

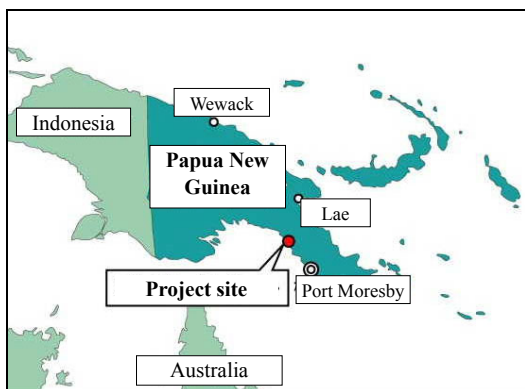
## Papua New Guinea

### Trans-Island Highway Construction Project (I) (II)

Report Date: February 2003

Field Survey: October – November 2002

#### 1. Project Profile and Japan's ODA Loan



Project site



Section of the Bereina-Malalaua Road

#### 1.1 Background

In Papua New Guinea (PNG), the absence of road links between its capital, Port Moresby, the second city, Lae, and the Highland Province, home to vigorous mining and agricultural production activity, meant a sole reliance on marine and air transport, a situation that was highly inefficient both in economic and social terms. To address this, the government formulated plans to construct a road linking the cities of Port Moresby and Lae that would pass through the Owen Stanley mountains, and in 1979, the Australian government supported the implementation of a feasibility study (F/S) for this route. The plan for the trans-island Port Moresby – Lae highway comprised a stretch spanning 575 kilometers, and included construction of a new 80 kilometer road between Bereina and Malalaua, detailed designs for the 135 kilometer section between Malalaua and Aseki, and widening of the existing 90 kilometer stretch between Aseki and Latep (all distances are approximate). Other sections were excluded from the plan.

In the southern Bereina-Malalaua section that was covered by this project, local residents were dependent upon marine transport, a situation that was, in fact, akin to living on an isolated inland islands. It was anticipated that the construction of a new road linking the area with the capital Port Moresby, would make a substantial contribution to economic development and to improving the services like health and education. The existing road between Aseki and Latep, the central section of the main island, was badly deteriorated and was often impassable during the rainy season. This section was the only route with Lae, and it was predicted that the improvements of the route would reform transport conditions and contribute to development in contiguous regions.

As indicated in the above, aside from the basic effects that are generally expected from road projects; the promotion of economic development due to stimulation of economic activity in local areas, and enhanced community welfare, this project was also expected to make a major contribution to political and social unification by providing an overland link connecting two major cities between

which interaction had been problematic.

## 1.2 Objectives

The objective of this project is to build the foundation for a highway network linking PNG's capital, Port Moresby, the second city, Lae, and the Highland Province, leading to a stimulation of human and material exchange, an improvement of living standards in local communities and a promotion of industrial development, through the construction of an all-weather road and the implementation of improvements in southern and central areas of the country.

## 1.3 Project Scope

The project broadly constituted two sub-projects. The first involved the construction of a new road (total length: 81km, width: 8.5m, 2 lanes, double-layer bitumen surface treatment) between Bereina (Central Province) and Malalaua (Gulf Province) and nine bridges. The second comprised width expansions and pavement improvements (total length: 87km, width: 4.5m, 1 lane, single-layer bitumen surface treatment) on the existing unpaved road between Aseki and Latep in Morobe Province.

The yen loan covered the entire foreign currency portion of project costs and some of the local currency portion. Specifically, Japan's ODA loan was allocated to the purchase of equipments, construction works, the procurement of necessary equipments and services, and the financing of consulting services (bidding assistance and construction management for the Bereina-Malalaua section, F/S review, detailed design and construction management for the Aseki-Latep section).

## 1.4 Borrower/Executing Agency

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

## 1.5 Outline of Loan Agreement

	Phase I (PN-P6-1)	Phase II (PN-P6-2)
Loan Amount	4,691 million yen	5,461 million yen
Loan Disbursed Amount	4,423 million yen	5,255 million yen
Exchange of Notes	July 1985	November 1990
Loan Agreement	March 1991	March 1991
Terms and Conditions		
-Interest Rate	4.0%	2.7%
-Repayment Period (Grace Period)	30 years (10 years)	30 years (10 years)
-Procurement	General untied	General untied (Consultant funding procured as partially untied aid)
Final Disbursement Date	March 2000	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. This project, along with the "National Road Improvement Project", scheduled for loan agreement conclusion at around the same time, was positioned as an important project under the PNG government's National Road Improvement Program.

The current PNG National Transport Development Plan (2001-2010) sets forth its vision for the nation's transport sector in which safe and reliable transport services are provided with all of the communities in a highly cost-effective way, and the various activities of individuals, families and businesses are supported. In order to put this vision into practice, the following policies are suggested: (1) maintenance, rehabilitation and improvement of the existing infrastructure, (2) development of new transport infrastructure to enhance the efficiency of goods and services distribution, (3) promotion of private sector expansions of efficient transport facilities, and (4) promotion of transport safety. The plan also aimed at the realization, by 2010, of improvement of access to health and education and other regional social welfare and administrative services, of possibility for all citizens to move whenever they want, of provision of cheap access between agricultural, mining and industrial production districts and the markets, and of promotion of opportunities to increase their income level in poor regions in the hinterlands and coastal areas.

In the ten-year period from 2000 to 2010, the government plans a public investment of 5,961 million kina, 91.1% of which is to be spent on the road sector.

With regard to the improvement work to the Aseki-Latep section in the project scope, a follow-up survey carried out as part of the project's consulting services after the project was initiated. As a result, there seemed to have been problems with the chosen route in terms of geographical conditions, etc. In consequence, the work on the section was cancelled due to the need for another follow-up survey. Since problems were observed with the initial route setting, the executing agency subsequently undertook to investigate a new route and a F/S is currently pending. On the other hand, the Bereina-Port Moresby section that links the project section with Port Moresby comprises the paved section between Port Moresby and Kanosia and the unpaved section between Kanosia, Aropokina and Bereina. Rehabilitation work on the Kanosia-Aropokina section is currently in progress using support from the Australian Agency for International Development (AusAID), and the section is positioned as an important link between the regions and the capital, Port Moresby.

The PNG road network is widely scattered in which countries' major cities are located as nuclei, but the highways linking the provinces and the key cities are underdeveloped. The road between Bereina and Malalaua was considered to be of some significance as the first road to link two neighboring provinces (Central Province and Gulf Province).

On the other hand, there are indications that traffic forecasts were excessive, given that traffic on the project section (Bereina-Malalaua) is currently 40 vehicles per day, which is equivalent to just 22% of the appraisal target.

Figure 2-1: Project sections

## 2.2 Efficiency

### 2.2.1 Project Scope

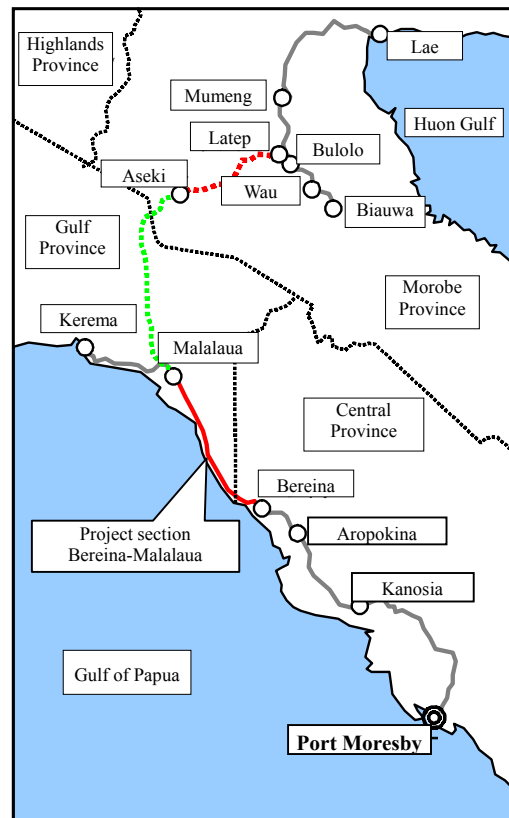
After the project was initiated, a follow-up survey carried out on the Aseki-Latep section, one of the two sub-projects, as part of the project's consulting services, indicated that the precipitous inclines in the section were inappropriate for road construction. The decision was made to undertake another detailed survey, which would lead to the selection of a new route. Accordingly, the Aseki-Latep section was shelved (cancelled) as it is to be implemented after the follow-up survey. The construction of the new road between Bereina and Malalaua was implemented as initially planned.

### 2.2.2 Implementation Schedule

Although the project was planned to span 73 months from February 1991 (L/A conclusion) through February 1997 (completion of civil engineering works and consulting services), the implementation schedule was in fact 128 months from March 1991 to October 2001, with the project being completed four years and seven months (55 months) behind schedule. The first reason for the delay was that it took time 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. In this project, land acquisition issues required 59 months to resolve, exceeding 25 months compared with the initial plans. The second reason is that damage at numerous points on the Bereina-Miaru River section (Phase I section) after the completion, repair work was undertaken between May 2000 and October 2001.

### 2.2.3 Project Cost

In initial plans, total project cost was estimated to be 13,536 million yen (with the ODA loan portion amounting to 10,152 million yen) however, total cost was in fact 11,794 million yen (the ODA loan portion: 9,678 million yen). The cost overrun resulted from additional work being necessary due to the improvement of the ground on marshland sections of the Bereina-Malalaua road and due to flooding during construction work, and the plunge of the value of kina against yen during project implementation. On the other hand, since the work on the Aseki-Latep section was



chancelled, overall costs were kept within planned levels.

#### **2.2.4 Implementation System**

As the project's executing agency, the Department of Works (DOW) set up an internal project management unit which supervised the overall implementation of the project and coordinated with all related organizations. Further, it put local offices in Bereina and Malalaua to take charge of execution management on the construction sites. The construction of the Bereina-Malalaua road was divided into two sections: section 1 between Berreina and Miaru River and section 2 between Miaru River and Malalaua, with civil engineering works being undertaken on section 1 first, followed by section 2. However, there were major discrepancies in the quality of the road on the two sections. Numerous cracks and potholes appeared in the surface of section 1 after the project was completed. Moreover, since the pavement surface was not flat in many places, leading to an uncomfortable travel, vehicles bounced off at a speed above 80km/h. In contrast, there were no major problems with the quality of section 2. Information gathered from the executing agency, the project's consultant and local residents indicated the following reasons.

- A Chinese firm contracted to construction work on both section 1 and 2 while the work was in fact undertaken by separate subcontractors. Differences of quality and execution management capacity among subcontractors were believed to be one possible cause of the variable quality of the two sections.
- Section 1 is a hilly country and the work was undertaken using normal standards and technologies for road construction. On the other hand, since the majority of section 2 was swamp, measures against soft ground were taken, to which more than twice as much as construction cost was invested. Moreover, since the target region was uncultivated prior to project implementation, it was impossible to carry out adequate preliminary surveys of this project. As a result, geological features in section 1 were found to be far worse than anticipated in the design stage (there were groundwater veins close to the surface). In consequence, loose and crumbling ground was observed in places.
- Consultants responsible for overall execution management were unable to keep an eye on all over the site, not allowing them to manage all the details of the process, for example, that the cement was mixed at the prescribed ratio or that roads were paved with it at a directed timing.

To summarize, various factors are conceivable for the variable quality of sections 1 and 2 , including differences among the subcontractors (used by the contractor), differences of the structural design for the road (a twofold construction cost for section 2 over section 1), the unexpectedly poor quality of the ground in section 1, and the consultant's execution management capacities. The defects in section 1 were subsequently repaired by the contractor.

### **2.3 Effectiveness**

#### **2.3.1 Traffic Volumes**

In 2001, the average volume of traffic on the Bereina-Malalaua section was 40 vehicles per day,

which is 22% of the initially planned value at appraisal (180 vehicles per day) or 57% of the revised value by the executing agency (70 vehicles per day) (Table 2-1). This fact implies that the estimate of traffic volume might be optimistic, although 100% of the effectiveness was not realized because PNG economy was stagnated after project planning and the route was not fully opened to traffic. One characteristic of the traffic on the section is that most of the traffic (85%) is PMV<sup>1</sup> (Public Motor Vehicle), bus into which truck has been converted. Judging from income level in PNG, car ownership among families is low, and walking is the only means of transport in rural and agricultural communities, while PMV is used for longer distances.

The project has resulted in the establishment of a link between Port Moresby and Kerema, the capital of Gulf Province, however, the volume of traffic has ever been extremely low and since the region has no major industries, substantial increase in traffic volume cannot be expected for a while. Nevertheless, if the right conditions are put in place, such as the future development of a nationwide road network and the establishment of links with other major cities including the second city of Lae, improving the road's function as a trans-island highway, it is highly possible that traffic volume would increase on the project section. However, it is predicted that a considerable amount of time will be necessary for the improvement work on the Aseki-Latep section that was withdrawn from this project and for the completion of the sections where the work has not been commenced, such as construction route between Aseki and Malalaua, which is still at the F/S stage. Accordingly, it is necessary to wait for quite some time before the initial objectives of this project are achieved and it can bring satisfactory results.

Table 2-1: Average Daily Traffic (ADT) Volumes on Bereina-Malalaua Section (2001)

		ADT (vehicles/day)	
		Estimates at appraisal	Estimates as revised by DOWI
Ordinary cars	Planned	13	10
	Actual	4	
Utility vehicles, etc. (PMV*, jeeps, etc.)	Planned	153	50
	Actual	34	
Trucks	Planned	14	10
	Actual	2	
Total	Planned	180	70
	Actual	40	

Source: JBIC data, DOWI

### 2.3.2 Reductions in Travel Times

Prior to project implementation, the Bereina-Malalaua section was uncultivated and residents of the region traveling to Port Moresby were required to take a boat down river or canal as far as Iokea where they would then transfer to a PMV that would take them along the old coastal road as far as

<sup>1</sup> PMV (Public Motor Vehicles) are buses, trucks where the bed 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, but since there are numerous unpaved roads in PNG there is a strong demand for PMV, which are heavy duty vehicles.

Port Moresby (Figure 2-2). The coastal route from Malalaua to Iokea took an hour, whilst the river or waterway route took between two to three. At Iokea, with luck the transfer to PMV could be straight through, however, bad timing would result in travelers being obliged to wait for the next-day service. The old road from Iokea to Bereina was unpaved and in extremely poor condition and was virtually impassable in wet weather. As a result the pre-project journey from Malalaua to Port Moresby took around ten hours at best, but could carry over to the following day depending on weather and boat service conditions.

Boats that run the rivers/waterways



PMV (public transport vehicle)



With the completion of the project, an all-weather connection was established between Malalaua and Bereina, making it possible to travel overland between the two cities in a short time, whatever the weather. The journey currently takes roughly an hour. Further, the long, inefficient, unreliable and dangerous trip from the Malalaua-Bereina region to Port Moresby has been reduced to around 6-8 hours and improvements have also been effectuated in terms of efficiency, reliability and safety.

### 2.3.3 Recalculation of Economic Internal Rate of Return (EIRR)

At appraisal, the EIRR for the Bereina-Malalaua section was calculated to be 5.9%. The recalculation made during this survey yielded a negative figure. This is attributed to the fact that post-completion traffic volume has insufficiently met the predictions made at appraisal, thus the project may be deemed inefficient in terms of its economic investment efficiency.

(Prerequisites)

Benefits: Reductions in travel expenses

Costs: Civil engineering costs, consulting service costs

Project life: 25 years from completion

## 2.4 Impact

### 2.4.1 Case Studies

A number of case studies were conducted as a means of ascertaining the impacts of the project on the target regions. The project's leading objectives were to improve living standards for community residents and to promote industrial development. However, due to the lack of unequivocal materials demonstrating a direct causal relationship between the project and the realization of these two objectives, it should be understood that the results of the case studies provide

only circumstantial evidence of the project's impact. 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 populations of the target regions are given in Table 2-2. In order to accurately identify the scope and population benefiting from project impacts it would be necessary to conduct a fixed-period traffic sample survey on the Bereina-Malalaua section. The limited duration of this survey, however, precluded the implementation of such a study. Notwithstanding, it may be assumed that the project had some form of direct impact on 20,404 people in 3,381 households in the Mekeo Kuni Rural LLG region of Central Province, and on 10,208 people in 1,838 households in the Lakekamu-Turi Rural LLG, and 11,478 people in 1,932 households in the East Kerema Rural LLG in Gulf Province.

Table 2-2: Population in Project Areas (statistics for 2000)

Region	Households	Population	Men	Women
1. Central Province	32,254	183,983	96,062	87,921
Kairuku-Hiri District	12,464	78,784	41,552	37,232
- Mekeo Kuni Rural LLG	3,381	20,404	10,556	9,848
2. Gulf Province	18,004	106,898	55,529	51,369
Kerema District	11,616	65,498	34,031	31,467
- Lakekamu-Turi Rural LLG	1,838	10,208	5,487	4,721
- East Kerema Rural LLG	1,932	11,478	5,994	5,485

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 Bereina and Malalaua, including administrative, hospital, school, and market operators, as well as shopkeepers, businessmen and PMV operators. A summary of the results is given below.

- The Bereina-Malalaua road is the first to link Central Province and its neighbor, Gulf Province, and it is thus highly meaningful in terms of promoting exchanges between the two provinces. Moreover, since project completion, people living near the coast have moved inland, forming new settlements closer to the road, thus the demand for better transport access has seemingly engendered a partial change in demographics.
- The project has also contributed to improvements in public services. With regard to administrative services, the completion of the project has made it possible for government workers to make trips out to the regions, something that was not previously feasible due to poor transport services, moreover, the frequency of such trips has also increased. There has also been a verifiable rise in patient numbers at health institutions since project completion. The emergency movement of patients has become easier and supplies of medical equipment and pharmaceuticals became smoother than before. On the other hand, the project has had little impact on educational facilities. Few impacts have been recognized since project completion, such as rises in the number of students at schools. Elementary schools are within walking



distance, and since the majority of high schools in the region are generally residential, the road has not been used frequently to go to school.

The increase in the number of travelers has led to an increase of the number of customers and sales at general stores in the towns and villages. Further, commodities are laid in stock and the sort of commodities increases, thanks to the improvements in transport access. On the other hand, small stores sell a light meal and agricultural production to road travelers in the communities along the Bereina-Malalau section, which can be linked to improvement of opportunities to acquire income.

A roadside stall



- The markets in Bereina and Malalaua, which are public, are held under the fixed schedule regarding opening day and hour, exclusively for rural residents. Thus the project has had little impact on the frequency of market opening, hour, etc. However, there have been increases in the frequency of stocking and sort of commodities.
- People living close to the road in the Bereina-Malalaua section have received benefit from various positive impact that are mentioned above, because of improvement of transport access after project completion. However, the impact on the people living adjacent to the old coastal road linking Iokea and Bereina has been different. In brief, prior to the implementation of the project, the route from Iokea to Port Moresby via Bereina was the only overland one and PMV traveled frequently from Port Moresby to Iokea as the terminal. With the opening of the road in the section of Bereina-Malalaua, however, many PMV transferred the route from the old road (unpaved) to the new road (paved). Therefore, access to public transport facilities became worse, leading to an inconvenience of the lives of the people living in the area.
- Since Bereina belongs to Central Province and Malalaua does Gulf Province control, public services are delivered within the respective provinces, and moreover, since Bereina is the center of Central Province there is little movement of people from this city to Malalaua. The groups that have received most direct benefits from the project are those who live near the road between Bereina and Malalaua, and those who live to the north of Malalaua.

### **Village-level Case Studies**

In order to know the lifestyle changes brought about by this project, a questionnaire survey were conducted by interviews at 200 households in four villages (50 households for each) , two of which are located close to the road, while the other two are far from it. The majority of respondents were subsistence farmers (86%). The sample also included public workers (13%), shopkeepers (1%), and others. A summary of the questionnaire is given below.

Table 2-3: Villages Surveyed

	Distance from the project road	Province	Sample No.
Apanaipi	Near (located alongside the project road)	Central	50 households
Lese-Oalai	Near (located alongside the project road)	Gulf	50 households
Iokea	Far (coastal, 15km from the road)	Central	50 households
Popoluluabo	Far (mid-stream Kapuri river)	Gulf	50 households
Total			200 households

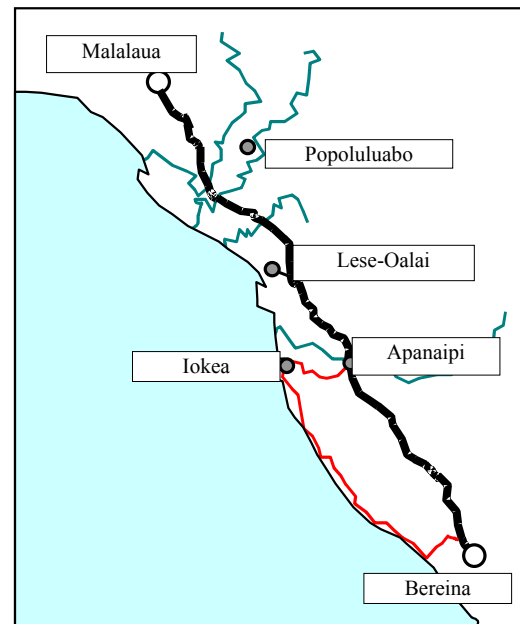
(1) Changes in transport mode, objective and frequency of travel

Use of PMV or trucks has risen from 87% to 99%, and almost all respondents have gained access to overland transportation. In contrast, use of boats and canoes, formerly the leading mode of transport, has dropped from 88% to 45%. The most conspicuous change was observed in Apanaipi, where boat use has fallen dramatically from 98% to 0%. It has also dropped from 100% to 12% in the village of Lese-Oalai. Clearly there has been a major shift from water to land transport among people living in the roadside villages. Since people in Popoluluabo still have to take boats down the Kapuri River to access overland transport, there has been no major change in boat use (100%→84%). On the other hand, boat use has risen from 54% to 84% in Iokea. This is believed to be because the dramatic decline of frequency of public transport services such as PMV around Iokea forced people to use boat transport.

The most common objective of road use is to sell agricultural production (90.5%), followed by visit of friends/family (86.5%), utilization of medical facilities (82.5%), shopping (81.5%), transporting cash crops (65.5%) and utilization of district offices (52%), etc. In terms of pre- and post-project changes in road use objectives, there has been a 26.5-point increase in district office utilization. Again, medical facility use is up 19.5 points, shopping by 17.5 points and cash crop transportation by 16.5 points.

In terms of road use frequency, prior to the project, more than 62% of respondents used roads less than once a month. This dropped to 19.5% after project completion and about 40% of respondents now use roads at least once a week, with 34% using 2-3 times a month. This may be attributed to the completion of the Bereina-Malalaua road and to the emergence of public transport services like PMV traveling on the route. As far as Iokea is concerned, although 56% of respondents used roads at least once a week (including daily) prior to the project, since its completion this figure has dropped to 8%, with 30% now using roads 2-3 times a month, and with 44% using them less than once a month.

Figure 2-2: Village locations



## (2) Changes in travel times, types of service

Roughly 90% of participants responded that the time to the capital Port Moresby has decreased to less than 50% of pre-project levels. In particular, all respondents in Apanaipi stated that they are now able to get to the capital within six hours. A similar change has also occurred in Lese-Oalai.

There has been no major change from pre-project levels in the number of visitors to the villages. On the contrary, the number of health officers' visit to the villages of Lese-Oalai and Popoluluabo has dropped. This may be due to the fact that improvement of access to medical facilities has made it easier for the villagers to receive health services, which has in turn reduced the need for health officers to make tours of the villages to provide medical examination.

In addition, more than 60% of respondents cited post-project increases in the supplies of key commodities like rice, sugar, flour and fuel for cooking at stores in the towns and villages. On the other hand, the majority of the villagers targeted by the survey stated that these products were comparatively more expensive than before the project, one reason for which is considered to be the dramatic decline in the value of the nation's currency, which has caused a steep rise in prices.

## (3) Changes in income levels and satisfaction ratings

Overall, 28% of respondents stated that the project had had a positive impact on their income. This impact has been particularly marked in the villages of Apanaipi and Lese-Oalai, which were isolated inland islands with no access to roads prior to project implementation. However, all respondents in Iokea averred that the project had had no positive impact on their income.

In terms of satisfaction ratings, 57.5% of all respondents stated that they were satisfied or highly satisfied with the project. Likewise, more than 90% of respondents in Apanaipi and Lese-Oalai mentioned that they were more than satisfied with the effects of the project, while 94% of respondents in Iokea answered that they were dissatisfied.

## (4) Conclusion

To summarize the above, the completion of the road in the Bereina-Malalaua section has increased access to road transportation for the residents living in contiguous regions. The outcome of this has been an increase in the number of frequent road users, an improvement of access to administrative and medical services, more vigorous economic activity such as cash crop transportation and sales of agricultural production, and increased opportunity to visit friends and family. The road has also knocked a considerable amount off the time needed for travel, and the improvements in the distribution system have enabled villagers to obtain a wider range of products than before. The project has also had a positive impact on the income of villagers. Such positive impacts have been particularly conspicuous in the regions where transport access was poor prior to the project. In areas that are remote from the newly constructed road, however, the regions along the old coastal road, for example, of which Iokea is typical, the project road has changed the flow of traffic causing access to deteriorate as compared to before. The residents of these areas now have less access to public services, distribution and economic activity and so forth, leading to some cases

where it became less convenient than before the project. This scenario was not foreseen at the planning stage. The project is believed to have had a direct impact on 42 thousand people living in areas adjacent to the road section.

#### **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 Measurement Act of 1978, and DOWI, the project's executing agency has not implemented any special environmental monitoring activities<sup>2</sup>. According to DOWI, 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 compensations were received from landholders during project implementation because land acquisition and compensation procedures for already acquired land had not been properly conducted. These claims took time, inviting delays in project implementation, however, formal procedures and compensation finally resolved the problems.

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 are 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 operation and maintenance of the project road is the jurisdiction of the Bereina DOW office in Central Province (covering the Bereina-Miaru River section) and of the Malalaua DOW office in Gulf Province (covering the Miaru River-Malalaua section). Maintenance work is not currently conducted under direct DOW management, instead the work is commissioned out to contractors and local communities. The role of the DOW has shifted and now center on road construction and maintenance planning and the management of contracts and work execution.

#### **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 DOWI headquarters' approval. In most cases, the contractors are small construction companies or groups of

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<sup>2</sup> At the strong request of the World Bank, an environmental unit was established within DOWI 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).

women/young people from villages living alongside the road. Large work contracts, meanwhile, are mainly for medium- and large-scale jobs such as periodic maintenance, and the selection of contractors and contract management, etc., is predominantly handled by DOWI headquarters. Bidding results are referred to the Procurement Supervision Management Committee for approval. The execution of work is supervised by consultants.

Routine maintenance is comprised of trimming vegetation alongside the road (once every 4 months), gully cleaning (once every 6 months), line painting (once a year), and the filling of potholes and cracks (as required). Periodic maintenance work includes resurfacing and other major jobs. However, none of these jobs have been carried out since the project was completed. This is due to a lack of DOW budget, and since both Bereina and Malalaua offices have insufficient fuel their functions have become severely constrained.

Again, the shift in the DOWI's role towards responsibility for road construction and maintenance planning, and the management of contracts and 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 job training and technological transfer have been inadequate, and field workers have highly demanded the training for 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 DOWI has constructed a database system called RAMS (Road Asset Management System)<sup>3</sup> 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 DOWI 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 project hinges on the guaranteed availability of an appropriate maintenance budget, which remains a matter of concern.

## 3. Feedback

### 3.1 Lessons Learned

**In order to secure project quality, appropriate expansions must be made to the scope of the execution supervision consultant's duties and to the implementation schedule, and the scope of responsibility must also be extended.**

In countries such as PNG, which are not annual loan recipients and have no JBIC office in

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<sup>3</sup> 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.

country, it is often difficult for JBIC to monitor a project in progress and to perform quality inspections once the project is completed. The major differences in the quality of sections 1 and 2 were the outcome of an accumulation of various factors, however, had rigorous quality control and execution supervision had been conducted at the implementation management stage, it would have been highly likely that certain steps could have been taken to prevent this problem. This is a task for the consultant company, thus in countries lacking experience in project implementation it is imperative that the scope of consultant duties and the implementation schedule be established on a larger scale than normal at appraisal, and that the scope of responsibility be extended simultaneously so as to enhance the quality of the project.

**With the ODA loan projects involving land acquisition in countries with a complex land acquisition system, it is necessary to engage a consultant or advisor who is a specialist in sociology or law with knowledge of the social situation and land issues in the country, and to formulate a schedule that is feasible in execution.**

The majority of land in PNG is owned under customary or traditional tenure and most of the land in the project section was uninhabited and owned by multiple tribes. In the case of tribal ownership, whilst it is easy to identify actual users, the identification of owners is usually fraught with difficulty, and the acquisition of land for this project was both arduous and time consuming. Land acquisition, compensation, and the relocation of residents are matters that should be handled by the government of the recipient country, and whilst there are limits to the support that can be furnished by JBIC, in cases where land acquisition involves a host of ethnic issues, relevant specialists should be engaged at each stage of the project, efforts made to identify the ethnic and social issues incidental to development, and the design stage in particular, must involve the establishment of a viable implementation schedule.

**For projects with low effectiveness and/or impact in terms of the cost-benefit performance, the content must be established at a level that is commensurate with that performance.**

Total costs for this project involved an investment of 12 billion yen, which must be weighed against certain limitations in its effect and impact. It cannot be denied that a reduction in the project's spec, for example keeping the number of lanes to one, would have achieved impacts on a similar level. From a long-term perspective, there is potential for increases in the volume of traffic on this trans-island road and for it to have a considerable impact on both the economy and society. However, at this point in time, it is really only feasible to evaluate the project in comparatively negative terms, and it would appear that a more appropriate level of assistance should have been established from the outset.

### **3.2 Recommendations**

(To JBIC)

**There is a need for appropriate monitoring of road maintenance conditions.**

As explained in the section on sustainability, there are deficiencies in the project's operation and maintenance system, thus requests should be made to the executing agency to bolster this side of their activities, and in the event of forecasts for a deterioration in pavement condition, it is hoped that JBIC will look into ways of addressing this issue.

### Comparison of Original and Actual Scope

Item	Plan	Actual
<b>1. Project Scope</b>		
<b>(Part A)</b>		
(1) Construction of a new road between Bereina-Malalaua	Total length: 81km No. of bridges: 9	As left
Phase I works: Bereina-Miaru River section	34km (3 bridges)	As left
Phase II works: Miaru River-Malalaua section	47km (6 bridges)	As left
(2) Consulting services -Bidding assistance -Execution management	Foreign specialists: 312M/M Local specialists: 252M/M	As left
<b>(Part B)</b>		
(1) Upgrading of existing Aseki-Latep section	Total length: 87km Road widening and pavement upgrade	Cancelled (not implemented)
(2) Consulting services -F/S review -Detailed design -Bidding assistance -Execution management	Foreign specialists: 38M/M Local specialists: 24M/M	Bidding assistance and execution management were not provided.
<b>2. Implementation Schedule</b>		
(1) L/A signing	Feb. 1991	Mar. 1991
(2) Consultant selection	Feb. 1991 - Feb. 1992	Jun. 1994 - Mar. 1995
(3) Land acquisition	Feb. 1991 - Feb. 1993	Feb. 1991 - Dec. 1995
(4) Tender	Feb. 1992 - Feb. 1993	Aug. 1995 - Mar. 1996
(5) Civil engineering works	Feb. 1993 - Feb. 1997	Apr. 1996 - Oct. 2001*
(6) Consulting services	Feb. 1992 - Feb. 1997	Jun. 1995 - Oct. 2001
		(*Repair work on defective sections was executed during May 2000 – Oct. 2001)
<b>3. Project Cost</b>		
Foreign currency	9,209 million yen	8,025 million yen
Local currency	4,327 million yen (28.5 million kina)	3,769 million yen (45.5 million kina)
Total	13,536 million yen	11,794 million yen
ODA loan portion	10,152 million yen	9,678 million yen
Exchange rate	1 kina = 152 yen (1990)	1 kina = 82.84 yen (Average for 1991-2001)

## **Third Party Evaluator's Opinion on Transisland Highway Project (I) (II)**

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### **Relevance**

The relevance of the project can be seen in two perspectives:

#### ***Government development goals & priorities***

Governments and most other developers of various projects usually have their own timing and development priorities to pursue a particular activity based on its own analysis of people's needs and wants at a given point in time.

In this case, the government of PNG based on data made available, made a decision to pursue the road project with two main objectives of improving lives of people in the areas where the road has been constructed as well as to provide income earning opportunities to them by having access to the road.

At this stage, the evaluators of the road project can safely comment that, the primary objective of creating road transport access for people who were disadvantaged in the past has been achieved in terms of its relevance to those villages affected by the lack of such a road link between the provinces concerned.

In other words PNG government's own road development goals and priorities as outlined in its National Road Improvement Project was vital and relevant for people in rural areas associated with this project.

#### ***Relevance in terms of Benefits to people affected***

There is no doubt that, this road project has significant relevance to the people affected in terms of its short/medium, and long term benefits.

Given all the inhibiting factors outlined in the background to this trans Island Highway construction project, it was justified to have this road link developed so that it can now allow access to both the service priorities as well as the recipients of those services.

It was therefore of relevance to establish that road link between the provinces and the disadvantaged rural population who in the past missed out substantially in the provision of vital humanitarian other social/economic opportunities and services.

### **Impact**

At this stage it may be premature to establish how much impact the project may have had in the long term on the lives of the people. Changes in a people's lifestyle are a gradual progress, which may take up to at least 10-15 years to materialize.

Factors such as traffic volumes, travel times, resettlement along road sites, and increased business activities near the road are only temporary indicators of new excitement and opportunities created by the road access, and in most cases utilized by opportunists who have the means to capture into such opportunities.

The long term impact of the road link can only be realized when institutions and services such as schools, hospitals commerce, and provided industry and employment opportunities are created whereby the population can get attracted to move their villages to these service locations, and eventually reduce the number of people commuting to and from main urban centres like Port Moresby, Lae or Kerema for such services.