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# ROAD MANAGEMENT IN PAPUA NEW GUINEA: AN EVALUATION OF A DECADE OF AUSTRALIAN SUPPORT 2007–2017

February 2018

OFFICE OF DEVELOPMENT EFFECTIVENESS

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ISBN 978-0-9954465-2-6

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Published by the Australian Government Department of Foreign Affairs and Trade, Canberra, 2018.

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**Cover photo:** Kassam Pass, Highlands Highway, Eastern Highlands Province. At the time of evaluation fieldwork, a landslip was threatening to cut off access to the Highlands region at this pass.

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## FOREWORD

The value of roads to PNG's economy and its people can hardly be overstated. They are the arteries of PNG. They link farmers to markets and businesses to customers. They enable people and communities to access services and markets. As such, the Transport Sector Support Program (TSSP) is a critical component of Australia's engagement with the Government and people of PNG.

This evaluation comes ten years into Australia's 15 to 20 year commitment to support the PNG Government to improve its transport infrastructure. The evaluation identifies a number of TSSP's important achievements, including its contribution of basic information on road conditions and analysis, which provide a strong foundation for evidence-based decision making.

The report makes it clear that despite the decade of Australian assistance, and contributions of other donors, PNG's roads remain in poor condition. It is evident from the report that an important reason for this is funding constraints, which have increased in recent years due to declines in energy prices. However, it is also evident that a key reason for the poor condition of PNG's roads is the underfunding of road maintenance.

Three key observations emerge from this work. First, from my time at the World Bank I know that this problem is not unique to PNG—it is not unusual in developing countries for the political attraction of new roads to result in inadequate funding for maintenance, which provides the highest economic returns and social benefits. On this, it is important to recognise that the condition of roads is PNG's sovereign responsibility. While Australia can (and has) expressed its views on this issue, it cannot unilaterally affect PNG's budget decisions.

Second, Australia and other donors have been correct in emphasising the importance of funding for maintenance. Moreover, continuing with TSSP provides a sound basis for Australia to constructively pursue its views on maintenance with the PNG Government. Indeed, sustaining Australia's efforts to support reform over the life of TSSP could secure enormous long term benefits to the road sector and the economy.

Finally, while the report's insights on the poor state of PNG's roads is certainly disappointing, it is important to note that this information is a direct result of TSSP's work on producing a much more accurate picture of the state of roads in PNG than has existed in the past.



**Jim Adams**

Chair, Independent Evaluation Committee

## ACKNOWLEDGEMENTS

The evaluation team was comprised of David Slattery (team leader) from the Office of Development Effectiveness of the Department of Foreign Affairs and Trade (DFAT); John Lee, Independent Consultant; and Matthew Dornan, Deputy Director of the Development Policy Centre, Australian National University.

The evaluation team would like to express sincere thanks to the DFAT staff, PNG Government stakeholders and beneficiaries for their insights into Australia's support for road management in Papua New Guinea.

The evaluation team would also like to thank DFAT's dedicated transport team and Transport Sector Support Program staff in Port Moresby for facilitating the evaluation team's visit.

## ACRONYMS AND ABBREVIATIONS

<b>ACD</b>	Agency Capacity Diagnostic
<b>ADB</b>	Asian Development Bank
<b>ASA</b>	Agency Support Arrangement
<b>BAMS</b>	Bridge Asset Management System
<b>DFAT</b>	Department of Foreign Affairs and Trade (Australia)
<b>DoTI</b>	Department of Transport and Infrastructure
<b>DoWI</b>	Department of Works and Implementation
<b>DSP</b>	Development Strategic Plan
<b>GDP</b>	Gross Domestic Product
<b>GoPNG</b>	Government of PNG
<b>iRAP</b>	International Road Assessment Programme
<b>LTMC</b>	Long-term maintenance contract
<b>MTDP</b>	Medium Term Development Plan
<b>NRA</b>	National Roads Authority
<b>NTS</b>	National Transport Strategy
<b>ODE</b>	Office of Development Effectiveness
<b>PMC</b>	Project Management Consultant
<b>PMV</b>	Public motorised vehicles
<b>RAMS</b>	Road Asset Management System
<b>TSCMIC</b>	Transport Sector Coordination, Monitoring and Implementation Committee
<b>TSSP</b>	Transport Sector Support Program
<b>VRCS</b>	Visual road condition survey

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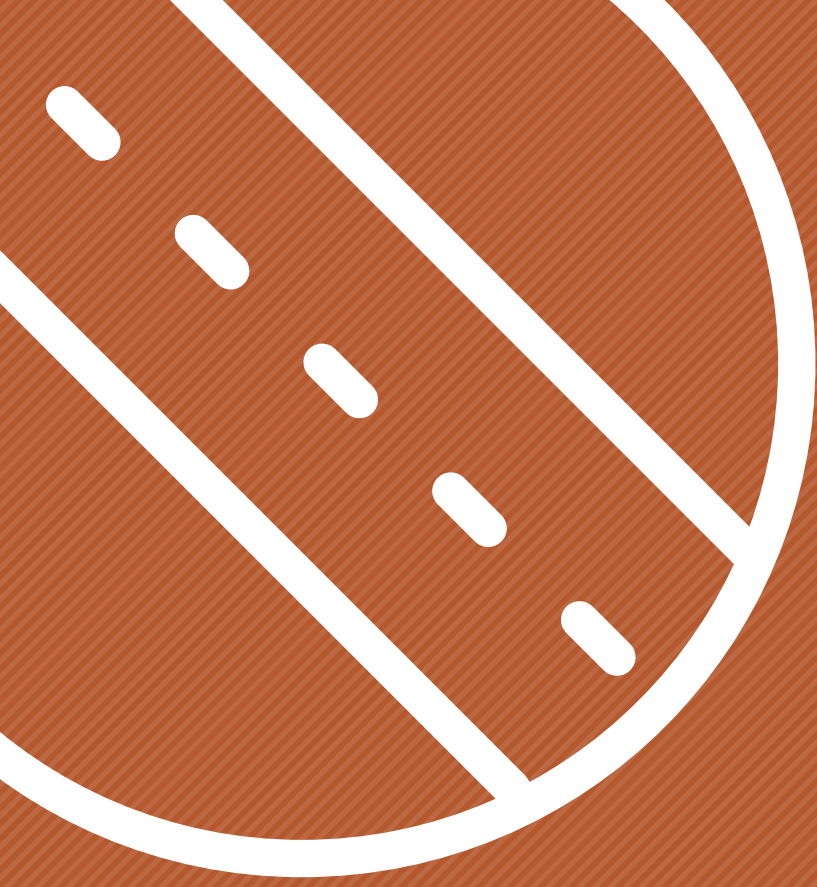
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**FUNDING FOR  
INFRASTRUCTURE HAS  
FALLEN BY 60 PER CENT IN  
THREE YEARS, WHICH HAS  
AFFECTED MAINTENANCE  
SPENDING.**





## EXECUTIVE SUMMARY

**MUCH OF PNG'S 30,000 KM ROAD NETWORK IS IN POOR CONDITION, INCREASING ROAD USER COSTS AND MAKING SECTIONS OF ROAD IMPASSABLE.**

### CONTEXT

Only 68 per cent of Papua New Guinea's (PNG's) rural population live within two kilometres of an all-season road. Much of PNG's 30,000 km road network is in poor condition, increasing road user costs and making sections of road impassable. This isolates large numbers of Papua New Guineans from markets and income-earning opportunities, as well as health and education services. Bad roads are a constraint to growth and a major cause of poverty and hardship.

Of PNG's road network, 8,738 km are 'national' roads, which are the responsibility of PNG's National Government. Within this, the PNG Government has consistently highlighted the importance of rehabilitation and maintenance, with a particular focus on 16 'national priority' roads. These 16 roads provide the greatest economic and social benefit to the greatest number of people, and comprise almost 4,300 km of the national road network.

Due to a combination of deficient road management and low levels of funding, the condition of national priority roads is poor. Data from a recent comprehensive and rigorous survey of road conditions shows that just 15 per cent of national priority roads are in good condition, and almost 67 per cent are in very poor condition, with other national roads in a similar condition. The condition of non-national roads, which are the responsibility of lower levels of government, is even worse than that of national roads.

Historical underfunding of routine road maintenance is exacerbated by PNG's current budget challenge. The economic climate in PNG has shifted considerably since 2014. The fall in commodity prices has produced an extreme revenue shock for PNG's budget, with the government slashing expenditure as a result. Funding for infrastructure has fallen by 60 per cent in three years, which has affected maintenance spending. If current levels of PNG Government funding continue, the condition of the road network will likely decline starkly, and pose severe economic and social costs.

### AUSTRALIA-PNG TRANSPORT SECTOR SUPPORT PROGRAM (TSSP)

Improving roads in PNG has been a major component of Australia's official development assistance to PNG over the last decade, with spending coming close to three-quarters of a billion dollars. The Australia-PNG Transport Sector Support Program (TSSP) has been the main vehicle for this assistance. Starting in 2007, the program is envisaged as a 15–20-year commitment to improve PNG's transport infrastructure. This evaluation assesses the management and effectiveness of TSSP to date.

TSSP's long-term outcome is 'a safe, reliable transport system in place enabling economic and social development in Papua New Guinea'. The program design identifies three objectives:

- » **Priority land transport assets maintained:** PNG agencies deliver a sustainable maintenance program with predictable PNG Government funding to maintain 75 per cent of priority national roads in good condition;<sup>1</sup>
- » **Critical transport safety and security systems operating effectively:** Critical safety and security regulatory and service functions consistently demonstrate enhanced stability, competence and compliance to standards;
- » **Effective agency and sector engagement, performance and accountability:** Systems in place to achieve predictable multi-year government funding for transport asset maintenance and key reforms progressed through enhanced engagement, agency performance and analysis.

TSSP covers maritime, air and land transport. Land transport—the subject of this evaluation—is by far the biggest focus, accounting for around 95 per cent of spending.

SMEC International Pty Ltd (SMEC) manages the implementation of TSSP.

TSSP's land transport component is delivered in partnership with the Department of Works and Implementation (DoWI), which is responsible for managing national roads and bridges, and the Department of Transport and Infrastructure (DoTI), which is responsible for sector planning and for preparing sector budget submissions.

The evaluation considered the following aspects of the TSSP, which mirror the structure of the report:

- » design
- » effectiveness in improving the capacity of key institutions in the sector
- » impacts and value for money
- » approach to gender and road safety
- » monitoring and evaluation.

## DESIGN

TSSP's focus on the maintenance of PNG's 4,300 km of national priority roads is sound, as these roads provide the greatest economic and social benefit to the greatest number of people in PNG.

Sectoral planning and budget preparation has been a major focus of TSSP's design. Despite TSSP support, there is still widespread underfunding of the sector and the allocation of PNG budget resources to projects outside of the sector budget submission. While TSSP successes in improving the quality of budget outcomes thus far have been modest, the large potential pay-offs from this work mean it should continue. Potential savings from optimal life-cycle treatments could provide discounted savings over 20 years that are between AUD0.51 billion to AUD2.6 billion, for cost of only about AUD0.04 billion on technical assistance—a small fraction of the potential savings. A stronger focus on policy engagement at the political level would increase the prospects for these savings to be realised.

PNG's current budget challenge has a number of implications for the design of TSSP. Firstly, given the very high costs of underfunding routine maintenance, DFAT should reverse the commitments it has made since 2013 to transition from routine and periodic maintenance to 'high-impact, complex capital works'.

Secondly, PNG's current budget challenges increase the importance of funding from development partners, especially Australia. At a time when TSSP's contributions to maintenance of PNG's national roads have increased in importance, it has been unable to sustain them at previous levels. Spending by TSSP through DoWI's asset maintenance account in 2016 was only about one third of 2013 and 2014 spending levels.

TSSP is widely considered one of the most effective examples of Australian-PNG cooperation and is Australia's vehicle for preserving the most important piece of economic infrastructure in PNG. At a minimum, we recommend that TSSP be provided with stable multi-year funding allocations.

<sup>1</sup> This target was originally set at 100 per cent before being revised in agreement with the PNG Government. The 75 per cent target is drawn from PNG's national policy documents. GoPNG has since revised this target, which may be further refined as improved data will enable improved target setting.

## CAPACITY DEVELOPMENT

TSSP's capacity-building approach, consisting of targeted technical assistance combined with a program of works implemented through government systems, provides the best prospects for influencing PNG Government policies and implementation. Through this strategy, TSSP has had a powerful influence on sector policies. It has convinced DoWI and DoTI of the need for rational, evidence-based planning and has improved the evidence base on the condition of national roads. It supported DoWI and DoTI senior managers to press claims with central agencies for rational budget allocations. It has been instrumental to the success of the inter-departmental 'Transport Sector Coordination, Monitoring and Implementation Committee' (TSCMIC) as a platform for policy dialogue. TSCMIC, and the coherent approach to developing sector budget submissions that TSSP has shaped, is widely viewed as a model of best practice in the PNG public service, and the quality of budget submissions has steadily improved. Lastly, by providing a functional model of sound road maintenance practice and tools that support this, TSSP is a key source of direct capacity to the sector and learning for counterparts.

In spite of these positive contributions, there is little evidence of any measurable improvement in the technical and organisational capacity of TSSP's main institutional partners, DoTI or DoWI. On this basis, it would be optimistic to think that this will change in the short to medium term—with or without donor support.

Recognising this, we think it is most useful to conceive of TSSP's inputs in the sector as a form of long-term capacity supplementation, especially in the high-end functions where existing capacity is stretched. Technical assistance is more likely to be effective in capacity-building if (i) it is maintained over a long period, (ii) it is focused on tasks that are on a critical path to practical delivery of maintenance outcomes, where the incentives to improve performance are greatest, and (iii) there is a recognition that some tasks will be done more reliably by external advisers and consultants for some time.

On this basis, we consider there is scope for improving the deployment of technical assistance in two ways:

- » By reconsidering some aspects of planned support for corporate functions that are less central than other functions to the practical delivery of maintenance outcomes.

- » By explicitly recognising the value of directly providing capacity in discrete areas where it is lacking in a sustained manner—specifically, for the key sector oversight mechanism, TSCMIC, and for data collection and the operation of asset management systems.

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**IMPROVED ROADS HAVE SIGNIFICANT POSITIVE IMPACTS ON THE LIVES OF AFFECTED COMMUNITIES AND ROAD USERS. WOMEN BENEFIT AS MUCH AS MEN.**

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## SUPPORTING THE PRIVATE SECTOR

There are opportunities to strengthen TSSP's support for small-scale contractors in a way that would not add significantly to the cost of project management and supervision services. Care should be taken to ensure continuity of workflow to small contractors to avoid the boom-bust cycles that can occur when there is a lack of continuity of support.

## EFFICIENCY AND IMPACT

Improved roads have significant positive impacts on the lives of affected communities and road users. Women benefit as much as men. Not all impacts are positive, but close attention to design and contract specifications can minimise risks, mostly relating to road safety and external social and health impacts.

TSSP analysis has shown that the savings in road agency and road user costs are potentially very large, but only when there is sustained commitment to a maintenance strategy. Without that, the benefits of money spent on individual TSSP-supported projects will soon dissipate. With the exception of work on Bougainville and the Eastern Highlands, few upgrading, rehabilitation and maintenance projects have been sustained over a long period, whether under TSSP or DoWI.

The focus on national priority roads is a sound one from a value for money perspective. Within this, the links between data on road condition and use and the works carried out in the field are unclear, making it difficult to assess whether chosen options have represented best value for money. To help address this, it would be useful for simplified criteria in the form of look-up tables and graphs to be generated by DoWI's road asset management system (RAMS) and used (in conjunction with field inspections) as the basis for more transparent decisions on what treatment to implement and what form of contract to adopt.

Moving forward, we also consider increased attention could be given to monitoring the condition of drainage and water crossings.

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## THE FOCUS ON NATIONAL PRIORITY ROADS IS A SOUND ONE FROM A VALUE FOR MONEY PERSPECTIVE.

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### ROAD SAFETY AND GENDER

PNG's road safety record is poor. TSSP's initial efforts to assess safety risk through road safety surveys and to address the main shortcomings in conjunction with maintenance treatments is the right one.

In the absence of dedicated resources over the last two years, gender has become largely invisible in project reporting. ODE considers it is important that DFAT define some modest, concrete and achievable outcomes that can be realised with available resources from a defined baseline. More can be done to highlight gender impacts of the program without necessarily applying significant additional resources.

### MONITORING AND EVALUATION

Despite support from multiple donors, including the ADB, Australia and the World Bank, the Road Asset Management System (RAMS) has failed in the past to become institutionalised as a key building block for planning and management of the road transport sector. This has meant that there has been no reliable basis for monitoring progress against shared objectives for improvement of the condition of national priority roads. TSSP has done good work to address this weakness by completing a comprehensive survey of the condition of national roads. As is mentioned above, we consider that this work should be scaled up.

While it has taken some time, TSSP has a structured process for developing a balanced program of research and project evaluation work. To get better value from available resources for evaluation and research TSSP should establish a combined monitoring, evaluation and research plan that sets out how it will balance the task of basic data collection, with a rolling program of research and evaluation projects.

### MUTUAL OBLIGATIONS

The empirical basis for assessing the adequacy of PNG Government commitments to routine maintenance—a feature of high-level agreements—is well established. However, there has been a decline in the reporting of the PNG Government's performance in fulfilling its commitments. Recent public reports have contained no direct commentary on the PNG Government's performance in taking responsibility for routine maintenance.

Donor funding still accounts for 36 per cent of transport sector resources, and Australian support accounts for a significant share of that amount. On this basis, we think there is scope for DFAT to exercise stronger leadership with like-minded donors in the task of lobbying for budget allocations that sensibly reflect empirical analysis of projects that will provide the best social and economic returns for the resources invested.

## OVERALL CONCLUSION

The period covered by this evaluation has been one of tremendous change. A resource boom saw the size of PNG's economy double over 10 years, but a recent downturn has resulted in severe cuts to government spending. As a result, PNG Government transport sector appropriations in 2017 are 60 per cent lower than they were in 2014 and about the same level as they were in 2011.

Australian support through TSSP has been important throughout this period. For most of this time, TSSP has maintained close to 2,000 km of roads, which amounts to roughly a quarter of PNG's national roads and close to a half of national priority roads—the country's most economically important roads. TSSP has implemented a long-term program of maintenance works in the Autonomous Region of Bougainville, helping it to recover from civil war. TSSP has built vital infrastructure in Oro province to re-establish access to markets and services after a devastating cyclone destroyed bridges and other infrastructure in 2007. It has established standards, guidelines, templates and procedures that are fundamental to the effective functioning of PNG's lead agency for road management, DoWI. It has supported the development of DoWI staff, providing them with vital experience of sound transport management practice. It has supported an asset management platform and provided much of the analytical material required to raise the level of policy debate on development of land transport infrastructure. It has heavily influenced the design of other donor projects in the sector.

This evaluation comes at a difficult time for PNG. Falling commodity prices have reduced revenues to below 2006 levels, despite a population that is 25 per cent larger. PNG's commitment to host the Asia-Pacific Economic Cooperation summit in 2018 is adding demands on the budget, in the form of infrastructure upgrades required to host the event. A large proportion of the National budget has been devolved to Members of Parliament to spend on development projects in their districts, placing further strain on National institutions to deliver against their mandates. These pressures have severely curtailed the PNG National Government's capacity to maintain services, including land transport services.

There is no reliable data on how the condition of national roads has changed over time, but a recent rigorous survey has shown that currently just 15 per cent are in good condition. Moreover, in spite of persistent advocacy from TSSP and improvement in the quality of budget submissions, routine maintenance, which provides the greatest economic and social benefit in development terms, continues to be underfunded. And there is also little evidence of improvement in the quality of budget execution and transparency over how the budget is spent.

The work TSSP does to maintain PNG's roads has a major impact in improving the lives of ordinary Papua New Guineans. While this impact is impossible to quantify precisely, it is undoubtedly large. Access to services and markets is central to the quality of life in PNG. In the words of a chief interviewed about the impact of TSSP's work to maintain roads through his village:

*The important thing is transport; we needed transport to take our copra and cocoa to the market. When they built this road, it provided an important service for us. The women also had a chance to make their own money through selling sweet potato, taro and other things like betel nut and mustard. In order for them to go to the market they have to use the road. The road brought about development, this thing they call development is the road.*

Through this evaluation, it is hoped that these positive impacts can be broadened. We believe the key to this lies in sharpening the focus on policy, planning and delivery tasks that are critical to the funding and implementation of effective maintenance programs, and by giving more careful attention to developing and demonstrating life-cycle solutions to the maintenance needs of selected corridors. This will require a DFAT commitment to providing for some years to come the key survey and analysis services that underpin the justification for rational budgeting and selection of optimum treatments. These critical inputs require advanced skills and a commitment to funding that PNG partner agencies are unlikely to establish for some time. This will also require a narrower focus on a more limited number of key corridors and further support for long-term, performance-based solutions intended to illustrate how roads should be managed over time and to provide a delivery model for subsequent support by other donors.

## RECOMMENDATIONS

### Recommendation 1

To maximise the benefits of TSSP's contribution to preserving and building PNG's most important piece of economic infrastructure, DFAT should:

- » reaffirm maintenance of the national road network as the best value for money use of TSSP resources and, within this, emphasise national priority roads as the program's main land component priority. Recent moves toward using TSSP resources to support 'high impact, complex capital works' should be reversed until there is genuine evidence that the PNG Government is able to look after routine maintenance of existing land transport infrastructure
- » provide a stable and predictable source of multi-year funding for road maintenance
- » fund an independent expenditure tracking study in the roads sector (as has already been undertaken in the health and education sectors) to address the lack of reliable information on the focus of spending on roads by different levels of Government in PNG. This would be in addition to, and supportive of, TSSP's continued efforts to increase transparency of PNG's expenditure on its road network.

### Recommendation 2

To provide reliable capacity for network planning, monitoring and decision support, DFAT should seek agreement with DoWI that TSSP will fund and be held accountable for:

- » collecting routine information on road, bridge and traffic conditions for the national network
- » developing and operating RAMS/BAMS functions to support DoWI and DoTI decision-making, including an enhanced ability to prioritise treatments to prevent damage from flooding.

### Recommendation 3

TSSP should require Project Management Consultants to prepare a plan for strengthening small-scale local contractor capabilities under TSSP's annual program of works, especially those carried out using pro forma contracts. A similar program of work continuity and mentoring focused on small-scale sub-contractors should be considered in conjunction with long-term maintenance contracts in targeted national road corridors.

#### Recommendation 4

To improve value for money from its physical works program, TSSP should:

- » increase its focus on demonstrating the benefits of optimal life-cycle maintenance for a more limited number of national road corridors and with greater priority given to long-term, performance-based maintenance projects
- » mandate cost-benefit analysis (CBA) of high cost projects which reduce the availability of funds for maintenance of roads that might otherwise become impassable, and require the CBA to take this opportunity cost into account
- » develop and use simplified criteria generated by RAMS as the basis for more transparent decisions on what treatment to implement and what form of contract to adopt
- » ensure that the program's gender equality targets are transparent and reported against
- » address the road safety risks identified by road safety surveys, but with better monitoring of impacts.

#### Recommendation 5

To strengthen the basis for mutual accountability and transparency over PNG Government commitments, TSSP should:

- » establish a formal structured process for communicating expectations about the PNG budget and providing feedback on budget outcomes at a political level
- » report progress by the PNG Government in fulfilling its partnership agreement commitments to provide adequate funding of road maintenance in Aid Program Performance Reports
- » report available information on the condition of national priority roads and how it is changing in Aid Program Performance Reports.

#### Recommendation 6

To strengthen accountability and learning outcomes from monitoring and evaluation and support evidence-informed decision making, DFAT should establish a costed and prioritised plan for evaluation and research for the remainder of TSSP with an increased emphasis on strengthening assessment of the program's value for money and its impact on people's lives.

**TSSP COMMENCED IN 2007 AS A  
15-20 YEAR COMMITMENT TO SUPPORT THE  
GOVERNMENT OF PAPUA NEW GUINEA TO  
ACHIEVE A WELL-MAINTAINED TRANSPORT  
INFRASTRUCTURE NETWORK.**





## MANAGEMENT RESPONSE

### SUMMARY

The Office of Development Effectiveness' evaluation into the land transport component of the PNG-Australia Transport Sector Support Program (TSSP) offers important insights into the performance of the program. We thank the evaluation team for its constructive engagement during the evaluation.

The TSSP commenced in 2007 as a 15-20 year commitment to support the Government of Papua New Guinea to achieve a well-maintained transport infrastructure network. We are currently mid-way through this investment and it is an appropriate time to reflect on the progress of the project and the challenges it faces.

The Office of Development Effectiveness report delivers a number of positive assessments, including that “the work TSSP does to maintain PNG’s roads has a major impact on improving the lives of ordinary Papua New Guineans”, “the focus on national priority roads is a sound one from a value for money perspective”, and that “TSSP has had a powerful influence on sector policies... TSSP is a key source of direct capacity to the sector and learning for counterparts”.

However, the evaluation also identifies a number of challenges and has highlighted areas for strengthening. This includes a re-evaluation of the approach to capacity development; adopting an increasingly long-term lifecycle approach to capital investments based on robust analysis; continuing to build the evidence base in the sector to improve prioritisation; and strengthening mechanisms for mutual accountability. The evaluation also highlights a critical challenge facing the sector—the need for increased funding for routine maintenance along with improved prioritisation of interventions.

### “THE WORK TSSP DOES TO MAINTAIN PNG’S ROADS HAS A MAJOR IMPACT ON IMPROVING THE LIVES OF ORDINARY PAPUA NEW GUINEANS”

We have agreed with the key recommendations of this evaluation, with some qualifications (see table below). As the evaluation acknowledges, the program was already actively engaged in addressing a number of the areas where the evaluation makes recommendations. This reflects the effort made by the program to continually evolve to maximise impact in what is a dynamic and challenging operating environment.

On this note, the program’s role is evolving to reflect the increased engagement of other donors in the sector, as observed by the review team. The funding gap for routine maintenance in the sector is very significant, such that it cannot be addressed by Australia’s contribution alone. Alongside improved prioritisation of the Government of Papua New Guinea’s resources, increased donor support will be necessary to arrest future decline in the aggregate condition of the national priority road network. To support this, the program will seek to play an important coordinating role in prioritising and aligning investment with key priorities across the road network.

The program’s significant investment in asset management also provides an important platform for investment by other donors, most recently the Asian Development Bank’s preparation of a project to upgrade the Highlands Highway from Nadzab Airport to Mount Hagen.

The findings of this evaluation will play an important role in informing management approaches for the remainder of the program with a view to maximising the impact of Australia and Papua New Guinea’s significant investment in the sector. We will continue to place high importance on management of risk and contractor performance across the program, including regular reviews and audits of the TSSP program.

**Table 1: DFAT response to recommendations**

Recommendation	Response	Explanation
<b>RECOMMENDATION 1</b>		
To maximise the benefits of TSSP's contribution to preserving and building PNG's most important piece of economic infrastructure, DFAT should:		
(a) reaffirm maintenance of the national road network as the best value for money use of TSSP resources and, within this, emphasise national priority roads as the program's main land component priority. Recent moves toward using TSSP resources to support 'high impact, complex capital works' should be reversed until there is genuine evidence that the PNG Government is able to look after routine maintenance of existing land transport infrastructure.	<b>AGREE</b>	Maintenance of PNG's priority national road network will remain the program's main priority in the land transport sector. This has been reflected in the current program workplan.
(b) provide a stable and predictable source of multi-year funding for road maintenance.	<b>AGREE WITH QUALIFICATION</b>	Program budgets can only be determined subject to annual appropriations and in response to Commonwealth priorities.
(c) fund an independent expenditure tracking study in the roads sector (as has already been undertaken in the health and education sectors) to address the lack of reliable information on the focus of spending on roads by different levels of Government in PNG. This would be in addition to, and supportive of, TSSP's continued efforts to increase transparency of PNG's expenditure on its road network.	<b>AGREE</b>	Post will commence discussions with the Government of Papua New Guinea on funding an independent expenditure tracking survey before the end of 2017.
<b>RECOMMENDATION 2</b>		
To provide reliable capacity for network planning, monitoring and decision support, DFAT should seek agreement with DoWI that TSSP will fund and be held accountable for:		
(a) collecting routine information on road, bridge and traffic conditions for the national network.	<b>AGREE</b>	Post will commence discussions on how the program can take a more direct role in data collection and asset management with the Government of Papua New Guinea before the end of 2017.
(b) developing and operating RAMS/BAMS functions to support DoWI and DoTI decision-making, including an enhanced ability to prioritise treatments to prevent damage from flooding.	<b>AGREE</b>	We will work with the Government of Papua New Guinea to ensure this is appropriately captured in asset management systems and processes for prioritising works.

Recommendation	Response	Explanation
<b>RECOMMENDATION 3</b>		
<p>(a) TSSP should require Project Management Consultants to prepare a plan for strengthening small-scale local contractor capabilities under TSSP's annual program of works, especially those carried out using pro forma contracts. A similar program of work continuity and mentoring focused on small-scale sub-contractors should be considered in conjunction with long-term maintenance contracts in targeted national road corridors.</p>	<b>AGREE</b>	<p>The program remains an active supporter of the Government of Papua New Guinea's Road Construction Industry Strategy. The program will build on this support by developing an enhanced plan to strengthen small-scale local contractors by mid-2018. This will include an enhanced role for the Program's Project Management Consultants.</p>
<p><b>RECOMMENDATION 4</b> To improve value for money from its physical works program, TSSP should:</p>		
<p>(a) increase its focus on demonstrating the benefits of optimal life-cycle maintenance for a more limited number of national road corridors and with greater priority given to long-term, performance-based maintenance projects.</p>	<b>AGREE</b>	<p>The program's current workplan reflects an increased focus on a more limited number of national road corridors. Post will pilot use of performance-based maintenance contracts through its future works program.</p>
<p>(b) mandate cost-benefit analysis (CBA) of high cost projects which reduce the availability of funds for maintenance of roads that might otherwise become impassable, and require the CBA to take this opportunity cost into account.</p>	<b>AGREE</b>	<p>We agree that cost-benefit analysis (CBA) should play a key role in the prioritisation of major projects. It is important that such analysis is considered in the context of other factors such as social outcomes and interregional equity alongside government priorities.</p>
<p>(c) develop and use simplified criteria generated by RAMS as the basis for more transparent decisions on what treatment to implement and what form of contract to adopt.</p>	<b>AGREE</b>	
<p>(d) ensure that the program's gender equality targets are transparent and reported against.</p>	<b>AGREE</b>	<p>The program is on track to finalise a new safeguard strategy in early 2018 that will incorporate gender equity targets. These targets will be reported on through the Annual Program Performance Report.</p>
<p>(e) address the road safety risks identified by road safety surveys, but with better monitoring of impacts.</p>	<b>AGREE WITH QUALIFICATION</b>	<p>Given the scale of road safety challenges in PNG, efforts to fully address risks will inevitably be limited by resourcing constraints. However, TSSP does factor appropriate road safety treatments into its planned works program and will strengthen monitoring and evaluation of this work to ensure it achieves greater visibility.</p>

Recommendation	Response	Explanation
<p><b>RECOMMENDATION 5</b></p> <p>To strengthen the basis for mutual accountability and transparency over PNG Government commitments, TSSP should:</p>		
(a) establish a formal structured process for communicating expectations about the PNG budget and providing feedback on budget outcomes at a political level.	<b>AGREE</b>	We will commence discussions with the Government of Papua New Guinea to establish a formal process for budget engagement in the sector by the end of 2017.
(b) report progress by the PNG Government in fulfilling its partnership agreement commitments to provide adequate funding of road maintenance in Aid Program Performance Reports.	<b>AGREE</b>	
(c) report available information on the condition of national priority roads and how it is changing in Aid Program Performance Reports.	<b>AGREE</b>	
<p><b>RECOMMENDATION 6</b></p> <p>To strengthen accountability and learning outcomes from monitoring and evaluation and support evidence-informed decision making, DFAT should:</p>		
(a) establish a costed and prioritised plan for evaluation and research for the remainder of TSSP with an increased emphasis on strengthening assessment of the program's value for money and its impact on people's lives.	<b>AGREE</b>	This plan is in draft format and will be finalised by early 2018.

## CHAPTER 1: CONTEXT

### ONLY ABOUT 68 PER CENT OF THE RURAL POPULATION OF PAPUA NEW GUINEA (PNG) LIVE WITHIN TWO KILOMETRES OF AN ALL-SEASON ROAD.

Much of this road network is in poor condition, increasing road user costs and making sections of road impassable. The limited reach and poor condition of the road network isolate large numbers of Papua New Guineans from markets and income-earning opportunities, and health and education services. Poor roads are a major constraint to inclusive economic growth.

Recognising the importance of roads, Australian spending on improving roads in PNG has been a major component of Australia's official development assistance to PNG over the last decade, and comes close to three-quarters of a billion dollars. This evaluation assesses the management and effectiveness of this contribution.

The 10-year period covered by the evaluation has been one of considerable change. A resource boom saw the size of PNG's economy double over 10 years, but a recent downturn has resulted in severe cuts to government spending. Consequently, PNG Government appropriations for the transport sector in 2017 are budgeted to be 60 per cent lower than in 2014 and approximately the same level as in 2011.

The historical underfunding of routine maintenance, combined with current budget constraints, have created a situation where the best available modelling suggests that the viability of much of PNG's existing road network is in serious question. Funding and other support provided to the roads sector by development partners, and especially the by Australian government as the largest provider of development assistance to PNG, is especially important in this context.

Given the significance of these changes, it is important as a starting point for this exercise to consider Australia's contribution in the appropriate context. To provide this context, this chapter outlines the state of the PNG road network, institutional arrangements in the sector, and the changing significance of the contributions of different donors.

### PNG LAND TRANSPORT INFRASTRUCTURE

PNG's road network is estimated to total 30,000 km (see Figure 1). Of this, 8,738 km comprise 'national' roads, which are gazetted as falling under the responsibility of the PNG Government. All other roads are 'non-national' and the responsibility of lower levels of government (see discussion below). There are 12 separate networks, plus roads on the smaller islands, giving rise to long-held aspirations to inter-connect those on the mainland, despite the high cost of building new roads through difficult terrain and sparsely-populated areas.

These aspirations need to be reconciled with other urgent priorities, including maintaining existing roads. At least on paper, maintenance takes precedence—in policies and planning documents, the PNG Government has consistently prioritised the rehabilitation and maintenance of 16 'national priority' roads. These roads are considered to provide the greatest economic and social benefit to the greatest number of people, and comprise almost 4,300 km of the national road network. National priority roads have been the primary focus of TSSP.

**THE HISTORICAL UNDERFUNDING OF ROUTINE MAINTENANCE, COMBINED WITH CURRENT BUDGET CONSTRAINTS, HAVE CREATED A SITUATION WHERE THE BEST AVAILABLE MODELLING SUGGESTS THAT THE VIABILITY OF MUCH OF PNG'S EXISTING ROAD NETWORK IS IN SERIOUS QUESTION.**

According to the latest available data, just 13 per cent of the national road network is in good condition, with 59 per cent considered to be in very poor condition (Table 2). National priority roads are in a similarly dismal state: 15 per cent are in good condition, and almost 67 per cent in very poor condition. This assessment, produced using new data from the TSSP-funded Visual Roads Condition Survey, is significantly worse than previous information produced by the Department of Works and Implementation's (DoWI) Road Asset Management System (RAMS) database—an issue discussed in Chapters 4 and 6.<sup>2</sup> There is no comprehensive data on the state of non-national roads, but given severe funding and capacity constraints at the sub-national level, their condition is likely to be poorer than that of the national network.

**Table 2: Condition of the national road network**

	Good	Fair	Poor	Very Poor	Total km
<b>Priority roads</b>	15%	9%	9%	67%	4,296
<b>Non-priority roads</b>	10%	5%	33%	53%	4,399
<b>Overall</b>	13%	7%	21%	59%	8,695

Note: Condition is defined in terms of a Ride Quality Index that reflects the acceptability of levels of surface roughness at different levels of traffic (higher levels of roughness being considered more tolerable at lower levels of traffic). Source: TSSP.

<sup>2</sup> Earlier visual inspections assessed 35 per cent of the network as being in good condition. There is internal debate within DoWI about which figure should be used. The criticism of visual inspections is that they are inherently subjective and that those undertaking inspections have in the past had incentives to exaggerate improvements in road conditions.



Highlands Highway near Goroka. Much of the national road network is in a poor condition. Sections of road like this one are not uncommon. Photo: Matthew Dornan.

The importance of land transport infrastructure and the economic and social impact of the poor state of the road network have been recognised by successive PNG Governments. The Medium Term Development Plan (2016–20) notes that:

*Well-maintained transport infrastructure is essential for the efficient flow of produce to markets and for the flow of consumer goods and services to village communities. It is widely accepted that the decline in the quality of PNG's transport infrastructure over the years has had a major adverse impact on service delivery and the capacity of Papua New Guineans to earn cash incomes.*

The poor state of the road network is due to a combination of deficient road management and, linked to this, low levels of funding.<sup>3</sup> The National Transport Strategy notes that:

*Historically, road maintenance has been severely underfunded for many years, if not decades, and the latest 2013 Budget is no exception. The DoWI was so inured to receiving only a fraction of the funding requirement that for several years the budget submissions covered only routine light maintenance to roads that were in good or fair condition, the remainder being left to deteriorate further and then become objects of largely donor funded reconstruction and rehabilitation programmes... Typically the budget submissions were for K100–200 million while the appropriation was between zero and K30 million.*

<sup>3</sup> Geology, topography and high levels of rainfall in much of the country have also undoubtedly made the maintenance of the road network more challenging. However, these factors have led to the decline of the road network only because of failures to respond appropriately.

It further notes that:

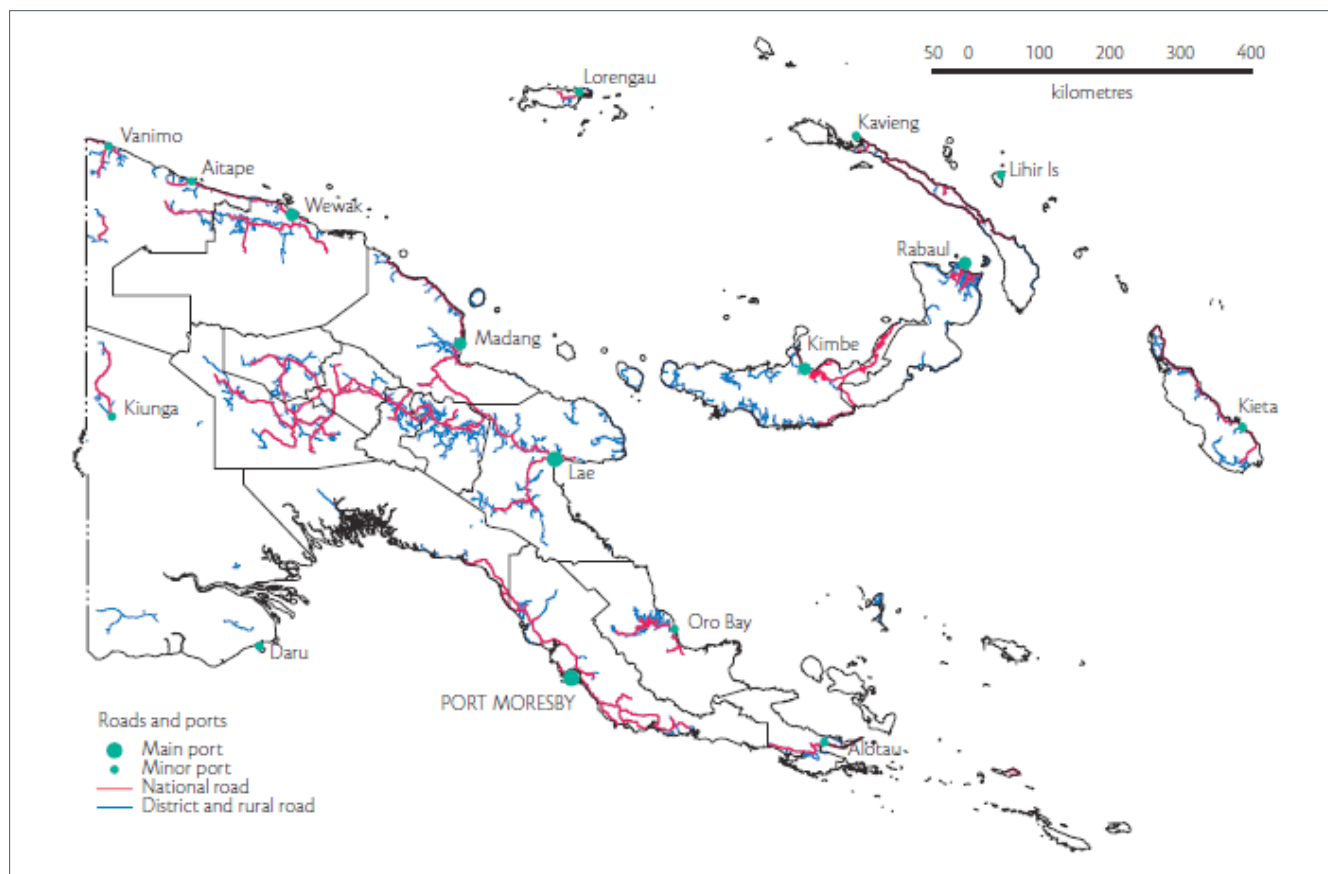
*Under-investment in maintenance of existing infrastructure has led to unnecessarily high rates of deterioration which have then required substantial rehabilitation or reconstruction, often funded through development assistance. Also, financial resources have not always been well directed and best practice construction and maintenance methods have not always been applied.*

Funding for road maintenance in PNG more than halved in the 20-year period after independence, a trend reflected in infrastructure spending more broadly. Per capita infrastructure spending by Government fell in real terms (2011 Kina) from approximately PGK250 in 1975 to PGK30 in 2001. Funding for maintenance has been a particular concern, with government funding often directed toward construction of new infrastructure rather than toward

routine maintenance, despite conclusive evidence that a maintenance-first approach is more cost effective. Rehabilitation or upgrades of low priority roads rather than routine maintenance of core road infrastructure have also been issues.

Budget allocations are only part of the problem. Expenditure on road management has consistently been lower than what is allocated in the budget, owing to unpredictable funding, poor budget execution, capacity constraints in both the public and private sectors, and weak budget discipline. In 2015 and 2016, expenditure on national roads only totalled around 40 per cent of what was budgeted. The effectiveness of a large proportion of this spending is also questionable, with poor quality of work and high unit costs a problem.

**Figure 1: PNG's road network**





## PNG GOVERNMENT POLICY AND INSTITUTIONAL ARRANGEMENTS

### Agency roles

The lead policy agency in the transport sector is the Department of Transport and Infrastructure (DoTI), which is responsible for sector planning and for preparing sector budget submissions. DoTI chairs the Transport Sector Coordination, Monitoring, and Implementation Committee (TSCMIC), which was established to facilitate coordination among 12 transport sector agencies and develop a whole-of-sector approach to planning. All major development partners participate in TSCMIC meetings. TSSP has provided the secretariat function for TSCMIC since its establishment.

The Department of Works and Implementation (DoWI) is responsible for managing national roads and bridges. Its functions include programming and contract management for national road and bridge construction and maintenance (except where these have been transferred to the National Roads Authority (NRA)—see below), specifying technical standards for road and bridge engineering and training, and advising government on engineering costs, technical design and construction matters. Most road construction and maintenance work is contracted to private sector companies and overseen by DoWI, except in cases of emergency reinstatement and in areas where there is no competitive private contracting capacity. DoWI maintains provincial works units in most provinces. DoWI also maintains RAMS (Road Asset Management System) and BAMS (Bridge Asset Management System), which inform forward maintenance plans and budget deliberations.

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## THE ACTIVITIES OF THE NRA TO DATE HAVE BEEN CONSTRAINED BY LIMITED FUNDING, OWING TO THE GOVERNMENT'S FAILURE TO EXPAND THE REVENUE THAT FLOWS INTO THE NRA'S ROAD FUND.

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The NRA is both a road fund and agency, responsible for routine maintenance of 2,200 km of the national road network gazetted as falling under its responsibility. Notionally, these roads become the responsibility of the NRA once they are in good condition and require only routine maintenance. In practice, that has not been the case. The activities of the NRA to date have been constrained by limited funding, owing to the Government's failure to expand the revenue that flows into the NRA's Road Fund (see Box 1). Nonetheless, the *National Transport Strategy (2013)* flags an expanded role for the NRA in the future, stating that it will progressively become responsible for 9,000 km of road by 2030.

## Box 1 The National Roads Authority

The NRA was established to ensure an ongoing and reliable supply of funds for maintenance of the national road network through an 'agency run on more professional lines, with high quality staff recruited under market conditions, not subject to public service rules, with less political interference.'<sup>4</sup> It outsources road maintenance activities, and is overseen by an independent board of directors comprised of seven representatives from road user organisations and four civil servants from the major road sector agencies.

There were significant delays in the actual establishment of the Road Fund and NRA, despite the requisite legislation passing parliament in 2003. Actual segments of road were only gazetted as falling under the responsibility of the NRA in 2009. The NRA was also not established as had originally been intended. The National Roads Authority Act (2003) combines the roles of Road Fund manager and road maintenance executor under the NRA, creating a potential conflict of interest which the NRA has sought to manage by 'ring fencing' roles.

The NRA receives its funding from the Road Fund, which accumulates revenue from a levy on domestically refined diesel fuel (which is used for both road transport and other purposes), equivalent to 4 toea/litre (approximately 2 US cents/litre). Annual deposits into the Road Fund range from K11 to K26 million, far from the K129.3 million the NRA estimates it would require to maintain the 2,200 km of road under its care. In 2014, NRA revenue represented less than 1.5 per cent of total Government spending on maintenance and rehabilitation of the national road network.

Notwithstanding these constraints, the National Transport Strategy (2013) flags an expanded role for the NRA in future years, stating that it will progressively become responsible for 9,000 km of road by 2030, which would require NRA spending to increase to K280 million from current levels of approximately K30 million. To facilitate this, the strategy states that by 2013, 'road user charges will be extended to include a charge on both petrol and diesel, an annual charge on registered vehicles and a charge for heavy vehicle axle loads.'

None of these developments has occurred. However, some positive changes are underway. The 2017 budget extends the 4 toea levy so that it applies to imported diesel fuel, a move internal PNG Government estimates indicate could raise the annual intake to K55 million. In addition, the National Executive Council has instructed DoWI to undertake an institutional review of the road sector in PNG, which will include a study of institutional roles and responsibilities in the sector. Part of the reason for this review is acknowledgement that current institutional arrangements between DoWI and the NRA may not be optimal.

Other agencies in the sector include the National Road Safety Council (NRSC), which promotes road safety and is responsible for collection of road traffic accident data, and the National Land Transport Board (NLTB), which regulates land transport services. Responsibility for vehicle, driver and transport licensing, vehicle type approval and roadworthiness standards, motor vehicle testing and dealer licensing, is currently delegated to provincial administrations and to Motor Vehicle Insurance Ltd (MVIL), both of which retain the revenues collected. In the future, it is intended that a new Road Traffic Authority (RTA) will assume these functions, but will outsource service delivery at the sub-national level to

provincial administrations, MVIL and other agents, and that the NLTB and provincial LTBs will be wound up. Whether this reform is to proceed in the future is uncertain; the RTA lacks the information technology infrastructure required to collect revenue, and it is unlikely the provinces will readily give up one of their main sources of revenue.

Problems with duplication and lack of clarity about agency functions are perhaps most evident regarding the functions of DoWI and NRA. While NRA was established to gradually take over routine maintenance of rehabilitated sections of the national road network, sections of road falling under its responsibility have in many cases required rehabilitation,

4 See Government of Papua New Guinea, 2013. National Transport Strategy

which NRA has insisted is the responsibility of DoWI. Coupled with the PNG Government's allocation of funding to NRA for major road rehabilitation and upgrading projects (including, initially, the Lae-Nadzab 4-lane project, which is now managed by the High Impact Projects Office),<sup>5</sup> this has led to duplication of functions and confusion regarding responsibility for sections of road gazetted to the NRA that are in poor condition.

The proposed establishment of the Infrastructure Development Authority (currently the High Impact Projects Office) which was to have been funded through resource rents accumulating in the Sovereign Wealth Fund, creates the risk of additional duplication. To its credit, the PNG Government has recognised this problem, and has announced a review of institutional roles and responsibilities in the sector, which will be supported by TSSP. It is understood this review will explore the future roles of the NRA and Infrastructure Development Authority.

## Planning

The planning framework for land transport is set out in Figure 2. The National Transport Strategy (NTS) is the PNG Government's guiding vision for the transport sector. It was published by DoTI in June 2013, at a time of rising government revenues, and sets out the Government's plans for the transport sector over the 20–30-year timeframe of Vision 2050 and the Development Strategic Plan (DSP) 2010–2030.

Guiding the implementation of the NTS is the Medium Term Transport Plan (2014–18), which establishes a more tangible agenda for government. It is linked to PNG's Medium Term Development Plan (MTDP). The MTDP forms the basis for funding allocations in the annual development (now capital) budget<sup>6</sup> and replaces the National Transport Development Plan, which guided the sector from 2006–10.

**Figure 2: Planning framework for land transport**

		STRATEGIC LEVEL			
		International	National	Transport Sectors	Other Sectors
Planning Horizon	Long Term ( 20 - 40 years )		Vision 2050 Development Strategic Plan	National Transport Strategy	Agriculture Forestry Minerals
	Medium Term ( 5 - 20 years )	Sustainable Development Goals	Medium Term Development Plan		Tourism Health Education
	Short Term ( 1 - 3 years )		National Development & Recurrent Budget	Transport (Govt Sector) Development & Recurrent Budget	Transport SOE and Private Sector Budgets

5 The High Impact Projects Office was first established with the intention that it would receive funding through the Sovereign Wealth Fund (which is yet to be created). It now sits within DoWI but reports directly to the Minister. It manages a number of new construction projects, including the Lae-Nadzab highway.

6 MTDP1, which operated from 2011 to 2015, has now been superseded by the MTDP2, which will be in place from 2016–18.

A common feature of these plans is the ambitious nature of the targets that they establish. The objective of Vision 2050 is for PNG's Human Development Index ranking to rise to 50, from its current level of 158. More immediately, the Development Strategic Plan aims to reduce maternal mortality rates from 733 deaths per 100,000 live births to 274 deaths by 2015, and to less than 100 deaths by 2020. It indicates that crime will be 55 per cent lower by 2020. Economic growth of the non-mining sector is crucial if such goals are to be met. The MTDP projected non-mining GDP growth of nine per cent per annum over 2011–15 (actual growth averaged four per cent per annum in that period). The MTDP also advocated greater borrowing by government for infrastructure development, arguing that 'Infrastructure investment will in turn lead to faster growth in Government revenues, financing the repayment of debt and ongoing high levels of infrastructure investment in future MTDPs.'<sup>7</sup>

The NTS, like other sectoral plans, has been drafted to complement and support national planning, which explains the adoption of ambitious targets for land transport. The NTS aims to increase the length of the national road network from less than 9,000 km currently to 25,000 km, and to have 100 per cent of that network in good condition by 2030. These targets are taken directly from the Development Strategic Plan (DSP) 2010–2030 and the MTDP. In the nearer term, the NTS sets a target of sealing all national roads by 2020, with 1,800 km

of the 16 Priority Roads (PGK2.1 billion) taking precedence, followed by 4,800 km of other national roads.

The NTS also explores construction of 'missing link' roads, which is a focus of both the DSP and MTDP. It is worth highlighting that most of the 16 'missing link' national roads (2,280 km) and four economic corridor roads included in the MTDP and DSP are not deemed economically viable by the Transport Investment Prioritisation Study (TIPS) conducted to inform it. TIPS concluded only six of the 16 'missing links' were likely to be viable.<sup>8</sup> These links nevertheless have benefit-cost ratios considerably below that of maintaining existing roads.<sup>9</sup>

Land transport infrastructure targets established by the MDTP, DSP and the NTS, set an ambitious agenda for the PNG Government. The total cost of new road links, upgrading to seal, and rehabilitation of national and provincial roads is estimated at PGK46 billion, of which PGK11 billion would be for provincial roads and K35 billion for national roads. An additional PGK735 million would be needed to upgrade or replace over 50 bridges on national roads that are economically viable, and an additional PGK735 million for 534 other bridges requiring repair. The annualised cost of achieving these targets over the next 5 years is PGK2.4 billion. This compares to average annual expenditure on roads since 2008 of a little over PGK400 million. Table 3 summarises the capital spending envisaged in the NTS.

7 It is worth noting that while the MTDP acknowledges the limited capacity of local contractors in PNG, it argues that "a commitment to longer term, program funding will provide the confidence industry needs to grow its capacity."

8 New Britain Highway (Biella-Kerevat), Gulf to Southern Highlands (Samberigi-Erave), Bundi Highway restoration, Lae-Wau road extension to Popondetta via Garaina, Southern Corridor on New Britain, and Trans-Fly (Morehead-Oriomo).

9 Given insufficient revenues, the PNG Government has done very little in practice to complete missing link roads.

**Table 3: Projected road funding requirements for capital works in National Transport Strategy (2010 constant Kina, millions)**

Program	2011–15	2016–20	2021–25	2026–30	Total
<b>New road links</b>	3,000	7,900	7,950	13,000	31,850
<b>16 priority roads—upgrade to seal</b>	400	700	650	250	2,000
<b>Other national roads—upgrade to seal</b>	600	1,250	1,450	1,850	5,150
<b>Sealed national roads — rehabilitation</b>	250	300	300	300	1,150
<b>Provincial and other roads</b>	750	2,000	1,375	1,375	5,500
<b>Totals</b>	<b>5,000</b>	<b>12,150</b>	<b>11,725</b>	<b>16,775</b>	<b>45,650</b>

**IT IS DIFFICULT TO BE TOO CRITICAL OF THE DESIRE TO EXPAND THE FOCUS BEYOND NATIONAL ROADS IN PROVINCIAL AND MISSING LINK ROADS. THEY REFLECT THE UNDERSTANDABLE ASPIRATIONS OF PNG TO CONNECT ITS DISPARATE ROAD NETWORKS.**

One point of difference between the NTS and the preceding National Transport Development Plan is the treatment of priority roads. The identification of 16 priority roads considered to provide the greatest economic and social benefit to the greatest number of people has been an important component of road planning in PNG since the Transport Prioritisation Study of 2006. The NTS marks a departure from this approach, opting to treat priority and non-priority national roads on an equal footing. In doing so, it notes that:

*While these roads continue to be important road network links, the investment that has been made in them and the economic development and population growth that has taken place since they were first identified means that the merits of further improvement need to be considered alongside that of other national and provincial roads...*

*Consequently, while the MTDP requires that the 16 priority roads be monitored in regard to their improvement and particular targets have been set, this NTS treats the 16 roads on an equal basis to all other roads.*

It is difficult to be too critical of the desire to expand the focus beyond national roads in provincial and missing link roads. They reflect the understandable aspirations of PNG to connect its disparate road networks. They also reflect the legitimate concerns of Members of Parliament for constituents. However, the basis for the claim that merits of further improvement of the 16 priority roads need to be reassessed given the investment that has been made is questionable—as discussed above, available analysis suggests that priority roads are in a dismal state, with 67 per cent classified as in very poor condition. Further, it is critical that policies reflect a coherent set of priorities that take economic and non-economic factors into account. On this, TSSP has been a consistent advocate with the PNG Government, including on the issue of whether the priority roads designation continues to be part of PNG Government transport policies. Thus far the impact of the change in focus is unclear and has not influenced TSSP, which maintains its commitment to priority roads.

## Implementation

In seeking to understand these high-level policy settings, it is important to note that the success of high-level planning in driving actual decision making in PNG is mixed. Policy direction is not always consistent with national plans, as demonstrated by two important developments signalled by the NTS. The first involves the gradual transferral of responsibility for national roads to the NRA, accompanied by an expansion of its revenue base. The second involves gazettement of non-national roads so that responsibility for them is assumed by DoWI. Neither change has occurred. In fact, movement appears to be in the opposite direction. DoWI is seeking to have roads currently gazetted as national removed so that they become the responsibility of sub-national levels of government, a logical move given the shift in government funding toward sub-national bodies. A significant portion of non-national roads are likely to become the responsibility of District Development Authorities, which now receive higher levels of funding than in the past (see discussion below). As flagged earlier, a review of institutional arrangements is currently considering the future role of the NRA in the sector.

Budget envelopes flagged in planning documents are also rarely met. Sector agencies label the targets established by high-level plans as “aspirational.” The allocation of funding that is made available is also subject to strong political pressures. Funds are often allocated in response to these pressures, and not in accordance with national plans and priorities.

This has important implications for prioritisation of land transport resources. While successive PNG Governments have acknowledged the importance of road maintenance, as reflected in relevant policies and plans, evidence that this has been backed up in practice is mixed. Historically, the PNG Government has tended to allocate or redirect funding towards construction of new infrastructure, or rehabilitation or upgrading of non-priority roads, rather than towards routine maintenance of the core road network. Given constraints in the level of funding available in the sector, routine maintenance needs have not been met.

As is discussed further in Chapter 3, underfunding of routine maintenance therefore continues to be a problem despite the ‘maintenance first’ focus of the National Transport Strategy.

Other issues also affect implementation. Landowner claims for compensation are ubiquitous in areas such as the highlands, and complicate work, often leading to significant delays. Capacity constraints in the sector are also a problem. Contractor quality varies enormously. Competition is limited, given that the separate networks render the movement of equipment costly. Many areas have only one or two contractors that can deliver large-scale projects, and some have none at all. The inconsistent provision of contracts for road work is one factor that has inhibited development of the industry.<sup>10</sup>

## Non-national roads

Two-thirds of PNG’s road network are not gazetted as ‘national roads’ and are the responsibility of sub-national levels of government. Management of non-national roads has been problematic, and weaker than that of the national road network. While non-national roads are undoubtedly in poorer condition than national roads, there is no data on their condition, nor is there a definitive listing of their length (22,000 km is an estimate).

A feeder road to the Kopafo village in Eastern Highlands Province. Non-national roads are in an even poorer condition than national roads.

As is discussed in more detail in Annex 1, there are serious problems with current arrangements for management of non-national roads. While responsibility for non-national roads formally resides with provincial and local level governments, funding provided to provinces is grossly inadequate, and is now dwarfed by funding allocated directly to Members of Parliament to spend on development projects in their districts through ‘Service Improvement Programs’ (SIPs). Forty per cent of SIP funding is dedicated to ‘transport services’, which includes road management. The bulk of SIP funding is channelled to the district level, where capacity is more limited than at the provincial government level. SIP funds are provided for development expenditure and are not for funding of recurrent activities like maintenance. This restricted allocation undermines good road management, as maintenance needs go unfunded while the larger part of expenditure is directed toward road construction or rehabilitation through the SIP funds. Unlike the provincial allocations, each district is provided with PGK10 million, irrespective of its population, remoteness, or cost of service delivery. The Auditor-General’s Office of PNG reports that accountability for the use of these funds is very limited.<sup>11</sup>

10 See Lucius D (2010) Civil Works Capacity Constraints. Asian Development Bank, Port Moresby.

11 Auditor-General’s Office of Papua New Guinea (2014), District Services Improvement Program: A report on the key findings resulting from the 2012/ 2013 District audits of expenditure relating to the District Services Improvement Program (DSIP).



A feeder road to the Kopafo village in Eastern Highlands Province. Non-national roads are in an even poorer condition than national roads.  
Photo: Matthew Dornan

There is also lack of clarity regarding who is actually responsible for management and maintenance of sub-national roads. The Determination of Service Delivery Functions and Responsibilities stipulates that it is a provincial government responsibility, but this is at odds with the fact that far greater funds are allocated to districts through Members of Parliament than provincial governments.<sup>12</sup> In practice, spending on roads is undertaken by the provincial government, district administrations, and where funds are allocated in the national budget, by the national Department of Works. Coordination between these levels of government is weak. A recent Australian National University–PNG National Research Institute study has found that districts refuse to share budget data with provincial governments, meaning there is no single account of spending on provincial roads.<sup>13</sup>

In policies, there is lack of clarity regarding future management of non-national roads. The National Transport Strategy envisaged a gradual process whereby roads are transferred to national government responsibility. This no doubt reflects the accurate view that capacity constraints at lower levels of government are both extreme and pervasive. However, national funding for non-national roads is increasingly allocated at the district level, despite almost no district administration in PNG employing an engineer. Funding constraints and devolution of a significant component of government resources to lower levels of government explain understandable moves by DoWI to have stretches of national road gazetted to sub-national levels of government.

<sup>12</sup> These issues are being examined by DoWI as part of its ongoing review of road hierarchies.

<sup>13</sup> The Australian National University—National Research Institute (ANU-NRI) research is ongoing and has not yet been published. However, preliminary results were presented by Ronald Sofo (PNG National Research Institute) and Matthew Dornan at the PNG Update conference in November 2016.

## DONORS

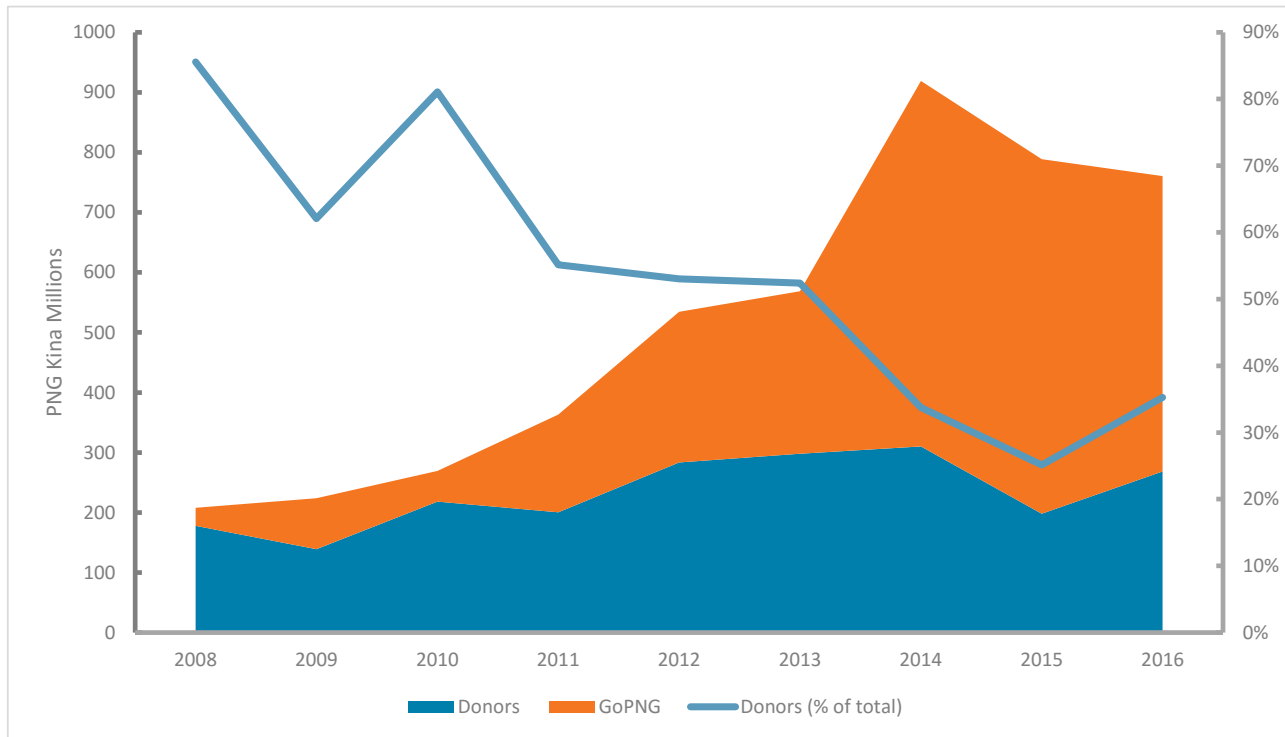
Donors have played an important role in the transport sector, even as the importance of their funding support has declined. Historically, the bulk of funding for maintenance of roads was provided by donors, as the limited PNG Government funds that were appropriated in the sector were spent on new infrastructure or on non-priority areas. Donor-funded technical assistance has given transport agencies a level of capacity that would not otherwise exist.

While donor funding for the sector has grown moderately in the last decade, it has become progressively less important

due to rising PNG Government expenditure. Currently, donors contribute approximately 35 per cent of funding to the transport sector (land, aviation and maritime), comprising both grant (11 per cent in 2016) and loans (24 per cent in 2016).

Donor funding for national priority roads has been slightly more important relative to total funding, at 36 per cent of the total in 2016, as can be seen in Figure 3. Although significant, this represents a decline from the historical share of donors—a decline that results from increases in PNG Government allocations for national priority roads (a trend that has recently reversed because of the significant cuts to the transport sector budget).

**Figure 3: Appropriation for national priority roads**



Source: PNG DoWI



As can be seen in Figure 4, Australia, the ADB and the World Bank have been the main development partners contributing grants and loans for land transport projects, together with mainly grant-based technical assistance for project preparation and sector policy and implementation support. Others active in the sector are Japan (JICA) through its bridge and construction equipment programs and more recently China through its support for road construction in the National Capital District.

Australian financial assistance for the road sector has averaged AUD64 million annually in the 10 years to 2015–16, or 54 per cent of the total support from development partners. TSSP has been the vehicle for almost all of this assistance.

The ADB has been the second largest funder to the roads sector over the past decade, with recent support measuring between PGK20 and PGK30 million per year, or about 17 per cent of the total donor assistance. An important commitment has been the Highlands Region Road Improvement Program, which covered second-tier national roads and important provincial roads in the five Highlands Provinces. From 2017, the ADB expects to commence the Sustainable Highland Highway Investment Program, a ten-year program approximately US\$900 million in value, which aims to restore, upgrade and maintain a 430 km section of the Highlands Highway between Lae and Mount Hagen.

The World Bank's recent activity has been through the Road Maintenance and Rehabilitation Project (RMRP) in six provinces outside of the Highlands, where its contribution has been around PGK10–15 million per year, or 11 per cent of the external assistance.

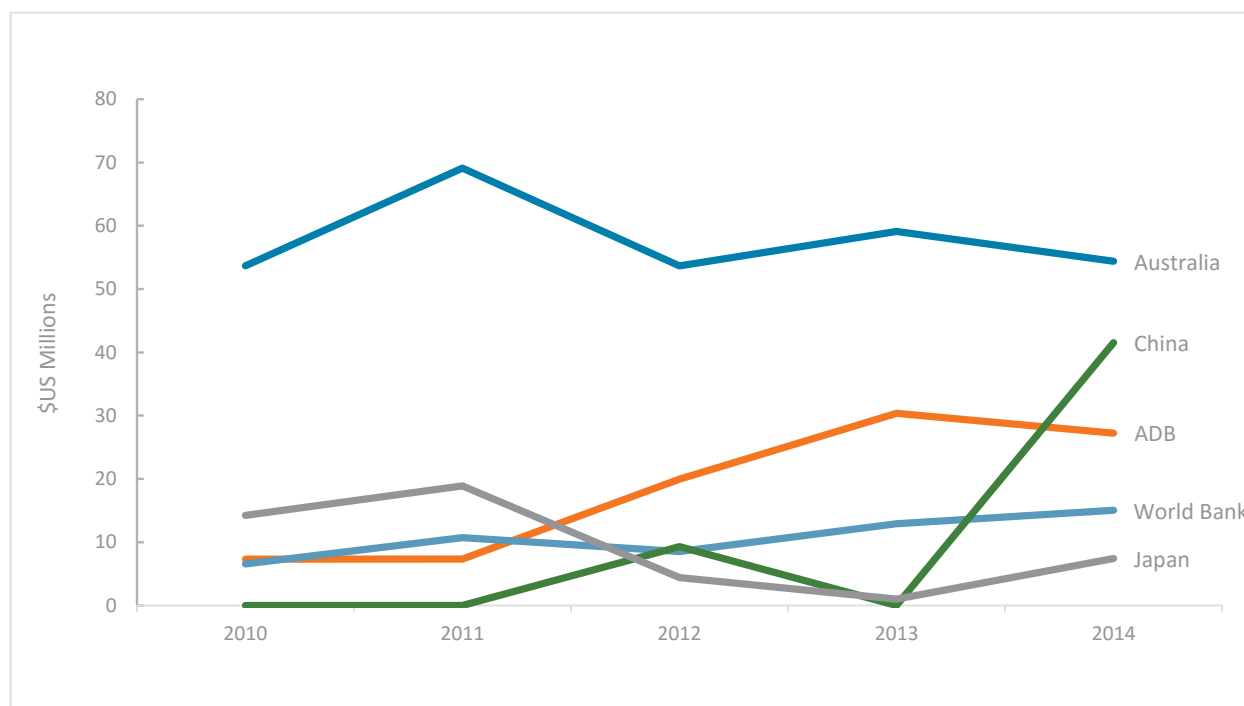
Given increases in availability of financing from the ADB and World Bank, both can be expected to become bigger players in the sector than they have been in recent times.<sup>14</sup> In the medium to long term, increases in Chinese funding in the sector should also be expected in the form of concessional loans provided by China Eximbank, with construction work undertaken by Chinese contractors.<sup>15</sup> Thus far, Chinese funding in road transport in PNG has mainly been limited to development of roads in the National Capital District. PGK318 million has been provided in the form of a concessional loan from China Eximbank to fund two components of the National Capital District Road Reconstruction project in 2014–16: the Gerehu-Nine Mile Road and the Gerehu-Poreporena Road. The other recent transport sector project funded by China involved the construction of an access road from the Chinese nickel mine to the main Ramu highway in Madang. It was funded through a US\$9.6 million grant from the Chinese government in 2012.

The effect of long-term increases in Chinese funding, together with greater lending by ADB and the World Bank, will be an expansion of the choices available to the PNG Government when it comes to funding road projects. PNG Government revenue will also rise relative to donor funding in the long-term. Both trends will reduce the leverage and influence of the Australian Government in the sector in the future.

14 Funds allocated to the Pacific through the World Bank's International Development Association (IDA) will increase to US\$900 million during the IDA18 replenishment period, which runs from July 2017 to June 2020, compared with US\$360 million for the previous three years. The merger of the ADB's ordinary capital resources and Asian Development Fund (ADF) resources will substantially increase the ADB's lending capacity by up to 40 per cent, providing additional opportunities for PNG to work with the ADB to improve its transport infrastructure. The recently agreed ADF12 replenishment will result in the ADB significantly scaling up its operations in the Pacific. The ADB has forecast an increase in new financing to the Pacific from US\$750 million per annum in 2015 and 2016 to about US\$1.3 billion in 2017 and 2018.

15 Although they fit the OECD definition of concessional, China Eximbank loans compare unfavourably to the concessional rates offered by JICA, World Bank and ADB. Terms of two per cent per annum over a 20-year period with a 5-year grace period are typical.

**Figure 4: Road sector and transport policy support in PNG: 2010–2014**



Source: OECD Creditor Reporting System and Lowy Institute Chinese Aid Map: <https://www.lowyinstitute.org/chinese-aid-map/>

Note: Chinese aid in 2014 is based on a US\$124.6 million concessional loan provided for National Capital District roads. The loan was expended between 2014 and 2016. As no details are available regarding annual expenditure, it is assumed in this graph that spending was of equal value in all three years.

## FINDINGS

Much of PNG's road network is in poor condition. According to the best data available, just 13 per cent of the national road network is in good condition, with 59 per cent considered to be in very poor condition. National priority roads are in a similarly poor state: 15 per cent are in good condition, and almost 67 per cent in very poor condition.

The poor state of the road network is due to a combination of deficient road management and, linked to this, low levels of funding. PNG Government allocation of funding for road maintenance has been limited despite the importance of road maintenance being acknowledged by successive PNG Governments.

Success of high level planning in driving actual decision making in PNG's transport sector is mixed. Policy direction is not always consistent with national plans. Targets established by national plans are often not realistic given funding allocated to the sector.

Funding and management of non-national roads is fragmented, and there is lack of clarity regarding the direction of government policy for non-national roads.

In this context, donors play an important role in the transport sector, providing 40 per cent of funding for national priority roads, as well providing road agencies in PNG with a level of capacity they would not otherwise have (as established in Chapter 4). That said, it is likely that the leverage and influence of the Australian Government in the sector will decline in the long run, as PNG Government spending and funding from other donors increase.

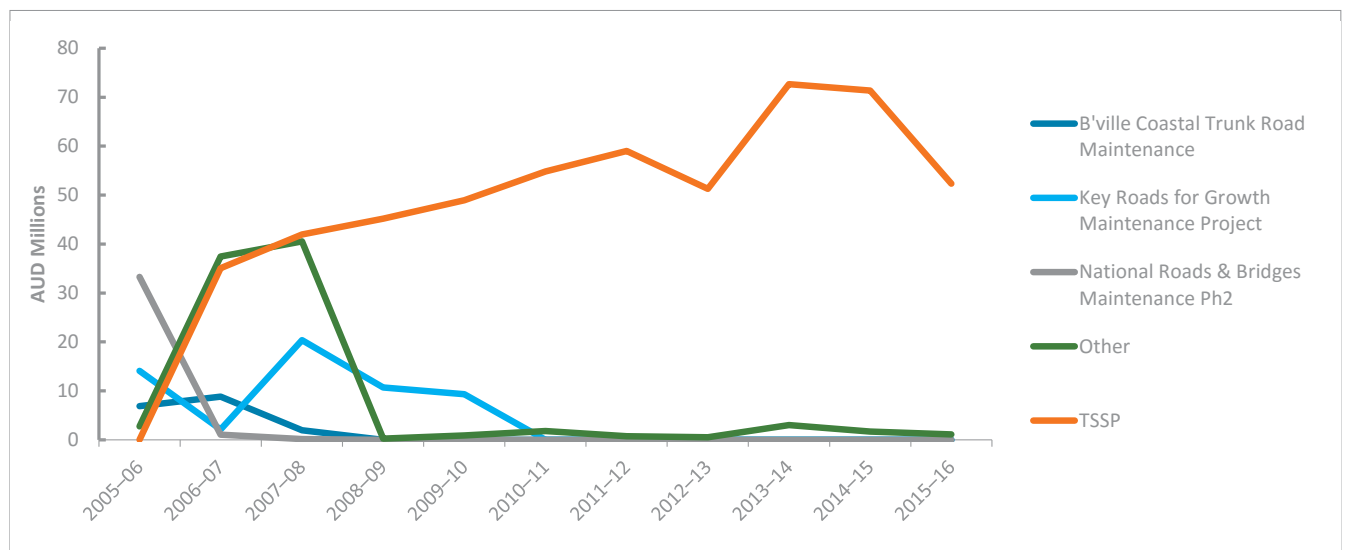
## CHAPTER 2: ABOUT THE EVALUATION

### THE TRANSPORT SECTOR SUPPORT PROGRAM

The Australia aid program has spent almost three quarters of a billion dollars to improve PNG's transport infrastructure over the past decade, most of which has been through TSSP. Starting in 2007, the program is envisaged as a 15–20-year commitment to improve PNG's transport infrastructure. The second, five-year phase of the program, valued at up to AUD400 million, started in late 2014.

While it has some features that make it stand out from previous work in the transport sector, TSSP is a continuation of a long history of Australian support in this area. As can be seen in Figure 5, TSSP consolidated work on transport infrastructure that Australia once provided through multiple projects and contracts, each with their own areas of focus and emphases. This was driven by a concern that projects had resulted in a piecemeal approach to capacity development, and had not provided a firm basis for influencing the PNG Government's use of its own resources.

**Figure 5: Transport sector expenditure, 2005–06 to 2015–16, current prices**



Source: AidWorks

TSSP's desired long-term outcome is 'a safe, reliable transport system in place enabling economic and social development in Papua New Guinea'. Underneath this the program design identifies three objectives:

- » **Priority land transport assets maintained:** PNG agencies deliver a sustainable maintenance program with predictable PNG Government funding to maintain 75 per cent of priority national roads in good condition;
- » **Critical Transport Safety and Security Systems Operating Effectively:** Critical safety and security regulatory and service functions consistently demonstrate enhanced stability, competence and compliance to standards;
- » **Effective Agency and Sector Engagement, Performance and Accountability:** Systems in place to achieve predictable multi-year government funding for transport asset maintenance and key reforms progressed through enhanced engagement, agency performance and analysis.

TSSP is a transport program, with a focus on maritime, air and land transport. However, land transport—the focus of this evaluation—is by far the biggest focus, accounting for around 95 per cent of program expenditure. Within this, TSSP's main focus has been maintenance of the national road network, and national priority roads in particular.

TSSP has carried out a large volume of upgrading and maintenance work in 12 provinces.<sup>16</sup> By end-2015, PGK694.5 million had been disbursed for DoWI asset maintenance and PGK157.7 million for Bougainville roads. TSSP supported the design and construction of four bridges costing over PGK130 million in Oro Province after Cyclone Guba destroyed most of the bridges and caused significant damage to other infrastructure in 2007. The project has delivered on commitments made under the Manus additional assistance package. Funded works have covered a range of treatments: sealing (upgrading) unsealed roads, re-sealing, re-sheeting (replacing lost material on unsealed roads), re-shaping (restoring the camber on unsealed roads), replacing bridges and culverts, river training, improving drainage, and grass-cutting. They have supported capacity building by demonstrating good practice in project selection, planning, procurement and delivery.

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## TSSP IS A TRANSPORT PROGRAM, WITH A FOCUS ON MARITIME, AIR AND LAND TRANSPORT. HOWEVER, LAND TRANSPORT—THE FOCUS OF THIS EVALUATION—IS BY FAR THE BIGGEST FOCUS.

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TSSP looks after a significant proportion of the national road network. In 2015, the most recent reported year, TSSP completed work on 1,425 km of road; 72 per cent (1,033 km) for maintenance, 27 per cent (378 km) for rehabilitation and one per cent (14 km of approaches to Oro bridges) for new construction.

## MANAGEMENT ARRANGEMENTS

Implementation of TSSP is contracted out through competitive tender to the SMEC International Pty Ltd. A small team in the Australian High Commission manage the program. This consists of two full time Australian and two locally engaged staff and an infrastructure specialist contracted to advise and support the Department.

SMEC provides administrative and management support services, including:

- » recruitment and deployment of long and short-term advisers to support capacity development and provide advice to DoWI and DoTI including by acting as secretariat for the TSCMIC
- » financial and procurement oversight for the program, including sub-contracting of physical works across PNG.

SMEC's contingent of advisers consists of 11 staff in its core management team as well as long-term advisers based in the DoWI (8) and DoTI (3).

<sup>16</sup> Central, East Sepik, West Sepik, Madang, Morobe, Milne Bay, West New Britain, East New Britain, New Ireland, Enga, Oro, Manus and the Autonomous Region of Bougainville.

The program of physical works is managed by four engineering advisers, with the support of project management and supervision consultants who are responsible for direct oversight of physical works in the provinces. The project management and supervision consultants are contracted through DoWI (except for Bougainville, where they are contracted directly to SMEC), but funded by DFAT through a trust account. SMEC is responsible for supporting DoWI's oversight and management of the project management and supervision consultant contracts.

## EVALUATION OBJECTIVE AND PURPOSE

The objective of the evaluation was to assess the positive and negative intended and unintended consequences of the PNG–Australia Transport Sector Support Program (TSSP) and identify areas for improvement.

The purpose of the evaluation was to distil and disseminate learning to inform the approach taken by TSSP over the remainder of its current phase and into the next.

## EVALUATION SCOPE

The evaluation assessed the performance of TSSP since it commenced in 2007 focusing on the land transport component. The evaluation did not cover air and maritime transport, which is also a focus of TSSP.

We originally intended to consider support for land transport provided through the Strongim Gavman Program and the Australian Department of Infrastructure and Regional Development under its MOU with DoTI. However, due to resource constraints, we could not complete this work in the time available.

The evaluation did not consider work under the project to support the Autonomous Bougainville Government, but did consider evidence about the impact of works funded by the Australian Government in Bougainville.

PNG is a high risk environment for corruption, ranked 139 out of 168 countries in the world according to the 2015 Corruptions Perceptions Index. The evaluation did not assess and cannot comment on the adequacy of the systems TSSP has established for managing the risk of fraud and corruption. We note that annual audits are conducted and have revealed no significant adverse findings in recent years.

## EVALUATION QUESTIONS AND METHODOLOGY

Key questions and sub questions for the evaluation are set out in Table 4.

**Table 4: Evaluation questions**

Area of Enquiry	Key Evaluation Questions
<b>Design</b>	<ol style="list-style-type: none"> <li>1. Are the assumptions that underpin the design of the land transport component of TSSP sound?               <ol style="list-style-type: none"> <li>a. Is the prioritisation of effort, including the focus on maintenance of 16 national priority roads and recent emphasis on “higher impact works” optimal?</li> <li>b. Has a whole of sector approach, including through TSCMIC, supported realistic and integrated planning in the land transport sector? Has it contributed to the allocation of GoPNG funding towards a corresponding list of prioritised infrastructure investments (including those related to road maintenance)?</li> <li>c. Has there been a clear, consistent and logical approach to implementation of TSSP?</li> </ol> </li> </ol>
<b>Capacity Development</b>	<ol style="list-style-type: none"> <li>2. What influence has TSSP had on the effectiveness of DoTI, DoWI and the private sector in improving the quality and quantity of land transport budgets and spending?               <ol style="list-style-type: none"> <li>a. Have advisers been successful in strengthening the skills and capabilities of their counterparts and the systems and procedures used by them? How sustainable are these impacts likely to be?</li> <li>b. Has policy, management and technical advice been directed at the areas of greatest need?</li> <li>c. Has there been effective coordination of advisory and training inputs in pursuit of the program’s main goals?</li> <li>d. Has TSSP’s support for physical maintenance works and other projects been successful in demonstrating best practice? Is there evidence of take-up by PNG agencies?</li> <li>e. Has there been sufficient focus in the program on strengthening the role and capabilities of the private sector?</li> </ol> </li> </ol>
<b>Efficiency and impact</b>	<ol style="list-style-type: none"> <li>3. Has TSSP been efficient and effective?               <ol style="list-style-type: none"> <li>a. What have been the positive and negative impacts of roadworks funded by TSSP for women, men, girls and boys in Papua New Guinea?</li> <li>b. What is the quality of TSSP roadworks? Do TSSP roads represent value for money?</li> <li>c. Have gender equality and road safety considerations been adequately addressed?</li> </ol> </li> </ol>
<b>Monitoring and evaluation</b>	<ol style="list-style-type: none"> <li>4. What is the quality of TSSP monitoring and evaluation, including in relation to:               <ol style="list-style-type: none"> <li>a. monitoring of the physical works?</li> <li>b. monitoring of capacity development?</li> <li>c. monitoring of progress against shared commitments and mutual obligations?</li> <li>d. the quality of evaluation and reporting of results?</li> </ol> </li> </ol>

As a project level evaluation, the evaluation was limited in its scope and resources relative to other ODE (strategic) evaluations. Given the short timeframe for the evaluation and limited time in country, evaluation findings and the extent to which definitive answers can be provided to evaluation questions was heavily dependent on existing sources of evidence.

Amongst the various sources of existing data, there was a focus on understanding and compiling data and evidence in three areas.

Firstly, the evaluation focused on understanding the condition of national roads and how this has changed over time using data from DoWI's Road Asset Maintenance System (RAMS) and the road condition data recently collected by DFAT through its Comprehensive Visual Road Condition Survey.

Secondly, the evaluation focused on understanding the composition of PNG Government budgets and expenditure for land transport, including trends in budget allocations and expenditure on maintaining national priority roads and the impact of the recent fiscal challenges.

Thirdly, the evaluation focused on building a picture from the available evidence of whether and how organisational capacities in the land transport sector have been developed by TSSP, including in areas such as policy formulation, planning, budget development, procurement, contract and financial management, and asset management. A key source of evidence for this analysis was interviews with advisers within DoWI and their counterparts. These sought to establish whether, and to what extent and in what contexts, advisers felt they had an influence on the operations of the Department.

Lastly, to support a sound understanding of the operational environment for TSSP, the evaluation team completed field visits to explore issues with on-the-ground implementation of TSSP including constraints associated with DoWI, TSSP and private sector capacity at the provincial level, as well as challenges relating to monitoring project implementation, and managing relationships with local communities. The locations chosen for the field visits and the rationale for their selection are as follows:

- » **Highlands Highway and Ramu Highways:** The evaluation inspected sections of the Highlands and Ramu Highways between Lae and Goroka, and Goroka and Madang, covering road maintenance work conducted in three provinces (Morobe, Madang, and Eastern Highlands). The Highlands Highway is the lifeline of the highlands region which is an important contributor to PNG's agricultural production, and is home to over 30 per cent of the country's population. The Ramu Highway connects Madang to the Highlands Highway and Lae, and is important for sugar and beef production. It has recently been the subject of a major scoping study on upgrading costs and benefits, which was conducted by TSSP in response to a request from the PNG Government, and which formed part of the Joint Understanding, signed in late 2013.<sup>17</sup>
- » **Oro Bridges Reconstruction Project:** The second visit assessed the work TSSP has supported to design and construct four bridges in Oro Province after Cyclone Guba destroyed most of the bridges and caused significant damage to other infrastructure in 2007. While the origins of the project pre-date the commitment to increase the emphasis on 'high impact, complex capital works', they are a good example of exactly that, and provided a basis for exploring questions about the potential costs and benefits of a possible move away from routine maintenance.
- » **Bougainville:** The Autonomous Region of Bougainville has received by far the most significant share of TSSP's funding relative to other PNG Provinces. Given the long history of Australian funding of road works in Bougainville, visiting Bougainville provided an opportunity to consider the economic and social impacts of road maintenance spending. The success in Bougainville of recruiting women to conduct labour-intensive road maintenance works also provided an insight into the impact of the project in promoting gender equality, and whether this can be used as a model in other provinces.

<sup>17</sup> The Joint Understanding was an agreement that was struck in the context of a Regional Resettlement Arrangement, an agreement made with PNG under the Rudd Labor Government in June 2013. In it, an additional AUD420 million of aid was committed to a range of (mostly infrastructure) investments.

## CONSTRAINTS AND LIMITATIONS

The evaluation was conducted in a short timeframe with a limited number of days in-country (2 weeks). To complete the evaluation in the required time, the team adopted a targeted approach to document review and interviews, with limited opportunity to deviate from the evaluation plan. Primary data collection was limited to data obtained through interviews, which were used to provide a picture of the perceptions of different stakeholders of the program and identify key data sources to substantiate findings and conclusions. There was necessarily a heavy reliance on secondary source documentation with interviews and site visits used to support accurate interpretation of these sources, and to verify their reliability. In particular:

- » In assessing value for money we depended on economic analysis conducted by the project. Given the intrinsic logic of routine maintenance from a cost-benefit perspective, this is not a major limitation for projects focused in routine maintenance. However, it was a more significant limitation for major projects, including road upgrades and the Oro Bridges project, which have not been subject to standard economic analyses.
- » We relied on secondary sources to provide a picture of the impact of the project on beneficiaries, with particular attention paid to the socio-economic impact and qualitative impact assessments and case study reports, which all involved extensive consultation with affected communities. Meaningful consultation with beneficiaries was not feasible within time constraints.
- » We tried to establish whether and how the condition of PNG's national road network has changed over the past 10+ years, focusing specifically on the 16 national priority roads that are the focus of agreed TSSP targets. However, our ability to do so was constrained by the unreliability of historical road condition data, which meant we were limited to anecdotal evidence to answer this critical question.



## CHAPTER 3: DESIGN

### THIS CHAPTER CONSIDERS THE DESIGN OF TSSP'S LAND TRANSPORT COMPONENT.

It addresses the following questions:

- » Are the assumptions that underpin the design of the land transport component of TSSP sound?
- » Is the prioritisation of effort, including the focus on maintenance of 16 national priority roads and shift away from maintenance to “higher impact, complex capital works” optimal?
- » Has a whole of sector approach, including through TSCMIC, supported realistic and integrated planning in the land transport sector? Has it contributed to the allocation of GoPNG funding towards a corresponding list of prioritised infrastructure investments (including those related to road maintenance)?
- » Has there been a clear, consistent and logical approach to implementation of TSSP?

### OBJECTIVES AND PRIORITIES

#### Objectives and targets

TSSP's high-level objectives have focused on delivery of transport infrastructure since the program's establishment. Phase 2 objectives relevant to land transport infrastructure include the maintenance of land transport assets (TSSP component 1 objective), and effective agency and sector engagement, performance and accountability (TSSP component 3 objective). The focus of these objectives is appropriate for a program like TSSP. However, many of the targets that they establish are not realistic.

Over-ambition is most evident in the component 1 objective, which aims by 2023 for:

*PNG agencies (to) deliver a sustainable maintenance program with predictable PNG Government funding to maintain 75 per cent of priority national roads in good condition.*

This target replaced an even more ambitious target—to have 100 per cent of national priority roads in good condition. Both targets were drawn from PNG Government policies.

Considering that just 15 per cent of national roads are currently in good condition, these targets were far too optimistic. Improvements against both targets were gauged by using RAMS data which was of poor quality, leading the PNG and Australian Governments to believe that national roads were in a much better condition than was the case.

It is important to note that optimistic assumptions made in the design of TSSP have not undermined the overall objectives of the land transport components of the program—to maintain land transport assets and improve PNG Government performance in the sector. These objectives are sound, despite excessively optimistic targets. However, assumptions have reduced transparency and accountability, as realistic targets against which performance can be measured are not specified. Taking this into account, one of the challenges for the program going forward is to establish a more realistic set of joint objectives that provide a basis for policy dialogue and mutual accountability. This problem is well recognised by DFAT's PNG program, which has worked to reframe objectives and performance frameworks so that they are expressed in terms that are within Australia's direct control.<sup>18</sup> DFAT's PNG program has also advised that DoWI also recognises this problem, and that TSSP is supporting it with more realistic planning in the future through the development of a new Medium Term Transport Plan.

<sup>18</sup> The Australia–PNG Aid Investment Plan states Australia's objectives for land transport in terms of distance (km) of roads that are subject to design/routine maintenance/periodic maintenance and rehabilitation annually.

Some important assumptions in the design of TSSP contributed to excessive optimism regarding what the program could realistically achieve. Most of these can be

categorised as relating to either: (a) the actions of the PNG Government, or (b) Australia's position in, and relationship with, Papua New Guinea (see Box 2).

## Box 2 Design Assumptions

Critical assumptions identified in the Design and Implementation Framework of TSSP (Phase 2) include the following:

### (a) Actions of the PNG Government

The TSSP design notes the crucial role played by the PNG Government in achieving TSSP objectives. Critical assumptions for component 1 involve meeting Transport Schedule funding targets, which in 2016–17, include the PNG Government allocating “sufficient funding to maintain the asset value of land, aviation and maritime transport infrastructure”—a requirement that is both vague and overambitious given current fiscal challenges. Critical assumptions for component 3 are similar. These include:

- » Budget resources are available for implementation of the NTS and MTDP
- » PNG Government national and transport sector policy documents set a realistic and integrated agenda
- » A well prepared, coordinated and promoted transport sector development budget submission will result in an increased level of funding to the appropriate agencies for projects prioritised by the sector.

None of these assumptions has held, and even considering the better fiscal position of the PNG Government at the time DFAT completed the TSSP Phase 2 design, they were not realistic.

### (b) Australia's position in, and relationship with, Papua New Guinea

The design of TSSP's second phase describes Australia's role in achieving TSSP objectives in terms of both support provided, and through the promotion of reform in the PNG Government. Component 3 therefore assumes that Australia “is able to deploy sufficient resources at Post to achieve the depth of policy dialogue required.” It notes that the “success of the component will be determined by whether:

- » AusAID-led dialogue with PNG Government politicians and senior public servants is taking place on a small set of targeted institutional and systematic reform priorities, informed by performance information and analysis, resulting in efficiency improvements.
- » AusAID is staffed to support effective dialogue and engagement at all levels and to participate in joint sector performance reviews with PNG Government, discussing priorities and funding, institutional blockages and new developments.
- » Performance-linked funds can be mobilised to support improvements in the sector.”

The first two of these assumptions have held, but without the desired impact. The High Commission and TSSP have engaged in regular dialogue with PNG Government officials, including in the context of the inter Departmental Transport Sector Coordination, Monitoring, and Implementation Committee. DFAT's PNG program informed us that this dialogue is robust, and we can attest that it is supported by rigorous analysis of PNG budget settings, institutional arrangements and implementation challenges in the sector. However, this has largely failed to influence the decisions made by political actors. Thus far, the third assumption, that performance-linked-funds can be mobilised to support improvements in the sector has also not held.

## Prioritisation

TSSP's core focus has been to support maintenance of the national road network, and within this, national priority roads—4,300km of the national road network that provides the greatest economic and social benefit to the country. Non-national roads, which are the responsibility of sub-national levels of government, are not a focus of TSSP. While acknowledging this is a gap, ODE considers restricting support to national roads, with particular emphasis on national priority roads, is appropriate for TSSP given its resource envelope and the current fiscal environment. Attempting to support sub-national levels of government to maintain non-national roads would spread TSSP resources too thinly and reduce the program's overall effectiveness. That said, if circumstances change, such as if the TSSP program budget were to double, co-financing of work with districts or provincial governments may be worth considering. This approach has been explored recently in a limited way by the ADB.<sup>19</sup>

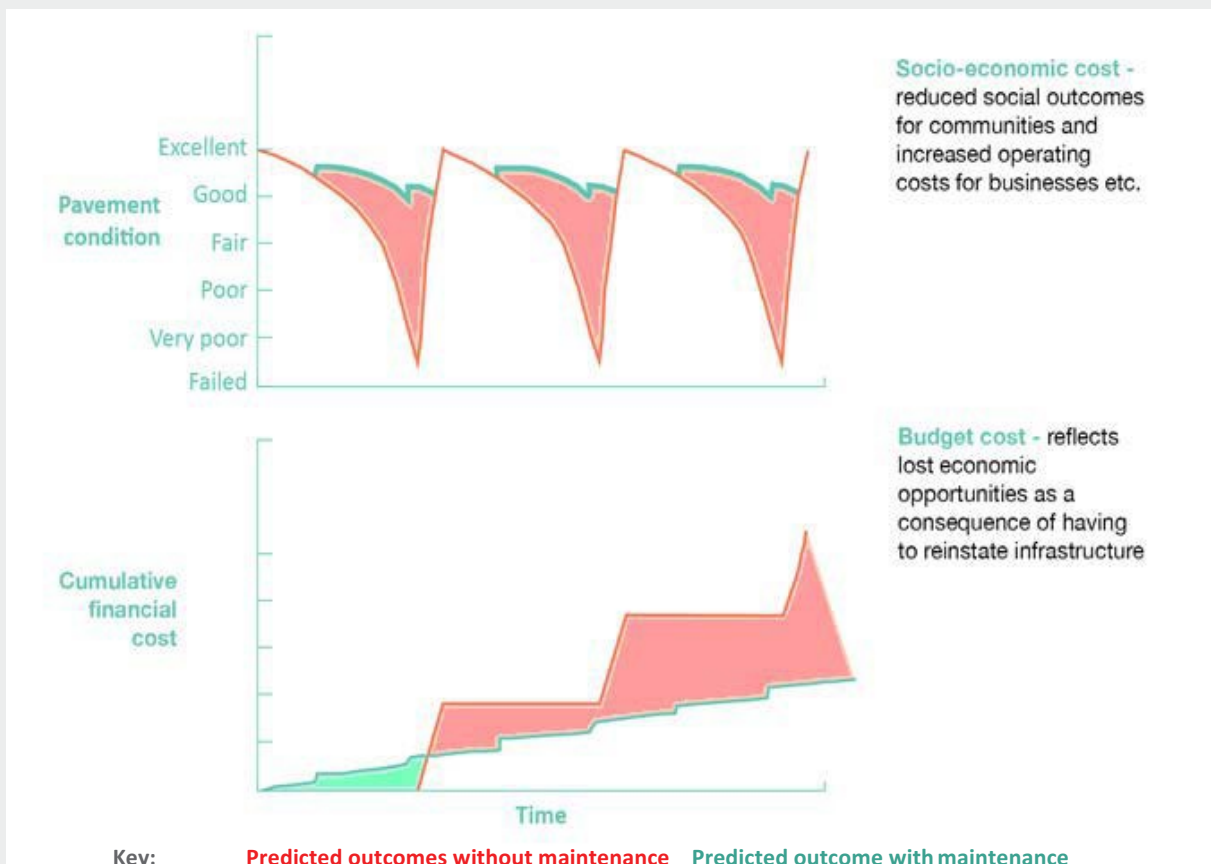
The logic of the focus on maintenance is that it provides a much better return on investment than new capital investments (Box 3). By focusing on road maintenance, TSSP aims to address the hugely costly culture of 'build, neglect, rebuild,' which is present across the Pacific, and which has been evident for decades in PNG's road sector.<sup>20</sup>

19 Asian Development Bank, 2016, *Wok Bung Wantaim: Using Subnational Government Partnerships to Improve Infrastructure Implementation in Papua New Guinea*.

20 Pacific Regional Infrastructure Facility, (2013), *Infrastructure Maintenance in the Pacific: Challenging the Build-Neglect-Rebuild Paradigm*.

### Box 3 Logic of road maintenance

The logic of preventative or routine infrastructure maintenance is well established. Routine maintenance, on average, offers economic returns that are considerably higher than investment in new infrastructure. For road infrastructure, the World Bank in its Transport Note of 2005 estimates that the cost of deferring routine maintenance of a sealed road is equivalent to 6 times the total cost of that maintenance after three years of neglect, and 18 times that cost after 5 years of neglect. These are the costs to the budget only. The socio-economic cost also needs to be considered. While these costs increase slowly initially, typically in the form of vehicle wear and tear, they rise exponentially when the road is in such poor condition that travel times are significantly extended, or when the road is no longer accessible to certain vehicles or in wet weather.



The benefits of maintenance relative to new road construction were confirmed in PNG through the Transport Infrastructure Prioritisation Study, which was funded by TSSP and completed in 2010–11 and is a good example of the important analytical work that has been supported by TSSP. That study sought to assess transport sector projects on the basis of their economic and social benefit relative to their cost. Its key finding is that projects for the preservation and upgrading of existing assets yielded far higher net benefits than new projects.

Of the 30 projects that were assessed as producing the highest benefit-cost ratio, all involved routine maintenance only, with benefit-cost ratios (BCRs) ranging from 12 to 3.2. These compare extremely favourably with the 16 'missing link' roads identified in the MTDP for construction, of which only five are identified by the NTS as having a BCR above 1 (and all but one have a BCR below 1.81).

Since 2013, there has been a move to broaden TSSP's focus to support 'high impact, complex capital works.' This was part of a commitment made at that time to increase spending on infrastructure from 37 per cent to 50 per cent of Australian aid to PNG by 2017, a commitment made in support of the PNG Government's focus on infrastructure-driven development. As part of this agreement, Australia also committed to establish a new 'Economic Infrastructure Advice Facility' to advise the PNG Government on infrastructure policy.<sup>21</sup> This program is currently under design and is expected to be established during 2017.

The push for 'high impact, complex capital works' has been driven by the PNG Government's emphasis on infrastructure development, and the Australian Government's stated desire to transition out of service delivery. In PNG, this emphasis developed during the period of high economic growth, when the budget envelope for infrastructure expanded at a rapid pace. Budget allocations for maintenance rose during this period, and so it was argued that TSSP should be refocused.

The economic climate in PNG has shifted considerably since 2014. The fall in commodity prices has produced an extreme revenue shock for PNG's budget, with the government slashing expenditure as a result. Funding for infrastructure has fallen by 60 per cent in three years, which has affected maintenance spending.

On paper at least, these considerations do not appear to have affected the agreed focus on high impact projects. The 2015–16 to 2017–18 Aid Investment Plan for PNG states that:

*As PNG moves towards larger scale infrastructure investments we aim to move towards a greater focus on provision of infrastructure policy and analytical support. Recognising PNG's growing capacity to provide routine road maintenance services, this will be accompanied by an increased focus on high impact, complex capital works.*

More recently, the 2016–17 Partnership agreement schedule states that:

*GoA will continue its transition from routine maintenance to funding larger, more complex transport infrastructure projects selected based on mutually determined priorities and available budget.*

One of four principles that guided the development of the current workplan was:

*[A] focus on higher value works in fewer provinces in order to shift out of routine maintenance as a function of basic service delivery.*

In the current funding environment, where money for maintenance is so desperately lacking, this shift in focus toward 'high impact, complex capital works' does not represent value for money for the Australian aid program. The shift, together with usage of the term 'high impact' to describe capital projects, threatens to undermine years of good work undertaken by TSSP to embed a 'maintenance first' approach to road management in PNG. That approach rightly argues that routine maintenance is 'high impact' and represents value for money. It is important that this focus on routine maintenance continues in the future. Despite the partnership agreement commitments described above, we note that this is the case in TSSP's current workplan. Future Aid Investment Plans and Partnership Agreements should reflect this.

21 A New Direction for Australian Aid in PNG: Refocusing Australian Aid to Help Unlock PNG's Economic Potential.

## PLANNING AND FUNDING

An important focus of TSSP has been improved planning in the transport sector, and related to this, securing sufficient funding for the sector through the PNG budget. TSSP has provided secretariat support for TSCMIC, and has assisted in the development of an integrated sector budgeting framework. Within sector agencies, including DoWI, it has promoted rational, evidence-based planning, with a strong focus on 'maintenance first' in the land transport sector. This support has influenced national planning. The importance of road maintenance has been acknowledged by successive PNG Governments and is reflected in relevant planning and policy statements. Within DoTI and DoWI, there is widespread acceptance of the value of good planning, and of the need to spend more on routine maintenance. There have been improvements in some areas. There is evidence that budget submissions are more focused (fewer projects in excess of the expected funding envelope are now included in budget submissions).<sup>22</sup> The Road Fund levy (see Box 1) has been extended to imported diesel in the 2017 budget. PNG's National Executive Council has also recently endorsed a plan to expand the use of tax credits from the private sector to fund restorative road maintenance and upgrades.<sup>23</sup>

Without wanting to diminish these hard won achievements, we are of the view that their impact on the overall land transport sector has been limited. Planning in the land transport sector continues to lack realism: the annualised cost of achieving goals established by the PNG Government over the next five years is PGK2.43 billion, which compares to average annual expenditure on roads since 2008 of a little over PGK400 million. The policy direction set by transport plans has also often not been followed (see Chapter 1 for a discussion). There is not much evidence that better budget submissions have translated into better budget outcomes. While welcome, changes to the tax credit scheme and the Road Fund<sup>24</sup> will not resolve the chronic underfunding of maintenance of the national road network. Expenditure on road maintenance continues to be insufficient and inadequately prioritised.

The ambition of adequately maintaining PNG's extensive road network should nevertheless be borne in mind. Even with optimal prioritisation and effective institutions, the resources available to spend on roads are very small. To underline this point, Fiji spends approximately twice what PNG does on road infrastructure, despite having 3,400km of roads relative to PNG's national network of almost 9,000km. Moreover, the improvements in the quality of PNG institutions that will be required to get better outcomes from existing resources will take decades rather than years. Continuing to advocate for improved allocation of budget resources and better implementation is a worthwhile endeavour, but it should be viewed as a long-term engagement. TSSP objectives should be framed accordingly.

### Funding levels

PNG Government policy statements recognise the importance of road maintenance. However, this has not translated into sufficient funding for maintenance. The extent of underfunding can be gauged by looking at a recent TSSP-funded *Roadwork Strategic Planning and Programming Study*, which includes detailed analysis of funding needs for road maintenance in PNG. The report, which is focused on national priority roads, concludes that for the PNG Government to meet its MTDP target of achieving good condition for 100 per cent of all national roads by 2030 (with 50 per cent in a good condition by 2017), expenditure would need to total PGK14.2 billion over 2016–20, or PGK2.9 billion annually over four years. In 2015, expenditure was less than PGK300 million.

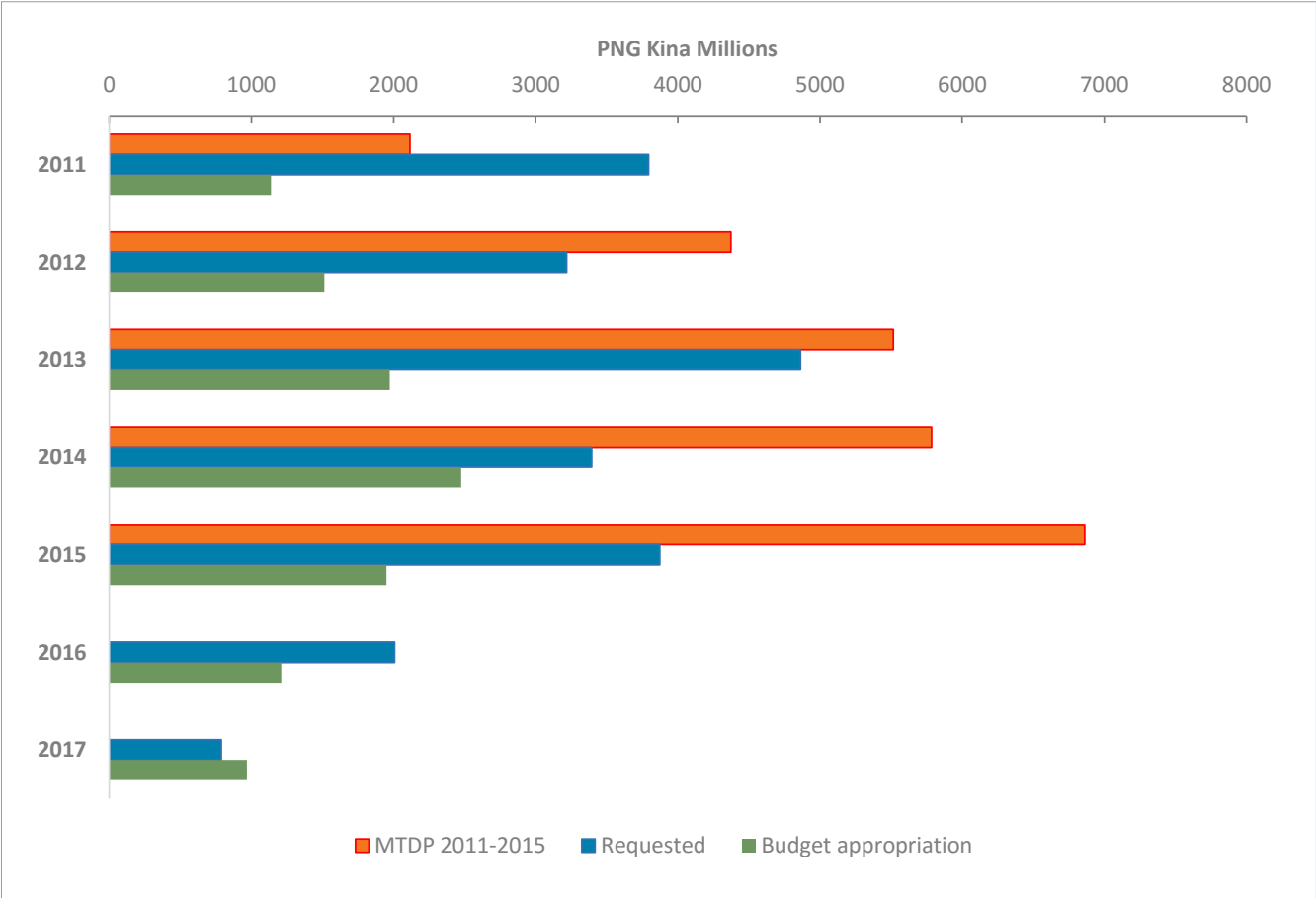
The scale of underfunding in the transport sector is also evident when comparing historical budget allocations against the targets established by the MTDP (Figure 6). Funding allocated in the budget has never reached 50 per cent of what would be required for these targets to be met, and in the medium term, is set to decline considerably given budgetary pressures (Box 4). Funding for the sector has fallen 60 per cent since its peak in 2014 when considering the 2017 budget.

22 The transport sector's 2015 budget submission included 99 projects in excess of the expected funding envelope and received funding for just 4 per cent. For the 2016 budget the excess projects numbered just 21 and 73 per cent of these received funding.

23 PNG's tax credit scheme enables businesses to claim a credit (up to a set limit) against tax payable on assessable income for contributions they make to the maintenance of essential infrastructure.

24 Changes to the Road Fund are explained in Box 1.

**Figure 6: Transport sector funding requirements, budget submission requests, and appropriations**



Source: Department of Transport and Infrastructure, Planning and Coordination Division

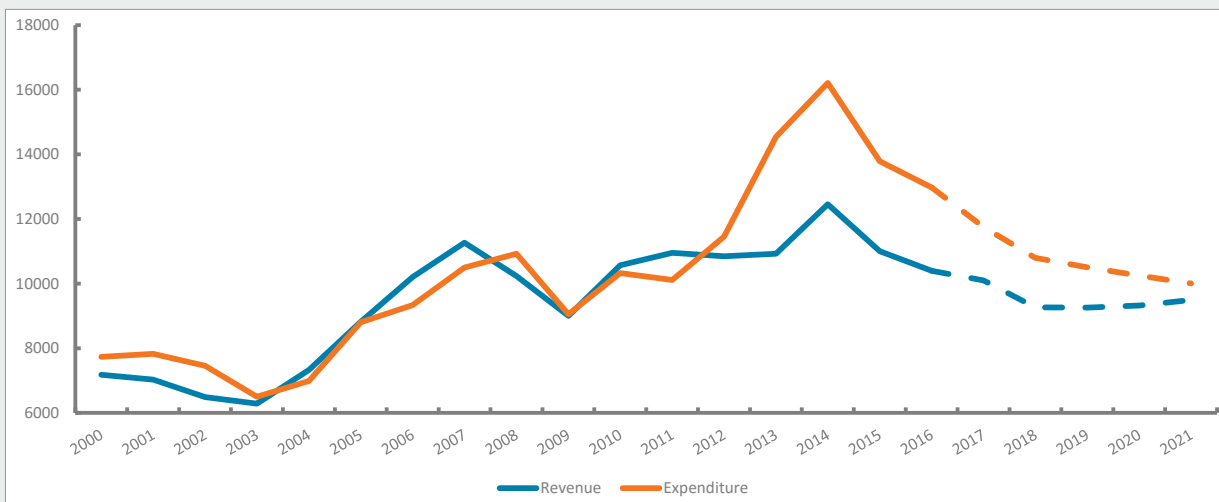
Notes: The MTDP 2016–17 does not provide funding requirements for its objectives. The National Transport Strategy does not provide annual estimates of required funding, but it does provide an estimate for the 2016–20 period of 14,825 million.

#### Box 4 PNG's fiscal challenge

The PNG economy has experienced considerable change in the last 10 years. A resource sector boom, driven in large part by the development of a USD19 billion Liquefied Natural Gas (LNG) project, saw the economy double in size between 2004 and 2014. Since then, a collapse in commodity prices has seen growth stagnate. GDP growth declined from an annual rate of more than 12 per cent in 2014 and 2015, to less than 3 per cent in 2016. The forward estimates indicate that growth below 3 per cent will continue through to 2021. Non-mineral GDP per capita has actually declined, owing to reduced investment and cuts in government spending.<sup>25</sup>

The decline in economic fortunes has significant fiscal implications for the PNG Government. Government revenue doubled in the decade-long boom to 2014. Expenditure rose slowly at first, but then very rapidly, as the Government borrowed against future LNG revenue earnings (see Figure 7). The subsequent decline in commodity prices, together with lower investment linked with the end of the construction phase of the LNG project, has adversely affected Government revenue. Revenue now is below that received in 2006, despite a population that is 25 per cent larger. PNG Treasury expects revenue to decline further in the future, with budget projections indicating that revenue per capita will fall below 2004 levels.

**Figure 7: PNG Government expenditure and revenue, real (2015) Kina, millions**



Source: PNG Government budget documents

The PNG Government has made significant cuts to expenditure in response to revenue pressures. In real terms, the 2017 budget produced cuts to health spending of 29 per cent, to education spending of 18 per cent, and to transport of 35 per cent when compared to the original 2016 budget. The only spending areas to be protected are the salaries of civil servants, and Service Improvement Program funds allocated toward the constituencies of Members of Parliament. The forward estimates indicate that government expenditure will continue to decline through to 2021, despite a rapidly growing population.

25 Non-mineral GDP is a better measure of welfare than overall GDP in PNG, as it excludes mining and LNG projects that have very little impact on the income and employment of ordinary Papua New Guineans.



## Funding allocations

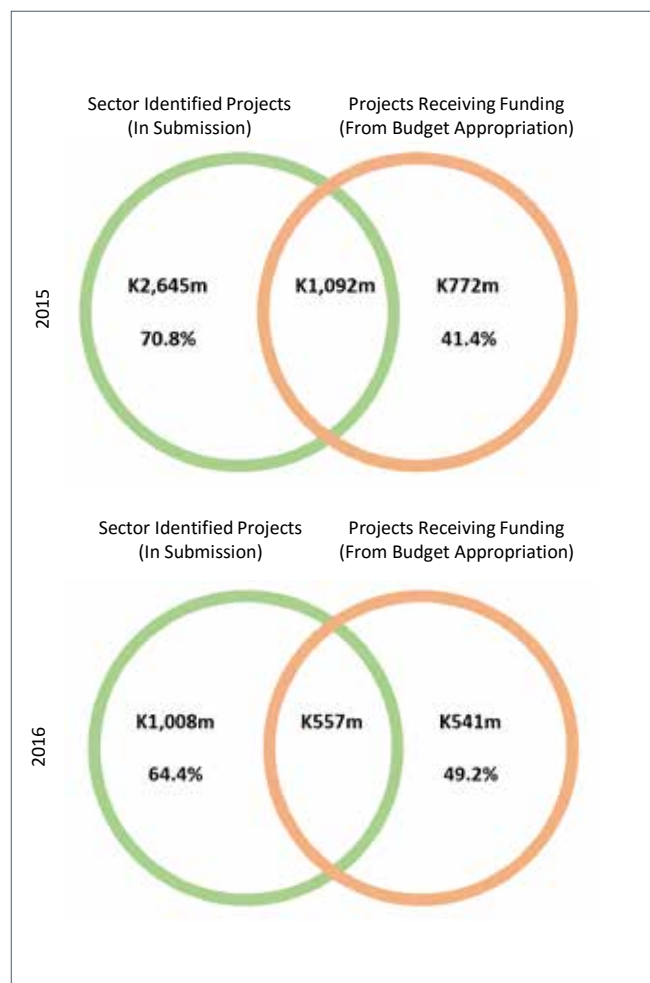
The funding challenges faced in the transport sector are not confined to the overall funding envelope. Funding that is appropriated to the sector is frequently directed toward projects not put forward in sector budget submissions. This occurs both during preparation of the budget, and afterwards, where budget allocations are often not used for intended purposes.

This is evident when considering the alignment of budget outcomes with submissions from sector agencies (Figure 8). In 2016, 64 per cent of the transport sector budget submission went unfunded, an improvement on the 71 per cent that went unfunded the previous year. At the same time, 43 per cent of projects that were funded were not submitted by the sector (41 per cent in 2015). While reflecting the understandable desires of the PNG Government to connect its road networks and provide access to constituents, these budget decisions have reduced the availability of scarce public resources from where they can be most effectively spent – on the maintenance of PNG's most important roads.

Even when funding is secured for routine maintenance in the budget, it is not necessarily safe. One problem is that funding for routine maintenance is used instead for emergency restorative works, given the absence of a budget for the latter. This explains DoWI's previous practice of requesting routine maintenance funding be included in the development budget rather than the recurrent budget, as the latter can be redirected more readily.

In 2015, funding for emergency works was introduced for the first time, in an effort to address this problem. It was cut in the 2016 budget. Another problem occurs with the process for approving large-scale projects (over K10 million in value) which requires National Executive Council approval. This step often leads to changes in the scope of projects, with additional works or redirection of maintenance funding toward new road construction not uncommon.

**Figure 8: Alignment of Appropriations with Sector submission (Capital plus Operational Maintenance)**



Source: TSSP budget analysis.

TSSP's initial design envisaged that these problems would be circumvented through an annual prioritisation linked to GoPNG's budgetary and planning processes, with DFAT funds matched by GoPNG contributions. This was described as follows:

*A funding facility will support prioritised transport infrastructure maintenance for which GoPNG has clearly budgeted and appropriated funds. In these cases, AusAID will provide matching funds according to a formula to be discussed and agreed prior to program inception.*

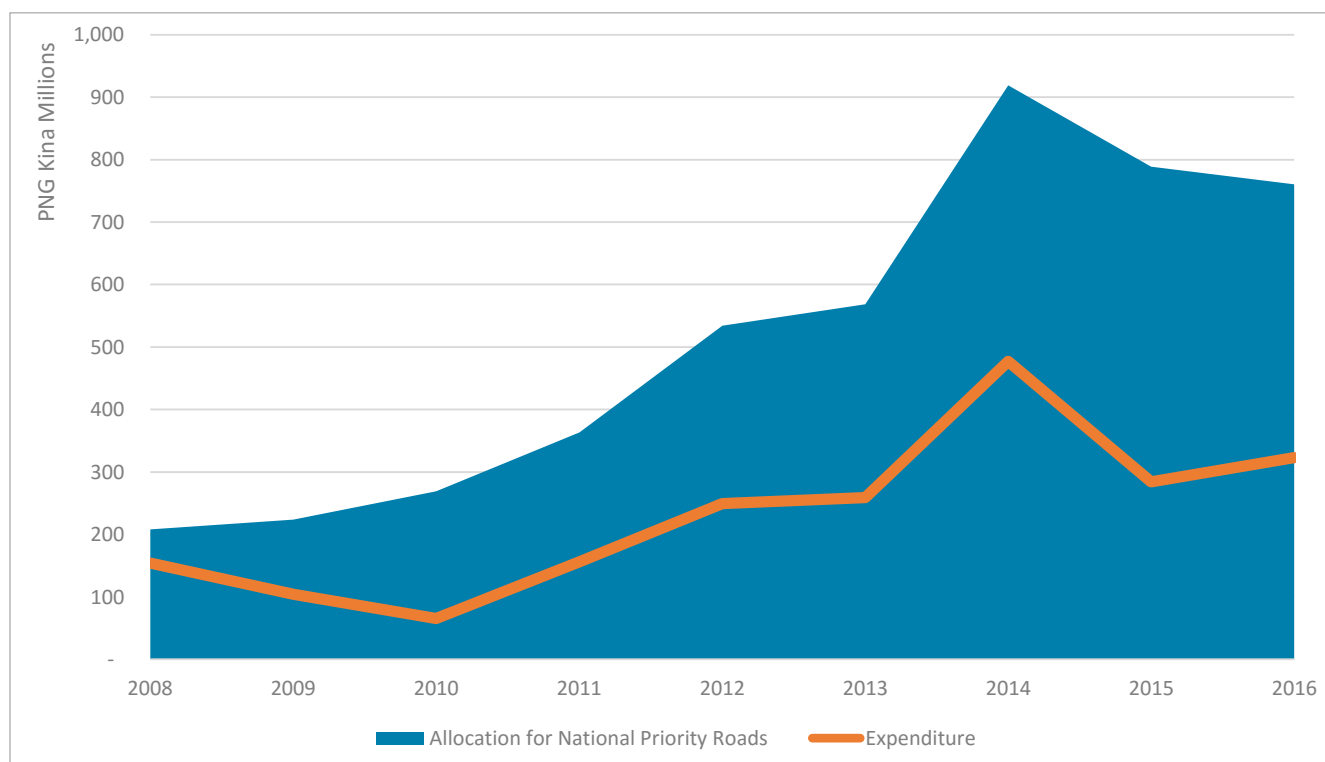
In practice, the PNG Government has not provided counterpart funds.

In summary, TSSP advisers have been diligent in strengthening the quality of budget submissions, and analysing and documenting the quality of budget outcomes, but have only had a modest influence on the quality of those outcomes.

### Expenditure

Compounding the problem of misalignment between budget submissions and budget outcomes is a significant annual underspend, with expenditure typically only 50 per cent of what is allocated in the budget. The impact of this on expenditure for national priority roads is evident in Figure 9.

**Figure 9: Appropriation and expenditure on national priority roads**



Source: DoWI

There are various reasons for this underspend, some of which relate to the transport sector, and some of which represent problems with the broader public financial management system in PNG. External factors that influence the timeliness of spending include conflict with landowners, the variable quality of contractors, and scarcity of foreign exchange. Within the PNG Government, a lack of budget discipline means there are major under and over spends across different entities in the Government. The tender approval process and late issuance of warrants by the Ministry of Finance also have an impact.<sup>26</sup> Further, it is a challenge to spend money on unsolicited projects approved in the budget process as such projects generally require 6–12 months scoping and planning.

The process for approving contracts over PGK500,000 in value is also extremely time-consuming. DoWI estimates that, on average, 60 weeks are required for a contract to be prepared, advertised, approved, and awarded by the Central Supply and Tenders Board. State Solicitor approval is also required, and where contracts are over PGK10 million in value, National Executive Council approval must be granted.

Finally, there are significant mismatches between what money is spent on and what it is directed toward in the budget. In 2013, the PNG Auditor-General's Office noted "significant weaknesses in the control framework" of DoWI, with:

*[C]ontrol activities such as delegations, authorisations, reconciliations, data and payroll processing and management monitoring (deemed) not sufficiently robust to prevent, detect, or correct error or fraud.*

The same report notes discrepancies in DoWI (not TSSP) accounts, including:

*22 payments totalling K30,080,847 (that) were made to suppliers/contractors where no prior contract agreements for the services provided before funds were released, (and) no documentations were attached as proof to validate the execution of the payments.*

The PNG Auditor General has routinely produced adverse opinions on the quality of PNG Government financial statements, including those produced by DoWI. These mean that PNG Government financial statements are likely to contain material errors and cannot be relied upon to provide an accurate picture of spending in the sector.

## TSSP FUNDING

A combination of factors has created uncertainty about the availability of Australian aid resources for TSSP's road maintenance program. This has caused delays in delivery, and made it difficult to achieve a clear and consistent program of works and model of delivery in line with the intentions of the project design and contract.

The first source of uncertainty arose from a sequence of reductions to Australia's aid budget that occurred after the second phase of TSSP was designed. The major event in this respect was the Government's decision in May 2014 to discontinue the scaling up of aid to 0.05 of GNI, as a result of which the planned budget ceiling for the project was scaled back from AUD500 million to AUD400 million over five years. While this was a significant cut, the revised ceiling still allowed for historically high levels of spending on PNG's land transport infrastructure compared to previous spending levels (AUD80 million per annum compared to AUD65 million annual expenditure over the 10 years to 2015–16). This, and the fact that the reductions occurred prior to contracting the project meant the operational impact of these cuts was negligible, although the reduced scale of the project did make it more difficult to achieve the already too ambitious objectives established in the design document.

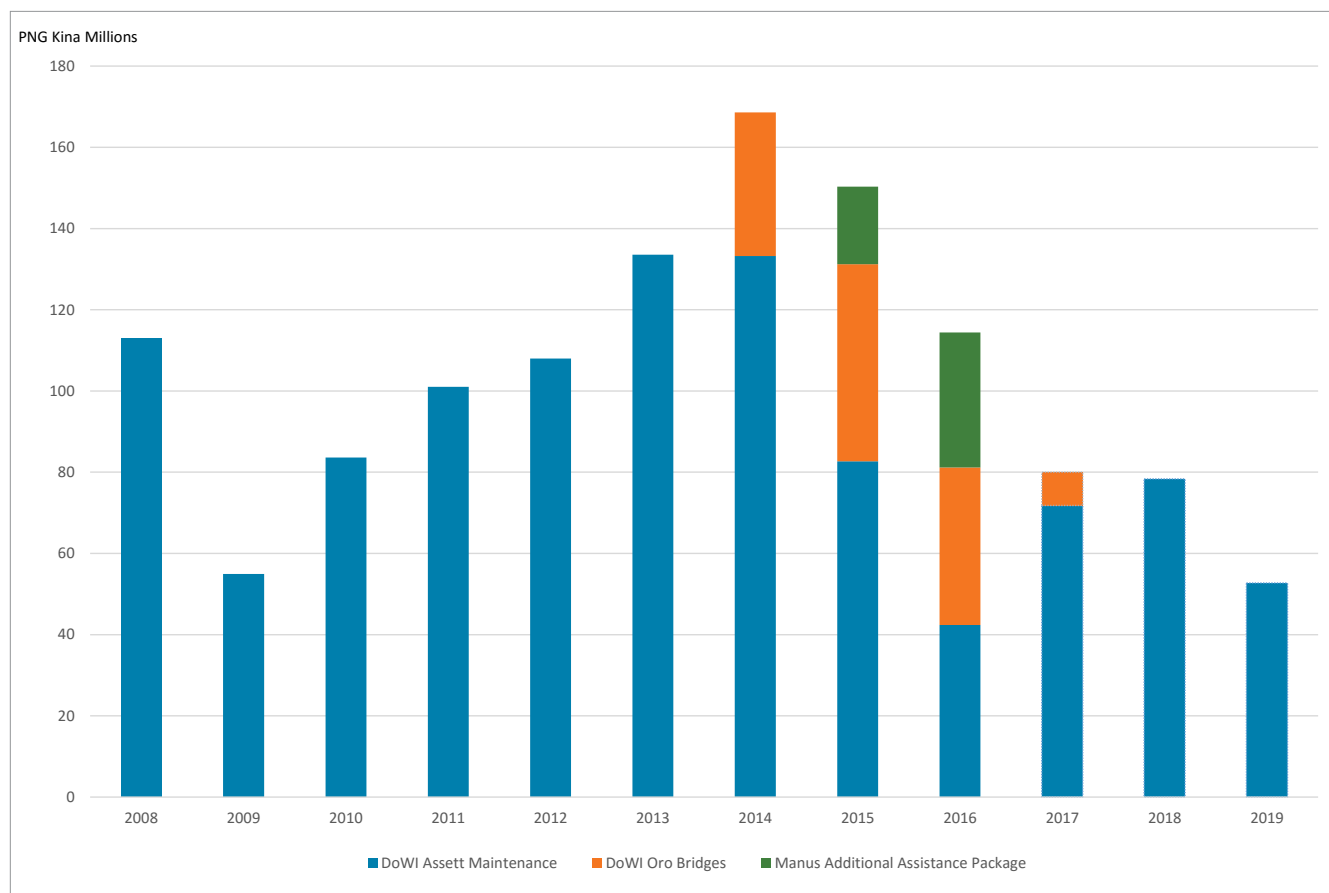
The second source of uncertainty arose from the need to accommodate capital commitments within established budget ceilings. This included the long-standing commitment to the Oro Bridges project, which was made in 2007, but was not contracted until 2012, and commitments that are more recent made under the Manus additional assistance package (Figure 10).

<sup>26</sup> For example, as of 30 June 2016, halfway through PNG's financial year, DoWI had received warrants equal to only 35 per cent of its budget appropriation for the year. Of these warrants, only 63 per cent had been spent (often owing to money not being made available in the bank), meaning spending to 30 June was only equal to 22 per cent of the year's budget appropriation.



TSSP has delivered on Australia's commitments under the Manus additional assistance package. This includes an upgrade of the Momote to Lorengau Road and of roads adjoining the Lorengau Market.

**Figure 10: TSSP expenditure 2008 to 2016 and projections to 2019, current (2015) prices**



Note: Excludes road maintenance expenditure in Bougainville and technical assistance expenditure. 2017, 2018 and 2019 figures are projections. 2019 projection is for a half year only.

The need to accommodate these within existing budget ceilings resulted in a cut of close to 70 per cent in spending on maintenance through the DoWI account in 2016 against 2013 and 2014 spending levels. As is discussed above, this has occurred at a time when there have been significant cuts to the DoWI budgets, which have significantly compounded spending pressures in the land transport sector. Expenditure on national priority roads fell from PGK477 million to PGK284 million between 2014 and 2015, and will fall further given lower budget appropriations going forward from 2016. Lower levels of TSSP spending on national priority roads through the DoWI asset maintenance accounted for 27 per cent of the PGK193 million fall in spending on national priority roads in 2015. While TSSP is not responsible for funding DoWI, this underlines the importance of predictability of funding allocations.

The final source of uncertainty has arisen from budget pressures across the PNG program, which have placed

significant downward pressures on TSSP forward budget projections. The need to accommodate a range of budget commitments from across the program have forced a further reduction in TSSP’s budget ceiling from AUD400 million to AUD350 million. The future impact of these budget pressures on TSSP’s ability to support DoWI’s asset management between 2017 and 2019 is shown in Figure 10.

These budget pressures have had important consequences for TSSP’s future road maintenance program. The first is that the need to accommodate two large capital projects has taken the project away from its core emphasis on routine maintenance and demonstrating the effectiveness of different models for this. While this discontinuity has been managed well, it is not ideal.

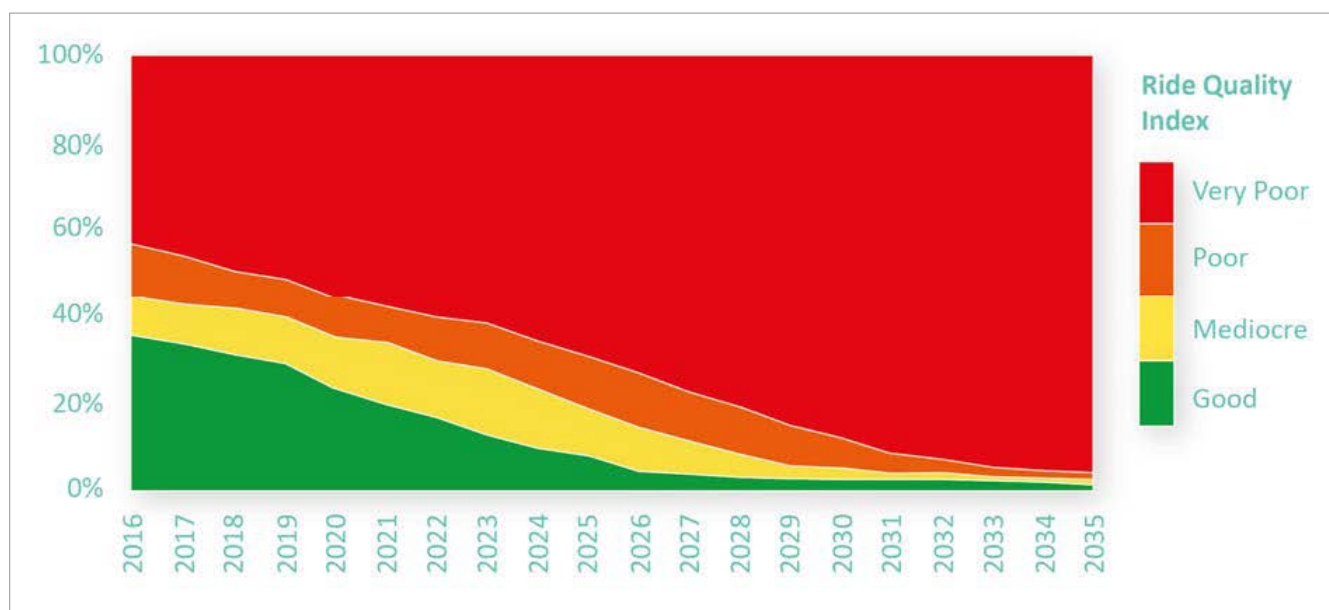
The second consequence is that the program that has consistently been rated as PNG’s best performing program has not had sufficient funds for it to pursue its core objective—maintenance of national roads.<sup>27</sup>

27 Transport has been one of the only sectors that has received a green rating for progress in PNG’s last four annual program performance reports.

The third implication is that this has occurred at a time when TSSP's contributions to maintenance of PNG's national roads have become more important. The reductions to TSSP's funding come at a time when the capacity of the PNG Government to maintain this infrastructure is severely constrained. Figure 11 shows starkly how road conditions

over the sealed portion of the priority national network are predicted to decline if levels of Government funding continue at their present rate, a projection contained in a major study commissioned by TSSP in 2015. The economic and social costs of this scenario would be prohibitive.

**Figure 11: Predicted condition of priority sealed roads with continuation of current funding levels**



Source: Roadwork, Strategic Planning and Programming Study, Australian Road Research Board, 2015

## ROAD CONDITIONS IN PNG ARE EXPECTED TO DECLINE UNACCEPTABLY AS A RESULT OF INADEQUATE FUNDING IN THE NEAR FUTURE, BASED ON BUDGET PROJECTIONS.

### FINDINGS

Although the overall objectives of TSSP are appropriate, many of the program's assumptions and targets are not realistic. This has reduced accountability, as targets against which performance can be measured are not specified.

The main focus of TSSP since it commenced has been to support maintenance of the national road network, and within this, national priority roads. This focus is sound, and represents the best value for money for TSSP. Moves since 2013 away from routine and periodic maintenance to 'high-impact, complex capital works' should be reconsidered given the ongoing underfunding of road maintenance in PNG. Noting that 'high-impact, complex capital works' are not a feature of TSSP's current workplan, future Aid Investment Plans and Partnership Agreements should reflect this.

Despite TSSP support for improved sectoral planning and budget preparation, there is still widespread underfunding of the sector and the allocation of PNG budget resources to non-priority areas (areas that have poor rates of social and economic return compared to alternatives).

Road conditions in PNG are expected to decline unacceptably as a result of inadequate funding in the near future, based on budget projections. This has a number of implications for TSSP:

- » TSSP efforts to secure funding for priority roads in the national budget should continue, although the long-term nature of this engagement must also be recognised.
- » At a minimum, TSSP should provide stable and predictable funding for road maintenance.

### Recommendation 1

To maximise the benefits of TSSP's contribution to preserving and building PNG's most important piece of economic infrastructure DFAT should:

- » reaffirm maintenance of the national road network as the best value for money use of TSSP resources, and within this, emphasise national priority roads as the program's main land component priority. Recent moves toward using TSSP resources to support 'high impact, complex capital works' should be reversed until there is genuine evidence that the PNG Government is able to look after routine maintenance of existing land transport infrastructure
- » provide a stable and predictable source of multi-year funding for road maintenance
- » fund an independent expenditure tracking study in the roads sector (as has already been undertaken in the health and education sectors) to address the lack of reliable information on the focus of spending on roads by different levels of Government in PNG. This would be in addition to, and supportive of, TSSP's continued efforts to increase transparency of PNG's expenditure on its road network.



THESE CHALLENGES  
ARE JUST AS RELEVANT  
TODAY AS THEY WERE  
TEN YEARS AGO.



## CHAPTER 4: CAPACITY DEVELOPMENT

In 2005, the design of TSSP's first phase identified the many capacity-development challenges it would face. These included an inability to mobilise adequate financial resources; difficulties in spending allocated funds; lack of clarity over policies and institutional structure; weak leadership; poor reporting, financial management and lack of accountability; the limited capacity of private contractors; outdated and inefficient procurement rules; and a political economy that undervalued maintenance. These challenges are just as relevant today as they were ten years ago.

TSSP's approach to capacity building has a sound logic: Agency Capacity Diagnostics (ACDs) identify capacity constraints; and Agency Support Arrangements (ASAs) agree to the areas that will most benefit from external support. The ACD and ASA for DoWI mirror the PNG Government's goals and priorities that are enshrined in its Corporate Strategic Plan. DoWI's ACD helped plan the transition from the first phase of TSSP to its current phase. The resulting approach has two linked parts: (i) assigning advisers to key DoWI and DoTI functions to help raise the understanding and skills of counterparts and help draft material to strengthen systems, tools and procedures, and (ii) procuring maintenance and other works to illustrate good practice in needs assessment, preparation, procurement and implementation. Importantly, the latter are implemented through Government systems (albeit in a highly-controlled manner) to increase the chances of sustainability.

Two questions for this review, therefore, are (i) whether there is evidence that TSSP's approach to capacity development is making progress towards the self-sufficiency of the two key partner institutions, DoWI and DoTI, and (ii) whether policy, management and technical advice have been directed to the areas of greatest need.

### SUSTAINABILITY OF CAPACITY-BUILDING EFFORTS

During the 2000s, there were rising value-for-money concerns about the heavy reliance on technical assistance in the Australian aid program, especially in aid-dependent countries. As part of the broader response to this concern, a joint PNG and Australian Government review of advisers in 2010 triggered a reduction in TSSP advisers from 25 to 10.<sup>28</sup> This narrowed the range of land transport functions supported by TSSP. During its first phase TSSP provided DoWI with technical assistance across a wide range of activities: engineering, research and materials testing, contract management and procurement, financial management, information technology and communications, human resource management and development, policy and planning, asset management, road project coordination and internal audit, among others. Following the adviser review and the end of Phase 1, DFAT limited the functions supported by advisers within DoWI to contract management and procurement, the development of the asset management system, planning, preparation and implementation of physical works, and, late in 2016, network planning. DFAT also narrowed the assistance to corporate functions in DoTI following the adviser review.<sup>29</sup>

The phasing out of support in certain areas provided a basis for the evaluation to assess the likely sustainability of improvements seen in areas that TSSP continues to support. What this demonstrates is the heavy dependence of such improvements on external support and their fragility when this support is removed.

28 Australian Government (2011), Joint Adviser Review Report.

29 To information systems, human resource management, financial management and transport policy.

One example is in efforts to strengthen DoWI's IT function. The completion report (June 2013) for the first phase highlights the outcomes from persistent support for IT and communications, with increases cited in the use of email for communication and internet for research, and improved links between headquarters and some provinces. However, by the time we conducted our fieldwork in November 2016, the IT function had deteriorated, with intermittent failure of servers and frequent loss of data, and connectivity with provincial offices that was no longer reliable.

Another example is the support TSSP once provided to DoWI to strengthen its internal audit function. TSSP performance reports note progress in developing an annual audit plan and implementing some of the planned audits. However, there continued to be staffing gaps in the Internal Audit Branch and these limited improvements were not sustained after support was withdrawn. There have been similar experiences in other areas where support was withdrawn or has been discontinuous.

It is important to note that capacity constraints in core areas such as information technology are not fundamentally about funding constraints. Although funding shortages do play a role, constraints are more about the efficiency with which available resources are used and the perceived need for them. On this, one of the more striking examples of the scope for improved efficiency within the PNG public service relates to the high number of unattached officers. This is a long-standing issue, and was identified by the Department of Personnel Management as an important contributor to overruns in the 2016 budget.<sup>30</sup> In DoWI, unattached officers account for over one quarter of its staffing establishment.

Based on this evidence and within these constraints, we conclude that DoWI's and DoTI's ability to maintain improvements brought about through external inputs is limited. TSSP's advisers have helped DoWI and DoTI to improve the guidelines, systems and procedures, and have had an important influence on PNG's road-sector policies and plans. However, in spite of these positive contributions, there is little evidence from the last ten years of assistance of any measurable improvement in the technical and organisational capacity of TSSP's main institutional partners. Changes of leadership, staff, budget priorities and decision criteria have usually undermined improvements once advisers have left.

This might seem to paint a bleak picture but we do not consider it so. It is important to recognise that many of the capabilities DoWI requires in order to fulfil its mandate will be difficult to access at public service pay rates, which means that outsourcing activities and bringing in external advisers will be an important feature of its business model moving forward. Consistent with this, TSSP provides a functional model of sound road maintenance practice and tools that support this, and an important source of direct capacity for the sector and learning for staff and counterparts. In a context where there is evidence that the quality of PNG's institutions is declining<sup>31</sup>, this can be considered both a positive achievement and, assuming current levels of Australian aid remain steady, a sustainable model for the future. Based on the analysis presented above, we believe it is important to recognise that technical assistance is more likely to be effective in capacity-building if:

- » it is maintained over a long period
- » it is focused on tasks that are on the critical path to practical delivery of maintenance outcomes, where the incentives to improve performance are greatest
- » it results in documented guidelines, systems and procedures that can be adopted and followed by partner agencies
- » there is a recognition that some tasks will be done more reliably by external advisers and consultants for some time.

## STRENGTHENING KEY FUNCTIONS

While the focus of TSSP's capacity-development assistance has shifted over its two phases, there has been continuity of support for several core functions, most notably in

- » developing sector policies, plans and budgets;
- » improving DoWI corporate planning and support;
- » improving DoWI procurement, contract and financial management;
- » improving DoWI monitoring and decision support; and
- » developing the capacity of contractors.

The following sections consider the targeting of efforts to develop capacity in these areas.

30 Independent State of Papua New Guinea, 2016 Budget Volume 1 Economic and Development Policies, Nov, p. 63

31 A number of well-informed observers made this observation to us. It is difficult to verify the accuracy of it, but there is certainly some reasonable evidence that this is the case. For example, the recent IMF assessment of public financial management in PNG recorded a decline in performance on a number of key fronts compared to previous assessments (see <http://devpolicy.org/pngs-financial-management-can-it-be-turned-around-20160112/> for analysis and links to the assessment). Similarly, assessments by the World Bank using the Country Policy and Institutional Assessment tool suggest there has been no improvement, and in several cases a decline, in key indicators of the quality of PNG's governance.

## Improving sector policies, plans and budget allocations

Through support for TSCMIC and DoWI, there has been a consistent focus on improving sector policies and securing sufficient funding for routine road maintenance. As is established in Chapter 3, TSSP's success in this respect has been modest with interests outside the control of TSSP being a dominant influence over road spending.

Notwithstanding these constraints, TSSP has had some important successes. It has had a powerful influence over high-level policy-making through its role in supporting TSCMIC. It has convinced DoWI and DoTI of the need for rational, evidence-based planning, making use of the road asset management system, RAMS. It has helped prepare budget and other briefings that highlight the critical need for adequate road maintenance funding.<sup>32</sup> By developing a standard business-case model, its DoTI advisers have helped ensure a consistent approach to prioritising annual budgets within a sector budgeting framework. Indeed, largely thanks to TSSP, the transport sector's budget submissions are viewed as a model of best practice by central agencies. Overall, it has provided a basis for DoWI and DoTI senior managers to press claims with central agencies for adequate maintenance spending and rational budget allocation. TSSP provides crucial support across every important policy reform being pursued in the sector, including for example, by supporting and influencing a review of institutional roles and responsibilities in the sector and advocating for reforms that would put the sector on a more sustainable footing. Within the PNG public service, the TSCMIC is widely recognised as a model for sector coordination and policy dialogue.

TSSP messaging on policy-making, planning and budget preparation has resonated strongly with the senior management of DoWI and DoTI, who have used TSSP analysis to press their claims with the central agencies for adequate maintenance spending and rational budget allocation. Arguably, this conviction at the highest level of decision-making holds the best prospect for sustaining the results of TSSP's capacity-building efforts over the long run. For these reasons, we think it important that TSSP continues to engage with the challenge of improving sector policy and budget settings. As is discussed in Chapter 6, this would be helped by strengthening TSSP's approach to mutual obligations. Beyond this, it might be worthwhile increasing the effort to raise the profile of the road funding debate. This could be done by supporting DoTI and DoWI in holding well-publicised workshops and circulating sharply-focused briefing material on the consequences of neglecting road maintenance (in terms of lower accessibility, rising prices and falling incomes). An important contribution to these arguments has already been made by a major study commissioned by TSSP—the *Roadwork, Strategic Planning and Programming Study*—which models projected road conditions under different funding and treatment scenarios (see Chapter 5), but further research in this area would help strengthen the value and impact of TSSP's advocacy.

We were informed of an intention to transfer the secretariat function of TSCMIC from TSSP to DoTI. We feel this move should not be rushed, particularly while TSCMIC continues to be a useful avenue for raising the level of debate over road funding and budget discipline. TSSP's role in supporting TSMIC is highly valued by senior management within DoTI, DoWI, the central agencies and other donors. A continuation of this role is more likely to preserve TSMIC's credibility and effectiveness than otherwise.

32 A good example is the strongly-worded presentation by the Secretary of DoWI to the Leaders' Summit in 2014.

## Improving DoWI corporate planning and support

Under the ASA, TSSP's contribution to DoWI corporate planning and support is expected to include advice on regulations governing institutional arrangements, policies governing outsourcing, human resource development, gender, social safeguards, environmental and road safety issues, long-term network planning, asset management, budget preparation and improved productivity.

Most of these areas were also covered by TSSP's original design, but the withdrawal of advisers has already resulted in a loss of capacity in areas like corporate planning and policy, IT and communications, HRD and financial audit, as mentioned earlier. There is a risk that further assistance with corporate functions will suffer a similar fate. Moreover, TSSP's corporate support is designed under the ASA to equip it with the capacity to deliver on the goals of the National Transport Strategy and DoWI's strategic corporate plan. Now that these have been undermined or deferred by a failure to provide the necessary funds, assisting the more aspirational strategic corporate functions becomes arguably less important (though some, such as assistance with procurement procedures, will remain essential); of greater importance is the more practical need to focus on maintaining existing assets. In this light, we consider there is scope to further rationalise some of the activities in the DoWI ASA.

## Improving DoWI procurement, contract and financial management

Procurement, contract and financial management have also been consistent areas of focus since the commencement of TSSP. TSSP is currently helping to establish a procurement plan, strengthening procedures for tendering, evaluating and awarding contracts, monitoring the procurement cycle, carrying out procurement audits, and strengthening contract management and administration, including financial management of contracts.

These are areas where improvements introduced by TSSP have influenced DoWI practice. For projects managed by TSSP (which follow DoWI regulations), the procurement process—other than for projects over PGK10 million that follow the time-consuming and opaque process through the CSTB and the National Executive Council—has been streamlined and made more transparent. Standard contract documents have been developed and applied successfully to both TSSP and DoWI-managed projects. Steps are being taken to introduce FIDIC standard forms of contract that give greater authority to supervising consultants in representing DoWI's interests.<sup>33</sup> Moreover, DoWI has used TSSP's Project Management Consultant (PMC) model (where works contracts are prepared, procured and supervised on DoWI's behalf by a consultant) on non-TSSP projects, supporting the view that DoWI recognises the strength and benefits of TSSP's approach.

A notable TSSP initiative has been its use of long-term maintenance contracts (LTMCs), initially in Morobe and the Eastern Highlands. The aim of this model is to transfer responsibility for maintaining sections of road over several years to a contractor who is paid only while the roads comply with predetermined quality standards; deductions apply when these standards are not met. Unlike existing small contracts, LTMCs lock in a commitment to funding over a multi-year period. With TSSP assistance in preparation, the World Bank has adopted this model for 120km of the Hiritano Highway, and the Asian Development Bank has adopted it for the length of the Highlands Highway under its 10-year Multi-Partner Financing Facility.<sup>34</sup>

Further TSSP assistance in these areas would likely continue to show some improvement in DoWI practices, and provide a vehicle for individual learning and development. The TSSP future work program provides for a further LTMC on the coastal highway in Madang province.

Three challenges, however, are likely to impact on the sustainability of gains made by TSSP in procurement and contract management: corruption, a shortage of engineering skills, and limitations on the capacity of the local contracting industry.

<sup>33</sup> FIDIC—International Federation of Consulting Engineers.

<sup>34</sup> In practice, under TSSP, an embryonic version has been used, with selected work components paid for based on inputs, not outcomes. The World Bank and ADB intend to try a model that pays for initial upgrading and rehabilitation based on inputs and subsequent maintenance based on road quality outcomes.

The first challenge is the fact that TSSP has little direct involvement in or influence over procurement and contract management for projects it does not fund.<sup>35</sup> TSSP has made strong efforts to ensure a competitive, transparent procurement process for its own contracts and has procedures in place that enable it to control the outcome of its own procurements. Generally, local contractors' responses to TSSP opportunities have been good, and we were informed that they value the program's clarity of scope, its supervision arrangements involving PMCs, and its predictable cash-flow. However, DoWI's own lack of project management skills, its inability to fund high-quality supervision, delays in access to funding, and incentives for corruption in procurement<sup>36</sup> impose strict limits on how far TSSP's technical and capacity-building approach can be expected to influence quality, value for money and transparency.

Secondly, the shortage of engineering and project management skills is a concern that has impacts on the procurement and project management capabilities of DoWI as well as the capacity and quality of contractors. According to a 2010 review of civil works capacity constraints attached as a supplementary document to the Country Partnership Strategy 2011–2015, this is one of the most commonly-cited problems and most difficult to overcome. Apart from vocational high schools, Unitech Lae is the only institution producing civil engineering graduates. TSSP's DoWI ACD noted that the number of students commencing transport-related undergraduate courses between 2005 and 2007 was 149. Of these 41 per cent, 30 per cent and 23 per cent abandoned their studies by the third semester of 2005, 2006 and 2007 respectively. This high drop-out rate limits the ability of DoWI to engage and develop engineers for roles in the Department. Moreover, those who do graduate find private-sector work more attractive, but in the mining and resources sector rather than in civil contracting, where salaries are low and career opportunities limited by the lack of project continuity.

We discuss the third challenge, limitations on private sector capacity, below.

## Improving DoWI network monitoring and decision support

The ASA has a justifiably strong focus on improving planning, monitoring and decision support tools.<sup>37</sup> Efforts to establish a rational planning function within DoWI rely on accurate, up-to-date information on traffic and the condition of roads and bridges, and effective decision tools to help select economically-optimum maintenance strategies. Together, these would enable DoWI to monitor network performance and the effectiveness of maintenance programs, illustrate maintenance needs, identify the impacts of alternative treatment strategies and funding at a network level, develop budgets, and identify the treatments needed at the local, project level.<sup>38</sup>

TSSP has made a significant contribution to building the required foundation of evidence. In 2014, it invested in a major effort to establish more accurate data on the condition of the road network through a comprehensive visual road condition survey (VRCS) of the national road network. Analyses of optimum treatments for individual links based on life-cycle costs and benefits are emerging from RAMS. The *Roadwork, Strategic Planning and Programming Study* made effective use of this data in assessing network-wide upgrading, rehabilitation and maintenance needs.

While this is a good start, much more needs to be done. Significant changes to road conditions have occurred since 2014, such that in a short time RAMS predictions of needed works will no longer be useful as a basis for treatment selection and works contracting at the project level. Even at a network level, the validity of the results is becoming outdated. Traffic data are also limited. Additional traffic surveys have since been initiated by TSSP, but have not yet been completed. The VRCS, and to a lesser degree the video surveys from an iRAP safety-rating exercise carried out in 2015 and 2016, are currently the only sources of reliable data on road conditions.

35 We did not assess and cannot comment on the adequacy of the systems TSSP has established for managing the risk of fraud and corruption. However, we did note these risks are under active and constant consideration by TSSP and the infrastructure unit in the High Commission.

36 For procurement there is a letter-of-no-objection process in place. This means that where the Central Supply and Tenders Board makes procurement decisions contrary to technical evaluations, recommendations and established policy, DFAT is not bound by these decisions and can withdraw. While this means DFAT has control over the outcome of procurement exercises, unsupported CSTB decisions in TSSP procurement processes have resulted in work being delayed or cancelled. A recent TSSP performance report notes for example that 'in the absence of this impediment to the timely contracting of works, an additional PGK10–15 million could have been expended during the year, and represents a significant opportunity cost to road infrastructure in PNG.'

37 Areas supported include asset information systems, a road network planning and management framework, asset management planning, monitoring road conditions, identifying needs, evaluating alternative maintenance strategies, prioritising and scheduling works, preparing annual budget submissions, and monitoring DoWI's performance in managing its network assets. The ASA also supports the related tasks of raising the quality of road and bridge design standards and outcomes, including consideration of resilience to climate change, and raising standards of road safety through design, works prioritisation, and better safety management at works sites.

38 The last of these will also require engineering judgment, currently provided by TSSP through the PMC.

To build on this, a more secure, long-term solution is required. Several earlier attempts under other donor programs to establish a sustainable RAMS/BAMS capability in PNG have failed and systems have fallen into disuse because of staff turnover, budget cuts and lack of commitment to data-collection, exacerbated by a lack of consistency of donor support. Once the data become outdated, the system loses credibility as a planning and budgeting tool. If history is any guide, TSSP's current efforts will go the same way unless the structure of commitment and incentives is altered. RAMS and BAMS are complicated tools that require large volumes of data that can be expensive to collect on a regular basis, notably on traffic composition and levels and on road and bridge conditions. They require advanced skills to maintain, and a leadership that understands and relies on the outputs.

The analysis carried out in the *Roadwork, Strategic Planning and Programming Study* is something DoWI should be able to do—or at least commission—routinely itself. However, DoWI has not funded the necessary surveys in the past, and is unlikely to do so in the immediate future,<sup>39</sup> given the shortage of funds. To ensure continuity of technical progress, functionality, budget support and quality control, this review recommends that the tasks of data collection and operating RAMS/BAMS should be placed squarely under the responsibilities of the TSSP managing contractor and funded by DFAT through the TSSP budget. The technical and funding commitment should be for the remainder of TSSP2 in the first instance, but with a capacity to extend for the life of the next phase of the program. In relation to RAMS and BAMS, the TSSP managing contractor would be accountable for:

- » the quality and reliability of specified data, and for generating reports to DoWI's specifications. Surveys of road conditions would make use of low-cost hand-held devices and software like "RoadRoid", which is currently being tested by TSSP and DoWI. Data, protected by security protocols, would be available on-line for monitoring, reporting and analysis;
- » running tests of alternative network, treatment and funding scenarios in response to requests by DoWI. TSSP would recommend works schedules and investment strategies, and would provide (and guarantee the currency, objectivity and quality of) outputs from the RAMS/BAMS planning tools to support DoWI decision-making.

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## EFFORTS TO ESTABLISH A RATIONAL PLANNING FUNCTION WITHIN DOWI RELY ON ACCURATE, UP-TO-DATE INFORMATION ON TRAFFIC AND THE CONDITION OF ROADS AND BRIDGES, AND EFFECTIVE DECISION TOOLS TO HELP SELECT ECONOMICALLY-OPTIMUM MAINTENANCE STRATEGIES

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Training would also be provided to DoWI asset management staff to enable them to understand and make effective use of the data and decision tools. The TSSP managing contractor would be incentivised to train its own staff so that a pool of the necessary skills is maintained within the country to ensure it complies with its performance-based contract conditions.

We also suggest that the proposed arrangement should pay greater attention than hitherto to monitoring the condition of drainage and water crossings. Although RAMS models pavement deterioration over time and under the impact of traffic, the most significant cause of road failure appears to be from flooding after heavy rains, a problem that is likely to get worse through the effects of climate change. TSSP should devise a survey program and maintenance strategy that better addresses this problem in the context of policies to strengthen resilience to climate change, allowing DoWI to increase its focus on drainage and protecting bridges and culverts through river training works and other treatments.<sup>40</sup>

We consider that the focus in the meantime should be on using the existing RAMS tool to generate simpler, more easily understood decision criteria and look-up tables that clarify the optimum treatments needed for any combination of traffic and road conditions. These simple decision tools should be made available to provincial works engineers and even sub-national works agencies to help them select treatments and plan their annual works programs. They would also help overcome an apparent lack of transparency noted in some instances by the review team about how the RAMS analysis of optimum treatments at DoWI headquarters results in the treatments and projects chosen and implemented in the field by DoWI, both independently and with TSSP assistance.

39 With the VRCS having cost PGK3.2 million, it is very unlikely that DoWI will commission regular updates every 2–3 years. Past experience under ADB and World Bank programs has not been encouraging: commitments to maintaining data integrity for asset management have not been fulfilled.

40 We note that TSSP is already assisting ADB in this way, by carrying out an assessment of flood-prone areas on the Highlands Highway.



Damaged bridge on the Ramu Highway. Wash outs of bridges and culverts are a common along PNG's roads, meaning particular attention needs to be paid to drainage and water crossings.

## Developing the capacity of contractors

The capacity of the road contracting industry in PNG presents procurement and management challenges for DoWI, adding to the problems it already faces. Opportunities in the resources sector may have led to some improvement since 2010, but even at that time there were fewer than 15 national contractors and five international companies with the technical knowledge, equipment and financial means to execute large civil engineering contracts.<sup>41</sup> Many of the contracts managed with the assistance of TSSP are under PGK500,000 in value, however, and are unattractive to these larger contractors. Under PNG's "my land, my work" culture, there are expectations that local teams, often unincorporated and without formal training or even experience, would be given the kind of work that local road maintenance entails. Management and technical skills are rare among small-scale contractors, and the use of unqualified sub-contractors is almost universal. Competition is often limited. These factors mean DoWI often has little choice but to accept bids from contractors who they suspect might under-perform.

Contractor under-performance is also a result of problems of DoWI's own making. Procurement delays are common. Contractors frequently encounter cash flow problems caused by DoWI's own payment delays (initial budget releases are often diverted from their intended use, for example, towards making up for late payments, or even insufficient budgets, on the previous year's contracts). The lack of a committed pipeline of projects means there is little incentive for contractors to gear up capacity when there is no assurance of a consistent flow of work. Finally, there is a lack of technical skills among provincial works engineers.

Given the scale of the challenges, the potential scope for supporting the contracting industry is wide. While some options were flagged as possible areas for future consideration, ways to develop the capacity of the private sector were not a major focus for the design of the second phase of TSSP. This states that:

*TSSP2's major impact in this area (as in TSSP1) will be providing through Component 1 a reliable funding stream and works pipeline to encourage private sector capacity development and increase interest amongst contractors in undertaking public sector works.*

Even so, TSSP has put effort into supporting DoTI's Road Construction Industry Strengthening Strategy. In 2016, 315 participants from local contractors attended workshops covering business management, bid preparation, pricing, risk management, financial management and contract compliance. In March 2017, three additional workshops were held in Kokopo, Lae and Mount Hagen. In addition, the Project Management and Supervision Consultants in Bougainville have provided training to strengthen quality control procedures and minimum safety requirements.

TSSP's *pro forma* contracts for minor works allow small, less experienced contractors to bid for jobs of varying size and complexity, thus earning valuable experience in routine and periodic maintenance works. Typical activities include vegetation control, drainage clearing, repairs and replacement, pavement repairs, rehabilitation and reconstruction of short sections, river training, pavement marking and roadside furniture repair and replacements. This experience is critical for the development of small and medium sized contractors in PNG.

Given resource constraints, it is sensible to keep the focus of any efforts in contractor capacity-building reasonably narrow.<sup>42</sup> However, we think that more could be done within these constraints.

41 D. Lucius, Civil Works Capacity Constraints, Supplementary Document, Country Partnership Strategy 2011–2015.

42 These challenges have been well documented in a March 2015 TSSP Discussion Paper on strengthening the road construction industry in PNG, drafted at a time when road expenditures were at a historically high level. The recommended initiatives included measures to strengthen industry regulation and licensing, contractor classification, training, and access to finance, and were consistent with the Construction Industry Policy Framework developed in 2009 by the Department of Trade and Industry. Their implementation would require a level of resourcing beyond the scope of TSSP2, however. Our own comments and recommendations are therefore confined to the more limited assistance that is possible under current and future TSSP strategies.



TSSP reports have often drawn attention to the lack of capacity among local contractors, particularly those suited to works of PGK500,000 or less. TSSP's programs provide an opportunity to help develop this component of the contracting industry, yet little if any progress has been reported in annual performance reports. With *pro forma* contracts making up a growing proportion of the future works program, greater attention should be given to this important capacity-building task. This could include requiring the PMCs to prepare small-contractor development plans and implementing these with mentoring through the procurement, award and supervision process.<sup>43</sup> In meetings with local contractors, the review team discovered that there are many small firms keen to participate in DoWI's maintenance program who lack information on upcoming opportunities, the management skills needed to price and bid on contracts, and methods of cost control and quality assurance. While these are common concerns in the contracting industry, they could be reduced with better communications, briefing, and some mentoring by PMCs.

If it is to make a substantive contribution to developing the capacity of contractors, it is also important for TSSP to maintain a consistent pipeline of contracts in the provinces where it works. The review team heard that some local contractors in East and West Sepik went out of business when TSSP's program there was curtailed, after having invested in capacity in expectation of a continuing program. While the viability of contractors is not TSSP's direct responsibility, it is something it can influence. This risk would be lowered if TSSP's physical program were confined to key national road corridors where the works program can be sustained over a longer period, preferably under performance-based LTMCs (see Chapter 5). This is consistent with TSSP's current strategy.

## TARGETING OF CAPACITY-BUILDING SUPPORT

Cuts to adviser numbers in 2011 brought a more disciplined and focused approach to capacity development. Unlike previous efforts when capacity-building was spread over corporate functions without clear or achievable outcomes having been identified,<sup>44</sup> there are now closer links with the core DoWI and DoTI activities that are central to funding and delivering better maintenance outcomes.

In general, the actions identified through the DoTI and DoWI ACDs and the DoWI ASA are sound.

Looking forward, we suggest the priority ought to lie with the most critical areas involved with (i) securing adequate funding, strengthening the case for this at the highest level of decision-making, and (ii) providing up-to-date data and sharply focused analysis to justify this. With the PNG Government currently unable to provide the level of funding needed to maintain existing assets and to give sufficient weight to maintenance within funding constraints, these two areas should be the core focus.

Simple business process mapping tools could be used to map DoWI's workflow in planning, preparing, procuring and implementing road maintenance and associated network management tasks. This would allow identification of critical tasks and their input/output requirements, and priority to be placed on those most closely linked to maintenance outcomes and requiring high-priority assistance from TSSP.<sup>45</sup> This way, the greatest effort would be placed on the practical tasks most likely to result in effective maintenance delivery as well as pitching the maintenance-first message at the highest levels of decision-making. Critical points in the DoWI workflow could be reviewed to determine what institutional capacity already exists, what additional help and training is needed, and where self-reliance is still a long way off and capacity must continue to be provided externally through TSSP.

43 This need not be a high-cost addition to the tasks of the PMC. A start along these lines has already been made in Bougainville, where a report assessing local contractor capacity is under preparation.

44 See, for example, Review of the PNG-Australia Development Cooperation Treaty (1999), April 2010.

45 The current ACD and ASA process does not have this facility for prioritising DoWI activities.

## FINDINGS

TSSP's capacity-building approach, consisting of targeted technical assistance combined with a program of works implemented through government systems, provides the best prospect for influencing PNG Government policies and implementation. However, the scope for influence is constrained by both political influences over budgeting and the technical capacity and level of funding of TSSP's partner agencies. Without changes in institutional incentives, the evidence suggests there are limited prospects that improvements in capacity achieved through external inputs will be sustained after they are removed. We therefore think it is important to focus available resources on directly providing long-term capacity in critical areas. Given the impending collapse of important parts of the network from a failure to fund maintenance, TSSP should preserve and strengthen its focus on building the case for giving greater priority and increased budgets to maintenance. This should include having TSSP take direct responsibility for (i) commissioning and managing a regular data collection program based on simplified low-cost survey techniques, and (ii) finalising and operating RAMS and BAMS in support of budget submissions and program advocacy. Both the survey program and the criteria for prioritising treatments in RAMS/BAMS should take greater account of the role of flood damage in causing road deterioration.

In the main, TSSP's capacity development efforts are disciplined, although certain aspects of TSSP's capacity-building focus on DoWI corporate strategies and the functions required to achieve NTS targets are looking increasingly ill-directed at a time when funding is no longer able to maintain existing assets. Technical assistance should be focused on those DoWI tasks that sit on the critical path for maintenance planning and delivery, and should help simplify and make more understandable to central agencies the criteria used to select treatments, the justification for increased maintenance spending, and the need to influence budget decision-making at the highest levels.

There is an opportunity to strengthen TSSP's support for small-scale contractors in a way that would not add significantly to the cost of PMC services. Care should be taken to ensure continuity of workflow to small contractors to avoid the boom-bust cycles that can occur when there is a lack of continuity of support. This continuity is also necessary to demonstrate the importance of a sustained, life-cycle approach to managing parts of the network, as discussed in the next chapter.

### Recommendation 2

To provide a reliable capacity for network planning, monitoring and decision support, DFAT should seek agreement with DoWI that TSSP will fund and be held accountable for:

- » collecting routine information on road, bridge and traffic conditions for the national network
- » developing and operating RAMS/BAMS functions to support DoWI and DoTI decision-making, including an enhanced ability to prioritise treatments to prevent damage from flooding.

### Recommendation 3

TSSP should require Project Management Consultants to prepare a plan for strengthening small-scale local contractor capabilities under TSSP's annual program of works, especially those carried out using pro forma contracts. A similar program of work continuity and mentoring focused on small-scale sub-contractors should be considered in conjunction with long-term maintenance contracts in targeted national road corridors.

## CHAPTER 5: EFFICIENCY AND IMPACT

**THE IMPORTANT THING IS TRANSPORT; WE NEEDED TRANSPORT TO TAKE OUR COPRA AND COCOA TO THE MARKET. WHEN THEY BUILT THIS ROAD, IT PROVIDED AN IMPORTANT SERVICE FOR US. THE WOMEN ALSO HAD A CHANCE TO MAKE THEIR OWN MONEY THROUGH SELLING SWEET POTATO, TARO AND OTHER THINGS LIKE BETEL NUT AND MUSTARD. IN ORDER FOR THEM TO GO TO THE MARKET THEY HAVE TO USE THE ROAD. THE ROAD BROUGHT DEVELOPMENT, THIS THING THEY CALL DEVELOPMENT IS THE ROAD.**

—Village chief, quoted in TSSP Independent Socio-Economic Performance Story Impact Study

Ultimately, TSSP's effectiveness should be viewed through the lens of its impacts on the lives of people served by national roads: not just the roads improved and maintained by TSSP, but all national roads, a key capacity-building aim. This chapter discusses, therefore, whether value for money has been achieved from the TSSP roadworks and from its efforts to strengthen maintenance across the road network.

### DIRECT AND INDIRECT IMPACTS OF IMPROVED ROADS

Better roads lower the costs of access and transport. Services by public motorised vehicle (PMV) become more readily available and competitive. Journey times reduce. Vehicle operating costs (depreciation and maintenance, fuel use, crew costs etc.) become lower. All this is axiomatic: the relationships between road conditions and transport costs are well-established and planning applications like those incorporated in RAMS can accurately predict the user cost savings resulting from alternative road treatments.

We know less, in PNG and elsewhere, about how people, especially the poor, respond to these savings and the impacts better access has on their lives. Are market and other cash-earning opportunities expanded by better access? Are health and education outcomes better? What about traffic accidents? Are young men more likely to migrate in search of opportunities elsewhere, leaving villages populated by women, children and the infirm?

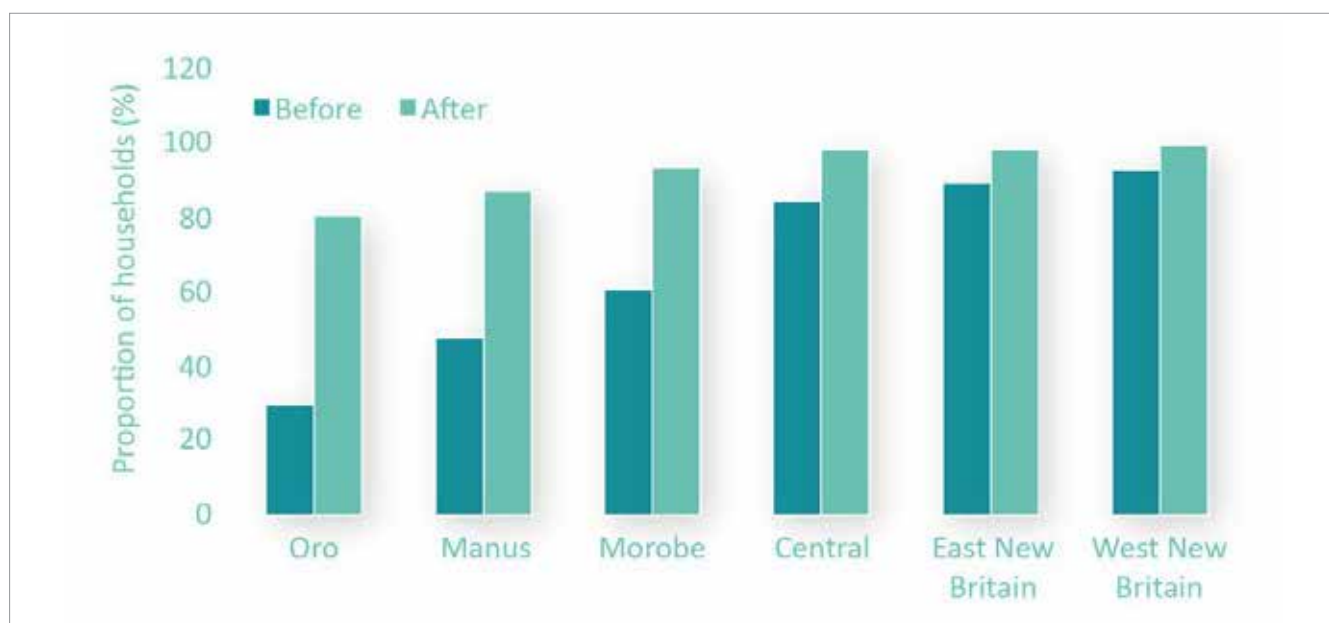
One source of direct benefits comes from participation in road works, which helps raise household incomes—important after economic disruption—and develops skills. The Oro Bridges project employed 200 villagers, the Magi Highway project employed 700, and 18,000 people (a third of them women) have been employed through community work agreements in Bougainville since 2008.

More importantly, there is a body of evidence showing that better accessibility is positively associated with reduced poverty. A comprehensive study of poverty and access in PNG in 2003 found that households living more than 60 minutes from the nearest road are almost twice as likely to be poor compared with those living in closer proximity. The poor travel 75 per cent longer than the non-poor to the closest mode of transport and over three times longer to reach

the nearest road. A one-hour increase in travel time to the nearest transport facility reduces real consumption by almost 10 per cent. The price of sweet potato, a national staple, declines seven per cent for every extra hour to the nearest transport facility. For each additional hour from transport infrastructure, the trade-store price of rice increases by 3.4 per cent. And each one-hour increase in travel time to the nearest road reduces the number of income-earning opportunities by 2.6 per cent. Put simply, poor areas have the least access to infrastructure and people in those areas benefit most from infrastructure investment. Infrastructure spending, whether on new assets or maintenance of existing facilities, can provide a form of targeted intervention that favours the poor.<sup>46</sup>

Similarly, a study covering six provinces in 2005 and 2006 found that for villages close to rehabilitated roads, household incomes increased significantly both directly, through employment on road works, and indirectly, through better access to markets and increased wage-earning opportunities. The impact of road rehabilitation and maintenance on poverty is illustrated in Figure 12. The percentage of households living above the poverty line in Oro Province, for example, increased from around 28 per cent to 80 per cent after roads were rehabilitated.

**Figure 12: Proportion of households above the poverty line before and after road rehabilitation and maintenance**



Source: S Jusij, W Asigau and N Laatumen, 'Social impact benefits of road rehabilitation projects in six provinces in Papua New Guinea, South Pacific', in: Australian Government—AusAID (2008) Infrastructure annual thematic performance report 2007–08.

<sup>46</sup> Gibson and Rozelle, *Poverty and Access to Roads in Papua New Guinea*, Economic Development and Cultural Change, Vol. 52, No. 1 (October 2003), pp. 159–185. It is noteworthy, however, that the main beneficiaries of improved roads tend to be those best able to take advantage of improved access—notably PMV operators and higher-income growers and marketers—while the response of the poorest is often limited by their own constrained circumstances. Several studies have highlighted this, illustrating for example the degree to which the poorest rely on walking for access to cash-earning opportunities and health services.

## Box 5 Affected communities speak about the impact of the Oro Bridges project

**Arleen Waraho:** Before the bridges we found it very hard, we found it very hard to sell our cash crops down to the factory. We get the hook knife and we cut the bunches and they fall down. For the loose fruit we collect it and put it in the net. The oil palm gives us more services. When we don't plant oil palm we can't stay like this, we stay with our dirty clothes but when we plant oil palm we have plenty clothes, we've got soap, we buy kerosene, we buy batteries and we buy solar.

**Isayah Orofa:** The bridge came and we are very happy. We are very happy so everything is very easy to us because if our children are sick we can cross the bridge and go to the school or the hospital.

**Petra Koya:** Bridges make earning money much easier for the women in Oro. They are very happy because the bridges are back as they know that they can do better and get more income from the oil palm.

**Alfie Hameno:** Sometimes we carry the bilums and the foodstuff to go across to the mountains. Some people from other villages they have tried to come across and the water has pulled them away. We had one person who was not expecting the water flood will come and he was washed away with water. We cannot find that person any more.

Source: Interviews from TSSP Independent Socio-Economic Performance Story Impact Study

A key factor in these results is the influence of market access on cash crop production and prices. When road access is good, it is less work and cheaper for producers to market their goods. The road repair program that followed the civil war in Bougainville provides an example of how production improves with better road access. Cocoa production increased sharply in 2002 following 11 years of production suppressed by the fighting. During the war, road maintenance stopped and the ring road around Bougainville became almost impassable. After the road was repaired (with AusAID funding), cocoa growers responded with a significant increase in production, especially in the main cocoa-growing areas of Wakunai and Tinputz.<sup>47</sup> Similarly, villagers have reported a rebound in palm oil production in Oro Province after TSSP repaired four bridges washed away by Cyclone Guba in 2007, making a positive impact on their lives (Box 5).<sup>48</sup>

Overall, the benefits for women are similar to those for men. This was highlighted by a study of changes experienced in six villages in three provinces in 2011. Interviews with villagers revealed that affected communities universally thought TSSP road improvements had improved quality of life, with women more likely than men to mention positive impacts associated with improved access to markets and services. However, the degree to which women benefit likely drops off in areas of higher poverty, where men are more likely to seek work elsewhere and women to rely more on roadside sales of limited garden produce and walking, rather than riding on a PMV, to access emergency healthcare.<sup>49</sup>

47 Scales, I., and Craemer, R., *Market chain development in peace building*, December 2007

48 Villagers also stressed the benefits of increased safety (without the bridges, river crossings were dangerous), restored access to schools and health facilities, and improved availability of, and lower prices for, daily necessities like clothes, soap, batteries and fuel.

49 While several studies have documented the impacts of improved roads on levels of poverty in PNG, few have isolated the impacts on women. Moreover, most have been concerned with rehabilitation projects or new roads, but not improved maintenance—nor with evaluating the consequences of a possible decline in access when maintenance is insufficient. The key studies reviewed include: Gibson J and Rozelle S, *Poverty and Access to Roads in PNG*, University of Chicago, 2003; Hughes P, *The Difficult Problem of Measuring the Village-Level Socio-Economic Benefits of Road Rehabilitation Projects in Rural Papua New Guinea*, RMAP Working Paper No 62, ANU Research School of Pacific and Asian Studies, 2005; and Allen B and Lowe M, *Papua New Guinea Roads Priority Study: Review of National Roads in Papua New Guinea*, ANU Research School of Pacific and Asian Studies, November 2006. The last of these included a useful review of earlier studies of road access and its socio-economic impacts, several from as far back as the 1970s.



Kumusi Bridge, Oro Province. TSSP supported the design and construction of four bridges costing PGK82.2 million in Oro Province after Cyclone Guba destroyed most of the bridges and caused significant damage to other infrastructure in 2007. At 285 metres in length, the Kumusi bridge is Papua New Guinea's longest two lane bridge.

## INTERVIEWS WITH VILLAGERS REVEALED THAT AFFECTED COMMUNITIES UNIVERSALLY THOUGHT TSSP ROAD IMPROVEMENTS HAD IMPROVED QUALITY OF LIFE, WITH WOMEN MORE LIKELY THAN MEN TO MENTION POSITIVE IMPACTS ASSOCIATED WITH IMPROVED ACCESS TO MARKETS AND SERVICES.

While the impacts are overwhelmingly positive, it is important to note that not all are. In the village based study just mentioned, villagers also frequently noted that improved roads had contributed to increased concerns about:

- » pedestrian safety, mentioned in 42 per cent of all interviews (44 per cent of interviews with women), with recommendations about improving road safety mentioned in 13 per cent of all interviews (nine per cent of interviews with women)
- » road safety as it relates to drivers, mentioned in 39 per cent of all interviews (41 per cent of interviews with women), with recommendations about improving road safety mentioned in 13 per cent of all interviews (25 per cent of interviews with women)
- » social issues such as increased access to alcohol, drugs and outside influences, mentioned in 41 per cent of all interviews (47 per cent of interviews with women).<sup>50</sup>

<sup>50</sup> Independent Socio-Economic Performance Story Impact Study (PSIS), October 2012. The chosen villages were a subset of those surveyed in an earlier, less satisfactory Socio-Economic Impact Study carried out for TSSP in 2008–2010 (see Chapter 6).

Notable from these responses are the small but measurable differences in the perceptions of men and women. With women left to care for the injured and most likely to suffer from male abuse of alcohol and drugs, their heightened concern about these impacts should not be surprising. Nor, perhaps, should their concern about pedestrian risk, given that the poorest of them are more likely than men to walk, rather than use a PMV, to sell their garden produce.

This underlines the strong justification for TSSP's attempts to include safety features in upgrading, rehabilitation and maintenance projects, including better safety management at worksites, and to require social and HIV/AIDS awareness and management plans to be maintained by contractors.

## SUSTAINABILITY OF IMPACTS

None of the studies quoted above address the question of *sustainability* of social, economic and welfare benefits. Bridges like those in Oro have an expected life of 40–50 years; their impacts can be expected to continue and develop further over time. Road sealing projects should last 7–10 years before needing overlay, but only if they are well maintained. In PNG routine maintenance is not assured and overlays are often delayed, while even freshly-sealed pavements can start breaking up and become impassable prematurely if drainage is poor and/or washouts occur at bridges or culverts. The team saw evidence of this on several road sections, including part of the Ramu Highway, for example, that had been sealed by TSSP only recently. The life of routine and periodic maintenance is even shorter: vegetation regrows and ditches can fill again within weeks, and re-gravelling material soon washes away in the wet season unless regularly upgraded and replaced. The lesson is that the benefits to users and local communities soon dissipate unless attention is focused on reducing the likelihood of flood damage (and making adequate provision for emergency reinstatement when damage occurs) and sustaining maintenance over a long period.

We think this requirement for a sustained commitment to maintenance means that TSSP's focus on implementing works contracts should be less concerned with geographical coverage and more with establishing and demonstrating the benefits of a sustained life-cycle maintenance regime in selected corridors, and providing sustained opportunities for local, small-scale contractors. To some extent this is already recognised in the current forward plan for TSSP, but there is not yet a clear focus on life-cycle management other than in

one LTMC corridor. RAMS is capable of prioritising corridors, but selection should be done in consultation with DoWI, DoTI and other donors. Ideally, this would include further LTMCs in addition to the one planned on Madang Coastal Highway, holding contractors accountable for maintaining road and bridge conditions to pre-determined standards over several years. This proposed approach to life-cycle management would also provide a pipeline of opportunities for ongoing support by other donors, as in the past with the Highlands Highway (ADB) and Hiritano Highway (World Bank).

Apart from comparing road agency and user costs in determining optimum maintenance treatments (see below), TSSP does not have a systematic approach to assessing the impacts of its projects on the lives and economy of local communities. The 2011 study referred to above is a step in the right direction and helps strengthen the justification for TSSP's efforts, but further research would help contribute to an assessment of impacts and value for money, even if only on a sample basis. This research should also try to assess the sustainability of project impacts, identifying the benefits of a continued commitment to maintenance under our proposed life-cycle management approach. There are upcoming projects where baseline and post-project surveys can be done: in Milne Bay, for example, with the sealing of Eliasi–Sagarai Junction (Magi Highway), Madang Coastal Highway LTMC, and East Sepik, the latter in conjunction with the efforts of other donors to strengthen rural marketing channels.

## VALUE FOR MONEY

### Technical assistance

Potentially, TSSP's most significant contribution to the efficiency of network management and value for money comes from its analysis of options for upgrading, rehabilitation and maintenance and use of the results to support the prioritisation of works and better budget outcomes. The TSSP-commissioned *Roadwork, Strategic Planning and Programming Study* is very important not only for providing objective analysis to support budget proposals, but also for demonstrating the consequences of under-funding maintenance, at least in terms of deteriorating road conditions and user costs. Using data on traffic and road conditions drawn from a variety of sources, it predicted the pattern of pavement deterioration and associated user costs under alternative maintenance strategies for all links in the 8,737 km national roads network, sealed and unsealed, priority and non-priority.

**Table 5: Projected savings under alternative budget scenarios (million PGK, in 2015 prices)**

Maintenance Strategy	2016	2017	2018	2019	2020	20-yr Savings*
Budget Forecast	678	659	650	656	657	-
Desirable standards with unlimited funding	7,602	896	752	1,163	948	6,773
Immediate optimum standards	4,123	784	953	907	1,196	8,016
Limited budget to 2025, then optimum standards	724	721	720	720	720	1,197

Notes: \* Discounted road agency and user cost savings over 20 years compared to forecast.

Source: Roadwork, Strategic Planning and Programming Study

The results are summarised in Table 5. They show that immediate adoption of economically optimum upgrading, rehabilitation and maintenance treatments (i.e. treatments that, over a 20-year life cycle, minimise road agency and user costs) would save the economy as much as PGK8,016 million (AUD3.4 billion) over 20 years in agency and user costs when compared with a continuation of current levels of annual funding.<sup>51</sup> A more realistic ramp-up of optimum treatments would save PGK6,773 million (AUD2.8 billion) over the same period. Even a scenario (probably the most likely) involving severely-constrained funding (at only 25 per cent of needs) until 2025, but with full optimum standards after that, would save PGK1,197 million (AUD0.5 billion) over the same 20 years.

This analysis highlights a powerful message from TSSP's asset-management efforts: that very large savings in costs to the economy would be realised if the PNG Government were to fund a program of optimum road maintenance treatments. The budgets required to do this are also shown in Table 5. If TSSP could succeed in getting this message to influence final budget outcomes, and to reduce allocations to politically-inspired projects, its effectiveness and impact on the economy would be considerable.

The analysis also illustrates the limitations of thinking only in terms of the costs incurred by DoWI when determining budgets. It shows for example that the costs to road users are much more important, even with PNG's low levels of traffic on much of the network. TSSP should continue to help budget decision-makers to understand this. Yet even this is only part of the picture. Had TSSP been able to measure the wider economic and community benefits that flowed from

the identified changes in road user costs—and the impacts of allowing roads to become impassable through neglect of maintenance—the arguments for greater expenditure on road asset management would be even more compelling. In conjunction with the suggested narrowing of focus towards priority corridors and life-cycle treatments, TSSP's future monitoring and evaluation program should address this need for a measure of the wider benefits of better maintenance.

One further important limitation to bear in mind with the analysis quoted above is that it deals with homogeneous road links, and predicts the performance of pavements over time and under traffic. It does not consider the disruption caused by heavy rains and flooding, yet these are the main determinants of premature failure and road closure. TSSP's advice on optimum life-cycle treatments and maintenance scheduling—and the value for money delivered by TSSP—would be improved if it were to include consideration of flood management solutions, and the cost of emergency reinstatement after bridge failures, washouts or severe drainage damage.

Has TSSP's technical assistance delivered value for money? Although there are positive signs of TSSP influence over policies and plans, the complete answer will not be evident for a while, unfortunately. The history of similar attempts to strengthen skills and capacity suggests that advisory inputs are usually not able to materially change the structure of incentives necessary for reform. Efforts to strengthen DoWI capacity will likely endure while the present advisers and counterparts are in place and have influence over key decisions, but this will not always be the case. The results

51 These cost savings are in addition to the social and welfare impacts at the community level discussed earlier in this chapter.



of TSSP's work on maintenance planning and budgeting, highlighting the alarming implications for the network's condition of a continuing neglect of funding, will not change budget allocation priorities unless the message gets through at the highest level. Nevertheless, if it did, and succeeded in achieving spending allocations based on optimal life-cycle treatments, then value for money would be immense. The TSSP analysis above suggests that discounted savings over 20 years could range from AUD0.5 billion to AUD2.8 billion, for a discounted future expenditure on technical assistance of only about AUD44 million—a fraction of the potential savings.<sup>52</sup>

### Physical works

Eighty-eight per cent of DFAT spending through TSSP has been on physical works, mostly funded through the DoWI Trust Account. For the TSSP maintenance program, the selection of projects for implementation through the Trust Account (and through the separate Bougainville program) has sometimes appeared to differ from the logic and principles of the RAMS analysis. Isolated sections of road inspected by the review team on the Highlands and Ramu Highways, for example, and in Bougainville, have been upgraded to seal while adjacent sections of road with apparently higher levels of traffic have not, implying that value for money had not been maximised; a similar example was reported in East Sepik. In recent years, TSSP has implemented two large projects that are departures from the TSSP design's focus on routine maintenance of national priority roads (see Chapter 2). Both projects have delivered substantial benefits to affected communities. However, neither was the subject of cost benefit analysis and it is unlikely that either would have been found to provide larger social or economic returns than projects focused on routine maintenance.

Value for money is also undermined when maintenance is unable to be sustained, whether under TSSP or DoWI. As noted earlier, the benefits of isolated maintenance projects (rehabilitation, grading, clearing drains, grass-cutting etc.) do not last long—indeed, are arguably hardly worth doing—unless optimum treatments are sustained over 10 or more years. Unfortunately, it is difficult to estimate the economic returns from individual TSSP projects. The *Roadwork, Strategic Planning and Programming Study* calculated the substantial 20-year savings in road user and agency costs that would result from alternative treatment strategies for the network (Table 5 earlier). However, the study assumes that each strategy includes a sustained program of routine maintenance and that periodic maintenance, rehabilitation

and upgrading works are completed when road and traffic conditions require them. Unfortunately, with the exception of work on Bougainville and the Eastern Highlands, most TSSP physical works have not been supported by a sustained program of subsequent maintenance, so the benefits of life-cycle management are not yet able to be demonstrated.

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## VALUE FOR MONEY IS ALSO UNDERMINED WHEN MAINTENANCE IS UNABLE TO BE SUSTAINED.

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The current TSSP workplan reflects an intent to address this issue by focusing on a smaller number of corridors. We believe this consolidation of effort could go further than it currently does, by including other LTMCs in addition to the one planned on Madang Coastal Highway. By focusing on a smaller number of corridors over a sustained period, TSSP will be better able to maintain its supported links through their full life cycle.

As the *Roadwork, Strategic Planning and Programming Study* showed, a continuation of existing budget levels will result in further deterioration of the national road network (see Figure 11 in Chapter 3). A growing number of links will become impassable more often. RAMS evaluation tools do not measure the economic and social consequences of this. Funds moved from maintenance to finance higher-cost 'high-impact' projects will hasten this scenario. In our view, it should be mandatory, therefore, that large projects be subject to cost-benefit analysis. This should evaluate not just likely changes in user costs and wider social and economic impacts, but also the opportunity cost associated with a shift in spending from the alternative of keeping a larger number of roads open through maintenance and emergency repair.

TSSP project selection and budgeting would benefit from a more transparent connection between the optimum treatments suggested by RAMS, the budgets adopted, and the works eventually contracted. Notwithstanding its data shortcomings, we understand that RAMS has been used to generate link-based treatment forecasts which in turn provide the basis for the draft National Roads Maintenance Plan (NRMP) 2016–2020, which we sighted at the end of our visit. This is a creditable outcome, but we consider that the way RAMS generates the treatments and priorities for the NRMP and TSSP programs should be made clearer and more

52 Assuming TSSP's current projections of spending on advisers and consultants over 10 years.

## Box 6 To seal or not to seal

The NTS gave priority to sealing the national road network. An unsealed (gravel) road tends to be viewed as sub-standard. If maintained properly, sealed roads offer a smoother ride, faster journey speeds and lower transport costs when compared with gravel roads. But over their lifetime they are 4–5 times more expensive in road agency costs. That is why TSSP's *Roadwork, Strategic Planning and Programming Study* found that the cost savings to road users of sealed roads only start outweighing the life-cycle costs to the road agency when traffic reaches about 300 vehicles per day. This condition applies in the Highlands Highway (where traffic on links varies from a low of 480 vehicles per day to a high of about 5,000) but not on many other rural links in the national network.

The case for sealing gets a boost from the results of recent research into the impacts of road development in PNG (Wiegand, Koomen, Pradhan & Edmonds, *The Impact of Road Development in Rural Papua New Guinea* (draft), December 2016). This study examined differences in the availability of sealed roads and various measures of welfare, income, consumption and market participation from household surveys between 1996 and 2010. Its main findings were that a 10 per cent increase in the proportion of roads that are sealed rather than gravel increases per capita consumption by 5.6 per cent, with the benefits seemingly concentrated among the poor. It also found some evidence of a transformation from subsistence farming to market-based activities. The study concludes that 'what really matters is whether a road is sealed or not'. Yet it is unclear from the draft study paper whether sealing roads *induces* a rise in income and consumption or whether areas with higher income and consumption tend to be more likely to have sealed roads by virtue of their higher level of activity and traffic.

There is no doubt that the focus on user cost savings in the *Roadwork, Strategic Planning and Programming Study* omits many of the wider community benefits of sealing roads. If these were to be included, the traffic threshold justifying sealing would likely be lower than 300 vehicles per day. But this would not necessarily justify shifting TSSP's attention from routine and periodic maintenance, which offer even higher economic returns (they effectively prevent the road from becoming impassable), to sealing. Spending more on sealing would inevitably mean spending less on routine and periodic maintenance, and more roads would become impassable. Moreover, the common assumption that sealed roads will continue to be maintained is often not borne out in practice. When sealed roads are poorly maintained, they break up badly, often causing user costs to be higher than on unsealed roads, and once they reach this condition they are much more expensive to repair.

transparent. This would also help to further strengthen the justification for maintenance spending under both programs.

RAMS is a complicated tool, the workings of which are difficult to understand by an interested lay person. It would be useful if its outputs could be summarised in the form of easy-to-understand selection criteria, generated by RAMS in the form of look-up graphs and tables. These simplified tools would set out the combination of road conditions and traffic that would warrant one treatment or another under a life-cycle maintenance strategy (see Box 6). They would also help support decisions about investment choices within the TSSP works program, while providing room for the engineering judgment of those who know local conditions best, the PMCs and DoWI's provincial engineers.

Does TSSP implement works efficiently? TSSP analysis suggests that it delivers road maintenance at one eighth of the cost of DoWI, based on a database TSSP maintains of unit construction and maintenance costs, compiled to improve cost estimates and benchmark bid prices. The data have been assembled based on a standard work breakdown structure that TSSP introduced in conjunction with improved contract documents; both have been adopted by DoWI for future projects. The unit costs are drawn from bid prices and out-turn costs for TSSP and non-TSSP projects. While they suggest that TSSP projects have achieved significant savings, differences in the composition of work items between projects make a reliable comparison difficult. It would be helpful if TSSP were to report periodically on the value for money achieved by its approach to project preparation, procurement, implementation and supervision.



Prompted by poor work-site management by contractors on DoWI projects TSSP has funded and facilitated Safety at Road Works training for small and medium sized contractors. With TSSP support, DoWI issued a 'Safe Traffic Control at Road Works' field guide, training manual and training video, which gave guidance on workplace planning, use of signage and traffic control at road construction sites.

## CROSS CUTTING ISSUES

### Road safety

Although the available data are poor, estimates suggest that PNG has very high rates of death and disability from traffic accidents, with pedestrians most affected. Over the past three years, an average of 522 deaths were reported on PNG's roads, but many accidents are unreported; the World Health Organisation has estimated the annual fatality rate is probably as high as 1,733.<sup>53</sup> This would mean PNG has 1.5 times more road deaths than Australia, yet there are only 100 thousand registered vehicles in PNG compared to over 17 million in Australia, and PNG has less than one third of Australia's population.

Road crashes are more likely on poorly-maintained roads, and when poorly-designed roads or bridges provide poor line-of-sight to oncoming traffic. Speed is also a risk factor, exacerbated by poor driver education and low standards of vehicle maintenance. Women and girls are disproportionately affected: they end up caring for disabled household members and find themselves the main source of support in the event of a family death.

Road safety was introduced as a consideration during TSSP1<sup>54</sup>, and featured in the design of TSSP2, with a focus on the National Road Safety Council (NRSC) and strengthening road safety links with DoWI and the NRA. TSSP reported some progress in helping to establish a road safety database, but there has been little evidence of progress since in terms of strengthening NRSC functions.<sup>55</sup> This is almost certainly

53 Global Status Report on Road Safety 2013

54 AusAID decided during TSSP1 to support road safety—both in terms of the management of road safety (primarily through technical advisory support to the NRSC) and to a lesser extent ensuring road safety engineering issues are considered for implementation as part of DoWI's road maintenance activities.

55 Without improvements to Police procedures for accident data collection and reporting, however, it is difficult to see how further progress with the database can be made.



**ROAD SAFETY INITIATIVES HAVE ONLY RECENTLY BEEN INTRODUCED TO THE TSSP PROGRAM, SO THERE IS NO EVIDENCE YET OF RESULTING REDUCTIONS IN ACCIDENT RISK.**

because the future of the NRSC is in doubt: legislation has already been passed (but no budget provided yet) to merge the functions of the NRSC with those of the Land Transport Division of DoTI and the Land Transport Board to form a new Road Transport Authority (RTA). The RTA is intended to be self-financing, but arrangements for taking over revenues from vehicle registration and driver licensing fees, and from compulsory third-party insurance fees, have not been finalised, as noted in Chapter 1.

Using the iRAP video survey and star rating system, however, TSSP2 has made an excellent start on addressing road safety issues by commissioning a safety assessment of 571km of the Highlands Highway and 3,796km of other priority national roads in 2015 and 2016. The ADB used the former in preparing its 10-year Highlands Highway Multi-Partner Financing Facility. The iRAP approach assesses accident risk attributable to road conditions and roadside features at 100m intervals, and gives a star rating to the safety of each link. The iRAP assessment of the Highlands Highway rated 91 per cent of the 571km corridor as 1-star (out of a possible 5 stars) for vehicle occupants and 97 per cent as 1-star for pedestrians—a damning indictment of the road’s safety standard. For locations or links at risk, countermeasures are selected from a catalogue of standard treatments, the economic impacts of which are evaluated based on relationships calibrated on data from comparable countries. A PGK635 million program of safety treatments would, iRAP estimated, reduce the number of deaths and serious injuries on the road by 64 per cent, preventing 31,000 deaths and serious injuries over 20 years.

This is an excellent starting point for including safety treatments in TSSP’s maintenance programs. TSSP intends to use the iRAP rating system to prioritise safety treatments in the works to be carried out on future upgrading, rehabilitation and maintenance contracts.

Prompted by observations of poor work-site management by contractors on DoWI projects, TSSP has also funded and facilitated Safety at Road Works training for small and medium sized contractors. With TSSP support, DoWI issued a ‘Safe Traffic Control at Road Works’ field guide, training manual and training video, which gave guidance on workplace planning, use of signage and traffic control at road construction sites.

Road safety initiatives have only recently been introduced to the TSSP program, so there is no evidence yet of resulting reductions in accident risk. With Police statistics considered unreliable, we believe that the opportunity should be taken to establish the baseline conditions of accident risk and incidence prior to upcoming projects such as the LTMC on



Example of a one star rated road for pedestrians; 97 per cent of the Highlands Highway has been assessed as being in this category.



Example of a one star rated road for vehicle occupants; 91 per cent of the 571km corridor Highlands Highways was assessed as being in this category.



An example of the discrete road safety features TSSP has introduced in its upgrade of the Momote to Lorengau Road on Manus Island.

the Madang Coastal Highway. A more substantive focus on establishing strong road safety measures, and assessing and demonstrating the benefits, would be helped by the suggested focus on fewer corridors.

### Gender equality

As shown above, the impacts of TSSP projects on women are like those on men, albeit with some differences in areas of concern and depending on location. On balance, TSSP's impact on women's lives is overwhelmingly positive.

The outcomes are less clear, though, when you examine the specific actions taken by the project to advance gender equality. Initially, it took some time for the project to develop a strategy for how it would address gender issues. This was made clear by an external review in 2009 that observed that:

*During early implementation of TSSP there appeared to be a lack of formal thought on how gender issues impact within the sector, and in particular, within TSSP. Individual advisers are reportedly doing some good informal work incorporating gender issues, this is largely invisible and the impact is unknown.*

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**THE INCOME FROM THIS WORK  
GIVES ME THE FLEXIBILITY TO PAY  
SCHOOL FEES AND BUY THE LITTLE  
EXTRAS THAT MY FAMILY NEEDS.**

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**Veronica Tasin (Team leader)**

To address this shortfall, a gender strategy was finalised in 2009, which sought to work with transport sector agencies to increase women's employment in the sector and contracting road maintenance so that women benefit financially from construction. The first tangible results of this strategy included in DFAT's annual performance reports (AOCs) did not appear until 2013, when it was reported that 'the program is progressing well against its agreed gender strategy', largely on the basis that five of eight corporate plans developed by transport sector agencies with TSSP support included performance indicators covering gender equity. However, the same report noted that the TSSP Gender Adviser position had been dropped in the transition period to TSSP2, which had affected progress.



The design for TSSP2 indicated several areas of focus to improve gender equality, including affirmative action to increase women’s participation in the program, ensuring women are consulted in decision making, and monitoring and reporting differential impacts between men and women. To pursue these, the design specified two full-time Gender and HIV/AIDS Specialists as members of the Core Specialist Team. Subsequent budget cuts meant this could not be carried forward, and ultimately only one Social Safeguards Specialist to cover all social safeguard and cross-cutting matters was specified in the Contract. Additional budget cuts since commencement of the contract and recruitment challenges have caused further delays, meaning the safeguards specialist had still not been mobilised by end 2016.

While specific advisers may do some good work, without dedicated resources, action on gender has become largely invisible in project reporting. The main exception to this has been in Bougainville, where there has been a consistent effort over time, and some visibility for gender equality in the use of community work agreements.<sup>56</sup> These have been used to provide employment opportunities for local communities in activities such as road-side vegetation control and drainage-clearing. Through these agreements,

Australia has given work and income to more than 18,000 Bougainvilleans. By directly promoting women’s employment in these agreements, TSSP has succeeded in steadily increasing the female participation rate in works to an all-time high of 33 per cent in 2015 (compared to 14 per cent in 2010).

Anecdotal evidence suggests the promotion of women’s engagement in these agreements has been effective in addressing gender equality. However, there is little systematic evidence about the precise impacts of increasing the share of female employment on women and their households. There are also questions around the efficiency of the use of community work agreements. The PMC DFAT contracts to oversee the Bougainville program reported to the evaluation team that the oversight of these arrangements is very labour intensive, accounting for roughly 90 per cent of their resources for only 10 per cent of the total value of works completed in Bougainville. On this basis, ODE considers there would be value in conducting a rigorous evaluation of the impact of the strategy of using community work agreements in Bougainville, with a specific focus on gender impacts (and with recognition given to the administrative savings derived from a planned shift to e-Cash as a method of payment). This could assess whether current arrangements consider women’s time-poverty arising from their traditional responsibilities as carers. This could also address the potential value of using the community agreement model in other locations, and of pushing contractors for higher rates of participation of women.

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**I AM PROUD TO BE A TEAM LEADER. THIS WORK IS WELL RESPECTED AND VALUED. THE WOMEN IN MY TEAM WORK HARD TO TAKE CARE OF THE ROAD FOR THE BENEFIT OF BOUGAINVILLE. THE WORKS HAVE STRENGTHENED THE POSITION OF WOMEN IN OUR COMMUNITY.**

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**Anna Vatoro (Team leader)**

<sup>56</sup> Some other positive aspects to TSSP’s work on gender promoting a ‘women in leadership’ agenda in the sector through its support for an accelerated executive mentoring program for promising women involving mentoring from senior women in TSSP and Australia’s transport sector.

In moving forward with this agenda, ODE considers it is important that DFAT define some modest, concrete and achievable outcomes that can be realised with available resources from a defined baseline. Looking at the experience of the previous gender strategy, even with dedicated resources for gender, it was never reasonable to expect that an external donor would be able to bring about a tangible increase in women's employment by transport sector agencies and there has never been any monitoring or reporting of performance in these terms. Considering available resources, the target and indicators that were recently included in the Aid Partnership Arrangement are a reasonable basis for pursuing gender equality through the project.<sup>57</sup> DFAT should ensure these targets are reported against, and do more to highlight gender impacts of the program.

## FINDINGS

Improved roads have significant positive impacts on the lives of adjacent communities and road users. Women benefit as much as men. Not all impacts are positive, but close attention to design and contract specifications will help minimise the more significant of those that are negative, mostly relating to road safety and external social and health impacts. These impacts are not monitored, though, and the program would benefit from research into how they occur and change over time. In the absence of such research, it is hard to provide an absolute measure of the value for money of TSSP's physical works program, even though the benefits of keeping roads open through routine maintenance far outweigh the small costs involved.

By establishing an ability to demonstrate the impacts of poor maintenance, TSSP has (with perseverance) helped bring about a recognition within DoTI and DoWI that, when funds are scarce, maintenance is the best thing to spend them on. Further perseverance might help translate this into better budget allocations. Success in this would pay handsome dividends, with potential savings of between AUD0.5 billion and AUD2.8 billion over 20 years.

There is a plan to address this, but to date few national roads have received sustained maintenance over a long period, whether under TSSP or DoWI. Consequently, the benefits of optimal life-cycle maintenance have not yet been demonstrated, and those works that are carried out often fall again into disrepair. TSSP's *Roadwork, Strategic Planning and Programming Study* has shown that, potentially, the associated savings in road agency and road user costs are very large indeed, but only when there is sustained commitment to a maintenance strategy along any given corridor. Without this—which has important implications for a narrowing of the focus of TSSP's works program—the benefits of money spent on individual TSSP-supported projects might soon dissipate.

The benefits of sealing are well recognised and will continue to justify such projects on roads carrying 300 vehicles per day or even lower. But this justification assumes effective life-cycle maintenance, something that under existing funding levels is not done. TSSP would be better advised to focus on rehabilitation and periodic and routine maintenance, for which the returns are greater, and to demonstrate the benefits of a life-cycle maintenance strategy in a more limited number of corridors, than to concentrate its funds on higher-cost sealing schemes. If higher-cost schemes are considered, they should be justified through a rigorous cost-benefit analysis to measure likely returns including realistic assumptions about the likelihood of effective life-cycle maintenance and consideration of economic and social benefits beyond road user cost savings. It should also recognise that funds spent on such projects will be at the expense of basic maintenance on other links which, in its absence, would become impassable more often.

The links between the RAMS analysis and the works chosen to be carried out in the field are sometimes unclear, making it difficult to assess whether the chosen option represents best value for money. There would be greater clarity if, as suggested in Chapter 4, simplified criteria in the form of look-up tables and graphs were generated by RAMS and used (in conjunction with field inspections) as the basis for decisions on what treatment to implement and what form of contract to adopt.

<sup>57</sup> The partnership agreement contains the high-level outcome of "Increased inclusion of women in the planning, design and delivery of transport infrastructure" with three indicators: an increased number of transport sector agencies implementing the Government's Gender Equity and Social Inclusion policy; proportion of women engaged through community works agreements in Bougainville; and, sustained focus on safety as a key consideration in the management of transport infrastructure systems.



PNG's road safety record is poor for a wide variety of reasons, including poorly-designed and poorly-maintained roads, low standards of driver awareness and training, uncontrolled speeds, unsafe vehicles, little separation of pedestrian movements from road traffic, and lack of effective enforcement of safety-related regulations. These are too many for TSSP to address. So its initial efforts to assess safety risk through iRAP rating surveys and to address the main shortcomings in conjunction with maintenance treatments are the right ones: they deal with those aspects of road safety that TSSP can control.

TSSP's impacts on women are like those on men, albeit with some differences in areas of concern and depending on location. On balance, TSSP's impact on women's lives is overwhelmingly positive. The outcomes are less clear, though, when you examine the specific actions taken by the project to advance gender equality. In moving forward with this agenda, ODE considers it is important that DFAT learn from past mistakes by avoiding overambitious objectives, and defining some modest, concrete and achievable outcomes that can be achieved with available resources from a defined baseline. These should be reported against.

#### Recommendation 4

To improve value for money from its physical works program, TSSP should:

- » increase its focus on demonstrating the benefits of optimal life-cycle maintenance for a more limited number of national road corridors and with greater priority given to long-term, performance-based maintenance projects
- » mandate cost-benefit analysis of high-cost projects which reduce the availability of funds for maintenance of roads that might otherwise become impassable, and require the CBA to take this opportunity cost into account
- » develop and use simplified criteria generated by RAMS as the basis for more transparent decisions on what treatment to implement and what form of contract to adopt
- » ensure that the program's gender equality targets are transparent and reported against
- » address the road safety risks identified by road safety surveys, but with better monitoring of impacts.

OVER THE LAST DECADE, THERE HAVE BEEN SIGNIFICANT EFFORTS TO PROMOTE ALIGNMENT AND MUTUAL ACCOUNTABILITY IN AUSTRALIA'S AID PROGRAM TO PNG.



## CHAPTER 6: MONITORING AND EVALUATION

This chapter examines a number of aspects of TSSP's monitoring and evaluation system, including:

- » monitoring of PNG Government adherence to partnership commitments
- » monitoring progress against shared objectives
- » monitoring implementation of physical works
- » monitoring of capacity development, and
- » use of evaluation and research.

### MONITORING PNG COMMITMENTS

Over the last decade, there have been significant efforts to promote alignment and mutual accountability in Australia's aid program to PNG. This was evident for example in the establishment of the Pacific Partnerships for Development, and in the requirement to establish and monitor progress against mutual obligations in *Making Performance Count*. Even before these policies were established, the concept design for the first phase in 2005 emphasised the importance of mutual accountability stating that the design was informed by Ministerial and senior official discussions which:

*[E]nvisage a new form of partnership that will require PNG to provide "matching funds", not in any narrow numerical sense, but following a clear trajectory toward greater assumption of its responsibilities for basic services, including maintenance of transport infrastructure. This partnership approach would need to be backed up by a clear and jointly agreed performance assessment framework for agreed priority sectors, including the transport sector.*

This emphasis was further formalised through the establishment of the Pacific Partnerships for Development, with the first one agreed between Australia and PNG in 2008. After a period where the target was set at 100 per cent, the Governments of Australia and PNG eventually settled on a target of 75 per cent of the 16 *National Transport Development Plan* national priority roads to be in good condition by 2015. This became TSSP's land transport objective from that time onwards.

### THERE HAS BEEN NO RELIABLE BASIS FOR MONITORING PROGRESS AGAINST SHARED OBJECTIVES

To provide a basis for assessing whether each partner was fulfilling its mutual obligations, schedules were developed to establish what these were. For example, the 2011 schedule for transport contains statements such as:

*The funding requirement for achieving the objectives in the Partnership will be derived primarily from: Redirection of the Government of Papua New Guinea's recurrent and development expenditures towards the Partnership priority outcomes and away from lower priority and/or ineffective programs, including allocations from funds held in trusts, and improved cost effective implementation across all programs.*

With the establishment of joint objectives and associated mutual obligations there was a need to monitor the PNG Government's budget allocations, and establish a system for communicating with the PNG Government about expectations and whether these were being met. A system was developed to support this, including communicating expectations to PNG prior to the budget via letters to the Treasurer and Planning Ministers, and meetings with other Ministers and senior bureaucrats outlining budget requests for different sectors. This was followed by detailed analysis of the budget and communications, sometimes at a senior level, about budget results. While it was not perfect, and was far from successful in all areas, it was a meaningful attempt to influence PNG Government resource allocations and assess whether budget allocations were consistent with partnership for development targets.

This approach was discontinued in 2014. At the same time, there has been a change in the quality and detail of external reporting on the PNG Government budgets. The 2013 annual program performance report (APPR) robustly discusses the challenges facing Australian aid for transport infrastructure, observes that the PNG Government's focus on routine maintenance had been inadequate and emphasises the need for robust policy discussion with counterparts to secure this funding. The 2014 and 2015 APPRs contain some discussion of the challenges in the sector, but no assessment of the adequacy of PNG's commitment to routine maintenance. In the 2016 APPR there is very limited discussion of the challenges in the sector, and no commentary on whether PNG had fulfilled its commitment to routine maintenance of national priority roads. Mutual obligations are referred to in the 2016 APPR in only very broad terms as having been established in the most recent partnership (March 2016) agreement. The schedules to this agreement, including the one for transport infrastructure, are not publicly available.

In considering options to address this, it is important to be realistic. Even when Australian aid represented a much higher proportion of available resources, the dominance of domestic political incentives in PNG meant its ability to influence PNG Government resource allocations was modest. Moreover, as is discussed in Chapter 1, with the declining importance of Australian aid as a proportion of domestic resources Australia's influence can be expected to decline.

However, it is also important to recognise that donor funding comprises a large portion of available funding in the sector at approximately 35 per cent of transport sector resources and 36 per cent of resources devoted to national priority roads. Within this, Australia provided 54 per cent of the total support from development partners in the 10 years to 2015–16.

On this basis, we think there is scope for DFAT to exercise stronger leadership with like-minded donors in the task of lobbying for budget allocations that sensibly reflect empirical analysis of projects that will provide the best social and economic returns for the resources invested. The empirical basis for doing so is already established through strong analysis by TSSP advisers in DoTI and DoWI of the quality of the PNG Government's transport budget and budget execution, capacity in key partner agencies, and progress in implementing the National Transport Strategy and Medium Term Development Plans. TSCMIC provides a platform for robust policy dialogue at a bureaucratic level about the sector budget submission, policy setting, institutional arrangements, and implementation challenges in the sector. What is currently missing is a formal structured process for communicating expectations and providing feedback on outcomes at a political level. We recommend that this be reinstated. We also recommend, consistent with the commitments in *Making Performance Count*, that DFAT report through APPRs on the adequacy of the PNG Government's commitment to routine maintenance of national priority roads, available information on the condition of national priority roads, and how it is changing.

## MONITORING PROGRESS AGAINST SHARED OBJECTIVES

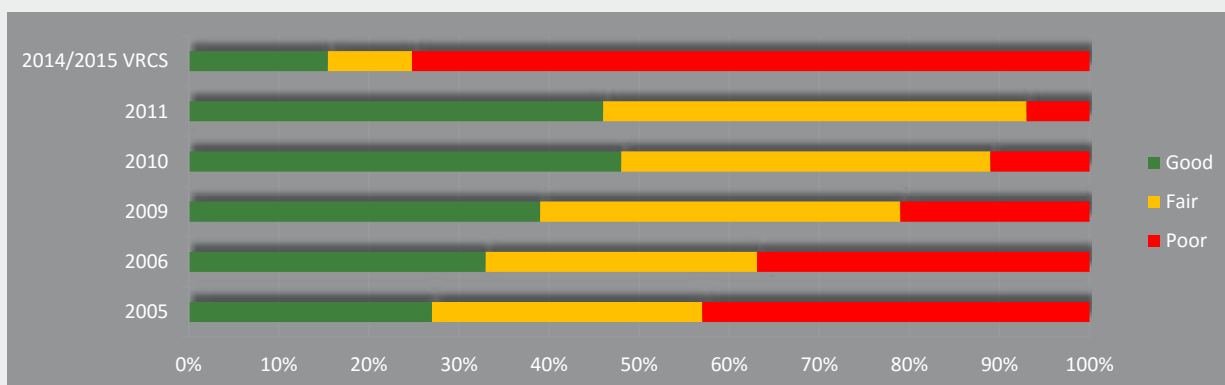
The establishment of a shared objective for TSSP increased the importance of reliable information on the condition of national roads. Attempts to establish this as a foundation for prioritising rehabilitation and maintenance programs, and determining budget requirements are longstanding, going back to the establishment of DoWI's Road Asset Management System (RAMS) in the late 1990s.

Unfortunately, despite intermittent support from multiple donors, including the ADB, Australia and the World Bank, RAMS has largely failed to become institutionalised as a key building block for planning and management of the road transport sector. In addition to some other practical implications discussed elsewhere in the report, this has meant that there has been no reliable basis for monitoring progress against shared objectives (see Box 7).

## Box 7 Monitoring progress against shared objectives

From the commencement of TSSP in 2007, optimism abounded about the extent of progress in improving the condition of the national road network, with DFAT (then AusAID) reporting large annual improvements in road condition. The proportion of national priority roads reported as being in good condition increased from 27 per cent in 2005, to 46 per cent in 2011. Over the same period, the proportion said to be in poor condition dropped from 43 per cent to seven per cent (see Figure 13). The positive trend prompted the PNG and Australian Governments to embrace the PNG Governments National Transport Development Plan objective of 100 per cent of priority national roads in good condition by 2015 when the first PNG Australia Partnership for Development was established in 2008.

**Figure 13: Reported condition of national priority roads 2005 to 2014–15**



This optimism persisted despite well-known and documented problems with the reliability of data in DoWI's Road Asset Management System (RAMS), and in particular the visual assessments that formed the basis for reported condition. For example, at the time the first stage of TSSP was being developed, the activity completion report for the project that preceded TSSP observed that:

*The DoWI's Roads Asset Management System (RAMS) output was noted but not relied upon for assessment data as it did not contain accurate and comprehensive inventory coverage of the road network in the NRBMP provinces, nor was it possible to align its information to enable priorities for maintenance to be based on relevant economic and social criteria.*

Concerns about the quality of data persisted through implementation of the first phase on the back of repeated reports from TSSP advisers and external interlocutors,<sup>58</sup> to the point where the activity completion point for phase one reported that the:

*TSSP1 design assumed that establishment and support for a RAMS and BAMS within DoWI would provide a base system for management of asset condition information. RAMS and BAMS have failed to provide TSSP1 with useable monitoring information.*

To its credit, DFAT ceased reporting road condition trends after 2011, with the 2011 APPR and subsequent reports noting the need to verify road condition data. The completion of the Visual Road Condition Survey in 2014 and 2015 paints a very different picture of the condition of the national roads, than that painted by data from visual assessments of the DoWI provincial engineers, suggesting only 13 per cent of national priority roads are in good condition, compared to the 46 per cent suggested by the visual assessment and that around three quarters of national priority roads should be correctly classified as in poor condition (against the seven per cent suggested by the visual assessment).

58 Especially the monitoring and review group which drew attention to major shortcoming of the system in its 2009 report.

To its credit, DFAT ultimately recognised the weakness of information on road condition and has conducted a comprehensive survey of the condition of the national road network that addresses this. This has generated accurate data on the condition of the road network, and a better foundation for decision making in the sector. It is important that DFAT sustains this effort. A clear lesson from the last 15 years is that DoWI administrative systems cannot be relied upon to maintain data quality and there needs to be regular comprehensive updating of data that is independent from management. A substantial contribution in this area would help to arrest the decline in statistical capacity in PNG, which has now reached a point where even Afghanistan has been assessed as having better statistical capacity.<sup>59</sup>

## MONITORING IMPLEMENTATION OF WORKS

With the exception of Bougainville, DoWI contracts out TSSP funded physical works and oversight of works, the latter to Project Management and Supervision Consultants (PMSCs). TSSP engineers monitor the procurement of these services and PMSC performance alongside DoWI staff and provincial works managers, and support DoWI to address any performance issues. DFAT established this arrangement in the first phase, and it is working reasonably well.

The phase two design included a number of provisions to strengthen them. Due to the budget reductions, several aspects of the project supervision arrangements in the design were not pursued. This includes a single contract supervision model to supervise works in all provinces, instead of the standing arrangement, which procures project supervision services through four separate contracts.<sup>60</sup> It also included plans for an independent review group to conduct periodic and ad hoc reviews of the TSSP performance<sup>61</sup> reporting to PNG Government/TSCMIC and AusAID.

A third area identified by the design for strengthening supervision arrangements was the inclusion of an independent technical audit consultancy. This was included to address the weakness of relying on visual inspection by TSSP engineers to gain assurance that works have been completed in accordance with expectations. The problem with this approach was highlighted by a review in 2011, which found that:

*Consistent with the terms of the contract between AusAID and SMEC, the TSSP ISP [contractor] and its engineering staff, in particular, see their role in this regard as strictly “capacity building” in effect, mentoring DoWI provincial engineers with a view to ensuring they follow correct procedures in verifying contractor invoices et al. While it seems TSSP engineers do undertake visual inspections of most major road works funded through the TSSP, there is no systematic auditing performed by TSSP staff of all works. At the same time however, in agreeing to pay further funding tranches into the DoWI Asset Management Imprest Account, AusAID is effectively relying on the ISP’s certification that expenditures previously incurred from the account have been appropriately verified. This is an issue that needs to be addressed under the ISP contracting arrangements for Phase 2. While all substantive contracts are competitively tendered under the TSSP, verification of all work actually performed is obviously critical to providing assurance that “value for money” is being achieved under the TSSP.<sup>62</sup>*

The phase two design included provision for an Independent Technical Audit Consultancy to address this weakness in the controls framework by sampling, testing and reporting on larger and more complex TSSP maintenance activities and generating information on the work of contractors.<sup>63</sup> DFAT has not established this arrangement yet.

59 <http://datatopics.worldbank.org/statisticalcapacity/SCIdashboard.aspx>

60 A tendering and selection process for this new arrangement was finalised and approved by the Office of the State Solicitor in July 2015 but was then cancelled before DoWI could continue further processing of the contract due to the re-phasing of TSSP funding discussed in Chapter 3.

Following discussions with DoWI and the incumbent contractors, it was agreed to implement four interim contracts on a reduced scale extendable at intervals of two months until November 2015, with two contracts extended until January 2016.

61 Including component progress, sector level progress, governance and policy reform issues, partner contributions and performance (including DoWI, NRA, Autonomous Bougainville Government (ABG), PMSC, ISP and AusAID).

62 AusAID (2011), Assessment of Financial Management Capability and Capacity, and Associated Risks and Benefits, for Assistance to PNG through the Transport Sector Support Program.

63 The phase 2 design states that: ‘The integration of ISP and PMSC inputs will be improved and DoWI supported to manage the PMSC contract more effectively than was the case in TSSP1. To ensure this, AusAID will increase its direct engagement and scrutiny in this area. Additional performance management levers will also be established including the roll out of an independent technical audit consultancy to assess the implementation of major works and make recommendations to improve quality control, work methods and value for money.’

In light of the reductions to TSSP's budget, it is understandable and appropriate that DFAT has not pursued some components of the original design. Moving forward, we consider DFAT should prioritise the introduction of a technical audit capacity within DoWI to provide a basis for independent verification that contractors have conducted works according to specification, and that they have provided value for money. DFAT's PNG program advised that technical audit capacity remains a priority for the program.

## MONITORING CAPACITY DEVELOPMENT

As discussed in Chapter 4, TSSP is reasonably well-positioned to make a strong contribution towards its core objective of capacity development in the land transport sector. Notwithstanding this point, it is also important that DFAT is realistic about the scope for donor funded projects to drive significant change in the quality of decision making and implementation across the sector. The experience of the first two phases suggests this is modest, with gains highly dependent on direct contributions from TSSP advisers, and unlikely to continue after support is withdrawn.

Unrealistic objectives have not helped in developing a careful narrative about TSSP's significant contribution to capacity in the sector. This was true regarding the establishment of a high-level target of 75 per cent of national priority roads in good condition by 2015, but is also true of lower level outcomes. For example, the end of TSSP2 outcomes in the design are worthwhile long-term objectives, but they are unlikely to be achieved to any meaningful extent by 2019. (Consider, for example, the objective that 'DoWI is managing a prioritised program of maintenance and upgrading for priority national roads in line with Partnership for Development and MTDP targets'.)<sup>64</sup> As such they are less useful as a basis for prioritising the use of aid resources and demonstrating how they have contributed to these outcomes.

DFAT's PNG program advised that they were realistic about the ability of the program to influence the political and institutional dynamics that have prevented a more effective prioritisation and use of land transport resources and agreed that program documents needed to better reflect this realism. Some steps have been made in the right direction with the recent revisions to the TSSP monitoring and evaluation plan, but these could go further. This would help the program to be clearer about the importance and scope of its direct contributions of capacity to the sector and to better monitor and evaluate the quality of these contributions.

## EVALUATION AND RESEARCH

TSSP has conducted a reasonable amount of evaluation and research, including some strong studies to generate much needed primary data (iRAP/VRCS), assess policy and budget settings (budget and road network cost analyses), address technical issues (benefit cost analysis on sealing versus grading roads), and evaluate impact (performance story implementation report). As would be expected, the quality of research and evaluation has varied but, taken as a whole, TSSP has generated a good body of evidence about issues and conditions in the land transport sector, and the direct contributions it has made. Through experience a lot has been learnt, including about the fundamental importance of collecting basic data on network conditions and use, but also about research and evaluation approaches that are likely to be more or less effective in a PNG context (Box 8).

<sup>64</sup> Other objectives are similarly unrealistic: NRA has increased capability to deliver its mandate and, should increased funding be available, maintain significantly increased kilometres of national roads; a prioritised program of road maintenance in Bougainville is being delivered, with increased Autonomous Bougainville Government capacity to plan and manage the program.

## Box 8 Evaluation approaches employed by TSSP

There have been two significant evaluations conducted by TSSP of the impact of roadworks. The first was an expensive socio-economic impact study, which included a comprehensive baseline study, and follow-up impact evaluation with affected communities and control groups, and implemented by a very large international infrastructure consultancy firm. The baseline study and follow-up administered over 1000 eight page surveys to households from 40 villages across 10 provinces, producing an enormous amount of data.

In spite of the scale of the investment, the evaluation struggled to develop a coherent narrative about change in affected communities. Data was contaminated by control villages up-rooting and moving to newly improved roads (a significant finding in itself). Given the problems of access to target populations and problems in supervising enumerators, there were likely to have been errors in data collection. As a result of one or both problems, the evaluation produced surprising and illogical findings, including the finding that there was no clear difference in changes to household incomes or access to markets between experimental and control groups. The report is convoluted, and it is difficult to identify its key findings and recommendations.

By contrast a more modest evaluation produced at a fraction of the cost of the socio-economic impact study was far more successful in producing useful results. The use of a rigorous qualitative method collected and analysed data from 124 interviews with community members in six villages across three provinces, focusing on identifying positive and negative changes that had resulted from the road improvements. This produced results that were simple and compelling, and helped to reinforce, amongst other things, the importance of measures to improve road safety for pedestrians, which was consistently highlighted as a concern by beneficiaries. These findings were workshopped and disseminated to different levels of government, and helped to build a stronger commitment to better road safety provisions in road developments.

To achieve better outcomes from available resources for evaluation and research, there would be value in spending more time on planning and prioritising evaluation, research and data collection projects, so that there is a balanced coverage of the most important issues facing both the project and the sector. This lack of holistic thinking and planning around the use of available evaluation and research resources can result in some imbalances and omissions. For example, there was no preparation for what should have been a routine evaluation of the costs and benefits of the Oro Bridges project, the single largest TSSP investment. While a study of the project is being progressed, it would have been preferable to do so with the benefit of real, rather than reconstructed, baseline data.

As discussed in Chapter 5, we believe there should be a more systematic focus on evaluating impacts and the sustainability of those impacts. We also believe there would be significant value in establishing a reliable stocktake of expenditure in the sector, given the unreliability of expenditure records identified in Chapter 3.

DFAT's PNG program advised that the evidence built by TSSP to date has been structured logically and with a process in place to build on this evidence base. We agree that some solid and important work has been done, and that there is now a structured process for developing a balanced program of research and evaluation work. However, we would expect that this would be more advanced by three years into the second phase of a large project. To get better value from available resources, TSSP should establish a combined monitoring, evaluation and research plan that sets out how it will balance the task of basic data collection, with a rolling program of research and evaluation studies addressing individual projects and sectoral policy issues. This plan should outline how evaluation of value for money can be improved, through better incorporation of simple cost benefit analysis metrics in post project evaluations. The plan should also be costed, so that resource parameters are clear, and priorities can be set accordingly.



## FINDINGS

There has been a progressive erosion in the robustness of official discussion about the PNG Government's performance in fulfilling partnership agreement commitments.

Systems in DoWI for tracking progress towards shared high-level objectives have failed to provide reliable data. DFAT has done good work to address this. This work should be scaled up.

There is scope for DFAT to exercise stronger leadership with like-minded donors in lobbying for budget allocations that sensibly reflect empirical analysis of projects that will provide the best social and economic returns for the resources invested.

Systems to monitor implementation of works are working reasonably well. They should be strengthened by developing

within DoWI an independent technical audit capability to verify that contractors have conducted works according to specification, and that they have provided value for money.

Monitoring of capacity development should focus on delivery of concrete contributions to capacity in the sector and objectives should reflect this.

While it has taken some time, DFAT has a structured process for developing a balanced program of research and evaluation work for the project. To get better value from available resources TSSP should establish a combined monitoring, evaluation and research plan that sets out how it will balance the task of basic data collection, with a rolling program of research and evaluation studies addressing individual projects and sectoral policy issues.

### Recommendation 5

To strengthen the basis for mutual accountability and transparency over PNG Government commitments, TSSP should:

- » establish a formal structured process for communicating expectations about the PNG budget and providing feedback on budget outcomes at a political level
- » report progress by the PNG Government in fulfilling its partnership agreement commitments to provide adequate funding of road maintenance in Aid Program Performance Reports
- » report available information on the condition of national priority roads, and how it is changing in Aid Program Performance Reports

### Recommendation 6

To strengthen accountability and learning outcomes from monitoring and evaluation, and support evidence informed decision making DFAT should establish a costed and prioritised plan for evaluation and research for the remainder of TSSP with an increased emphasis on strengthening assessment of the program's value for money and its impact on people's lives.



THE BIGGEST INFLUENCE ON  
MANAGEMENT OF NON-NATIONAL  
ROADS IS PNG'S ONGOING  
DECENTRALISATION.

## ANNEX 1: FUNDING ARRANGEMENTS FOR NON-NATIONAL ROADS

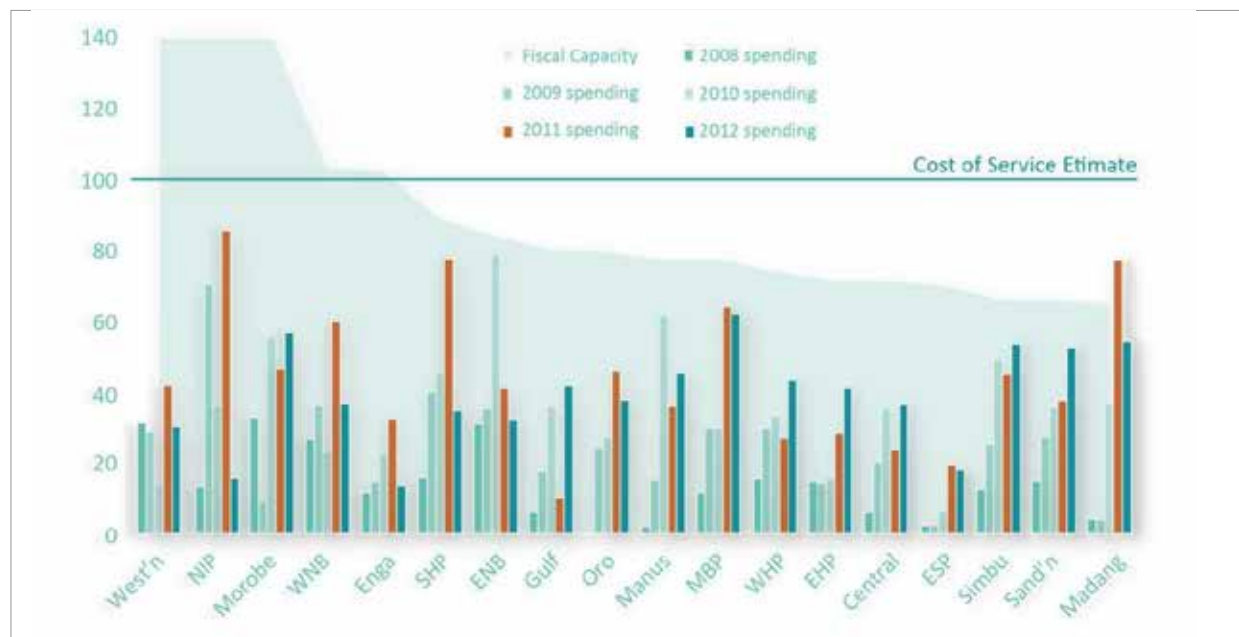
The biggest influence on management of non-national roads is PNG's ongoing decentralisation. The 1995 Organic Law on Provincial and Local Level Governments (OLPLLG) transferred responsibility for a wide range of service provision responsibilities to provincial and below them, local level governments. The ensuing Determination of Service Delivery Functions and Responsibilities assigned responsibility for management of non-national roads to provincial governments. However, adequate funding did not follow. Starved of funds, non-national roads fell into disrepair.

The National Economic and Fiscal Commission's *Cost of Services Study* (2005) alerted government and donors to chronic underfunding of basic services at the sub-national level. National government funding to lower levels of government to perform their functions increased in response, aided by increasing revenues. Recognition of

inequitable funding between provinces led to further reforms in 2008, with the introduction of needs-based grants to the provinces (these took into account the cost of services and the revenue-raising capacity of different provinces). This saw further increases in national government 'function grants' to lower levels of government, which rose from PGK140 million in 2009 to PGK578 million in 2016.

However, for a range of reasons, implementation has been lacking. Transfers of funds from central government are often made late in the year. Capacity within provincial governments varies, but is generally poor. This is reflected in low expenditure relative to the estimated cost of service delivery, evident in Figure 14, which tracks provincial government infrastructure maintenance spending (the bulk of which is for roads). There is very poor reporting on the funds that are spent.

**Figure 14: Spending on infrastructure maintenance relative to cost of services estimate**



Source: NEFC, Provincial Expenditure Review 2012

A more recent development is the large increases in constituency development funds (called 'Service Improvement Programs' or SIPs) provided to Members of Parliament for development projects in their electorates.<sup>65</sup> To support spending of SIP funds at the district level (districts form the electoral boundaries for 89 of PNG's 111 Members of Parliament) new administrative units have been created in the form of district development authorities. The funding allocated to Members of Parliament dwarfs earlier increases in function grants provided to provincial administrations. Function grants to provincial governments in 2016 totalled PGK508 million, while SIP funding for provinces and districts was PGK1.3 billion (PGK890 million for 89 Open Members, and PGK445 million for 22 Governors).<sup>66</sup>

The SIP funds have been subject to considerable criticism. The Australian National University—National Research Institute (ANU–NRI) Promoting Effective Public Expenditure surveys found that significant numbers of projects funded using SIP funds were not completed. In Gulf province (a particularly poor performer) completion rates for SIP projects were 25 per cent for schools, and zero per cent for health clinics. An Auditor-General audit of SIP spending concluded in 2012–13 that there had been 'limited value from the DSIP funds granted when measured against the original investment criteria', and that there was a 'pervasive breakdown in the DSIP governance framework across the Districts'. Of PGK440 million spent that year, over PGK116 million was 'spent on projects where expenditure is unsupported or projects that are incomplete/abandoned', and PGK67 million of spending lacked supporting documentation.

65 DSIP/PSIP Guidelines stipulate how these funds should be spent by sector. 30 per cent of funds are supposed to be spent on infrastructure, while 10 per cent is allocated to administration associated with spending these funds. In practice, a significant portion of DSIP/PSIP is spent on recurrent activities, despite this being contrary to the Guidelines.

66 Local Level Governments also normally receive small amounts of SIP funding (PGK30,000 in each LLG in 2016). In the 2017 budget this was cut and replaced by a PGK10,000 grant to Wards, which sit below LLGs.