



Original Article

The Political Economy of Road Management Reform: Papua New Guinea's National Road Fund

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Abstract

Papua New Guinea's (PNG's) road system is in a parlous state after decades of neglect. More than half of the roads in the country require urgent rehabilitation. The PNG Government sought from 2003 to address the problem through the establishment of a Road Fund designed to earmark revenue for road management. Development partners supported these efforts, which were similar to reforms implemented in other parts of the world. This article examines the establishment of an independent road fund and road management agency in PNG. It finds that these reforms have not markedly improved road conditions, and that they have been undermined by a lack of support from political leaders and parts of the civil service. The article's conclusion, that the establishment of a road fund is no panacea against political obstacles to road maintenance funding, is relevant to a broader literature concerning the establishment of independent institutions to address governance challenges.

Key words: political economy, economic reform, road management, road fund, Papua New Guinea

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1. Introduction

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. Most of the feeder roads are frequently impassable. Communities in coastal and mountainous areas that rely on sea and air transport are becoming more isolated because of deteriorating physical infrastructure. In all transport subsectors, the dilapidated state of infrastructure is largely the result of inadequate maintenance and poor management over a long period. Wharves, jetties and airstrips have fallen into disrepair and disuse. Almost half of national roads and two thirds of provincial roads need rehabilitation or reconstruction before they can be properly maintained. The limited air, water and road transport networks are impediments to growth for Papua New Guinea and is (sic) stalling the development of this country.– Papua New Guinea's 2013 National Budget

This dramatic statement, taken directly from the 2013 national budget, highlights the impact on Papua New Guineans of poor infrastructure management, including road management. In the *Doing Business Survey*, Papua New Guinean businesses, most of which are urban, 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). In rural

areas, the problem is more significant. Poor road conditions prevent access to markets, and to health and education services, for a large proportion of Papua New Guinea's (PNG's) 7.6 million people (85 per cent of whom live in rural areas). Limited access to transportation contributes to poverty in PNG, with household income and expenditure survey data showing that the inability to access roads is positively correlated with higher incidence of poverty (Gibson & Rozelle 2002). The poor state and limited reach of the road network is widely recognised as a principal barrier to economic development in PNG.

Deficient road management and funding are to blame for the poor state of PNG's road system. Following independence, funding for road maintenance in PNG more than halved over a 20-year period, with the national road network, already limited in its reach, deteriorating as a result (Kwa et al. 2009). There were concomitant cuts in the linkages between rural communities and urban centres; a development that served to undermine the growth of agriculture and other rural industries.

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 towards 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, financial 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 for the commercialisation of road management as a means of addressing inadequate road maintenance. An important element of commercialisation in many countries has involved the establishment of road funds, used to earmark or hypothecate 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 towards road maintenance, with earmarking in effect an attempt to depoliticise 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, establishment of the Road Fund was a response to the poor state of road management, which the Road Fund was designed to address by providing a consistent source of funding for road maintenance. A National Roads Authority (NRA) overseen by an independent board was also established in order to plan, manage and procure maintenance activities on a commercial basis, free from political interference.

This article studies the establishment and impact of the PNG Road Fund and the National Roads Authority on road management in PNG. Section II discusses the political economy of road management, as well as the objectives of, and experiences with, establishment of road funds in other countries. Section III provides a historical overview of road management and reform in PNG, including the establishment of the PNG Road Fund and National Roads Authority. Sections IV and V discuss the impact of these organisations and conclude with some policy lessons.

2. Road Management and Reform

2.1. *The Political Economy of Road Management*

Road infrastructure is important for economic development. Evaluation reports consistently show strong economic returns from investments in road infrastructure, although impact at the macroeconomic level is more difficult to gauge because of issues of measurement and causality (World Bank 2007a; Bryceson et al. 2008; Asian Development Bank 2011; Straub 2011). The positive economic impact of roads is hardly surprising. Road infrastructure greatly reduces costs associated with trade, employment and access to health and education services (World Bank 2007a). It has been found to improve productivity and to facilitate other infrastructure development. There is now a rich literature on the endogenous growth effects of transport infrastructure, a good summary of which is provided by Straub (2008).

Despite this, road infrastructure, and transport infrastructure more broadly, 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). A World Bank report published in 1988 quantified the impact of poor maintenance for the first time, concluding that approximately 15 per cent of past Bank lending for roads had been lost as a result. This publication was important in the development of commercial approaches to road management (World Bank 1988).

Roads closely match the definition of a public good, as they are non-excludable and

non-rivalrous.¹ Road management, including maintenance, has therefore traditionally been a government responsibility. There are a number of explanations for why governments may not perform these functions adequately. Capacity constraints adversely impact planning and implementation of road maintenance, because of 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 for maintenance while at the same time funding new roads, despite clear economic arguments in favour of prioritising road maintenance over road construction. 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 affects road quality in the medium to long run (Heggie & Vickers 1998; Carruthers 2005). Governments therefore suffer immediate

1. Few goods and services in the real world are perfect public goods, but roads closely resemble public goods given that (i) it is difficult/costly to prevent people from using roads (although not impossible—toll roads are used to impose a price on road access in many countries, although this would be difficult in PNG given law and order issues), and (ii) the use of a road by one person has a minimal impact on its use by other people (although cumulatively there is an impact, in the form of traffic congestion).

political repercussions when reducing spending on health and education, but not when reducing funding for routine (or preventative) road maintenance, which is the most cost effective maintenance activity.² 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). This last point is particularly important in PNG, as will be discussed later, given the clientelistic nature of its politics.

A number of authors also point to the role of development assistance in creating perverse incentives (Ostrom et al. 2001; Gibson et al. 2005). Development funding for new infrastructure, according to this argument, reduces government incentives to adequately maintain that infrastructure, as it causes decision-makers to undervalue the cost of capital (Ostrom et al. 1993; Ostrom et al. 2001). A different, although not contradictory, argument can be mounted regarding development assistance provided for road maintenance. Such funding, according to this argument, can reduce the onus on governments to fund maintenance activities. The bulk of development funding for the road sector in PNG is currently directed towards management and rehabilitation of existing roads.

2.2. Road Funds and the Commercialisation of Road Management

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 (Torres Martinez 2001; World Bank 2007b; Harral et al. 2011). Two influential papers written by Ian Heggie and Piers Vickers argued that road

2. Maintenance activities are characterised as (i) routine (or preventative), which is low-cost and should take place on an ongoing basis; (ii) periodic (or specific), which involves greater expense and should take place approximately every 5 years; and (iii) rehabilitative, which involves significant expenditure and should only take place when the road has deteriorated significantly (Pacific Region Infrastructure Facility 2013).

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 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. Road fund advocates used this distinction to argue that the allocation of funding towards road management resembled an off-budget user charge rather than notional earmarking of government revenue for road management: a view that remains contested (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 depoliticisation 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 that government spending should be determined by a parliament, which is accountable to the people. 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 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; World Bank 2007a; World Bank 2007b; Gwilliam 2011). 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. A review by Benmaamar (2006) identified 27 Sub-Saharan African countries that had established a road fund. In Latin America, road funds were created in a number of Central American countries, in Argentina and at the state level in Brazil. In Eastern and Central Europe, a number of road funds were also established. In East Asia, road funds were

established in Lao PDR (with considerable success), the Philippines (the fund was later closed) and China (a first-generation fund) (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. An Independent Evaluation Group study of road funds found that 'In practically all countries for which measures are available, there has been a significant increase in the percentage of roads in good condition' (World Bank 2007b). No fund met all the features of an 'ideal' second generation road fund, and this had a strong bearing on performance (Gwilliam 2011). 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).³

There was also variation between regions. In Asia, many road funds lacked autonomy from government, and this limited their impact on road conditions (Guillossou & Stankevich 2008; Gwilliam 2011). The commercialisation of road management in Sub-Saharan Africa achieved better results, although implementation of road works often remained a problem given limited capacity in the private sector and lack of oversight by road agencies (Stankevich et al. 2005). 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 worldwide (Harral et al. 2011).

3. This was reflected in road conditions. One study of road funds in Africa found that where both a road fund and independent road agency were established, 82 per cent of primary roads were in good or fair condition, as opposed to just 70 per cent where a road fund was established without a road agency, and 62 per cent where a road agency was established without a road fund (World Bank AICD 2009).

3. Road Management in Papua New Guinea

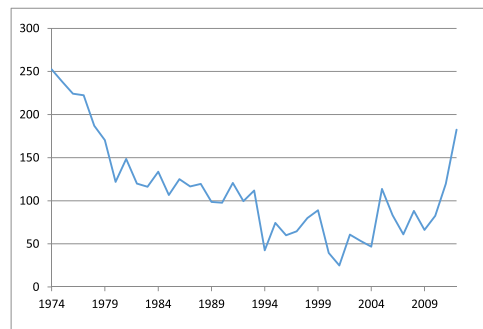
3.1. Context

There are approximately 30,000 km of roads in PNG. The national road network comprises 9,000 km of roads deemed important to the national economy, which fall under the jurisdiction of the PNG Government. The remaining 21,000 km are non-national roads, which are managed by provincial and district level governments. The road network has limited reach, as illustrated by the fact that the capital, Port Moresby, is not connected by road to the second biggest city (Lae), or to PNG’s agricultural heartland (the highlands region), where 40 per cent of the population resides (Figure 1). PNG is the only country in the world where the two largest cities are on the same land mass but are not connected by road.

The road network in PNG has suffered from a reduction in road maintenance funding over many years; a reduction mirrored by broader

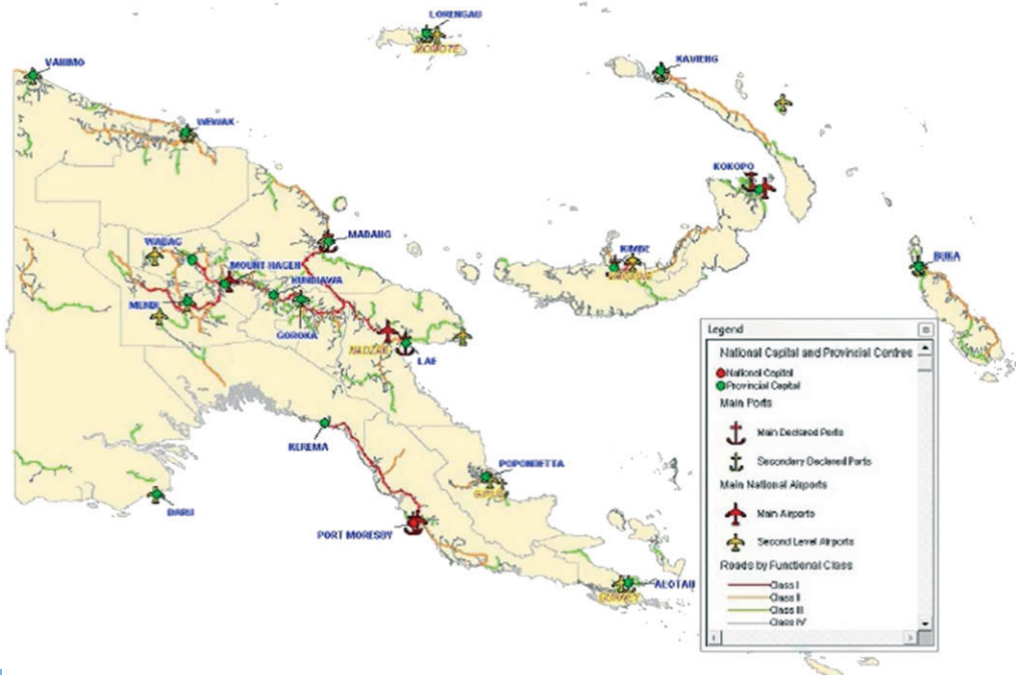
declines in infrastructure spending, as shown in Figure 2. The consequence of the decline in maintenance spending was a dramatic deterioration in the condition of the road network. In 2007, only 35 per cent of national roads were in good condition, meaning that they were passable by a two-wheel drive vehicle in wet weather. Non-national roads are in considerably worse condition (Government of Papua New Guinea 2013).

Figure 2 Government Expenditure on Infrastructure, Per Capita (2011 Kina)



Source: Compiled from analysis by Batten (2009) and Swan and Mako (2014).

Figure 1 Map of Papua New Guinea’s Road Network



Source: PNG Department of Works (2014)

Other factors have also adversely affected road management in PNG. Inadequate funding reduced the capacity to plan and implement maintenance activities in PNG, with the Department of Works and Implementation (DoW) being most affected as the government agency traditionally responsible for road management. Development of road management capacity in the private sector was limited by the inconsistent provision of maintenance contracts and a resources boom that made it difficult to recruit skilled professionals given attractive salaries in other economic sectors (Government of Papua New Guinea 2010; Lucius 2010). Limited competition between contractors has driven prices higher, while negotiating road work and the sourcing of raw materials with landowners has often been a challenge, with claims for compensation and attacks on road maintenance crews a common occurrence (Lucius 2010). PNG's geography and geology have also increased road maintenance requirements, given high rainfall, steep slopes and muddy terrain in much of the country. Maintenance that is undertaken often faces considerable delays and cost overruns as a result, with the DoW reporting that final expenditure over 50 per cent of contract value is not uncommon (Interviews with DoW, 2012, 2014).

3.2. Political Economy

Underlying many of these constraints to road management are political economy factors. The political culture in PNG, as in most of Melanesia, has been characterised as a continuation of traditional 'big man' politics, a two-way patron-client interaction where political leaders earn support (and votes) by distributing state resources to their support base (Kabutaulaka 1998). A number of authors have argued that the Westminster system of government adopted by PNG at independence has reinforced such practice (Reilly 1996). Francis Fukuyama (2007) describes it thus:

Traditional PNG society is characterized by 'big man' politics, in which status is derived from one's ability to distribute resources to people in

one's village. This practice has simply been transposed to a national level, where legislators seek to distribute national resources to their wantok or descent group.

There is ongoing debate about the extent to which 'big man' politics represents a Melanesian form of clientelism, defined by Hicken (2011), as a situation where policy preferences and the provision of public goods are of secondary importance and where politicians instead focus on providing local public goods or private goods to their supporters (whose support is contingent on the transfer of these goods). Fraenkel (2011) argues against comparing 'big man' politics to political clientelism, given the fluidity of political power in Melanesia. The impact on road management is nevertheless comparable. The focus of political leaders in PNG is on distributing resources to constituents in return for political support in the short term (Reilly 1996; Stewart & Strathern 1998; Ketan 2000; Kurer 2007). In the road sector, this is often manifested in road construction and rehabilitation projects, particularly of local roads. Funding for routine maintenance is deficient at the same time. Economic and financial imperatives are thereby of secondary importance in budget decisions, with political considerations taking precedence (Interviews with PNG civil servants, various years). Broader public policy questions are also not the primary focus of political leaders, who, concerned as they are with the distribution of resource to their local support base, often effectively become project managers—a role that should be occupied by road management agencies.

Political influences are readily apparent when considering funding decisions in the road sector. Only a small percentage of road projects for which funding is requested by the civil service actually receive funding. At the same time, over half of budget funding allocated for roads is directed towards projects that were never proposed by the civil service. These projects are typically the initiative of political leaders themselves and are not supported by economic or financial analysis (Interviews with PNG civil servants, various years). Rules established to govern public spending further

amplify the influence of political considerations. Expenditure over K10 million 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 (Interviews with PNG civil servants, various years).

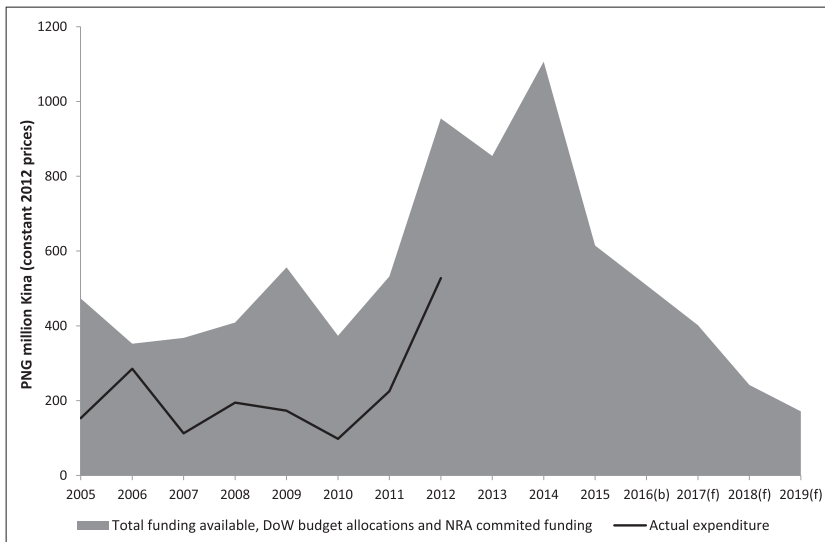
Corruption, and responses to corruption, also impact road management. Corruption is rife in PNG, which is ranked by Transparency International as 145th out of 175 countries in its 2013 Corruptions Perceptions Index (a ranking of 1 indicates low levels of perceived corruption). There is anecdotal evidence to suggest that this increases the cost of road maintenance (Interviews with PNG civil servants, various years). Bureaucratic systems established to prevent corruption can themselves be burdensome. Expenditure over K300,000, for example, must be approved by the Central Supply and Tenders Board and the Office of the State Solicitor. The DoW reports that a timeline of 40–50 weeks is the norm for approval of contracts that are valued at over K10 million (PNG Department of Works 2012).

3.3. Recent Developments

There have been significant changes to funding for maintenance and rehabilitation of national roads in recent years. Figure 3 shows historical funding allocations and spending on rehabilitation and maintenance of the 9,000 km national road network. According to the National Transport Strategy, annual funding required for maintenance and rehabilitation of the road network between 2011 and 2015 was K1,017 million: K634 million of which was for the national road network. For similar funding to be continued in real terms, this figure would need to rise gradually over time, amounting to over K850 million in 2018 (Government of Papua New Guinea 2013).

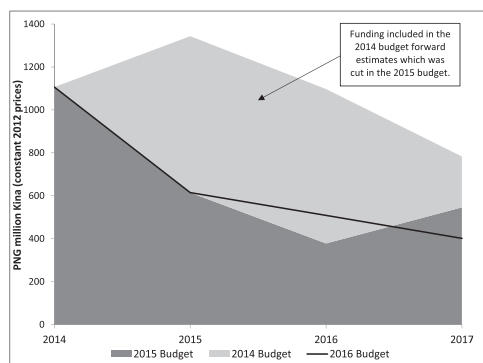
The 2014 budget allocation for maintenance and rehabilitation exceeded what is proposed in the National Transport Strategy. Increases in overall funding were due primarily to government funding allocations; assistance from development partners measured 27 percent of total funding in 2014, down from 38 percent in 2005. Actual spending on road maintenance and rehabilitation continued to be below what was budgeted; however, it did increase,

Figure 3 Papua New Guinea (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. Expenditure figures are based on data provided by DoW to 2012; data for 2013–14 are not publicly available.

Figure 4 Road Maintenance and Rehabilitation Funding: Budget Forward Estimates



Source: Compiled by the author using data contained in PNG budget papers.

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 since deteriorated, with funding available in 2015 approximately 44 per cent lower than in 2014 (Figures 3 and 4). The forward estimates indicate further funding reductions in future years, with projected funding in 2019 measuring just 15.5 per cent what was available in 2014.⁴

The main reason for the rapid increase and subsequent decrease in road maintenance and rehabilitation funding is the resources boom. Government spending in 2014 reached record levels, with the promise of future revenue increases resulting from the US\$19 billion Liquid Natural Gas project. Since then, PNG's medium-term economic prospects have weakened considerably. The fall in international commodity prices, combined with other factors, will reduce government revenue by an estimated K1.6 billion in 2016 (over 12 per cent of total revenue) (Flanagan 2015; Government of Papua New Guinea 2015). This experience points to the special challenges in maintaining

4. There are caveats to this data given difficulties in separating funding for national and non-national roads, and funding for construction as opposed to funding for rehabilitation and maintenance. A conservative approach has been adopted in producing these estimates, which are likely to over-estimate available funding.

steady funding for road maintenance in countries where government revenue is volatile due to reliance on the resources sector.

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, an engineer and former Minister for Works who had argued for increased maintenance funding. Subsequent to his departure, funding for road maintenance has declined significantly. Public financial management reform, and in particular, the move towards medium-term budgeting, was also arguably a factor in increased road maintenance activity (not just budgetary allocations) prior to 2015. So too was reform of the DoW (for details, see Government of Papua New Guinea 2013; PNG Department of Works 2014). Both developments have been overshadowed since by the revenue shock experienced by the PNG government and its subsequent efforts to reduce spending.

3.4. *The Road Fund and National Roads Authority*

The PNG Road Fund and its supporting agency, the NRA, were established by the National Roads Authority Act (2003). Both institutions target the national road network and are overseen by an independent board comprising seven representatives from road user organisations and four civil servants from the major road sector agencies (the chair must come from the private sector). Their objectives, which are consistent with those of the Heggie-Vickers model, include (i) ensuring an ongoing and reliable supply of funds for road maintenance and (ii) directing 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).

Road fund advocates argued that such reform was appropriate in PNG, given the political economy impediments to adequate resourcing of road maintenance. However, the establishment of the Road Fund and NRA differed to the Heggie-Vickers model in several

Table 1 Road Fund Revenue and Funding Requirements of NRA (million Kina, current prices)

Year	Actual deposits in road fund	Funding allocations to NRA in the development budget	Funding required by 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.

respects, with the roles of road fund manager and road maintenance executor combined under the NRA, and with revenue sources never set up as intended (Heggie 1995; Heggie & Vickers 1998; Government of Papua New Guinea 2010).⁵ The PNG Government allocated K15 million in 2012, K20 million in 2013 and K15 million in 2015 to the NRA in recognition of this funding shortfall. There were also 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 placed under NRA responsibility in 2009.

4. Discussion

The impact of the PNG Road Fund and NRA has been limited because of funding constraints resulting from the failure to establish an adequate source of revenue. Road Fund revenue represents less than 1.5 per cent of total government spending on maintenance and rehabilitation of the national road network (Table 1). The NRA is officially responsible for 2,200 km of the 9,000 km national road network. It actually maintains just 443 km of road,

with the remainder managed by the DoW. The Road Fund has been successful in earmarking financial resources for road maintenance and protecting them from misdirection. Reported attempts on the part of political leaders and central agencies to use Road Fund revenue for expenditures that are not related to road maintenance have not been successful, with funds protected by the NRA Board, which must approve Road Fund expenditure (National Roads Authority Act (2003); Interviews with NRA and DOW, 2012).⁶ However, the Road Fund and NRA have had limited impact on road conditions and have not achieved their primary objectives.

There are also other problems. There is some confusion regarding the roles of the NRA and DoW, with road sections in poor condition having been officially transferred to the NRA, but with an informal agreement that these will be rehabilitated by DoW (without this necessarily occurring). The informal nature of these arrangements has undermined accountability for the roads in questions and points more broadly to a lack of political engagement. The NRA has also not overcome planning and implementation issues; in part because the NRA operates under the same civil service rules governing procurement and contracting as the DoW (NRA Board oversight of spending being additional), but also because of limited capacity within the NRA itself. These rules are an obstacle to effective and efficient execution of road maintenance activities.

6. Road Fund expenditure has also been independently audited, albeit with delays.

5. The PNG Road Fund receives revenue from the earmarking of an existing levy on domestically refined diesel fuel (in contravention of IMF recommendations), 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 (Government of Papua New Guinea 2010).

Underlying the limited impact and development of the Road Fund and NRA is a lack of support and engagement by political leaders. 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. Indeed, support and engagement by political leaders in the Road Fund and 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). Domestically, the Ministers for Transport and Works drove the initiative, but 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, AusAID), and most importantly, from the Departments of Treasury and Finance, which opposed earmarking of revenue given concerns about budget fragmentation and lack of parliamentary oversight in a country where trust funds have been used to avoid oversight in the past (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.

Such concerns were neither new nor unique to PNG. Developments in PNG in many ways reflect the experience of other countries where limited political support has undermined the efficacy of reform. In PNG, a lack of political engagement by political leaders did facilitate the establishment of a Road Fund and agency by a small group of supporters. Had there been more engagement, it is likely that political opposition would have prevented the requisite legislation from passing through parliament. But the consequence of limited engagement

has been the failure to fully implement legislation, which was passed 13 years ago, and which falls short of the second generation road fund model.

The PNG experience points to a more fundamental problem with reforms aimed at depoliticising road management and one that is relevant in other parts of the world. Road fund arrangements are not a panacea to lack of support for road maintenance by government. Indeed, political support is both a prerequisite to reform and is required on an ongoing basis if the road fund is to expand and fully develop. Road funds are generally established over time, with a revenue base that expands gradually as the fund and agency prove their effectiveness and acquire responsibility for greater lengths of road. The idea that the establishment of a road fund and agency will depoliticise road management is therefore problematic from the outset. The nature of political involvement in decision-making may 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. Papua New Guinea, with its clientelistic political culture that ensures political leaders are heavily focused on transferring resources to their local support base, does not fit this description. It is important not to overstate the potential impact of road fund-related reforms in such contexts.

These findings are relevant to a broader literature concerned with the establishment of independent institutions to address governance challenges (Leftwich 1994; Grindle 2012). Much of that literature is concerned with corruption (Painter 2014), although there are obvious parallels with the establishment of road funds in order to bypass budgetary processes that are inherently political. The

literature is generally critical of such initiatives. Leftwich (1994), for example, argues that it is 'illusory to conceive of good governance as independent of the forms of politics and type of state which alone can generate, sustain and protect it'. Painter (2014), in noting the paradox that 'political intervention to achieve reform must be accompanied by a form of political self-denial', argues that in anti-corruption efforts, 'political support and protection are needed just as much as independence, to provide the necessary resources and the required autonomy to conduct effective investigations and prosecutions'. These arguments are also relevant to anti-corruption efforts in PNG, which recently has seen its independent anti-corruption body (Investigation Taskforce Sweep) undermined by the political leaders it has sought to investigate.

The literature referred to earlier is therefore critical of efforts to bypass politics. It lends support to the earlier observation that road funds are most likely to succeed where least needed: in countries where there is strong political support for road management reform. In the context of PNG's road sector, such arguments raise questions about the appropriateness of a politically independent road fund. *Was the Road Fund doomed to fail from the beginning? Given reform of the DoW, and the increasing frequency with which it outsources road work, what is the value-add in PNG of a separate road management agency (the NRA)?*

Interestingly, the PNG Government's *National Transport Strategy* prepared in 2013 proposes an expanded role for the Road Fund and NRA, stating that the NRA will progressively become responsible for 9,000 km of road by 2030. This 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, NRA is expected to fund between K150 and K200 millions 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'. The fact

that this has not occurred at the time of writing is an indication of an ongoing lack of political support and engagement.

5. Conclusion

The challenges faced by PNG in managing its road network are shared by many other developing countries. Road management, and especially maintenance, has suffered because of underfunding and capacity constraints. In PNG, this has led to the deterioration of the road network, with adverse consequences for the well-being of Papua New Guineans.

Political incentives are important in explaining why successive governments in PNG have failed to allocate sufficient funding to road maintenance despite its positive economic return. This article has argued that 'big man' politics, a Melanesian variant of political clientelism, has undermined management of the road network, with funding allocated without consideration of economic or financial impact, and construction of new roads prioritised over maintenance of existing roads. Initiatives to depoliticise decisions relating to funding and planning/implementation of road management activities have emerged in response, with the active support of development partners. Central in such efforts has been the establishment of an autonomous road agency whose road maintenance activities are funded by fees collected from the road sector. These reforms have their basis in similar developments in other parts of the world, particularly in Sub-Saharan Africa.

The establishment of the Road Fund and NRA in PNG has had limited impact on road management or road conditions in PNG, given a lack of political support and engagement, as well as opposition to the Road Fund 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, and the Road Fund not created as originally proposed, with its revenue base never expanded. As a result, Road Fund revenue in 2014 was equivalent to less than 1.5 per cent of total funding for road

management in PNG. Both the Road Fund and NRA effectively continue to function as pilots; they remain marginal to road management and have had minimal impact on road conditions. Indeed, an argument can be mounted that the Road Fund and NRA have been detrimental to improvement of road management given their contribution to the fragmentation of technical assistance and donor funding and to duplication among road management agencies (a concern now of great relevance in PNG, given government efforts to establish another independent infrastructure agency: the Infrastructure Development Authority).

The PNG experience demonstrates that establishing a road fund is no panacea against political obstacles to road maintenance funding. This finding is relevant to a broader literature concerning the establishment of independent institutions to address governance challenges, much of which is also critical of such approaches. In the roads sector, it is clear that ongoing political support and engagement 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.

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