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Road Management Reform: The Papua New Guinea Road Fund and National Roads Authority

Abstract

Road management and funding in Papua New Guinea has been deficient for many years, resulting in the deterioration of the road network. The Government of Papua New Guinea, with the support of development partners, has sought since 2003 to commercialise road management in order to address the problem through the development of a Road Fund and National Roads Authority. This paper examines the establishment of these organisations and their impact on road maintenance. It finds that reforms aimed at commercialising road management have been undermined by a lack of support from political leaders and parts of the civil service, and that the newly established road management organisations remain marginal as a result. A number of policy lessons are discussed.

I. Introduction

The poor state and limited reach of the road network is one of the greatest barriers to economic development faced by Papua New Guinea (PNG). Limited access to transportation prevents access to markets, and to health and education services. An analysis of household income and expenditure data show that the inability to access roads is positively correlated with higher incidence of poverty (Gibson & Rozelle 2002).[1] In the *Doing Business Survey*, Papua New Guinean businesses identified the state of transport infrastructure as the third most significant constraint to business activity and investment, marginally lower than law and order issues and corruption (Asian Development Bank 2014).

The primary reason for the poor state of PNG's road system is deficient road management and funding. Funding for road maintenance in PNG more than halved in the 20-year period after independence due to the decisions of political leaders with the result being the deterioration of the road network (Kwa, *et al.* 2009). Per capita infrastructure spending by government fell in real terms (2011 Kina) from approximately K250 in 1975, to K30 in 2001. The effect of this dramatic fall in funding was that links to rural communities were cut, adversely impacting livelihoods, education, and healthcare provision.

[1] This data was collected as part of the 1995–1996 PNG Household Survey. Similar analysis of subsequent household income and expenditure surveys was not possible due to non-inclusion of a question on distance from road infrastructure.

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Papua New Guinea's experience with road management and funding is not unique. Road management is deficient in many developing countries despite widespread recognition of the important role that road infrastructure plays in facilitating economic development. The underlying reasons for poor management are largely political. Governments often fail to allocate sufficient funding toward road maintenance, an important component of road management, given short-term political imperatives that are sometimes associated with political clientelism. This creates resource constraints and contributes to limited capacity and accountability among road management agencies, with adverse impacts on road infrastructure. There are long-term economic and social costs associated with the deterioration of road infrastructure, which are largely borne by road users. It is estimated that for every dollar required for road maintenance that is not spent, there is an increase in vehicle operating costs in the order of two to three dollars (World Bank 2007a).

Development partners have argued in some countries for the commercialisation of road management as a means of addressing poor road maintenance. Commercialisation can involve the establishment of road funds which are used to earmark government revenue for maintenance and, in some cases, construction of road infrastructure. In the case of second generation funds, an independent road agency that is responsible for road management is also created. Such reform is a direct response to the failure of governments to allocate sufficient funding toward road maintenance, with earmarking in effect being an attempt to de-politicise road management by transferring responsibility for funding and road management decisions away from political leaders.

The Government of Papua New Guinea passed legislation to create a road fund in 2003. As in other countries, the establishment of the Road Fund was a response to the poor state of road management in Papua New Guinea (PNG). The establishment of the PNG Road Fund was designed to address this deterioration by providing a consistent source of funding for road maintenance. A National Roads Authority overseen by an independent board was also established in order to plan, manage and procure maintenance activities.

This paper is the first independent study of the PNG Road Fund and the National Roads Authority. Section II discusses the political economy of road management, as well as the objectives of, and experiences with, the establishment of road funds in other countries. Section III considers reform in PNG, providing an overview of road management and a history of reform over the last decade. Section IV discusses the impact of the PNG Road Fund and National Roads Authority and concludes with some policy lessons.

II. Road management and reform

A. The political economy of road management

Road infrastructure, and transport infrastructure more broadly, is important for economic development, providing access to trade and employment opportunities, and to health and education services (Asian Development Bank 2011; Bryceson, *et al.* 2008; Straub 2011; World Bank 2007a). Despite this, road infrastructure is deficient in many developing countries (World Bank 1994; World Bank 2007a). An ongoing issue is poor management of transport infrastructure, and in particular, inadequate maintenance. As early as 1977, the OECD Development Assistance Committee lamented the failure of developing countries to fully finance recurrent costs related to donor-funded infrastructure projects (OECD DAC 1977). The World Bank subsequently explored underfunding of infrastructure maintenance in a number of papers (Heller 1979; World Bank 1979; World Bank 1981).

Roads closely match the definition of a public good. Road management, including maintenance, has therefore traditionally been a government responsibility. There are a number of reasons why governments may not perform these functions adequately. Capacity constraints adversely impact planning and implementation of road maintenance, due to lack of technical 'know-how', a rigid civil service structure, and limited accountability resulting from unclear roles and responsibilities. Funding constraints contribute to these issues. Lack of money undermines accountability, as road deterioration can always be blamed on inadequate funding. It also makes difficult the development of private sector road contractors, which are reluctant to invest in a sector where funding is uncertain (Pacific Region Infrastructure Facility 2013).

The preferences of political leaders are important in explaining underfunding of road maintenance, although fiscal constraints are also a factor. Governments fail to allocate necessary funding despite clear economic arguments in favour of prioritising road maintenance over construction of new roads. The PNG Department of Works and Implementation estimates that $1 spent on routine maintenance saves $4–5 in rehabilitation costs (PNG Department of Works 2014). Political economy factors can help to explain such seemingly irrational behaviour, as can intertemporal inconsistency. Road maintenance activities are often said to have 'low visibility', relative to spending on education and health services; whereas reducing expenditure on the latter has an immediate impact on services, reducing funding for road maintenance commonly only affects road quality in the medium to long run (Carruthers 2005; Heggie & Vickers 1998). Governments therefore suffer immediate political repercussions when reducing spending on health and education, but not road maintenance. At the same time, investments in new infrastructure generate greater political rewards in the short-term than spending on maintenance (Pacific Region Infrastructure Facility 2013).

B. Road funds and the commercialisation of road management

A number of development partners sought from the mid-1990s to commercialise road management in response to ongoing problems with road maintenance and the limited success of earlier capacity building efforts (Harral, *et al.* 2011; Torres Martinez 2001; World Bank 2007b). Two influential papers written by Ian Heggie and Piers Vickers argued that road management should be operated like a fee-for-service business, with road users charged fees that would be channelled into road management, and in particular, road maintenance (Heggie 1995; Heggie & Vickers 1998). Heggie and Vickers also sought for road agencies to be given greater autonomy from government and for road management activities to be outsourced to the private sector.

An important aspect of the reforms proposed by Heggie and Vickers involved the establishment of second generation road funds. Road funds were not new, having operated in countries such as Japan, the United States, and New Zealand from the 1950s. A number of Sub-Saharan African countries had established road funds in the 1980s in order to improve road maintenance, often with the support of the World Bank. The results were generally disappointing, with earmarked (or hypothecated) revenues often allocated by governments to other sectors, or misspent by road agencies that were not subject to proper oversight (Potter 1997; World Bank 2007b).

The 'second generation' road funds that commenced in 1993 with the establishment of the Zambian road fund differed from these 'first generation' road funds in several important aspects. Second generation road funds were characterised by strong links between user fees and road management spending, with user fees channelled directly to a road fund and not through consolidated revenue (Carruthers 2005). Another difference involved oversight of the road fund by a board with road user representation; a structure that facilitated road user input into the management of revenue. A third point of difference was that second generation road funds were part of a broader set of reforms intended to increase private sector participation in road management activities outsourced by independent road management agencies.

Commercialisation of road management was therefore not only about funding maintenance in contexts where governments lacked incentives to provide adequate funds. It was also about changing the way that planning and implementation of maintenance and other road management activities occurred. An important theme in these reforms was the de-politicisation of decisions relating to both: (i) funding for road management, especially road maintenance; and (ii) day-to-day road management (Heggie & Vickers 1998). This objective was not welcomed by all. There continues to be considerable opposition to road funds, on the basis of arguments that government spending should be determined by a parliament which is accountable to the electorate. There is also a widespread view that establishing a road agency results in unnecessary duplication in countries where existing road management capacity is weak.

The World Bank supported the establishment of these second generation road funds from the 1990s in various contexts. So too did the Asian Development Bank and other regional bodies such as the United Nations Economic and Social Commission for Asia-Pacific, and the Economic Commission for Latin America and the Caribbean (Asian Development Bank 2003; Gwilliam 2011; World Bank 2007a; World Bank 2007b). Even the IMF, which had traditionally opposed hypothecation, supported the establishment of second generation road funds subject to strict conditions and in certain circumstances, such as where public financial management was weak (Potter 1997).

The region where second generation road funds became most prevalent was Sub-Saharan Africa, given a generally poor record of road management and ongoing development assistance to the sector (Benmaamar 2006; World Bank 2007b). The impact of second generation road funds on road management was mixed, but in general, more positive than the experience with first generation road funds. Results were especially positive in Sub-Saharan Africa, where a World Bank study concluded that:

> Road funds have been generally effective in Sub-Saharan Africa in raising sufficient funds to support timely maintenance through a direct linkage to expenditures, especially where they function in combination with an autonomous road board. But the Heggie-Vickers 'commercial' model has not caught on world-wide (Harral, *et al.* 2011).

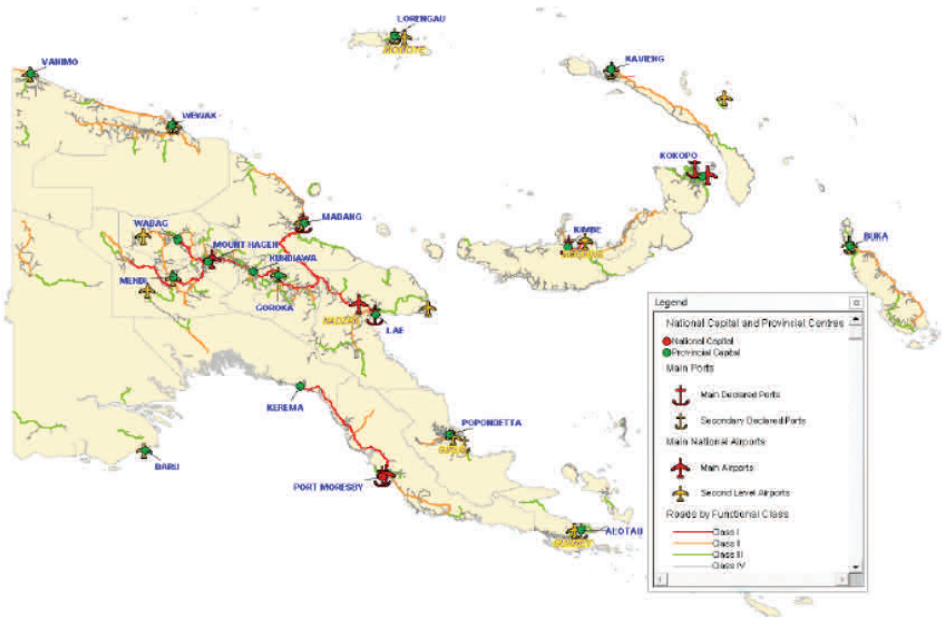
Road funds increased maintenance spending in Sub-Saharan Africa, but a lack of autonomy in other regions hampered their impact (Gwilliam 2011; Harral, *et al.* 2011; World Bank 2007b). Road funds were less effective where existing civil service organisation continued to be responsible for road management, as these organisations were often burdened by civil service procedures and a lack of trained personnel (Gwilliam 2011). Evaluations also found considerable bias against rural feeder roads among road funds; most road funds were established with a mandate to manage primary roads but not rural roads (World Bank 2007b).

III. Road management in Papua New Guinea

A. Context

There are approximately 30,000km of roads in PNG. The national road network comprises 9,000km of roads deemed important to the national economy, which fall under the jurisdiction of the PNG Government. The remaining 21,000km are local roads which are managed by provincial governments with some assistance from the PNG Department of Works and Implementation. The road networks have limited reach, as illustrated by the fact that Port Moresby is not connected by road to Lae (PNG's second largest city) or the highlands region (the agricultural heartland of PNG) (see Figure 1). PNG is the only country in the world where the two largest cities are on the same land mass but not connected by road.

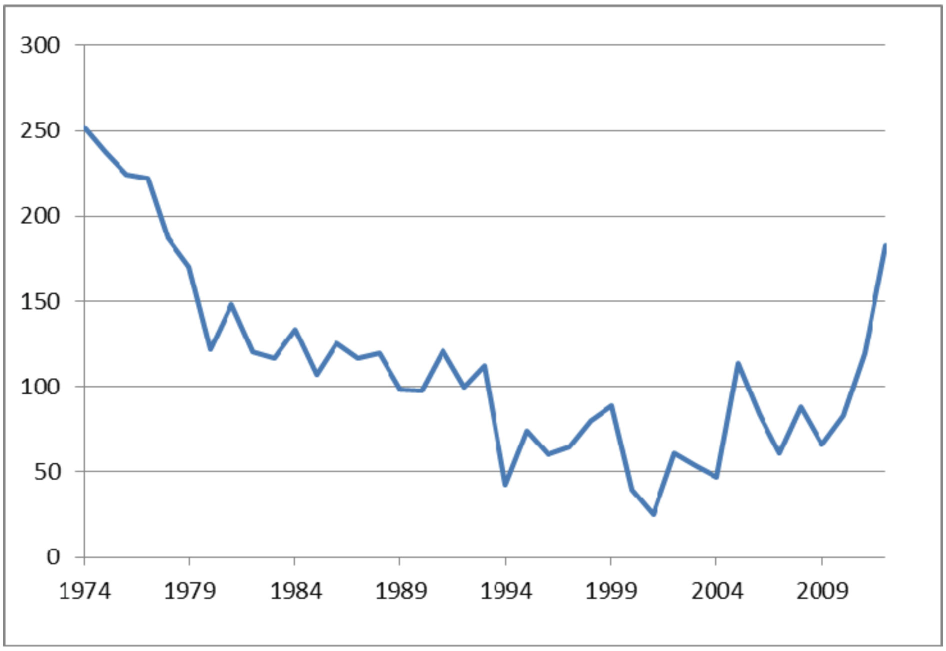
Figure 1. Map of PNG's road network



Source: PNG Department of Works (2014)

The road network in PNG has suffered from a lack of maintenance over many years. Successive governments in the 1980s–1990s reduced road maintenance funding, notwithstanding an increase in traffic volumes. This reduction was mirrored by broader declines in infrastructure spending, as shown in Figure 2. Similar data on road maintenance spending are not available prior to 2005, but it is widely acknowledged that maintenance spending also fell dramatically over this period.[2]

Figure 2. Government expenditure on infrastructure, per capita (2011 Kina)



Source: Batten (2009) and Swan and Mako (2014).[3]

The consequence of the decline in maintenance spending, coupled with PNG's rugged topography and high rainfall, has been a dramatic deterioration in the condition of the road network. In 2007, only 35 per cent of national roads were in good condition, meaning that they were passable by a two wheel drive vehicle in wet weather. Data are not available on the state of provincial roads, although it is widely accepted that these are in considerably worse condition than national roads. The PNG National Budget (2013a) offered the following sombre assessment:

> Papua New Guinea's transport networks are failing. Major roads, including the crucially important Highlands Highway, have deteriorated alarmingly, raising the costs and reducing the availability of transport services. Communities … are becoming more isolated because of deteriorating physical infrastructure. In all transport subsectors, *the dilapidated state of infra-structure is largely the result of inadequate maintenance and poor management over a long period*. (emphasis added)

Inadequate funding also reduced capacity to plan and implement maintenance activities in PNG. The Department of Works and Implementation (DoW) bore the greatest effect, as the government agency traditionally responsible for maintenance of national roads.[4] Poor salaries and conditions led many skilled DoW staff to leave the agency for employment in the private sector, where remuneration for engineering and accounting professionals is higher. Development of the private sector was also limited by the inconsistent provision of maintenance contracts, and a resources boom which made it difficult to recruit skilled professionals such as engineers to the road sector given attractive salaries in other areas

2. Department of Works and Implementation data on road maintenance spending channelled through the recurrent budget show a decline from K160 million in 1989 to a low of K15 million in 2003. However, this measure considered on its own is misleading as there was also a shift toward funding of maintenance through the development budget in the same period (Interviews with Department of Works: 2012, 2014).
3. Batten first calculated spending through to 2006 based on budget documentation. Swan and Mako (2014) adopt a similar methodology in order to calculate spending through to 2014.
4. DoW was formerly known as the Department f Works and Transport.

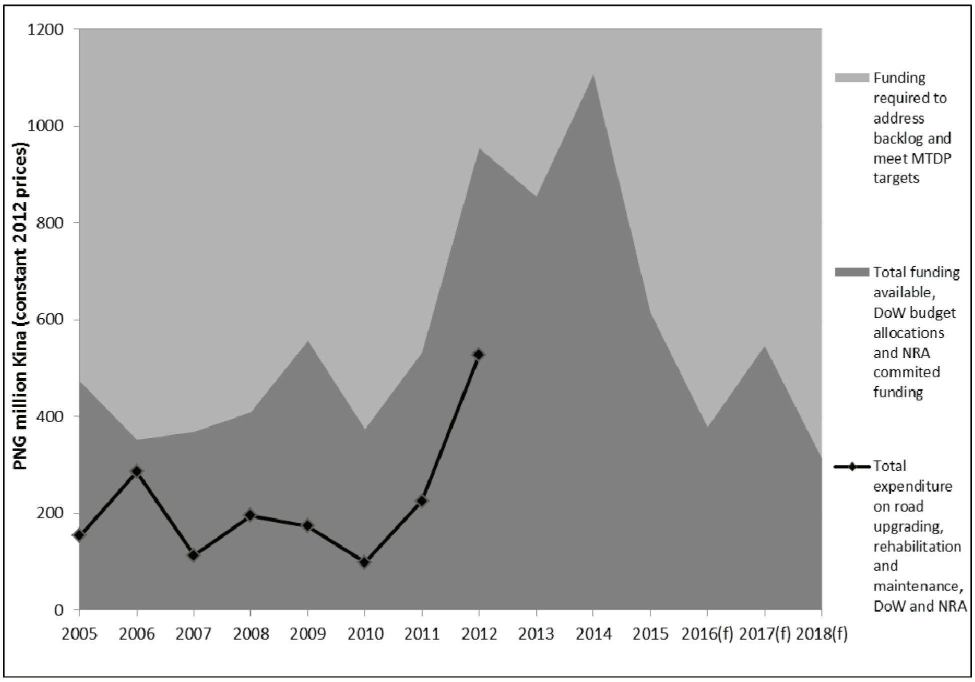
(Government of Papua New Guinea 2010; Lucius 2010). Reforms designed to facilitate the outsourcing of road maintenance activities therefore had limited impact, given lack of contract management expertise in DoW and capacity constraints in the private sector (Government of Papua New Guinea & World Bank 2004; Lucius 2010; PNG Department of Works 2014).

Other factors have also adversely affected road management in PNG, creating a dichotomy between planning and implementation of road management activities. Corruption is widely regarded to be a problem, and is a contributing factor in the poor quality of maintenance undertaken. Limited competition between contractors has driven prices higher, while negotiating road work and the sourcing of raw materials with landowners can be a challenge (Lucius 2010). Maintenance that is undertaken often faces considerable delays and cost overruns as a result (and due to other issues such as weather conditions in the highlands). The DoW reports that final expenditure over 50 per cent of contract value is not uncommon (Interviews with DoW: 2012, 2014). Bureaucratic obstacles to expenditure are also significant. Expenditure over K300,000 must be approved by the Central Supply and Tenders Board and the Solicitor General’s Office. An additional step is required for expenditure over K10 million, which must be approved by the National Executive Council comprising cabinet ministers. Proposals considered by the National Executive Council are frequently altered on the basis of political priorities. The DoW reports that a timeline of 40–50 weeks is the norm for contracts over K10 million in value, and that delays can result in the Ministry of Finance reallocating funds or reducing future funding (PNG Department of Works 2012).

B. Road management funding and reform

The 2010 Budget saw significant increases in funding for maintenance and rehabilitation of national roads commencing in that year. Figure 3 shows historical funding allocations and spending on rehabilitation and maintenance of the 9,000km national road network. The light area shows the difference between budget allocations for maintenance and rehabilitation, and what PNG’s 2011–2015 medium-term development plan (MTDP) estimates is needed over four years to achieve the ambitious targets that it established. If less ambitious, and arguably more realistic, targets are adopted, as in the National Transport Strategy, annual funding required for maintenance and rehabilitation of roads between 2011–2015 is K1,017 million: K634 million of which is for the national road network.

Figure 3. PNG Government funding for road maintenance



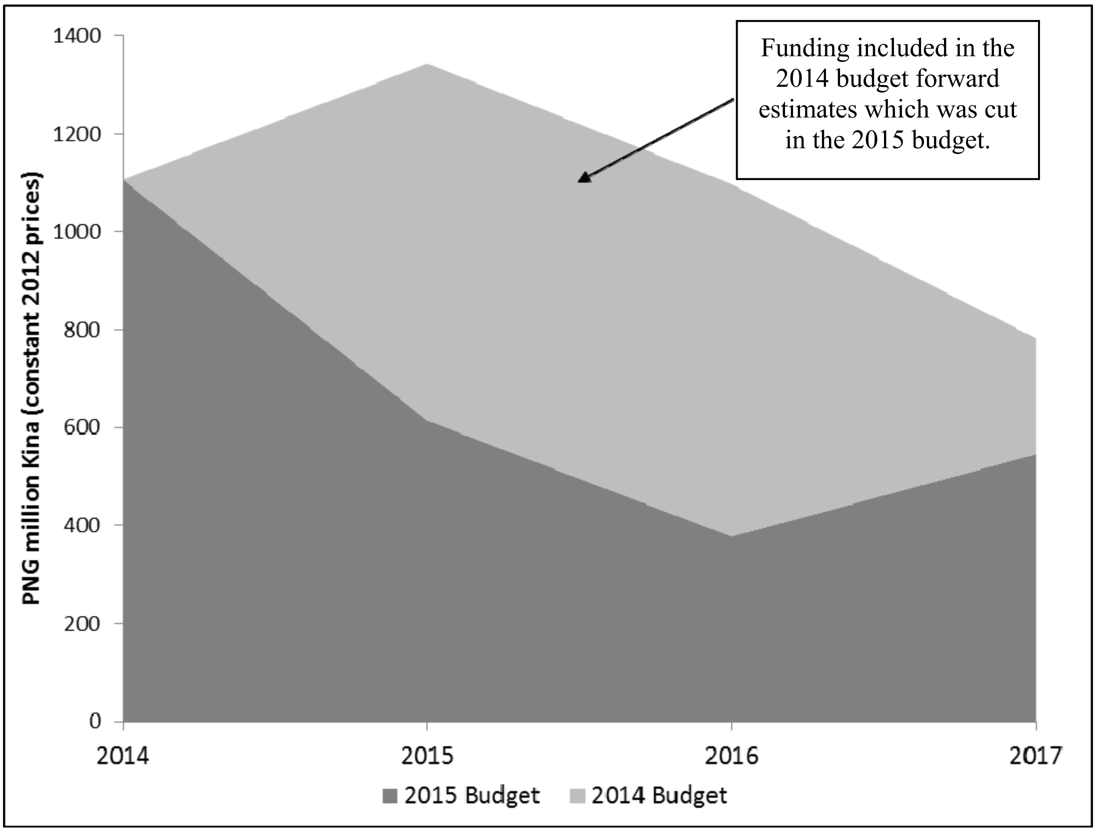
Source: Compiled by the author on the basis of PNG budget papers, and data provided by the Department of Works and Implementation, and National Roads Authority.

* Funding required to address backlog and meet MTDP targets would be required over a five-year period. Funding available to DoW and NRA, as well as total expenditure, are primarily for national roads, however some projects also focus on local and provincial roads. It was not possible to disaggregate this data. Expenditure figures are based on data provided by DoW to 2012; data for 2013–2014 are not publicly available. Funding covers all costs associated with road management, including the cost of plant, equipment, and labour.

The 2014 budget allocation for maintenance and rehabilitation the first time almost equalled for what is recommended by the MTDP, and exceeded what is proposed in the National Transport Strategy. Increases in overall funding were due primarily to government funding allocations; assistance from development partners measured 27 per cent of total funding in 2014, down from 38 per cent in 2005 (Department of Works and Implementation figures, various years). Actual spending on road maintenance and rehabilitation continued to be below what was budgeted; however, it did increase, suggesting that the capacity to implement maintenance/rehabilitation work on the ground expanded with higher funding for these activities (data is not available after 2012).

The road funding situation has subsequently changed as a result of the 2015 Budget. Funding for maintenance and rehabilitation of roads and bridges declined significantly, with funding available in 2015 44 per cent lower than in 2014. The forward estimates include additional declines in funding for road maintenance and rehabilitation. These spending cuts are also significant: funding for road maintenance and rehabilitation has been cut by K1.69 billion between 2015 and 2017, as shown in Figure 4. In 2018, funding allocations will measure just 28 per cent what was available in 2014.

Figure 4. Road maintenance and rehabilitation funding: Budget forward estimates



Source: Compiled by the author using data contained in PNG budget papers.
Note: Funding covers all costs associated with road management, including the cost of plant, equipment, and labour.

There are some caveats to note when considering budget data. First, there continues to be a dearth of available information regarding spending on routine maintenance as opposed to rehabilitation. Second, it is difficult to separate funding directed toward national and provincial roads in the budget documents, which means this data is likely to overestimate allocations to the national road network.[5] Third, medium term budgeting is still being developed in PNG, which means that forward estimates are not very reliable.

[5] Figure 3 incorporates the best estimates of the DoW.

The general trends in funding of road maintenance and rehabilitation are clear despite such caveats. Funding increased rapidly in recent years, rising to record levels, only to fall equally quickly in 2015 and afterwards. The reasons for the increase and subsequent decrease in road maintenance and rehabilitation funding allocations are various. The current government has highlighted infrastructure as a government priority, allocating more funding than ever before to infrastructure development in 2014. This was in a period when government spending also reached record levels, with the promise of future revenue increases resulting from the US$19 billion Liquid Natural Gas project.[6] Since 2014, Papua New Guinea's medium term economic prospects have weakened considerably. The fall in the international price of oil has also affected prices for Liquefied Natural Gas, which will reduce government revenue from the LNG project by an estimated K1.1 billion in 2016 (or, about 9 per cent of total domestic revenue) (Flanagan & Howes 2015). A loan that the government secured in 2014 in order to secure an equity stake in the project has further increased its exposure to such price volatility.

Fiscal considerations are paramount in explaining funding allocations for road maintenance and rehabilitation in PNG. However, other factors have also played a role. Funding for maintenance and rehabilitation of existing roads, as opposed to construction of new roads, rose under the former Treasurer (who oversaw the budgets of 2012–2014) — an engineer and former Minister for Works who had argued for increasing maintenance funding in the past. Public financial management reform was also arguably a factor. The integration of the recurrent and development budgets helped to combine the road management choices of government, making clearer the choice between maintenance/rehabilitation, and new roads. The development of a medium term budgeting framework provided certainty regarding road maintenance funding in future years, enabling the private sector to invest in equipment. This facilitated the increase in actual road management activity shown in Figure 3 to 2012, as did reform of the Department of Works and Implementation, which established regional offices for road works, strengthened important institutions such as the asset management branch and audit committee, and developed a raft of human resource policies and procedures (Government of Papua New Guinea 2013b; PNG Department of Works 2014).

IV. The Road Fund and the National Roads Authority

A. Establishment

The PNG Road Fund and its supporting agency, the National Roads Authority (NRA), were established by the *National Roads Authority Act (2003)* with the objectives of ensuring an ongoing and reliable supply of funds for road maintenance, and in order to direct that funding 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" (Government of Papua New Guinea 2010). These goals were consistent with those of the Heggie and Vickers model, which sought to de-politicise both funding allocation and broader road management decisions.

There were significant delays in the actual establishment of the Road Fund and the NRA, despite the requisite legislation passing parliament in 2003. Actual segments of road were only placed under the responsibility of the NRA in 2009. The Road Fund targets the national road network. An independent board of directors oversees the Fund's operations, and comprises seven representatives from road user organisations and four civil servants from the major road sector agencies. The *National Roads Authority Act (2003)* stipulates that the chair of the fund must be always someone from the private sector.

6. This is due in large part to a US$19 billion Liquid Natural Gas project which has resulted in strong economic growth and the promise of future revenues (the full benefits of which will not be received until after the government repays a loan used to secure its equity stake in the project).

The establishment of the PNG Road Fund and the NRA differed to the original proposal for separate management of the Road Fund and the National Roads Authority, which would have been consistent with the second-generation model advocated by Heggie and Vickers (Government of Papua New Guinea 2010; Heggie 1995; Heggie & Vickers 1998). The *National Roads Authority Act (2003)* instead combined 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.

Revenue sources for the PNG Road Fund were also not set up as originally intended. The PNG Road Fund currently receives revenue from the earmarking of an existing 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). No revenue is available from additional levies on diesel or other fuels, heavy vehicle charges, or vehicle registration fees: measures that had been anticipated when the PNG Road Fund was established, and some of which were approved by the National Executive Council, but were never implemented (Government of Papua New Guinea 2010). The PNG Government allocated K15 million in 2012 and K20 million in 2013 to the NRA for road maintenance, in recognition of a funding shortfall. Another allocation of K20 million is included in the 2015 budget.

The PNG Road Fund and the NRA, as established, therefore fail to meet many of the features of an 'ideal' second generation road fund. There is no separation of funding and service provision functions. The legal basis that establishes the NRA's responsibilities has not been fully implemented. Rules for expenditure are not clear given the use of government systems and processes that lack transparency. And the receipt of revenue from the earmarking of an existing fuel levy is in contravention of IMF recommendations.

B. Impact

The impact of the PNG Road Fund and the NRA has been limited due to funding constraints and a requirement to adhere to civil service rules governing procurement and contract establishment.

The Road Fund has been successful in earmarking financial resources for road maintenance and protecting them from misdirection. Since the Road Fund was established, there have reportedly been attempts on the part of political leaders and central agencies to use the funding for expenditures that are not related to road maintenance: a common occurrence in government. On each occasion, and despite political pressure, these funds have been protected by the NRA Board, which must approve Road Fund expenditure (National Roads Authority 2013; Interviews with NRA and DOW, 2012). Road Fund expenditure has also been independently audited, albeit with some delay. Success in this area demonstrates the potential benefits of independent governance arrangements.[7]

More broadly, however, the PNG Road Fund and the NRA have not achieved their underlying objective of directing a stable flow of funds toward maintenance of the national road network. As of 2014, the NRA is officially responsible for 2,200km of the 9,000km national road network. It actually maintains just 443km of road, with the remainder managed by the DoW. This is primarily the result of funding constraints. Annual deposits into the Road Fund range from K11 million to K26 million (see Table 1). In 2014, NRA revenue represented less than 1.5 per cent of total government spending on maintenance and rehabilitation of the national road network. The NRA estimates that it would require K129.3 million to maintain the 2,200km of road that is formally under its care. A considerably broader revenue base would be required before it could manage the 9,000km national road network: an objective that was envisaged at its establishment.

7. The NRA has also contributed to broader commercialisation of road management by pioneering the use of long-term performance-based maintenance contracts in PNG. The DoW now uses similar contracts.

Table 1. Road Fund revenue and funding requirements of the NRA (million Kina, current prices)

Year	Actual eeposits in the Road Fund	Funding allocations to the NRA in the Development Budget	Funding required by the NRA (for roads under NRA responsibility)
2006	16.58	_	_
2007	20.03	_	_
2008	21.48	_	_
2009	16.27	_	_
2010	11.99	_	57.93
2011	26.64	_	75.51
2012	11.00 (to Sept)	15.00	80.75
2013	20.00	20.00	120.93

Sources: Figures from 2006 to 2012 (to September) were provided by the National Roads Authority. Figures for 2013 are taken from the National Transport Strategy. The latest NRA annual report that is available is for 2010.

There is ongoing confusion regarding the role of the NRA and DoW. In theory, DoW is responsible for rehabilitating road sections in poor condition, with responsibility for routine maintenance of these roads transferred to the NRA once gazetted by the Minister (after the transfer is first approved by the NRA Board). In practice, road sections in poor condition have been officially transferred to the NRA, with an informal agreement that these would be rehabilitated by DoW (without this occurring to date). The informal nature of these arrangements has undermined accountability, and points to a lack of political engagement.

The way in which the NRA was established has also caused problems. The NRA has not overcome planning and implementation issues associated with road maintenance activities. Road Fund revenues are allocated to the NRA, which procures services from the private sector and the DoW. However, the NRA operates under the same civil service rules governing procurement and contracting as the DoW (the NRA Board oversight of spending being additional). These rules are an obstacle to the transparent, effective and efficient execution of road maintenance activities, as discussed earlier.

C. Discussion

The lack of funding channelled to the Road Fund and the NRA suggest that the benefits that have resulted remain limited and, to date, do not justify their establishment. Underlying the limited impact of the Road Fund and the NRA is a lack of support and engagement by political leaders, and ongoing opposition among parts of the civil service. Successive PNG Governments have failed to establish an adequate and independent source of revenue for the Road Fund and subsequent requests for funding from the annual budget have been met with paltry allocations subject to great uncertainty. The Road Fund and the NRA as a result have in effect functioned as pilots, with limited responsibility for the road network. The way in which these organisations were established has also undermined their impact.

So, what are the lessons from the establishment of the Road Fund and the NRA?

It is hardly surprising that institutional reform aimed at addressing political obstacles to adequate road maintenance funding should be undermined by lack of political support. Support and engagement by political leaders in the Road Fund and the NRA was always limited. The PNG Government passed legislation establishing these institutions on the recommendation of development partners. The Asian Development Bank was particularly instrumental, providing technical assistance (TA 3716-PNG, TA3191-PNG, TA 3716-PNG), and including establishment of the NRA in a covenant on the PNG Government under Loan 1709 (Government of Papua New Guinea 2010).[8] Domestically, the Ministers for Transport and Works drove the initiative with minimal involvement by other members of parliament.

Various groups in the civil service opposed the establishment of a Road Fund. Opposition came from elements of the DoW (and initially its supporting development partner, Australian Agency for International Development (AusAID)), and most importantly, from the departments of Treasury and Finance, which opposed earmarking of revenue (Government of Papua New Guinea 2010; Interviews with PNG civil servants, 2012). This opposition was significant, given the influence of the central departments and the role of the DoW in managing and delivering road maintenance work. The opposition to earmarking by Treasury and Finance reflected concerns about budget fragmentation and lack of parliamentary oversight in a country where trust funds have been used to avoid oversight in the past. In the DoW, there was a view that the duplication that would result from the establishment of the NRA was harmful to road management efforts. This view was also initially shared by AusAID, which preferred to focus on the continuing efforts to reform the DoW.

Such concerns were not unique to PNG. Developments in PNG in many ways reflect the experience of other countries where obstacles to establishing truly independent road management agencies and funds have limited the impact of reform. In PNG, a lack of political direction did facilitate the establishment of a Road Fund and agency in an environment where opposition to the reforms could conceivably have prevented the requisite legislation from passing through parliament. But the consequence has been the failure to fully implement legislation which was passed 12 years ago, and which falls short of the second generation road fund model.

The PNG experience also points to a more fundamental problem with reforms aimed at de-politicising road management. Road fund arrangements are not a panacea to lack of support for road maintenance by government. Indeed, political support is a pre-requisite to reform, and is required on an ongoing basis if the road fund is to expand and fully develop. Thus, road funds are generally established with a revenue base that expands over time, as the road fund and agency prove their effectiveness and become responsible for managing greater lengths of road. The idea that the establishment of a road fund and agency will de-politicise road management is therefore problematic. The nature of political involvement in decision-making may gradually change as the road fund is developed, but political engagement and support will remain central to road management reform and the effectiveness of a well-funded road fund.

What this means is that road funds are likely to be most successful in countries where there is strong support for reform of road management. These in turn are the countries where a road fund is least needed, or where political engagement and support would likely result in increased funding and better delivery of road management activities even in the absence of a road fund. It is therefore important not to overstate the potential impact of road fund-related reforms.

In PNG, strong political engagement and support has been lacking, with no expansion of road user fees that would accrue to the Road Fund despite the development of capacity in the NRA. There has been improvement in road management in PNG more broadly in recent years. Funding for road maintenance expanded between 2010 and 2014, although is now set to decline again. Importantly, the DoW is now better able to spend that funding as a result of internal reforms and investment by the private sector (Government of Papua New Guinea 2013b). This latter development, to which the Road Fund and the NRA have been marginal, raises questions about the value-add in PNG of a separate road management agency (the NRA)

8. The ADB-supported Road Sector Review in 1999 recommended the establishment of a DoW road management team which would form the basis for a future National Road Board (Government of Papua New Guinea 2010). ADB TA 3191-PNG Road Sector Cost Recovery Improvement Project (RSCRIP) in 2001 established a plan for creation of a Road Fund. The plan at this time was to transform part of the DoW into a NRA.

subject to the same procurement processes as the DoW, given that road management activities managed by DoW are increasingly undertaken on a commercial basis. At the same time, decreases in funding for road maintenance and rehabilitation in coming years point to the potential benefits of earmarking funding for such activities, even if benefits to date associated with the Road Fund and NRA have been limited.

The *National Transport Strategy,* prepared in 2013, proposes an expanded role for the Road Fund and the NRA in the near future. The strategy states that the NRA will progressively become responsible for 9,000km of road by 2030, which would require NRA spending to increase to K280 million from current levels of approximately K30 million. Road fund revenue would need to expand in a manner commensurate with this new spending, with the strategy arguing that: "by 2015 the NRA is expected to fund between K150 million and K200 million of road maintenance", and that to do so, "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." Whether this occurs will be a good indication of the level of political support and engagement enjoyed by both the National Transport Strategy and the Road Fund/NRA. The lack of any progress to date in expanding the revenue base of the NRA is not promising in this respect.

V. Conclusion

The challenges faced by Papua New Guinea in managing its road network are shared with many other developing countries. Road management, especially maintenance, has suffered from capacity constraints and underfunding. Political incentives are important in explaining why successive governments have failed to allocate sufficient funding to road maintenance despite its positive economic return. Development partners in response have advocated the commercialisation of road management through the establishment of an autonomous road agency whose road maintenance activities are funded by fees collected from the road sector. The underlying purpose of such reform is the de-politicisation of decisions relating to funding and planning/implementation of road management activities.

The establishment of the Road Fund and the NRA in PNG has had limited impact, given a lack of support and engagement by political leaders, as well as opposition among parts of the civil service. Limited political engagement has been evident since parliament passed the *National Roads Authority Act (2003)*, with the establishment of the NRA delayed by many years. The Road Fund was also not created as originally proposed. Importantly, its revenue base was never expanded as had been intended, with funding in 2014 equivalent to less than 1.5 per cent of total funding for road management in PNG. This has meant that the Road Fund and the NRA are not in a financial position to maintain even the small portion of the national road network now under their responsibility. Both organisations effectively continue to function as pilots, and remain marginal to road management in PNG.

The PNG experience has parallels with that of other countries where governments have failed to establish autonomous road agencies. In the case of PNG, opposition appears to have emanated from central departments such as Treasury and Finance, which opposed revenue hypothecation due to concerns about lack of accountability and oversight. There was also a view that establishment of the NRA would result in unnecessary duplication which would harm road management efforts. What was lacking was the support of powerful domestic political champions for the NRA.

The PNG experience clearly demonstrates that establishing a road fund is no panacea against political obstacles to road maintenance funding. Strong and ongoing political support is required for the establishment and expansion of an effective road fund and agency. This suggests that road fund-related reforms are likely to be most successful where needed least, in countries where there is political will to reform road management, and that the corresponding impact of establishing a road fund should not be overstated.

The PNG Road Fund has achieved some successes notwithstanding its problems, the most notable being its ability to protect revenue in the Road Fund from misdirection. However, given the small scale of funds involved, this on its own does not justify the Road Fund and the NRA's establishment. Whether the National Transport Strategy results in an expanded role for the Road Fund and the NRA, in which the organisations are able to improve road management in PNG, remains to be seen. The future of the Road Fund and the NRA is likely to be determined by the ability of competing ministries to influence elected political leaders. Central finance agencies are likely to continue their opposition to earmarking, a position that may be consolidated by concerns about the establishment of another infrastructure management organisation: the proposed Infrastructure Development Authority. The Department of Transport and now (to a lesser extent) the Department of Works are likely to support the National Transport Strategy's proposed expansion of the Road Fund, given the potential to secure future revenue for road maintenance.

What is clear is that the NRA will not be in a position to fulfil the role envisaged for it by the *National Transport Strategy* without reform of the revenue base of the Road Fund. This will require political support and engagement. Should the government reverse its support for the National Transport Strategy and choose not to expand the Road Fund's revenue base, it will instead need to ensure that adequate funding for road maintenance is channelled to road management agencies in future years. The roads sector in PNG will suffer if it pursues neither action.

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