the objective of repairing and maintaining roads that connect the coastal and interior areas as well as the interior north-south roads.

This Rural Highway Rehabilitation & Improvement Project II is a continuation of the Rural Highway Rehabilitation & Improvement Project which was signed and extended in September 1996 as part of the "10-Year Program for the Rehabilitation of the Transportation Network", and was meant to repair the arterial roads in northern and southern Peru.

1.2 Objective

The project's objective is to promote improvement of the transverse roads that connect the interior and coastal areas, to secure the smooth flow of traffic, and to secure access to markets and employment opportunities for those living in poverty, and thereby to contribute to the economic revitalization of interior areas and rectification of regional disparities.

1.3 Borrower/Executing Agency

Borrower: Republic of Peru

Executing Agency: Ministry of Transport and Communication (MTC) and Provias Nacional (road network maintenance department under MTC)

1.4 Outline of Loan Agreement

Loan Amount / Loan Disbursed Amount	9,184 million yen / 9,183 million yen
Exchange of Notes / Loan Agreement	– / November 1997
Terms and Conditions - Interest Rate - Repayment Period (Grace Period) - Procurement	Construction: Interest rate 2.7%, Repayment period: 25 years (7 years), general untieed loan Consulting services: Interest rate 2.3%, Repayment period: 25 years (7 years), general untied loan
Date of Disbursement Completion	March 2006
Main Contractors (1 billion yen or more)	Consorcio Chiclayo (Peru), Energoproject Holding S.A. (former Yugoslavia) J.J.C. Contratistas (Peru)
Consulting Services (100 million yen or more)	CESEL S.A (Peru), Nippon Koei (Japan) (JV) , Barriga Dall'orto S. A. Ingenieros Consultores (Peru)
Feasibility Study (F/S), etc.	Contract signed for the Rural Highway Rehabilitation & Improvement Project (September 1996)

2. Evaluation Result (Overall Rating: B)

2.1 Relevance (rating: a)

2.1.1 Relevance at the time of appraisal

The Fujimori Administration's (second term, latter 1990s) "New Economic Policy" emphasized operation, maintenance, and rehabilitation of the transportation system. The main aim of the "10-Year Program for the Rehabilitation of the Transportation Network (1996–2005)" which was drawn up under this policy was to rehabilitate roads that connected the coastal and interior areas as well as the interior north-south roads.

This was a project to repair rural roads in northern and southern Peru, and the target was

the road segment of Chiclayo–Chongoyape, which connects major cities in the interior and on the coast (northern area), and the road segment of Abancay–Chalhuanca, which is part of the main arterial road in the Andes Mountains (southern area). This project was consistent with the above 10-Year program and it was deemed to be highly significant.

2.1.2 Relevance at the time of ex-post evaluation

Peru's macro economy is improving due to increased exports of major items such as mineral resources whose prices are soaring,[1] and the Marco Macroeconómico Multianual 2008–2010, a multi-year macroeconomic guideline prepared by Peru's Ministry of Economy and Finance, reflects this resultant profit in its individual and social policies (i.e., for infrastructure development). There is continued emphasis on the transportation sector with investment of $4.2 billion scheduled over the three years of the plan. An infrastructure development plan based on the international project Integration of South American Regional Infrastructure (IIRSA)[2] was set forth, and development of the trans-continental road (Interoceanica[3]), which comprises segments of this project, is a high-priority undertaking that is part of IIRSA.

Peru's Ministry of Transport and Communication stresses the importance of the target segments in its current integrated transportation plan (2006–2023) as follows.

— Northern Chiclayo–Chongoyape Segment

Development of this arterial road which connects Chiclayo (Lambayeque Province), an important city in the north, with Cajamarca Province, an interior province that is a major producer of minerals and agricultural products, etc., is extremely important for economic development in the north.

— Southern Abancay–Chalhuanca Segment

This road connects an interior area that includes Cusco, etc., with coastal cities, and it is also important internationally as a part of the trans-continental road Interoceanica.

Given the above, the project is consistent with the national plan, etc., both at the time of appraisal and at the time of ex-post evaluation, and so its relevance is extremely high.

[1] Amid the worldwide trend in recent years toward soaring resource prices, Peru has continued to experience steady economic growth as a producer of silver (world's top producer) and zinc (world's third largest producer). Peru's economic growth rate in 2007 was 8.9%.

[2] IIRSA is a project undertaken by 12 South American countries for planning and coordinating wide-area infrastructure development. The project cost for roads and railways to connect the Atlantic and Pacific oceans as well as a communications network and electric power network that cover the entire continent is approximately $37.4 billion (approximately 4.3 trillion yen).

[3] Interoceanica is a trans-continental road that connects Peru's Pacific coast and Brazil.

2.2 Efficiency (rating: c)

The project period and the project cost both significantly exceeded the plan (project period: 268%; project cost: 124.5% approximately), and so the efficiency is rated as low.

2.2.1 Outputs

The project's originally planned outputs and actual outputs are shown below. The actual outputs were basically as planned.

Table 1: Comparison of Original and Actual Output

Output	Original (at appraisal)	Actual
(1) Northern arterial road (Chiclayo–Chongoyape)	60 km	59.22 km (basically as planned)
(2) Southern arterial road (Abancay–Chalhuanca)	120 km	119.34 km (basically as planned)
(3) Consulting services (construction supervision, engineering service for the Chongoyape–Cajamarca segment)	264.5 M/M Of which, the E/S portion was 25.5 M/M	Unknown

The entire length of the southern arterial road was developed basically as planned, but the detailed plan was revised so that additional construction[4] was carried out for reinforced walls and side drains, etc. It was not possible to confirm the actual M/M of the engineering service in detail, but the scope of the engineering service survey was expanded[5] in association with the detailed design according to an interview survey conducted on site. Although there was an increase in the time period of the construction supervision in association with the extension of the project implementation period, it appears that the output was basically according to plan because it was confirmed that operations themselves were implemented as planned.

[4] Including increases in the construction of transport, structural, and drainage facilities (elevated earthen works, increase in soil removal, and additional construction of retaining walls and side ditches along narrow roads), additional construction of reinforced walls and gabions, and expansion of platforms.

[5] The concerned road is not yet improved, but in 2006 a feasibility study was conducted based on these survey results. The final survey is planned in the current MTC development plan; however, a survey respondent replied that because the entailed project cost is extremely large (approximately US$300 million), funding is currently being studied.

Map 1: Northern arterial road (Chiclayo–Chongoyape)

Map 2: Southern arterial road (Abancay–Chalhuanca)

2.2.2 Project period

The actual project period significantly exceeded the plan. The planned period was November 1997 to December 2000 (38 months). The actual project period was November 1997 to April 2006 (102 months), representing an increase of 64 months over the planned period. The main reasons for the delay are as follows.

(1) Overall reasons for delay of the project

- Delay in loan disbursement due to the policy of the government at that time[6] which was restructuring its financial affairs:
  Phase I[7] of the Rural Highway Rehabilitation & Improvement Project (yen loan) had already begun at that time, and following the start of the project (in 1997) from 2000 onward, financing for Phase I was given priority because restrictions were placed on foreign borrowing by the government.
- Delays in the selection process of contractors and consultants (halting of the selection process due to inadequate government funding and objections raised by bidders, etc.)

(2) Reasons for delay of separate outputs

- Northern arterial road: Implementation was delayed until domestic-currency funds could be obtained in 2003 from Corporacion Andina de Fomento (CAF), in addition to the fact that priority was given to the implementation of the southern arterial route.[8]
- Southern arterial route: Interruption of construction due to heavy rains and implementation of additional construction.
- Engineering service: The actual survey concluded in August 2001, but internal approval was delayed due to the impact of the reorganization of the executing agency (Provias Nacional).

[6] The Fujimori-Toledo Administration (latter 1990s to the early 2000s) promoted a structural adjustment policy aimed at cancelling the budget deficit and foreign-owed debt which had ballooned in the 1980s.
[7] The ex-post evaluation of this project is completed (FY2005).
[8] Due to Peru's decision that, because the southern route is also part of the trans-continental road and the southern ring road, its completion was important for the effects of both roads to manifest.

Roads improved by the project

Northern (Chiclayo–Chongoyape)

Southern (Abancay–Chalhuanca)

2.2.3 Project cost

The total planned project cost was 12,245 million yen, but the total actual project cost was 15,253 million yen, which exceeded the plan (125% of the planned amount). The main reasons for the increase are as follows.

(1) Changes at the detailed planning stage and additional construction during implementation: The amount of construction was increased mainly on the southern arterial route (Abancay–Chalhuanca). It was affected by rising construction costs due to higher raw material prices, in addition to the fact that issues in construction arose which were not anticipated during planning, such as the fact that this segment lies on a plateau at an altitude of 2,000 meters, the ground is soft, and access by trucks is difficult.[9]

(2) Increase in the work volume of the consulting service in association with the extension of the project period (see "2.2.2 Project period").

(3) Increase due to expansion of the scope of the engineering service

2.3 Effectiveness (rating: a)

2.3.1 Annual average daily traffic (AADT)

The current traffic volume on the roads improved by this project is shown in the table below. The increase on the southern road is particularly striking.

[9] In association with this, additional construction was implemented, including increases in construction of transport, structural, and drainage facilities (elevated earthen works, increase in soil removal, and additional construction of retaining walls and side ditches along narrow roads), additional construction of reinforced walls and gabions, change in quarry location, and repositioning of utility poles.

Table 2: Annual Average Daily Traffic (AADT)

Segment	At appraisal (vehicles)	Actual* (vehicles)
(1) Northern arterial road (Chiclayo - Chongoyape)		
• Segment average (planned level: 3,100 vehicles)	1,847	3,212(171%)
• Chicalayo environs (10-km point)	5,082	6,960(137%)
• Midpoint (Patapo/30-km point)	No data	2,063
• End point (Chongoyape/60-km point)	No data	612
(2) Southern arterial road (Abancay–Chalhuanca)		
• Casinchihua	46	443 (963%)
• Chalhuanca	No data	259

Source: Ministry of Transport and Communication (MTC).
Note 1: The actual level of traffic of the northern road was calculated using a 24-hour traffic volume survey (7 days) conducted at the time of the field survey.
Note 2: The AADT for (1) was calculated by multiplying the actual traffic volume by revised coefficients for the month and day of the week.
Note 3: The traffic volume for the southern road in (2) is the average of March 2008.
Note 4: Casinchihua is a toll station which is approximately midway between Abancay and Chalhuanca.

The road improvement is thought to have awakened the latent demand discussed below and to have contributed to the increase in traffic volume of both segments.

(1) Northern road (Chiclayo–Chongoyape)

In the environs of Chiclayo (at the 7-km point between Pomalca and Chiclayo), the traffic volume was approximately 7,000 vehicles, an increase of 37% from the time of the appraisal. The cause behind this is thought to be the recent opening of a large sugar refinery in Pomalca and the rise in usage of this route by trucks transporting the refinery's main products, syrup and bagasse.

These agricultural products are exported from northern ports through which the Pan-American Highway passes, in addition to being consumed in Chiclayo. The primary route is Chongoyape to Chiclayo to Lambayeque. The table below shows the fluctuations in traffic volume on the main arterial roads that connect to the project's road segments, and traffic volume is increasing for all segments. Segments with a particularly strong relationship with the project for the above-mentioned reason are the Chiclayo–Lambayeque segment and the Chiclayo–Pimentel segment.

Table 3: Annual Traffic Volume of Segments Connecting to the Northern Road

(Unit: vehicles)

Year	To Lambayeque	To Pimentel	Moche to Biobal
2000	1,776,090	No data	344,560
2004	No data	3,910,245	362,810
2005	No data	No data	362,080
2006	2,134,520	5,237,750	392,740

Source: Ministry of Transport and Communication (MTC).
Note 1: The above routes ("To Lambayeque" and "To Pimental") refer to the Chiclayo–Lambayeque segment and the Chiclayo–Pimentel segment, respectively.

On the other hand, the traffic volume at Chongoyape was 612 vehicles/day. MTC points out that this figure represents an increase from the time prior to project implementation but noted that the real demand is not reflected in the figure. In other words, because the route from west Chongoyape to Cajamarca Province is not complete yet, the latent demand from inland Cajamarca Province to Chiclayo, which the actual demand area of this segment, is not being expressed. It will only be possible to confirm the real traffic volume and demand on this road when the latent demand from Cajamarca Province,[10] which is a large producer of minerals and agricultural products, is realized.[11]

(2) Southern road (Chalhuanca–Abancay)

The improvement of this segment resulted in shorter travel time and an increase in the number of vehicles engaged in long distance transport between such cities as Lima–Cusco and Ica–Cusco. The table below displays the trend in traffic volume on the project road and a major road that connects to the project roads, and both are increasing.

In particular, the opinion was expressed that enabling the transport of agricultural products from Abancay to Lima is important for the economic development of Abancay.[12]

Table 4: Annual Traffic Volume of Segments Connecting to the Southern Road

[10] In this area, there are large mines such as Michiquillay and El Galeno

[11] A mine development company called Rio Tinto is operating west of Chongoyape, and improvement of the access road leading to Chongayape is being undertaken at the company's expense (US$11 million). Even more active transport is anticipated when this road is opened.

[12] Comment by the Mayor of Abancay in an interview during the field study.

Year	Abancay–Limatambo	Nazca–Ica
2000	134,685	520,125
2003	No data	536,185
2004	No data	521,950
2005	No data	535,820
2006	205,860	561,005

Source: Ministry of Transport and Communication (MTC).
Note 1: Abancay–Limatambo
Note 2: Nazca–Ica is a major route that connects Cusco with the coastal area and the capital city of Lima.

2.3.2 Time-saving and cost-saving

Pavement of the roads by this project resulted in saving of travel time and vehicle operation/maintenance costs. The following two tables show a comparison of the time and cost required at the time of the appraisal and after the project. The time required on both segments was reduced by half after the project compared to the time of the appraisal for all vehicle types. For the southern road in particular, considering that, at the time of appraisal, the road was routinely closed for certain periods[13] during the wet season due to poor road surface conditions, the actual effect of the project is higher than the average figures suggest.

Table 5: Comparison of Time Required at Appraisal and Post Project

Output	At Appraisal	Post Project[14]
(1) Northern arterial road (Chiclayo–Chongoyape)		
Passenger car	90–120 minutes	50–60 minutes
Bus	130–180 minutes	60–78 minutes
Large truck	160–180 minutes	72–84 minutes
(2) Southern arterial road (Abancay–Chalhuanca)		
Passenger car	200–240 minutes	120–140 minutes
Bus	210–270 minutes	150–170 minutes
Large truck	240–290 minutes	170–210 minutes

Source: Ministry of Transport and Communication (MTC)

Vehicle operation cost per kilometer was reduced by nearly 50% compared to the time of

[13] The surface conditions of the southern road was particularly poor during the wet season, and problems frequently occurred such as travel requiring from six hours to one day and road closures for several days at a time due to landslides and mud.
[14] The time-saving effects were confirmed during the field study when nearly identical times were measured.

the appraisal for almost all vehicle types on both road segments.

Table 6: Comparison of Vehicle Operation Cost[15] at Appraisal and Post Project

(Unit: US$/km)

Output	At Appraisal	Post Project
(1) Northern arterial road (Chiclayo–Chongoyape)		
• Passenger car	$0.42	$0.25
• Bus	$2.18	$1.31
• Large truck	$2.03	$1.45
(2) Southern arterial road (Abancay–Chalhuanca)		
• Passenger car	$0.68	$0.29
• Bus	$3.34	$1.42
• Large truck	$2.40	$1.63

Source: Ministry of Transport and Communication (MTC)

In the interviews conducted during the field study with bus companies that operate on the project's segments, interviewees noted the following effects of the road improvement as improvements in the work environment of road transporters.

- It became possible to increase the number of bus runs per day due to the shortened travel time,[16] and this increased income.
- Maintenance costs were reduced as a result of the reduction in vehicle breakdowns, less frequent tire changes (from every two months to every six months) and fewer visits to the repair shop following the road improvements.

2.3.3 Economic internal rate of return (EIRR)[17]

The EIRR of the northern arterial road calculated at the time of appraisal was 18.9%, and when recalculated by this ex-post evaluation study, the result was 17.3%. So, the EIRR was basically as planned, but reasons for the slight decline may include the increase in operation and maintenance cost due to the increase in traffic volume, in addition to the increase in project cost.

[15] Costs established based on IRI (see section on operation and maintenance under "Sustainability") for each vehicle type.

[16] The number of long-distance buses running between Lima and Cusco which use this segment increased from 3/week to 30/day, operated by 10 bus companies. So, this segment has contributed greatly to the development of the inter-city transportation network.

[17] The calculation results at the time of appraisal for the southern road are unknown. The figure was not recalculated because comparison was impossible.

Table 7: Result of EIRR Recalculation

	At Appraisal	Post Project
EIRR	18.9%	17.3%
By Segment		
1) Chiclayo–Tuman	Unknown	23.3%
2) Tuman–Patapo	Unknown	16.8%
3) Patapo–Chongoyape	Unknown	7.9%
Benefits: Time-saving and vehicle operation cost-saving Costs: Initial investment (construction cost) and O&M cost		

Note 1: For recalculation, the HDM III model[18] was used, just as at the time of appraisal.

2.3.4 Qualitative effects (Evaluation of road condition by residents in the northern area only[19])

In the questionnaire survey of road segment users (245 respondents; see "2.4 Impact"), improvements in the road conditions and transportation means resulting from the project were evaluated as follow.

Table 8: Evaluation of Road Conditions and Transportation Means

	Very Satisfied	Satisfied	Average	Dissatisfied
General level of satisfaction	**19.6%**	**77.1%**	**2.9%**	**0.4%**
Road condition	27.3%	66.9%	4.9%	0.8%
Bus operation	Greatly Improved	Improved	No Change	Worse
Number of buses	17.1%	73.5%	9.4%	0%
Punctuality	18.0%	70.2%	11.4%	0.4%
Travel time	40.4%	53.9%	5.7%	0%

Note 1: Approximately 90% of the 245 respondents are bus users.

The general level of satisfaction was over 90%, and many respondents highly appreciated the improvements particularly in the number of buses and the travel time.

In view of the above, the effects of the project are being expressed basically as planned, and so the effectiveness is evaluated as high.

[18] The HDM III Model (Highway Design and Maintenance Model) is software which was developed by the World Bank, and it is used mainly to measure the effects of road projects. By establishing indicators for traffic volume and usage conditions in this software, an outlook for long-term operation and maintenance costs can be produced and investment effects can be measured.

[19] Qualitative effects were not studied for the southern road because beneficiaries are dispersed throughout the area, making it difficult to select and collect the time and cost samples.

2.4 Impact

2.4.1 Economic revitalization and rectification of regional disparities in the region along the roads

The trends in the gross regional domestic products (GRDP) of the major provinces related to the project area are as shown below. Economic development is especially striking in the interior areas, such as Cusco and Cajamarca, with growth of over 200% compared to 1997. The estimated number of beneficiaries of this project is 3.2 million persons, which is the total population of Lambayeque, Cajamarca (northern part), and Aprimac (southern part) provinces.

Table 9: Gross Regional Domestic Products (GRDP) of the Four Major Provinces

(Unit: million nuevo sol)

		1997	2004	2005	2006	Compared to 1997
North	Lambayeque	5,716	7,430	8,435	9,357	164%
	Cajamarca	3,588	7,382	8,877	10,258	286%
South	Aprimac	975	964	1,068	1,276	131%
	Cusco	3,815	5,807	6,683	8,273	217%

Source: Instituto Nacional de Estadistica e Informática (INEI) (Peru's government statistics bureau).

It is difficult to measure the direct contribution of the project's impact on the macro economy because the roads opened relatively recently, in 2004–2006. The improved convenience brought by the road opening produces economic effects such as creation of employment opportunities for residents, increase in the number of tourists, and market expansion (see "2.4.2 Beneficiary survey"), and so it appears to be making a certain contribution to regional development.

Reference: Examples of Increases in Employment and Economic Opportunities

A grape vineyard and freezing plant (San Juan Agricola Empresa) were established using Chilean capital near Chongoyape thanks to the road improvement. The plant aims to process grapes from about 500 ha and employs approximately 400 to 600 local residents (the number employed varies according to the season). This creates a large economic effect for the small city of approximately 17,000 persons, and the reaction of the residents has been extremely positive. The vineyard owner indicated in an interview that the decisive

factor for establishing the operation was the improved access to the port for exports brought about by the road improvement, which evidences that the road improvement had a large impact on regional development.

Grape Freezing Plant near Chongoyape

2.4.2 Beneficiary survey

The beneficiary survey consisted of a questionnaire survey of residents in the Chiclayo–Chongoyape area. The valid responses numbered 245.

Table 10: Summary of Beneficiary Survey (northern road)

Respondents	245 residents of the Chiclayo–Chongoyape area, 90% of whom use microbuses
Type of Usage	Commute to work/school: 70%, tourism: 20%; daily use (shopping, going to the hospital, etc.): 10%
Frequency	Approximately 80% are weekly users (daily: 13%; 2–3 times/week: 23%; 1 time/week: 41%)

(1) Northern area (Chiclayo–Chongoyape)

In the beneficiary survey of the residents, the effects of the road improvement mentioned by many respondents were economic effects and improvements in the quality of life. Approximately half of the respondents acknowledged that their incomes had actually risen. Among the reasons given, those that were particularly frequently mentioned are an increase in new employment opportunities and an expansion of business scale[20] due to an increase in visitors.

[20] A restaurant operator in Chongoyape stated that visitors increased by more than 40% and the number of foreigners doubled compared to before the project.

Table 11: Summary of Beneficiary Survey Results

Improvement in living environment	Improved	No change	
	82%	18%	
Reason*	Increased income	More convenient life	Wider range of movement
	46%	34%	29%
Reason for increased income*	New employment opportunity	Increase in business opportunities	Improved market access
	15%	76%	24%

Note 1: The questions were multiple choices.
Note 2: The total number of respondents was 245.

As reasons given for the "more convenient life" response, many stated that access to public services improved, including easier access to schools and healthcare facilities. Additional opinions from interviews[21] with residents during the field study are listed below.

1) Improvement in living environment

• Improved access to healthcare facilities: Time was shortened and the response was improved for emergency transport (for births, surgeries, etc.) to Chiclayo, of which there are approximately 30/month, and vehicle breakdowns and accidents during transport were reduced.

• Improved daily life: Improved convenience for commuting to school and work, enabling of one-day long-distance commutes, and more frequent trips to Chiclayo for shopping.

2) Economic effects: New construction and greater usage of restaurants and hotels due to more tourists, and opening of new company offices.

[21] During the field study, a group discussion was held with the mayor of Chongoyape, leading business persons, and persons connected with healthcare facilities, etc.

Survey at bus stop in Chiclayo **Interview in Chongoyape City**

(2) Southern area (Abancay–Chalhuanca)

Quantitative evaluation and analysis is difficult since no macro statistical data was prepared, but statements indicating the following were collected in beneficiary interviews in the field. In an interview, the mayor of Abancay also mentioned the following as effects of the road improvement.

- Increase in transport of agricultural products (grains and potatoes, etc.) to major consumption centers such as the capital city of Lima
- Increase in the number of companies setting up operations[22]
- Hotel construction due to the increase in tourists

From the above, it can be confirmed that the project made a certain contribution to local development.

(3) Questionnaire for transport companies (northern area only)

In a questionnaire survey of local bus and transportation companies (to which 40 companies responded),[23] 90% recognized positive effects from the project. The effects mentioned included an increase in freight transport volume, in addition to an increase in sales (approximately 60%) parallel with the increase in transportation service and number of passengers as well as a reduction in vehicle maintenance costs (40%).

2.4.3 Impact on the natural environment and improvement of traffic safety

In the beneficiary survey (northern area) approximately 36% of respondents pointed out problems such as increases in noise and traffic accidents, etc. In interviews with residents, some residents pointed out the problems of noise due to an increase in traffic volume, especially trailers and of traffic accidents due to excessive speeds.

Table12: Results of the Beneficiary Survey

Negative Effects	Exist	Do not exist		
	35.9%	64.1%		
Reasons/Factors	Air pollution	Noise	Increased traffic accidents	Other
	12%	22%	23%	2%

[22] According to the mayor of Abancay, Lima construction companies, etc., are entering the area.

[23] The survey targeted operators of “combi” on the Chiclayo–Cajamarca segment.

Although the risk of breakdown was reduced by the road improvements, traffic volume also increased; thus increasing minor collisions.[24] The table below shows the transport police's accident statistics for roughly the past two years on the northern road.

Table 13: Number of Traffic Accidents on the Chiclayo–Chongoyape Segment

Jurisdiction	Number of Accidents	Injured	Fatalities
Pomalca (7/2007–5/2008)	107	44	3
Patapo (3/2006–4/2008)	22	8	0
Total	129	52	3

Source: Transport Police Station (Pomalca, Patapo)

According to an interview with the chief of the Pomalca Road Police Station, the number of accidents is not especially large compared to other average roads, but the main causes of accidents are excessive speeding by large trucks carrying agricultural products and irresponsible driving. This has led to the illegal placement of speed bumps by residents, as stated in the section on operation and maintenance, and so the safety awareness of drivers needs to be raised.

2.5 Sustainability (rating: a)

2.5.1 Executing agency

2.5.1.1 Operation and maintenance system

Provias Nacional, which is under the Ministry of Transport and Communication (MTC), was the executing agency of this project. However, different parts of the organization are handling O&M for the northern and southern areas.

(1) Northern area (Chiclayo–Chongoyape)

The Lambayeque Province regional office of Provias Nacional is in charge of O&M for the northern area, and it consigned the O&M activities to local small and medium companies. The provincial regional office has a staff of 17 persons, of which 10 are technical staff.

(2) Southern area (Abancay–Chalhuanca)

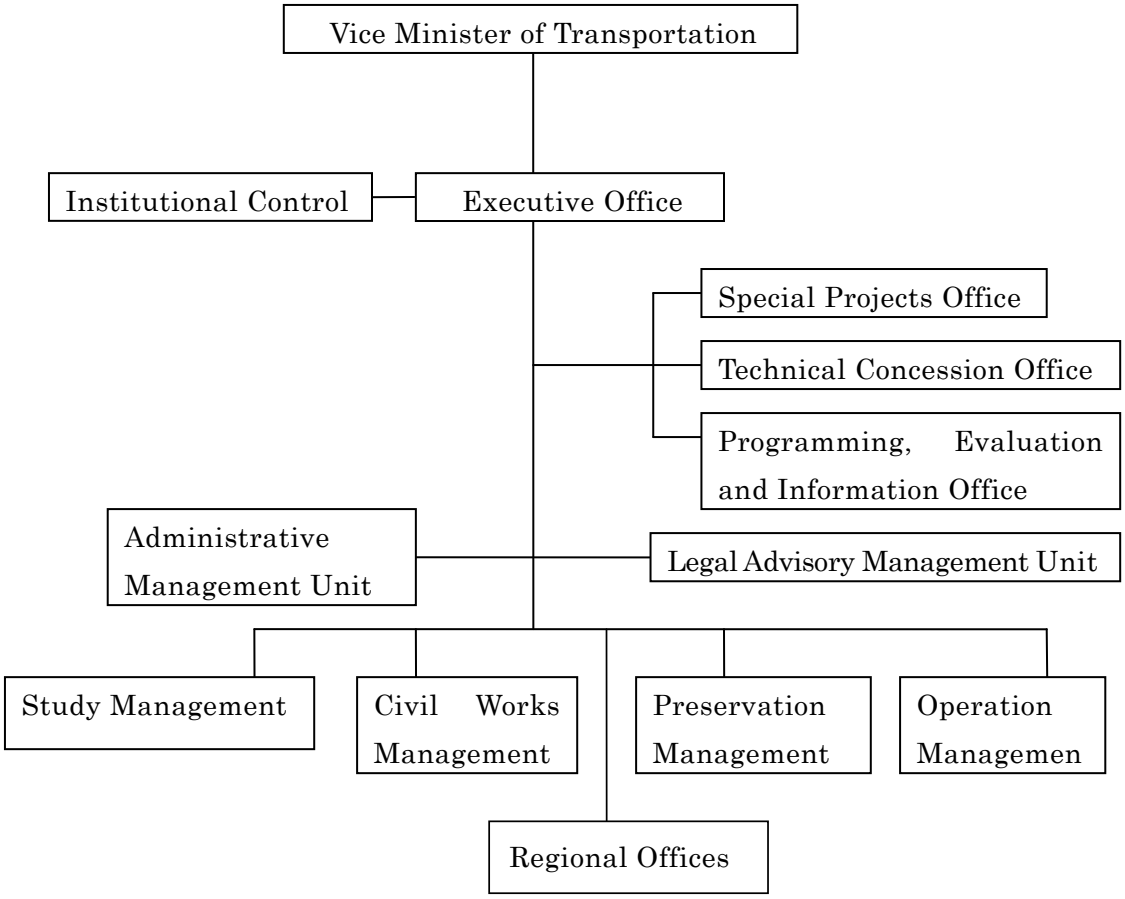
In the southern area, Provias Nacional has signed a concession contract with a private

[24] The accident statistics for the period prior to project implementation could not be confirmed, but the opinion of the chief of the Pomalca Road Police Station is that accidents have increased compared to prior to road improvement.

company called Survial.[25] Survial employs local residents to handle the practical side of O&M. There are a total of 18–20 O&M teams composed of 8–10 persons each, and each team is in charge of approximately 100 km of road, working in rotation.

Peru is currently promoting the consignment of O&M operations to private companies as a part of "Project Peru" which was explained in the "Relevance" section of the Ex/Post Comparison Sheet. Therefore, Provias Nacional is in the process of shifting to the role of supervisor.

Organization chart of Provias Nacional



Source: Provias Nacional

[25] Survial is a joint company formed by three private companies, and it is a temporary company whose main work is this concession contract. The contract is for 757 km of Segment 1 of the Interoceanica road, including this project segment and covers (1) operation and maintenance, (2) engineering service for repair and rehabilitation services (for part of the segment), and (3) repair and rehabilitation works. The periods of the contract are 25 years, 10 months, and 24 months, respectively. Essentially, Concar (a group company of Grana y Montero, the largest construction company in Peru) is in charge of the overall operations.

2.5.1.2 Technical capacity for operation and maintenance

(1) Northern area (Chiclayo–Chongoyape)

Local small and medium companies handle the practical side of O&M under the supervision of Provias Nacional. The small and medium companies that receive the consignments have lengthy experience in road O&M, and so there is no problem in their technical capacity.[26]

(2) Southern area (Abancay–Chalhuanca)

Survial (a private company) which handles O&M is a joint company (see "Operation and maintenance system" for details) financed by the largest construction company in Peru, Grana y Montero. Survial also has abundant experience in road-related O&M as well as management, and so there are no problems.[27]

2.5.1.3 Financial status for operation and maintenance

(1) Northern area (Chiclayo–Chongoyape)

Consignment to private companies is being promoted as part of "Project Peru," which was discussed in the "Relevance" section of the Ex/Post Comparison Sheet. Local small and medium companies handle the actual work under the supervision of Provias Nacional (see the "Technical capacity" section). The annual budget for FY2008 of the Provias Lambayeque regional office was approximately 1.068 million sol (US$370,000), and the budget for daily O&M operations was 562,000 sol (approximately US$220,000 to US$230,000). The office replied that it has secured an adequate budget so that implementation of operations will not be hindered.

(2) Southern area (Abancay–Chalhuanca)

A firm financial base is secured because the O&M funds are paid through the concession contract with Provias Nacional. The concession contract for O&M including the project area for FY2008 was approximately 30 million sol (approximately 1.12 billion yen). Survial, which handles actual operations, has the capital participation of the largest construction company in Peru, Grana y Montero, and so there is no problem in its finances.

(3) Financial status of Provias Nacional

[26] No particular training, etc., is being implemented at the consignee company because most of the workers are former employees of Provias Nacional and are experienced in road maintenance.

[27] Local staff is undergoing in-house training at Survial. According to an interview survey at Survial, there is little technical difficulty in the operation and maintenance work itself and there are no large problems.

The total FY2008 budget of Provias Nacional is approximately 1.87 billion sol (approximately 69.8 billion yen). The annual budget for O&M is approximately 500 million sol (approximately 18.9 billion yen). The current total budget is nearly double the 880 million sol of 2004. According to an interview with the responsible staff member from the financial affairs department, behind this increase lies the recent buoyancy of Peru's macro economy in particular, budget allocation that is being conducted more appropriately than previously, and nearly full funding of the requested amount for O&M. Given this, there appear to be no problems in the financial status of O&M at the current point in time.

Table 14: Annual Budget/Actual Expenditures of Provias Nacional

(Unit: 1,000 nuevo sol)

	2004		2005		2006		2007		2008
	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget
Road rehabilitation									
Investment amount									
Concession contract									
Road maintenance									
Paved road improvement cost									
Lambayeque Office share)									
Fixed costs									
Other									
Concession contract									
Service fee									
Total									

Source: Provias Nacional

2.5.2 Operation and maintenance status

Below is the result of an evaluation of road conditions along the project segments based on IRI,[28] an international road condition indicator.

(1) Northern area (Chiclayo–Chongoyape)

The IRI for the Chiclayo–Chongoyape segment is 1.22 m/km (10 m/km prior to project implementation) and maintains the highest level attainable for a paved road, indicating that the condition of the road is good. However as mentioned in the "Effectiveness" section, mainly due to vehicles travelling at excessive speeds, residents have illegally set up speed bumps on the road in front of their residences to prevent accidents

(2) Southern area (Abancay–Chalhuanca)

The IRI on the southern road varies depending on the segment, as shown below.

1) Chalhuanca–Sauinto Bridge: 1.27 m/km

[28] The International Roughness Index (IRI) is an index with was proposed by the World Bank in 1986, and it expresses the evenness of roads in five levels. The lower the figure, the better the condition of the road, and the highest rank is 0.78–1.5 m/km. The source is Provias Nacional.

2) Sauinto Bridge–Abancay: 2.4 m/km

In dangerous locations, Survial is taking measures such as the installation of reinforced walls. Landslides occur during the wet season, but as of now, the landslides have not caused any human injury or large impacts which obstruct the passage of traffic. Since December 2007, two cases of damage have occurred involving small-scale soil erosion and landslides. The service level established in the concession contract is to make the road passable within 8 hours and to fully restore it within 48 hours. Up to this point, measures have been carried out appropriately.

Illegal speed bumps set up by residents

Roads damaged due to landslide

Given the above, there are no problems in the ability of the project's executing agency or in the O&M system, and so the sustainability is evaluated to be high.

3. Conclusion, Lessons Learned, and Recommendations

3.1 Conclusion

Given the above, the evaluation of this project is high.

3.2 Lessons Learned

N.A.

3.3 Recommendations

(1) Northern area (Chiclayo–Chongoyape)

Safety measures should be strengthened to prevent high-speed, dangerous driving, and the number of speeding vehicles should be reduced. Through this, agreement should be reached with the residents so that they cease setting up illegal speed bumps.

(2) Southern area (Abancay–Chalhuanca)

As long as the latent threat of soil erosion and landslides exists, accidents at points of poor visibility will continue to be an issue. On the other hand, it is desirable to promote construction of retaining walls on mountainous roads in view of their cost effectiveness, even though the construction is expensive.

Comparison of Original and Actual Scope

Item	Planned	Actual
1. Output 1) Northern arterial road Chiclayo–Chongoyape	Total length: 60 km	Total length: 59.22 km
2) Southern arterial road Abancay–Chalhuanca	Total length: 120 km	Total length: 119.34 km
3) Engineering Service (Chongoyape–Cajamarca)	264.5 M/M (share of E/S portion: 25.5 M/M)	Unknown
2. Project period Total	November 1997–December 2000 (38 months)	November 1997–April 2006 (102 months)
1) Northern arterial road Chiclayo–Chongoyape	November 1997–March1999 (17 months)	November 2004–April 2006 (18 months)
2) Southern arterial road Abancay–Chalhuanca	November 1997–March 1999 (17 months)	September 2001–February 2004 (30 months)
3) Consulting service 1. Construction supervision	November 1997–November 1998 (13 months)	September 2001–April 2006 (54 months)
2. Northern arterial road E/S	January 1999–December 2000 (24 months)	May 2000–November 2002 (31 months)
3. Project cost Foreign currency Local currency	3,276 million yen 8,969 million yen (Local currency $71,754,000)	335 million yen 14,915 million yen (Local currency $127,118,000) (Local currency $4,976,000)
Total ODA loan portion Exchange rate	12,245 million yen 9,184 million yen $1＝125 yen 1 sol ＝ 43.9 yen (as of 1997)	15,253 million yen 9,183 million yen $1＝116.1 yen (July 2001–June 2006 average) *Bank of Japan standard foreign exchange rate 1 sol = 32.14 yen (as of June 2003)