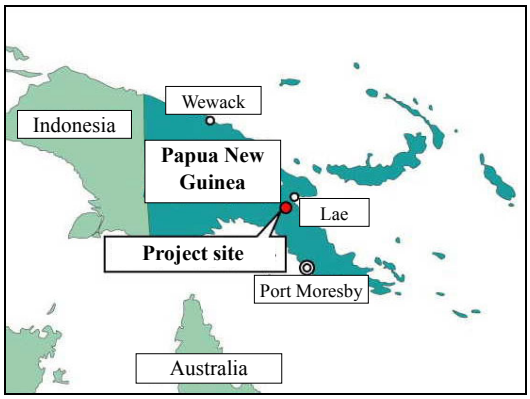
Papua New Guinea

National Road Improvement Project

Report Date: February 2003

Field Survey: October - November 2002

1. Project Profile and Japan's ODA Loan



Project site

Road section: Mumeng-Bulolo

1.1 Background

At the time of appraisal, Papua New Guinea's (PNG) existing road network totaled some 21,443km and road density was 0.05km/km^2, thus its road infrastructure was expanding considerably more slowly than in other contiguous developing nations. [1] For example, road densities in neighboring countries stood at 0.11km/km^2 in Indonesia, 0.16km/km^2 in Thailand and 0.54km/km^2 in the Philippines. Characteristically, in PNG priority was given to the development of roads linking neighboring cities and villages for which construction costs were low and the technologies involved simple, whilst roads traversing wetlands or mountainous areas, even important arterial links, were inadequately developed due to issues with either construction costs or technological capacity. Accordingly, local residents living in areas lacking sufficient road infrastructure were forced to rely on inefficient and dangerous marine transport to get around. There were also numerous regions without access to marine transport, and these regions were lagging far behind the rest of the country in terms of economic development, to say nothing of basic social services such as education and health.

To address this situation, PNG's government formulated a Provincial Road Development Plan and a National Highway Development Plan (1990-2000) and set about developing the nation's backward road infrastructure. The National Highway Development Plan envisaged annual targets of (1) national highway improvement plan formulation for a total 240km (including 100km of new construction) (2) improvement/paving of 66km of existing national roads, (3) new construction of 32km, and (4) widening of 5 bridges from one to two lanes. Specifically, plans included the development of the trunk road linking Port Moresby on the south coast and the eastern coastal region and the opening of the coastal road between Vanimo-Aitape in the northern coastal region, plus

[1] Appraisal data is for 1988.

improvement/paving of key routes. In the Highlands Province, mainly improvement of the existing transnational link between Port Moresby-Lae, and development of the Karimui access route; and on New Britain, one of the islands, construction of a link between Biara-Rabaul. The National Highway Development Plan was advanced with the support of the Asian Development Bank (ADB) and the European Economic Community (EEC).

Gold mines and coffee plantations were under development in the area around Mumeng-Wau in Morobe Province, one of the regions covered by this project, and the Mumeng-Wau link occupied an important position as a means of transporting products from the area to PNG's second largest city of Lae. Similarly, rubber and cocoa plantations were being expanded in the Rigo-Kwikila area of Central Province, and the road between Rigo-Kwikila was an important transport link to the capital Port Moresby. Since the intention was to transport products from both areas over land, traffic volumes were forecast to grow 6% a year between Mumeng-Wau and 5% a year between Rigo-Kwikila. However, both sections were narrow at between 4-6m, which gave rise to issues such as difficulty in passing, traffic interruptions during the rainy season, and escalating maintenance costs, thus improvements were necessary in order to meet future growth in traffic volumes. [2]Both the Mumeng-Wau link and the Rigo-Kwikila link were part of the National Highway Development Plan cited above.

1.2 Objectives

To upgrade the existing links between Mumeng-Wau in Morobe Province and Rigo-Kwikila in Central Province to all-weather roads so as to improve transportation (unpaved, narrow, low standard roads), which was inconveniencing the lives of local residents and acting as a serious brake on agricultural development of coffee, rubber, etc., and promote socioeconomic development.

1.3 Project Scope

The project broadly comprised two sub-projects. The first involved improvement of the existing Mumeng-Wau section in Morobe Province (width expansions and paving for a total 58km) and the reconstruction or construction of 10 bridges; the second comprised improvement of the Rigo-Kwikila section in Central Province (width expansions and paving for a total 18km) and the reconstruction or construction of three bridges.

The ODA loan covered the entire foreign currency portion of project costs and some of the local currency portion. Specifically, funding was allotted to the purchase of necessary equipment, the financing of construction and procurement of necessary equipment and services, and the financing of consulting services.

1.4 Borrower/Executing Agency

Government of the Independent State of Papua New Guinea/Department of Works (DOW)

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[2] The Mumeng-Bulolo section was graveled, as was the Bulolo-Wau section, however, a 1.5km section out of Wau had been paved. On the Rigo-Kwikila link, some 5km of the approximately 10km section on the Rigo side had been paved, however, the 8km section out of Kwikila was unpaved.

1.5 Outline of Loan Agreement

Loan Amount Loan Disbursed Amount	3,515 million yen 3,011 million yen
Exchange of Notes Loan Agreement	November 1990 March 1991
Terms and Conditions -Interest Rate -Repayment Period (Grace Period) -Procurement	 2.7% 30 years (10 years) General untied (Consultant funding procured as partially untied aid)
Final Disbursement Date	May 2001

2. Results and Evaluation

2.1 Relevance

At the time of appraisal, more than 90% of total transport sector expenditure was targeted at the road sector under PNG public investment plans, and high priority had been assigned to the development of the nation's roads.

The current PNG National Transport Development Plan (2001-2010) sets forth its vision for the nation's transport sector as follows: the provision of community-wide transport services that are both safe and reliable via highly cost efficient means, in order to support the various activities of individuals, families and businesses. In order to make this vision a reality, the government has set forth the following policies: (1) to maintain, rehabilitate and improve the existing infrastructure, (2) to develop new transport infrastructure to enhance the efficiency of goods and services distribution, (3) to promote private sector expansions of efficient transport facilities, and (4) to promote transport safety. The plan also targets the realization, by 2010, of improved access to regional social and administrative services, such as health and education, freedom of movement for all citizens, the provision of cheap access between agricultural, mining and industrial production districts and the markets, and the promotion of opportunities for residents of poverty-stricken regions in the hinterlands and coastal areas to increase their income level.

The government plans to invest 5,961 million kina in the ten-year period through 2010, of which 91.1% is to be spent on the road sector.

The Lae-Mumeng-Bulolo-Wau section that was among the links covered by the project represents an important link between PNG's second city, Lae, and the coffee, lumber and mining production districts of Bulolo district. The 22km section between Bulolo-Wau was not ultimately implemented via this project, however, it is cited as being a priority project under the current national development plan.

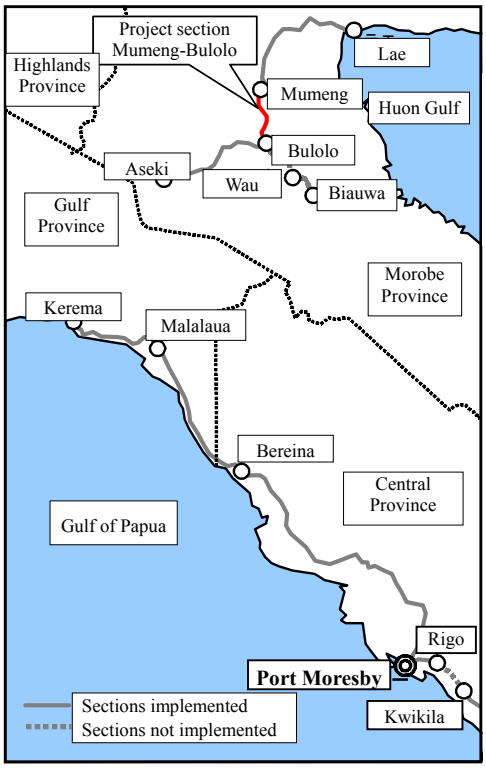
The five-year plan (2003-2007) that is currently being developed by the provincial government of Morobe has set forth a policy aimed at strengthening Bulolo's administrative services, including health and education, with the aim of making Bulolo a core city with functions second only to the province's capital Lae. Further, the intention is to expand the use of the stretch of national highway that runs between Lae-Wau as an industrial road by stimulating coffee, vanilla and lumber

production and revitalizing industries such as mining development, etc.; the section is currently used mainly by passengers and for small-scale market activities.

Development of road infrastructure is a priority task in the province, and 8 million kina has been budgeted for construction and maintenance of provincial roads. This is equivalent to roughly 10% of the province's total annual budget of 81 million. Four roads link Mumeng-Bulolo, and there are plans for continued development and to promote the effective utilization of the network.

As this demonstrates, road development continues to be a priority issue within the development of PNG's transport sector, and moreover, the role of regional development in the areas targeted by this project also continues to be important, thus the project is considered to have been relevant.

Figure 2-1: Project sections



With regard to the second sub-project covering improvement of the existing Rigo-Kwikila section, as detailed later, although work was undertaken up to the detailed design and tender preparation stage, escalating construction costs ultimately resulted in the sub-project being shelved. Rigo-Kwikila is a thriving agricultural region with spice, fruit, coconut, rubber, coffee and copra plantations, and the Rigo-Kwikila section is the trunk road for overland transport of produce to Port Moresby and an important part of the route linking the eastern coastal region with the capital. The section is included in the National Highway Development Plan, and although it was not implemented, it was in line with top policies and is considered to be highly necessary.

2.2 Efficiency

2.2.1 Project Scope

The project scope covered improvements to existing road sections between Mumeng-Wau and Rigo-Kwikila, however, in contrast to the results of the feasibility study, the detailed design compiled by the consultant revealed the ground on the Mumeng-Bulolo section to be tectonically hard, which pushed up implementation costs for the section. The outcome of this was that although detailed designs and bidding preparations were undertaken for the Rigo-Kwikila section (18km) and the Bulolo-Wau section (22km) on the Mumeng-Wau link, since total construction costs had increased for the above reasons, and furthermore, economic stagnation was affecting PNG treasury finances rendering it difficult to appropriate the necessary local currency funds for the project, the improvements to these two sections were withdrawn from the scope. The final scope covered improvements to the existing Mumeng-Bulolo section (37km) and the reconstruction/construction of

seven bridges.

A major avalanche occurred in the Mumeng-Bulolo region in November 2000 as the result of torrential rains, the Mumeng Bridge was blocked by debris and large sections of pavement were washed away on part of the route causing extensive damage. Additional work was undertaken to repair this damage.

2.2.2 Implementation Schedule

The implementation schedule was planned to span 77 months from February 1991 (L/A conclusion) through June 1997 (completion of civil engineering works and consulting services), however, it in fact ran 122 months from March 1991 to April 2001, with the project being completed three years and nine months (45 months) behind target. The primary reason for the delay was the time needed to handle land acquisitions. The land issue in PNG involves complex historical, cultural and ethnic issues, and land acquisition always entails difficulties. There are multiple reasons for this but in the first instance, since the land ledger is unclear numerous deed holders insist on their rights, which in many cases require time-consuming court proceedings to establish true ownership.

Moreover, land is not traditionally owned by individuals and in many cases ownership is assigned to an entire tribe, which means that there are numerous deed holders and negotiations take time. The current project covered improvements to existing roads and it was anticipated that land acquisition issues with the exception of the land newly required for expansions to target sections had been resolved when the road was first constructed. However, it became apparent that at the time of initial construction the then government had not undertaken the proper land acquisition and compensation procedures. In consequence, deed holders along the target section made strong claims to the government regarding unresolved compensation issues while the project was in progress, which took time to settle and delayed project implementation. These land acquisition issues took 68 months to unravel, which was far in excess of the 20 months cited in the original plans.

The second reason for the delay was that the executing agency had little experience of consultant selection, thus these procedures also needed time to complete.

2.2.3 Project Cost

Project costs for the Mumeng-Bulolo section exceeded the budget due to the additional construction costs necessitated by tectonic hardness, the additional costs generated by the need to repair the Mumeng Bridge and a section of road damaged by avalanche debris during the torrential rains of November 2001, and by the introduction of the VAT system in PNG in 1998. However, because the work on the Rigo-Kwikila section and the Mumeng-Wau section was cancelled, overall costs were kept within planned levels. In addition, the ODA loan covered the majority of total project costs, which amounted to 3.25 billion yen, thus the burden on PNG government finances was modest at 240 million on a yen base.

2.3 Effectiveness

2.3.1 Traffic Volumes

A target of 360 vehicles/day was set at appraisal for average daily traffic volumes on the Mumeng-Bulolo section for 2001, however, the actual figure was 528 vehicles/day, thus an attainment rate of 147% (Table 2-1). This is mainly attributable to significant increases in utility vehicle traffic such as PMV[3] (Public Motor Vehicles), etc., which has posted growth rates three times higher than planned levels, accounting for 82% of total traffic volume. The volumes of medium and large vehicles (buses, trucks, etc.), on the other hand, were lower than target figures. PMV include trucks that have been converted into carryalls (large cars/trucks with) and off-road vehicles such as jeeps, and in PNG where ownership of a family car is low due to levels of income, they are a popular mode of public transport among residents of rural and agricultural communities. For reference, after appraisal the executing agency released a revised traffic volume estimate for the target section of 570 vehicles/day, i.e. an attainment rate of 93% for their estimate.

Table 2-1: Average daily traffic volumes on the Mumeng-Bulolo section (2001)

		Average Traffic Volumes (vehicles/day)	
		Estimates at appraisal	Estimates as revised by the executing agency (reference)
Ordinary cars	Planned	36	57
	Actual	62	
Utility vehicles, etc. (PMV*, jeeps, etc.)	Planned	144	228
	Actual	432	
Buses/HGV	Planned	144	228
	Actual	23	
Small/medium-sized trucks	Planned	36	57
	Actual	11	
Total	Planned	360	570
	Actual	528	

Source: JBIC data, DOW

Note 1: *PMV: Public Motor Vehicle

Note 2: Because the executing agency's revised estimates do not give vehicle-specific planned traffic volumes, the total figure of 570 vehicles/day was divided into 10% for ordinary vehicles, 40% for utility vehicles, 40% for buses/small trucks, and 10% for medium/large trucks on the basis of JBIC's category-specific appraisal estimates.

It is worth noting that Mumeng was hit by disaster in November 2000 and has been subject to flooding and avalanche damage on a further three occasions, thus many areas of the town are still

[3] PMV (Public Motor Vehicle) are carryalls, trucks where the loading space has been converted into seating and a roof canopy attached. The majority are privately owned but they are a widespread means of public transport in PNG. Microbuses and other such services are available in urban areas, however, since there are numerous unpaved roads in PNG there is a strong demand for PMV, which are heavy-duty vehicles.

devastated/divided and recovery is still in progress. According to a Mumeng district officer, the outcome of this is that Mumeng's population has dropped to a third of its former level.

2.3.2 Reductions in Travel Times

PMV (public transport vehicle)

Prior to project implementation, the section of road between Mumeng-Bulolo was unpaved and narrow, and conditions deteriorated especially during the rainy season when smooth passage and safety became problematic. The section was upgraded to all-weather pavement and width expansions were executed, which has made driving more efficient and safer than before. It has also reduced the time required to travel between Mumeng and Bulolo from 1.5-2 hours to around 30-45 minutes.

2.3.3 Recalculation of Economic Internal Rate of Return (EIRR)

At appraisal, the EIRR for the Mumeng-Wau section was calculated to be 12.3%. When the EIRR for the Mumeng-Bulolo section was recalculated during this survey, the result was a negative figure. This is considered mainly attributable to the fact that, (1) although total project costs were kept within planned levels, a considerable cost overrun was generated on the Mumeng-Bulolo section, and (2) because work was not started on the Bulolo-Wau section, the benefits expected to be produced on the section were not generated due to changes to the project's scope. This increased the costs and reduced the benefits in the EIRR recalculation, yielding a negative figure.

(Prerequisites)
Benefits: Reductions in travel expenses, reductions in maintenance costs
Costs: Civil engineering construction costs, consulting service costs
Project life: 20 years from completion

2.4 Impact

A number of case studies were conducted as a means of ascertaining the impacts of the project on the target regions. There were city-level case studies that mainly targeted key personnel within the administration, health and educational organizations, and village-level case studies that targeted local residents living in project regions. The project region (Mumeng-Bulolo section) falls under the administrative jurisdiction of the Bulolo district of Morobe Province. Beyond Bulolo, the section connects with Wau and Menyamya and local residents (of Menyamya) also use the Mumeng-Bulolo road section. The survey was subject to time and cost constraints as the result of which it did not precisely encompass the range and population affected by the project. However, it may be assumed that the project had a direct impact on a total of 147,000 people, i.e. 14,571 households or 77,232 people in Bulolo and 14,009 households or 68,546 people in Menyamya.

Table 2-2: Population figures for target regions (statistics for 2000)

Region	Households	Population	Men	Women
Morobe Province (total)	102,607	539,404	280,710	258,694
1. Bulolo District	14,571	77,232	41,148	36,084
- Mumeng	4,717	23,495	12,485	11,010
- Warai	1,871	9,465	4,796	4,669
- Watu	2,282	13,411	7,128	6,283
- Urban Wau/Bulolo	2,509	13,037	7,075	5,962
- Wau	3,192	17,824	9,664	8,160
2. Menyamya District	14,009	68,546	34,906	33,640
- Aseki	5,909	30,894	15,810	15,084
- Kome	4,838	22,548	11,353	11,195
- Wapi	3,264	15,104	7,743	7,361

Source: 2000 Census, National Statistics Office, Port Moresby, July 2002.

City-level case studies

In order to gather information on the socioeconomic changes that were affected by the project in the regions covered, interviews were conducted with various key persons in the two cities of Mumeng and Bulolo, including administrative, hospital, school, and market operators, as well as shopkeepers, businessmen and PMV operators. A summary of the results is given below.

- The population of the Mumeng-Bulolo region (Bulolo) is said to be around 77,000, whilst that of the Menyamya district, where Wau is located, is around 68,000, thus the project had an impact on some 147,000 people of one form or another.

- The reductions to travel times on the Bulolo-Mumeng and Bulolo-Lae sections effectuated by the project have improved residential access to public services such as administration and health. Especially, Bulolo is the center of administrative and economic activity in the district, thus the residents of local communities travel back and forth many times a day in order to receive administrative/health services, to make commercial transactions and to go shopping. Medical institutions in municipal Bulolo have confirmed that patient numbers are up since project completion. Moreover, it is now easier to transport emergency patients. The impact on educational institutions has not been as marked and there have apparently been minimal increases in student numbers at the cities' schools.

- Market distribution has improved. Since completion, improved access to Lae has led to residents of Bulolo and Wau to the south, in particular, making more frequent trips to the city to trade agricultural produce, etc. Similarly, residents of Mumeng are traveling to Bulolo more frequently.

- There has been confirmed growth in customer numbers and sales at shops in Bulolo since project completion. In addition, more stock is being laid in more frequently. However, the Mumeng market (public market) was destroyed by disaster and has yet to be rebuilt. Since the

2001 closure of the Bulolo market (public) by the city office due to deteriorating security as urbanization progressed, the people who operated out of the public market have continued to ply their trade using vacant land or roadside stalls. The Mumeng market has yet to fully recover from the disaster, the population is declining and economic activity has stagnated, thus the project has not had any tangible impact on commercial activity in the region.

- According to PMV operators, there has been no significant change in the number of PMVs operating on the Mumeng-Bulolo section per se. Among reasons cited for this, the majority of PMV are privately owned and operate services between Lae-Mumeng-Bulolo-Wau, however, since the Bulolo-Wau section and parts of other sections remain unpaved, vehicles are prone to frequent breakdown due to the enormous stress imposed by traveling on unpaved roads. Repair costs are commensurately high. Moreover, in order to increase the number of services, operators also need significant funds to buy new PMVs, however, this is no easy matter since individual fundraising capacity is limited.

- Worsening security has become a serious issue in the region in recent years, and the faster speeds that are now possible since the road was paved have led to a decrease in the probability of becoming the victim of road crimes such as carjacks, an impact that was not predicted during planning.

Village-level case studies

In order to gather information on the lifestyle changes brought about by the project, interviews were conducted using a questionnaire survey at 50 households in each of four villages (total 200 households) in the target region, two located close to the road, two at some distance from it. The majority of respondents were subsistence farmers (83.5%). The sample also included public workers (4%) and shopkeepers (1.5%), among others. A summary of the questionnaire is given below.

Table 2-3: Villages surveyed

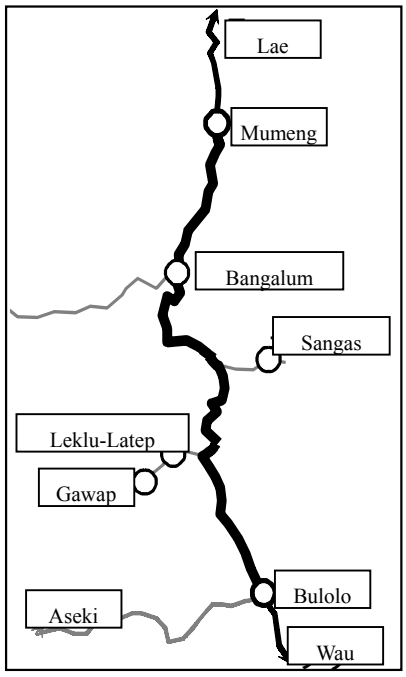
	Distance from project road	Province	Sample No.
Bangalum	Near (located alongside the project road)	Bulolo	50
Sangas	Far (located on a linking provincial highway)	Bulolo	50
Leklu-Latep	Near (located on a linking provincial highway)	Bulolo	50
Gawap	Far (located on a linking provincial highway)	Bulolo	50
Total			200

(1) Changes in transport mode, objective and frequency of travel

There were roads, albeit unpaved, in the project region prior to implementation, thus there has been little change in the PMV/truck utilization rate, which increased from 99% to 100%. The percentages of walkers have also remained constant in the villages of Sangas and Leklu-Latep, dropping from 26% to 24%.

A comparison of use objectives, however, indicates major post-project increases for shopping (85%→93.5%), followed by medical institutions (69.5%→76.5%) and visits to friends/family (35.75%→39%). There have been only slight increases in the figures for transport of cash crops (23.5%→ 24%), attending school (11.5%→10.5%), and marketing (91%→90%), thus little change from pre-project levels.

Figure 2-2: Survey village location map



Regarding road use frequency, daily users have increased substantially from 5.5% pre-project to 20%. The numbers using the road 2-3 times a week have almost doubled from 24% to 42%, whilst the numbers using the road 1-3 times a week have halved from pre-project levels, dropping from 45% to 25.5%. Opportunities for village residents to use the road have thus clearly increased over their former levels.

(2) Changes in travel times, types of services used

All respondents stated that the time required to get from their village to Lae has halved, and the city can now be reached within three hours from all four villages.

Regarding increases in the number of visitors to the villages, 51% of respondents from the four villages said that visits by health officers had increased, that figure was 39.5% for school inspectors and 23.5% for district officers. However, 46% of respondents stated that there had been no change in the overall number of visitors to the village. Correspondingly, 68% responded that opportunities to access health services had increased, with 42% responding similarly for access to educational services.

Furthermore, more than 60% of respondents stated that supplies of necessary commodities such as rice and sugar at village and town shops had increased from pre-project levels. 36% also cited increased supplies of garden crops. However, the majority of respondents stated that the prices of these products were comparatively higher, however, the steep declines in the value of the nation's currency throughout this period are one likely reason for the soaring commodity prices.

(3) Changes in income levels and satisfaction ratings

A full 60% of all respondents stated that the project had had a positive impact on their earnings. Moreover, 96% stated that they were satisfied or highly satisfied with the work undertaken. This result was common to all four villages covered by the survey.

(4) Conclusion

In summary of the above, the completion of the Mumeng-Bulolo section has increased access to road transportation for the residents living in contiguous regions. This has led to more residents becoming frequent road users and to improved access to public services such as administration, medical treatment and education. Travel times have been reduced improving the distribution system, which has led to rises in product supplies in village stores. Moreover, the majority of residents in the four villages covered by the survey stated that the project had had a positive impact on their income.

2.4.2 Environmental Impacts

In principle, environmental monitoring in PNG is undertaken by the Department of Environment and Conservation (DEC) in conformity with the Environmental Planning Act of 1978 and DOW, the project's executing agency did not implement any special environmental monitoring activities. [4]According to DOW, the DEC has not reported any explicitly negative environmental impacts from its monitoring of air pollution and noise generated by the project.

As stated in section 2.2.2, claims for compensation were received from landholders during implementation because land acquisition and compensation proceedings for already acquired land had not been properly conducted. Although it took time to respond to the situation, inviting delays in project implementation, the procedures and compensation were ultimately handled correctly. However, not all compensation has been paid and the executing agency is still remitting compensation payments.

It was not necessary to relocate any residents for the purposes of project implementation.

2.5 Sustainability

2.5.1 Organizational System

The operation and maintenance of project facilities is undertaken by the executing agency, the DOW. Until last year, the DOW was known as the Department of Works and Transport (DOWT), however, this organization was divided into the DOW and the Department of Transport and Civil Aviation (DOTCA) after the inauguration of the new administration in August 2002. The DOW is responsible for the implementation and maintenance of public works, whilst the DOTCA is charged with policymaking and planning for the entire transport sector.

The Lae office of the DOW has jurisdiction over the operation and maintenance of this project's facilities. Maintenance work is not currently conducted under direct DOW management, instead it is commissioned out to contractors and rural communities via a contract system. The role of the DOW has shifted and now centers on the planning of road construction and maintenance, and the management of contracts and work execution.

[4] At the strong request of the World Bank, an environmental unit was established within DOW in March 2002 and efforts to formulate an environmental monitoring system are progressing gradually. The work is currently the responsibility of one environmental specialist (on loan from DEC).

2.5.2 Technical Capacity

The maintenance of project facilities is conducted via a contract system, which is broadly divided into two categories according to contract price, small work contracts (less than 100,000 kina) and large work contracts (more than 100,000 kina). Small work contracts are predominantly for routine maintenance jobs such as hard shoulder cleaning, weed culling and patching; contractor selection and contract management are executed by regional offices with DOW headquarters' approval. In most cases, the contractors are small construction companies or groups of women/young people from villages living alongside the road. Large work contracts, meanwhile, are mainly for medium-sized jobs such as periodic maintenance, and the selection of contractors and contract management, etc., is predominantly handled by DOW headquarters. Bidding results are referred to the Procurement Management Committee for approval. The execution of work is supervised by consultants.

Routine maintenance is comprised of hard shoulder weeding (once every 4 months), gully cleaning (once every 6 months), line painting (once a year), and the filling of potholes and cracks (as required). However, none of these jobs have been carried out since the project was completed. Moreover, the Mumeng-Bulolo section runs through mountains and in a number of locations the collapse of rock faces on either side of the road have partially blocked the highway, obstructing the flow of traffic. According to DOW, a number of countermeasures have been proposed including using netting to cover the rock face and roofing the road, but budget constraints have prevented their implementation.

In addition, the shift in the DOW's role towards core responsibility for road construction and maintenance planning, and the management of contracts and work execution has coincided with changes in the skills required of field workers and in the nature of their work, which now entails the management of the contracts and maintenance tasks being undertaken by contractors as well as work supervision. However, the necessary training and technological transfer has been inadequate, and field workers have been highly vocal in demanding training to facilitate the acquisition of new skills. Nonetheless, no system has been developed for implementing such training.

2.5.3 Financial Status

With the support of the Asian Development Bank (ADB), the DOW has constructed a database system dubbed RAMS (Road Asset Management System)[5] for managing road maintenance; the system went into operation in 2000. A survey of the nation's 30,000km road network (8,000km national highways, 22,000km rural roads) has already been completed, on the basis of which the RAMS has calculated that PNG requires an annual road maintenance budget of 110 million kina. However, the parlous state of national finances means that DOW is in fact only apportioned an annual maintenance budget of 30-40 million kina (for national highways only). In order to secure a stable maintenance budget, donor agencies including ADB are providing assistance to establish the maintenance foundation, however, this has yet to yield sufficient results. The sustainability of this

[5] RAMS provides road condition ratings based on fixed standards; this information is fed into a database which then calculates the cost of necessary maintenance and assigns priority based on the extent of damage and the degree of urgency.

project hinges on the guaranteed availability of an appropriate maintenance budget, however, there is much uncertainty concerning the viability of achieving this.

3. Feedback

3.1 Lessons Learned

A thorough investigation must be undertaken of feasibility study content and the construction costs established on the basis of it, as well as of the state of national finances in the executing country.

Despite the fact that adequate project effects were achieved, the project's EIRR was negative. This is presumed to be the result of increased construction costs and the fact that since one of the sections included in the initial plans (feasibility study) was not executed, project benefits decreased. The absence of local currency budget allocation at the detailed design phase made it necessary to undertake major revisions to the content of project plans, and accordingly, for projects assumed to encompass numerous uncertainties vis-à-vis their execution, it is crucial that sufficient account be taken of feasibility study accuracy and the capacity of the target country to allocate the local currency funds at appraisal so as to ensure that the resulting project scope is viable.

In planning projects, consideration must be afforded to the system and circumstances of national/regional land ownership in the target country, related issues must be amply researched and plans established that are feasible in execution.

The implementation of this project was subject to major delays resulting from complications with land acquisition issues arising from the fact that the procedures and compensation had not been properly undertaken for previously acquired land. Therefore, in planning projects it is necessary to make allowances for PNG's complex land issues (an unclear land ledger, numerous cases of land being owned by an entire tribe, etc.), and to confirm that proper procedures and compensation have been undertaken, not just for land that is to be newly acquired but also for previously purchased tracts, and then to establish a viable implementation schedule.

3.1 Recommendations

It is necessary to strengthen the road maintenance capabilities of the executing agency.

This has been pointed out in connection with the project's sustainability. There are inadequacies with the project's maintenance system, thus efforts must be made to further reinforce the maintenance capabilities of the executing agency.

Comparison of Original and Actual Scope

Item	Plan	Actual
1. Project Scope (Part A) (1) Improvement of the existing Mumeng-Wau section	Total length: 58km (Road widening & upgrading of pavement)	Only Mumeng-Bulolo section executed Total length: 37km
(2) Bridge reconstruction / construction	No. of bridges: 10	Only Mumeng-Bulolo section executed No. of bridges: 7
(Part B) (1) Improvement of the existing Rigo-Kwikila section	Total length: 18km (Road widening & upgrading of pavement)	Canceled (not implemented)
(2) Bridge reconstruction / construction	No. of bridges: 3	Canceled (not implemented)
(Common to Part A & Part B) (3) Consulting services -Review of F/S -Detailed design -Bidding assistance -Execution management	Foreign specialists: 176M/M Local specialists: 83M/M	As left *The following works were provided. Design reviews of the Mumeng-Bulolo and Rigo-Kwikila sections; design for the ulolo-Wau section; designs for 13 bridges; bidding assistance and execution management for the umeng-Bulolo section.
2. Implementation Schedule (1) L/A conclusion (2) Consultant selection (3) Detailed design (4) Land acquisition (5) Tender (6) Civil engineering works (7) Consulting services	Feb. 1991 Feb. 1991 – Jan. 1992 Feb. 1992 – Jan. 1993 May 1992 – Dec. 1993 Aug. 1992 – Jun. 1994 Aug. 1993 – Jun. 1997 Feb. 1992 – Jun. 1997	Mar. 1991 Jun. 1995 – Jun. 1996 Jul. 1996 – Oct. 1997 Completed in Dec. 1997 Feb. 1997 – Jun. 1997 Oct. 1997 – Feb. 2001* Jul. 1996 – Apr. 2001 (*Repairs to defective and damaged sections were conducted between Mar. 2000 and Feb. 2001)
3. Project Cost Foreign currency Local currency Total ODA loan portion Exchange rate	3,035 million yen 1,652 million yen (10.9 million kina) 4,687 million yen 3,515 million yen 1 kina = 152 yen (1990)	2,098 million yen 1,155 million yen (21 million kina) 3,253 million yen 3,011 million yen 1 kina = 55 yen (average for 1996 – 2001)

Third Party Evaluator's Opinion on
National Road Improvement Project

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Relevance

The donor's (JBIC) policy is aimed to contribute to the Economic and Social Development of developing countries and to foster international co-operation through loans and other financial operations. The National Development Policy /Plan of the recipient country (PNG) in Road Development and National Highway Development was focused on developing the country's underdeveloped road infrastructure.

In line with the National Plan, this project focused on upgrading and paving the existing links between Wau - Mumeng in the Morobe Province and Rigo-Kwikila in the Central Province to all weather roads. The initial scope of the project had to be altered due increasing costs brought about by both economic stagnation and natural factors. Because of these factors the Bulolo-Wau and Rigo-Kwikila segments of scope for road improvement were withdrawn.

PNG is largely a rural based country with the majority of its people dwelling in rural areas (86%). These people largely depend on subsistence agriculture and the informal sector for survival. However, there is very limited access to basic services, roads, bridges and general infrastructure to improve the lives of these people. In recent years most of the condition of existing roads and bridges have deteriorated extremely and the country has not been able to address this issue with any measurable level of success given the tough economic conditions. This area of investment by JBIC through the improvement of roads and bridges is an essential contribution to PNG.

Beneficiaries of road projects relate to any one individual, group or community who is a potential user of the improved roads. In the case of this project ordinary village people, groups and communities as well as business houses and the state is a potential beneficiary of the road project. In terms of meeting the needs of beneficiaries, local people benefit from the improved road both socially and economically.

Impact

The project was too costly to implement to the extent that the project scope was withdrawn for the Bulolo-Wau and Rigo-Kwikila segments of the scope of the project were withdrawn and the funds were spent on improving and rebuilding bridges of only one segment (Mumeng-Bulolo). This was due to unforeseen negative changes both in the environment where the tectonically hard ground led to increasing costs and the avalanche had environmental impact on the project area in Mumeng. Institutional problems with obtaining appropriate levels of PNG state support for the project also had an impact on the withdrawal of the project scope. The Recalculated Economic Rate of Return was a negative figure because of the changes after the appraisal of the project.

As the report highlights, one of the unforeseen outcomes of the project was the tedious job of sorting out land ownership and compensation issue, which led to long delays in implementing the project. This is a crucial factor to be given due consideration for any development project in PNG. In relation to socio-economic impact of the project, the improvement of the road will lead to numerous benefits. Some of these benefits have been pointed out by the report: - Reduction in amount of traveling time, increase in traffic, access to urban market and basic services and transportation of urban goods and services to rural villages.

On the issue of sustainability, there is a danger of maintaining sustainability of

the road with the role of the Department of Works and Transport shifting its responsibility from actually maintaining roads to the role of planning road construction and maintenance and the management of contracts and work execution. In a society where nepotism, bribery and corruption are evident, the issues of the process of awarding contracts, maintaining quality in road maintenance, supervision and inspection before payments are made to contractors would be seriously questioned. These could affect the final outcome of projects even if sufficient resources are invested in road projects and undermine sustainability.