



CONSULTANCY SERVICE TO BROADEN THE  
REVENUE BASE FOR THE ROAD FUND  
(Ref no: 112656)

# Final Report



**aurecon**



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**Aurecon Contact Person:** Stefan Neubrech  
**Tel:** +27 12 427 2722; **Fax:** +27 86 292 1898  
**Email:** Stefan.Neubrech@aurecongroup.com

**Aurecon South Africa**  
Aurecon Centre  
Lynnwood Bridge Office Park  
4 Daventry Street  
Lynnwood Manor  
Tshwane

**Roads Fund Board Head Office**  
1st Floor Mawasiliano Towers  
Sam Nujoma Road  
P.O Box 12497  
Dar es Salaam  
Tanzania

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<b>Abbreviations</b>	
AADT	Annual average daily traffic
AARTO	Administrative Adjudication of Road Traffic Offenses
AGO	Automotive gasoline (diesel)
CET	Common External Tariff
CIF	Cost, Insurance and Freight
CNG	Compressed Natural Gas
CRB	Contractors Registration Board
DCC	Dar es Salaam City Council
DRC	Democratic Republic of Congo
EAC	East African Communities
ESAL	Equivalent Standard Axle Loads
EVs	Electric vehicles
EWURA	Energy and Water Utilities Regulatory Authority
FY	Financial year
FVP	Foreign Vehicle Permit
GAPCO	Gulf Africa Petroleum Corporation
GCM	Gross combined mass
GPS	Global positioning system
GSM	Global System for Mobile
GWC	Gross Combination Mass
GVM	Gross Vehicle Mass
HDM	Highway Development and Management Model
HEVs	Hybrid Electric Vehicles
LGA's	Local Government Authorities
LM	Local municipalities
LPG	Liquefied Petroleum Gas
LPO	Local purchase order
MoFP	Ministry of Finance and Planning
MOU	Memorandum of understanding
MoWTC	Ministry of Works, Transport and Communication
MSP	Motor Spirit Premium (MSP)
NRFA	National Road Fund Agency
NPV	Net Present Value
OLS	Ordinary Least Squares
OSBP	One Stop Border Post
PBPA	Petroleum Bulk Procurement Agency
PCE	Passenger Car Equivalent

PHEVs	Plug Inn Hybrid Electric Vehicles
PORALG	President's Office of Regional Administration and Local Government
PMMR	Performance based Management and Maintenance of Roads
PPP	Public Private Partnership
PSV	Passenger Service Vehicle
REA	Rural Energy Agency
RF	Road Fund
RFA	Road Fund Administration
RFB	Road Fund Board
RONET	Road Network Evaluation Tools
RMLF	Road Maintenance Levy Fund
RNL	Road network length
RSE	Regional Secretariat Engineers
RST	Road surface type
RRC	Road Reserve Charges
RUC	Road User Charge
SADC	Southern African Development Community
TPDC	Tanzania Petroleum Development Corporation
SUMATRA	Surface and Marine Transport Regulatory Authority
TANROADS	Tanzania Roads Agency
TANRUC	Tanzania Road User Chargers Model
TATOA	Tanzania Truck Owners Association
TARURA	Tanzania Rural-Urban Road Agency
TBS	Tanzania Bureau of Standards
TMC	Temeke Municipal Council
TPA	Tanzania Port Authority
TRA	Tanzania Revenue Authority
Tshs	Tanzanian Shillings
UTI	Ullage Temperature Interface
VfM	Value for money
VKT	Vehicle Kilometres Travelled
VOC	Vehicle operating cost
WDC	Weight Distance Charges
WIM	Weigh-in-motion

## Definition section

“**Average**” can be defined as the summation of all the values in a frequency distribution divided by number of values in the distribution

"**Classified roads**" means any public road including trunk roads, regional roads, urban roads and feeder roads

"**Development**" means the upgrading of a road to a new standard, including a new road or bridge construction, widening or rehabilitation of a road that has been left in poor condition for a long time;

“**Discount rate**” the interest rate used to determine the present value of future cash flows

“**Entry point**” means any place, premises or other area appointed or designated as a point or points at or with which transit charges is payable under the Foreign Vehicle Transit Charges Act, 2006

“**Emergency maintenance**” shall mean all maintenance activities required to open or repair roads, bridges and other parts of the road infrastructure after a natural or other unforeseen disaster like fire, major accidents that cause damage to the road and natural events like floods. Repairs to roads and bridges that have deteriorated over time are not included in this category.

“**Feasible roads**” in terms of this report, the maintenance and/or upgrade is feasible if it yields a positive NPV over the analysis period.

“**Financial performance**” can be defined as the percentage of the planned budget that was spent

"**Fuel**" means petrol, whether super or regular, and diesel for use in the propulsion of a vehicle.

"**Fund**" means the Roads Fund established by section 4 of the Road and Fuels tolls Act, 2006.

"**Local authority**" means a district, town, municipality or city authority

“**Foreign vehicle**” means a motor vehicle registered in a country other than Tanzania

“**Median**” can be defined as the midpoint of a frequency distribution.

“**Motor vehicle**” is defined in the Road traffic Act (1973) to mean any self-propelled vehicle intended or adapted for use on the roads and includes an engineering plant.

“**Net Present Value**” The NPV of a given investment is obtained by subtracting the present value of the costs from the present value of the future benefits. The investment is viable if the NPV is positive.

“**Owner**” in relation to any foreign vehicle includes –

- a) The person having use of the vehicle under a hiring or hire purchase agreement
- b) The person in charge of the vehicle
- c) The driver of the vehicle, and
- d) Any person who holds himself out as or is the agent of the owner in relation to any business connected with the vehicle

“**Rehabilitation**” Includes activities that aim to restore the original condition of the road through relatively extensive works like pavement reconstruction, mill and replace, reshaping of the cross-section, reconstruction of the shoulders, drainage works and thick overlays.

"**Road agency**" means any road agency other than TANROADS;

"**Road and fuels toll**" means the toll imposed by section 4 and payable under Road and Fuels Tolls Act, 2006;

"**Road maintenance**" means all works to preserve riding quality, road shape, drain, culverts, structures and bridges, spot improvement of bad spots to maintain accessibility; resealing, reshaping and re-gravelling;

"**Roads Minister**" means the Minister responsible for roads;

"**Road Toll**" means fuel levy;

"**Routine maintenance**" means all maintenance works required continuously or at intervals on every road whatever its engineering characteristics or traffic volume, and comprises of activities such as grass cutting, drain cleaning, culvert and bridge cleaning and - maintenance, road furniture and bridge guide rails maintenance, paved road patching, edge repair, crack sealing, and line remarking, and also unpaved road grading, shaping, and pothole repairs. The work is normally performed by routine maintenance teams with no advanced skills.

"**Periodic maintenance**" mean all maintenance works carried out at intervals of several years. Some activities included here are also referred to as preventative maintenance. Typical activities on paved roads include resealing, overlays of less than 100 mm, fog sprays and shoulder re-forming. Pavement layer reconstruction or the addition of a pavement layer must not be included here, but under rehabilitation. Typical activities on unpaved roads include re-graveling, rip and re-compact and cross-section reforming. Periodic maintenance is usually done on a defined project basis.

"**Physical performance**" means percentage of planned km executed (or number in terms of bridges)

"**Spot maintenance**" means localised maintenance works carried out on short sections (typically 1 km or less) of roads in order to ensure a reasonable level of passability, and comprises of activities such as road surface repairs, embankment repairs, culvert and drainage repairs, localised road reshaping and re-gravelling, and the construction of diversions. Spot maintenance is usually done due to the excessively poor condition of a road over a short section that threatens the flow of traffic. Spot Maintenance can be used on both paved and unpaved roads.

"**Revenue**" means taxes, duties, fees, fines or other monies imposed by or collected under the laws or the specified provisions of a law

"**Revenue Commissioner**" means a person appointed as a Commissioner in respect of any tax.

"**Transit charges**" means the money payable on the use of a foreign vehicle on a public road

"**Vehicle**" is defined in terms of the Foreign Vehicles Transit Charges Act (R.E. 2006) to mean any motor vehicle contracted or adapted for use on the road and includes a trailer. The Road Traffic Act (1973) provides a wider definition, to including a vehicle of any description whatsoever, and includes a machine or implement of any kind drawn or propelled along roads whether by animal, mechanical, electrical or any other motive power.

"**Vehicle Kilometres Travelled (VKT)**" is calculated by multiplying the AADT by the road length

"**Non-feasible roads**" in terms of this report, the maintenance and/or upgrade is unfeasible if it yields a negative NPV over the analysis period.

"**Upgrading**" Includes projects that improve the level of service of the road/bridge to beyond that of the original specification, i.e. widening, geometric changes and improvements, pavement works, and related ancillary works.

## Executive summary

### 1. Introduction and background

Road infrastructure plays a significant role in the social and economic growth and development of a country, providing the public access to social services and employment, as well as increasing access for trade.

The current revenue accruing to the Roads Fund (RF) cannot meet the maintenance requirements of the total road network in mainland Tanzania, requiring measures to broaden the revenue base of the RF to bridge the financial gap.

Aurecon was appointed by the Roads Fund Board (RFB) for the study “*Consultancy Services to Broaden the Revenue Base for the Road Fund*”. The study commenced on 21 June 2016 with a kick-off meeting with the RFB, followed by the first set of stakeholder engagement. The consultants produced a number of deliverables summarized in the figure below, with the overall objective being to determine the appropriate level of funding to facilitate the delivery of road maintenance in the country. This **Final Report** provides a summary of the main findings and recommendations to increase the RF revenue base.



Figure 0-1: Summary of project deliverables

### 2. Current revenue sources for the Roads Fund

The first step to broadening the revenue base of the Road Fund is to analyse the current revenue sources to identify leakages in revenue and methods to improve the collection procedures, to ensure that the RF can maximize the revenue potential of these funding sources.

The RF's current revenue sources, namely fuel levy, transit fees, abnormal load permits, as well as overloading fees at weighbridges were discussed at length in the working paper “Existing Revenue Sources for the Roads Fund” attached in Annex B of volume 2. This working paper analysed the relevant



charge levels, flow of funds, collection of funds, revenue volumes and revenue gap analysis of each of the current sources of revenue for the RF.

Chapter 4 of this Final Report summaries the enabling mandate for collection, the current and future potential of the current revenue sources, gaps in the collection of funds, as well as recommendations for improving the collection of funds.

The RF is currently highly dependent on the fuel levy, which contributes 96-97% of the total RF revenue. The adjustment of the other current funding instruments and introduction of new funding instruments will contribute to reducing the dependency on the fuel levy.

Based on the analysis of the current revenue sources for the RF, the main findings are summarized below:

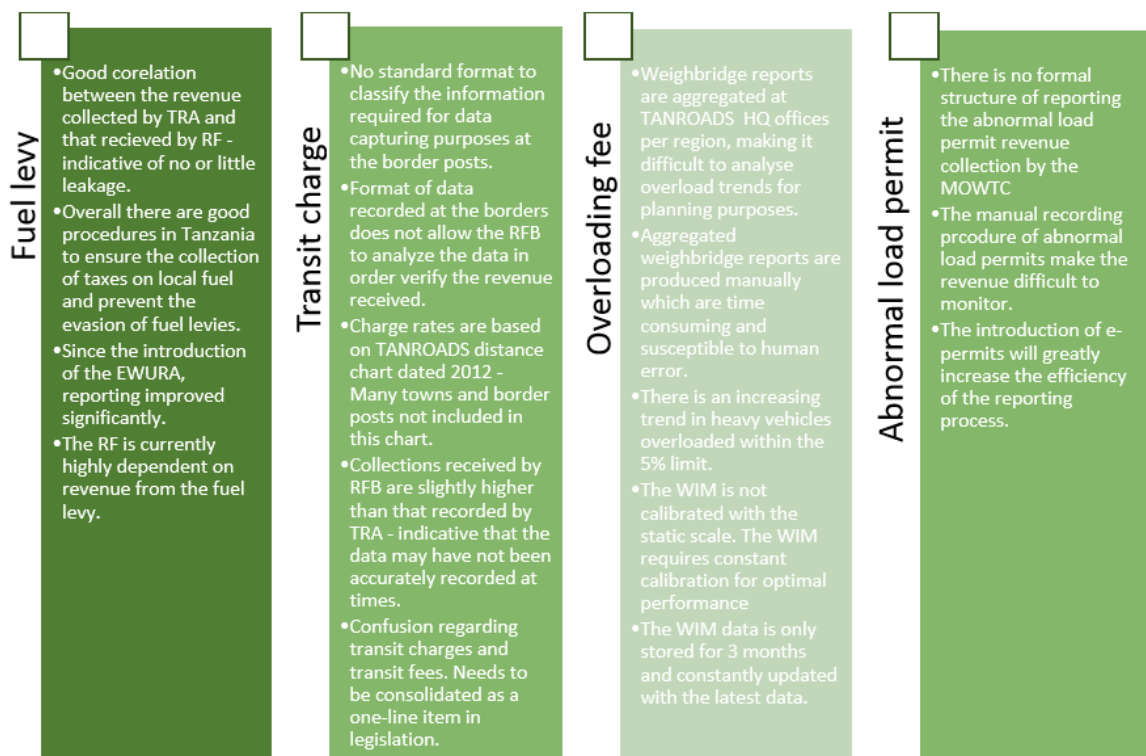


Figure 0-2: Main finding regarding current revenue sources for the RF

### 3. Investigation of new revenue sources for the RF

In order to increase the revenue base of the Road Fund, a number of existing charges, taxes and levies for devotion to the RF; as well as the introduction of new charges, taxes and levies in Tanzania for the RF were investigated. Each of the potential revenue sources were evaluated against a number of assessment criteria to determine its suitability for the RF. A summary of the revenue sources investigated, as well as the assessment criteria used to determine the suitability for the RF is shown below in Figure 0-3.

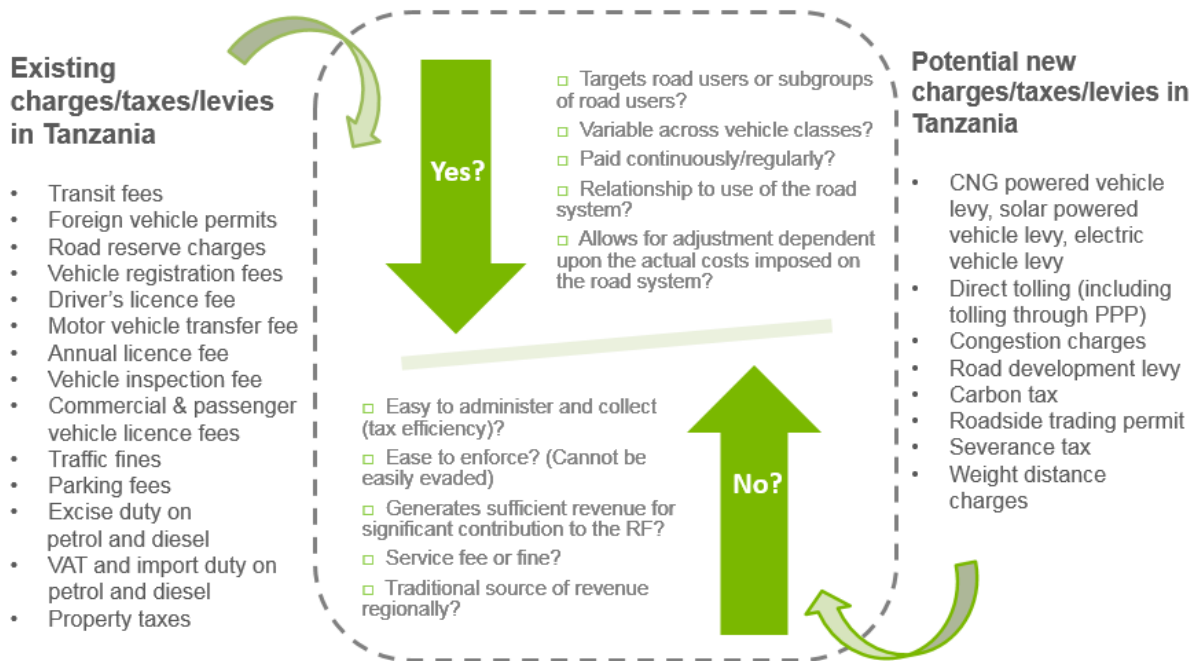


Figure 0-3: Summary of revenue sources investigated and assessment criteria

The full evaluation of the potential for implementation of each revenue source against the criteria listed is shown in Table 5-10 in Chapter 5.6, in the form of a criteria matrix.

In addition to the criteria assessment, the new revenue sources listed in Figure 0-3 above were benchmarked with other countries in terms of the success of implementation and/or collection, cost of implementation and/or collection, as well as revenue potential. Typical revenue sources for the RF in other EAC and SADC countries were also investigated and are summarized in Table 5-1.

Based on the assessment of each revenue source identified for the RF in Tanzania, it is recommended that the transit related charges (transit fees and FVP) should be devoted to the RF as a first phase approach to increasing the revenue of the RF.

The Road and Fuel Tolls Act states that the revenue from heavy vehicle licence fees should accrue to the RF. Since the annual vehicle licence fees were recently abolished and the excise duty on petrol and diesel was increased to compensate for this revenue, a portion of the excise duty revenue should be devoted to the RF.

The road reserve charges and weight distance charges should also be considered if the policy issues regarding the collection of road reserve charges and technology issues regarding the collection of weight distance charges can be properly rectified.

A levy on CNG, solar and electric powered vehicles should also be considered in the future when these vehicle types become applicable to Tanzania's future vehicle fleet. Tolling should be considered for roads where there are sufficient traffic volumes to generate adequate revenue.

The revised structure of funding instruments for the RF is summarized in Figure 0-4 below.

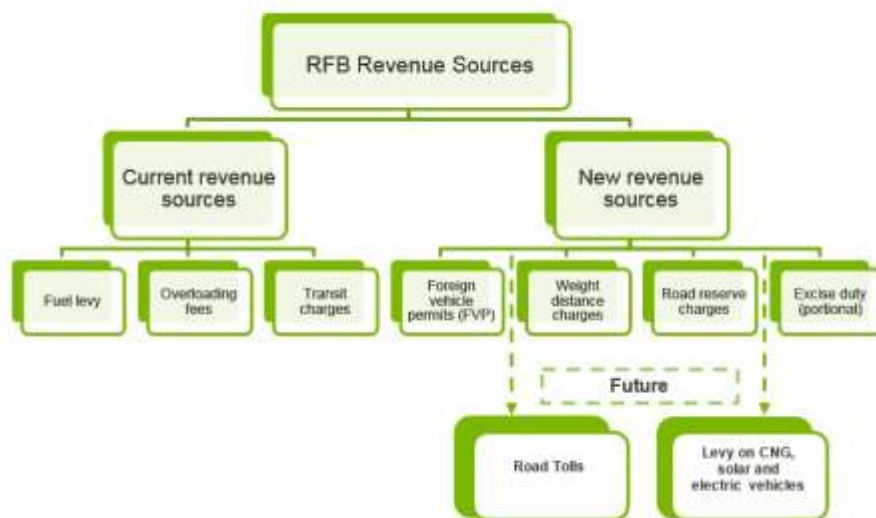


Figure 0-4: Proposed revenue sources for the RF

#### 4. Tanzania’s maintenance and development requirements

Optimal timing of maintenance is imperative in the sense that postponement of maintenance actions may result in higher funding levels required. For instance, by performing reseal actions on a paved road at an earlier point of time may result in savings in costs later on, as more expensive rehabilitation actions or even pavement reconstruction are not needed at a later stage.

Keeping this in mind, a number of maintenance and development scenarios were developed for both the classified and entire road network, summarized in the figure below.

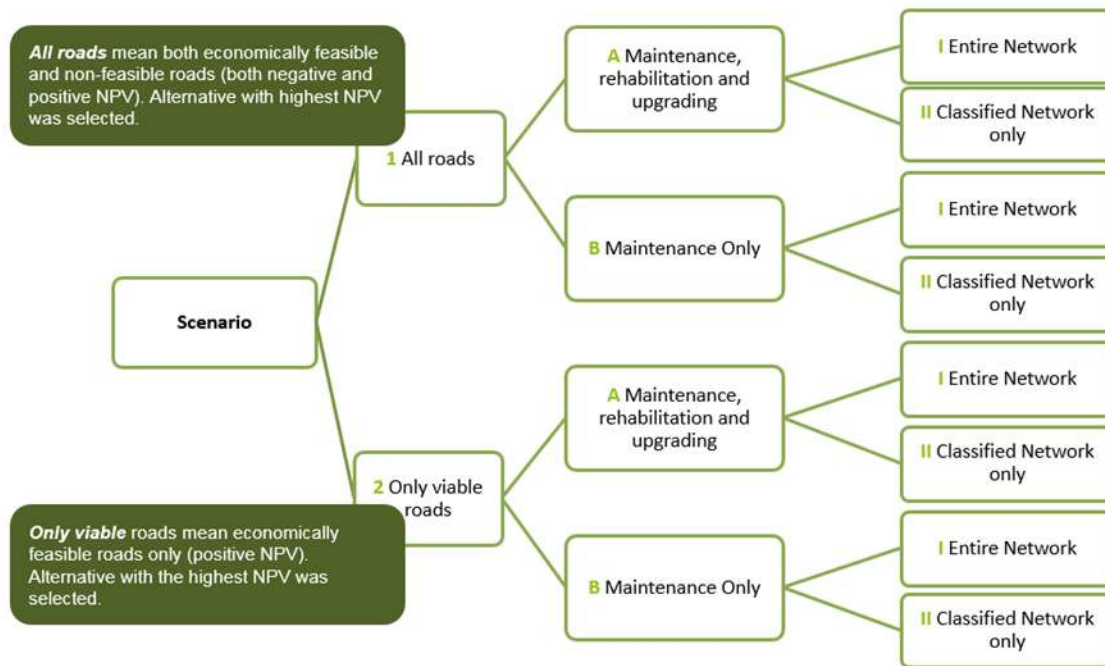


Figure 0-5: Proposed maintenance and development scenarios for Mainland Tanzania

The evaluation of the maintenance and development needs in mainland Tanzania was carried out using the HDM-4 programme, as explained in Chapter 6.3 of this Final Report. The economic effects of the upgrades and maintenance actions on the study area were modelled using road network data, maintenance and improvement intervals/frequencies, as well as unit costs which were retrieved from TANROADS and PORALG.

The total cost for each of the road maintenance (routine/recurrent and period maintenance) and improvement (rehabilitation and upgrade) actions (outputted in the HDM-4 programme) were divided over the 20 year analysis period to give an average annual cost for each action. The other annual maintenance costs such as bridge and weighbridge maintenance, as well as non-works costs such as administration and supervision costs borne by TANROADS and PORALG for which RF funding is required were then added to the total funding requirements. The latest release to the MoWTC for FY2015/2016, as well as the RFB's latest administrative and operational costs for FY2015/2016 were added to the total funding requirements, as a representation of the MoWTC and RFB annual requirements. The total results were then categorized into 8 requirement scenarios, as described in the diagram above. A full breakdown of the funding requirements per scenario and per cost item is summarized in Table 6-4 for TANROADS and Table 6-5 for PORALG, with the total requirements summarized in Table 6-6.

The funding scenarios were presented to the steering committee, where it was decided that road maintenance should be focused on improving accessibility, especially for poor rural communities regardless of whether they are economically feasible or not. Further, the RF was established primarily of road maintenance - at least 90% of the funds must be used for maintenance and not more than 10% should be used for development. Based on the items discussed, a combination scenario was proposed. The proposed scenario is a combination of scenarios 1B and 2A. This scenario illustrates maintenance activities on all road links (irrespective of economic feasibility) and rehabilitation on links where it is economically feasible. The total RF funding requirements for the respective proposed scenarios, as well as the combined scenario is shown in the diagram below. The financial gap based on the latest RF total release for FY 2015/2016 (approximately USD 300.69) is shown in red in Figure 0-6 below.

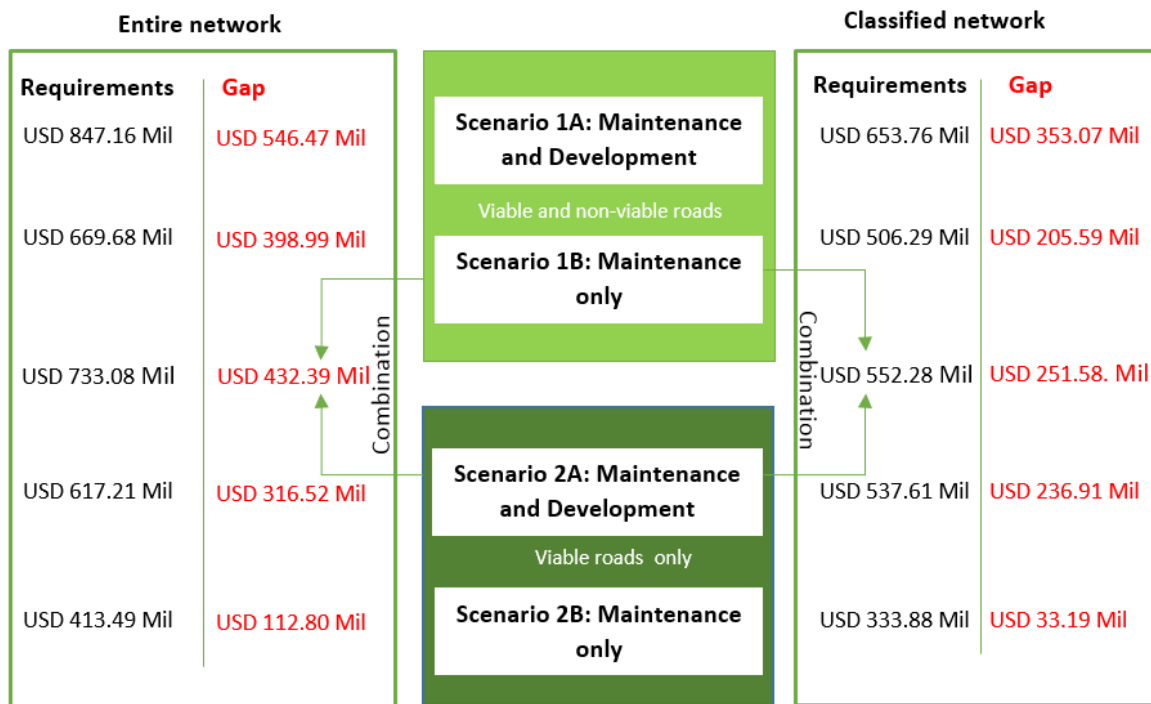


Figure 0-6: Funding requirements and funding gap per scenario

It is obvious that necessary funding requirements will be more achievable if maintenance and development activities are implemented for the classified network, as illustrated Figure 0-6. Current RF collection meets 46% of the maintenance and development requirements for the most expensive scenario (1A) and 90% of the maintenance and development requirements for the most affordable scenario (2B) for the classified network compared to 35% and 73% respectively for the entire network.

The vehicle operating cost, road condition and asset value of each requirement scenario were also analysed and are summarized in Chapter 6.6 of this Final Report. The option of multiple requirement scenarios allow strategy makers and planners to select a scenario depending on the funds available and the long term intention for the road network. For instance, both maintenance and development on the network will increase the asset value of the network whereas continual maintenance activities only, will either reduce or maintain the asset value of the network over time as demonstrated in Figure 6-23 and Figure 6-24.

The combined scenario was selected as the preferred scenario due to the following reasons:

- a) The RF was established primarily for road maintenance. At least 90% of the funds must be used for maintenance and not more than 10% should be used for development according to the Road and Fuel Tolls Act Cap 220 (R.E 2006), Part II. Development categorized under scenarios 1A and 2A include both rehabilitation and upgrade, thus the total development requirements surpasses the 10% limit (distribution shown in Figure 6-14 and Figure 6-15). The proposed combined scenario only includes rehabilitation as part of development, thus the development funding requirements for this scenario is more or less lies within the 10% limit.
- b) Chapter 6.6 shows the effect that each scenario has on the VOC, condition and asset value of the road network. The combined scenario is the preferred scenario due the advantageous effects on the paved road network. This scenario ensures that the asset value of the road network is maintained over the analysis period. The combined scenario, along with 1A and 2A result in the greatest reduction in the VOC.

- c) Road maintenance should be focused on improving accessibility, especially for poor rural communities regardless of whether they are economically feasible or not. This scenario illustrates maintenance activities on all road links (irrespective of economic feasibility) and rehabilitation on paved road links where it is economically feasible.

## 5. Adjustment of current and proposed funding instruments

The need for a revised charging system arises from the fact that the current disbursements from the RF render a large funding shortfall compared to the maintenance and development needs of mainland Tanzania as shown in Figure 0-6 above.

The adjustment of the charge levels of current funding instruments for the RF as well as the charges levels of the proposed new funding instruments were analysed using the Tanzania Road User Charges Model (TANRUC). The model takes various factors such as road expenditures, policy variables, road use data and fuel consumption data as input to the model. These factors are then applied and processed by the model to produce results in the form of cost recovery figures for various cost recovery mechanisms. The TANRUC model was used to investigate the necessary charging levels per instrument (existing and new) based on the cost responsibility of each vehicle type in order to achieve the maintenance and development funding requirements of the road network in mainland Tanzania.

The adjustment of the charge levels of the current and proposed funding instruments for the RF are dependent on the funding requirement scenario selected, as well as the funding instruments inputted in the TANRUC model. Two funding scenarios were thus devised to serve as an indicator for the adjustment of RUC's based on the recommended funding instruments for the RF, namely funding scenario X and funding scenario Y. Funding scenario X includes two current revenue sources for the RF – the fuel levy and transit charges, as well as the foreign vehicle permits recommended for devotion to the RF. Funding scenario Y includes two current revenue sources for the RF – the fuel levy and transit charges; foreign vehicle permits, road reserve charges, excise duty (portion) recommended for devotion to the RF, as well as the introduction of weight distance charges. The funding instruments for each funding scenario are summarized in Figure 0-7. The required charging levels for the respective funding scenarios are summarized in Figure 8-4 and Figure 8-5.

Funding scenario X will maintain the Roads Fund dependency on the fuel levy and requires a drastic increase in the fuel levy to meet the desired funding requirements. Funding scenario Y reduces the dependency on the fuel levy and diversifies the funding instruments for the RF. Funding scenario X can be used as a first approach for the adjustment of FVP and transit charges as the devotion and introduction of new funding instruments (which form part of funding scenario Y) to the RF may take several years to implement.



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## Funding scenarios



Fuel levy, transit charges,  
FVP

---



Fuel levy, transit charges,  
FVP, weight distance  
charges, road reserve  
charges, excise duty (portion)

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Figure 0-7: Proposed funding scenarios

A summary of the adjustment mandates and frequency for adjustment for the current and proposed revenue sources for the RF is shown in the table below. The revenue effect on the RF is also summarized in the table below. A full discussion of the adjustment mandates and frequencies is included in Chapter 8.3.

Table 0-1: Summary of required adjustment mandates and frequencies for proposed revenue sources for the RF

Revenue Source Type	Adjustment Mandate	Proposed Frequency	Adjustment	Revenue Effect
Transit Charges	<ul style="list-style-type: none"> <li>▪ Minister of Finance</li> <li>▪ Foreign Vehicles Transit Charges Act</li> <li>▪ Finance Act</li> </ul>	Every 5 years (last adjusted in 2001)	<p>Extension of transit charges to all vehicle types.</p> <p>Transit charges and transit fees should be included as a one-line item in legislation</p>	Medium
Vehicle overloading fees	<ul style="list-style-type: none"> <li>▪ Minister of Transport, Work and Communication</li> <li>▪ Road Traffic Act 30 of 1973, Road Traffic Regulations under section 114(1)(p)</li> <li>▪ Finance Act</li> </ul>	At least biennial basis (last adjusted in 2001)	<p>Altering of certain fees as the current levels have not been amended since 2001.</p> <p>Amending the part of the Regulations dealing with the collection and management of public revenues.</p>	Minimal
Fuel levy	<ul style="list-style-type: none"> <li>▪ Minister of Finance</li> <li>▪ Road and Fuel Tolls Act R.E 2006</li> <li>▪ Finance Acts</li> </ul>	At least an annual review	<ul style="list-style-type: none"> <li>▪ List of exempt bodies should be revisited.</li> <li>▪ Adjust fuel levy with small fixed increments.</li> <li>▪ If required increase is high, diversion of a portion of the excise duty.</li> </ul>	Significant
Foreign vehicle permit	<ul style="list-style-type: none"> <li>▪ Minister of Finance</li> <li>▪ Transit Charges Act</li> <li>▪ Road and Fuels Tolls Act</li> <li>▪ Foreign Vehicle Transit Charges Act</li> <li>▪ Finance Act</li> </ul>	Every 5 years	<p>The definition of transit charges should be amended to expressly include FVP and be aligned with related Act.</p> <p>The administration, collection and charge level of the FVP should be included in the relevant Act.</p>	Medium
Road reserve charges	<ul style="list-style-type: none"> <li>▪ Minister of Finance</li> </ul>	Every 5 years	In consultation with TANROADS, TARURA, MOWTC and LGAs	Significant

Revenue Source Type	Adjustment Mandate	Proposed Frequency	Adjustment	Revenue Effect
	<ul style="list-style-type: none"> <li>▪ Road and Fuels Tolls Act</li> <li>▪ Finance Act</li> <li>▪ The Roads Act</li> </ul>		Consolidation of Bylaws and Regulations such that road agencies follow one set of regulations.	
Weight distance charges	<ul style="list-style-type: none"> <li>▪ Minister of Finance</li> <li>▪ Road and Fuels Tolls Act</li> <li>▪ Finance Act</li> </ul>	To be in line with the fuel levy	Weight Distance Charges should be complementary to the fuel levy and be in-line with adjustments in the fuel levy.	Medium but high collection cost
Excise duties on fuel	<ul style="list-style-type: none"> <li>▪ Minister of Finance</li> <li>▪ Road and Fuel Tolls Act</li> <li>▪ Excise Act</li> <li>▪ Tax Administration Act</li> <li>▪ Finance Act</li> </ul>	Annually based on the increase in heavy vehicle population	Devote a portion of excise on fuel to RF based on the revenue that would have been generated by the annual heavy vehicle licence fees.	High potential
CNG, solar & electric powered vehicles	<ul style="list-style-type: none"> <li>▪ Minister of Finance</li> <li>▪ Road and Fuel Tolls Act</li> <li>▪ Finance Act</li> </ul>	As and when the fuel levy is adjusted	Amend definition of fuel levy to include CNG, electric and solar powered vehicles	Minimal (based on fleet current)
Toll roads	<ul style="list-style-type: none"> <li>▪ Minister of Finance</li> <li>▪ Road and Fuel Tolls Act</li> <li>▪ Finance Act</li> </ul>	To be revisited and adjusted in small increments on at least a biennial basis (every two years)	Implementation of toll roads only recommended on particular roads / corridors where sufficient revenue can be generated.	Medium

It was decided that maintenance and development activities should be conducted on the classified network based on the **Road and Fuel Tolls Act Cap 220 (R.E 2006)** which refers to the use of the Roads Funds for classified roads. The funding requirements for the preferred combined requirement scenario on the classified network is **USD 552.28 million**. The latest RF release was USD 300.69 million for FY 2015/2016, meaning there is a current **deficit of USD 251.58 million**, as shown in Figure 0-6.

As mentioned, based on the funding requirement scenario selected and the funding instruments inputted into the model, there are an infinite number of solutions available for the adjustment of charges. Based on the recommendation of the combined requirement scenario on the classified network and the funding instruments in funding scenario Y, the TANRUC computer model was used to provide a guideline for the charge levels of the proposed funding instruments for the RF. A summary of the required charge levels for funding scenario Y based on vehicle cost responsibility is summarized below.

**Table 0-2: Adjusted charge level per funding instrument based on funding scenario Y**

Vehicle Type	Fuel Levy (USD c/l)		Transit Charge (USD/100 km)		FVP (USD/day)		RRC (USD/unit)		Excise duty (USD c/l)		WDC (USD/100km)	
	Current	Required	Current	Required	Current	Required	Current	Required	Current	Required	Current	Required
Motorcycle (petrol)	12.55	13.47		0.40		0.03	N/A	-	16.86	0.51	-	-
Light Vehicle (petrol)	12.55	13.47	-	0.80	0.22	0.81	N/A	-	16.86	0.51	-	-
Bus (diesel)	12.55	13.47	-	4.63		3.88	N/A	-	11.35	0.51	-	2.91
Light Truck (diesel)	12.55	13.47	6.00	4.01		3.00	N/A	-	11.35	0.51	-	2.66
Medium/Heavy Truck (diesel)	12.55	13.47	16.00	12.82		9.74	N/A	-	11.35	0.51	-	9.32
Non-vehicle related	-	-	-	-		-	Variable	Variable		-	-	-

It should be noted that **the charges shown only serve as an indicator** for the adjustment of RUC's. The user of the TANRUC model can adjust the figures manually and add addition funding instruments, as desired.

It is recommended that the proposed increase is implemented at least over a 3-5 year period. To minimize the effects on the road user, a 5 year implementation plan is proposed by the consultant. Based on an implementation plan of 5 years, the revenue generated per year and funding shortfall is shown in the graph below.

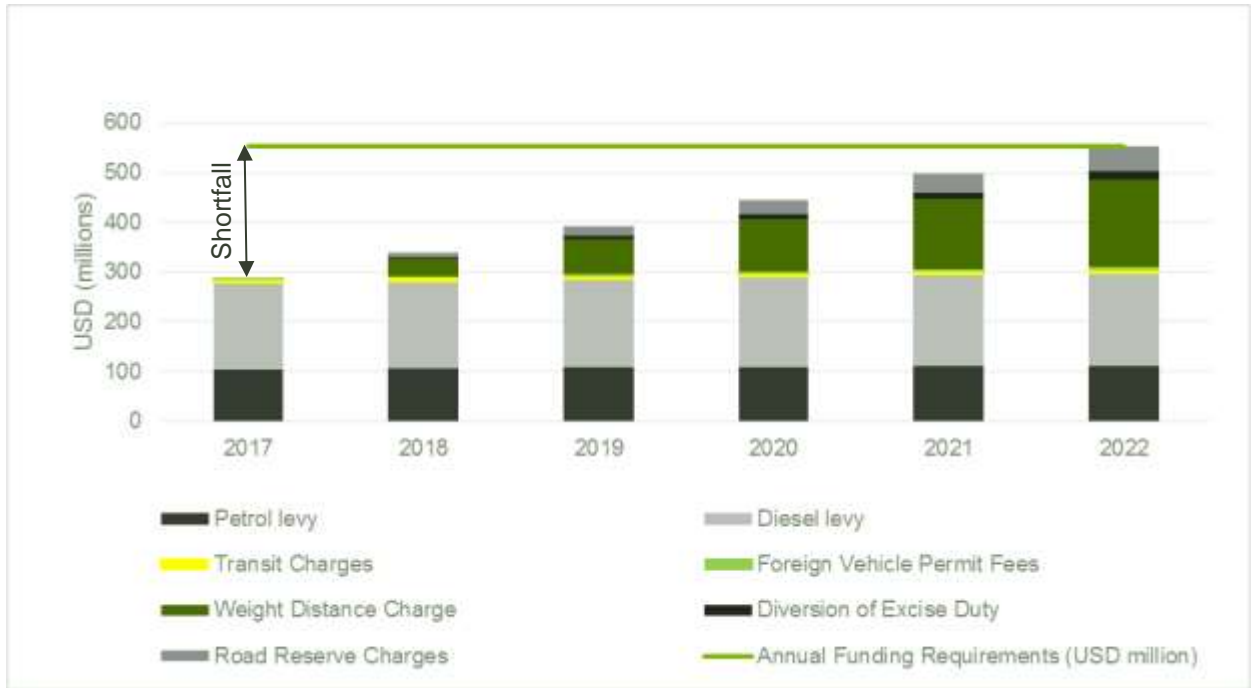


Figure 0-8: Revenue and funding shortfall for 5 year implementation plan

Figure 0-8 shows that the devolution of the FVP, road reserve charges, a portion of the excise duty, as well as the introduction of weight distance charges to the RF drastically reduces the dependency on the fuel levy. The fuel levy would only contribute 54% to the total RF by year 2022 (at the end of the 5 year implementation period) compared to 96-97% contribution currently. Weight distance charges would be the second highest contributor to the RF after the fuel levy.

A complete summary of the main findings and recommendations made throughout this study can be found in Chapter 9 of this **Final Report**.



## Chapter 1 Introduction



# 1 Introduction

## 1.1 Report Objective and Structure

The purpose of this *Final Report* is to present the findings and recommendations of the study to increase the revenue base of the Roads Fund. This report also provides a summary of the previous working papers and activities that contributed to the final recommendations made by the consultant.

This Final Report is structured as follows:

- a) Section 1 (this section) provides the introduction to the study, objectives of the study and a summary of the key deliverables submitted during the study period;
- b) Section 2 presents a brief overview of the Tanzanian Road Network in terms of the network length condition and traffic;
- c) Section 3 provides an introduction to the Roads Fund and its Board;
- d) Section 4 provides a summary of the existing sources of revenue for the Roads Fund in terms of the mandate and current revenue collections, as well as a gap analysis between the revenue collected and received;
- e) Sections 5 provides a review and recommendations for potential new sources of revenue for the RF discussed in WP "Recommendations for New Sources of Revenue", attached in Annex D of Volume 2.
- f) Section 6 provides a summary of the maintenance and development needs in mainland Tanzania and the effects of various maintenance plans on the condition, VOC and asset value of the road network. The maintenance practices in terms of force account and PMMR are also examined in this section;
- g) Section 7 provides a summary of the effectiveness, efficiency and economy of the implementing agencies. It reviews the execution of maintenance works on the basis of a number of criteria and recommends procedures to avoid possible mismanagement of resources in the future;
- h) Section 8 provides a summary of the methodology used to adjust the current revenue sources and newly identified sources of revenue for the RF, as well as the mandate and frequency for adjustment.
- i) Section 9 provides a summary of the final recommendations and findings made throughout this study, for the increase of the revenue base of the RF. It also includes an implementation plan for the adjustment of current and new sources of revenue for the RF.

## 1.2 Project Objective

The overall objective of the study is to determine the appropriate level of funding to facilitate the delivery of road maintenance in the country. To achieve this overall objective, the Terms of Reference details the necessary steps as follows:

- a) To review the existing revenue sources in the last five years and assess its potential to generate revenue in the coming 10 years.
- b) To identify and propose new funding instruments and its related charges (RUC's and Non-RUC's) to ensure that road users collectively generate sufficient revenue to finance road maintenance programmes and progressive developments.
- c) To review maintenance needs in the last five years using RNET, HDM-4 or other appropriate analysis software and prepare a multi-year road maintenance need forecast for the coming 10 years. This is to be compared with forecasted revenue in bullets one (a) and two (b) to establish the financial gap.

- d) To establish a methodology for determining damage imposed on road pavements by overloaded vehicles on the paved network, and to determine the extent of current damage and the corresponding cost of reinstating the same.
- e) To examine overloading fees charged on overloaded vehicles in relation to damage imposed by vehicles on the paved road network and propose suitable charges to prevent overloading.
- f) To establish a system that helps to adjust road user charges to reflect the road maintenance expenditure based on the fee for services principle.
- g) To establish systems of improving efficient use of available limited resources so as to achieve more mileage with fewer resources.
- h) To build capacity of RFB staff on RNET and HDM-4.

A brief summary of the project deliverables, meetings held and staff employed is shown in **Appendix A**.

### 1.3 Key deliverables

#### a) Inception Report

Includes the meeting minutes, times and dates of the kick-off meeting with the client and first set of stakeholder engagements, as well as a summary of the documentation retrieved during the stakeholder consultations.

#### b) Condition Assessment Guidelines

Includes the best practice guidelines for the collection of road condition data, including the type of condition data required and measurement of the various indicators used for the determination of the overall road condition in comparison with the current practices of TANROADS and the LGA's in terms of condition assessment. Recommendations were made in terms of the harmonization of condition data collection between TANROADS and PORALG and frequency of data collection.

#### c) Report of Existing Revenue Sources

This working paper reviews the current sources of revenue for the RFB in terms of the mandate, collection process, flow of funding from collection, revenue trend for the last 5 FY's and a gap analysis between the actual collections and money received by the RFB.

#### d) Provision of Training Materials and Training on HDM-4 and RNET

Training was given to the RFB staff members on HDM-4 and RNET by an accredited trainer in conjunction with Aurecon. Week one of the training was from 19-23 September 2016, and week two from 3 to 8 October 2016. The attendants received their certificates on the last day and RFB have four licences from which to run the HDM-4 programs. This training will allow the RFB to perform road maintenance plans, develop maintenance prioritization plans and various budget constraints depending on the funding availability.

#### e) Cost Recovery Guidelines for Pavement Damage due to Overloading

The purpose of this working paper was to present an analysis of the effects of vehicle overloading on the road network of mainland Tanzania and to provide an indication of the financial implications and recommendations for the recovery of the associated cost. This report also provides suggested amendments for the current overloading fee structure to ensure cost recovery from overloading as recommendations regarding the overall weighbridge masterplan.

**f) Recommendations for New Sources of Revenue**

This working paper analyses the potential of existing taxes, charges and fees in mainland Tanzania to be devoted to the RFB, as well as the introduction of new fees, charges and levies to broaden the revenue base of the RF.

**g) Guidelines and TOR for conducting Technical Audits**

The aim of this working paper was to evaluate the Terms of Reference and the Manual for conducting Technical Audits as contained in the Monitoring and Evaluation Manual (Technical Part) used for technical audits in Tanzania, to identify shortcomings and to propose appropriate amendments.

**h) Guidelines on Establishing Road Maintenance Needs**

This working paper presents guidelines to Implementing Agencies for determination of road maintenance needs. It also specifies the maintenance needs submission requirements applicable to Implementing Agencies (Road Agencies) and serves as a guideline for (RFB) for appraising the submitted maintenance needs and accompanying request for funding.

**i) Review of financial audit techniques including eligibility of funding**

Describes the current methods and procedures employed in financial auditing of the RFB, as well as by the RFB to audit funds collected by collection agencies and spent by implementing agencies. Based on an evaluation of the current methods and procedures, recommendations for improvement in auditing procedures were made.

**j) Multiyear Road Maintenance Need Assessment report**

This working paper describes the methodology used to analyse the maintenance and development needs of mainland Tanzania over the next 20 years and presents the results of the HDM-4 model for the TANROADS and PORALG network.

**k) Guidelines for the Adjustment of RUC's**

This paper identifies the mandates and mechanisms required for the adjustment of existing, diverted and new proposed sources of revenue to the RFB to help ensure that the RFB collects sufficient revenue to finance road maintenance programmes and progressive developments. Suggestions are made based on the required revenue identified in the "Multiyear Road Maintenance Need Assessment report", attached in Annex H of Volume 2 and the theoretical cost responsibility of each vehicle type, calculated within the TANRUC model.

**l) Report on Capacity building**

The overall objective of the assessment was to determine the degree to which the current organisational structure and the qualification levels and experience of the RFB personnel enable the agency to deliver on the strategic objectives of the collection of funds, the disbursement of funds and the monitoring of expenditure.

**m) Computer model**

The TANRUC model developed by Aurecon will assist the RFB to make adjustments to the charge levels of funding instruments for the RF. The model takes various factors such as road expenditures, policy variables, road use data and fuel consumption data as input to the model. These factors are then applied and processed by the model to produce results in the form of cost recovery figures for various cost recovery mechanisms.

#### n) Monthly/Quarterly reports

Monthly reports and quarterly reports were submitted to the client during the course of the study, to provide progress updates to the client in terms of the activities conducted and deliverables achieved by the consultant throughout the project timeline. It includes the targeted deliverables, activities such as internal and external meetings (including the minutes), as well as the financial status of each reporting period.

## 1.4 Study assumptions

### 1.4.1 Average exchange rates

The yearly exchange rates used throughout this report were based on the GDP in national currency and the GDP in dollars, obtained from the International Monetary Fund shown below in Table 1-1. The calculated exchange rate was then used per financial year.

Table 1-1: Calculated exchange rate from GDP

Units	2010	2011	2012	2013	2014	2015	2016	2017
GDP National currency (TZS) (A)	43 836	52 763	61 434	70 953	79 442	89 411	100 712	115 390
GDP (USD) (B)	31	34	39	44	48	45	46	51
Calculated exchange rates (A/B)	1410.15	1571.11	1571.69	1597.54	1651.99	1991.16	2194.20	2253.97
Financial year	-	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017
Average exchange rate per FY	-	1490.63	1571.40	1584.62	1624.77	1821.58	2092.68	2224.08



## Chapter 2 The Tanzanian Road Network



## 2 The Tanzanian Road Network

According to the Roads Act 2007, all classified roads in Tanzania Mainland are vested under the Minister for Works, Transport and Communication (MoWTC). Tanzania has a classified road network estimated to be in the order of 87 581 kilometres (km), of which approximately 35 000 km are National Roads, classified as Trunk and Regional roads managed by the Tanzania National Roads Agency (TANROADS), an executive agency under MoWTC. In discharging its role of managing the national roads network, TANROADS uses its head office in Dar Es Salaam and is supported by Regional Manager's Offices located in 25 regions in mainland Tanzania.

The remaining 52 581 km of classified road network are district roads, which includes collector, feeder and community roads. These are managed through the Local Governments Authorities (LGA's) that are coordinated through the President's Office Regional Administration and Local Government (PORALG). The district roads are managed by PORALG through 185 Councils or Local Government Authorities (LGAs). PORALG provides the co-ordination and oversight function through its Directorate of Infrastructure, assisted by Regional Secretariat Engineers (RSE) in each region to co-ordinate the road activities of the LGAs within the region. During the time of writing this report, the Tanzania Rural and Urban Roads Agency (TARURA) was in the process of being established and it is understood that TARURA will perform some of the functions that are currently being performed by PORALG.

### 2.1 Road Network Characteristics

#### 2.1.1 Road classification

Section 12 (2) (a) and (b) of the Road Act, 2007 (No. 13 of 2007) states that the national roads shall include:

**1. a trunk road which is primarily-**

- i. a national route that links two or more regional headquarters or
- ii. an international through route that links regional headquarters and another major or important city or town or major port outside Tanzania

**2. a regional road is a secondary national road that connects**

- i. a trunk and district or regional headquarters;
- ii. a regional headquarters and district headquarters;

Section 12 (3) (a) (b) and (c) of the Road Act, 2007 (No. 13 of 2007) states that the district roads shall include:

**1. a collector road which is –**

- i. a road linking a district headquarters and division centre;
- ii. a road linking a division centre with any other division centre,
- iii. a route linking a division centre with a ward centre;
- iv. a road within an urban area carrying through traffic which predominantly originates from and is destined out of the town and links with either regional or a trunk road.



## 2. a feeder road which shall be-

- i. a road within urban area that links a collector and other minor road within the vicinity and collects or distributes traffic between residential, industrial and principal business centre of the town;
- ii. a village access road linking wards to other wards centre;
- iii. a community road within the village or a road which links a village to a village.

### 2.1.2 Road length

The road network in mainland Tanzania consist of trunk, regional, district, urban and feeder roads. TANROADS is responsible for managing the trunk and regional roads (approximately 35 000km), and PORALG is responsible for managing majority of the network consisting of district, urban and feeder roads (approximately 108 946km including unclassified roads). The extent of the Mainland Road Network is summarized below in Table 2-1. At present, only 6.9% of the total estimated network is paved. The latest data pertaining to the road network extent was retrieved from PORALG Annual Report FY 2015/2016 and TANROADS Business Plan 2016/2017.

Table 2-1: Road Network in mainland Tanzania (km) PORALG 2016, TANROADS 2017

Road Type	Type			
	Paved (km)	Gravel (km)	Earth (km)	Total (km)
TANROADS Trunk	7 342	5 444	-	<b>12 786</b>
TANROADS Regional	1 321	20 893	-	<b>22 214</b>
PORALG District/Feeder/Urban	1 325	22 089	85 532	<b>108 946</b>
Total	9 988	48 426	85 532	<b>143 946</b>

### 2.1.3 Road condition

As of June 2015, 30 347 km of the TANROADS network was surveyed, while the remainder was under construction for upgrade or impassable during the time of the survey. The results are shown in Table 2-2 below.

Table 2-2: TANROADS network condition 2015 (TANROADS, 2015)

Type	Condition						Total km	
	Good		Fair		Poor		Km	%
	Km	%	Km	%	Km	%		
Regional Paved	697	65	314	29	69	6	1 080	100
Trunk Paved	4 622	74	1 246	20	402	6	6 270	100
Regional Unpaved	4 958	25	11354	58	3 384	17	19 696	100
Trunk Unpaved	1 203	36	1584	48	514	16	3 301	100
<b>Total</b>	<b>11 480</b>	<b>38</b>	<b>17 199</b>	<b>48</b>	<b>4 369</b>	<b>14</b>	<b>30 347</b>	<b>100</b>

Table 2-2 shows that the majority of the TANROADS paved network is in a good condition while the TANROADS unpaved network is in a fair condition (TANROADS Annual Progress Report 2014/2015).

The current estimated condition of the PORALG road network is shown below, as reported in the PORALG Annual Report 2015/2016.

Table 2-3: LGA network condition 2015 (PORALG, 2016)

Type	Condition						Total km	
	Good		Fair		Poor			
	km	%	km	%	km	%	km	%
Paved	901	68	257	19	168	13	1 325	100
Gravel	9 308	42	8 482	38	4 299	19	22 089	100
Earth	14 320	17	28 531	33	42 681	50	85 532	100
<b>Total</b>	<b>24 529</b>	<b>23</b>	<b>37 270</b>	<b>34</b>	<b>47 148</b>	<b>43</b>	<b>108 946</b>	<b>100</b>

Based on Table 2-3, a large portion of unclassified earth tracks are included in the PORALG network, which are in a poor condition.

#### 2.1.4 Vehicle population

The total vehicle population in mainland Tanzania for 2015 was retrieved from Tanzania Revenue Authority (TRA), shown below in Table 2-4.

Table 2-4: Total vehicle population for 2015 (retrieved from TRA during stakeholder consultation)

Vehicle Category	<500cc	Btn 500cc and 1500cc	Btn 1500cc and 2500cc	Btn 2500cc and 5000cc	Above 5000cc	Total	Distribution
Agricultural tractor	4 999	436	1 209	8 701	2 163	<b>17 508</b>	1%
Agricultural trailer	645	10	10	75	178	<b>918</b>	0%
Construction equipment	131	20	79	1 675	5 214	<b>7 119</b>	0%
Heavy Load vehicle (GVM > 3500kg)	5 692	174	773	11 013	75 665	<b>93 317</b>	5%
Heavy passenger vehicle (12 or more people)	16	914	15 996	32 905	5 112	<b>54 943</b>	3%
Light load vehicle (GVM 3500KG or less)	1 826	14 451	36 273	37 636	4 177	<b>94 363</b>	5%
Light passenger vehicle (less than 12 persons)	1 90	139 956	282 721	86 242	4 559	<b>51 4668</b>	27%
Motor tricycle	63 173	83	26	29	7	<b>63 318</b>	3%
Motorcycle	1 023 653	1 397	233	85	61	<b>1 025 429</b>	54%
Other	281	812	1 358	1 445	1 152	<b>5 048</b>	0%
Trailer	35 124	35	16	35	184	<b>35 394</b>	2%
<b>Total</b>	<b>113 6730</b>	<b>158 288</b>	<b>338 694</b>	<b>179 841</b>	<b>98 472</b>	<b>1 912 025</b>	<b>100%</b>

The annual vehicle registrations in mainland Tanzania, retrieved from TRA is shown below in Table 2-5. Majority of the annual registrations comprise of motorcycles and light passenger vehicles which make up the bulk of the Tanzanian vehicle population. Based on the number of vehicles registered between the years 2010 and 2015, one can derive that on average 217 092 vehicles were registered per annum.

Table 2-5: New vehicle registrations (2010-2015) (retrieved during TRA consultation)

Vehicle type	2010		2011		2012		2013		2014		2015	
Agricultural tractor	1 451	1%	1 416	1%	1 860	1%	1 372	1%	2 119	1%	1 429	1%
Agricultural trailer	30	0%	65	0%	136	0%	489	0%	47	0%	21	0%
Construction equipment	764	0%	1 052	1%	798	0%	752	0%	1 065	0%	653	0%
Heavy Load vehicle (GVM > 3500kg)	5 429	3%	5 859	3%	6 092	4%	7 032	3%	10 112	3%	5 810	2%
Heavy passenger vehicle (12 or more people)	3 794	2%	2 796	2%	2 035	1%	3 483	2%	6 382	2%	3 704	2%
Light load vehicle (GVM 3500KG or less)	4 581	3%	5 262	3%	4 913	3%	7 126	3%	10 859	4%	6 639	3%
Light passenger vehicle (less than 12 persons)	37 605	22%	35 101	19%	35 444	21%	53 022	24%	70 239	23%	47 291	19%
Motor tricycle	1 993	1%	5 198	3%	7 356	4%	13 475	6%	22 643	7%	8 329	3%
Motorcycle	115 468	67%	125 412	68%	106 763	63%	132 623	59%	175 197	57%	164 432	67%
Other	181	0%	411	0%	441	0%	365	0%	1 384	0%	1 723	1%
Trailer	2 322	1%	2 850	2%	3 472	2%	3 919	2%	6 300	2%	4 164	2%
Total	173 618	-	185 422	-	169 310	-	223 658	-	306 347	-	244 195	-

### 2.1.5 Traffic

The various vehicle types shown in Table 2-4 and Table 2-5, as captured by TRA, were then grouped into motorcycles, car/pickups/small buses, light trucks and medium/heavy trucks for simplicity such that it could be combined with the traffic data retrieved from TANROADS. The combined vehicle categories are shown below as the “output vehicle categories”.

Table 2-6: Combined vehicle categories

TRA Vehicle categories	TANROADS Vehicle categories	Output Vehicle categories
Agricultural tractor	-	<b>Other</b>
Agricultural trailer	-	
Construction equipment	-	
Other	-	
Trailer	-	
Motor tricycle	-	<b>Motorcycle</b>
Motorcycle	-	
Light load vehicle (GVM 3500KG or less)	Light Truck	<b>Light Truck</b>
Heavy Load vehicle (GVM > 3500kg)	Artic Truck/Heavy Truck/Medium Truck	<b>Heavy Truck</b>
Light passenger vehicle (less than 12 persons)	Car/Pickup/Small Bus	<b>Car/Pickup/Small Bus</b>
Heavy passenger vehicle (12 or more people)	Large Bus	<b>Bus</b>

The average annual daily traffic (AADT) on the trunk and regional roads were retrieved from TANROADS while assumptions were made on the on the district, feeder and urban roads (Table 2-8). The weighted average traffic per vehicle class was calculated on the TANROADS paved and gravel networks and the same vehicle percentage distribution was applied to the PORALG paved and gravel roads, while it was assumed that only pick-ups and motorcycles would travel on the earth roads. The AADT on the road network in mainland Tanzania is shown in Table 2-7 below.

Table 2-7: AADT on the paved and gravel road network in mainland Tanzania

Road type	Length (km)	Motorcycle	Car/Pickup/Small Bus	Bus	Light Truck	Medium/Heavy Truck	% HV
<b>Trunk under TANROADS</b>							
Paved	7 342	152	935	136	68	379	35%
Gravel	5 444	18	116	12	14	42	34%
<b>Regional under TANROADS</b>							
Paved	1 321	168	1 388	82	78	127	16%
Gravel	20 893	15	105	6	13	25	27%
<b>District/Feeder/Urban under PORALG</b>							
Paved	1 325.5	80	561	88	24	128	27%
Gravel	22 088.8	8	29	2	7	44	59%
Earth	85 531.9	1	9	0	0	0	0%

Table 2-8: AADT assumptions on the PORALG network

Road Type	Good condition	Fair condition	Poor condition
Paved	1000	500	200
Gravel	100	80	50
Earth	20	10	5



## Chapter 3 Establishment of the Roads Fund Board



## 3 Establishment of the Roads Fund Board

### 3.1 Introduction

The Roads Fund (RF) was established in terms of the Road Tolls (Amendment) Act 2 of 1998 (“the Amendment Act”), which amended the Roads Toll Act of 1985 (“the Principal Act”).

The Roads Fund Board (RFB) was established with a mandate to collect funds, disburse funds and monitor the RF Funds. The Boards’ mission is to provide adequate and stable flow of funds for road works and monitor its utilisation by Implementing Agencies.

### 3.2 Sources of revenue

Within the road sector of Tanzania there are dedicated revenue sources aimed at maintenance of the road network accruing to the RF and is to be disbursed to TANROADS, MoWTC and the LGA’s through (PORALG).

The Road and Fuel Tolls Act Cap 220 (R.E 2006) (hereinafter “the Road and Fuel Tolls Act”) in Section 4 regulates the RF, into which all monies collected from the following sources are to be paid (quoted verbatim):

- a) Transit fees,
- b) Vehicle overloading fees,
- c) Heavy vehicle licences,
- d) Road and fuels tolls imposed on diesel and petrol, and
- e) any other source at the rate or rates to be determined by Parliament.

It is important to note that “**fuel toll**” above refers to what is widely termed the **fuel levy** and is applicable to petrol and diesel utilized by road users.

### 3.3 Key responsibilities

The key responsibilities of the RFB in terms of the Road and Fuel Tolls Act Cap 220 (R.E 2006) and for purposes of this study are listed below:

- a) To advise the roads Minister on new sources of roads and fuel tolls, adjustment of rates of existing roads and fuel tolls and on the regulations for collection of road and fuel tolls for the purpose of ensuring adequate and stable fund flow of funds to road operations;
  - i) to apply the money deposited into the Fund for the purposes approved by the Parliament;
  - ii) to set out procedures for agents with respect to the collection of roads tolls for the purpose of the Fund;
  - iii) to ensure full collection and transfer of collected roads tolls to the Fund’s account;
- b) To develop and review periodically the formula for allocation and disbursement from the RF to TANROADS, local authorities and other agencies and advise the roads Minister accordingly;
  - i) to recommend to the roads Minister an allocation of funds for TANROADS, local authorities and other road agencies to undertake road management at a level that is suitable and affordable;
  - ii) to disburse funds from the Fund to TANROADS, local authorities and other agencies;



- iii) to ensure that the operations of TANROADS, local authorities, other road agencies and the Fund are technically and financially sound;
  - iv) to monitor the use of the funds disbursed to TANROADS, local authorities or other agencies for the purpose of the objects of the Fund;
- c) To make any other recommendations to the roads Minister as it considers necessary to enable the Board to achieve its objectives.

### 3.4 Mandate of the Roads Fund

In terms The Road and Fuel Tolls Act Cap 220 (R.E 2006), Part II:

- a) At least ninety percent of the money deposited in the Fund shall be used for maintenance and emergency repair of **classified roads**<sup>1</sup> and related administrative costs in mainland Tanzania in accordance with approved operational plans made;
- b) Not more than ten percent of the money deposited in Fund shall be used for roads development and related administrative costs in mainland Tanzania in accordance with the plans and budgets approved by Parliament;
- c) The money deposited in the Fund shall not be used for any other purposes than those provided for in subsections (3) and (4) of part 2 of the Act (mentioned above); and
- d) The money deposited in the Fund shall be audited by the Controller and Auditor General or any other qualified auditor appointed by the Board after the approval of the Controller and Auditor General.

### 3.5 Collection and release

Table 3-1 below is a summary of the funds which have accrued to the RF since FY2010/2011 to FY2015/2016 while

Table 3-2 shows the releases for the last 5 FY's. The collections and releases were retrieved from the RFB during the consultation period.

Table 3-1: Revenue collected for the RF (Tshs in billions)

Financial Year	Fuel Levy		Transit Charges		Overloading fees		Total	
	Tshs in bill	% share	Tshs in bill	% share	Tshs in bill	% share	Tshs in bill	% change
2010/2011	314.84	97%	4.69	1.4%	6.25	1.9%	325.78	-
2011/2012	391.00	96%	5.77	1.4%	10.00	2.5%	406.77	<b>24.9%</b>
2012/2013	434.47	97%	5.41	1.2%	7.94	1.8%	447.82	<b>10.1%</b>
2013/2014	626.02	98%	6.52	1.0%	8.69	1.4%	641.2	<b>43.2%</b>
2014/2015	623.18	97.1%	7.90	1.2%	10.87	1.7%	641.95	<b>0.1%</b>
2015/2016	705.09	97.6%	9.73	1.3%	8.05	1.1%	722.57	<b>12.6%</b>

<sup>1</sup> Means any public road including trunk roads, regional roads, urban roads and feeder roads (The Road and Fuel Tolls Act Cap 220 (R.E 2006))

Table 3-2: Revenue releases for FY 2011/2012 to 2015/2016 (Tshs in billions)

Financial year	TANROADS	PORALG	MOW	RFB	Total
2011/2012	197.43	94.02	21.94	3.17	316.55
2012/2013	267.98	127.61	29.78	4.30	429.66
2013/2014	314.54	149.78	34.95	5.04	504.31
2014/2015	244.45	114.99	27.07	3.49	390.00
2015/2016	393.02	187.15	43.67	5.41	629.25

Figure 3-1 shows a good correlation between the funds collected in each financial year and the total release except for the FY 2014/2015 where the collection exceeded the budget released by 65%.



Figure 3-1: Summary of the RFB collection and releases (retrieved from RFB)

Overall, the total RF collections have shown an increasing trend, with the biggest increase witnessed in FY 2013/2014 (total increase of 43.2 %) after the fuel levy rate was increased from Tshs 200 to Tshs 263 per litre on petrol and diesel. The RF is dependent on the fuel levy as its main source of revenue which contributed 96%-98% to the total collections in the last 5 years.



## Chapter 4 Current Sources of Revenue for the Roads Fund Board

# 4 Current Sources of Revenue for the Roads Fund Board

## 4.1 Introduction

The relevant charge levels, flow of funds, collection of funds, revenue volumes and revenue gap analysis of each of the current sources of revenue for the RF were discussed in length in the working paper on “Existing Revenue Sources for the Roads Fund” ,attached in Annex B of Volume 2.

The following section will provide a brief overview of the current sources of revenue for the RF as per the Road and Fuels Tolls Act Cap 220 (R.E 2006) and includes:

- a) The enabling mandate for collection;
- b) The current and future potential of the revenue sources;
- c) Gaps in the collection of funds; and
- d) Recommendations for improving the collection of funds.

A summary of the current sources of revenue of the Roads Fund and the responsible collection agency is shown below.

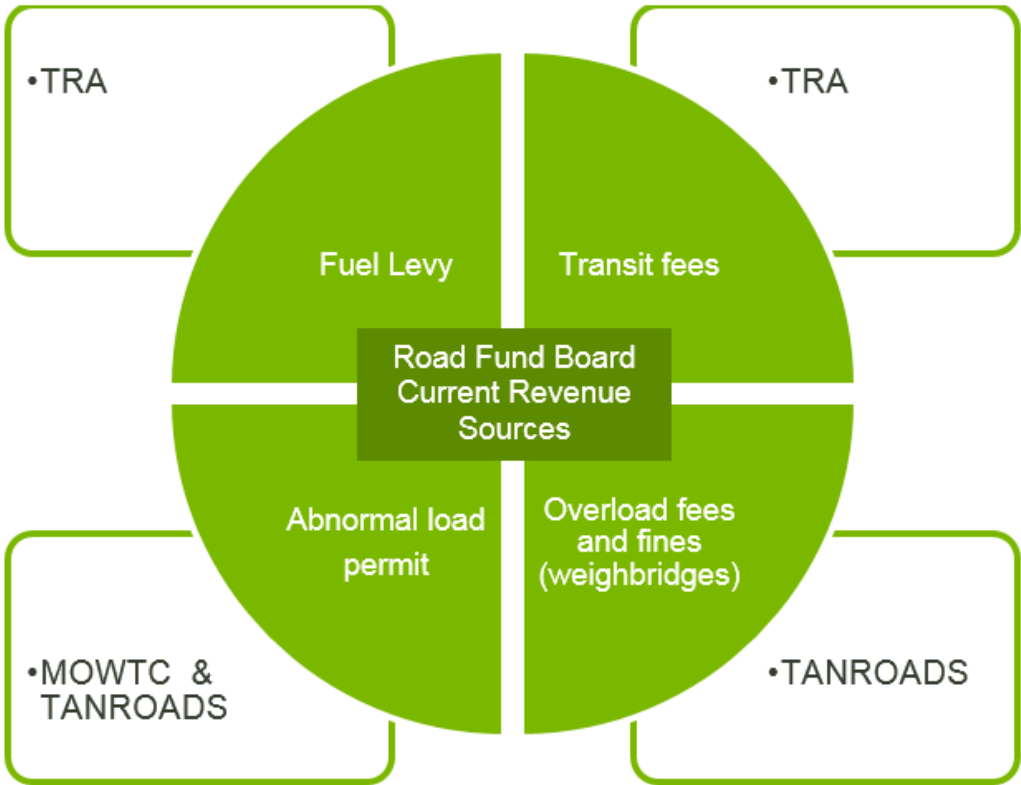


Figure 4-1: Roads fund current revenue sources and responsible collection agency



## 4.2 Institutional landscape

The table below shows a summary of enabling legislation and main functions of the RFB and the relevant collecting agencies.

Table 4-1: Enabling legislation/instrument and main functions of RFB and collecting agencies

Institution	Enabling legislation	Main relevant functions
RFB	a) Road and Fuel Tolls Act Cap 220 (R.E 2006)	a) The recipient of all monies collected as roads and fuel tolls imposed on diesel and petrol, transit fees, heavy vehicle licences <sup>2</sup> , vehicle overloading fees; b) Responsible for disbursements for the development and maintenance of roads as prescribed.
PORALG	a) Article 145 of the Constitution b) Local Government (District Authorities) Act 1982 c) Local Government (Urban Authorities) Act 1982	Facilitation, monitoring and coordination of maintenance activities of certain District, Urban and Feeder Roads in the Local Government Agencies (LGAs) of Tanzania Mainland, as well as the preventive maintenance of bridges and maintenance of culverts.
TANROADS	a) Executive Agencies Act, 1997 and the Amendment Act, 2009 b) The Roads Act, 2007 c) The Road Traffic Act 1973	a) To undertake procurement and management of contracts for design, maintenance, emergency repairs, spot improvements, rehabilitation, upgrading and construction of roads under its control; b) To improve road safety and reduce negative environmental impact in the road network under its control; c) Upon request of local authorities, perform any work in connection with any road under the control of such authorities or agencies, or have it done under its supervision, for the account of that authority and charge a fee for such service; d) To establish and maintain an appropriate road databank; e) To co-operate with local authorities and road agencies with respect to long-term, annual and operational plans for roads; f) To establish and operate weigh-bridges and enforce axle load control in the road network under its control; g) To oversee establishment and operations of toll roads; h) To carry out or commission research as necessary in support of its aim and functions; and i) To advise the Ministry on regulations and standards for road works.
MoWTC	Constitution of the United Republic of Tanzania, 1977 (as amended)	a) Policy formulation, strategic planning and regulation in the road sub-sector. b) Oversees road and bridges development.
TRA	TRA Act 1995	The central body for the assessment and collection of specified revenue and to administer and enforce the laws relating to such revenue

<sup>2</sup> Not currently being paid to the RFB, but should be as per legislation

## 4.3 Review of current sources

### 4.3.1 Fuel levy

As part of the government taxes, levies and charges collected, a total fuel levy of Tshs 313 is collected per litre of diesel and petrol on all localised fuel, of which Tshs 263 per litre is currently allocated to the RFB (84% of the total fuel levy). Since July 2013, the Tshs 200 per litre previously allocated to the RFB was increased to Tshs 263 which increased the total revenue by approximately 44% compared to the previous financial year (FY). A breakdown of the fuel price is shown below as of February 2014 for Dar es Salaam. The fuel levy currently constitutes 16% of the petrol pump price and 17% of the diesel pump price. The portion of the fuel levy that goes towards the RFB constitutes 13% of the pump price for petrol and 14% of the diesel pump price. The remainder (Tshs 50 out of the Tshs 313) accrues to the Rural Electrification Fund.

Table 4-2: Pump price composition in Dar es Salaam – Feb 2017, Energy and Water Utilities Regulatory Authority (EWURA)

Description	Unit	Petrol	Diesel
Cost CIF	Tshs/ltr	891.51	916.41
Local costs	Tshs/ltr	76.06	77.94
Fuel levy	Tshs/ltr	313	313
Excise duty	Tshs/ltr	339	215
Petroleum fee	Tshs/ltr	100	100
Charges payable to other local authorities & executive agencies	Tshs/ltr	18	18
OMC's overheads and margins	Tshs/ltr	113	113
Retailers margin	Tshs/ltr	98	98
Transport charges (local)	Tshs/ltr	10	10
<b>Total pump price Dar es Salaam</b>	<b>Tshs/ltr</b>	<b>1 958.56</b>	<b>1 861.35</b>

The fuel levy is the largest source of revenue for the Roads Fund currently contributing 97% of the RFB income and the percentage contribution to the RFB has not been lower than 96% in the last 8 years on record.

#### 4.3.1.1 Enabling legislation

The enabling legislation and collection agency for the fuel levy is summarised in the table below.

Table 4-3: Summary of enabling legislation for the fuel levy

Type	Collection agency	Regulator	Applicable to	Mandate for collection
Fuel levy	TRA	MoFP	Fuel importers at the point of importation	a) Road and Fuels Tolls Act Cap 220 (R.E 2006) b) Finance Acts



#### 4.3.1.2 Gap analysis

##### Fuel volumes and fuel levy revenue

The actual fuel levy collections was retrieved from two data sources within TRA for the FY2010/2011 to FY 2015/2016. The two data sources compared well with each other, as well as with the revenue received by the RFB.

Table 4-4: Comparison of fuel levy collected by TRA and received by RFB (Tshs in billions)

FY	TRA Source 1 (TRA website)	TRA Source 2 (Dept of Taxpayer services and education)	Received by RFB
2010/2011	315.31	315.31	314.84
2011/2012	390.50	390.50	391.00
2012/2013	436.25	436.25	434.47
2013/2014	625.91	625.91	626.02
2014/2015	623.22	656.00	623.18
2015/2016	705.15	-	705.09

The fuel levy revenue was then calculated using the actual volumes of imported fuel (from EWURA) to be used locally for FY2010/2011 to FY2015/2016. The revenue was calculated by multiplying the volumes imported by the fuel levy current rates (Tshs 263), as discussed in WP “Existing Revenue Sources”, attached in Annex B of Volume 2. The trend of imported diesel and petrol for local use is shown below in Figure 4-2 (including the transit fuel that has become localized and exempted fuel).

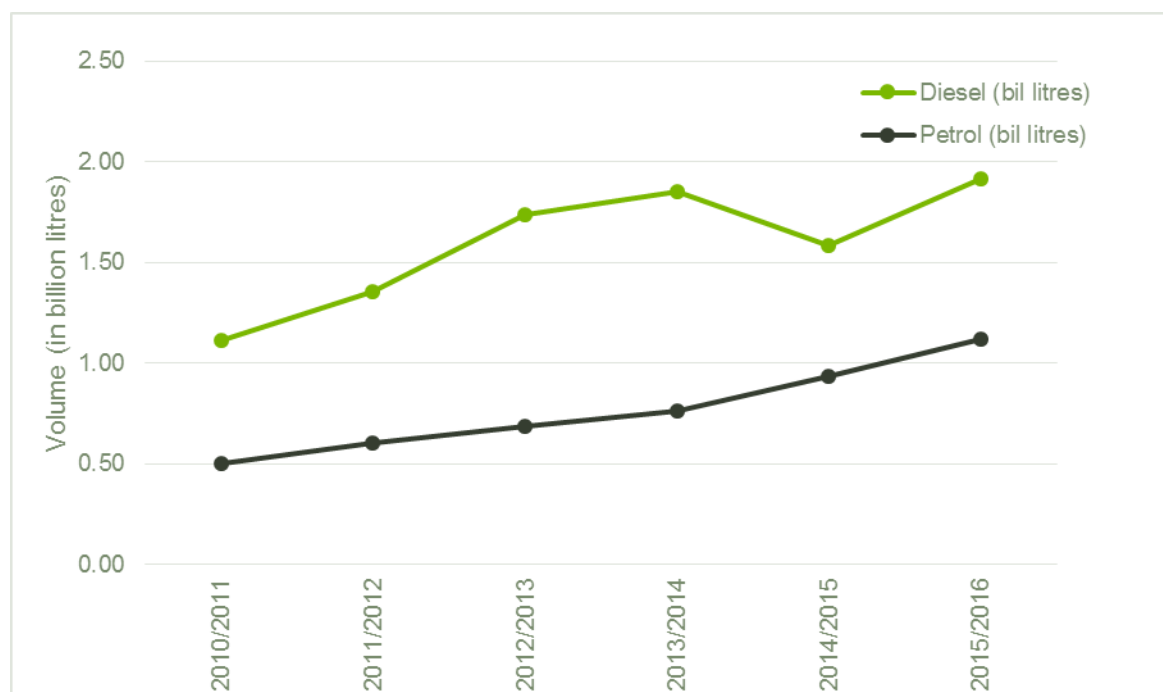


Figure 4-2: Trend of imported diesel and petrol for local use in mainland Tanzania (EWURA)

The volumes of petrol and diesel have been increasing, as expected with the growing demand, except for the FY 2014/2015 showing a decrease in diesel imports. The fuel volume trends correlate with the

increasing fuel levy revenue received by the RFB between 2010/2011 to 2013/2014 and decrease in the fuel levy revenue received by the RFB in FY 2014/2015 shown in Table 3-1. According to the “Downstream petroleum Subsector Performance Review Report 2013/2014” by EWURA, the decrease in the diesel fuel consumption was due to a more stable power supply situation in the country in 2014 and less power generation using diesel by industries and individuals.

A comparison of the fuel levy revenue received by the RF and collected by TRA, as well as that calculated from the EWURA fuel imports is shown below in Figure 4-3.



Figure 4-3: Comparison of fuel levy revenue

Figure 4-3 show that the fuel levy revenue received by the RFB and collected by TRA correlate well for the last six financial years. The calculated fuel levy values are slightly higher than that collected by TRA and received by RFB, as expected due to the inclusion of the exempted fuel volumes during the calculation.

### Correlation of fuel consumption with road usage

The fuel consumption for road use (based on VKT<sup>3</sup>) was compared to the total fuel imported for local use. Ideally, the total fuel importations (total imported fuel for localized use) should be higher than the fuel purchased for road use due to the off-road use in industries such as construction, agriculture, fishing, rail and mining. When the road fuel use is higher than the imported fuel, it is indicative of abnormalities such as the use of transit fuel on the local market.

The comparison involved the following steps:

- a) Obtain the annual quantity of fuel imported for local use (assumed to be the total quantity of fuel sold) (from EWURA);
- b) Obtain average fuel consumption figures for each vehicle class in litre/100km (from HDM-4 based on TANROADS configuration);
- c) Obtain the total VKTs per vehicle type (road network data and traffic data was retrieved from TANROADS and PORALG);

<sup>3</sup> The VKT is calculated by multiplying the AADT by the road length

- d) Multiply the total VKTs per vehicle type by the average fuel consumption figure per vehicle type to arrive at the estimated fuel used on the road network;
- e) Compare the estimated quantity of fuel sold for road use (as in d) with the actual quantity of fuel sold – assuming all fuel imported for local use is sold (as in a);
- f) The estimated quantity of fuel sold for road use should be less than the actual quantity sold, because of off-road fuel usage.

These steps were undertaken separately for petrol and diesel and the results of the estimated on-road fuel usage is indicated in Table 4-5.

Table 4-5: Estimated fuel usage compared to actual fuel sold

Usage Parameter	Vehicle Class						
	Motor Cycle	Light <sup>4</sup> vehicles	Total Petrol	Bus	Light Truck	Medium / Heavy Truck	Total Diesel
VKT/year (Million)	771	4 990	<b>5 761</b>	538	421	1 764	<b>2 723</b>
Fuel Consumption l/100km (From HDM-4)	6.24	16.61	-	34.07	26.59	67.87	-
Estimated fuel sold for road use (Million litres)	48.11	828.84	<b>876.95</b>	183.30	111.94	1197.23	<b>1492.47</b>
Total fuel imported for local use (FY2014/2015) (Million litres)			<b>931.87</b>				<b>1586.14</b>

The estimated road fuel usage as per Table 4-5 is lower than the actual fuel imported. The phenomenon that the estimated road fuel usage is lower than that of the actual fuel imports (actual quantity sold) is indeed good news. In the past there were significant concerns with regards to the possible evasion of the fuel levies and taxes on fuel. The evasion of levies and taxes on fuel took place in the form of the following:

- g) **Mixing of kerosene with petrol or diesel** - This practice has however stopped, as the taxes and levies on kerosene were brought in line with the taxes and levies of petrol and diesel, therefore removing the incentive for mixing kerosene with petrol or diesel.
- h) **Sale of transit fuel net of taxes on the domestic market** - The TRA clamped down on this practice through marking of transit fuel. The growth in the imports for transit fuel compared to the imports destined for local consumption also follows a similar trend which seems to support the statement that TRA has managed to clamp down on this practice (refer to the Figure 4-4 below).

<sup>4</sup> Light vehicles includes cars, pick-up's and mini-buses



Figure 4-4: Trend in the importation of local and transit products (FY2009/10-FY2014/15) (EWURA Annual Reports)

#### 4.3.1.3 Recommendations and general observations

During stakeholder consultation with TPA, it was mentioned that there is a new type of live computer system installed at the port which shows when pipes are connected to the vessel and which valves are active. TPA manages this system and any of the stakeholders can have access to this information. Investment in such technologies will reduce leakages in the fuel industry and losses in the associated tax and levy collection.

Overall the revenue collected by TRA and received by the RFB correlate very well which is indicative that there is no or little leakage of imported fuel for local use.

The introduction of the fuel marking programme has also resulted in a number of benefits for the fuel industry. As reported by EWURA, the introduction of fuel marking in September 2010 has reduced adulteration malpractices, reduced the dumping of transit products in the local market, reduction in smuggling malpractices as well as increased transit cargo through Tanzania due to improved efficiency (EWURA, 2016).

#### 4.3.2 Transit charges

This charge is payable by foreign heavy vehicles at various entry points to Tanzania, collected by TRA officials operating under the responsible Commissioner appointed by the Minister of Finance and Planning. A charge of USD 6 per 100km is applicable to heavy vehicles less than 3 axles and USD16 per 100km for heavy vehicles exceeding 3 axles.

Transit charges are collected at all formal border posts namely, Kasumulu, Tunduma, Sirari, Kabanga, Namanga, Mwanza, Horohoro, Holili, Rusumo, Mutukula and Tarakea.

It should be noted that Road and Fuel Tolls Act Cap 220 (R.E 2006) dictates that **transit fees** revenue should accrue to the RFB. TRA currently **collects transit fees, transit charges and Foreign Vehicle Permit (FVP)** fees at the border post which are all transit related charges however currently only the transit charges accrue to the RFB.

#### 4.3.2.1 Enabling legislation

The enabling legislation and collection agency for transit charges is summarised in the table below.

Table 4-6: Summary of enabling legislation on transit charges

Type	Collection agency	Regulator	Applicable to	Mandate for collection
Transit charges	TRA	MoFP	Foreign heavy vehicles entering Tanzania at designated entry points	a) Transit Charges Act, 1995 (2006 R.E.) b) Road and Fuels Tolls Act Cap 220 (R.E 2006). This act refers to transit charges while in reality transit charges are being allocated to the RFB.

#### 4.3.2.2 Gap analysis

The revenue collected at the mentioned border posts were sourced from TRA during stakeholder consultation for the FY 2011/2012 to FY2015/2016, shown in the table below. The percentage difference between the revenue collected by TRA and that received by RFB is shown in the last column of the table.

Table 4-7: Transit charges collected by TRA at the border posts FY 2011/2012-FY2015/2016 (Tshs in billions)

Financial Year	Kasumulu	Tunduma	Sirari	Kabanga	Namanga	Mwanza	Horohoro	Holili	Rusumo	Mutukula	Tarakea	Total (TSHS in billions)	%Difference that received by RFB
2011/2012	0.82	0.47	0.73	0.83	1.30	0.01	0.24	0.18	0.73	0.13	0.05	5.49	-5%
2012/2013	0.64	0.56	0.66	0.82	1.30	0.01	0.12	0.18	0.73	0.24	0.09	5.35	-1%
2013/2014	0.79	0.81	0.61	0.59	1.83	0.003	0.14	0.21	0.62	0.27	0.14	6.01	-8%
2014/2015	0.52	0.85	0.62	0.48	2.39	0.001	0.34	0.33	0.96	0.64	0.19	7.32	-8%
2015/2016	0.61	0.85	0.63	0.74	1.69	0.002	0.40	1.34	1.58	0.99	0.22	9.06	-7%

The collections shown above correlate well with the transit charge revenue shown in Table 3-1. The collections received by RFB are slightly higher than that collected by TRA which indicates that the data may have not been accurately recorded at times.

The individual entry and exits of all foreign vehicles in Tanzania between 2014 and 2016 were also collected from TRA but could not be used as it was not in a user friendly format. There is no standard format used to classify the information required for data capturing purposes such as the vehicle type (distinguish between light and heavy vehicles with two axles). In the data retrieved by Aurecon, the

distances used for the start and end of the journey were not recorded, as well as the duration of stay for the majority of the vehicle entries.

The transit charge at the border post is currently charged based on a distance chart produced by TANROADS. However, many towns and border posts are not included in this chart, in which case Google Maps is used. This makes it difficult to regulate the charge at the border post and this distance chart needs to be updated urgently. During stakeholder consultation with TRA, it was mentioned that a proposal was submitted to the RFB for this distance chart to be updated.

#### 4.3.2.3 Recommendations and general observations

One of the functions of the RFB is to ensure full collection and transfer of collected funds by TRA into the Funds account. The data collection from each border post can be used as a check for the RFB, who can calculate the charge for every foreign heavy vehicle and compare with the funds received from TRA, reducing the potential for leakages.

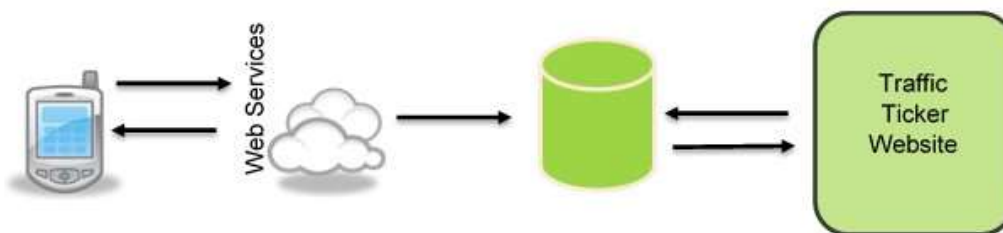
It is proposed that TRA records at least the following:

- a) Vehicle registration number
- b) Vehicle type (heavy or light)
- c) Number of axles
- d) Type of goods
- e) Tonnage
- f) Date of entries
- g) Point of entries
- h) Destination
- i) Distance between entry and destination
- j) Date of exit
- k) Calculated duration of stay in days
- l) Charge levied (USD/km)
- m) Calculated transit charge payable

It is proposed that a live data capturing system is used at the border posts. This will automatically capture and upload the data which can be monitored by the RFB in conjunction with cameras at the site.

An example of a live data capturing system has been used by Aurecon through the “Traffic Ticker” application. The application was developed by Aurecon and is superior to the conventional paper method in the sense that it fast tracks the data capturing and enables the supervisor to verify the captured data in the field as the data is being captured live. This technology allows the surveyor to capture and classify vehicles efficiently and quickly, as well as limits the effort related to data capturing which can be extensive if the traditional paper method is being used. The surveyor can be constantly supervised throughout the day as the data is captured live. A high level overview of the Traffic Ticker Application is provided below.





This application could be updated to incorporate the other data fields required by TRA (listed in items a to m above). The application can also be extended to the collection of Foreign Vehicle Permits (FVP) at the border post. The application features highlighted in Table 4-8.

Table 4-8: Features and benefits of the time-ticker application

Features (what the product does)	Benefits
<ul style="list-style-type: none"> <li>a) Runs on any Android phone or tablet, and can be deployed to iPhones.</li> <li>b) Point of view photograph at start of survey contributes to data quality.</li> <li>c) GPS location data ensures that survey data is geotagged.</li> <li>d) Individual vehicles classes can be accessed by flicking the vehicle class list up or down on the screen.</li> <li>e) Captured data is uploaded to the server in real time and is immediately available for quality control or analysis purposes.</li> <li>f) No need for manual recapturing of data from capture sheets.</li> <li>g) Captured data is available as Excel reports from the system.</li> <li>h) If the survey is conducted at a location where no GSM network coverage is available, the recorded survey data is retained on the phone until the device is within coverage.</li> </ul>	<ul style="list-style-type: none"> <li>a) Data quality: the survey is recorded in real time, ensuring that surveyors don't record fictitious data after the fact.</li> <li>b) Data quality: the recorded GPS data and point of view photographs ensure that we know exactly where the vehicle was recorded.</li> <li>c) Data quality and productivity: By circumventing the need to recapture recorded data into spreadsheets from paper sources. Avoids introduction of data errors and reducing the turnaround time of the survey.</li> <li>d) Ease of use: The app has been designed for a mobile phone form factor. Surveyors have found that the phone form factor is much easier to handle in the field.</li> </ul>

### 4.3.3 Vehicle overloading fees / abnormal load permits

Vehicle overloading fees consists of both **vehicle overloading fees** at the weighbridge and the application for **abnormal load permits** (for vehicles of abnormal dimensions or exceeding the legal load).

Both MoWTC (for vehicles that cross regional borders, irrespective of the originating points) and TANROADS (vehicles that originate and terminate within their regional jurisdiction) collect fees for abnormal load permits and surcharge (four times the corresponding fee for the overload).

TANROADS also collects vehicle overloading fees, being a penalty imposed on overloaded vehicles at the weighbridge stations and the parking fees imposed on an overloaded vehicle that has parked in the weighbridge yard for a period of more than three days.

#### 4.3.3.1 Enabling legislation

The table below summarises the enabling legislation for the collection of overloading fees.

Table 4-9: Summary on overloading fees

Type	Collection agency	Regulator	Applicable to	Mandate
Overload fines at weighbridges	TANROADS	MoFP	Heavy vehicles passing a weighbridge, weighed in terms of GVM and axle load	<ul style="list-style-type: none"> <li>a) Executive Agencies Act, 1997</li> <li>b) The Roads Act, 2007</li> <li>c) The Road Traffic Act 1973</li> <li>d) The Road Traffic (Maximum Weight of Weight of Vehicles) Regulations made under Section 114(1)(p) of the Road Traffic Act 1973- GN No. 30</li> </ul>
Abnormal load permits	MoWTC & TANROADS	MoFP	Vehicles of abnormal dimensions or exceeds the legal load.	<ul style="list-style-type: none"> <li>a) Executive Agencies Act, 1997</li> <li>b) The Roads Act, 2007</li> <li>c) The Road Traffic Act 1973</li> <li>d) The Road Traffic (Maximum Weight of Weight of Vehicles) Regulations made under Section 114(1)(p) of the Road Traffic Act 1973- GN No. 30</li> </ul>

#### 4.3.3.2 Gap analysis

##### TANROADS overload collections at the weighbridges

The revenue collected from overload charges were compared amongst three sources within TANROADS:

- a) Source 1: TANROADS Annual Reports FY2010/2011-FY2013/2014
- b) Source 2: TANROADS Overload Trends Report FY2010/2011-FY2013/2014
- c) Source 3: TANROADS Annual Weighbridge Report

The total amounts collected for overload as published in the annual report and annual weighbridge report include fees from overloading, abnormal load permits and surcharge and parking fees.

It was noted that there is no formal reporting structure to distinguish between the amounts collected for overloading and parking fees individually but instead are lumped together.

Table 4-10: Overload amounts collected by TANROADS at weighbridges (in Tshs billions)

FY	Annual report	Overload trends (summary) <sup>5</sup>	Annual weighbridge report
2010/2011	3.58	3.58	Not available
2011/2012	4.27	3.62	Not available
2012/2013	-	3.82	Not available
2013/2014	5.01	5.01	Not available
2014/2015	5.22	5.32	4.53
2015/2016	Not available	Not available	5.53

<sup>5</sup> It is uncertain if these figures are only for weighbridges or also include parking and permit fees.

## Abnormal load permit fees collected by TANROADS

The abnormal load permit fees collected from TANROADS consist of the actual cost of the permit and the additional surcharge depending on the exceeded weight. It was noted that TANROADS does not have any formal structure of reporting these fees.

Table 4-11: Abnormal load charges (TANROADS)

FY	Abnormal load fees (Tshs)	Source
2015/2016	183 557 133.20	Annual weighbridge report 2015/2016
2014/2015	136 192 980.40	Annual weighbridge report 2014/2015
2013/2014	221 383 173.00	Individual quarterly reports 2013/2014
2012/2013	full dataset not available	-
2011/2012	full dataset not available	-
2010/2011	full dataset not available	-

## Abnormal load permit collected by MoWTC

Due to data being captured manually, the consolidated data for the abnormal load permit fees was only available for FY 2015/2016 from the MoWTC, summarized below. The table below shows the calculated revenue from the abnormal permits based on the number of permits issued and that collected by MoWTC (note that this excludes surcharge, e-permit charges and sticker charges).

Table 4-12: Comparison of abnormal permit fees for FY 2015/2016 (Tshs in millions)

Date	Calculated permit fee revenue	Collected permit fee only (MoWTC)	Difference
Jul-15	41.30	33.85	7.44
Aug-15	43.41	19.59	23.82
Sep-15	25.37	26.38	(1.01)
Oct-15	23.42	26.76	(3.35)
Nov-15	25.45	22.08	3.37
Dec-15	19.51	21.72	(2.20)
Jan-16	49.50	25.22	24.28
Feb-16	21.50	22.91	(1.40)
Mar-16	23.83	23.85	(0.02)
Apr-16	19.35	20.46	(1.10)
May-16	12.90	12.34	0.56
Jun-16	10.75	11.59	(0.84)
<b>Total</b>	<b>316.29</b>	<b>266.73</b>	<b>49.56</b>

Notes this table is for the permit fee only, excluding surcharge and e-permit

Based on the actual number of permits issued by MoWTC, there has been an under recovery of revenue of Tshs 49.56 million.

The table below shows the total revenue collected by MoWTC including the actual permits issued manually, the surcharge for vehicles overloaded and the issuing of e-permits.

Table 4-13: Comparison of revenue collected by the MoWTC and that received by the RFB FY 2015/2016 (Tshs in millions)

Month	Total collected by MoWTC	Received by RF from MoWTC	Difference collected by MoWTC and received by RF
Jul-15	48.43	48.23	-
Aug-15	102.60	104.84	(2.24)
Sep-15	337.15	678.78	(341.63)
<b>Q1</b>	<b>488.17</b>	<b>831.84</b>	<b>(343.67)</b>
Oct-15	38.67	38.67	-
Nov-15	72.32	74.06	(1.74)
Dec-15	102.97	102.97	-
<b>Q2</b>	<b>213.96</b>	<b>215.70</b>	<b>(1.74)</b>
Jan-16	51.50	51.50	-
Feb-16	237.28	237.28	-
Mar-16	112.55	112.55	-
<b>Q3</b>	<b>401.33</b>	<b>401.33</b>	<b>-</b>
Apr-16	131.35	610.16	(478.82)
May-16	111.64	131.35	(19.71)
Jun-16	111.62	223.25	(111.64)
<b>Q4</b>	<b>354.60</b>	<b>964.76</b>	<b>(610.16)</b>
<b>Total</b>	<b>1 458.09</b>	<b>2 413.63</b>	<b>(955.54)</b>

Table 4-10 shows an anomaly in that the total revenue collected by MoWTC was less than that received by RFB for FY2015/2016, which can be attributed to inaccurate capturing of the revenue collected due to the manual recording process.

#### 4.3.3.3 Recommendations and general observations

##### Decimalisation of overloading

Heavy vehicles will always try to bypass the weighbridge system. The system specifications implemented at the weighbridge must take this into consideration and attempt to penalise such absconders. It should however be noted that the more innovative the system in identifying the offenders that ignore the WIM (and signals that direct them to the scale), the greater the expense. It is a trade-off between “can you catch all the fish in the sea” or are you happy to get your fair share thereof.

In its truest sense, decriminalisation means to legalise an action that was formerly a criminal offence. Total decriminalisation would result in overloading being permitted. To deter operators from overloading, some penalty measures should still be applied. However, alternative adjudication means that a new manner of adjudication is found to deal with an offence, which does not necessarily constitute criminal adjudication. The purpose is always to alleviate the burden on criminal courts and to effectively retrieve the monetary value of the damage caused by overload offenders from the operator.

A factor that needs to be considered when decriminalising road traffic (overload) offences is that an administrative body will be needed to adjudicate the offences and this will only be justified in the case of a country where the courts are not coping with the workload of traffic offences. Where courts do cope with the workload, establishing yet another government body in a country where expertise and capacity are scarce commodities cannot be justified and the solution in that country would rather be to provide

an electronic system, linking weighbridges, the relevant roads authority and the courts, together with implementing a penalty points system.

The decriminalisation of overload offences needs to be properly considered and carefully evaluated by the countries. The end result of decriminalisation should be a simplified and effective process. If this cannot be achieved, the criminal system should be made more effective, and the legislation should be amended to prevent the accrual of a criminal record to the offender.

In South Africa, there the Administrative Adjudication of Road Traffic Offences (AARTO) legislation was implemented which has a demerit point system aimed to penalise drivers and operators who are habitual offenders which can eventually lead to the suspension and cancellation of a licence and operator card. The purpose of the demerit points is to determine an alternative to the current punishment in terms of the criminal law. The AARTO Act does not specifically state that road traffic offences are not criminal offences anymore. It states that it provides for the administrative adjudication of road traffic offences. Therefore the Act still allows an offender to opt for the court procedure.

It is up to politicians and policy makers to enforce laws that make it difficult for trucks to operate if they do not abide by the regulations.

#### **Site visit to the Vigwaza weighbridge and comparison to operations in South Africa**

The following observations were made based on a site visit to the Vigwaza weighbridge:

- a) The WIM system was malfunctioning during the time of visit which highlights the most important aspect of a WIM screening lane installation (which automatically directs vehicles to the static scale) – it is only as good as the maintenance and support of the technology in use at such a site. The WIM at this weighbridge has not been working properly and all vehicles have to be weighed manually. It should be noted that once a WIM system is installed, there must be sufficient budget for maintenance and support of the system.
- b) The WIM requires constant calibration and the best form of calibration is comparing the actual WIM mass with that of the static scale. There was no evidence that this is being done at the WIM at Vigwaza. It is best done if the matching data from the WIM and the static scale is uploaded to a central database. Currently the WIM is not being calibrated (mentioned in stakeholder consultation with TANROADS). The WIM data is only stored for a maximum period of 3 months and is constantly updated with the latest data.

Other general comments of weighbridge operations and systems:

- a) The technology in use has a typical usable life of 5-7 years. Better technology is usually available within 12 months after commissioning an installation and a major revamp/ upgrade is required from 5 years onwards, mainly due to obsolete/outdated equipment for which support or spares is no longer available.
- b) Most systems provide the same functionality and the specifications is up to the client. The specifications should talk to the operational model which includes a choice of “how automated versus manual” the system should be.
- c) The mass determined by a WIM sensor can be +/- 20% of that of the static scale and depends on various factors which one can have no control over such as the behaviour of drivers when they approach and/or drive over the scale, the make-up of the vehicle and how well it transfers the mass to the axles or axle units whilst in motion.
- d) In South Africa vehicles that the WIM considers to be 95% within the limits can pass the scale. Vehicles above the 95% interval are being directed to the scale. This is a configurable parameter as many factors play a role for setting this threshold:
  - v) The stacking distance to prevent tail backs from encroaching on the access to the static scale causing a possible danger to road users.
  - vi) The speed of processing a weigh transaction at the static scale.
  - vii) From an operational point of view:
    - To identify the top over loaders (set the threshold to more than 100% to improve the chance of directing only overloaded vehicles to the site),
    - For instance - if only a static scale facility is available and static weighing is the only true measurement of mass, the threshold must be set to a value to ensure a constant flow of vehicles and get the maximum out of the operations at the scale.

### **Comparison of multi-deck compared to single-deck weighbridges in South Africa**

In the early 1990's most of the static scales in South Africa were single beam scales capable of measuring the mass of one axle at a time. These facilities were constructed as lay byes on roads with high volumes of average annual daily truck traffic (ADTT) but did not make provision for holding yards nor did they require the driver to correct the load before proceeding with the journey. It was purely for the issuing of fines and arrest of drivers if no admission of guilt was paid for the offence committed.

The accuracy of these type of scales were challenged in court and the Department of Transport commissioned the Council of Scientific and Industrial Research (CSIR) to do an investigation at all weigh facilities in use in South Africa. The results showed that:

- a) Measuring vehicle axle by axle to determine the mass of a multi axle group is not accurate at all.
- b) There are too many factors (suspension of the vehicle, levels of the other axles in the group compared to the axle on the single beam scale, to mention a few) that affect the accuracy of the measurement. It was recommended that this method of determining the mass of an axle unit and adding it up to arrive at the gross vehicle mass (GVM) must immediately be discontinued.

The report recommended the use of either single platforms scales (usually a 3m x 4m) with stringent level control for the approach and departure to the deck to ensure that height differences between the axles being weighed versus the other axles is kept to a minimum or multi-deck scales with the decks perfectly aligned.



Both methods are currently deployed in South Africa and specifically the Western Cape where Aurecon is the consultant for the Western Cape's Overload Control Strategy. There are issues experienced with results repeatability if a vehicle is weighed on a single deck versus a multi-deck. There are various reasons for this:

- a) Drivers do not follow instructions and deliberately do not release brakes when they stop the axle /axle groups on the decks. This transfers mass from axle/axle units that has already been weighed to the axle/axle unit being weight and vice versa.
- b) The effect becomes worse if the vehicle is old and has a worn suspension.
- c) Even if the height difference between axles on versus off the deck is within specifications, it can result that the total combination mass is more or less than the combination mass if the vehicle is weighed on a multi-deck.
- d) It should be noted that when weighing the same vehicle on a multi-deck, this same phenomenon occurs - that the mass of the axle or axle units differs from one weight to the other. However, it was observed that the Gross Combination Mass (GCM) does not differ with more than 2-3 switch points (that is 40 - 60 kg).

It is for this reason that in the Western Cape, South Africa, only multi-deck scales are constructed since 2003 and that when a scale is due for major rehabilitation that upgrading to a multi-deck is included if it had a single platform scale previously.

There are considerations, other than accuracy, that make multi-decks more feasible than single decks:

- a) Reduction in stacking distance - if the volume of trucks to be weighed per hour exceeds the scale approach stacking distance, then the choice should be a multi-deck or double multi-deck (if volume warrants it) in order to weigh more trucks per hour.
- b) Unnecessary delays for legal road users - irrespective of whether WIM's or visual screening is used, the chances are good that legally loaded vehicles will be directed to the static scale for weighing. It is a cost to the economy if the queues get too long with a single deck scale. There is obviously not the same concern if the vehicle was found to be overloaded. However, waiting time should be kept reasonable as far as possible.
- c) The alternative to lengthen the stacking distance to accommodate the single deck scale has other constraints. More kilometres of roads have to be constructed to high pavement standards and maintained thereafter. This cost of longer stacking lanes and the cost to construct a level approach and departure of at least 22m at both ends of the static scale exceeds the cost of a multi-deck scale by far.

Single deck scales can be used with great success on routes with lower AADTT where stacking is not the main concern. The GCM obtained from adding the individual axle or axle unit mass, however, could be overstated with as much as 2% in some extreme cases.

### **Weighbridge reporting in Tanzania**

During stakeholder consultations with TANROADS, it was mentioned that data is collected from each region on a monthly basis and entered manually into Excel at the TANROADS head office. It is understood that only the aggregated overloading values from each region are captured, and not per weighbridge.

This method of data collection is ineffective and time consuming, and makes it difficult to analyse the overload trends across the country for planning purposes.

The following suggestions are made:

- a) WIM data should be integrated with the static scale data and uploaded to a central system. This will also assist with calibration of the WIM system as data from the WIM and static scale can be easily compared.
- b) The static scale and WIM data should be uploaded to the central system at least once a day.
- c) The central system should include a username and password to allow authorised persons to log in and draw reports, make searches and export reports to Excel spreadsheets.

Currently in South Africa, the static scale data from each weighbridge at each of the 9 provinces is uploaded to a central database on a daily basis which is also recommended for Tanzania. It is understood that phase 2 of the WIM software update is currently in progress whereby the WIM data is automatically uploaded to the central database. The next step will be to integrate the WIM and static scale data to be uploaded to the central database in real time.

It was mentioned during consultation with TANROADS that they are in the process of introducing a live data capturing system for the static scales. It is currently in the design phase and will capture live data at 13 weighbridge stations. There will also be live streaming rooms at TANROADS HQ, TANROADS 10 regional managers' offices, MOWTC and RFB to allow for constant monitoring. The live data, along with the camera footage will be stored on the servers such that they can be retrieved at any time.

#### **4.4 Summary of the chapter**

Currently, the RFB is dependent on the fuel levy which constitutes 96-97% of the fund. The fuel levy is a stable revenue source for the RFB considering the increasing vehicle population and thus the increasing demand for fuel. The transit fees and overloading fees constitute the remainder 3-4% of the RF, however the overloading fees are meant to serve as a deterrent and the revenue from overloading should ideally decrease over time.

It was noted that there are anomalies in the data capturing process for the transit charges and abnormal load permits. In terms of the transits charges, the revenue received by the RF is slightly higher than that recorder by TRA in Table 4-7. The individual vehicle entry and exit data captured by TRA is not in a user friendly format. The distance chart used by TRA to approximate the transit charge is outdated and excludes many of the main towns in mainland Tanzania, making it difficult to regulate the charging system.

The data capturing system at the border post must be improved to increase the integrity of data and the monitoring of the funds by the RFB. It is proposed that TRA collects the information categories recommended in section 4.3.2.3 at the border posts. It is also recommended that a live data capturing system is introduced at the border posts, similar to the "time ticker" application described in section 4.3.2.3 . The live data system can be monitored by the RFB in conjunction with cameras on site.

At time of the site visit to Vigwaza, the WIM was malfunctioning (WIM was frozen indicating that all vehicles to proceed out of the weighbridge station). Although the WIM may reduce the burden at the static scale for stations that experience high volumes of traffic, it is only as good as the maintenance and support of the WIM system. The WIM system must also be constantly calibrated by comparing the WIM data with that of the static scale. Since the WIM is not being calibrated, it could mean that either more vehicles are instructed to proceed to the static scale, increasing the burden on the static scale or that more over loaded vehicles are allowed to proceed out of the weighbridge station without being weighed at the static scale.

The threshold at which the WIM is set to also plays an important role, as it should ensure that the top over-loaders are identified at the WIM to ensure maximum flow of vehicles and operations at the static scale.

The current revenue accruing to the Road Fund (RF) aimed at maintenance and development of the road network cannot meet the maintenance and development requirements of the total road network in mainland Tanzania. The financial gap will be established in chapter 6.

To expand the revenue base for the RF, one should examine both adjusting the rate of current charges and well as examining the introduction of new revenue sources for the Road Fund. The next chapter will examine additional revenue sources for the RF, as well as their suitability as a revenue source for the RF.



## Chapter 5 New Sources of Funding for the Roads Fund Board

## 5 New Sources of Funding for the Roads Fund Board

### 5.1 Introduction

The review of existing fees, taxes and charges in Tanzania and their potential to be devoted to the RF as well as the introduction of new fees, taxes and charges in Tanzania for the Roads Fund was examined in length in the WP “*Recommendations for New Sources of Revenue*” attached in Annex D of Volume 2 in terms of:

- a) The nature of the fee;
- b) Collection procedure in terms of current charges, fees and taxes;
- c) Mandate for collection;
- d) The charging levels of current charges, fees and taxes;
- e) The revenue potential for each revenue source discussed;
- f) Benchmarking of new fees, charges and taxes with other countries; and
- g) Final recommendations for the diversion or introduction of revenue to the roads fund.

This section will provide a summary of the main findings and recommendations made in the WP “*Recommendations for New Sources of Revenue*” attached in Annex D of Volume 2.

### 5.2 Review of Roads Fund Financing in EAC and SADC

The roads fund sources of revenue across the EAC and SADC region are similar in type, albeit varying in levels as apparent from the table below.

Table 5-1: Road Fund Sources in EAC and SADC region

Country	Roads Fund	Current Instruments
<b>East African Community (EAC)</b>		
Burundi	National Road Funds (Funds National Routier)	<ol style="list-style-type: none"> <li>a) Fuel tax</li> <li>b) Drivers' licenses</li> <li>c) Road tolls*</li> <li>d) Import duties on vehicles</li> </ol>
Kenya	Kenya Roads Board	<ol style="list-style-type: none"> <li>a) Fuel levy and Transit Tolls* via the Road Maintenance Levy Fund (RMLF)</li> <li>b) Agricultural Cess</li> </ol>
Rwanda	Road Maintenance Fund	<ol style="list-style-type: none"> <li>a) Petrol and diesel levy</li> <li>b) Road toll*</li> <li>c) Fines paid for overloading vehicles and for contravening the traffic law</li> </ol>



Country	Roads Fund	Current Instruments
Tanzania	Roads Fund Board.	a) Fuel b) Overloading Fees c) Abnormal load permit fees d) Transit Charges e) Heavy vehicle license fees  Note: The heavy vehicle license fees collected by TRA do however not accrue to the RFB
Uganda	Uganda Road Fund	a) Fuel levy b) International transit fees c) Vehicle license fees d) Weight-distance charges e) Axle load fines f) Bridge and road tolls g) Fees levied by the Fund for its services h) Appropriations by Parliament Funding from Development Partners
<b>Southern African Development Community (SADC)</b>		
Angola	Legislation for implementation of a Road Fund has already been established but not implemented yet.	Central government funding
Botswana	An Institutional Study of Botswana Road Agencies was carried out in 1998 which recommended that a Road Fund be established but the recommendations of the Institutional Study have however not been implemented yet.	Central government funding
DRC	None	Central government funding
Lesotho	Road Fund was established in 1995 and became operational in 1997.	a) Levy on petrol and diesel b) Road Toll* Gate Fees c) Vehicle License Fees
Madagascar	None	Central government funding
Malawi	Through the Road Fund Administration Act of 2005.	a) Parliament appropriations b) Roads Fund Fuel Levy c) International Transit Fees d) A percentage of road user charges including taxes, tariffs and tolls e) Loans, grants and donations  Note: revenues have thus far been derived only from Fuel Levy and International Transit Fees
Mauritius	None	Central government funding



Country	Roads Fund	Current Instruments
Mozambique	Road Fund (Fundo de Estradas) was created in 1999.	<ul style="list-style-type: none"> <li>a) Fuel charges,</li> <li>b) Transit charges</li> <li>c) Bridge tolls</li> </ul> Note: The central government does not contribute to road maintenance funding
Namibia	The Road Fund Administration (RFA) was established by the Road Fund Administration Act 1999 (Act 18 of 1999).	<ul style="list-style-type: none"> <li>a) Fuel Levy</li> <li>b) Vehicle registration and licensing fees</li> <li>c) Cross border charges</li> <li>d) Mass distance charges(local and foreign)</li> <li>e) Abnormal load fees</li> </ul>
Seychelles	None	Central government funding
South Africa	None	Tolling on specific roads. Central government funding
Swaziland	None but institutional reform in the process of being implemented.	Central government funding
Tanzania	See above	See above
Zambia	The National Road Fund Act, 2002 created the National Road Fund Agency (NRFA) and the National Road Fund.	<ul style="list-style-type: none"> <li>a) Moneys appropriated by Parliament</li> <li>b) Fuel levy</li> <li>c) License fees,</li> <li>d) Vehicle registration fees</li> <li>e) International transit fees</li> <li>f) Weigh bridge charges &amp; fines for Vehicle overloading offences</li> <li>g) Road user levies including tariffs, Taxes and tolls as may be determined by the Minister</li> <li>h) Loans, grants or donation.</li> </ul>
Zimbabwe	Roads Fund (ZINARA) established in terms of the Roads Act of 2001.	<ul style="list-style-type: none"> <li>a) Appropriations from parliament</li> <li>b) Grants</li> <li>c) Vehicle license fees</li> <li>d) Fuel levy</li> <li>e) Toll roads</li> <li>f) Transit fees</li> <li>g) Abnormal Load Fees</li> <li>h) Overload Fees</li> </ul>

**Note: \* In these cases tolls refer to transit related charges or cross border charges**

### 5.3 Criteria for qualification of potential fees, taxes and charges

In order for a fee, tax or charge to qualify as potential source for the RF, it must meet certain criteria such as:

- a) Target road users or subgroups of road users specifically,
- b) Be variable across vehicle classes,
- c) Be paid continuously or regularly,
- d) Preferably have some relationship to use of the road system,
- e) Preferably have a mechanism to adjust revenue dependent upon the actual costs imposed on the road system,
- f) Be easy to administer and collect,
- g) Be enforceable,
- h) Generate sufficient revenue to make a significant contribution to the road user charging system,
- i) Should not be a service fee.

### 5.4 Existing fees, taxes and charges

#### 5.4.1 Motor vehicle fees, charges and taxes

Motor vehicle fees, charges and taxes are a combination of 5 revenue sources, namely, motor vehicle registration fee, annual motor vehicle licence fee, motor vehicle transfer tax, drivers licence fee and fire inspection fee. A summary of each in terms of collection, applicability, and the enabling act or regulation is shown in the table below.

Table 5-2: Summary on motor vehicle fees, charges and taxes

Type	Description	Collection agency	Applicable to	Act/regulation
Motor vehicle registration fee	Charged whenever a motor vehicle is registered, or re-registered on change of ownership, and paid by the owner of the motor vehicle	TRA	All vehicle owners must make an application for the registration of their motor vehicle except for: <ul style="list-style-type: none"> <li>a) Motor vehicles owned by the government;</li> <li>b) Tanzania Peoples Defence Forces;</li> <li>c) International organizations;</li> <li>d) Diplomatic or consular offices.</li> </ul>	<ul style="list-style-type: none"> <li>a) Road Traffic Act, 1973</li> <li>b) Motor Vehicles (Tax on Registration and Transfer ) Act, R.E 2008</li> </ul>
Annual motor vehicle licence fee	Payable by the vehicle owner by the annual anniversary of the payment of his vehicle registration, according to the vehicle engine size		All vehicles excluding: <ul style="list-style-type: none"> <li>a) Tractors</li> <li>b) Motorcycles</li> <li>c) Tricycles</li> </ul>	<ul style="list-style-type: none"> <li>a) Road Traffic Act, 1973</li> <li>b) Roads and Fuels Tolls Act Cap 220, 2006 R.E</li> </ul>

Type	Description	Collection agency	Applicable to	Act/regulation
Motor vehicle transfer tax	This tax is payable by the transfer of a motor vehicle upon completion of the transfer of ownership of the vehicle		Applies to a vehicle of every description other than a tractor.  This tax is however not payable upon the transfer of a motor vehicle between spouses, the transfer to the corresponding half-share owner, the transfer to a trustee in a deceased or insolvent estate, or transfers between associated bodies corporate	a) Road Traffic Act, 1973 b) Motor Vehicles (Tax on Registration and Transfer ) Act, R.E 2008
Drivers licence fee	A driver's licence, valid for a period of 3 years ensures that those driving on the roads are qualified drivers, hence ensuring safety on the roads, as well as addressing the issue of fake licences.		All vehicle types	a) Road Traffic Act, 1973
Fire Inspection Fee	An annual fire inspection fee based on engine capacity of motor vehicles.		Applicable to all vehicles	a) Tanzania Fire and Rescue Force Act, 2007 b) Fire and Rescue Force (Safety and Inspections Certificates) Regulations, 2008 (and amendment regulations of 2012 and 2014)

It can be argued that the vehicle registration fee, motor vehicle transfer tax and drivers licence fee are more service like fees for the various administration activities. It is unlikely that these revenue streams can be mandated for dedication to the RF.

Based on the calculations carried out in the WP "Recommendations for New Sources of Revenue" (attached in Annex D of Volume 2), using the 2015 vehicle population, approximately Tshs 156.3 billion was collected from annual licence renewals during the year 2015 of which approximately Tshs 34.98 billion was collected from annual heavy vehicle licence fees. The estimate amount is significant in terms of the RF latest collection, and would be the second highest source of revenue after the fuel levy (currently Tshs 705.09 billion in FY2015/2016).

Traditionally, all vehicle licence fees are a source of revenue to RF as shown in Table 5-1, as they allow access to the using of the road network. Road and Fuels Tolls Act Cap 220 (R.E 2006) states that the revenue from heavy vehicle licence fees should accrue to the RF. It is understood that the annual licence fees were abolished and the excise duty on petrol and diesel were increased to recover this revenue. Based on the revenue sources for the RF listed in the Road and Fuels Tolls Act Cap 220, a portion of the excise duty should be diverted to the RF to make up for the revenue that would be generated from the heavy vehicle licence fees.

Apart from being a revenue source, vehicle licence fees also fulfil the function of establishing the size of the vehicle fleet more accurately bearing in mind that vehicles that are no longer used are not deregistered and still appear in the vehicle register. As vehicle owners would only pay vehicle licence fees for vehicles that are being used, vehicle licence fees are in the opinion of the consultant a proper "tool" to access the size of the vehicle population.

#### 5.4.2 Commercial & Passenger Service Vehicle Licence Fees (Road Service Licencing fees)

One of the main functions of the Surface and Marine Transport Regulation Authority (SUMATRA) is to issue, renew and cancel licences for commercial conveyance purposes. The "regulated sector" for which SUMATRA is mandated to issue licences to expressly means rail transport, ports and maritime transport, public passenger road transport and commercial road transport as per the SUMTRA Act, 2001.

SUMATRA signed a MoU with all local governments in Tanzania Mainland to carry out the functions as per the Motorcycles and Tricycles regulations, 2010. Motorcycle and tricycle road service licence fees are collected by LGA's under MOU's where revenues are shared with the LGA's at a rate of 50%.

The Road Service Licence fees can be separated into Passenger Service Vehicle Licences and Commercial Vehicle Licence fees (heavy goods vehicles). The relevant collection agency, applicability and act/regulation of each is summarized below.

Table 5-3: Summary of Commercial & Passenger Service Vehicle Licence Fees

Type	Collection agency	Applicable to	Act/regulation	Revenue in last FY2015/2016
Passenger Service Vehicle Licences	SUMATRA	Any person who wishes to operate for hire or reward a motor vehicle with a carrying capacity of more than 7, including the driver	Transport Licensing Act, Road passenger vehicles, 2007	Tshs 3.38 billion
	Local government authority or any other agent appointed by SUMATRA	Any persons who intends to operate for hire or reward a motor cycle or tricycle	Transport Licensing Act, Motor cycles and Tricycles Regulations, 2010	Tshs 6.04 billion
Commercial Vehicle Licence fees (heavy goods vehicles)	SUMATRA	Any persons who wishes to operate a goods carrying vehicle	Transport Licensing Act, Goods Carrying Vehicles Regulations, 2012	Tshs 263.54 million

Based on the commercial vehicle licence collections (discussed in WP "Recommendations for New Sources of Revenue" attached in Annex D of Volume 2), the number of heavy goods vehicle has increased in recent years thereby having a direct impact on the deterioration on the roads. It can be argued that a portion of the revenue generated from heavy goods vehicles should be diverted to the RF to deal with the accelerated damage associated with the increase in the heavy vehicle population. It was stated in the proposal submitted by the RFB, that the truck owners would rather have the revenue for the road transport licensing channelled towards road maintenance (Roads Fund Board, 2016).

It can however also be argued that this transport licensing is more of a permit type fee to regulate the Passenger Service Vehicles, Heavy Goods Vehicles, Motorcycles and Tricycles that can supply services to the public in mainland Tanzania.

### 5.4.3 Vehicle inspection fee

According to the RFB proposal (Roads Fund Board, 2016), it was mentioned that Government undertook the decision to dedicate the vehicle inspection fee to the Roads Fund in FY2012/2013. This revenue source has not yet been dedicated as the operational modalities are still under progress by the MoTWC (RFB, 2016).

It appears as if the inspection being referred to in this instance is a road-worthy type of inspection, where it is assessed whether a motor vehicle or trailer is fit for purpose for which it is being used, and issued a certificate of fitness in respect thereof, for the purpose of transfer of ownership of the vehicle. Currently, the vehicle inspection fees are collected by the Police Force and submitted to the National Treasury.

Other than the Road Traffic Act, 1973 allowing for the inspection of motor vehicles and trailers by a “vehicle inspector” as designated by the Minister of Transport it is not readily apparent which ministry or what categories of officers would be designated vehicle inspectors for the purposes of these charges.

### 5.4.4 Transit related charges

As discussed in the WP “*Report of Existing Revenue Sources for the RF*”, attached in Annex B of Volume 2, according to the Roads and Tolls Act Cap 220 (RE 2006) that regulates the Roads Fund, the **transit fees** are listed as a revenue source that should accrue to the RF. Currently, TRA collects **transit fees, transit charges and foreign vehicle permits fees** which are all transit related charges and should accrue to the RF, however, currently only the **transit charges** portion accrue to the RF. A summary of the transit related charges (excluding transit charges which are already currently collected for the RF) are shown in the table below.

Table 5-4: Summary of transit related charges collected in Tanzania

Type	Collection agency	Applicable to	Act/regulation	Revenue collection in last FY2015/2016
Transit fees	TRA	Transit fees are listed as non-tax revenue collected. It is not clear what these transit fees are or who they are applicable to.	It is unclear what policy or legislation mandates the collection of transit fees	Tshs 312.91 million
Foreign vehicle permits	TRA	During stakeholder consultation with TRA, the various transit related fees were discussed and it was mentioned that foreign vehicles entering Tanzania pay for a foreign vehicle permit (FVP) at the cost of USD 20, valid for a period of 3 months. It appears as if these fees are only payable by light foreign motor vehicles (up to 2 tonnes), regardless of time and distance to be travelled.	Legislation and regulations pertaining to the collection of the foreign vehicle permit (FVP) fees per se does not seem to exist.	Tshs 401.47 million

The revenue retrieved from TRA for the transit fees and foreign vehicle permits (FVP) is small in relation to the transit charges accruing to RF (approximately 9.73 billion in FY2015/2016). However, it can be

argued that these are transit related charges and should accrue to the RF nonetheless in compliance with the Roads and Fuels Act Cap 220 (RE 2006).

It seems that transit fees seem to be confused with transit charges albeit the revenues are reported separately.

The FVP is collected and is valid for three months. The aim of the FVP should be to recover the fixed costs incurred by foreign vehicles (time based) whilst the aim of transit charges is to recover variable costs from foreign vehicles (distance related).

**5.4.5 Excise duty on petrol and diesel**

Tariffs charged under the excise duty category are either specific or in proportion to the estimated value of the goods or services (ad-valorem rates).

The aim of the excise duty is to acquire additional revenue, provide disincentives for consumption of some environmentally or socially detrimental goods and impose extra taxes on a selection of luxury goods. The excise duty tax is levied on the ex-factory price or import price (Ministry of Finance and Planning, 2014). A summary of the excise duty in terms of collection, applicability and act/regulation are shown in the table below.

Table 5-5: Excise duty summary

Type	Collection agency	Applicable to	Act/regulation	Revenue potential
Excise duty	TRA and then paid to central government	Excise Duty is a tax applied to specific goods and services manufactured locally or imported at varying rates, payable on any scheduled article imported by the importer thereof at the time immediately before the article ceases to be subject to customs control, or upon sale or removal from the premises from where it was manufactured should the goods be manufactured locally.	<ul style="list-style-type: none"> <li>a) Finance Act of 1999</li> <li>b) The Tax Administration Act 2015</li> <li>c) The Excise (Management and Tariff) Act Cap 147 R.E 2008</li> </ul>	Based on the volume of fuel imported, the excise duty revenue was calculated to be Tshs 341.02 billion on diesel and Tshs 315.90 billion for petrol for FY2014/2015.

The revenue generated from the excise duty on petrol and diesel (method for the calculation of revenue discussed in WP “Recommendations of New Sources of Revenue”, attached in Annex D of Volume 2) is comparable to that of the revenue raised and generated from the fuel levy.

It is understood that the annual licence fees were abolished and the excise duty on petrol and diesel were increased to recover this revenue. The excise duty on petrol and diesel has increased by 40c/l per litre since July 2017, after the abolishment of the licence fees. The Road and Fuel Tolls Act states that the revenue from heavy vehicle licence should accrue to the RF. Since the licence fees are now abolished and the excise duty on petrol and diesel has increased, a portion of the excise duty revenue should be diverted to the RF.

Tshs 34.98 billion was collected from heavy vehicle licence fees in FY2015/2016. In order to arrive at the same revenue, a portion of the excise duty amounting to 5% per litre on petrol and diesel should be diverted to the RF.



The dedication of a portion of the excise duty revenue on petrol and diesel would significantly contribute to the RF.

#### 5.4.6 VAT and import duty on petrol and diesel

A summary of VAT and import duty in mainland Tanzania in terms of the collection agency, applicability and relevant act/regulation is summarized in the table below.

Table 5-6: Summary of VAT and import duty on petrol and diesel

Type	Description	Collection agency	Applicable to	Act/regulation
VAT	Value Added Tax (VAT) in Tanzania is an indirect tax applied on the supply and importation of taxable goods, services in mainland Tanzania.	TRA	<ul style="list-style-type: none"> <li>a) Applied on the supply and importation of taxable goods, services in mainland Tanzania.</li> <li>b) Goods supplied from outside mainland Tanzania</li> </ul>	Value Added Tax Act, 2014
Import duty	The formation of the East African Community Customs Union in January 2005, resulted in a three band Common External Tariff (CET) for all goods imported into Tanzania, Kenya and Uganda from foreign countries.	TRA	Importation of : <ul style="list-style-type: none"> <li>a) semi-finished goods</li> <li>b) Final consumer goods or finished commercial goods</li> </ul>	<ul style="list-style-type: none"> <li>a) Finance Act of 1999</li> <li>b) Tax Administration Act, 2015</li> </ul>

According to Value Added Tax Act, 2014 supplies and imports exempt from value added tax include both petrol and diesel under the list of VAT exempt petroleum products in item 15 of part 1 of the Schedule to the Act.

According to the CET, petroleum oils and oils obtained from bituminous minerals which include MSP (petrol) and AGO (diesel) have a duty rate of 0% (MoFP, 2014).

Traditionally, VAT on petroleum products is not a traditional source for the Roads Fund and it is unlikely that this revenue source can be dedicated according to the criteria listed in section 5.3.

#### 5.4.7 Road reserve charges

Road reserve charges in Tanzania are based on advertisements and utilities installed within the road reserve and are summarized in terms of collection and enabling act/regulation below.

Billboards are erected on road reserves, and utilities constructed within the road reserve, and it could thus be argued that they use the road reserves and therefore have to make a contribution to the provision of road infrastructure.

Table 5-7: Summary of road reserve charges

Type	Description	Collection agency	Act/regulation	Revenue collections last FY2015/2016
Advertisements in the road reserve	<ul style="list-style-type: none"> <li>a) Billboards, posters and adverts, banners and flyers,</li> <li>b) Advertising on towers, bridges &amp; pylons,</li> <li>c) Advertisements on construction site, boundary walls and fences</li> <li>d) Trailer advertising</li> </ul>	TANROADS and the LGA's collect billboard fees in their respective jurisdictions	<ul style="list-style-type: none"> <li>a) Ministry of Works, 2010, "Manual for Control of Advertisement within Road Reserve"</li> <li>b) bylaws of the relevant local government authority</li> </ul>	Municipal council billboard fees- Tshs 11.16 billion
Utilities installed in the road reserve	Placement of public lighting, telegraph, adverts, telephone, electric supplies and posts, drains, sewers and mains	TANROADS and the LGA's collect utility fees in their respective jurisdictions	<ul style="list-style-type: none"> <li>a) Ministry of Works, 2013, "Manual for the Control of Utilities Installation within the Road Reserve"</li> <li>b) The Roads Act, 2007</li> <li>c) The Roads Management Regulations, 2009</li> </ul>	TANROADS collected Tshs.6.88 billion out of Tshs110.88 billion from optical fibre installed in the road reserve. Revenue from other utilities were not available.

During the consultation visit with Temeke Municipal Council, it was stated that TANROADS and LGA's are collecting billboard fees according to road ownership while TANROADS stated that the municipal territory determines who receives the billboard fees, and not the road owner. There is confusion regarding the collection of billboard fees based on the contrasting statements made by TANROADS and Municipal Councils, making it a poor source of revenue in terms of enforcement and administration.

The local municipalities have been said to receive very little money from the RF, relying on their development partners and own source of funding. The revenue from billboard fees is one of their major sources of revenue for the municipalities.

This revenue source should be considered if the responsibility for collection by the relevant authority and enforcing payment for the use of the road reserve is sorted out.

#### 5.4.8 Parking fees

During stakeholder engagement with the Temeke Municipal Council (TMC), it was stated that the Dar es Salaam City Council (DCC) collects all parking fees in Dar es Salaam on behalf of the local governments and return a certain percentage to the relevant local municipalities. Each of the (then) three municipalities (Kinondoni, Temeke and Ilala) are supposed to receive 25% of the revenue while 25% is retained by DCC as an admin fee. The parking fees are collected manually by contractors, therefore this revenue source is dependent on the honesty of these contractors, as well as the quantity and location of these officials within the city.

Table 5-8: Summary of parking fees

Type	Applicable	Collection agency	Act/regulation
Parking fees	All vehicle types except Government vehicles, emergency vehicles and fire service vehicles which are exempted	Collection is done by the relevant LGA, or the City Council on their behalf, as is the case with the Dar es Salaam City Council (DCC).	Bylaws of LGA's are the statutory instrument governing the collection of parking fees within their jurisdiction.

The manual collection of the parking fees by officials is an insufficient collection structure making it vulnerable to leakages, meaning that the DCC and other LGA's cannot fully maximize this revenue source.

The DCC and LGA's have limited funding and rely on this source of revenue to carry out their functions. It is therefore not recommended that this source of revenue is dedicated to the RF.

#### 5.4.9 Property tax

Property tax can be defined as tax based on the value of property, paid to the local or municipal governments, with the property value evaluated by a tax assessor. Usually, the property tax is determined by multiplying the property tax rate by the current market value of the property. The value of the property is re-evaluated by the municipality periodically. The tax applies to real property (immovable property) or property attached to the land itself, including immovable improvements to the land (Investopedia, 2016).

Table 5-9: Summary of property tax

Type	Applicable	Collection agency	Act/regulation
Property tax	<ul style="list-style-type: none"> <li>a) Residential properties – 0.15% of rateable value</li> <li>b) Commercial properties - 0.2% of rateable value</li> </ul>	Local Authorities have been collecting property taxes on a flat rate basis. TRA mandated for collection since July 2016	<ul style="list-style-type: none"> <li>a) Local Government Finance Act no 9 of 1982</li> <li>b) Finance Act 2016</li> <li>c) The Tanzania Revenue Authority Act, Cap 399;</li> <li>d) The Urban Authority (Rating) Act, Cap 289;</li> <li>e) The tax administration Act, 2015;</li> <li>f) The Tax Appeals Act, Cap 408.</li> </ul>

The property tax is a source of revenue for the LGA's and the diversion of property tax from their already limited funding is not recommended. It is our understanding that the revenue from property taxes will still accrue to LGA's even though TRA now collects it centrally.

#### 5.4.10 Traffic fines

Traffic fines are road use related. However, they are meant to serve as a deterrent and this type of revenue source should not be encouraged.

## 5.5 Potential new charges, levies, fees and taxes

This section mentions and expands on charges, levies, fees and taxes which could potentially be added as government revenue sources, with a focus on those with a high possibility of dedication to the RF.

### 5.5.1 Levy on CNG, solar and hybrid vehicles

One of the mechanisms considered to broaden the revenue of the RFB and adding to revenue collected from existing Road User Charge sources is the introduction of levies on compressed natural gas (CNG) solar vehicles and hybrid vehicles, to ensure that the revenue from the fuel levy is not eroded through the introduction of CNG, solar and hybrid powered vehicles.

#### 5.5.1.1 CNG powered vehicles

Tanzania is one of the countries in which huge natural gas discoveries were made in recent years. This has led to the implementation of the Government Natural Gas Project, which is in progress under the close monitoring and supervision of the Tanzania Petroleum Development Corporation (TPDC, 2014).

An initial detailed engineering design and feasibility study for the gas distribution network initiative was carried out in 2012 and locations for the stations were identified. **The gas distribution network is expected to distribute natural gas to about 8,000 vehicles in Dar es Salaam.** According to the initial 2012 design, TPDC plans on constructing at least 15 compressed natural gas (CNG) stations in phases in Dar es Salaam, starting with the construction of five stations, to provide cheaper, cleaner energy for more of its citizens. However, TPDC faced financing challenges for implementation of the project (The East African, 2014).

The project also now need to be updated to include the Rapid Bus Transport (BRT), which was not reflected in the earlier 2012 design and TPDC plans to undertake a further feasibility study to incorporate the inclusion of BRT. The reason for including BRT now is that the Government of Tanzania is to change the BRT system from using petrol to natural gas.

In January 2017 TPDC stated however that the project has still not commenced yet because of lack of funding. TPDC is however still confident that the project will take off and more stations will be constructed (The East Africa, 2017).

### 5.5.1.2 Electric vehicles

There are currently three types of electric / hybrid vehicles, namely Hybrid Electric Vehicles (HEVs), Plug-In Hybrid Electric Vehicles (PHEVs) and All Electric Vehicles (EVs).

The Tanzania car market is based on pre-owner vehicles, while the new vehicle market is marginal. The current level of income does not support the purchase of new vehicles. For a substantial majority of private consumer's new vehicles remain unaffordable, making pre-owned vehicles the most accessible route to car ownership.

### 5.5.1.3 Potential alternate fuelled vehicles

Taking into consideration the very small new vehicle market, it is expected that CNG, solar and electric vehicles will constitute a very small portion of the vehicle population in the country.

However, it is also expected that the country will follow the global trend in implementing these vehicles in the future. Based on the global trend it is expected that there is considerable scope for implementing an alternative fuel levy as new source of revenue for the Tanzania RFB in the future.

## 5.5.2 Weight-distance charges (WDC)

The rationale of WDC is to reduce the cross-subsidisation of heavy vehicles by their lighter counterparts if only a fuel levy is in place.

Weight distance charges have been implemented in other countries with success, however, this system requires high-level compliance and modern technology, which may pose a challenge to the implementers, resulting in failure to collect the desired revenue.

Tanzania is a large country and adopting country-wide tracking systems would be expensive thereby limiting WDC charges to perhaps only the major corridors. Additionally, vehicles would need to be tracked and charged from day one – it would be difficult to charge early adopters while others continue to avoid the charge. Implementation would take a number of years and would come at great expense to the government.

This revenue source can be considered if suitable technology can be adopted to ensure enforceability for the applicable vehicle categories.

## 5.5.3 Direct tolling

A toll road is a road for which a fee (toll) is charged to allow one to travel on. In most developed countries, toll roads are a form of user charge typically applied to help recoup the cost of road construction and maintenance. Worldwide tolls are progressively becoming a common way to make users pay for all or part of the infrastructure construction and maintenance. Collection of road toll is dependent on the willingness of the users to pay for using a particular road over alternative routes and modes of transport.

Potential consequences of tolling include the uncertainty that toll revenues will be sufficient to cover all the costs of construction, maintenance and operation (revenue risk). Nonetheless tolling has been proven to work worldwide. Furthermore, it is considered a fair option, as payment is restricted to the actual road users and not the general public.

Toll is an excellent method to collect money from road users which can be used for the maintenance and development of that particular road being tolled provided that there are adequate traffic volumes passing through the toll system to recover the collection cost, infrastructure costs, and operational costs.

Given the high initial and ongoing costs for implementing the toll system and need for high traffic volumes, this type of revenue source is only recommended for implementation on particular roads/corridors.

#### 5.5.3.1 Tolling through Public-Private Partnership (PPP) Projects

Inadequate funding for roads is a universal problem in road sectors. This, as well as the global acceptance of fee for service and user pay principles have resulted in a general embracement of conventional toll roads to solve the financing problem. Conventional toll roads however have limitations. These limitations can however be addressed through public private partnerships.

It can be stated that PPPs can be structured to offer many benefits above conventional toll roads but offering all benefits all the time is generally not attainable.

Support from developing partners and government is important since a large portion of the road network is currently in poor condition. Road sector specific PPP's will need to be investigated to ascertain their feasibility and ability to operate as a PPP in terms of affordability of road users and traffic volumes, as well as various other criterion laid out in policy and legislation.

#### 5.5.4 Congestion charging

Congestion in the city of Dar es Salaam is as a result of a faster growth in the supply of cars compared to the expansion of the road network (Kiunsi, 2013). Congestion causes pressure on the roads, and thus increases the need for their maintenance. A congestion fee can be introduced to fund road maintenance. A congestion fee is a charge based on specific peak in cities or towns.

This form of charge will not only generate revenue, but also manage traffic in the city. The charge should entirely be based on the amounts of traffic entering and leaving the city (Dar es Salaam) during peak hours. Collection should be done by means of an electronic system fitted to every vehicle with access to the city centre. There are multiple technologies available for vehicle recognition such as camera based recognition, radio-frequency identification, dedicated short-range communications, etc (Pike, 2010).

The revenue collected from congestion fees can be significant given the high number of vehicles in the city of Dar es Salaam. Other possible advantages will be drastic decongestion of the city due to avoidance of paying the respective fee. Decongestion of the city would further lead to improved road safety. Although this fee can serve as a funding source, it remains primarily a traffic management tool designed to discourage road users from using the city roads at peak times and may not be the best solution for the RF revenue maximisation as optimally the revenue collected would decrease over time as vehicles divert to other routes or shift to public transport. From an enforcement point of view, it will also be challenging to implement a congestion fee.

Disadvantages arise from the complexity of setting up a collection mechanism, which can be very costly. Likewise, the system can lead to extra traffic on routes that do not incur congestion fees.

#### 5.5.5 Carbon tax pricing on motor vehicles

Carbon tax was initially suggested by stakeholders, during the initial stakeholder engagement after the project inception. Carbon taxes can be defined as a fee levied by governments on the production, distribution or use of fossil fuels and is charged per tonne of greenhouse gas (carbon dioxide) produced from the burning of fossil fuels, envisaged for the protection of the environment by reducing the demand on fossil fuels (Lumba, 2015).

Carbon taxes can be used to target the road users directly by charging vehicles based on their fuel consumption. This type of fee would be applicable to highly trafficked cities such as Dar es Salaam, associated with high levels of congestion and pollution.

Although carbon taxes can be used to charge and collect revenue from road users directly, their primary purpose is to mitigate environmental concerns regarding fossil fuels. The money generated from this



type of tax should rather be directed to the National Environment Management Council to deal with issues regarding environmental concerns related to carbon emissions.

#### **5.5.6 Road development levy**

The road infrastructure is under a lot of pressure and is in need of adequate funding for sustainability. A road development levy that is similar to the railway development levy, which is charged on CIF of all imported goods can be introduced. A rate of up to 1.5% could be recommended on all imports and collection be done by TRA, as with the Rail Development Levy.

Although this type of levy would have a large revenue potential, it is not recommended as it will be counterintuitive in the sense that there is already a rail development levy aimed at causing a shift from road to rail and to develop the rail network.

#### **5.5.7 Roadside trading permits**

In the city of Dar es Salaam, street trading is the most common form of informal work (Mramba, et al., 2016). There were approximately 700, 000 street vendors in Dar es Salaam in 2007 which increased to more than 1 million in 2014 (Mramba, 2015). Due to the large number of road side traders, a road side trading permit fee can be implemented and the revenue dedicated to the RF, as it can be argued that the trading occurs within the road reserve.

Since this type of fee would target the lower income earning end of the population, the fee introduced would have to be small and the revenue generated would be insignificant in terms its contribution to the RF.

It is therefore not recommended that this type of fee is implemented as it would increase the financial burden on the street vendors and would also be difficult to administer and collect.

#### **5.5.8 Severance tax**

A severance tax is based on the extraction of non-renewable natural resources. In terms of this study, it can be used to compensate the country for extra wear and tear on its roads caused by trucks moving heavy haul bulk goods. There is high revenue potential in areas with large-scale mining activities in Tanzania.

The tax can be imposed at the time the mineral is purchased, similar to a sales tax. This tax can also be levied on the volume extracted. This would reduce the number of parties to be taxed and also enable government to get the revenue upfront.

This type of tax uses the user pays model which tax places the burden of payment on the heavy vehicles owners or companies, which in reality contribute significantly to the damage of roads. However, the tax may not be based upon proportional use of the road unless it is charged per kilometre travelled which may be difficult to monitor and the monitoring process is associated with high administration costs.

The severance tax will only apply to certain areas of the country where minerals are extracted and transported from and the demand and supply patterns of these minerals may be erratic, therefore making the revenue flow uncertain. This type of charging system is therefore not recommended for implementation.

#### **5.5.9 Backlog maintenance levy**

It can be implemented as a percentage of CIF on fuel to target the rehabilitation of the paved network. Since the RFB's mandate with regards to development is limited to 10%, the backlog maintenance levy could be channelled through treasury instead of the RFB, however, there is a risk that the money will not be ring fenced and that it will be used for other purposes.

#### **5.5.10 Tourist fees from game reserves**

Charges collected from tourists entering game reserves or national parks are used inter alia to maintain the roads in game reserves and that these charges should be used exclusively for roads in game reserves and not other roads. With the potential formation of a new road agency responsible to oversee the road network in game reserves, the charges collected from tourists will be a source of revenue for the new game reserve road agency.

## 5.6 Summary and recommendations for new sources of revenue for the RFB

Based on the review of the potential revenue sources throughout this section, a summary of the potential for implementation of each source against the criteria listed is shown below in the form of a criteria matrix. The overall source potential based on the test against the required criteria is shown in the last column.

Table 5-10: Summary of recommendations for new sources of revenue for the RFB

Potential Revenue Sources	Targets road users / subgroups of road users?	Variable across vehicle classes?	Paid continuously / regularly?	Relationship to use of the road system?	Allows for adjustment dependent upon the actual costs imposed on the road system?	Easy to administer and collect (tax efficiency)?	Ease to enforce? (Cannot be easily evaded)	Generates sufficient revenue for significant contribution to the RFB?	Service fee or fine?	Traditional source of revenue regionally?	Comment	Source potential
<b>Existing charges/taxes/levies in Tanzania</b>												
Transit related charges												
Transit fees	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Transit related charges should be dedicated to the RF according to the Road and Tolls Act Cap 220 (RE 2006).	Recommended
FVP	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes		Recommended
Road reserve charges												
Billboard advertisement	No	No	Yes	No	No	Potentially yes but currently no	Potentially yes but currently no	No	Yes	No	Major confusion in terms of the collection procedure and enforceability, making it an unreliable source for the RF	To be considered
Utilities in the Road Reserve	No	No	Yes	No	No	Potentially yes but currently no	Potentially yes but currently no	Yes	Yes	No	Large revenue potential however users are reluctant to pay and TANROADS only collects a small portion of the total amount charged	To be considered

Potential Revenue Sources	Targets road users / subgroups of road users?	Variable across vehicle classes?	Paid continuously / regularly?	Relationship to use of the road system?	Allows for adjustment dependent upon the actual costs imposed on the road system?	Easy to administer and collect (tax efficiency)?	Ease to enforce? (Cannot be easily evaded)	Generates sufficient revenue for significant contribution to the RFB?	Service fee or fine?	Traditional source of revenue regionally?	Comment	Source potential
Motor vehicle												
Vehicle registration fees	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Used in countries such as United States, New Zealand and Australia to contribute towards the transport sector and road maintenance. This is however more like a service fee for the administration activities.	Not recommended
Drivers licence fee	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No		Not recommended
Transfer fee	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes		Not recommended
Annual vehicle licence fee	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Not applicable anymore. Recently abolished with the excise duty on petrol and diesel increased.	Recommended but not applicable
Vehicle inspection fee (all vehicles)	Yes	Yes	Yes	Yes	No	Yes	Yes	Still to be determined	Yes	No	Currently in the process of dedication to the RF by MoTWC	In process of diversion
Commercial & Passenger Service Vehicle Licence Fees:												
Passenger Service Vehicle Licences	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Rapid growth in revenue trends making it a potential reliable source for RF. This serves as a	Not recommended

Potential Revenue Sources	Targets road users / subgroups of road users?	Variable across vehicle classes?	Paid continuously / regularly?	Relationship to use of the road system?	Allows for adjustment dependent upon the actual costs imposed on the road system?	Easy to administer and collect (tax efficiency)?	Ease to enforce? (Cannot be easily evaded)	Generates sufficient revenue for significant contribution to the RFB?	Service fee or fine?	Traditional source of revenue regionally?	Comment	Source potential
Commercial vehicle licence	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	No	permit type fee to regulate PSV, HGV, motorcycles and tricycles that supply service to the public	Not recommended
Traffic enforcement revenue	Yes	Yes	No	Yes	No	No	No	No	Yes	No	Meant to serve as a deterrent and this type of revenue source should not be encouraged for funding	Not recommended
Parking fees	Yes	Yes	No	Yes	No	No	No	No	No	No	Currently uses an insufficient collection structure making it vulnerable to leakages. Current source of revenue for LGA's and DCC who already have limited funding	Not recommended
Portion of excise duty on petrol and diesel	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes <sup>6</sup>	Large revenue potential comparable with fuel levy currently accruing to RF. Already collected by TRA which will relieve RFB from administration costs.  Recently increased by 40c/l on petrol and diesel. Portion to be diverted to RF to compensate for heavy vehicle licence fees mandated to accrue to the RF.	Recommended (portion only)

<sup>6</sup> Yes if portion of excise duty is transferred to the fuel levy, otherwise not applicable

Potential Revenue Sources	Targets road users / subgroups of road users?	Variable across vehicle classes?	Paid continuously / regularly?	Relationship to use of the road system?	Allows for adjustment dependent upon the actual costs imposed on the road system?	Easy to administer and collect (tax efficiency)?	Ease to enforce? (Cannot be easily evaded)	Generates sufficient revenue for significant contribution to the RFB?	Service fee or fine?	Traditional source of revenue regionally?	Comment	Source potential
VAT and import duty on petrol and diesel	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Not a traditional source of revenue for the Roads Fund but rather a traditional source of revenue for treasury.	Not recommended
Property taxes	No	No	Yes	No	No	No	Yes	Not currently	Yes	No	Not really road user related and a source of revenue for LGA's who already have limited funding	Not recommended
<b>New charges/taxes/levies in Tanzania</b>												
CNG, electric and solar powered vehicle levy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not currently	No	Yes	Can be levied in similar manner as fuel levy	Recommended in future
Weight distance charges	Yes	Yes	Yes	Yes	Yes	No, depends on system implemented	No, depends on system implemented	Dependent on system implemented	No	Yes	This system requires high-level compliance and modern technology. Also requires high administrative costs.	To be considered
Direct tolling	Yes	Yes	Yes	Yes	Yes	Depends on system implemented	Depends on system implemented	Dependant on system implemented	No	Yes	Given the high initial costs for implementing the toll system and the traffic flow pattern in Tanzania, this type of revenue source is recommended only for specific roads.	Recommended on specific roads only.



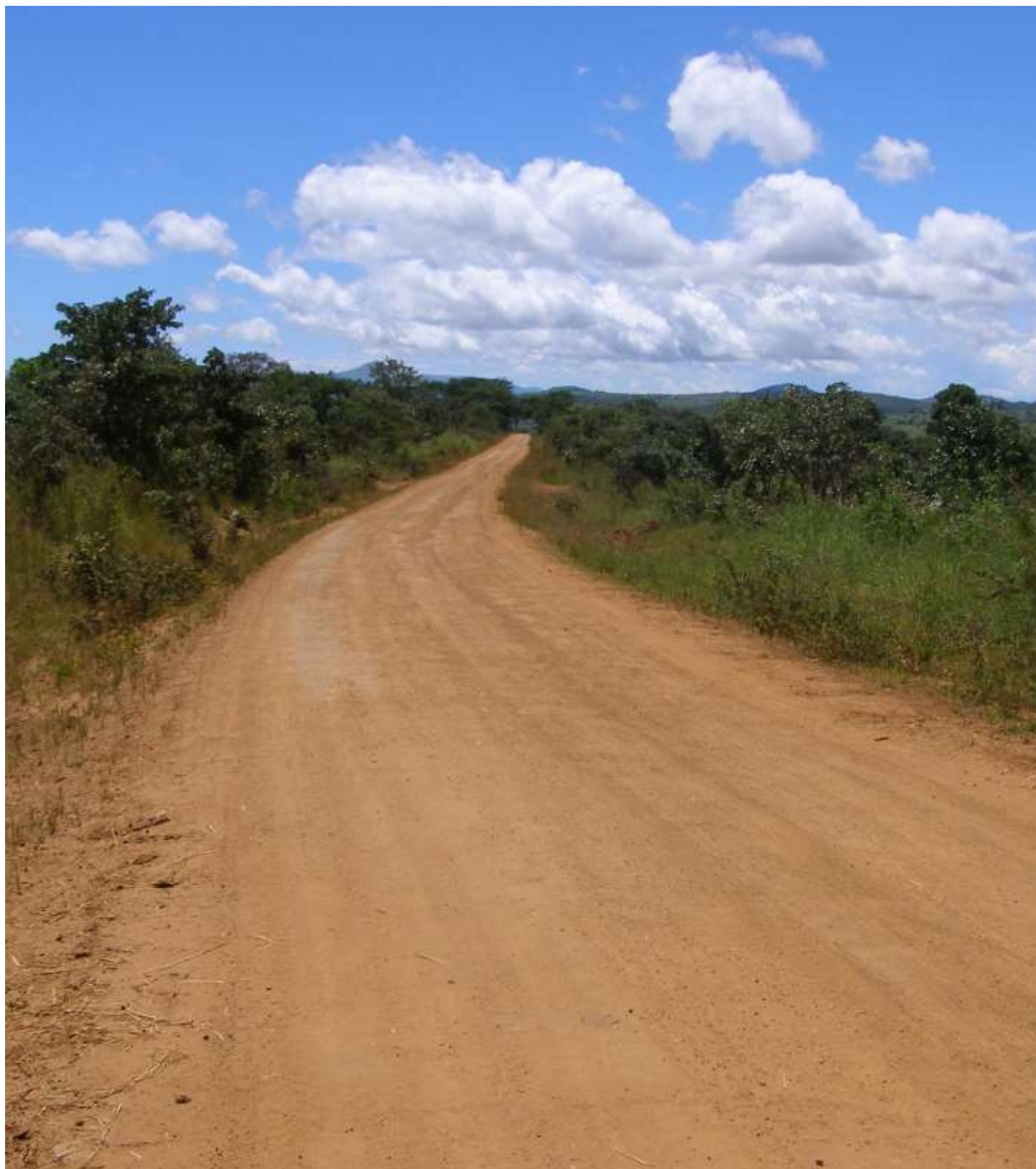
Potential Revenue Sources	Targets road users / subgroups of road users?	Variable across vehicle classes?	Paid continuously / regularly?	Relationship to use of the road system?	Allows for adjustment dependent upon the actual costs imposed on the road system?	Easy to administer and collect (tax efficiency)?	Ease to enforce? (Cannot be easily evaded)	Generates sufficient revenue for significant contribution to the RFB?	Service fee or fine?	Traditional source of revenue regionally?	Comment	Source potential
Congestion charges	Yes	Yes	Yes	Yes	Yes	No, depends on system implemented	No	Dependant on system implemented	No	Yes	Primarily a traffic management tool designed to discourage road users from using the city roads at peak times. Difficult to implement	Not recommended
Road development levy	No	No	Yes	No	Yes	Yes	Yes	Yes	No	No	Will be difficult to implement given existence of the Rail Development Levy	Not recommended
Carbon tax	Yes	Yes	Yes	Yes	Yes	Depends on system implemented	Yes	Dependant on system implemented	No	No	Money generated from this type of tax should rather be directed towards the environmental sector	Not recommended
Roadside trading permits	No	No	Yes	Yes	No	No	No	No	No	No	This type of fee is implemented as it would increase the financial burden on the street vendors and would also be difficult to administer and collect.	Not recommended
Severance Tax	Yes	No	Yes	Yes	No	Yes	Yes	No	No	No	This type of fee will only affect those in these mining areas and may be considered an unfair charging system	Not recommended
Backlog maintenance levy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Can be used to target rehabilitation on the paved network	Recommended
Tourist charges at	No	No	Yes	No	No	Yes	Yes	No	No	No	Should be used to maintain roads in game reserves only.	Not recommended

Potential Revenue Sources	Targets road users / subgroups of road users?	Variable across vehicle classes?	Paid continuously / regularly?	Relationship to use of the road system?	Allows for adjustment dependent upon the actual costs imposed on the road system?	Easy to administer and collect (tax efficiency)?	Ease to enforce? (Cannot be easily evaded)	Generates sufficient revenue for significant contribution to the RFB?	Service fee or fine?	Traditional source of revenue regionally?	Comment	Source potential
game reserves												

Based on the summary above, it is recommended that the transit related charges (transit fees and FVP) should be devoted to the RF as a first phase approach to increasing the revenue of the RF. The Road and Fuel Tolls Act states that the revenue from heavy vehicle licence fees should accrue to the RF. Since the licence fees are now abolished and the excise duty on petrol and diesel was increased, a portion of the excise duty should be diverted to the RF.

Following comments from the steering committee, the road reserve charges and weight distance charges should be considered if the current confusion regarding the road reserve charges and technology issues regarding the weight distance charges can be properly rectified. A levy on CNG, solar and electric powered vehicles should also be considered in the future when CNG fuel vehicles become applicable to Tanzania's future vehicle fleet. Tolling should be considered for roads where there are sufficient traffic volumes to generate adequate revenue.

In order to fund the rehabilitation of the paved network, a backlog maintenance levy as a percentage of the CIF on petrol and diesel should be considered.



## Chapter 6 Road Network Maintenance and Development in Mainland Tanzania

## 6 Road Network Maintenance and Development in Mainland Tanzania

### 6.1 Introduction

The economic costs of poor road maintenance are borne primarily by road users in the form of vehicle operating costs and travel time delays. But when a road is allowed to deteriorate from good to poor condition, it will also become increasingly expensive to bring the road back to good condition, as indicated in Figure 6-1. Figure 6-1 illustrates the condition and deterioration of a road over time for different maintenance strategies requiring different funding levels. 1, 3 and 6 in the figure eludes to the addition cost factors if maintenance is postponed. It illustrates that optimal timing of maintenance is imperative in the sense that postponement of maintenance actions may result in higher funding levels required. For instance, by performing reseal actions at an earlier point of time may result in savings in maintenance costs, as relatively more expensive rehabilitation actions or even pavement reconstruction are not needed at a later stage. According to TANROADS report on periodic maintenance and rehabilitation programme for paved trunk and regional roads, it is estimated that the maintenance costs increase by six times after three years of neglect and up to 18 times after five years of neglect (TANROADS (2), 2015).

The maintenance needs to be well understood by all budget managers and strategic planners involved in the budget and planning cycle.

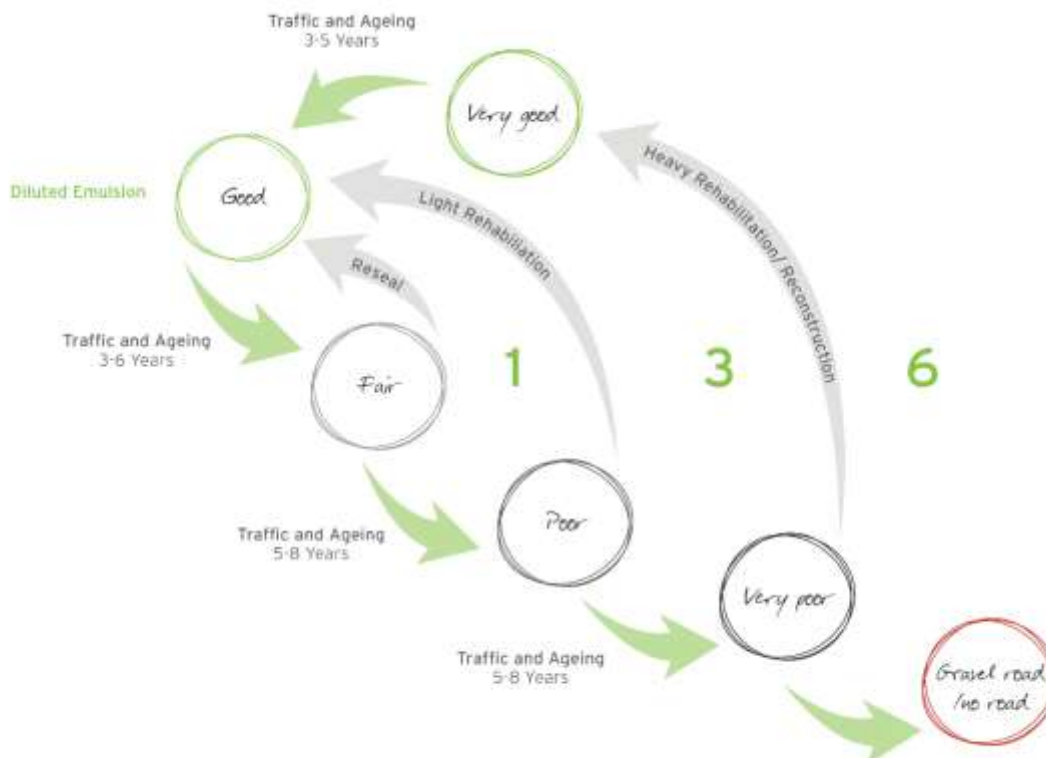


Figure 6-1: Impacts of delaying road maintenance on the road network

## 6.2 Assessment of Tanzanian road maintenance and development needs methodology

The evaluation of the maintenance and development needs in mainland Tanzania was carried out using the HDM-4 programme.

The input for the program consists of traffic figures, construction cost, road deterioration and maintenance information and vehicle operating cost inputs. A variety of outputs are possible. The model estimates, year by year, the road conditions and resources used for maintenance under each maintenance strategy for each road section, as well as the physical resources consumed by each vehicle operation.

To model the economic effect of the upgrades and maintenance actions of the entire study area, all of the road sections were combined into a single programme in HDM-4.

## 6.3 Inputs for the HDM-4 programme

### 6.3.1 Road network

Data on the TANROADS paved and unpaved network was retrieved from TANROADS Road Maintenance Management System (RMMS). The HDM-4 file retrieved from TANROADS was populated with the following information per link in the network:

- a) Definition (e.g. name, base type, category, etc.);
- b) Geometry (rise and fall, speed limit, altitude, curvature etc);
- c) Pavement (surfacing, previous works, pavement strength etc);
- d) Condition (roughness, percentage area cracking, rutting, potholes etc); and
- e) Traffic (AADT)

Due to the large extent and lack of data availability on the PORALG network, the PORALG road network was entered into the model at a high level based on the latest condition and length data from the PORALG Annual Report 2015/2016. The weighted average traffic per vehicle class was calculated on the TANROADS paved and gravel networks and applied to the PORALG network accordingly while it was assumed that only pick-ups would travel on the earth roads.

### 6.3.2 Alternatives

The following alternatives were created for each section within the network:

#### **Alternative 0: Do nothing**

This alternative models the base case. In this case it is assumed that no maintenance is done on the road. This base case, relates to the zero hypothesis.

#### **Alternative 1: Do minimum**

This alternative models minimum maintenance to the roads within the network (routine maintenance and periodic).



## Alternative 2: Upgrade

This alternative models upgrades from earth to gravel and gravel to paved standard. It also models routine and periodic maintenance, as well as rehabilitation on the paved network

The maintenance and development actions for each alternative is shown in the table below, with the individual works items expanded on in Table 6-2.

Table 6-1: Proposed alternatives per section

Pavement type	Alternative 0	Alternative 1	Alternative 2
Paved	Do nothing	Maintenance on paved roads (TANROADS routine and periodic maintenance – paved)	TANROADS maintenance treatment (TANROADS routine and periodic maintenance including rehabilitation)
Gravel	Do nothing	Maintenance on gravel roads (TANROADS maintenance-unpaved)	Upgrade to engineered paved road including TANROADS routine and periodic maintenance including rehabilitation
Earth	Do nothing	Earth road maintenance	Upgrade to gravel road including maintenance on gravel roads

### 6.3.3 Maintenance standards

This item allows the user to define a responsive or scheduled intervention for a maintenance action. The maintenance action will be triggered if certain criteria in terms of roughness, re-graveling, cracking etc. are fulfilled. Scheduled intervention is specified in terms of time (for example, every 5 years).

The following maintenance strategies were inputted into the programme, along with the unit costs and interventions as shown in the table below, retrieved from TANROADS RMMS. The unit costs were adjusted for asphalt overlay, double bituminous surface treatment, rehabilitation and single bituminous surface treatment as explained in the WP “Multi-year Assessment of Road Maintenance Needs”, attached in Annex H of Volume 2. Interventions were inputted as retrieved from TANROADS RMMS except for grading, where the treatment was based on the ADT, as more highly trafficked roads would require more frequent grading.

Table 6-2: Maintenance standards adapted for network analysis

Treatment	Financial Unit cost (US\$)	Intervention/frequency
<b>TANROADS routine maintenance (paved)</b>		
Edge repair	31.16/m <sup>2</sup>	Interval>=1 year, max material <=5000m <sup>2</sup> /km/year
Patching	31.16/m <sup>2</sup>	Interval>=1 year and max material <=5000m <sup>2</sup> /km/year
Crack sealing	2.56/m <sup>2</sup>	Interval>=1 year and max material <=5000m <sup>2</sup> /km/year
<b>TANROADS periodic maintenance and rehabilitation (paved)</b>		
Rehabilitation	99.93/m <sup>2</sup>	Roughness>6 IRI
Asphalt Overlay 50mm	34.53/m <sup>2</sup>	Roughness>=4.5, <=10 IRI
Single bituminous surface treatment	7.30/m <sup>2</sup>	Total carriageway cracked > 20% and AADT >=0, <=500veh/day and Roughness <=10IRI
Double bituminous surface treatment	12.60/m <sup>2</sup>	Total carriageway cracked > 20% and AADT >=500, <=10000veh/day and Roughness <=10IRI
Edge repair (preparatory works)	31.16/m <sup>2</sup>	Interval>=1 year, max material <=5000m <sup>2</sup> /km/year
Patching (preparatory works)	31.16/m <sup>2</sup>	Interval>=1 year and max material <=5000m <sup>2</sup> /km/year

Treatment	Financial Unit cost (US\$)	Intervention/frequency
Crack sealing (preparatory works)	2.56/m <sup>2</sup>	Interval>=1 year and max material <=5000
<b>TANROADS unpaved network maintenance</b>		
Regravel	11.43/m <sup>3</sup>	Gravel thickness <=50mm
Grading	1190/km	ADT<20, grading at 180 days 21 < ADT < 99, grading at 90 days ADT>100, grading at 45 days
Spot regravel	11.43/m <sup>3</sup>	Gravel thickness>50mm, <=100mm and max material <=350m <sup>3</sup> /km/year
<b>Earth routine maintenance</b>		
Grading	1190/km	Grading at 180 days

### 6.3.3.1 Benchmarking unit costs of period and routine maintenance

A comparison of unit costs for routine and period maintenance costs in the various SADC and EAC countries (where available) are shown below for paved and unpaved roads. The unit costs for unpaved roads are shown in Figure 6-2 and in Figures 6-3 to 6-5 for paved roads. Gauteng, Northern Cape, Eastern Cape, Mpumalanga, Limpopo and Western Cape are provinces within South Africa.

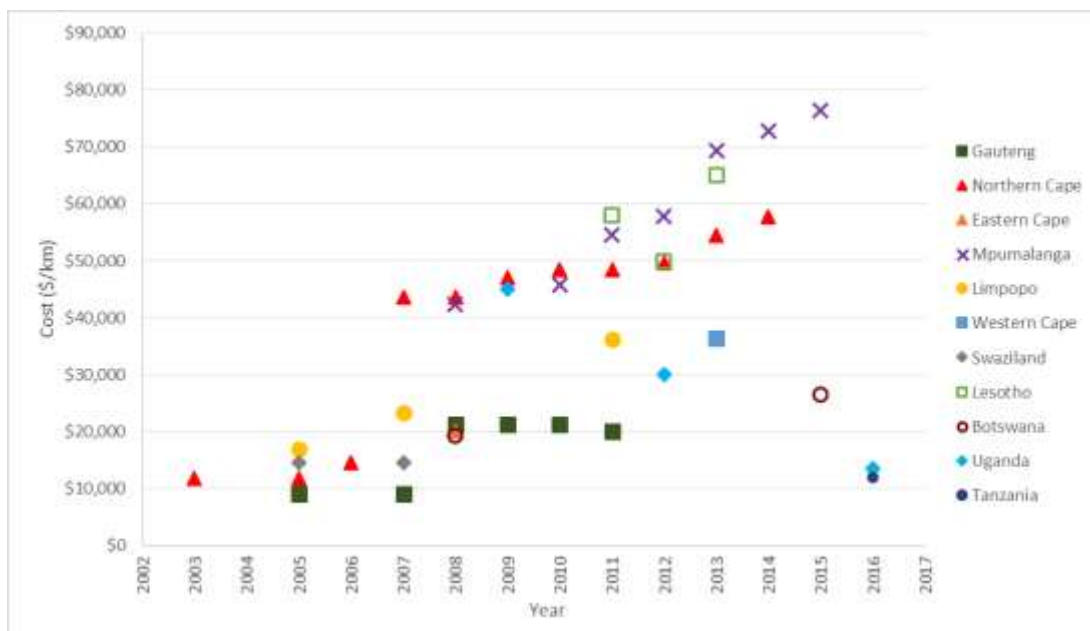


Figure 6-2: Unit costs for regravelling in EAC and SADC countries

The unit cost for regravelling in Tanzania compares well with Uganda for the year 2016 but is on the lower end compared to South Africa and Lesotho for the previous years.

The unit costs for light and heavy rehabilitation and reseal in Tanzania compare well with the other countries but is on the lower end in terms of patching.

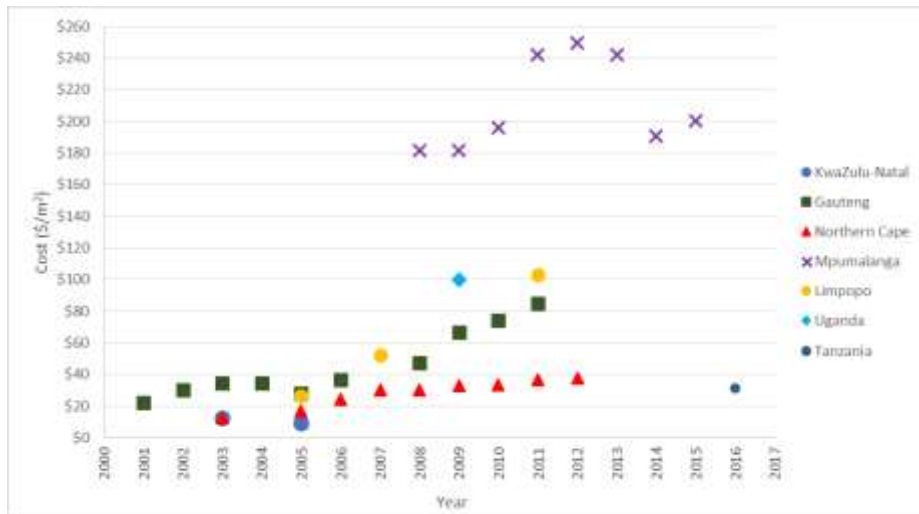


Figure 6-3: Unit costs for patching in EAC and SADC countries

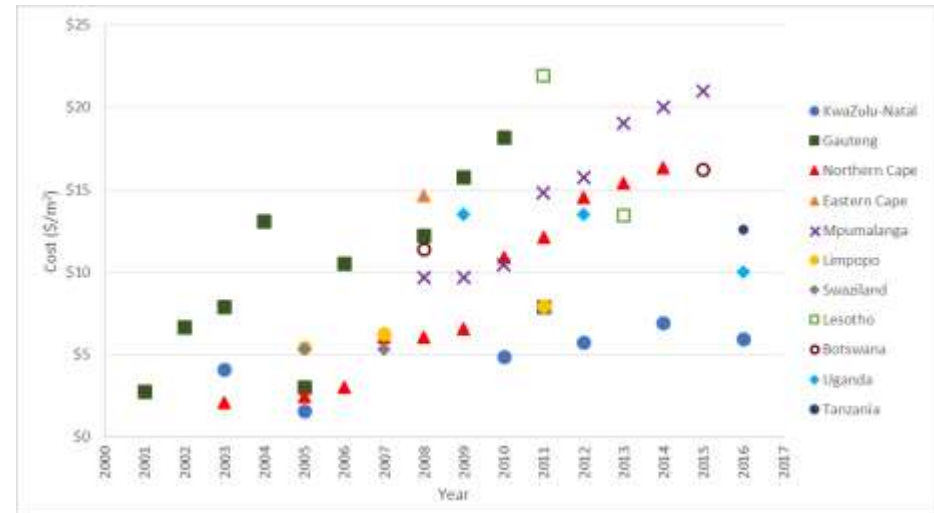


Figure 6-4: Unit costs for reseal in EAC and SADC countries

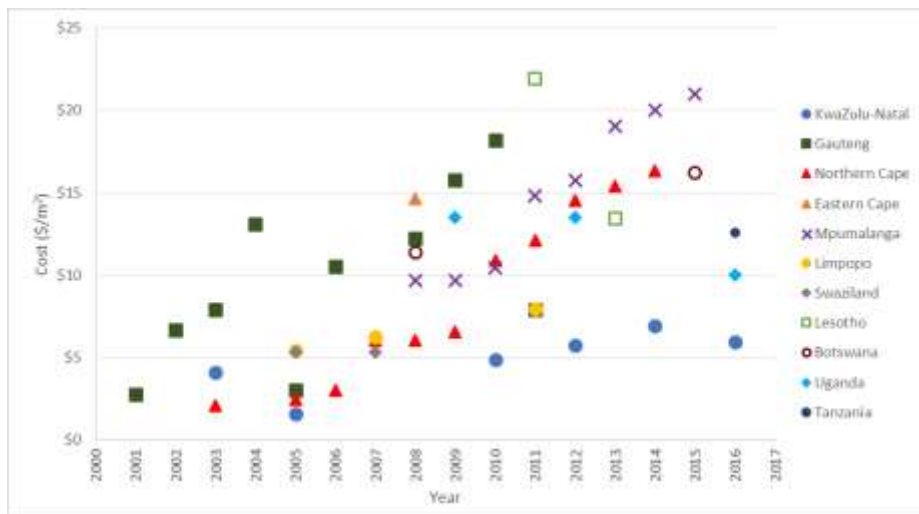


Figure 6-6: Unit costs for light rehabilitation in EAC and SADC countries

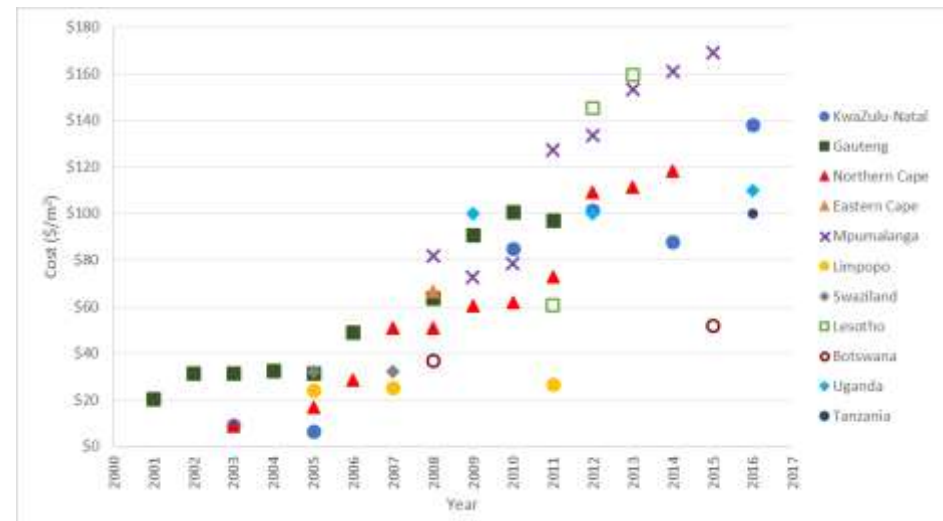


Figure 6-5: Unit costs for heavy rehabilitation in EAC and SADC countries

### 6.3.4 Improvement standards

The improvement standards item contains construction option specifications. Provision is made to use detailed quantities and unit costs to calculate the construction costs. The unit cost for the upgrade of gravel to engineered paved road and the upgrade of earth to gravel road was based on unit costs encountered in the EAC and SADC region, shown below.

Table 6-3: Improvement standards adopted for network analysis

Upgrade option	Financial Unit cost (USD/km)	Intervention	Duration for construction (years)
Upgrade to gravel	67 368	year =2017	1
Upgrade to engineered paved road	740 000	year =2017	2

#### 6.3.4.1 Benchmarking improvement action unit costs

The unit costs for the upgrade from earth to gravel and gravel to engineering paved standard is shown in Figure 6-7 and Figure 6-8 below for SADC and EAC countries. It should be noted that the unit costs for the improvement actions in Tanzania were based on estimates as described in the WP “Multiyear Road Maintenance Need Assessment Report” attached in Annex H of Volume 2.

Gauteng, Northern Cape, Eastern Cape, Mpumalanga, Limpopo and Western Cape are provinces within South Africa.

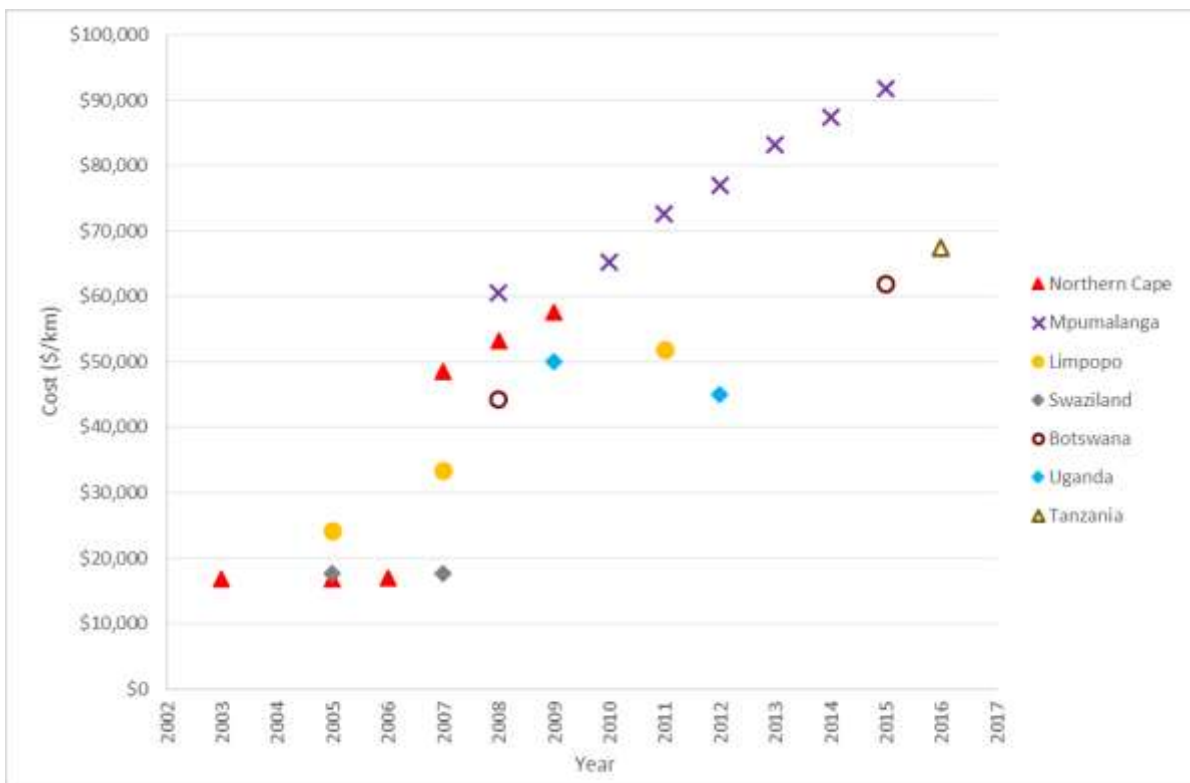


Figure 6-7: Upgrade earth to gravel road

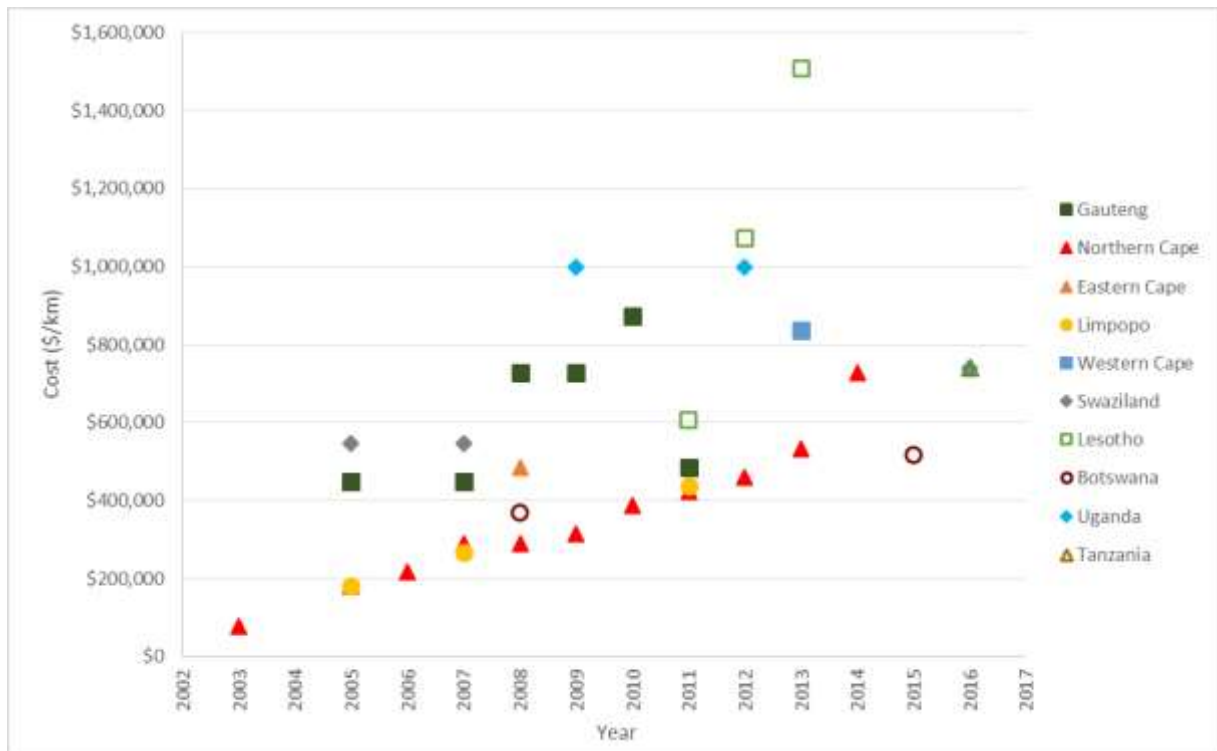


Figure 6-8: Upgrade from gravel to engineered paved standards

#### 6.4 Maintenance and development requirements in mainland Tanzania

The total cost for each of the **road maintenance** (routine/recurrent and period maintenance) and **improvement** (rehabilitation and upgrade) actions (outputted in the HDM-4 programme) were divided over the 20 year analysis period to give an **average annual cost** for each action. The average annual cost over the 20 year period was used due to year-to-year fluctuations in the cost of each of the individual maintenance and improvement actions, which is impractical for the adjustment of road user charges. The maintenance and development requirements were analysed on the entire road network (including the unclassified roads) and classified road network only to show the difference between the funding requirements for the two networks. It should be noted that there are only classified roads within the TANROADS network. The results were then categorized into 8 funding scenarios described in Figure 6-9. The **other annual maintenance costs** such as bridge and weighbridge maintenance, as well as **non-works costs** such as administration and supervision costs borne by TANROADS and PORALG for which RF funding is required were then added to the total funding requirements. The other annual maintenance costs and non-works costs were extracted from TANROADS Business Plan Report for FY 2016/2017 and the PORALG Annual Performance Report for District, Urban and Feeder Roads Maintenance for FY 2015/16. A breakdown of these other road works and non-works costs for TANROADS and PORALG are shown in Table 6-4 and Table 6-5 respectively.

The latest release to the MoWTC for the FY2015/2016 was added to the total funding requirements shown in Table 6-3 to cater for the costs borne by the MoWTC for the implementation of development projects on the road network. The administrative and operational costs for the RFB were also added to Table 6-6, as retrieved from RFB for the FY 2015/2016.

The funding requirements per scenario is shown in Table 6-4 for TANROADS and Table 6-5 for PORALG, while the total funding requirements is summarized in Table 6-6.

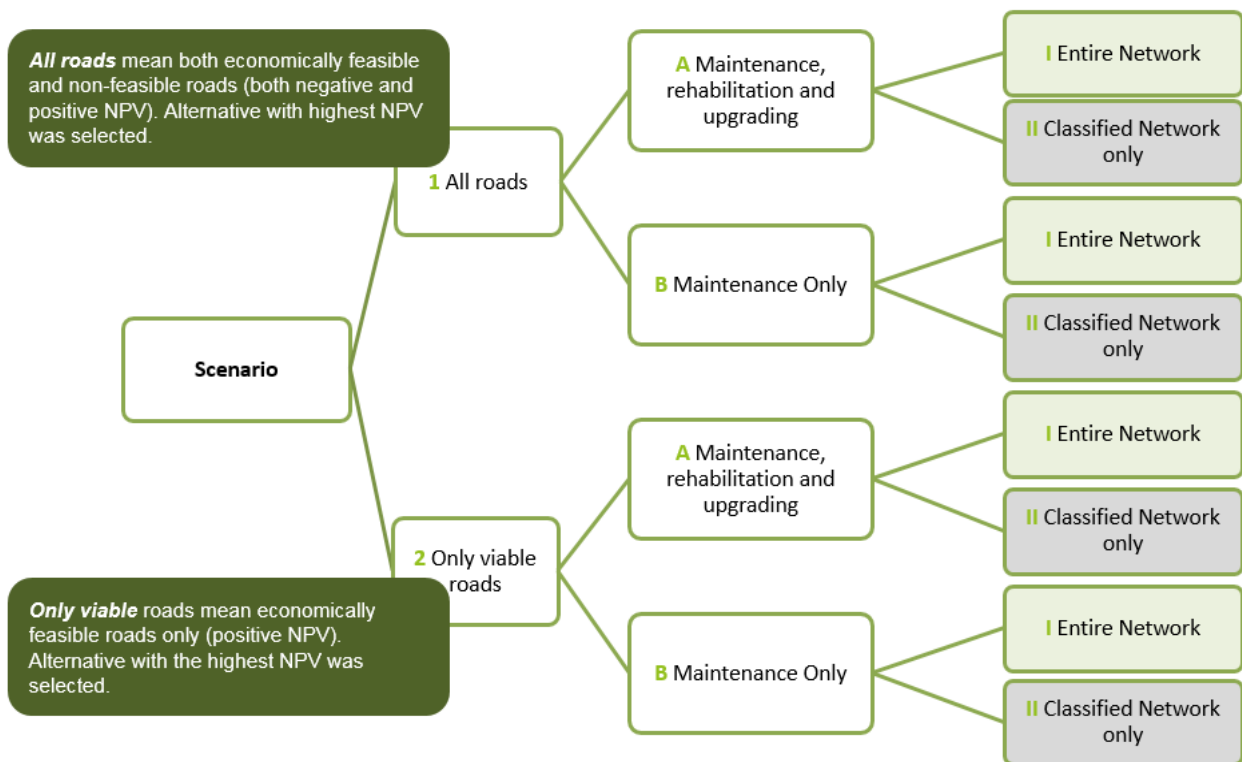


Figure 6-9: Proposed requirement scenarios for the Road Fund<sup>7</sup>

**Note: values for the entire network are highlighted in green while values for the classified network are highlighted in grey in Table 6-4 to Table 6-6.**

The proposed scenarios in Figure 6-9 above are only based on economic feasibility (based on the Net Present Value). Based on a presentation of the scenarios to the steering committee on 3-4 July 2017, it was decided that maintenance should not be concentrated on economic feasibility but should rather be focused on improving accessibility within Tanzania, especially for the poor rural communities. It was also mentioned that the RF was primarily established for the purpose of funding road maintenance which should remain the main focus. At least 90% of the funds must be used for maintenance and not more than 10% should be used for development according to the Road and Fuel Tolls Act Cap 220 (R.E 2006), Part II. Based on these comments from the steering committee, a **combined scenario** was proposed. The proposed combined scenario is a combination of scenarios 1B and 2A (analysed on the entire network and classified network). This scenario illustrates maintenance activities on all road links (irrespective of economic feasibility) and rehabilitation on paved links where it is economically feasible.

<sup>7</sup> For mutually exclusive projects such as the ones analysed, the feasibility (viability) of the project is based on the net present value (NPV) which must be greater than 0 for the project to be viable. The NPV can be obtained by subtracting the present value of the costs from the present value of the future benefits.



Table 6-4: TANROADS development and maintenance requirements (USD) in mainland Tanzania

Activity	Scenario 1A (I and II)	Scenario 1B (I and II)	Scenario 2A (I and II)	Scenario 2B (I and II)	Combined scenario
<b>Road Works</b>					
1. Routine Maintenance	35 966 683	40 953 760	30 174 498	23 503 588	34 093 963
2. Periodic Maintenance	119 450 023	126 575 315	108 764 279	71 230 340	115 534 459
3. Rehabilitation	64 799 670	-	64 730 219	-	63 892 156
4. Upgrading	94 789 375	-	94 789 375	-	-
5. Bridges Preventive Maintenance	3 367 356	3 367 356	3 367 356	3 367 356	3 367 356
6. Bridges Major Repairs	22 362 592	22 362 592	22 362 592	22 362 592	22 362 592
7. Emergency works	18 752 150	18 752 150	18 752 150	18 752 150	18 752 150
8. PMMR Project Phase 2 (BRT and 10 Regions)	3 605 404	3 605 404	3 605 404	3 605 404	3 605 404
9. Weighbridge Improvements & Major repairs	14 747 648	14 747 648	14 747 648	14 747 648	14 747 648
10. HQ Based Maintenance Activities	6 391 986	6 391 986	6 391 986	6 391 986	6 391 986
<b>Total works component (USD) (A)</b>	<b>384 232 887</b>	<b>236 756 211</b>	<b>367 685 507</b>	<b>163 961 065</b>	<b>282,747,714</b>
<b>Non-road works</b>					
1. Administration and supervision	25 357 412	25 357 412	25 357 412	25 357 412	25 357 412
2. Weighbridge operations	8 882 760	8 882 760	8 882 760	8 882 760	8 882 760
<b>Total non-works component (USD) (B)</b>	<b>34 240 172</b>	<b>34 240 172</b>	<b>34 240 172</b>	<b>34 240 172</b>	<b>34 240 172</b>
<b>Totals</b>					
Total maintenance and development requirements TANROADS (USD) (A+B)	418 473 059	270 996 383	401 925 679	198 201 237	316 987 886
RFB release 2015/2016 to TANROADS (USD) (C)	187 806 463	187 806 463	187 806 463	187 806 463	187 806 463
<b>Financial gap (USD) (C-A-B)</b>	<b>-230 666 596</b>	<b>-83 189 920</b>	<b>-214 119 216</b>	<b>-10 394 774</b>	<b>-129 181 423</b>

**Notes:**

1. Routine and periodic maintenance, rehabilitation and upgrade requirements were determined from the HDM-4 analysis. Other road works and non-road works were adopted from TANROADS Business Plan Report for FY 2016/2017.
2. Exchange rates used are shown in Table 1-1
3. There are only classified roads within the TANROADS network hence the funding requirements for each scenario on the TANROADS network shown in Table 6-5 above would be the same for both the entire network and classified network (hence values are not highlighted to match Figure 6-9).

Table 6-5: PORALG development and maintenance requirements (USD) in mainland Tanzania

Activity	Scenario 1A	Scenario 1B	Scenario 2A	Scenario 2B	Combined scenario
<b>Road works</b>					
1. Routine Maintenance on entire network (I)	323 783 235	323 783 235	110 386 730	110 386 730	323 783 235
2. Periodic Maintenance on entire network (I)	61 431 710	61 431 710	61 431 710	61 431 710	61 431 710
3. Rehabilitation on entire network (I)	-	-	-	-	-
4. Upgrading on entire network (I)	-	-	-	-	-
1. Routine Maintenance on classified network (II)	147 153 329	147 153 329	47 545 659	47 545 659	147 153 329
2. Periodic Maintenance on classified network (II)	44 664 832	44 664 832	44 664 832	44 664 832	44 664 832
3. Rehabilitation excluding on classified network (II)	-	-	-	-	-
4. Upgrading excluding on classified network (II)	-	-	-	-	-
5. Bridges culverts and drifts	8 862 301	8 862 301	8 862 301	8 862 301	8 862 301
6. Emergency Works	3 734 083	3 734 083	3 734 083	3 734 083	3 734 083
<b>Total works component (USD) on entire network (I)</b>	<b>397 811 329</b>	<b>397 811 329</b>	<b>184 414 824</b>	<b>184 414 824</b>	<b>385 214 945</b>
<b>Total works component (USD) on classified network (II)</b>	<b>204 414 544</b>	<b>204 414 544</b>	<b>104 806 874</b>	<b>104 806 874</b>	<b>204 414 544</b>
<b>Non- road works</b>					
1. Supervision Councils and Road inventory & condition survey	3 554 867	3 554 867	3 554 867	3 554 867	3 554 867
2. Monitoring PMORALG	595 657	595 657	595 657	595 657	595 657
3. Monitoring RS Eng	505 342	505 342	505 342	505 342	505 342
4. Administration	397 108	397 108	397 108	397 108	397 108
5. Capacity building	1 231 693	1 231 693	1 231 693	1 231 693	1 231 693
6. Purchase of lab equipment	602 099	602 099	602 099	602 099	602 099
7. Operations of road research centre	381 329	381 329	381 329	381 329	381 329
8. Purchase of mobile weighbridges	152 914	152 914	152 914	152 914	152 914
<b>Total non-works component (USD)</b>	<b>7 421 010</b>	<b>7 421 010</b>	<b>7 421 010</b>	<b>7 421 010</b>	<b>7 421 010</b>
<b>Totals</b>					
Total maintenance and development requirements (USD) on entire network (I)	405 232 339	405 232 339	191 835 834	191 835 834	392 635 955

Activity	Scenario 1A	Scenario 1B	Scenario 2A	Scenario 2B	Combined scenario
Total maintenance and development requirements (USD) on classified network (II)	211 835 555	211 835 555	112 227 885	112 227 885	211 835 555
RFB release 2015/2016 POALG (USD)	89 432 141	89 432 141	89 432 141	89 432 141	89 432 141
<b>Financial gap (USD) on entire network (I)</b>	<b>-315 800 198</b>	<b>-315 800 198</b>	<b>-102 403 693</b>	<b>-102 403 693</b>	<b>-303 203 815</b>
<b>Financial gap (USD) on classified network (II)</b>	<b>-122 403 414</b>	<b>-122 403 414</b>	<b>-22 795 744</b>	<b>-22 795 744</b>	<b>-122 403 414</b>

Notes:

1. Routine and periodic maintenance, rehabilitation and upgrade requirements were determined from the HDM-4 analysis. Other road works and non-road works were adopted from PORALG Annual Performance Report for District, Urban and Feeder Roads Maintenance for FY 2015/16.
2. Grey highlighted cells for classified network and light green highlighted cells for entire network as illustrated in Figure 6-9
3. Exchange rates used are shown in Table 1-1

Table 6-6: Total road development and maintenance requirements (USD) in mainland Tanzania

Activity	Scenario 1A	Scenario 1B	Scenario 2A	Scenario 2B	Combined scenario
<b>TANROADS and PORALG funding requirements</b>					
Total road works on entire network(A) (I)	782 044 216	634 567 539	552 100 331	348 375 888	667 962 659
Total road works on classified network (B) (II)	588 647 431	441 170 755	472 492 382	268 767 939	487 162 258
Total non-road works (C)	41 661 183	41 661 183	41 661 183	41 661 183	41 661 183
<b>Total road works non-works and development requirements on entire network (D=A + C) (I)</b>	<b>823 705 398</b>	<b>676 228 722</b>	<b>593 761 513</b>	<b>390 037 071</b>	<b>709 623 841</b>
<b>Total road works non-works and development requirements on classified network (E=B + C) (II)</b>	<b>630 308 614</b>	<b>482 831 938</b>	<b>514 153 564</b>	<b>310 429 122</b>	<b>528 823 441</b>
<b>RFB and MOWTC funding requirements</b>					
<b>RFB administrative costs 2015/2016 (F)</b>	<b>2 585 951</b>	<b>2 585 951</b>	<b>2 585 951</b>	<b>2 585 951</b>	<b>2 585 951</b>
<b>MoWTC release 2015/2016 (G)</b>	<b>20 867 385</b>	<b>20 867 385</b>	<b>20 867 385</b>	<b>20 867 385</b>	<b>20 867 385</b>
a) Trunk roads	5 579 299	5 579 299	5 579 299	5 579 299	5 579 299
b) Regional roads	11 853 784	11 853 784	11 853 784	11 853 784	11 853 784
c) Ferries	1 884 039	1 884 039	1 884 039	1 884 039	1 884 039
d) Road Admin related activities	820 558	820 558	820 558	820 558	820 558
e) Road safety and environment	729 706	729 706	729 706	729 706	729 706

Activity	Scenario 1A	Scenario 1B	Scenario 2A	Scenario 2B	Combined scenario
<b>Latest RFB release</b>					
<b>Total RF release FY 2015/2016 (H)</b>	<b>300 691 939</b>	<b>300 691 939</b>	<b>300 691 939</b>	<b>300 691 939</b>	<b>300 691 939</b>
<b>Total requirements</b>					
Entire network (I)	847 158 734	699 682 057	617 214 849	413 490 406	733 077 177
Classified network (II)	653 761 950	506 285 273	537 606 900	333 882 457	552 276 776
<b>Financial gap</b>					
Total Financial gap on entire network (H-D-F-G) (I)	-546 466 795	-398 990 118	-316 522 910	-112 798 467	-432 385 237
Total Financial gap on classified network (H-E-F-G) (II)	-353 070 010	-205 593 334	-236 914 960	-33 190 518	-251 584 837

Notes:

1. Grey highlighted cells for classified network and light green highlighted cells for entire network as illustrated in Figure 6-9
2. The latest release to the MoWTC for the FY2015/2016 was added to the total funding requirements to cater for the costs borne by the MoWTC for the implementation of development projects on the road network. Costs based on funds released to MOWTC in FY2015/2016, as retrieved from RFB.
3. The latest release to the RFB for the FY2015/2016 was added to the total funding requirements to cater administrative and operative costs borne to the RFB, retrieved from the RFB.
4. Exchange for financial year 2015/2016 as shown in Table 1-1

## 6.5 Financial gap

### 6.5.1 The maintenance and development requirements compared to current RFB collections

The maintenance and development requirements of PORALG and TANROADS compared to the current available funds (RF release FY2015/2016) from the RF are shown in Figure 6-10 to Figure 6-13 for the entire network and classified network respectively.

For the entire road network shown in Figure 6-10, the latest RF release to TANROADS is closest to meeting TANROADS funding requirements in scenario 2B (I) (95%). The current release from the RFB to PORALG only meets 47% of the PORALG network requirements even for the most affordable scenario for PORALG (2A (I) and 2B (I)) which is expected due to large extent of the PORALG network. The total funding requirements for the entire road network is shown in Figure 6-11. The financial gap is USD 113 million for the most affordable scenario (2B (I)) and USD 546 million for the most expensive scenario (2A (I)).

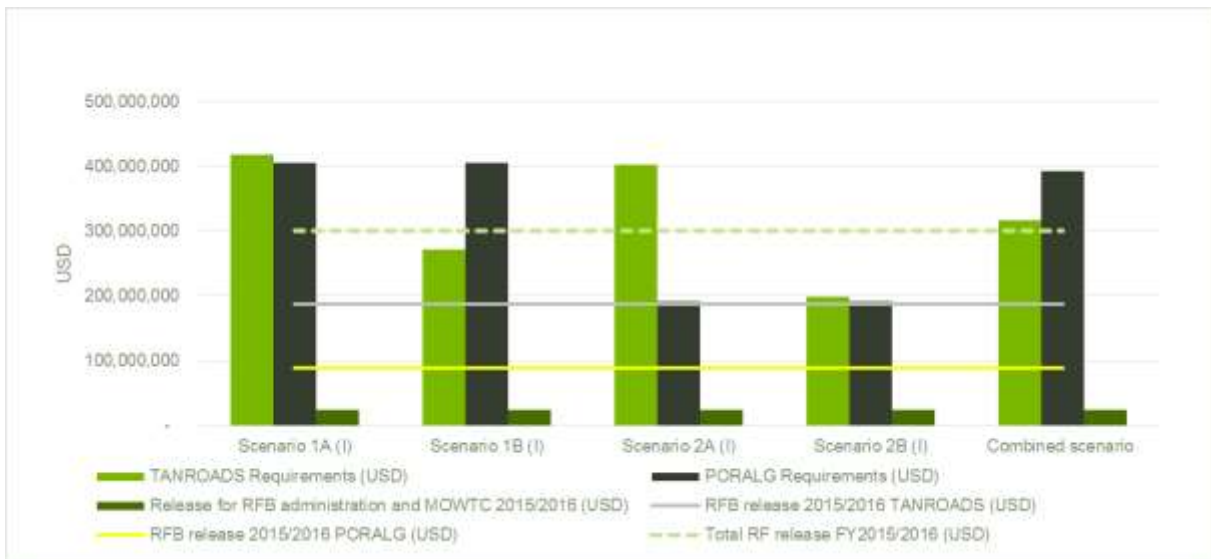


Figure 6-10: Funding requirements versus total RF release per road agency (entire road network)

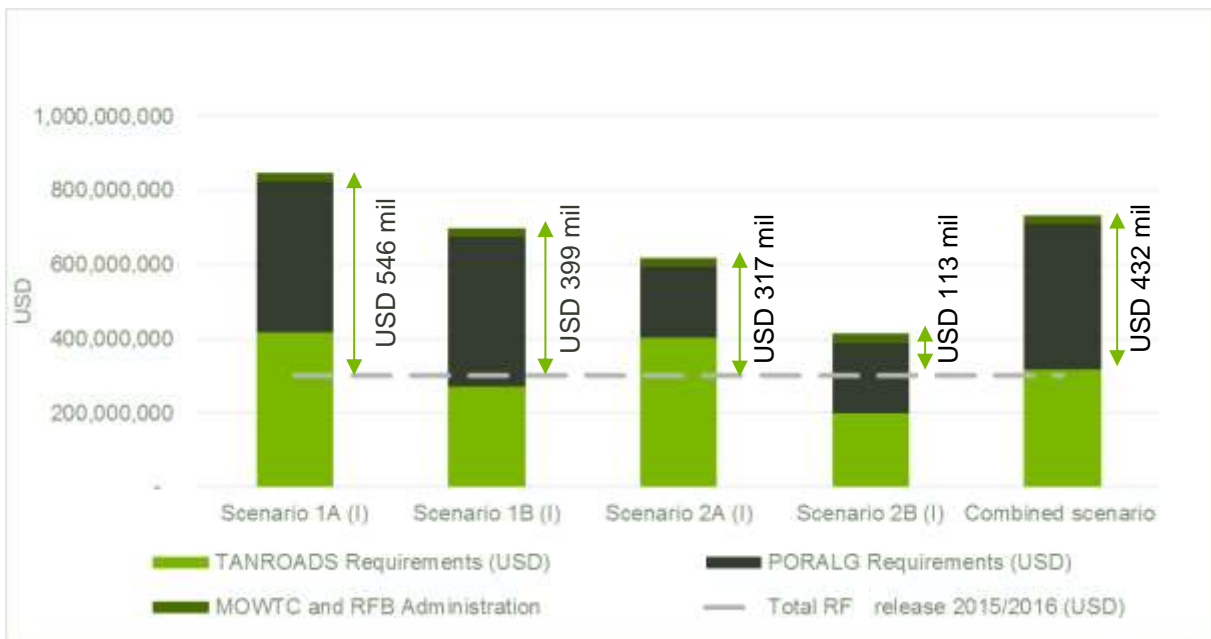


Figure 6-11: Total road agency funding requirements compared to current RFB levels on the entire road network

For the classified road network shown in Figure 6-12, the latest RFB release to TANROADS is closest to meeting TANROADS funding requirements for scenario 2B (II) (95%), which is the same as in Figure 6-10 as all the roads of the TANROADS network are classified. The current release from the RFB to PORALG meets 80% of the PORALG network requirements compared to 47% in Figure 6-15 for the most affordable scenario for PORALG (2A and 2B) due to the decreased network length. The total funding requirements for the entire road network is shown in Figure 6-13. The financial gap is USD 33 million for the most affordable scenario (2B (II)) and USD 353 million for the most expensive scenario (2A (II)).



Figure 6-12: Funding requirements versus total RF release per road agency (classified road network)

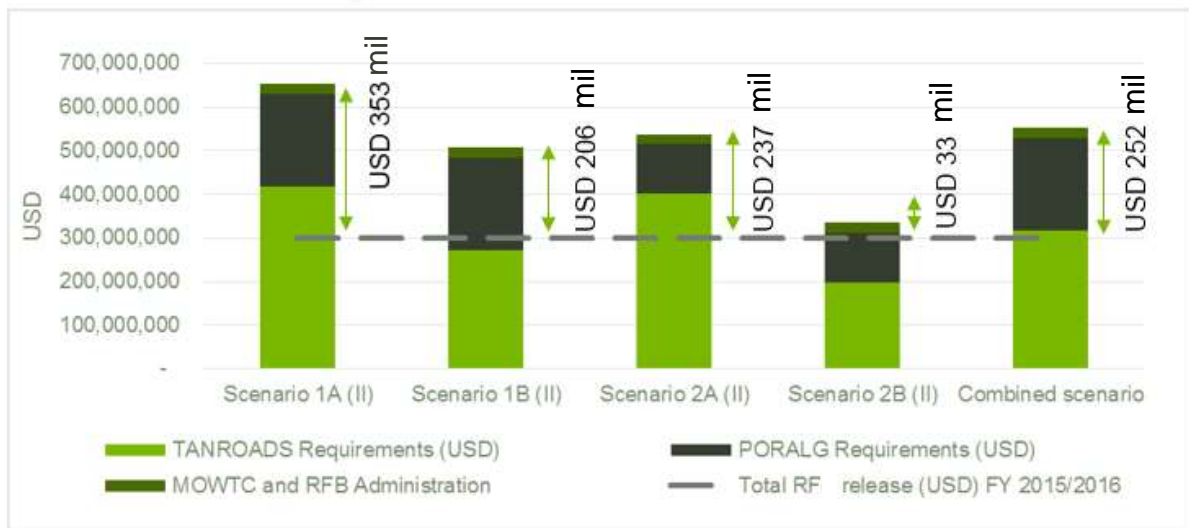


Figure 6-13: Total road agency funding requirements compared to current RF release (classified road network)

### 6.5.2 Distribution of maintenance and development needs

The distribution of direct road works (routine maintenance, periodic maintenance, rehabilitation and upgrading) is shown in Figure 6-14 and Figure 6-15 below. The other indirect road works and non-road works is shown as “other”.



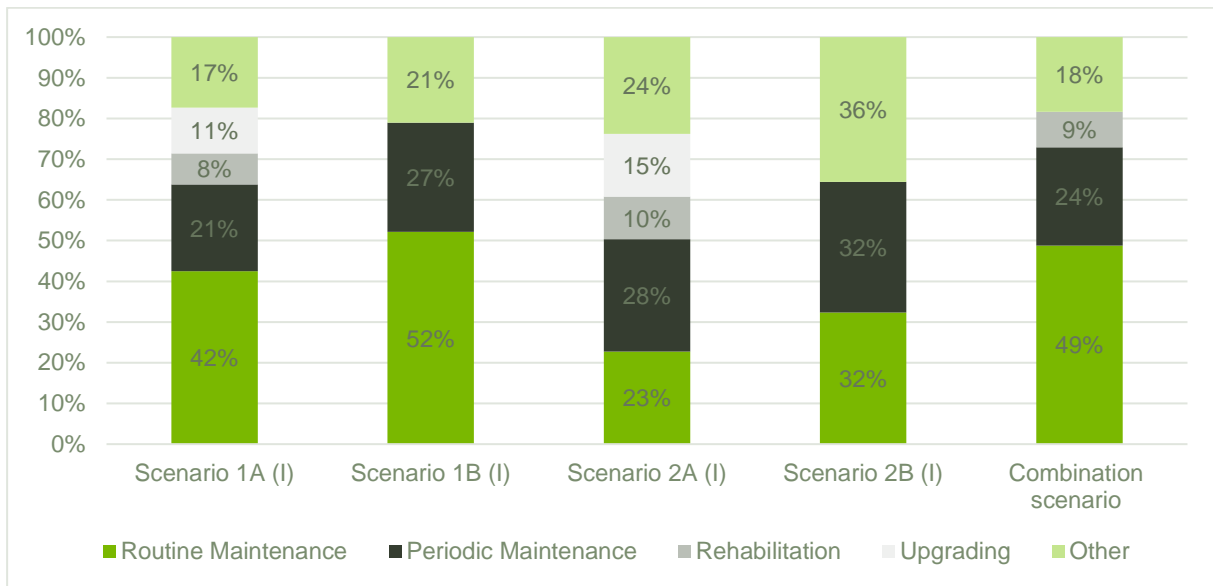


Figure 6-14: % Distribution of total funding requirements per scenario on entire road network

It is evident that the development needs (i.e. rehabilitation and upgrades amount to 19%, 25% and 9% for scenario 1A (I), scenario 2A (I) and the combined scenario on the entire network.

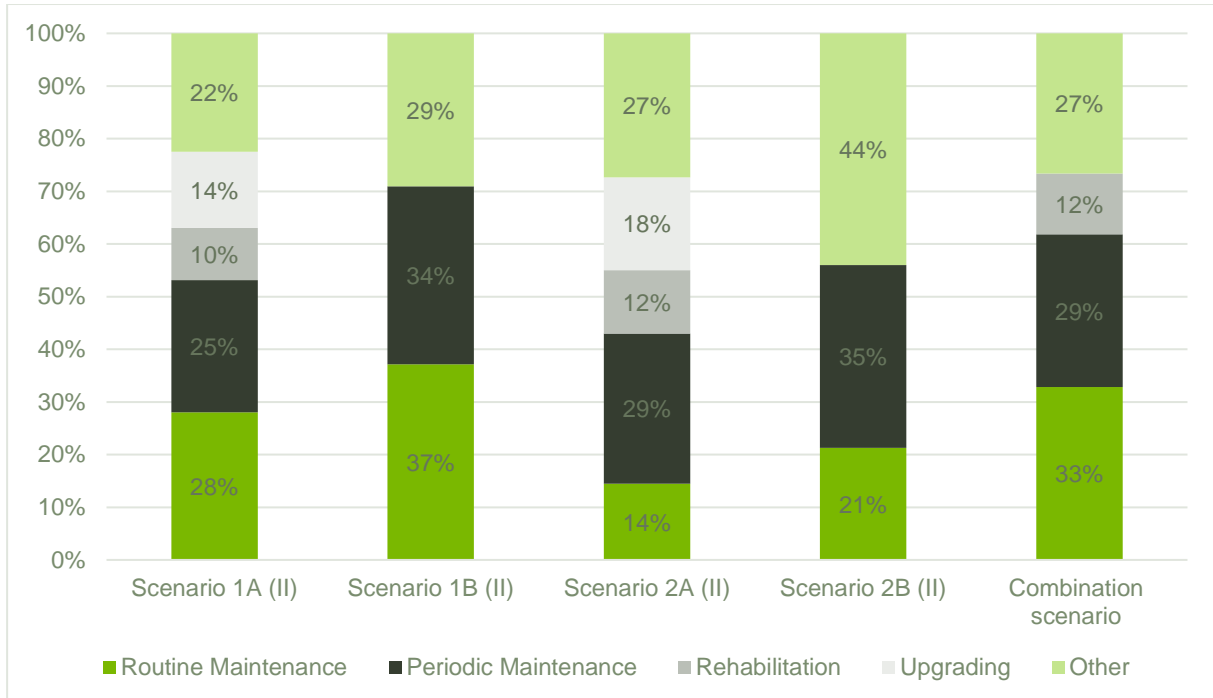


Figure 6-15: % Distribution of maintenance and upgrade action per scenario on classified road network

For the classified network only, the development needs amount to 24%, 30% and 12% respectively for scenario 1A (II), scenario 2A (II) and the combined scenario.

The combination scenario on the classified network is the preferred scenario. It is noted that the development requirements, comprising of rehabilitation on the paved network where feasible for the combined scenario exceeds the 10% limit for development as per legislation.

### 6.6 Effects of the respective scenarios on road condition, VOC and asset value of the road network

#### 6.6.1 Road condition

The condition of the paved and unpaved networks per funding scenario over the analysis period is shown in Figure 6-16 to Figure 6-21 below.

The condition index for each link on the paved network was calculated and converted to a “very poor”, “poor”, “fair”, “good” and “very good” condition rating using the criteria shown in the table below. The data required and the formulas used to calculate the condition index of paved roads is explained in the working paper entitled “Road Condition Assessment Guidelines”, attached in Annex A of Volume 2 .

Table 6-7: Criteria for condition rating on paved and unpaved networks

Unpaved roads - Gravel thickness (mm)	Condition index – paved roads	Overall condition rating
0	0-30	Very poor
1-50	31-50	Poor
51-75	51-75	Fair
76-100	76-85	Good
>100	86-100	Very Good

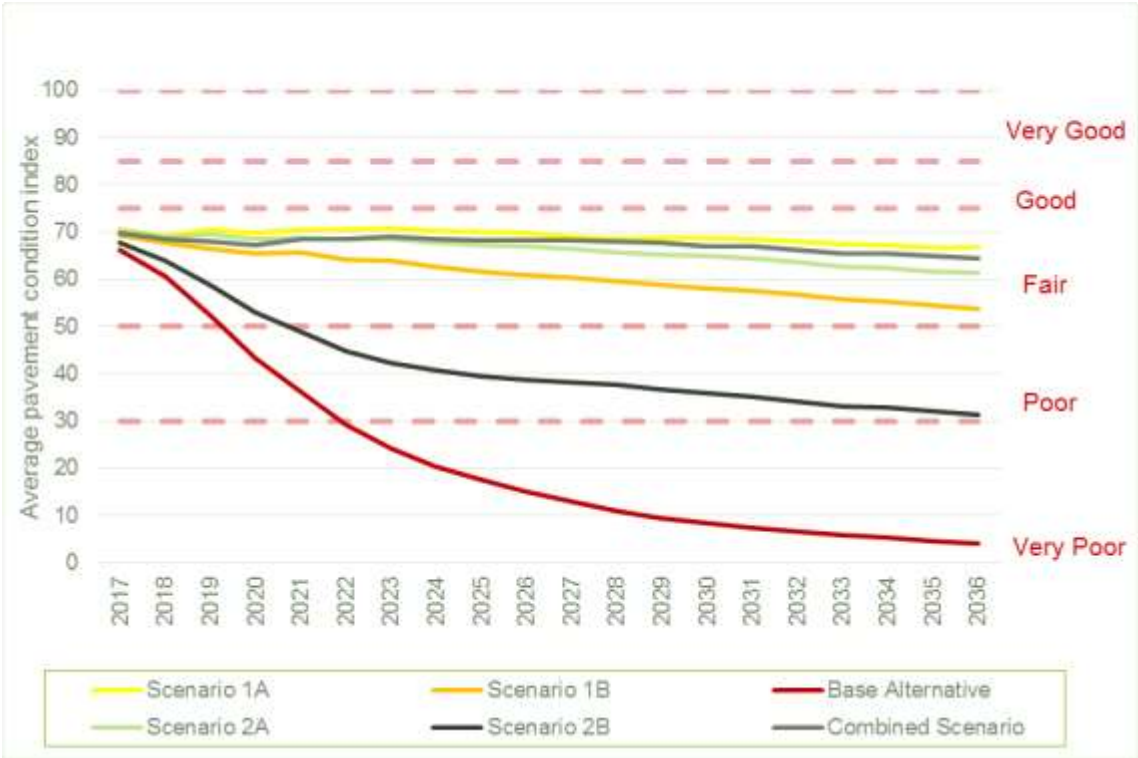


Figure 6-16: Paved network road condition per scenario (I and II)

All of the paved roads on the PORALG and TANROADS networks are classified and were combined to show the condition of the paved network in Figure 6-16 above. Overall, the current paved network (TANROADS and PORALG paved network) is in a fair condition and will maintain this condition over the 20 year period if funding scenario 1A, 1B, 2A or combined scenario is selected. For 2B, the paved network will deteriorate to a poor condition in year 2019.

Since rehabilitation only occurs on the paved network, the “combined scenario” would be equivalent to scenario 1B condition graphs for the unpaved network in Figure 6-17 to Figure 6-21.

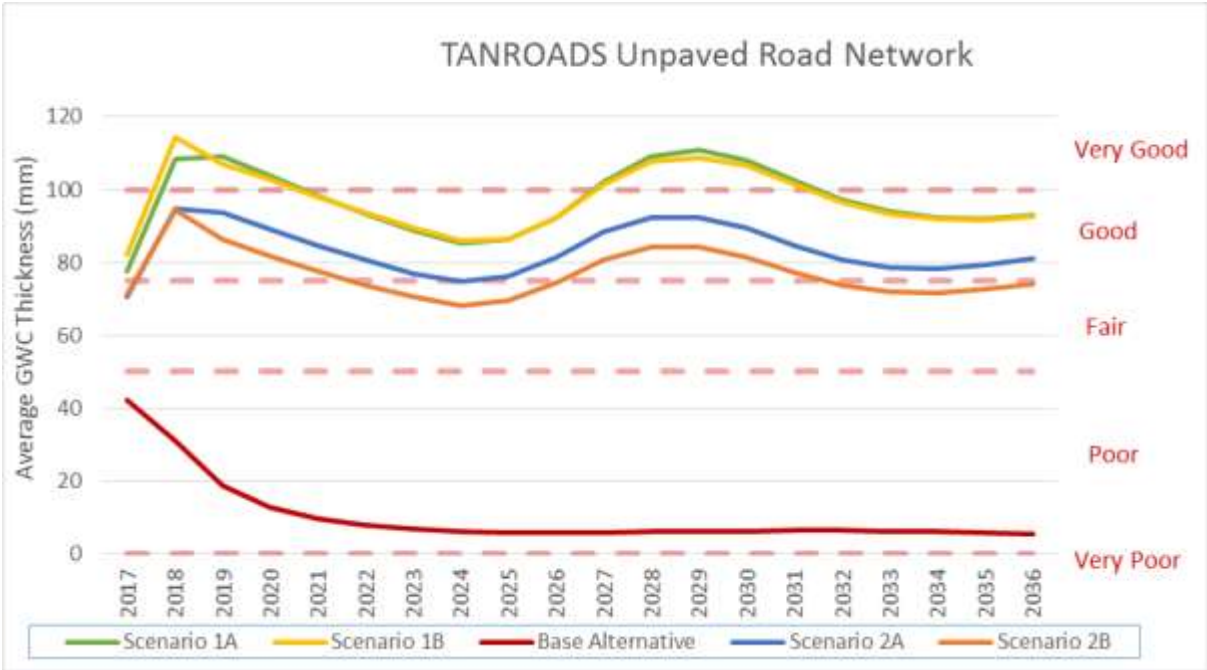


Figure 6-17: TANROADS unpaved network road condition per funding scenario (I and II)

All of the unpaved roads in the TANROADS network are classified and were combined to show the TANROADS unpaved network road condition over the analysis period in Figure 6-17 above. TANROADS unpaved network will maintain a good to very good condition over the 20 year period if funding scenario 1A or 1B is selected, good condition if scenario 2A is selected and fair to good condition if scenario 2B is selected.

As the majority of PORALG roads are earth roads (i.e. gravel thickness of 0mm). The condition of earth roads reflects very poor and skews the results for the fairly small gravel road network. The results of Figure 6-18, Figure 6-19, Figure 6-20 and Figure 6-21 should be interpreted bearing the above in mind.

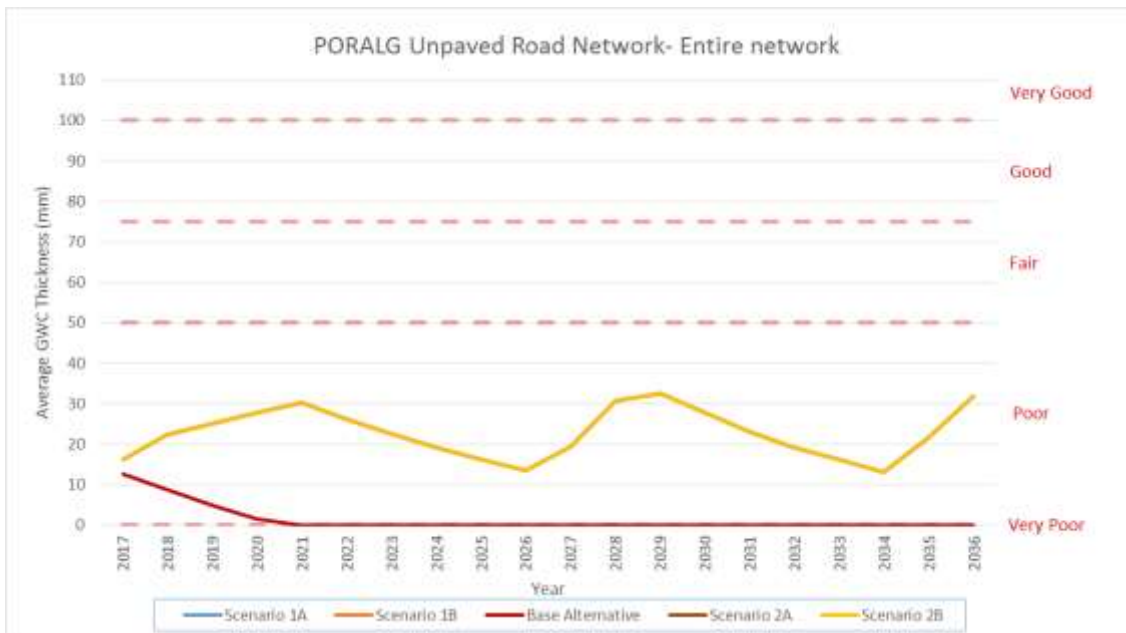


Figure 6-18: Entire PORALG unpaved road network condition per scenario (I)

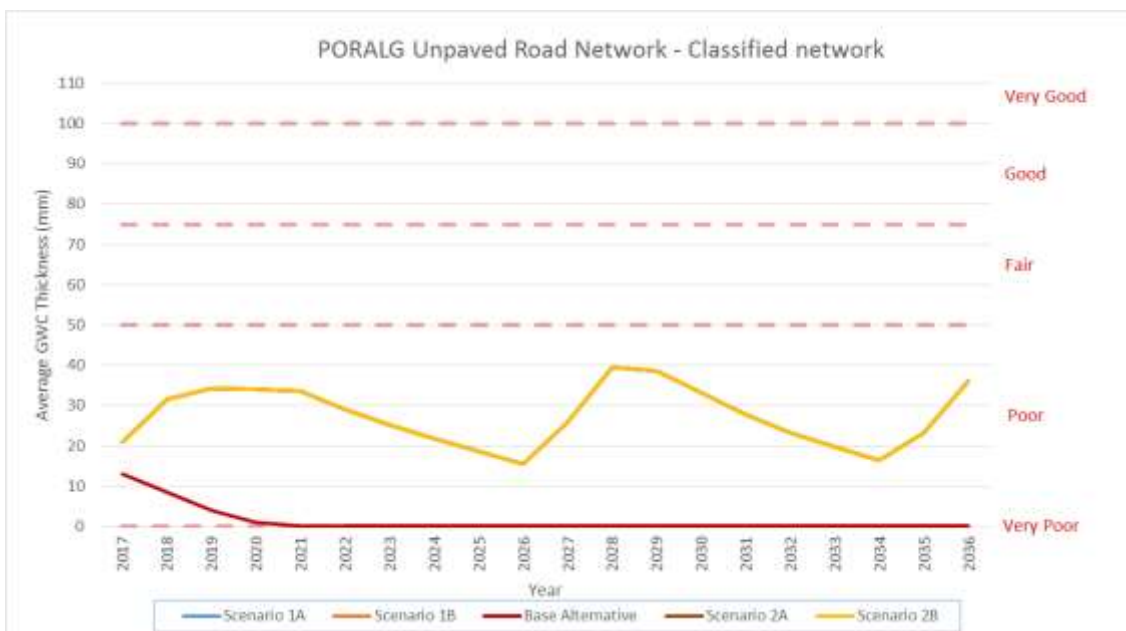


Figure 6-19: Classified PORALG unpaved road network condition per scenario (II)

The condition of the **entire** PORALG unpaved network is shown in Figure 6-18 while the condition of the **classified** PORALG unpaved network is shown in Figure 6-19 over the analysis period. Irrespective of the funding scenario 1A, 1B, 2A or 2B, the overall condition of the PORALG unpaved network will stay in a relatively poor condition whether analysing the entire network or classified network. This is expected due to the large portion of the PORALG unpaved network which is currently in poor condition, as well as the large extent of the earth road network under the jurisdiction of PORALG.

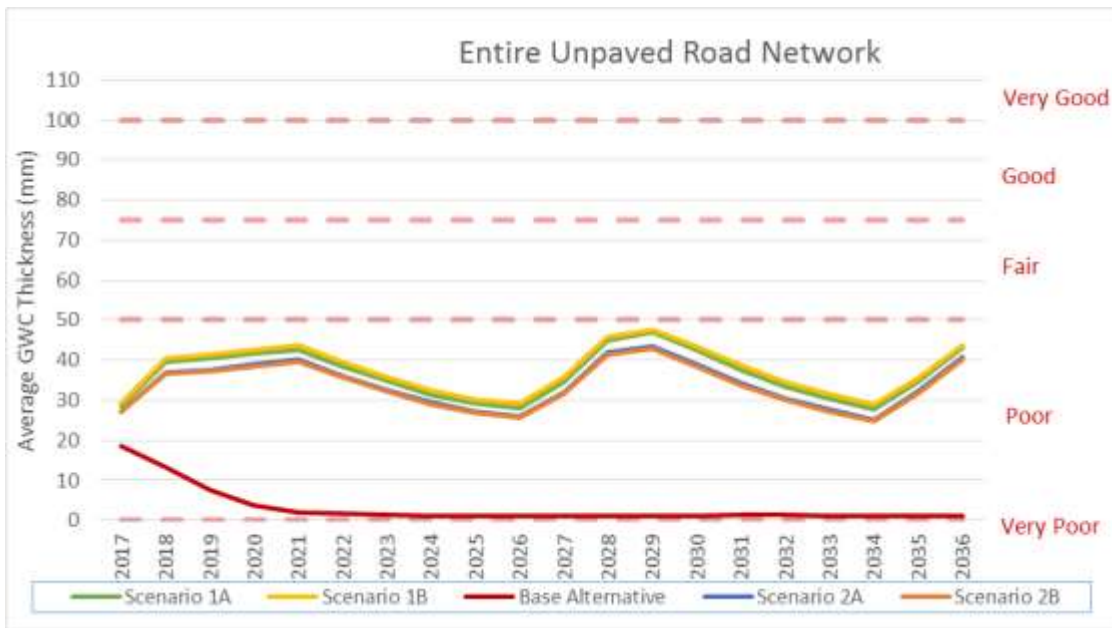


Figure 6-20: Entire PORALG and TANROADS unpaved road network condition per scenario (II)

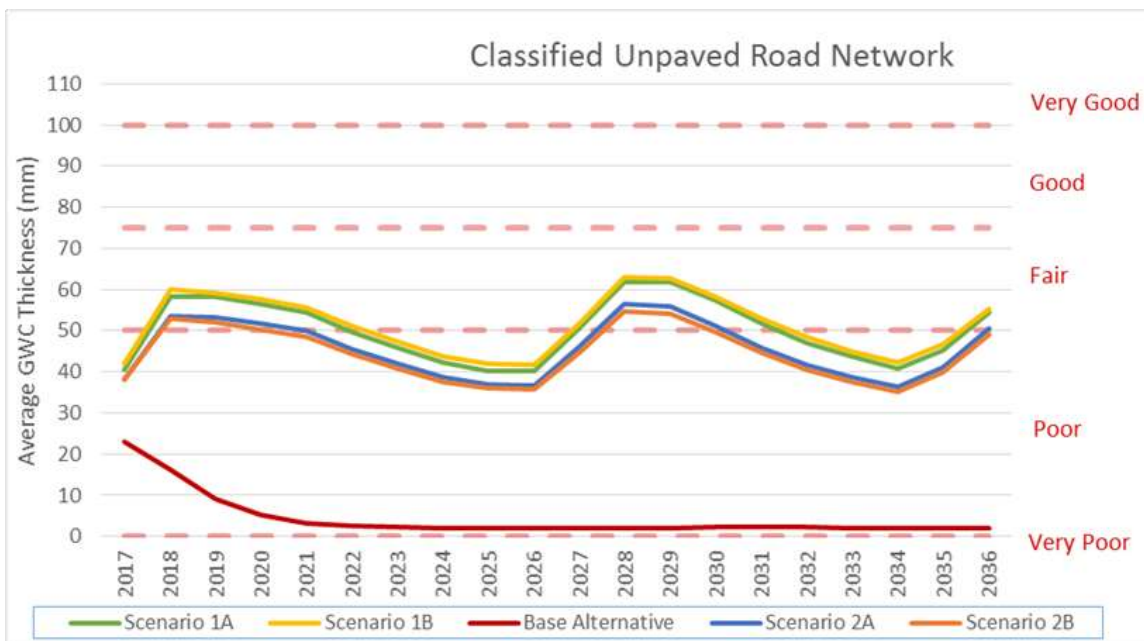


Figure 6-21: PORALG and TANROADS unpaved classified road network condition per scenario (I)

The unpaved roads over the **entire network** for PORALG and TANROADS were combined in Figure 6-20 while the unpaved **classified roads** belonging to PORALG and TANROADS were combined in Figure 6-21. Due to the large extent of the PORALG unpaved network in comparison with the TANROADS unpaved network, the PORALG unpaved network tends to skew the results when the two are combined together. The overall unpaved network when analysing over the **entire network** in mainland Tanzania will remain in a generally poor condition over the analysis period irrespective of the

scenario selected. The combined unpaved **classified** road network will stay in a fair to poor condition over the analysis period regardless of which scenario selected.

**6.6.2 Asset value**

As the pavement deteriorates over time, the value of the structural layers decreases. Pavement deterioration continues over time until the structural layers have to be reconstructed; at this stage the value of the structural layers is zero. The value of any road is calculated as the value it would have if it was new, minus the cost of taking it from its present condition to the “very good” condition. The amount subtracted corresponds to the cost of eliminating any deficiency the road may have. This concept is similar to the generally accepted accounting practice of calculating an asset’s “book value” which equates to cost minus accumulated depreciation.

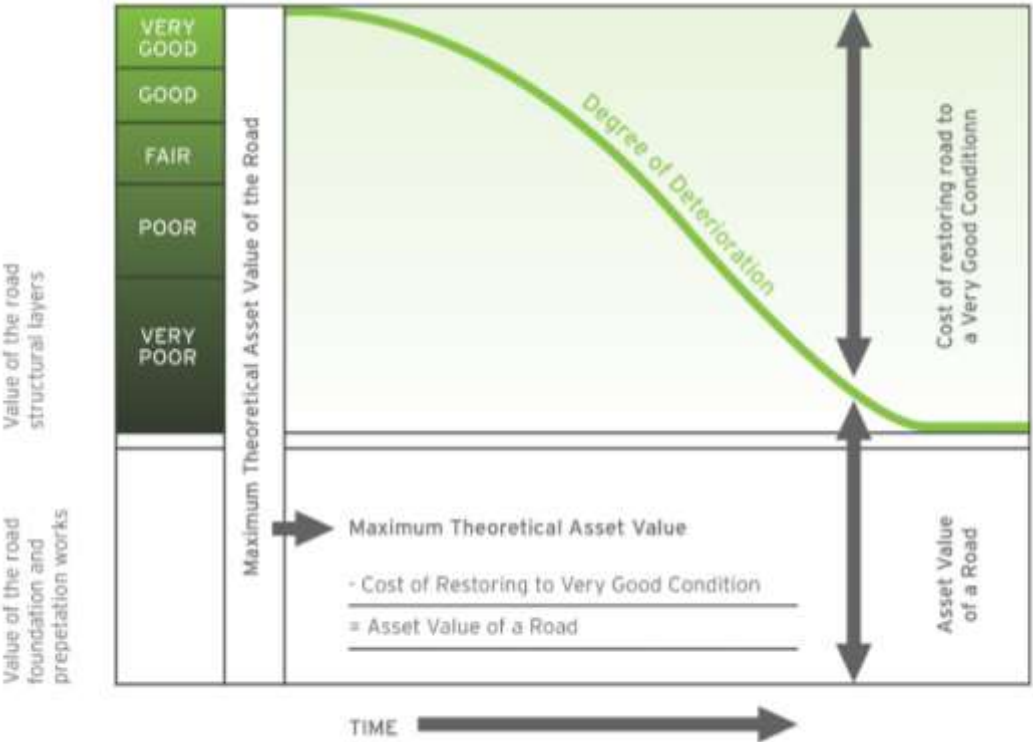


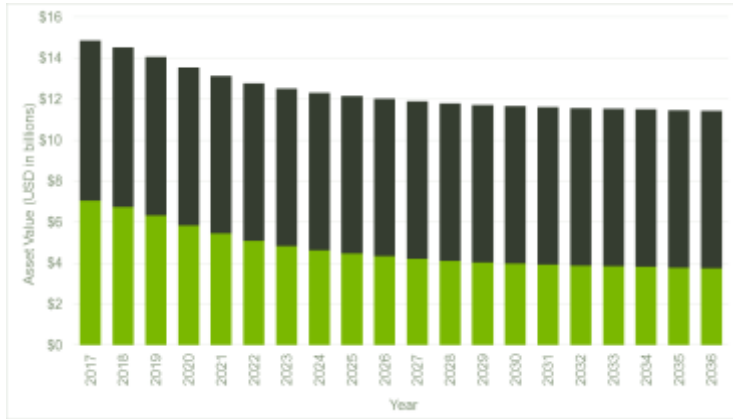
Figure 6-22: Illustration of asset value

The formulas used to calculate the asset value of the paved and unpaved roads are discussed in the WP “Guidelines for Adjustment of RUC’s”, attached in Annex I of Volume 2. The asset value per scenario over the **entire network** and the **classified network** is summarized in the Figure 6-23 and Figure 6-24 respectively. The following can be observed:

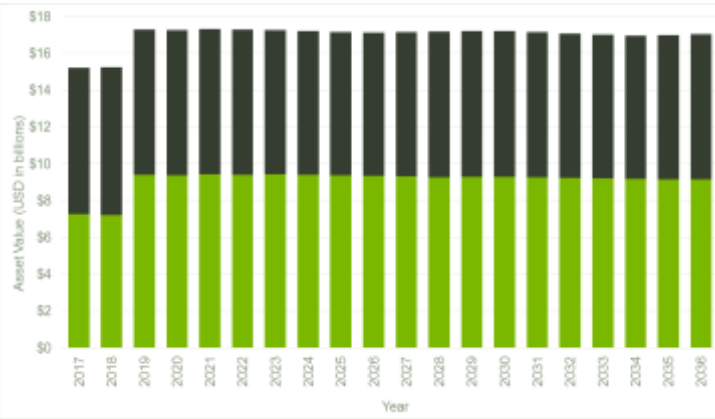
- a) The asset value for each scenario follows the same trend for the entire network in Figure 6-23 and classified network in Figure 6-24 (example: the asset value trend for scenario 1A (I) in Figure 6-22 is the same for 1A (II) in Figure 6-22 ;
- b) The base alternative and funding scenario 2B show a definite decreasing trend in the asset value of both the paved and unpaved roads for the entire network and classified network;



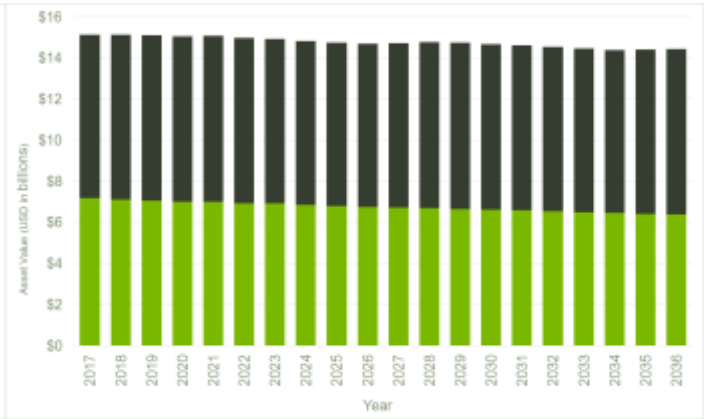
- c) Scenario 1A and 2A increases the asset value of the paved and unpaved roads, which is then maintained till the end of the analysis period for both the entire network and classified network;
- d) Scenario 1B generally maintains the current asset value of the entire road network and classified road network, with a small decrease over the analysis period;
- e) The combined scenario more or less maintains the current asset value for both the entire network and classified network;
- f) The entire road network has a higher asset value for all scenarios compared to the classified road network, due to the decreased network length of the classified network.
- g) The asset value of the combined scenario (the preferred scenario) on the classified network amounts to approximately USD 12 billion and remains more or less constant. The asset value of the combined scenario for the entire network amounts to about USD 15 billion with a minimal decrease over the analysis period.



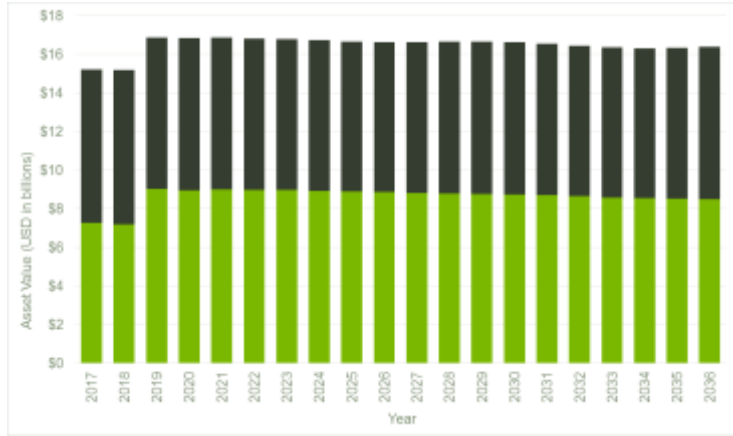
Base scenario



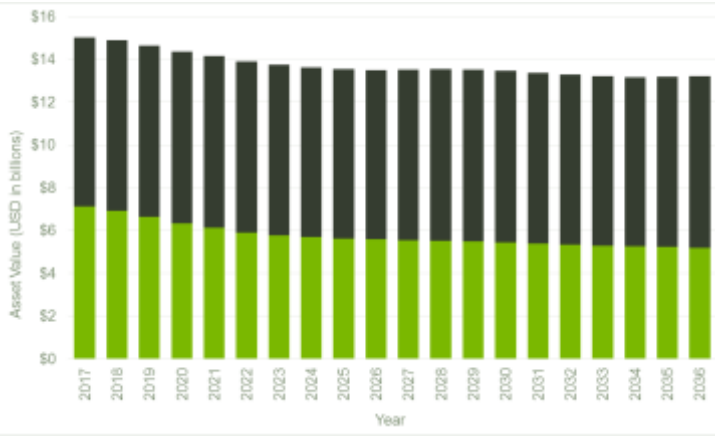
Scenario 1A (I)



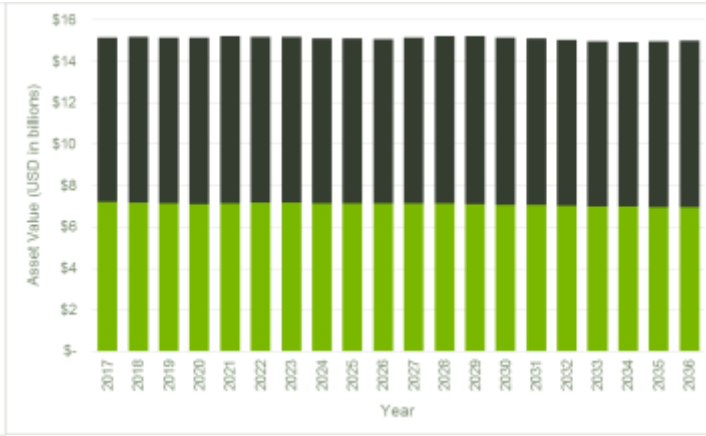
Scenario 1B (I)



Scenario 2A (I)



Scenario 2B (I)



Combined scenario

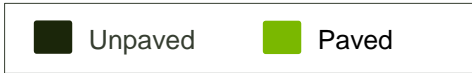
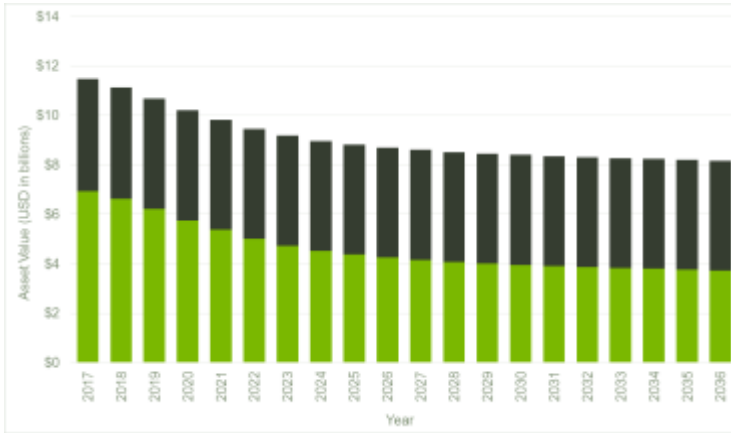
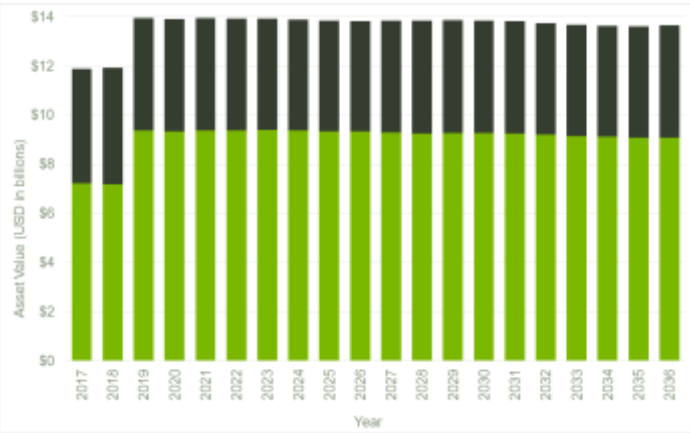


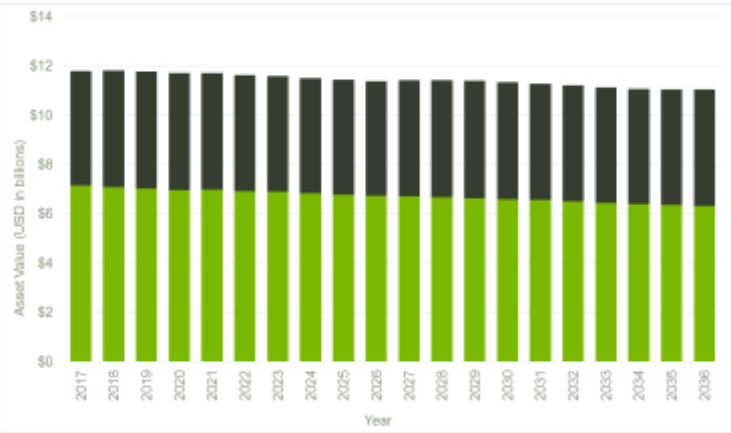
Figure 6-23: Asset value per funding scenario on the entire network



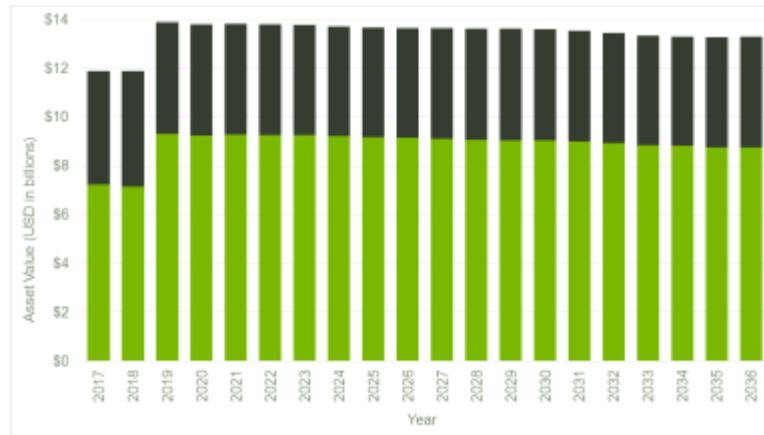
Base scenario



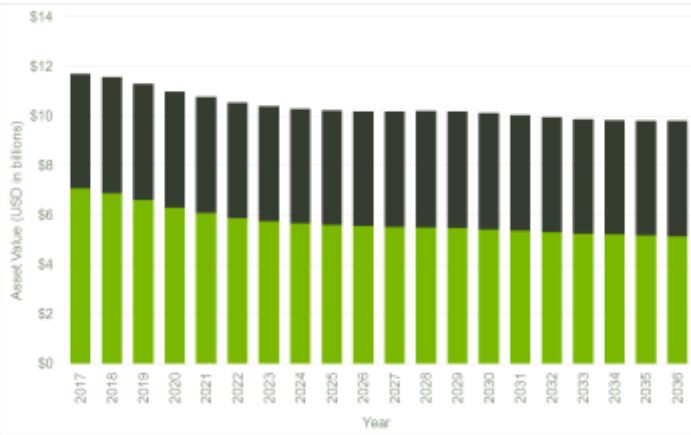
Scenario 1A (II)



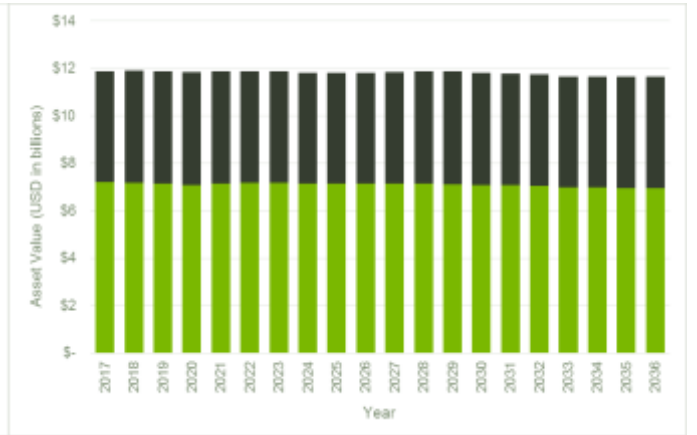
Scenario 1B (II)



Scenario 2A (II)



Scenario 2B (II)



Combined scenario

Figure 6-24: Asset value per funding scenario on the classified network



### 6.6.3 Vehicle operating cost (VOC)

The VOC trend and VOC reductions for each of the funding requirement scenarios on the entire road network are shown in Figure 6-25 and Figure 6-26 below while the trends on the classified road network are shown in Figure 6-27 and Figure 6-28.

Scenario 1A, 2A and the combined scenario revealed the greatest reduction in VOC for both the entire network and classified road network. The VOC for all scenarios are lower when analysing the classified network compared to the entire network. This is expected as the unclassified roads on the entire network are unpaved and in poor condition which is associated with higher vehicle operating costs.

#### VOC for the entire network

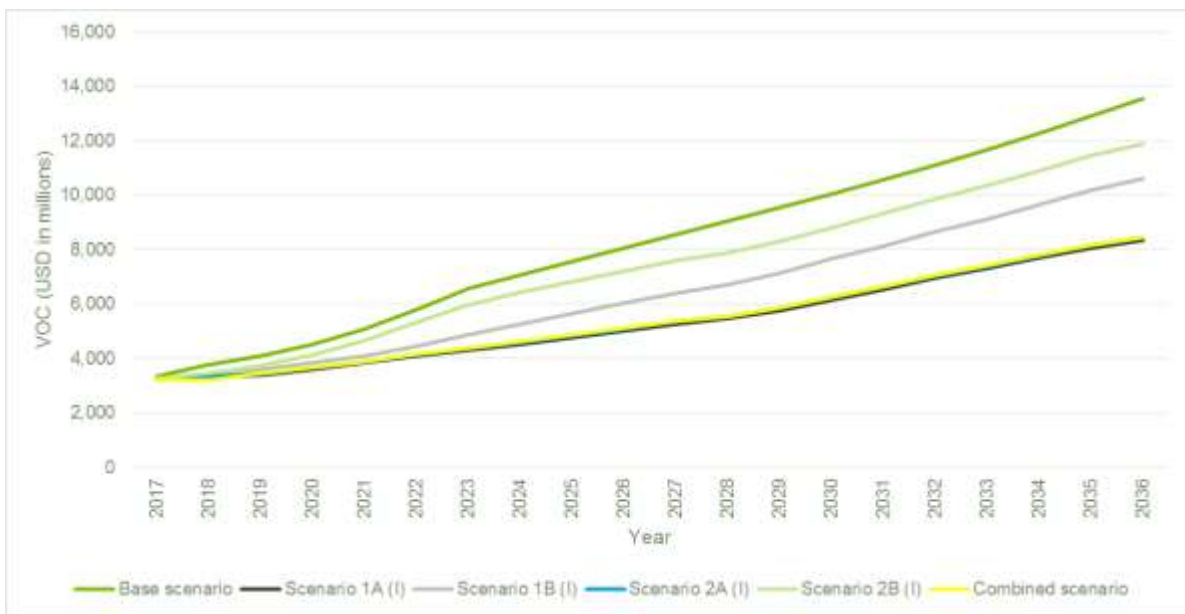


Figure 6-25: VOC trend per funding scenario for entire road network

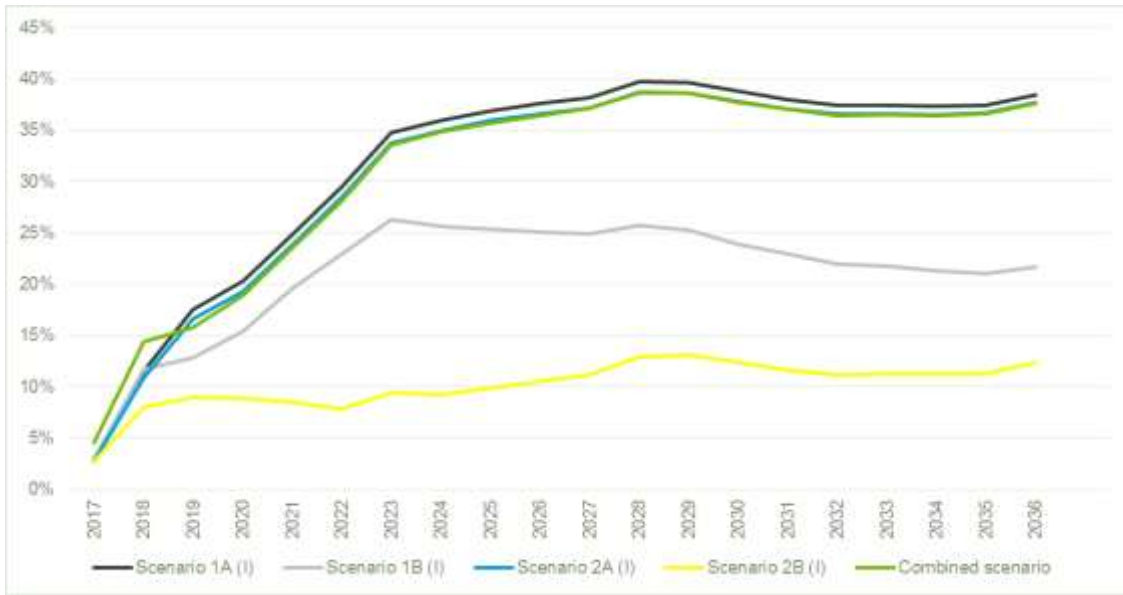


Figure 6-26: Reduction in VOC per funding scenario for entire road network

### VOC for the classified network

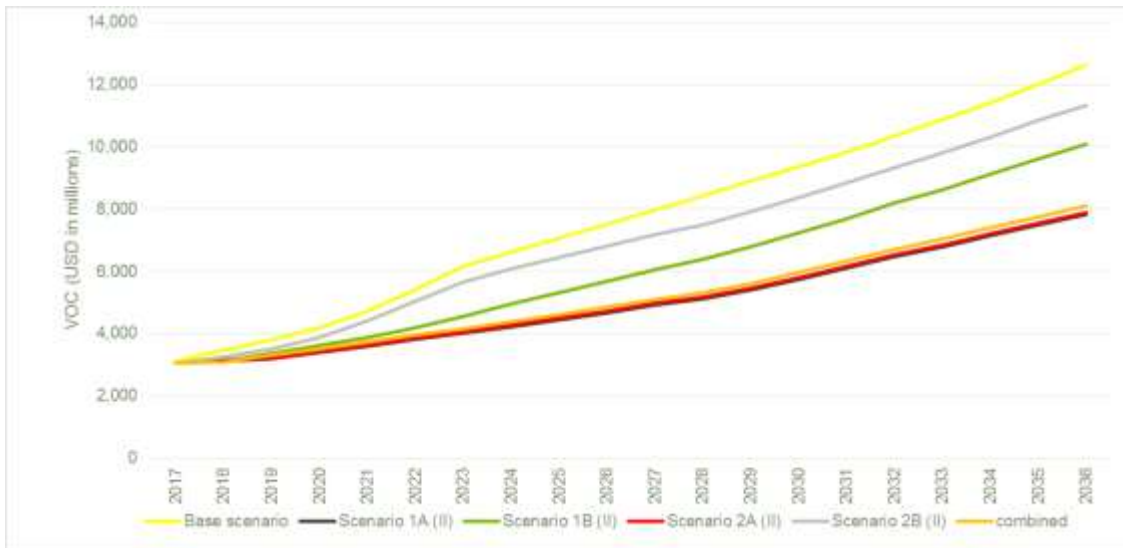


Figure 6-27: VOC trend per funding scenario for classified network

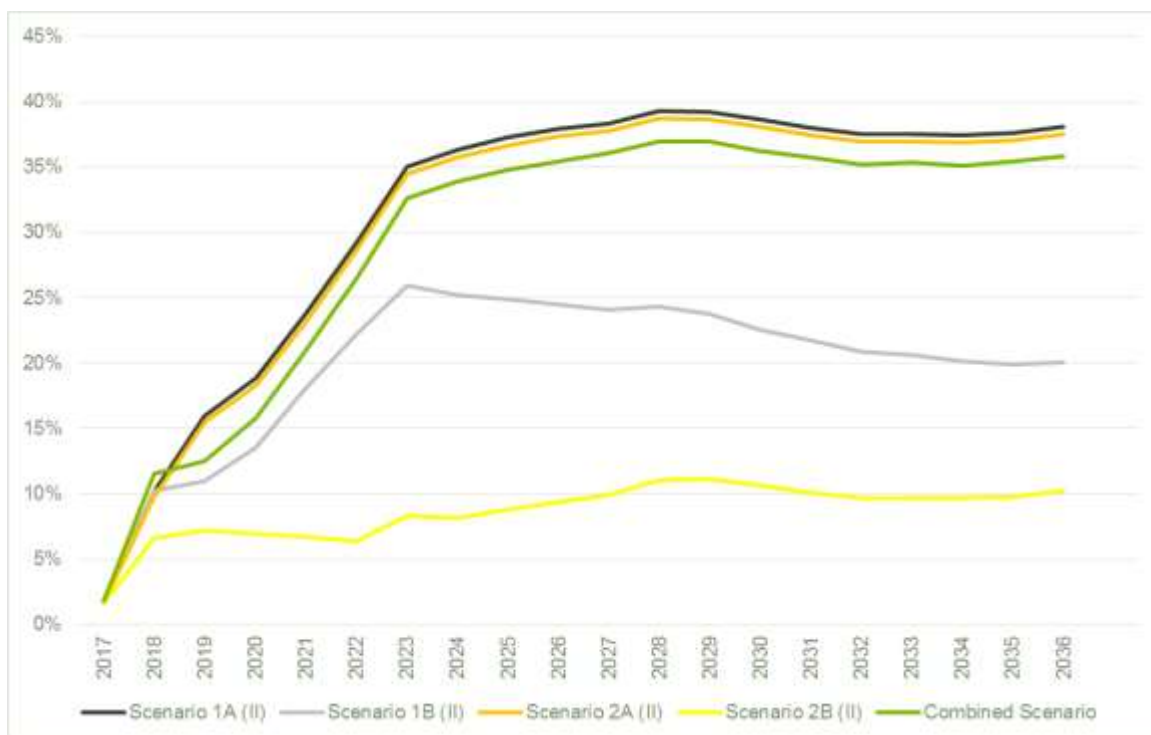


Figure 6-28: Reduction in VOC per funding for classified network

## 6.7 Chapter summary

This chapter examined the maintenance and development requirements in mainland Tanzania and the financial gap was established in relation to the current RF collection.

Optimal timing and prioritization of maintenance activities is imperative in the sense that postponement of maintenance actions may result in higher funding levels required. This means that the budget available for maintenance and development must be maximized such that the condition of fair to good roads can be maintained or improved. As the road condition deteriorates, it becomes more expensive to restore the road to its original condition.

The evaluation of the maintenance and development needs were carried out using the HDM-4 programme over an analysis period of 20 years. The HDM-4 model estimates, year by year, the road conditions and resources used for maintenance under each maintenance strategy for each road section, as well as the physical resources consumed by each vehicle operation. The inputs for the programme such as traffic figures, condition, road network characteristics, unit costs, maintenance and upgrade frequencies, etc. was obtained from TANROADS. Due to the lack of availability of data on the PORALG network, the PORALG road network was entered into the model at a high level based on the latest condition and length data from the PORALG Annual Report FY2015/2016.

Three alternatives were assigned to each link in the network depending on the pavement type (ie: paved, gravel, earth), with alternative one being “do nothing”, alternative 2 being routine maintenance and periodic maintenance and alternative 3 being rehabilitation and upgrade from earth to gravel or gravel to paved standard, as explained in Table 6-1. Based on the input factors, the model selects the most viable alternative in terms of the net present value (NPV).

The maintenance and development requirements were analysed on the entire road network (including the unclassified roads) and classified road network only to show the difference between the funding requirements on the two networks. The other annual maintenance costs such as bridge and weighbridge



maintenance, as well as non-works costs such as administration and supervision costs borne by TANROADS and PORALG for which RF funding is required were then added to the total funding requirements. The results of the requirements were then split into 8 scenarios as explained in Figure 6-9. Based on comments from the steering committee regarding the funding requirement scenarios, a *combined scenario* was formed for both the entire network and classified network. The proposed combined scenario is a combination of scenarios 1B and 2A and includes maintenance activities on all road links (irrespective of economic feasibility) and rehabilitation on links where it is economically feasible.

The option of multiple funding scenarios allow the strategy makers and planners to select a maintenance and/or development scenario depending on the funds available and the long term intention for the road network. For instance, both maintenance and development on the network will increase the asset value of the network whereas continual maintenance activities only, will either reduce or maintain the asset value of the network over time as demonstrated in Figure 6-23 and Figure 6-24.

It is obvious that necessary funding requirements will be more achievable if maintenance and development activities are implemented for the classified network, as demonstrated in Table 6-6. Current RF collection meets 46% of the maintenance and development requirements for the most expensive scenario (1A) and 90% of the maintenance and development requirements for the most affordable scenario (2B) for the classified network compared to 35% and 73% respectively for the entire network.

The combined scenario on the classified network is the most plausible scenario and represents the preferred scenario due to the advantageous effects of the VOC, asset value and road condition on the road network. The scenarios also have different policy implications in terms of allocation between TANROADS and PORALG and the portion of funding to be allocated for development works

The calculated funding requirements for each of the scenarios over the entire network and classified network shown in Table 6-6 will be used as the target for the adjustment of current funding instruments discussed in chapter 4 as well as the potential new funding instruments discussed in chapter 5. The required adjustments of the charge levels of current and new identified sources of revenue for the RF will be discussed in Chapter 8.



## Chapter 7 Effectiveness, Efficiency and Economy of Implementing Agencies

## 7 Effectiveness, Efficiency and Economy of Implementing Agencies

### 7.1 Introduction

The purpose of this chapter is to assess the execution of maintenance works on the basis of a number of criteria and to recommend procedures to avoid possible mismanagement of resources in the future.

The definition of each of the assessment criteria is stated below:

- a) Efficiency refers to “determining whether things were done right” which can be evaluated by:
  - i) Examining the utilization of the funds received for maintenance and evaluating the factors that contributed to sub-optimal financial and/or physical performance;
  - i) Comparing the unit costs with the median and average unit costs for the various maintenance activities;
  - ii) Investigating different methods to carry out maintenance (ie. force account units, maintenance contracts and Performance based Management and Maintenance of Roads (PMMR)).
- b) Quality means “if the work has been completed to acceptable standards” and can be evaluated by:
  - i) The type of tests or procedures (including results) put in place to ensure that maintenance activities are completed to adequate quality standards
- c) Effectiveness can be defined as “doing the right things” which can be evaluated by:
  - i) Criteria used for fund allocation;
  - ii) Criteria used to select a maintenance activity;
  - iii) Adequate prioritization;
  - iv) Whether contractors are awarded work according to their classification.

The mentioned criteria will be used to evaluate the periodic and recurrent maintenance activities carried out by TANROADS and PORALG.

### 7.2 Utilization of funds

The utilization of funds per financial year gives an indication of how efficient the implementing agencies are using funds received to carry out the necessary maintenance activities. However, there are a number of factors that affect the utilization of the funds and the efficiency of the agency should not solely be based on the utilization of funds. This section will also investigate the reasons for poor physical and financial performance by the implementing agencies.

#### 7.2.1 Physical and financial performance per financial year

The physical and financial performance of the implementing agencies for FY2009/2010 to FY 2015/2016 is shown below in Figure 7-1 and Figure 7-2. Data was obtained from the RFB Annual report 2013/2014

for the FY2009/10 to FY2013/14 while data for years FY2014/15 to FY2015/16 was retrieved from TANROADS Operational Plan for FY2017/18.

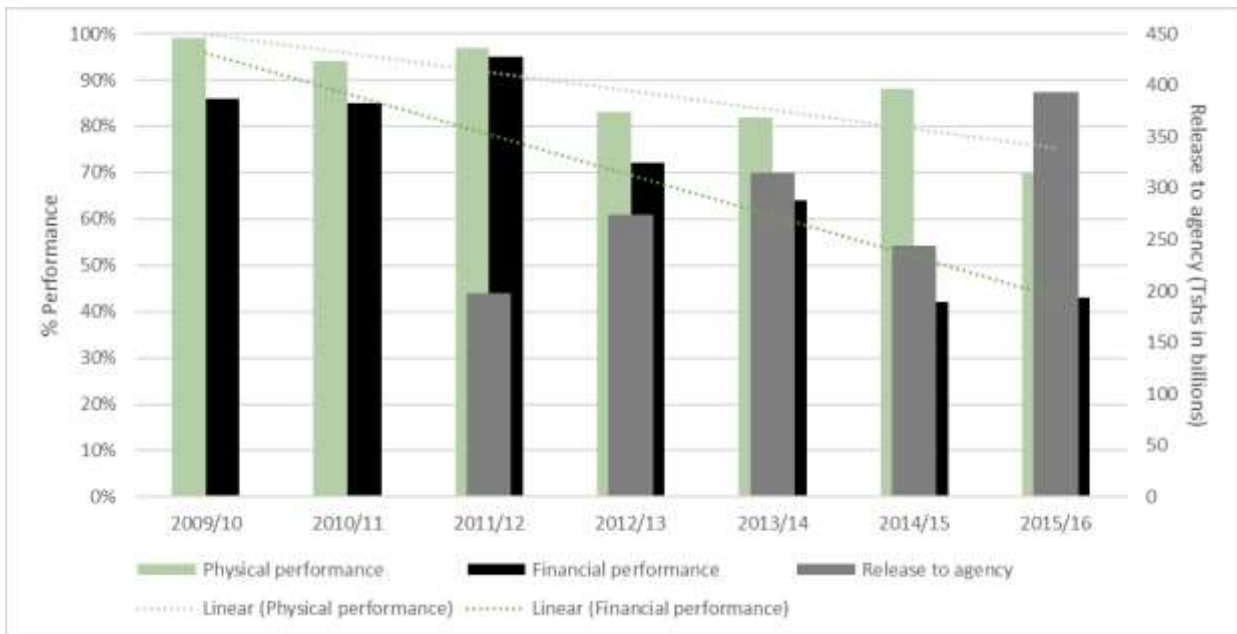


Figure 7-1: Physical and financial performance TANROADS (RFB, 2014; TANROADS 2017)

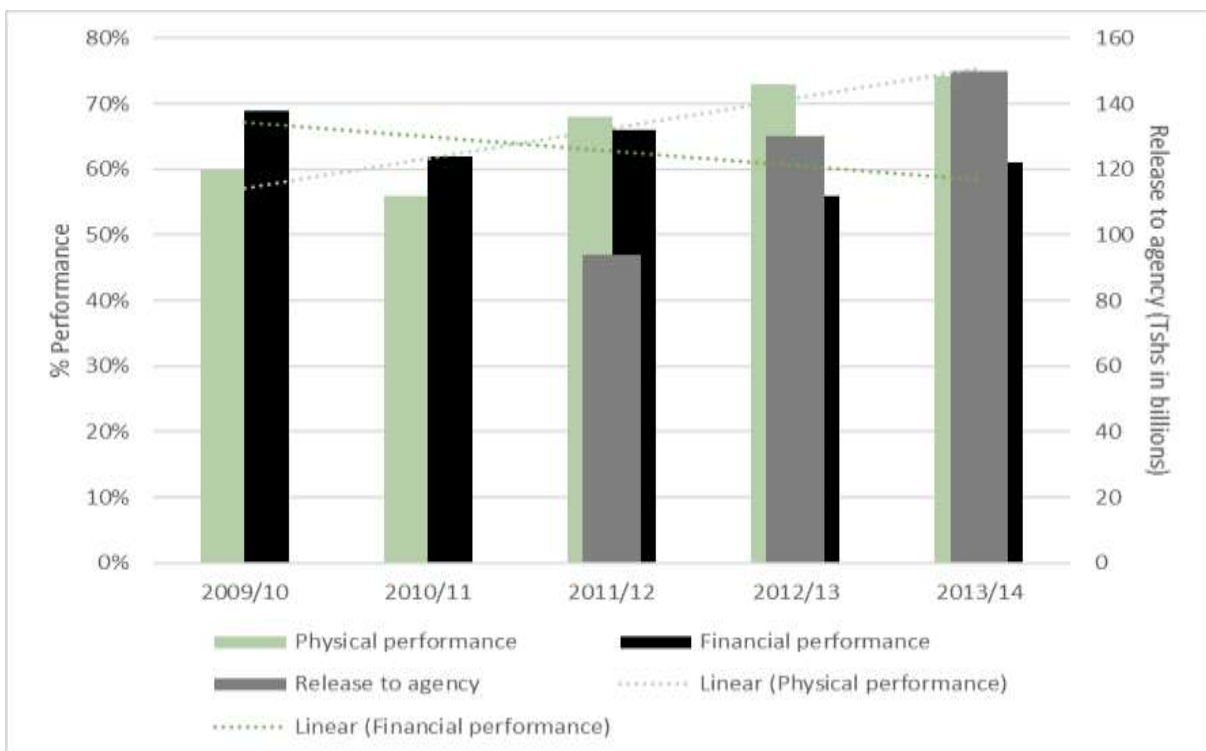


Figure 7-2: Physical and financial performance PORALG (RFB, 2014)

Both the financial and physical performance of maintenance works under the jurisdiction of TANROADS show a decreasing trend with the poorest financial performance witnessed in the last two financial years (2014/15 and 2015/16) with 42% and 43% achieved respectively. Financial year 2015/16 also witnessed the worst physical performance (70%) from the last 9 financial years examined for TANROADS. Based on TANROADS Operational Plan for FY2017/18, the release of funds in FY 2014/15 and FY 2015/16 were irregular resulting in the late payment of contractors and hence poor performance of the contractors.

On the other hand, PORALG shows an increasing trend in the physical performance but a decreasing trend in the financial performance for the years examined.

The decreasing trend in financial performance is indicative of capacity related issues resulting in the under-utilization of funds.

Other reasons for decreases in the financial and physical performance include as reported by TANROADS and PORALG annual reports:

- a) Delays in the procurement of works;
- b) Retentions and terminations of contracts;
- c) Geographical location of the projects causing delays (especially in rural areas);
- d) Incompetence of contractors causing delays;
- e) Lack of supporting staff in the DE's offices;
- f) Untimely release of funds from Treasury or the RFB;
- g) Low capacity of the local construction industry;
- h) Inadequate contract management skills among supervision staff;
- i) Insufficient supervision resources.

### **7.2.2 Physical and financial performance per quarter**

The physical and financial performance of road maintenance activities on trunk and regional roads per quarter and per region is shown in Figure 7-3 and Figure 7-4 for FY2014/2015 and in Figure 7-5 and Figure 7-6 for FY2015/2016, as reported by TANROADS HQ.



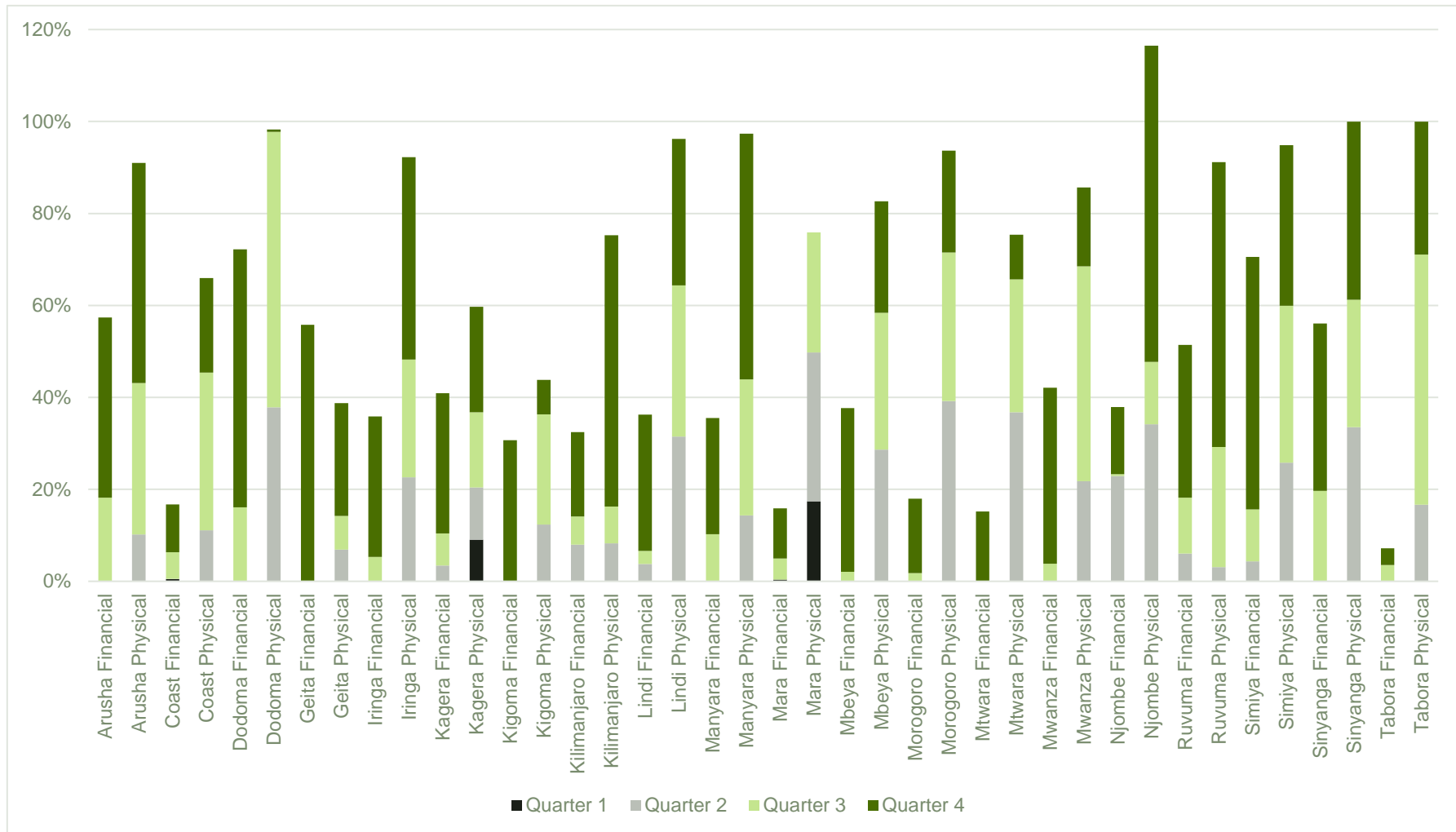


Figure 7-3: Physical and financial performance per quarter and region for road maintenance activities- Trunk roads FY 2014/2015



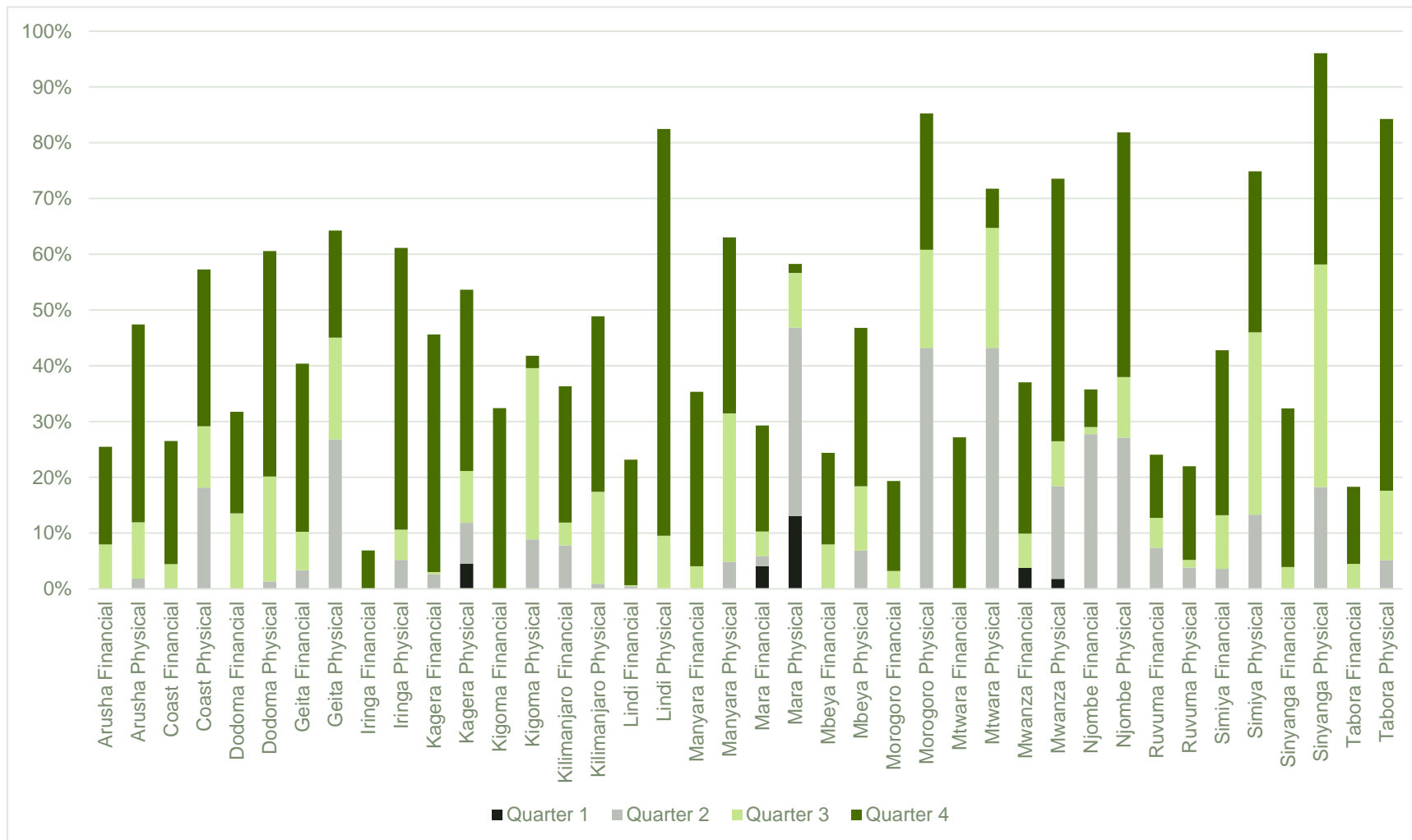


Figure 7-4: Physical and financial performance per quarter and region for road maintenance activities- Regional roads FY2014/2015

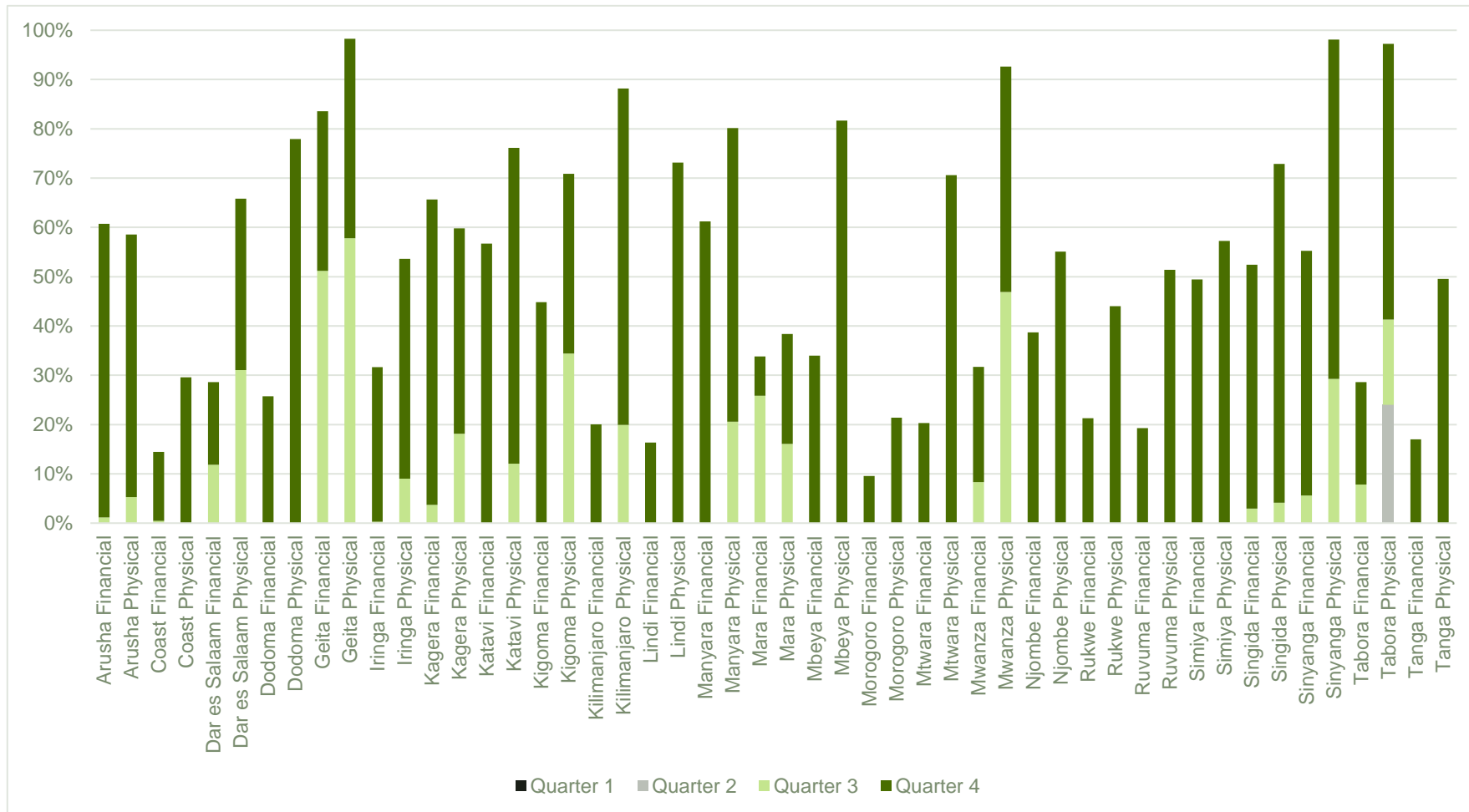


Figure 7-5: Physical and financial performance per quarter and region for road maintenance activities – Trunk roads FY 2015/2016

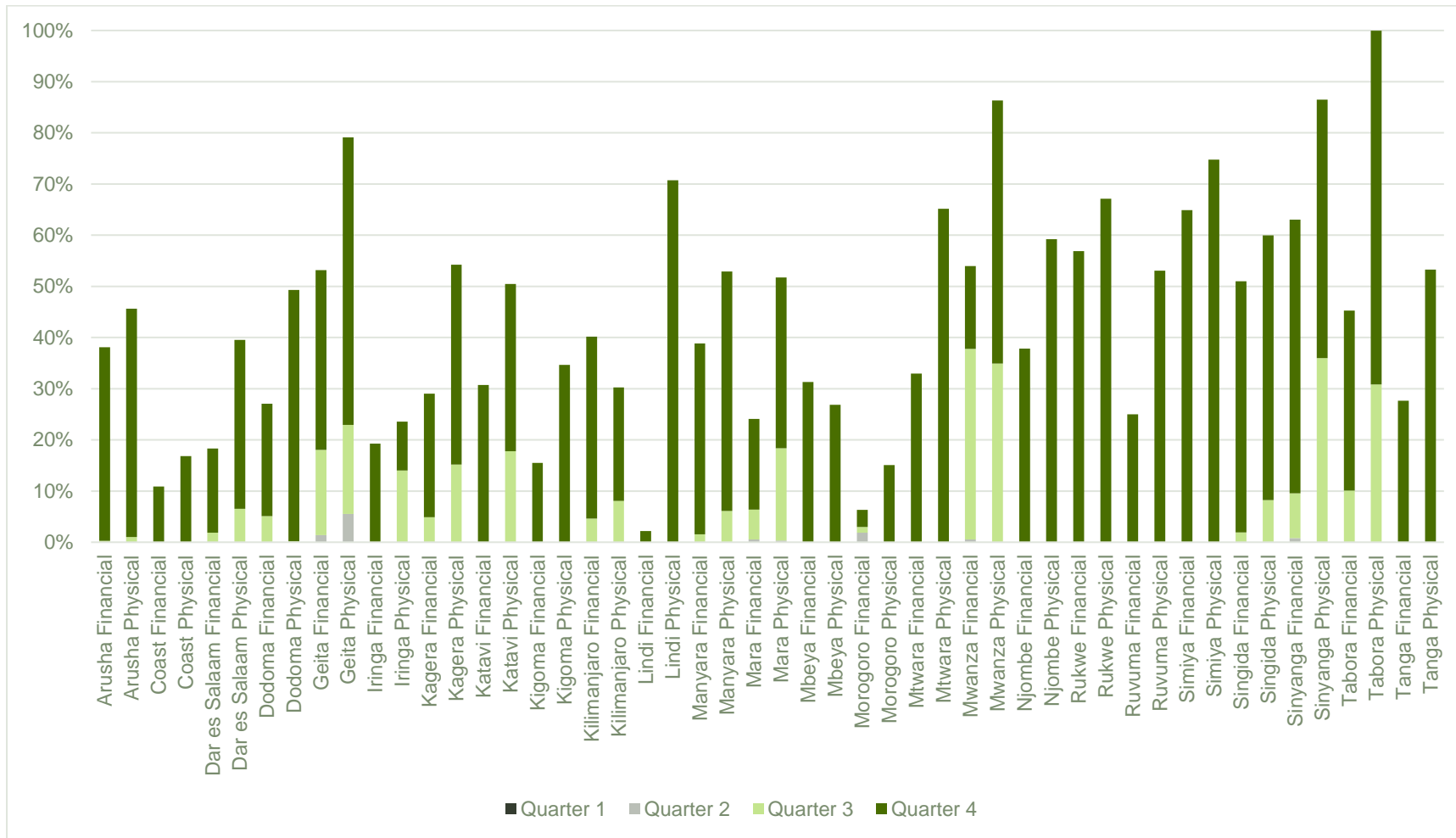


Figure 7-6: Physical and financial performance per quarter and region for road maintenance activities – Regional roads FY 2015/2016

Based on the graphs, the following can be observed:

- a) Majority of the work only commences in the 3rd and 4th quarter;
- b) There is a common trend across the regions in the sense that the physical performance is greater than the financial performance which can be expected. For some regions, there is a large variation between the physical and financial performance which is indicative of the late payment of contractors;
- c) No road maintenance works commenced in quarter 1 for FY 2015/2016 in any of the regions;
- d) In some instances, road maintenance works were only paid for in the following quarter after the works were actually conducted. For example, in Figure 7-3, physical works for Dodoma and Iringa began in quarter 2, however payment for works began in quarter 3. Delays in payment could be due to the late release of funds from the RFB or Treasury. The late payment of works may result in delays in maintenance works as contractors may pause work until payment has been made.

The poor physical and financial performance in quarter 1 and 2 may be due to the delays in the procurement process as reported by TANROADS, where it is stated that procurement process according to procedures under Procurement Act 2011 and Regulations 2013 takes about three (3) months leading to delays in the commencement of road maintenance works.

The delays in the procurement of works may result in the rollover of works and funds into the next financial year, which in turn reflects poorly on the agencies physical and financial performance.

### 7.2.3 Rollover of funds

#### TANROADS

Based on RFB Annual Report 2013/14, 18% of physical works and 36% of the budget from FY 2013/14 was rolled over into FY 2014/15.

#### PORALG

Based on RFB Annual Report 2013/2014, approximately Tshs 28 billion of the PORALG budget for maintenance was rolled over into FY 2014/2015.

As reported in PORALG Annual Report FY2015/2016, a total of Tshs. 40.4 billion was rolled over from FY 2014/15 of which councils managed to spend Tshs 27 billion up to the end of the fourth quarter of FY 2015/2016 for maintenance of roads and drainage structures.

The large roll over of funds suggests that PORALG does not have the capacity to fully utilize funds. It is understood that with the establishment of TARURA, the capacity to manage the funds received from RFB will increase.

## 7.3 Quality procedures

There are three types of checking procedures completed by TANROADS in terms of quality assurance:

- a) Internal financial audits completed by TANROADS - TANROADS auditors visit each region annually (or more if necessary). Projects are then selected on a sample basis. It is more of a financial audit, however, if there are technical issues identified during the auditing process, they are reported to the CML (central materials laboratory) to investigate. The auditors are accompanied by the regional staff to the site where they make observations in terms of the maintenance activities performed. The audits are completed according to the "Procurement Audit Programme" and "Contract Audit Programme". The mentioned audit programmes contain the necessary "checks" to be conducted

during the audit. In terms of quality, the auditors look at the quality assurance issued by the regional managers, as well as proof of the laboratory testing that was conducted.

- b) Regional monitoring – there are material engineers as well as a regional monitoring laboratory in each region. This ensures that the materials used for construction are of adequate quality. The laboratory testing is the first precautionary method before construction can commence. There is no payment made without proof of material testing and approval by the regional material engineer. The engineers from TANROADS HQ also visit 3 regions per quarter and perform an inspection according to the Road Maintenance Handbook which is used as a guide for maintenance inspections (discussed during consultation with TANROADS).
- c) External audits carried out by the RFB are done on a sample basis.

During consultation with TANROADS regarding the overall quality of work completed by the contractors, the general opinion is that the overall quality of work is of fair to good condition due to the three way monitoring system.

## 7.4 Adequate planning and prioritization

### TANROADS

The TANROADS RMMS is a computer based system developed by TANROADS with similar functionality as the HDM-4 programme, which stores road network data. The TANROADS RMMS was developed for annual maintenance programmes whereas HDM-4 is generally used for multi-year planning purposes.

The RMMS is used to provide a maintenance programme for the road network and to prioritize the maintenance activities based on the budget available.

The RMMS is continuously updated with network data which has a large influence on the annual maintenance programmes. For paved roads, a condition survey is conducted annually and at least 50% of the condition data should be updated in the RMMS annually. Condition surveys on the unpaved roads are conducted twice a year- once in the dry season and once in the wet season via a visual inspection. There are 700 traffic count stations across the country and at least 25-30% of the road traffic data is updated in the RMMS annually (discussed during stakeholder consultation with TANROADS).

In terms of the effectiveness of the works selected for implementation, the maintenance activities are selected by a treatment matrix which is a function of the roughness, cracking, ravelling and traffic levels. The treatment matrix is based on the HDM-4 programme and the treatment matrices for paved roads is shown in Appendix C. The RMMS only allocates money to roads that are in fair to good condition. Roads that are in poor condition fall under development. The prioritization plan determined by the RMMS is then analysed and adjusted according to multi-criteria analysis including connectivity, population, social services and tourism (discussed during stakeholder consultation with TANROADS).

Figure 6-1 illustrates that optimal timing of maintenance is imperative in the sense that postponement of maintenance actions may result in higher funding levels required. The frequency of periodic maintenance activities can be established in advance based on historic trends with the added possibility to adjust the frequencies, as the conditions and traffic on roads change. Hence periodic maintenance activities are triggered based on the treatment matrices in the RMMS. For example, if for a certain unpaved road, it has been established that regravelling should be done every 3 years, the frequency can be adjusted to every 2 years if it became clear the traffic count on the road has increased significantly. Thus, it is vital that the road network data in the RMMS is current such that the correct maintenance activities and frequencies are selected. Frequency of interventions for routine maintenance is determined by daily conditions on the road. For example, when a pothole appears, it has to be prepared immediately, as is unblocking of culverts after heavy rains.

## PORALG

It is understood that PORALG uses the District Roads Management System (DROMAS) for the planning of maintenance programmes however this system is not being maintained.

PORALG road maintenance cost and budget allocation calculations to the LGA's take into account a subjective measure of traffic volumes, road conditions, road surface and a continuously disputed road network length. The lack of accurate assessments of these measures is likely to result in improper allocation of funds. Considering the huge discrepancies in the reported road network length database in Tanzania, PORALG would have to first get a more precise measure of the road network length before applying this approach.

## 7.5 Effectiveness

During consultation with TANROADS, a list of the contracts completed in Dodoma, Mbeya, Tanga and Kagera were retrieved for FY2013/2014, FY2014/2015 and FY 2015/2016. The regions each belong to one of the 4 zones, namely Coast, Central, Southern Highlands and Lake. The information included the contractor name, the works completed in each contract, the unit cost for each work action, the quantity of works and the total contract price. The contract data was analysed in the subsections below.

### 7.5.1 Contractor class analysis

The Contractor Registration Board (CRB) provides a limit for any single contract in terms of the contract value, shown in the table below. It gives an indication of the size of the contract that the contractor is allowed to undertake.

Table 7-1: Contract class limit in million Tshs for civil works in Tanzania (CRB, 2017)

Class	Limit for any single contract (In Million Tshs)- Civil works
1	Unlimited
2	5000
3	3000
4	1500
5	750
6	300
7	150

Based on the individual contract data received from TANROADS, a comparison was made with the contract class limitation provided by the CRB. The contractor class of each contractor from each of the mentioned regions was established based on the list of registered contractors published by CRB and plotted against the total contract price, shown in Figure 7-7 below. The vertical bars show the limit for each class, which is labelled accordingly.

From the graphs, the following can be observed:

- a) In Dodoma, Mbeya and Tanga, smaller contract companies (class 6 and 7) are allowed to conduct big contracts outside their class limit (up to the class 5 class limit). This could result in inadequate quality. Contractors are classed according to their capabilities in terms of the company size, labour force, technical skills, and equipment. Thus small contracting companies may not have the capabilities to conduct works outside their class limit which may require a higher skill set. Thus the CRB has placed a class limit for good reason which should be adhered to when awarding contracts.



- b) Large, high skilled contracting companies (class 1 and 2) are doing small works (below Tshs 500 million) that would rather be fit for a class 5 to 7 contractor. Many of the small works that were conducted by these large contracting companies were general routine and periodic maintenance that could have been carried out by the class 5 to 7 contractors to give the smaller contracting firms for experience within their class limit and to subsequently empower the small scale contractors. This can also have an impact on the price tag of the services rendered.
- c) There is high competition between the class 4 to 7 class contractors while there are fewer class 1 to 3 contractors in the 4 regions analysed.
- d) In Kagera, the contract value of all contracts is smaller than Tshs 150 million, as can be expected from very rural areas such as Kagera. There are mainly very small contractors (contractor class 5 to 7) with only very few in class 1 to 4.

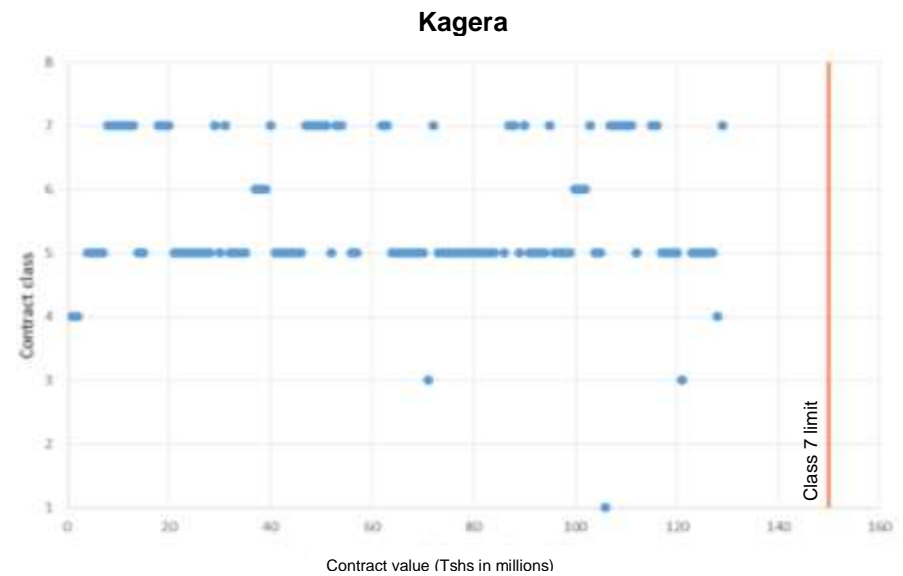
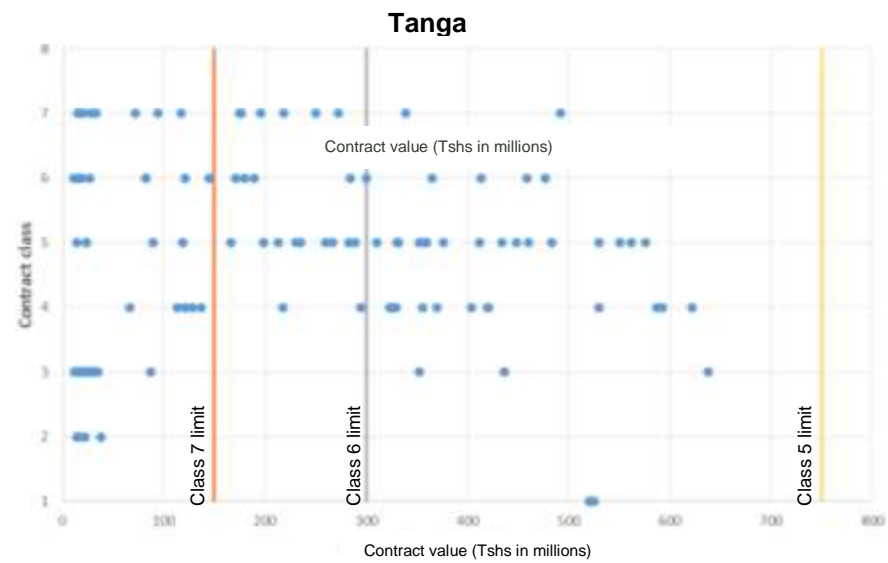
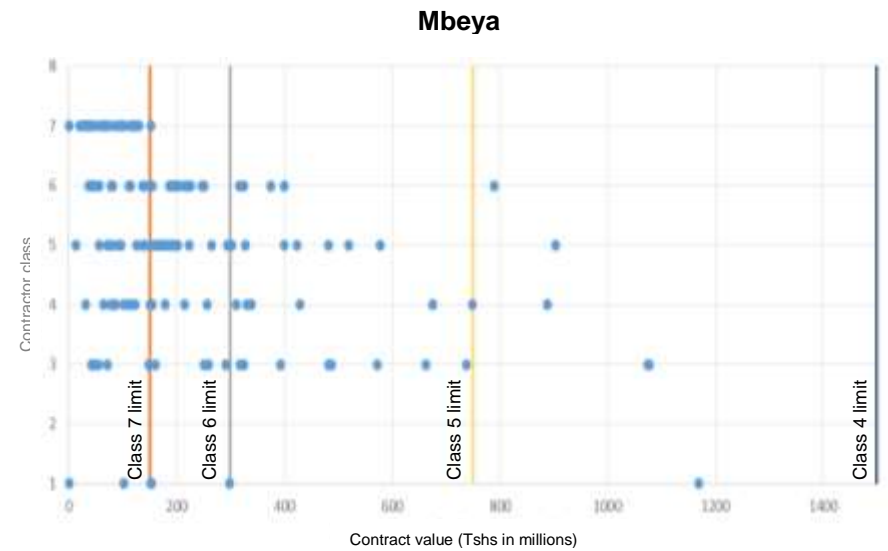
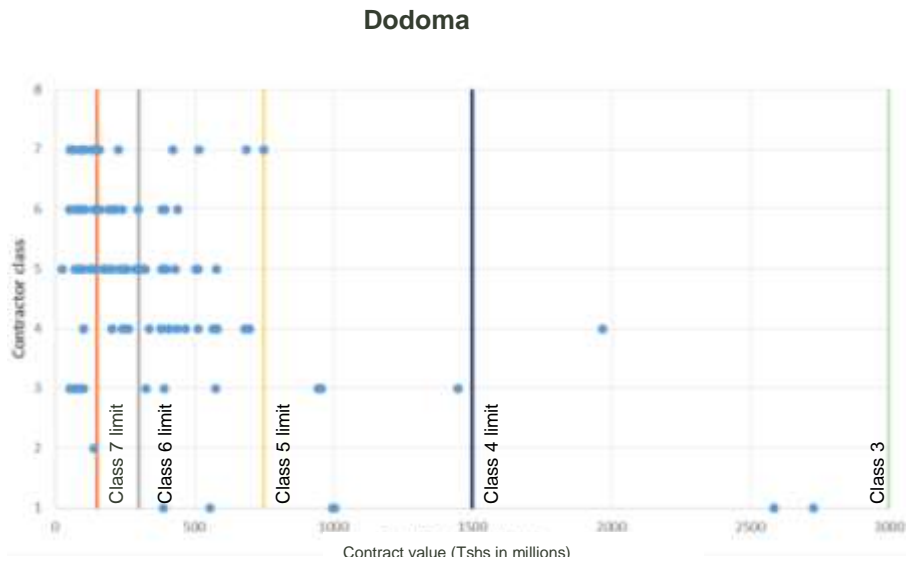


Figure 7-7: Contractor class compared to contract value in Dodoma, Mbeya, Tanga and Kagera

### 7.5.2 Quantity and unit cost comparisons and analysis

Based on the list of contracts retrieved from TANROADS during stakeholder consultation, the quantity of works was plotted against the unit cost per maintenance activity. Based on the large number of maintenance activities, a selected few maintenance activities were chosen based on frequency of occurrence, importance and relative value compared to the overall contract size. These activities are grass cutting and surface treatment to concrete elements shown below in Figure 7-8 and Figure 7-9 respectively. The individual contracts were plotted for Dodoma, Kagera and Mbeya and Tanga for FY2013/2014, FY2014/2015 and FY 2015/2016 for the mentioned maintenance activities.

The following can be observed from the graphs:

- a) The larger the quantity of works, the smaller the unit cost as shown by the trend line;
- b) The smallest quantity of works have the largest unit cost;
- c) For the small works, there is a very big variation in the unit costs compared to the larger works.

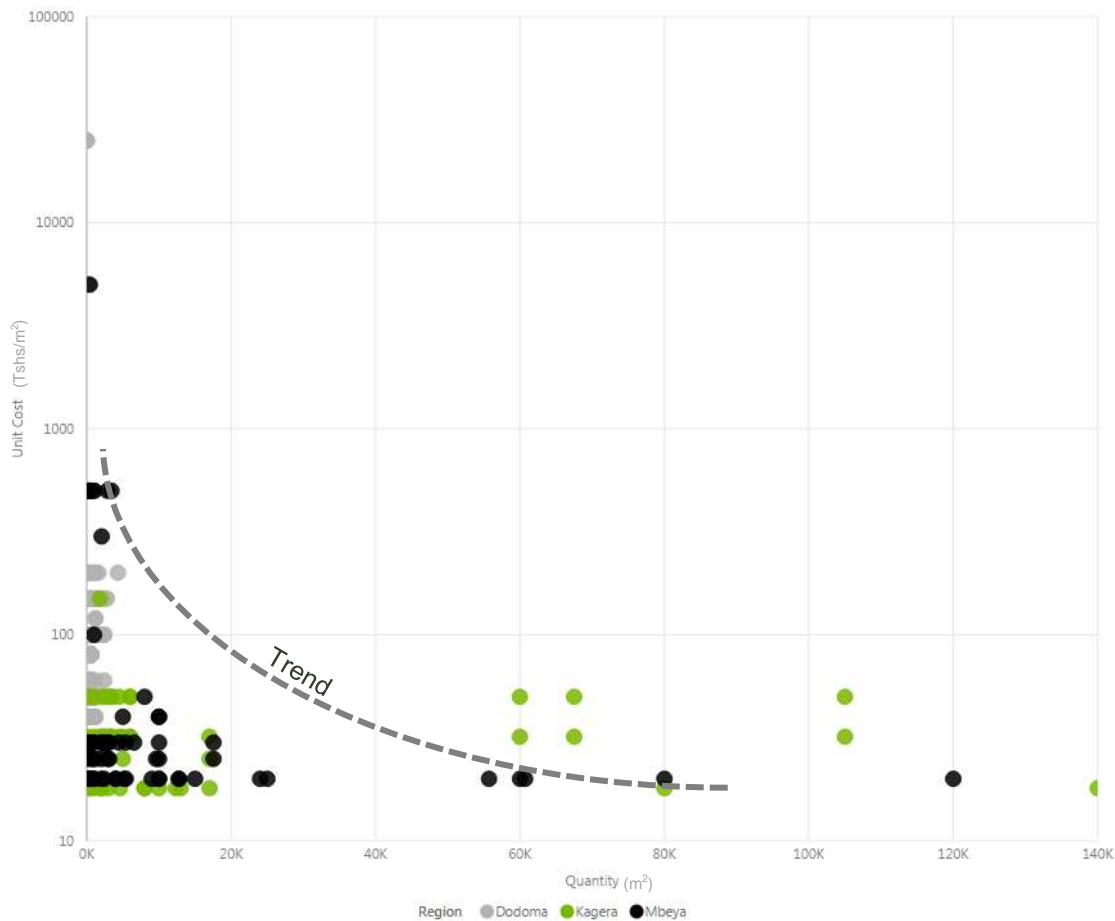


Figure 7-8: Quantity and unit cost comparison for grass cutting

It should be noted that based on the information received, no grass cutting was performed in Tanga and no surface treatment to concrete elements was performed in Kagera.

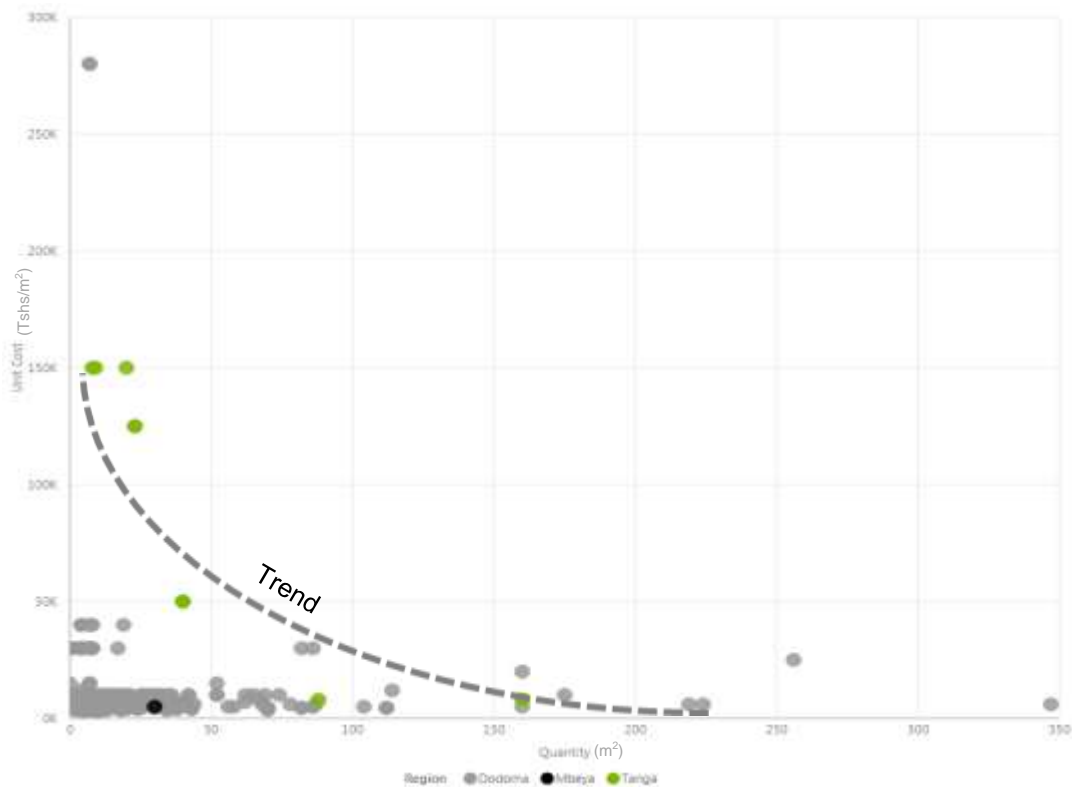


Figure 7-9: Quantity and unit cost comparison for surface treatment to concrete elements

Where possible, sections of road should be combined resulting in larger contract sizes to ensure that savings from economies of scale can be realised resulting in increased value for money for the RFB.

7.5.3 Variation of unit costs from the average and median

Based on the contract data received from TANROADS, the average and median unit cost was calculated for each maintenance activity. The country wide average per activity (retrieved from TANROADS and used for planning purposes) was then compared to the calculated average and median unit costs for Kagera, Mbeya, Dodoma and Tanga.

The median may be considered as a more accurate method of comparison as it excludes the outliers in a data set whereas the calculated average includes outliers in the dataset.

Based on the most expensive activities (gravelling, grass cutting and bituminous surface seal) within the four regions shown, the median and average unit costs within the Kagera, Mbeya, Tanga and Dodoma regions were compared to the country averages for FY2015/2016. The results are shown in Figure 7-10 to Figure 7-12. Both the median and average graphs show a similar trend. However, there is more variation when comparing the unit costs to the calculated median than the calculated average (bigger outliers when comparing to the median). The comparison of the country unit cost with the contract median and averages per activity for each region and contract are shown in Appendix D.

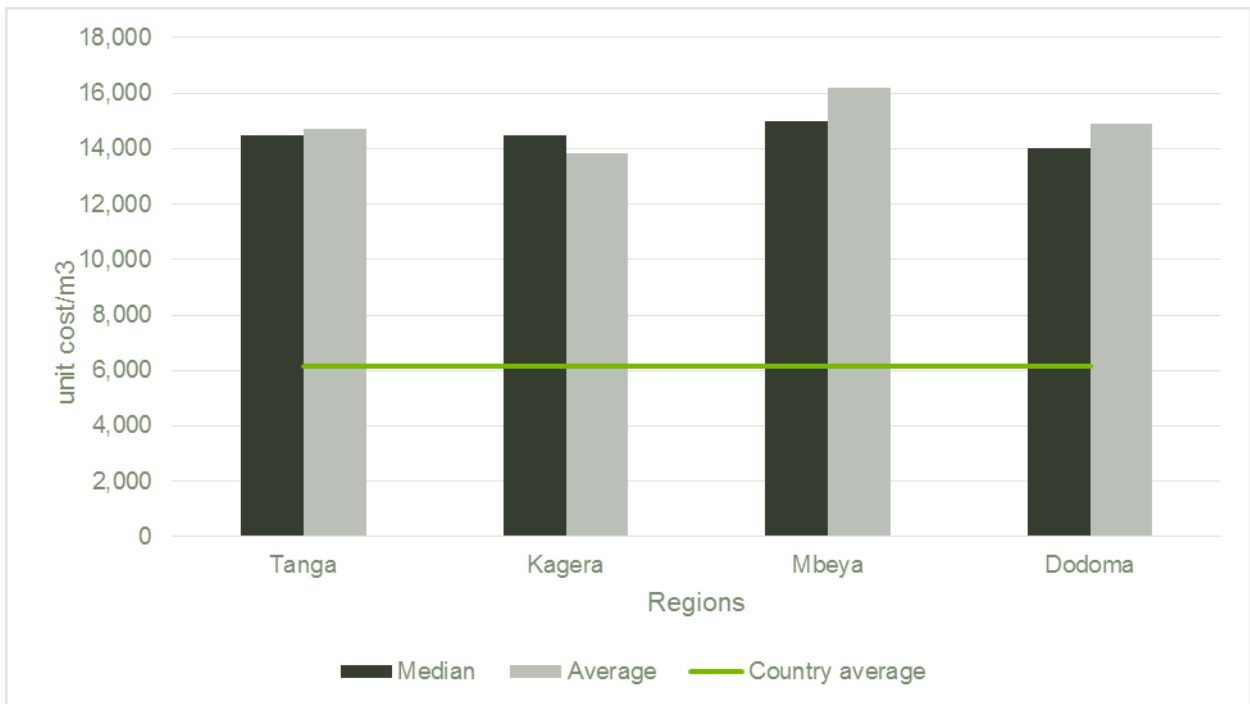


Figure 7-10: Comparison of region median and averages with country average for gravelling within FHD

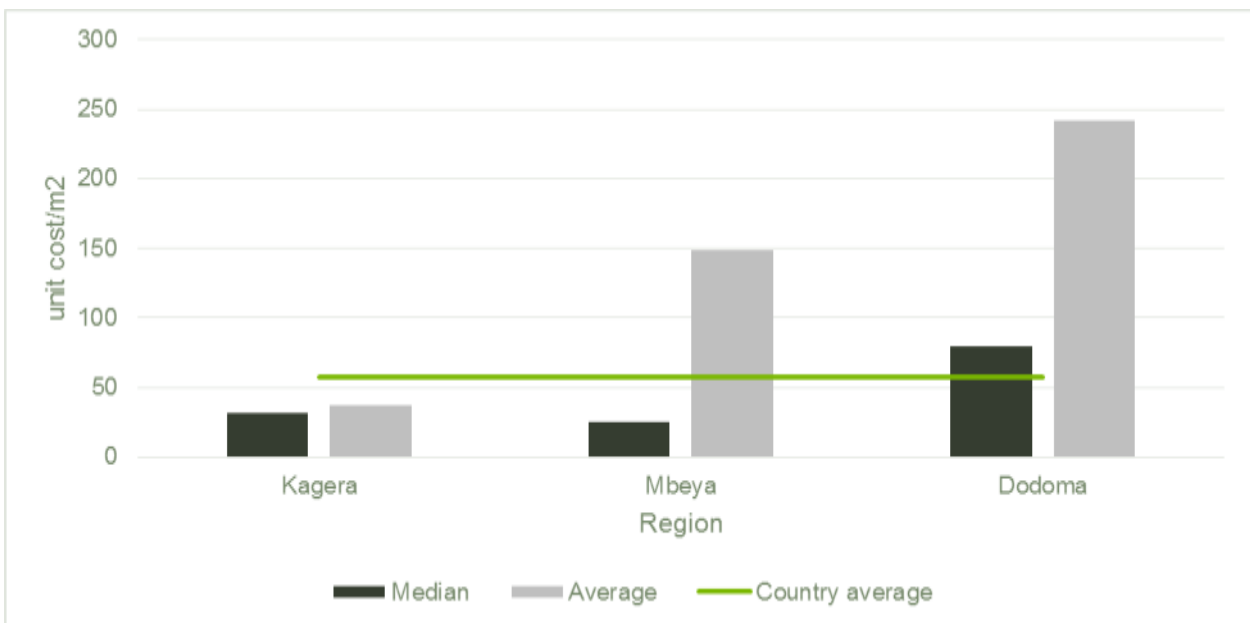


Figure 7-11: Comparison of region median and averages with country average for grass cutting

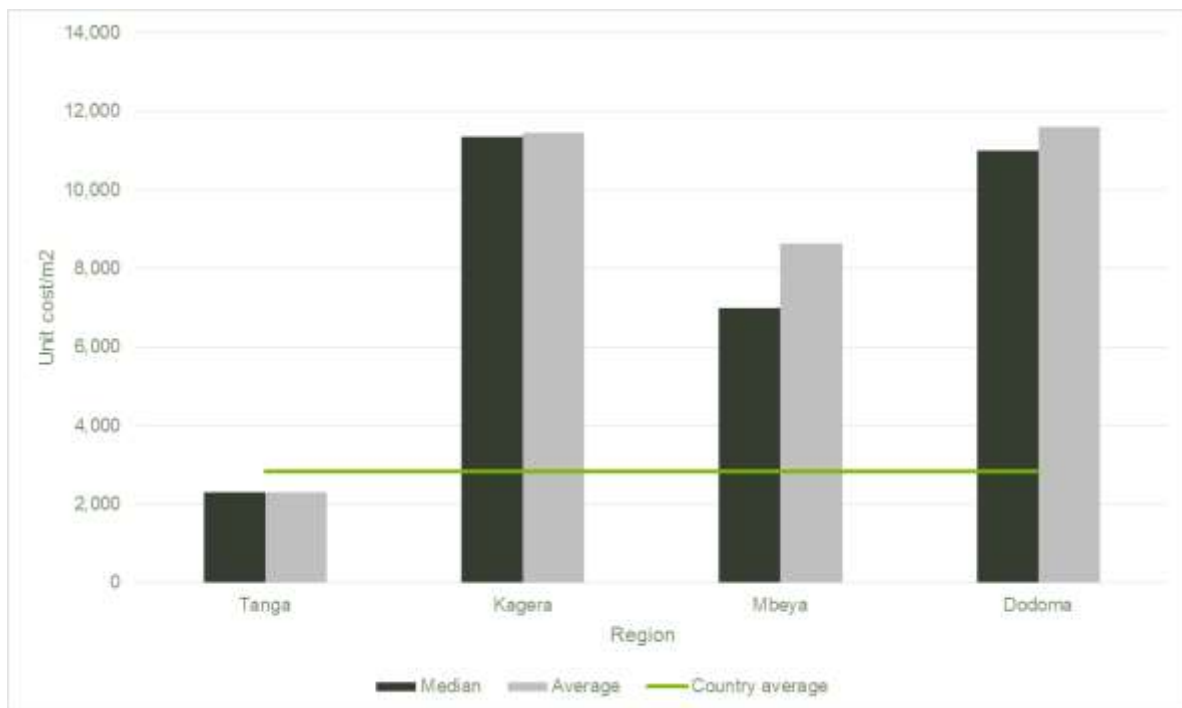


Figure 7-12: Comparison of region median and averages with country average for bituminous surfacing layer (second seal)

Both the medians and averages for **gravelling** in all regions are more than double the country average. The medians for grass cutting are in line with the country averages for Kagera, except for Dodoma and Mbeya where the median and average are more than double. For grass cutting contracts in Mbeya and Dodoma reveal significant outliers which can be seen from the difference between the median and average. The median and averages for bituminous surface layer in Dodoma, Mbeya and Kagera are far greater than the country average, except for Tanga where it is lower.

#### 7.5.4 Various models for the execution of works

There are various models to execute maintenance works ranging from in-house (or force account units) to outsourcing (or contract based maintenance) to performance based maintenance which all impact on efficiency.

##### 7.5.4.1 Force account units

*Force account units are units formed under government authority, with the capability of carrying out maintenance and construction work.*

TANROADS annual reports states that regional managers are instructed not to use force account arrangements in their regions except in cases where it is inevitable. An increase in local contractors doing road works has resulted in the decreased the use of force account units. Force account was last used by TANROADS in FY 2013/2014 where only 1% was executed by force account units and has not been used since.

Based on consultation with TANROADS, it was stated that contractors are preferred over the force account units. Force account units are often perceived as less expensive but there are hidden costs



such as employee benefits, government housing, etc. that may make them more expensive. Force account units also tend to be less efficient than contractors, as force account units are not profit driven (ie. the salaries of the employees of force account units are guaranteed).

### **Advantages and disadvantages of force account units**

A short summary of the advantages and disadvantages of force account units is given below:

#### **Advantages:**

- a) Force account units enable government roads authorities to remain knowledgeable with regards to road maintenance and construction. If all force account is done away with, the roads authorities are at the mercy of what the private sector contractors tell them regarding construction and maintenance techniques, rates of progress, unit cost rates, complexity of work, etc.;
- b) Force account work attracts young engineers and technicians for employment at the government roads authorities. Engineers need hands on experience of construction and maintenance work, which they can acquire as resident engineers at force account units. If force account is done away with, there remains little incentive for new recruits to join the roads departments, since most of the work remaining is of administrative and management nature. The young engineers are left with merely controlling the work which consultants and contractors are doing;
- c) In cases of emergencies, like flash floods, or other contingencies interrupting traffic flow on roads, force account units can quickly be mobilized to resolve the crisis;
- d) With force account units at its disposal, roads authorities can experiment with new construction procedures and do research on various road construction and maintenance issues;
- e) Force account units are versatile and can be redeployed to other more important projects virtually overnight;
- f) Force account units compel roads authorities to do construction and maintenance work on a continuous basis (road authorities have to keep their staff and equipment occupied and recover the costs of the force account units);
- g) Staff at force account units enjoy good job security.

#### **Disadvantages**

- a) Force account units are not profit driven like private contractors and hence force account units are mostly not as effective and efficient as private contractors,
- b) The staff at force account units are government employed and have the government job security. Staff dismissals for unacceptable behaviour are very protracted,
- c) Overhead costs at force account units are very high. Staff are provided with government housing, transport, medical aid, pensions.

Tanzania is part of SADC and therefore adheres to the SADC Protocol on Transport, Communications and Meteorology in the Southern African Development Community (SADC) Region. The protocol states that force account work should be done away with over time.

A short case study on how force account units were dealt with in Namibia is included below. The case study was adapted from the *Medium to Long term Master Plan for Namibia 2004 and 2012*.

## **The Roads Contractor Company (RCC) in Namibia**

The RCC was established in terms of the Companies Act, and is fully owned by the Government of Namibia. The Roads Contractor Act (No. 14 of 1999) was promulgated in the Government Gazette of 18 October 1999. The Company was established on 10 March 2000 and commenced operations on 1 April 2000.

The RCC was formed from the road maintenance and construction “arm” of the Department of Transport, within the Ministry of Works, Transport and Communication. Relevant assets, liabilities, rights and obligations were transferred to the RCC in order that the company may be able to carry out its objectives.

The company was granted a period of three years from 1 April 2000 to become fully competitive and commercialised. During this time it would receive preferential maintenance contracts from the Roads Authority. Thereafter the RCC would have to tender for contractual work on an open tender basis. The preferential treatment was however extended.

The Minister of Works, Transport and Communication recently initiated an independent review of the performance of the RCC. This was because of concern that the RCC did not achieve the levels of competitiveness in terms of effectiveness and cost efficiency that were expected of it.

### **Implications of the RCC’s un-competitiveness**

Major implications of the RCC’s continued un-competitiveness were defined as follows:

- a) The road user is burdened with a 20%-30% cost premium due to the RCC’s inefficiency, as the inefficiency directly translates to higher road user charges to be recovered from road users.
- b) The un-competitiveness of the RCC puts a constraint on the development of a competitive road maintenance and construction sector.
- c) The credibility of the institutional reforms pertaining to the entire road sector is being put at risk and the subsequent economic empowerment through the facilitation of SMME’s (small, medium and micro-enterprises) is hindered.

Based on an article published in 2017, the RCC requires approximately N\$ 1.1 billion (about USD 85 million) to be transformed into a competitive enterprise. The Namibian government is considering whether they should fund or liquidate the RCC (West Coast FM, 2017).

## **7.5.5 Performance based management and maintenance of roads (PMMR) projects in mainland Tanzania**

The pilot project for the PMMR was introduced in Tanzania in 2004 and launched in 2007 as part of the government’s strategy to increase the effectiveness and efficiency of maintenance and management on the Tanzanian road network. The project was implemented in Mwanza, Rukwa and Tanga on 1 056km unpaved road network. There were two contractors assigned to each region, each managing 110km to 220km of road for a duration of 5 years.

Performance based contracts aims at achieving road user satisfaction such as riding quality throughout the contract period but is also more demanding on the contractors and road authority. The contractor takes on the responsibility to maintain and manage a road over the contract duration based on a number of performance criteria (service quality levels) specified by the contract and is paid a fixed monthly sum based on their ability to meet this criteria. There is a penalty or a percentage payment reduction for non-compliance with the service quality levels. Majority of the risks lie with the contractor compared to

traditional BOQ where the risk is mainly carried by the Road Authority who determines the maintenance activities and quantities to be carried out on a particular road. In PMMR, the contractor can select the required work to maintain the service quality levels over the contract duration, included in the tender price.

PMMR projects have been implemented successfully in other countries on bitumen roads, with very little experience on gravel roads. The implementation of the pilot project provided means for assessing the benefits, strengths and weaknesses of PMMR on unpaved roads in Tanzania. The recommendations and lessons learnt through the pilot project are summarized in the report entitled “Consultancy services for the facilitation and training during the pilot programme for PMMR”, prepared by COWI (COWI, 2013).

A comparison of average unit rates of maintenance works on unpaved roads for all regions using the traditional BOQ approach compared to the average unit rate for PMMR on unpaved roads is shown in the table below for 2012. Unit rates for the PMMR approach are significantly lower. Further, since the maintenance works for the PMMR approach is selected by the contractor, it is likely to be more economical as it is in the best interest of the contractor to minimize costs (COWI, 2013).

Table 7-2: Comparison of PMMR and BOQ unit rates (COWI, 2013)

Contract type	Service quality level		
	Very good ADT>100vpd	Good ADT>50-100vpd	Fair ADT<50vpd
PMMR: Maintenance unit cost/km/year TSHS	5,051,835	4,255,007	3,639,397
BOQ: Maintenance unit cost/km/year TSHS	12,358,830	8,119,206	5,676,325
Cost savings by PMMR in %	59%	47%	35%

One of the favourable benefits of PMMR is guaranteed quality of the road throughout the contract period as the contractor is required to meet performance criteria at all times or face penalties. In the traditional based contracts, road quality has attained a defined quality after e.g. the grading operation, but thereafter will deteriorate until the next contract for grading is implemented (COWI, 2013).

The bidding documents were revised based on the lessons learned in during the pilot project. PMMR phase II will now be rolled out on a number of roads in various regions. The design and implementation of PMMR phase II is currently in progress, done by a consultant company. The consultant has also finalized the selection of 850 km candidate roads from ten (10) regions and grouping and packaging of roads (TANROADS, 2017).

### 7.6 Chapter summary

This chapter combined the efficiency, economy, quality and effectiveness of maintenance works. The following was found:

**Efficiency and economy**

- a) In terms of the utilization of funds, both TANROADS and PORALG show a decreasing trend in the financial performance shown in Figure 7-1 and Figure 7-2. PORALG reported in their Annual Report FY2015/2016, a total of Tshs. 40.4 billion was rolled over from FY 2014/15.
- b) Both the declining financial performance and large rollover of funds is indicative that PORALG does not have the capacity to utilize funds.

Based on the quarterly performance illustrated in Figure 7-3 to Figure 7-6 the majority of the works only commence in quarter 3 and 4. It was stated during consultation with TANROADS that the delays in the commencement of works are mainly due to delays in the procurement process which can take up to 3 months. The road maintenance contracts are revised yearly, which means that the lengthy procurement process must be carried out again. Depending on the delay, the road may already start to deteriorate, requiring more funds to maintain a particular road and has a negative influence on the overall performance of the implementing agencies.

- c) There seems to be large variation in the unit costs across all regions. There is potential to improve the checking of unit rates.
- d) Economies of scale can be realised by combining contracts.

### Quality

TANROADS currently has a 3 way monitoring system through internal audits, regional monitoring by material engineers in each province and external audits carried out by the RFB. It is in the opinion of the consultants that there are sufficient procedures in place to ensure adequate quality of the maintenance works. There is scope for improvement for monitoring the quality of roads under the jurisdiction of PORALG but it is understood that the formation of the rural road agency TAWURA will result in improved monitoring

### Effectiveness

TANROADS RMMS is used to provide a maintenance programme for the road network and prioritize the maintenance activities based on the budget available.

PORALG road maintenance cost and budget allocation calculations to the LGA's take into account a subjective measure of traffic volumes, road conditions, road surface and a continuously disputed road network length. The lack of accurate assessments of these measures is likely to result in improper allocation of funds.

Based on the sample of contracts retrieved from TANROADS, small contract companies (class 6 and 7) are being allowed to carry out work beyond their class limit. This may result in poor quality works as these smaller companies may be awarded work beyond their capabilities. The larger companies are also contracting for small works (within the class 1 and 2 limits) which may not be in line with policy to empower small scale contractors.

It was also found that PMMR results in greater efficiency than traditional maintenance contracts.



## Chapter 8 Revised Charging System

## 8 Revised Charging System

### 8.1 Introduction

The need for a revised charging system arises from the fact that the current disbursements from the RF render a large funding shortfall compared to the maintenance and development needs of mainland Tanzania as demonstrated in section 6.5.

The proposed adjustment of the following funding instruments will be discussed within this chapter, including the mechanisms and mandates regarding the proposed adjustments:

- a) Current revenue sources for the Roads Fund
  - i) Transit charges
  - ii) Fuel levy
  - iii) Overloading fees
- b) Devoted revenue sources for the Roads Fund
  - i) Foreign Vehicle permit (FVP)
  - ii) Excise duty on petrol and diesel (portion)
  - iii) Road Reserve Charges (RRC)
- c) Introduction of new funding instruments for the Roads Fund
  - i) Road user levy on CNG, electric and solar powered vehicles
  - ii) Weight distance charges
  - iii) Road tolls

The potential new and devoted sources of revenue for the Roads Fund was discussed in detail in section 5 with final recommendations made in Table 5-10.

### 8.2 Brief overview of the methodology

The adjustment of road user charges and proposed new charges was analysed using the Tanzania Road User Charges Model (TANRUC) outlined in the figure below. The model takes various factors such as road expenditures, policy variables, road use data and fuel consumption data as input to the model. These factors are then applied and processed by the model to produce results in the form of cost recovery figures for various cost recovery mechanisms.



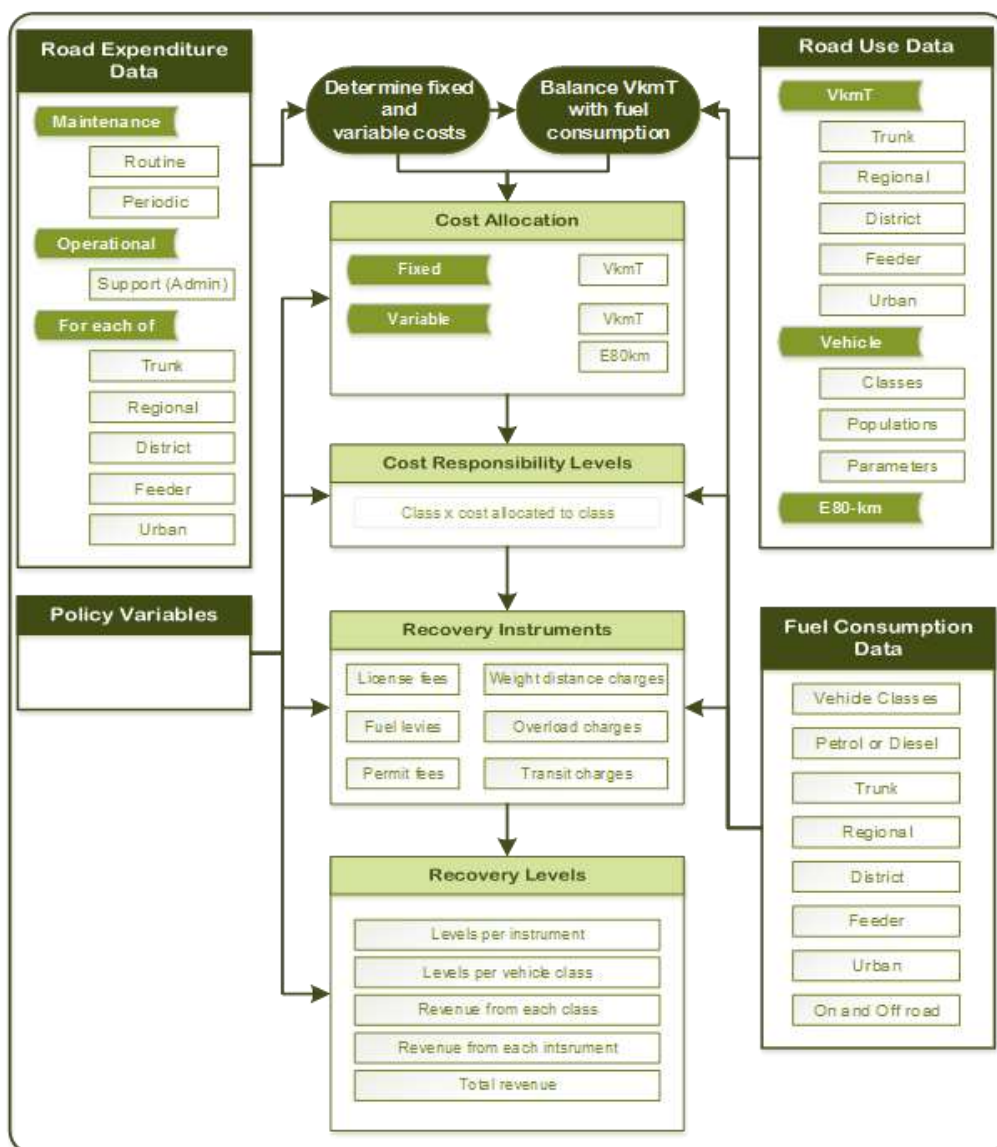


Figure 8-1: Basic approach of the TANRUC model

The TANRUC model was used to investigate the necessary charging levels per instrument (existing and new) based on the cost responsibility of each vehicle type in order to achieve the maintenance and development funding requirements of the road network in mainland Tanzania based on the funding requirement scenario's described in section 6.4.

As shown in the figure above, the cost allocation per vehicle type is based on the vehicle kilometres travelled (VKT<sup>8</sup>) per year and the E80<sup>9</sup>-km tabulated below in Table 8-1 to Table 8-4 for the entire road network and classified road network in mainland Tanzania.

<sup>8</sup> The VKT is calculated by multiplying the AADT by the road length

<sup>9</sup> The E80 or equivalent 80KN standard axle (ESAL) is the unit used for the axle load equivalency factor.



Table 8-1: VKT Million per vehicle type on entire road network

Road Type	Length (km)	Motorcycle	Car/Pickup	Bus	Light Truck	Medium/Heavy Truck	Total
<b>Trunk</b>							
Paved	7 342	407	2 507	364	182	1 015	<b>4 475</b>
Gravel	5 444	37	230	24	27	84	<b>402</b>
<b>Regional</b>							
Paved	1 321	81	669	40	38	61	<b>889</b>
Gravel	20 893	114	798	48	103	189	<b>1 252</b>
<b>District/Feeder/ Urban</b>							
Paved	1 326	39	272	43	12	62	<b>428</b>
Gravel	22 089	67	233	20	60	353	<b>733</b>
Earth	85 532	28	281	0	0	0	<b>309</b>
<b>TOTAL</b>	<b>143 946</b>	<b>773</b>	<b>4 990</b>	<b>539</b>	<b>422</b>	<b>1 764</b>	<b>8 485</b>

Table 8-2: VKT Million per vehicle type on classified road network

Road Type	Length (km)	Motorcycle	Car/Pickup	Bus	Light Truck	Medium/Heavy Truck	Total
<b>Trunk</b>							
Paved	7 342	407	2 507	364	182	1 015	<b>4 475</b>
Gravel	5 444	37	230	24	27	84	<b>402</b>
<b>Regional</b>							
Paved	1 321	81	669	40	38	61	<b>889</b>
Gravel	20 893	114	798	48	103	189	<b>1 252</b>
<b>District/Feeder/ Urban</b>							
Paved	1 326	39	272	43	12	62	<b>428</b>
Gravel	12 606	38	133	11	34	201	<b>418</b>
Earth	38 310	13	126	0	0	0	<b>138</b>
<b>TOTAL</b>	<b>87 241</b>	<b>727</b>	<b>4 735</b>	<b>529</b>	<b>396</b>	<b>1 613</b>	<b>7 999</b>

Based on Table 8-1 for the entire network and Table 8-2 for the classified network, about 8 485 million vehicle kilometres and 7 999 million vehicle kilometres were travelled on each of the respective networks annually. It is evident that the highest usage is on the TANROADS paved network which amounts to 5 3654 million VKT, which can be attributed to the higher traffic levels. The AADT per vehicle type and road type was discussed in section 2.1.5.

E80 km's are used to allocate load related variable costs and are calculated by multiplying the E80 factor shown in Table 8-3 and Table 8-4 with the VKT in Table 8-1 and Table 8-2 for the entire network and classified network respectively.

Table 8-3: E80 million per vehicle type on the entire road network

Road Type	Length (km)	Motorcycle	Car/Pickup	Bus	Light Truck	Medium/ Heavy Truck	Total
<b>E80 Factor</b>		<b>0.0</b>	<b>0.0</b>	<b>0.8</b>	<b>0.4</b>	<b>3.3</b>	<b>-</b>
<b>Trunk</b>							
Paved	7 342	0.00	0.00	290.92	65.49	3348.19	<b>3 704.60</b>
Gravel	5 444	0.00	0.00	19.02	9.84	278.23	<b>307.10</b>
<b>Regional</b>							
Paved	1 321	0.00	0.00	31.60	13.56	202.82	<b>247.98</b>
Gravel	20 893	0.00	0.00	38.35	36.99	623.12	<b>698.46</b>
<b>District/Feeder/ Urban</b>							
Paved	1 326	0.00	0.00	34.15	4.19	204.88	<b>243.21</b>
Gravel	22 089	0.00	0.00	15.98	21.57	1164.59	<b>1 202.14</b>
Earth	85 532	0.00	0.00	0.00	0.00	0.00	<b>0.00</b>
<b>TOTAL</b>	<b>143 946</b>	<b>0.00</b>	<b>0.00</b>	<b>430.02</b>	<b>151.65</b>	<b>5 821.83</b>	<b>6 403.50</b>

Table 8-4: E80 million per vehicle type on the classified road network

Road Type	Length (km)	Motorcycle	Car/Pickup	Bus	Light Truck	Medium/ Heavy Truck	Total
<b>E80 Factor</b>		<b>0.0</b>	<b>0.0</b>	<b>0.8</b>	<b>0.4</b>	<b>3.3</b>	<b>-</b>
<b>Trunk</b>							
Paved	7 342	0.00	0.00	290.92	65.49	3348.19	<b>3 704.60</b>
Gravel	5 444	0.00	0.00	19.02	9.84	278.23	<b>307.10</b>
<b>Regional</b>							
Paved	1 321	0.00	0.00	31.60	13.56	202.82	<b>247.98</b>
Gravel	20 893	0.00	0.00	38.35	36.99	623.12	<b>698.46</b>
<b>District/Feeder/ Urban</b>							
Paved	1 326	0.00	0.00	34.15	4.19	204.88	<b>243.21</b>
Gravel	12 606	0.00	0.00	9.12	12.31	664.63	<b>686.06</b>
Earth	38 310	0.00	0.00	0.00	0.00	0.00	<b>0.00</b>
<b>TOTAL</b>	<b>87 241</b>	<b>0.00</b>	<b>0.00</b>	<b>423.16</b>	<b>142.38</b>	<b>5 321.87</b>	<b>5 887.41</b>

## 8.3 Adjustment mandates and adjustment frequencies

### 8.3.1 Current funding instruments for the RF

#### 8.3.1.1 Transit charges

##### Adjustment mandate

Part II and III of the Foreign Vehicles Transit Charges Act provides for the imposition, administration and collection of transit charges, as well as the amounts and categories of charges. The Minister responsible for Finance is empowered to administer the charges. Thus, the Minister has the responsibility of assessing, setting and adjusting the charge levels, as per Section 3(4) of the Act. The schedule to this Act instituted the initial levels of charges payable for the mentioned two categories. The Schedule of amount payable may be amended via the Finance Act by the Minister, as may be for the currency or category of vehicle and its corresponding payment level. In 2011 the Finance Act amended the schedule to the Foreign Vehicles Transit Charges Act by inserting that Tanzanian Shillings was also an acceptable currency in which the charges are payable. The Minister of Finance is furthermore mandated in Section 12 of the Foreign Vehicle Charges Act to make Regulations prescribing further modalities in connection with transit charges.

##### Adjustment frequency

The Transit Charges rate levels have not been adjusted since 2001. It is suggested that these fees be adjusted at least every 5 years, to take into account the growth in the cost of planning and construction, and road maintenance gap resulting from the effects of inflation and value of currency.

#### 8.3.1.2 Vehicle overloading fees<sup>10</sup>

##### Adjustment mandate

The current overload fee structure is based on 2001 levels and the levels have since then not been revised. The Act that governs the imposition and collection of vehicle overloading fees is the Regulations made under section 114(1) (p) of the Road Traffic Act 30 of 1973, namely the Road Traffic (Maximum Weight of Vehicles) Regulations, 2001.

Section 114 (1) (p) of the Road Traffic Act, 1973 provides that *“the Minister of Transport, Works and Communication may make the regulations prescribing the maximum weight and maximum dimensions of any motor vehicle, trailer or carriage, and any load thereon, that may be used on any road, the maximum weight that may, be transmitted on the road surface by the wheel or wheels on any one axle of a motor vehicle, trailer or carriage, as well as the maximum and minimum air pressure of the tyres of any motor vehicle or trailer and further prescribing a maximum punishment of a fine not exceeding fifty thousand or imprisonment not exceeding ten years or both such fine and imprisonment for any contravention of any such regulation made”*.

Section 114 (2) of the Road Traffic Act, 1973 mandate the subjects on which the Minister of Finance may regulate, but **none** of the provisions mention charge levels regarding weight of vehicles.

The Regulator of the overload fee levels as published in the Road Traffic (Maximum Weight of Vehicles) Regulations, 2001 (the Regulations) is thus only the Minister for Transport, Works and Communication.

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<sup>10</sup> Overloading fees were **not included** in the TANRUC model as it is meant to serve as a deterrent for overloading and should not be relied on as a source of revenue RF but rather serve as addition revenue

In the Third Schedule to the last mentioned Regulations provision is made for the schedule of overloading fees payable for an axle and group of axles, at a US dollar rate per kilogram range overloaded by a vehicle. This Schedule is as per Regulation 11 (2) (a) which provides that the fee to be paid for an overloaded axle or group of axles is to be specified in the Third Schedule to the Regulations.

The Fourth Schedule to the Regulations provides a schedule of overloading fees payable for a Maximum Gross Vehicle Mass as a US dollar rate per overload up to the mentioned range of kilograms. This Schedule is as per Regulation 11 (2) (b) which states that the fee to be paid for the Gross vehicle Mass overload is to be as specified in the Fourth Schedule to the Regulations.

It should be noted that Regulation 11(2) (c) provides that where a vehicle is overloaded both with respect to axle load and gross vehicle mass limits, only the schedule giving the highest fee will be applied.<sup>11</sup>

Throughout the Regulations other fee or fine levels are prescribed, such as the USD 2000 fine in Regulation 6 (b) payable on the contravention of an overload special permit issued. The abnormal permit fee cost is set at USD 20 in Regulation 9 (1). The parking penalty fee of USD 20 per day payable after transgressing the 3 allowable parking days with an overloaded vehicle in Regulation 5. When a vehicle bypasses or absconds a weigh bridge station, whether overloaded or not, the registered owner of the vehicle is liable for a bypass fee according to Regulation 13 (3).

Seeing as the Minister mandated to make these Regulations is the Minister for Transport, Works and Communication, he is also responsible for making and publishing adjustments to the charge levels and other relevant stipulations. As mentioned, the discussed charges have not been updated since 2001, whilst the cost of maintaining and developing road and transport infrastructure has escalated much. The Minister should thus decide on appropriate levels by which these fees should be increased and may be guided by the working paper on Cost Recovery Guidelines for Pavement Damage due to Overloading. The adjustment would need to be done via the Finance Act, as this Act is to *“impose and alter certain taxes, duties, levies, fees and to amend certain written laws relating to the collection and management of public revenues”*. The proposed adjustments are directly with respect to the altering of certain fees and amending the part of the Regulations dealing with the collection and management of public revenues.

### **Adjustment frequency**

Neither the Road Traffic Act, 1973 nor the 2001 Road Traffic (Maximum Weight of Vehicles) Regulations prescribe the frequency at which any rate, charge, fee or fine should be amended. It is prudent that a specific provision is made in the Regulations for the automatic increase of these fees, failing which the financing gap for road development and maintenance is not likely to decrease. A separate new Regulation, which would currently be Regulation 19, should provide a “blanket increase frequency” which would allow and compel the Minister to consider and publish increases to all the charges, fines, fees and rates in the Regulations on at least a biennial (every two years) basis. The rate at which the increases should occur are addressed in a separate working paper hereto entitled “Cost Recovery Guidelines for Pavement Damage Due to Overloading”, attached in Annex C of Volume 2.

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<sup>11</sup> It should be noted that according to EAC legislation on overloading which includes the East African Community Vehicle Load Control Act, 2013, the overloading fee would be based on both GVM **and** axle limit. The latter is being planned for Tanzania as well.

### Adjusted fee

Based on the overload trend retrieved from TANROADS, shown in Figure 8-2 below, there is an increasing trend in overloaded vehicles which contradicts the purpose of the overloading fee which is supposed to serve as a deterrent. The current overloading fees must be increased to reverse this current trend by discouraging overloading, which will in turn reduce damage to the Tanzanian road network. The overloading fee contributed approximately 1-2% to the total collected revenue in the last 5 FY and the decrease will not significantly affect the roads fund collects.

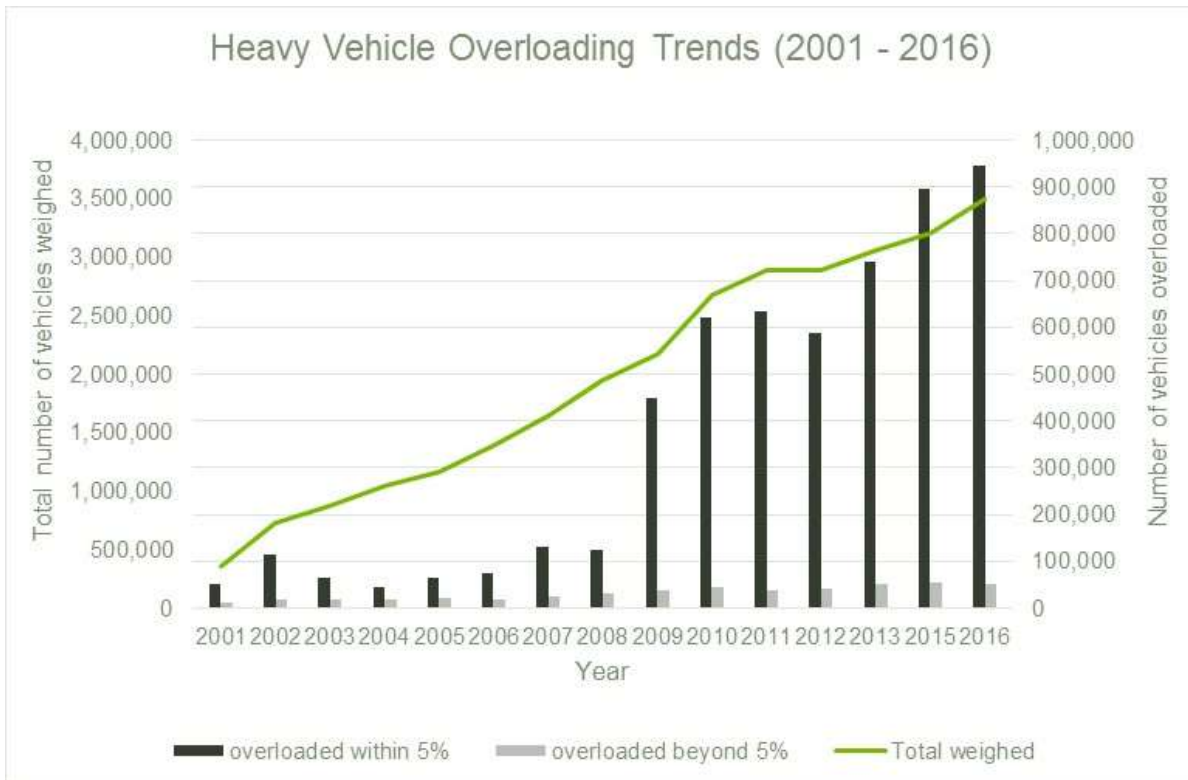


Figure 8-2: Heavy vehicle overloading trends (2001-2016)

A suggested amended fee structure for overloaded vehicles and abnormal load permits are discussed in a previous working a paper entitled “Cost Recovery Guidelines for Pavement Damage Due to Overloading”, attached in Annex C of Volume 2.

### 8.3.1.3 Fuel levy

#### Adjustment mandate

The statutory instrument establishing the Fuel Levy as a source of revenue to the RFB is the Road and Fuel Tolls Act R.E 2006 (the Road and Fuel Tolls Act), with Part IV dealing with the Imposition of Road and Fuel Tolls. There have been predecessor Acts establishing this initially, but lastmentioned revised edition Act includes all amendments up to 2006 and is thus used, together with further amendments thereafter. What is widely termed the Fuel Levy has the technical term of Road and Fuel Toll per this Act in the definition section thereof as well as throughout the entire Act. Section 7(6) of this Act provides that the road and fuel toll payable on fuel shall be levied and paid in accordance with the rates prescribed in the Second Schedule to the Act. This Act in Schedule 2 sets the Fuel Levy at Tshs 100 per litre on

both petrol and diesel in 2006, which has been amended periodically via the Finance Acts. This has the effect of amending the Second Schedule to the Act with each adjustment to the rate of toll, or otherwise as the case may be.<sup>12</sup>

The Minister of Finance is the Minister ultimately responsible for the administration of this Act and is the Regulator of the level of the Fuel Levy, as well as the collection and distribution modalities.

The Road and Fuel Tolls Act mandates the Minister of Finance to “*amend, vary, add to, replace or otherwise alter the First or Second Schedule*” to this Act, in Section 7(7). The First Schedule provides for the “*rate of toll per vehicle of vehicle registration*” and the Second Schedule for fuel toll rates chargeable at filling stations. Neither this Act nor its Regulations of 2016 make mention of with whom the Minister of Finance is to consult on the adjustment of the levy. In the least the Minister of Energy and Minerals and also the Minister of Transport, Works and Communication should be consulted with during the decision making process.

The Minister of Finance may furthermore order exemptions to any person, body of persons, or any vehicle or category of vehicles from the payment of any road and fuel toll (Fuel Levy), under such conditions as what the Minister may impose, as provided for expressly in section 8 of the Road and Fuel Tolls Act.

The Minister of Finance has published lists of exempt bodies over time, and it is suggested that this list be revisited for the level and time period for which especially mines and large scale agricultural producers are exempted from paying the fuel levy, as they are very large diesel and petrol consumers (albeit primarily off-road users). The Minister should very carefully consider the granting of as well as the modalities and effects of existing and further exemptions, as they are difficult to revoke. The modalities will be discussed in a separate working paper on reimbursing off-road users of fuel.

### **Adjustment frequency**

The proviso in the Road and Fuel Tolls Act giving the Minister mandate to amend the Fuel Levy, namely S7 (7), makes no mention of the frequency of such amendments. It is however recommended that this section be amended so as to cater for at least an annual review of the Fuel Levy and other Tolls. It is advisable to increase the Levy annually in small increments more frequently so as to avoid undue sudden shocks to the economy at unforeseen intervals upon irregular adjustments, which often has the effect of the petrol and diesel price increasing leading to the upsurge in the price of consumer products, without the price thereof being decreased again should the fuel price or its elements decrease again. These increments can be at a fixed or variable amount. However, seeing as indices tend to vary greatly from year to year in the region, it may be advisable to adjust the Levy at a fixed amount per annum rather than linking it to an index.

## **8.3.2 Proposed revenue sources for devotion to the RF**

### **8.3.2.1 Foreign Vehicle Permit**

#### **Devotion and adjustment mandate**

The definition of “transit charges” in the Transit Charges Act (S1) would need to be widened so as to align with the Road and Fuel Tolls Act proviso that all “transit related charges” are to accrue to the RFB<sup>13</sup>. Currently the definition of transit charges is that “transit charges means the money payable on the use of a foreign vehicle on a public road”. So as to standardise terminology and avoid misinterpretation and ambiguity the definition should be amended to expressly include Foreign Vehicle

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<sup>12</sup> At the time of writing this working paper the Fuel Levy on petrol and diesel was Tshs 263 per litre.

<sup>13</sup> S 4(1) of the Road and Fuel Tolls Act



Permits. The collection modalities and revenue flow of these I should also be dealt with in the Transit Charges Act so as to ensure that they accrue to the RF.

It is important that the Road and Fuels Tolls Act be amended to include the same definition of transit charges including FVP fees as per the Foreign Vehicle Charges Act. Section 1 of both Acts contain definition sections.

The collection of these fees should be formalised as aforementioned, as there does not appear to be a readily available statutory instrument to regulate these fees. Parts II and III of the Foreign Vehicle Transit Charges Act should be amended accordingly, as they deal with the imposition of transit charges and the administration and collection thereof, respectively. The Schedule to this Act determines the amount payable for the mentioned categories of vehicle, as mandated in S3 of the Act. Once the collection modalities and revenue flow have been established formally in the legislation mentioned, the revenue levels for FVP should be adjusted via the Finance Act going forward.

The relevant minister for both the Road and Fuel Tolls Act and the Foreign Vehicle Charges Act is the Minister of Finance, as per section 1 of each of the Acts. He is mandated to regulate on the adjustment of this fee. This is further corroborated by the express mandate in S 3(4) of the Foreign Vehicle Charges Act which provides for the Minister of Finance to amend, vary, add to or replace or otherwise alter the contents of the Schedule. S 7(7) of the Road and Fuel Tolls Act contains the same proviso.

#### **Adjustment frequency**

The aforementioned mandates to adjust fees in both the Road and Fuel Tolls and Foreign Vehicle Charges Acts do not give directives on the frequency of the adjustments.

The adjustment of these fees should occur as determined by the Minister of Finance as aforesaid, but should not remain constant for more than 5 consecutive years. A proviso to this effect should be included in the main Act regulating these changes, which is recommended to be the Foreign Vehicle Charges Act, in s 3(4).

### **8.3.2.2 Devotion of a portion of excise duty on fuel sales to the RF**

#### **Diversions and adjustment mandate**

Currently all Excise Duties are collected per the Excise (Management and Tariff) Act Cap 147 R.E 2008 (the Excise (Management and Tariff) Act) by the TRA Commissioner and Agents, and paid to the central government (consolidated fund). The recommendation is that a portion that should be devoted to the RF, equivalent to the revenue that would be generated from heavy vehicle licence fees.

The Road and Fuel Tolls Act should be amended in S4 to include that the relevant calculated portion of excise on the Fuel Levy is also a source of revenue to the RF. The institution of this devotion, as well as collection and distribution modalities should however be provided for in the Excise (Management and Tariff) Act, being the principal Act for this Duty. A likely section for this purpose could be Part VII of this Act, dealing with duties. A provision should also be made therein that the rate or percentage of the portion of the excise duty on fuel that will flow to the RF will be ascertained by the Minister of Finance from time to time and published in the relevant Schedule to the Road and Fuel Tolls Act. This amendment to devote the portion of the excise on fuel may be done via the Tax Administration Act, in a similar way as what the 2015 amendments were made via latter Act. The amendment of the portions to be transferred could then be made via the Finance Acts in the future.

The Minister of Finance is the applicable regulator who will have the final say on and responsibility for publishing the quantum and modality of the portion of excise duty to devote to the RF should this recommendation be adopted. It is suggested that the relevant portion be paid from TRA to the ring-



fenced RF Collection Account by TRA, which is the “special account” as per S12 of the Public Finance Act, 2001.

### **Adjustment frequency**

After the base line portion of excise duty to be devoted to the RF is finalized (Tsh/litre on petrol and diesel), the adjustment of these fees to be devoted should occur as determined by the Minister of Finance.

It is recommended that the portion of excise duty (Tsh/litre on petrol and diesel) devoted to the RF should be revised on an annual basis. The idea behind the devotion of a portion of excise duty to the RF is to compensate for the revenue generated from heavy vehicle licence fees. Since the heavy vehicle fleet would increase on an annual basis, the portion of excise duty devoted should have a proportional increase to the growth in the heavy vehicle fleet which can be monitored through the vehicle population.

### **8.3.2.3 Devotion of Road Reserve Charges (RRC)**

There are contrasting statements made by TANROADS and PORALG regarding the collection of billboard fees. The Roads Act 2007 states that the relevant road authority may permit any person or authority (in writing) to use the road reserve temporarily under its jurisdiction. TANROADS stated that the municipal territory determines who receives the billboard fees and not the road owner, while Temeke Municipal Council stated that TANROADS and LGA’s are collecting billboard fees according to road ownership. The LGA’s collected Tshs 11.16 billion in FY 2015/2016 while TANROADS stated that they only charge engineering fees to inspect the billboards in terms of safety. The revenue potential from advertising in the road reserve can be increased if TANROADS also collects the billboard fees within their jurisdiction.

Currently the LGA’s do not collect revenue from utilities within the road reserve while TANROADS collects revenue from optical fibre within the road reserve. TANROADS stated that users are reluctant to pay, shown by their current collection of Tshs 6.88 billion out of Tshs 117.76 billion issued.

### **Diversion and adjustment mandate**

Currently, there is a “Manual for the Control of Advertising within the Road Reserve”, under Regulation 8 of the Road Use Regulations, 2010, which contains the specifications and charges for various categories of advertisements within the road reserve. The LGA’s however have their own bylaws regarding the specifications and charge rates for advertisements in the road reserve. These two need to be line with each other and both road agencies need to follow the same regulations.

There are currently discussions between TANROADS, MOWTC and PORALG to determine who is mandated to collect the respective road reserve charges, as well as the jurisdiction for collection. Policy issues must be rectified in terms of collection by the relevant authority and enforcing payment for the use of the road reserve.

Road reserve charges need to be added to the Road and Fuel Tolls Act Cap 220 as a revenue source for the RF.

### **Adjustment frequency**

The adjustment of these fees should occur as determined by the Minister of Finance as aforesaid, but should not remain constant for more than 5 consecutive years. A proviso to this effect should be included in the main Act regulating these changes.

### 8.3.3 New funding instruments for the Roads Fund

#### 8.3.3.1 CNG, solar and electric vehicles

##### **Establishment and adjustment mandate**

Seeing as the Road and Fuel Tolls Act cap 220 RE 2006 (the Road and Fuel Tolls Act) already makes provision for the collection of a fuel levy, in the form of roads and fuel tolls imposed on diesel and petrol, it would be relatively simple to widen the application of the Act to include the fuel levy on CNG purchased for the propulsion of a vehicle.

In section 1 of this Act, the definition of “fuel” may be amended to include all compressed natural gasses (CNG), as applicable for the propulsion of a vehicle. “Vehicle” is already defined widely in this Act to include “every description of conveyance for the transport of human beings and goods.” The Minister of Finance is mandated to amend this Act.

The definition of gas in the Petroleum Act, 2015 is a wide definition which includes CNG by implication due to its composition ingredients of propane. These Acts should contain the same definition of “gas” so as to avoid unnecessary complications. The Minister of Petroleum Affairs is mandated to amend this Act.

The Road and Fuel Tolls Act should also be amended in Section 4(1) by the addition of monies collected as road and fuel tolls on CNG’s sold for the purpose of the propulsion of a vehicle, as well as petrol and diesel, as an additional source of “monies collected” for the Fund.

Section 7(2) (a) on the imposition of road and fuel tolls would not need to be amended, as any person on the purchase of fuel has to pay the road and fuel toll as per this Act, and the definition of Fuel would have been amended already so as to include CNG.

The remainder of section 7 would also not need to be amended, due to last-mentioned reason. Likewise with section 8, dealing with the Minister of Finance having permission to exempt users from road and fuel toll will not need amendment.

Part V, dealing with the administration and collection of road and fuel tolls will also most likely not need to be amended, as the provisions with regard to the occasion, place and method of collection of road and fuel tolls will apply to CNG as well, as it is also to be levied and recouped at the same instances in the value chain as the fuel levy, namely at the sale of first instance to the bulk purchasers and recouped from consumers on purchase at filling stations. The Commissioner of TRA remains the responsible person for the administration and collection of the CNG levy, together with the rest of the Fuel Levy (currently comprised only of the levy on petrol and diesel).

The Second Schedule to the Act, dealing with the rate of toll at a filling station on petrol and diesel (respectively) would need to be amended so as to reflect the rate of toll on CNG as a separate line item. The rate may be amended in future via the Finance Act.

The Minister of Finance is mandated in Section 7(7) of the Road and Fuel Tolls Act to amend, vary, add to, replace or otherwise alter the First or Second Schedule to this Act. The amendment is done via the Finance Act.

##### **Adjustment frequency**

The Road and Fuel Tolls Act is silent on the frequency of the adjustment of tolls. It is however suggested that provision is made such that the CNG levy is adjusted whenever the fuel levy is adjusted.

## Administration and collection

It is recommended that the fuel levy for CNG vehicles is collected in the same manner that the fuel levy is currently collected.

## Proposed levy on CNG, solar and electric vehicles

Calculating the levy on CNG entailed the following:

- a) Imposing a levy on CNG vehicles by determining what the levy should be for CNG vehicles to collect the same amount of revenue as collected from petrol vehicles.

To make provision for solar and electric vehicles, the following two mutually exclusive options were considered:

- b) Option 1: Imposing a battery charge (levy / kWh) on solar and electric vehicles to then accordingly determine what the levy per kWh should be to collect the same amount of revenue as collected from their petrol counterparts.
- c) Option 2: Imposing a battery levy on solar and electric vehicles, to then accordingly determine what the once-off battery levy should be for electric vehicles to collect the same amount of revenue as collected from their conventional counterparts

The findings are indicated in Table 8-5:

Table 8-5: Estimated CNG levy, battery charge and once-off battery levy

Vehicle Type	Light (Petrol)	Light (CNG)*	Light (Electric)
Fuel Consumption (l/100km or kWh/100km)** (A)	12	16	25
Current Fuel Levy (Tshs/l) (B)	263		
Revenue from Fuel Levy over 100km (Tshs) ('C=A x B)	3 156		
Required CNG levy or Battery Charge Levy (Tshs/l) (D=C/A)		197.25	126.24
Battery Lifetime (km) ('E)			100 000
Required Once-Off Battery Levy (Tshs/Battery) (F=C/100 x E)			3 156 000

Notes:

\* CNG vehicle fuel consumption approximately 30 % higher than normal vehicle

\*\* The fuel efficiency of an all-electric vehicle are measured in kilowatt-hours (kWh) / 100 km rather litres (l) / 100 km

Tanzania electricity cost = US\$0.12 / kWh as in November 2016. Source: Mr Hussein Kamote: Director of Policy and Advocacy at Confederation of Tanzania Industries (CTI)

### 8.3.3.2 The collection of toll roads

The working paper on “*New Sources of Revenue*”, attached in Annex D of Volume 2, discusses the concept of direct tolling in Tanzania and other counties, and also contains a section on Public Private Partnerships. Conventional toll roads have limitations that are shown in the paper which are indicated to possibly be addressed through Public Private Partnerships.

Toll is an excellent method to collect money from road users which can be used for the maintenance and development of that particular road, provided that there are adequate traffic volumes passing through the toll system to recover the collection cost, infrastructure costs, and operational costs. Given

the high initial and ongoing costs for implementing the toll system and the levels of traffic in Tanzania, this type of revenue source is only recommended for implementation on particular roads/corridors.

Government toll roads, which are currently non-concession roads, that have been determined as roads feasible for tolling from time to time may be tolled as provided for in the Road and Fuel Tolls Act Cap 220 R.E 2006. The predecessor Acts to this Act also provided for toll levying and collection, but this Act contains amendments to 2006 and is thus used. The Road and Fuel Tolls Act provides expressly in section 4 (2) that all monies collected as roads and fuel tolls are to be deposited in the account of the Road Fund. Part IV of this Act deals with the imposition of Road and Fuel Tolls, which includes in S 7(1) the tolls being payable on the purchase of fuel as well as by foreign vehicles (except when liable to pay transit charges or if bearing an EAC number plate) and the vehicle owners or drivers carrying fuel in bulk for use in Tanzania.

Section 5 of Part IV mandates the Minister of Finance to schedule a toll station other than a fuel filling station, where a vehicle passing along a public road or public ferry is to pay tolls at the rates prescribed in the First Schedule to this Act. The Second Schedule prescribes toll rates payable at fuel filling stations.

Presently it seems as if only fuel tolls are being collected, but this Act does legislate that road tolls are also chargeable by the Minister of Finance, when he so determines.

#### **Adjustment mandate**

The Minister of Finance is mandated in Section 7(7) of the Road and Fuel Tolls Act to amend, vary, add to, replace or otherwise alter the First or Second Schedule to this Act. The amendment is done via the Finance Act.

#### **Adjustment frequency**

The Road and Fuel Tolls Act is silent on the frequency of the adjustment of tolls. It is however suggested that provision is made that toll rates are revisited and adjusted in small increments on at least a biennial basis (every two years) so as to avoid sudden shocks to the economy.

#### **8.3.3.3 Weight distance charges**

Weight distance charges are an excellent way to recover the cost that heavy vehicles cause to the road. The success of implementation is highly dependent on the technology or methodology adopted to track the distance of vehicles. Implementers may also experience difficulties in terms of enforcement and acceptance by the public. Depending on the technology or methodology adopted to track the distance, there may be a lag until sufficient revenue can be generated. Implementer must weigh the pro's and con's between the cost of implementation and their targeted revenue.

#### **Adjustment mandate**

Weight distance charges will need to be added to be added to the Road and Fuel Toll Act Cap 220 as a revenue source for the RF.

#### **Adjustment frequency**

Adjustments in the weight distance charges need to be in line with adjustments in the fuel levy.

## 8.4 Adjustment of charge levels for current and new funding instruments for the RF

### 8.4.1 Proposed funding scenarios

The adjustment of the charge levels of the current and proposed funding instruments for the RF are dependent on the funding requirement scenario selected (as shown in Figure 6-9), as well as the funding instruments inputted in the TANRUC model. Based on the funding requirement scenario and funding instruments selected, there are an infinite number of solutions available for the adjustment of charge levels. Thus to simplify the process, two funding scenarios (X and Y) were developed, based on the recommended revenue sources for the RF made in Chapter 5.6, summarized in the figure below.

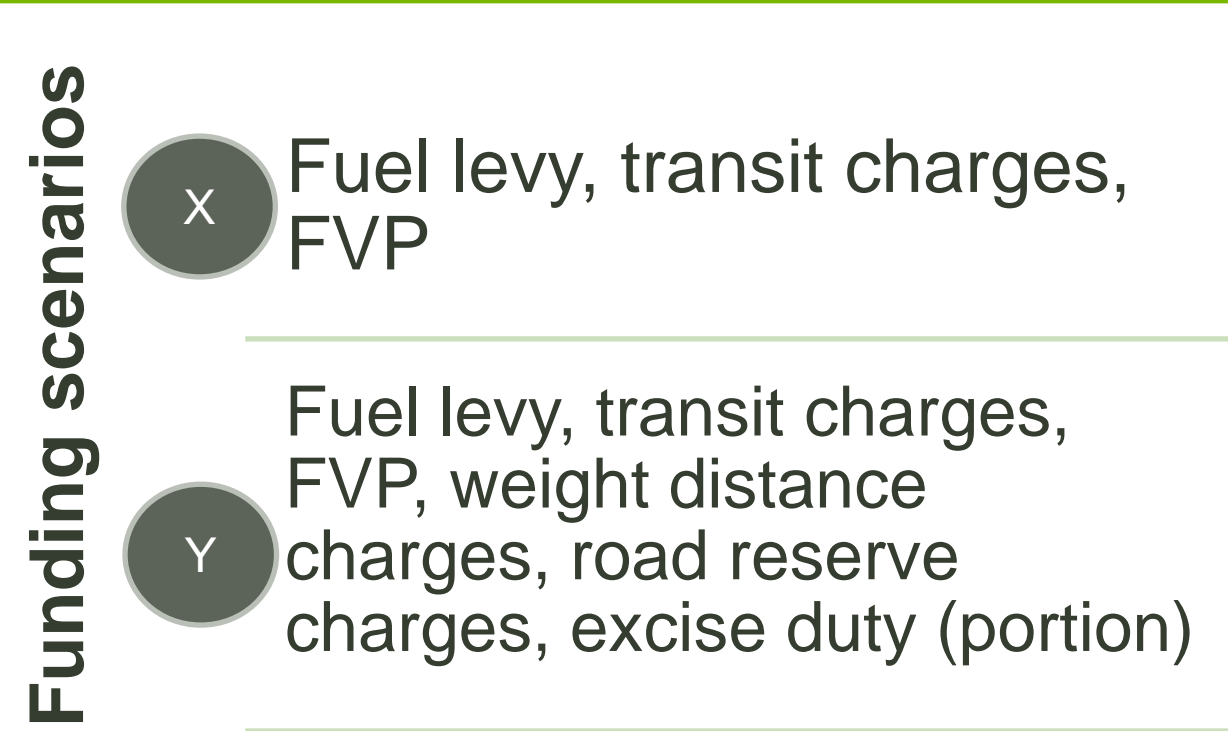


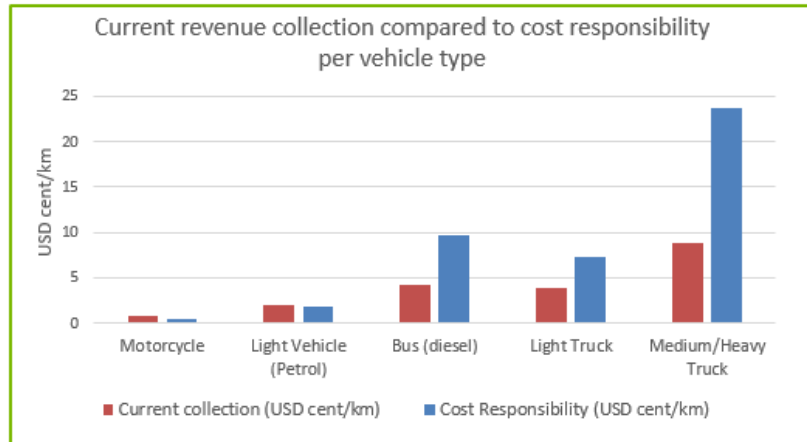
Figure 8-3: Proposed funding scenarios for the adjustment of charge levels

Funding scenario X includes two current revenue sources for the RF – the fuel levy and transit charges, as well as the foreign vehicle permits recommended for devotion to the RF. Funding scenario X represents the most realistic scenario in terms of the funding instruments for the RF. The FVP would be easier to devote to the RF in terms of politics and legislation compared to the other recommended funding instruments for the RF. Funding scenario Y includes two current revenue sources for the RF – the fuel levy and transit charges; Foreign vehicle permits, road reserve charges, excise duty (portion) recommended for devotion to the RF, as well as the introduction of weight distance charges. Funding scenario X would be easier to implement over the short term while funding scenario Y is achievable over the long term after the legislation issues regarding the road reserve charges and technology issues regarding the weight distance charges can be resolved.

#### 8.4.2 Required charge levels per funding scenario

As mentioned in Chapter 6.7, the combined scenario on the classified network is the preferred scenario due to the advantageous effects on the asset value and road condition of the paved network. The total funding requirements of this scenario is USD 552.28 million as shown in Table 6-3. The TANRUC model was then used to adjust the funding instruments identified in funding scenario X and Y to reach a target revenue of USD 552.28 million.

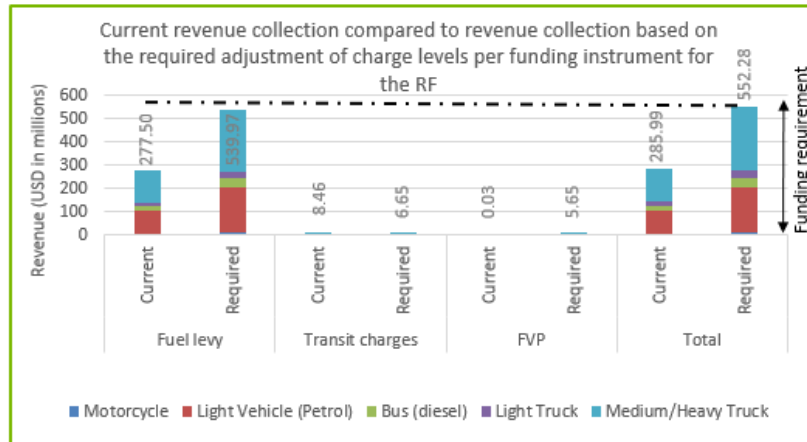
A summary of the required charge levels for each of the funding instruments in funding scenarios X and Y is shown in Figure 8-4 and Figure 8-5 respectively.



Current charge level per funding instrument

Vehicle Type	Fuel Levy (c/l)	Transit Charge (USD/100 km)	FVP (USD/day)*
Motorcycle	12.55	-	-
Light Vehicle (Petrol)	12.55	-	0.22
Bus (diesel)	12.55	-	-
Light Truck	12.55	6.00	-
Medium/Heavy Truck	12.55	16.00	-

\*Funding instrument does not currently accrue to the RF

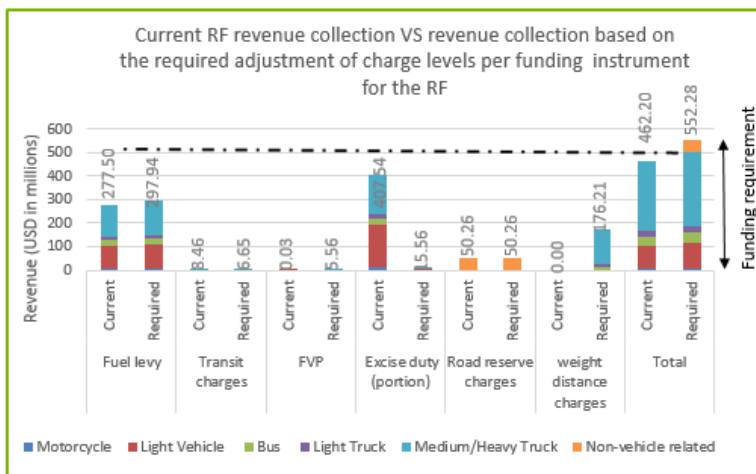
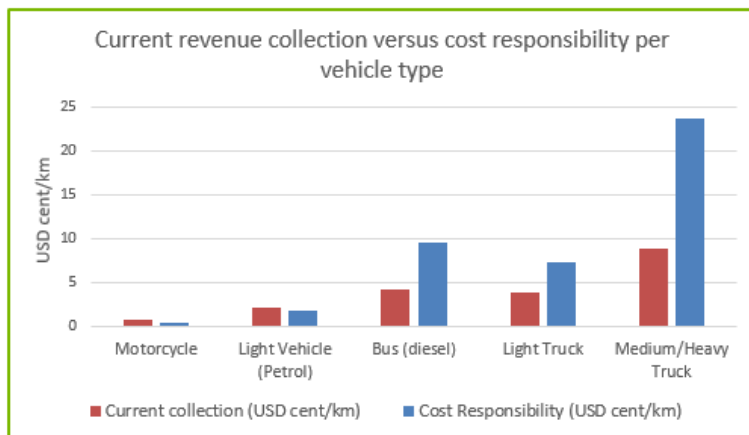


Adjusted charge level per funding instrument

Vehicle Type	Fuel Levy (c/l)	Transit Charge (USD/100 km)	FVP (USD/day)
Motorcycle	24.42	0.40	0.03
Light Vehicle (Petrol)	24.42	0.80	0.81
Bus (diesel)	24.42	4.63	3.88
Light Truck	24.42	4.01	3.00
Medium/Heavy Truck	24.42	12.82	9.74

Figure 8-4: Summary of charge levels and revenue of funding instruments for funding scenario X





#### Current charge level per funding instrument

Vehicle Type	Fuel Levy (c/l)	Transit Charge (USD/100 km)	FVP* (USD/day)	RRC* (USD/unit)	Excise duty* (c/l)	WDC* (USD/100 km)
Motorcycle	12.55	-	-	-	16.86	-
Light Vehicle	12.55	-	0.22	-	16.86	-
Bus	12.55	-	-	-	11.35	-
Light Truck	12.55	6.00	-	-	11.35	-
Medium/Heavy Truck	12.55	16.00	-	-	11.35	-
Non-vehicle related	-	-	-	Variable	-	-

\*Funding instruments do not currently accrue to the RF

#### Adjusted charge level per funding instrument

Vehicle Type	Fuel Levy (c/l)	Transit Charge (USD/100 km)	FVP (USD/day)	RRC (USD/unit)	Excise duty (c/l)	WDC (USD/100km)
Motorcycle	13.47	0.40	0.03	-	0.51	-
Light Vehicle	13.47	0.80	0.81	-	0.51	-
Bus	13.47	4.63	3.88	-	0.51	2.91
Light Truck	13.47	4.01	3.00	-	0.51	2.66
Medium/Heavy Truck	13.47	12.82	9.74	-	0.51	9.32
Non-vehicle related	-	-	-	Variable**	-	-

\*\*Depends on size of billboard and/or type of utility, extent of utility, etc.

Figure 8-5: Summary of charge levels and revenue of funding instruments for funding scenario Y

The first graph in Figure 8-4 and Figure 8-5 show the current revenue collection based on the current charge levels of the fuel levy and transit charges compared to the calculated cost responsibility of each vehicle type. The cost responsibility of each vehicle type was calculated in the TANRUC model in order to achieve the funding requirements for maintenance and development on the road network of the selected requirement scenario. The cost responsibility was based on variable E80 related costs, variable VKT related costs and fixed GVM related costs. The graph shows that the current revenue recovered from heavy vehicles (from fuel levies and transit charges) are much lower than their cost responsibility in terms of the damage they cause to the roads. An adjustment is thus required to recover additional revenue from heavy vehicles.

The summary of the required charge levels in funding scenario X illustrated in Figure 8-4 shows that a large increase of USD 11.87 c/l (approximately Tshs 261) in the fuel levy is required to meet the funding requirement of USD 552.28 million. The required increases in the transit charges and foreign vehicle permit fees are relatively small and achievable. The transit charges and foreign vehicle permits were extended to all vehicle types whereas currently FVP are only payable by light vehicles and transit charges are payable by heavy vehicles. If this funding scenario is selected, the RF will continue to be dependent on the fuel levy for the majority of its funding (98% of total funds). This scenario can however be used as a first approach for the adjustment of FVP and transit charges as the devolution and introduction of new funding instruments to the RF may take several years to implement.

The summary of the required charge levels for the funding instruments in funding scenario Y is illustrated in Figure 8-5. The devolution of the FVP, road reserve charges, a portion of the excise duty, as well as the introduction of weight distance charges to the RF drastically reduces the dependency on the fuel levy (fuel levy would only contribute 54% to the total RF compared to 96-97% currently). Further, only a small increase of USD 0.92 c/l in the fuel levy is required. Based on the approximate heavy vehicle licence revenue calculated for the year 2015 (explained in section 4.5.2), the portion of excise duty required to generate the equivalent revenue of Tshs 34.98 billion was calculated as USD 0.51c/l (approximately 11.22 Tshs/l) on petrol and diesel. The required weight distance charges payable by buses and trucks in Tanzania would be the second highest contributor to the RF after fuel levies (approximately USD 176.21 million). The road reserve charges also has a large revenue impact of USD 50.26 million, which would contribute approximately 9-10% to the RF if these charges can be properly enforced.

**8.4.3 Benchmarking fuel levy charge levels with other countries**

Table 8-6 shows the portion of the fuel levy, taxes and charges that constitutes the fuel pump price less the dealer and OMC margins for a number of countries in SADC and EAC.

Based on Table 8-6, the fuel levy, taxes and charges constitutes the largest percentage of the fuel price in Uganda, South Africa and Kenya.

Table 8-6: Proportion of fuel levies, taxes and charges of pump price

Country	Petrol	Diesel
Tanzania	16%	17%
Botswana	2%	1%
Namibia	11%	11%
South Africa	24%	26%
Lesotho	3%	4%
Swaziland	3%	3%
Zimbabwe	4%	2%

Country	Petrol	Diesel
Kenya	18%	21%
Uganda	27%	21%

The fuel levy in each country is shown in Table 8-7 below and was converted to USD for comparison purposes. South Africa and Uganda have the highest fuel levies from the countries examined.

Table 8-7: Fuel levy in USD cents

Country	Fuel levy national currency		Fuel levy (USD cents)		Exchange rates
	Petrol	Diesel	Petrol	Diesel	
Tanzania	313	313	13.89	13.89	2253.97
Botswana	12	7	1.12	0.65	10.76
Namibia	114	114	7.60	7.60	15.00
South Africa	315	315	21.00	21.00	15.00
Lesotho	30	40	2.00	2.67	15.00
Swaziland	35	35	2.33	2.33	15.00
Zimbabwe	-	-	6	2	-
Kenya	18	18	17.37	17.37	103.65
Uganda	950	630	25.72	17.05	3694.33

Based on the percentage of taxes on fuel, there is some scope to increase the fuel levy albeit to a limited extent in order to avoid the evasion of taxes on fuel.

## 8.5 The downstream effects of increases in the fuel levy

### 8.5.1 The elasticity of demand for fuel

An important economic characteristic of any product is the price elasticity of the demand for that product, i.e. the percentage change in the amount of the product demanded in reaction to a one percent change in the price of the product. In analysing the impact of a fuel price increase, the price elasticity<sup>14</sup> of the demand for fuel is obviously important.

The majority of international studies found fuel sales to be relatively price inelastic. Various price elasticity estimates are given in Appendix B.

For purposes of this study, the estimates of the Bureau for Economic Research were applied in order to estimate the impact of a fuel price increase on the volume of fuel sold. The estimates of the Bureau for Economic Research are based on modern co-integration techniques which are superior compared to the standard techniques such as Ordinary Least Squares (OLS), as they provide an answer to the so-called spurious correlation problem. Unfortunately, no Tanzania specific estimates exist, and it is

<sup>14</sup> An elasticity measures the response of the sales volume of a product to a change in the price of the product or to a change in some other factor (such as consumers' income). More precisely, the numerical value of a particular elasticity indicates the percentage change in the sales volume in reaction to a one percent (1%) increase in the price (or income). An elasticity is generally designated as "elastic" or "inelastic" depending on whether its absolute value exceeds 1.0 or not.

therefore recommended that this needs to be rectified<sup>15</sup>. However, it is believed that the South African estimates represent a fair reflection of the situation in Tanzania.

Table 8-8 depicts *inter alia* the short term and long term price elasticities of petrol and diesel as well as the possible impact on the quantity of fuel sold due to the increase of the fuel levy and the subsequent increase in the fuel price. The table below demonstrates the elasticity of fuel by applying a large increase of Tshs 166c/l to the fuel levy (increase in fuel levy is for demonstration purposes only).

Table 8-8: Estimation of possible impact of fuel price increase on quantity of fuel sold

Item	Petrol	Diesel
Price Elasticity: Short Term	-0.21	-0.18
Long Term	-0.51	-0.06
Current Fuel Price (Tshs/l) <sup>16</sup>	1958.56	1861.35
Current fuel levy (Tshs/l)	263	263
Proposed increase in Levy (Tshs/l)	166	166
Resultant increase in Fuel Price (%)	8%	9%
% Decrease in Fuel Consumption: Short Term (%)	-2%	-2%
Long Term (%)	-4%	-1%

Regarding the table above, the following should be noted:

- a) As mentioned previously, the fuel price elasticity estimates of the Bureau of Economic Research in South Africa were used which appear in the first row.
- b) The current fuel prices in Tanzania (Dar es Salaam) appear in the second row.
- c) The fuel levy appears in the third row (portion for the RF).
- d) The increase in the fuel levy was exaggerated to demonstrate the effects on the fuel consumption. An increase of Tshs 166 (shown in the fourth row) would mean that the fuel price (i.e. the pump price payable of which the fuel levy is only one component) would increase with 8% and 9% for petrol and diesel, respectively.
- e) The resultant percentage decrease in fuel consumption is shown in the fifth row, and the quantity of fuel consumed will decrease by approximately 2% over the short-term for petrol and diesel. Over the long term the quantity of fuel consumed will decrease with approximately 4% and 1% for petrol and diesel respectively. It should be noted that the estimated percentage decrease in the quantity of fuel sold is less than the increase in the fuel price itself (9% and 10% increase on the levy on petrol and diesel respectively). This is due to the fact that fuel is relatively inelastic, and implies that the RFB will be able to increase its revenue by increasing the fuel levy. If fuel would be elastic, it would imply that the RFB would in fact lose revenue if the fuel levy would be increased.
- f) Elasticities can however not measure directly the political acceptance of increases at the level considered.

<sup>15</sup> During the course of the study, it was not possible to estimate Tanzania specific elasticities, as not sufficient historic information was available pertaining to fuel prices and quantity of fuel sold.

<sup>16</sup> Cap prices February 2017 for Dar es Salaam as published by EWURA

### 8.5.1.1 Inflationary impact of the fuel price

It is often stated that an increase in the fuel price (due to the increase of the fuel levy or the landed cost of fuel) has an inflationary effect on the economy. The reason for this could be as follows:

Road transport is used as an input to produce many goods and services. If the fuel price increases, the costs of producers also increase, and those cost increases are shifted largely onto the consumer. The consumers could actually face higher price increases than the initial increase in the price of fuel. This is due to the fact that many producers work with a mark-up on costs. For instance, if the fuel price increases from Tshs 100 to Tshs 120 (i.e. a 20 cent cost increase), and the mark-up of a producer is 20%, then the consumer is faced with a Tshs 24 price increase which is more than the initial Tshs 20 cost increase. This “multiplier effect” will result in price inflation to a greater or lesser extent, depending on the increases in the fuel price.

Even if the fuel price decreases, producers and retailers are often reluctant to decrease prices of goods, and will often increase the price of goods again once they are faced with additional fuel price increases, therefore increasing their profit.

Botswana follows a more pragmatic approach which is more ideal to combat the inflationary impact of fuel price increases by not lowering the fuel price if the CIF component of the fuel price decreases due to exchange rate considerations or other reasons.

The fuel price is also more visible than other VOC components (e.g. licence fees), and therefore drastic fuel price increases (due to increases in the fuel levy) are less popular than drastic increases in any other RUC instrument (e.g. licence fees), although the effect on total road transport costs is the same. This requires that the public needs to be educated and desensitised in order to make fuel price increases (due to an increase in the fuel levy) more acceptable.

## 8.6 Summary of the adjustment of RUC's and non-RUC's

The vehicle cost responsibility is related to the damage that each vehicle type causes to the road respectively, and was based on variable costs related to the VKT and E80; and fixed costs related to the Gross Vehicle Mass (GVM). The TANRUC models uses this principle of cost responsibility to adjust the charge levels of RUC's.

It is recommended that the combined scenario be used as the **target funding requirement** for the adjustment of road user charges due to the advantageous effects on the paved road network, as demonstrated by the VOC, condition and asset value graphs in chapter 6.6. The funding requirement for the combined scenario on the classified network is USD 552.28 million. This funding requirement includes maintenance on all roads regardless of feasibility and rehabilitation on road links where it is feasible.

The adjustment of the charge levels of the current and proposed funding instruments for the RF are dependent on the funding requirement scenario selected, as well as the number of funding instruments inputted in the TANRUC model. Two **funding scenarios** were devised, namely funding scenario X and funding scenario Y. Funding scenario X includes two current revenue sources for the RF – the fuel levy and transit charges, as well as the foreign vehicle permit fees recommended for devotion to the RF. Funding scenario Y includes two current revenue sources for the RF – the fuel levy and transit charges; foreign vehicle permit fees, road reserve charges, excise duty (portion) recommended for devotion to the RF, as well as the introduction of weight distance charges. The funding instruments for each funding scenario are summarized in Figure 8-3. The required **charging levels** for the respective funding scenarios are summarized in Figure 8-4 and Figure 8-5, to be used as an **indicator** for the adjustment of each of the funding instrument based on the damage that each vehicle type causes to the roads.

Funding scenario X will maintain the Roads Fund dependency on the fuel levy and requires a drastic increase in the fuel levy to meet the desired funding requirements. Funding scenario Y reduces the dependency on the fuel levy and diversifies the funding instruments for the RF. Funding scenario X can be used as a first approach for the adjustment of FVP and transit charges as the devolution and introduction of new funding instruments (which form part of funding scenario Y) to the RF may take several years to implement.

Based on the benchmarking of fuel levy with other countries, Tanzania has one of the highest fuel levies and a high proportion of taxes that constitute the pump price after South Africa, Uganda and Kenya, from all the countries examined. Although increasing the fuel levy, will have the most significant effect on the RF collections compared to all other revenue sources, increasing the fuel levy will also increase the portion of taxes that constitutes the pump price and may encourage the evasion of these taxes. This should be a considerable factor for the adjustment of the charge rate of the fuel levy.

This chapter also examined the adjustment mandates and adjustment frequencies for each of the current and potential revenue sources for the RF.





## Chapter 8 Key findings, recommendation and conclusion



## 9 Key Findings, Recommendations and Conclusion

### 9.1 Proposed revenue sources for the RFB

Based on the review of potential revenue sources for the RFB in Chapter 5, it was recommended that **road tolls, road reserve charges and foreign vehicle permits (FVPs), as well as a portion of the excise duty** are devoted to the RFB. The introduction of **weight distance charges (WDC)** should also be considered based on the large revenue potential and comments from the steering committee, however, may be difficult to implement due to Tanzania's large road network.

It is understood that the annual licence fees were recently abolished, while the excise duty on petrol and diesel were increased to compensate for the revenue from annual vehicle licence fees. Currently, heavy vehicle licence fees are mandated to accrue to the RF according to the Road and Fuel Tolls Act Cap 220. Traditionally, annual vehicle licence fees for all vehicle types are a funding instrument for Roads Funds in countries such as Uganda, Lesotho, Namibia, Zambia and Zimbabwe as shown in Table 5-1. Annual vehicle licences also have a large revenue potential (approximately Tshs 156.3 billion) based on the current vehicle population. It is proposed that the licence fees are reinstated to be used specifically as a revenue source for the RF and as means to monitor the size of the vehicle population in Tanzania. There are already mechanisms in place for the collection of the licence fees, as well as estimates for the cost of collection. It may be much easier to reinstate the licence fees than to implement WDC which may take years to recover sufficient revenue. Alternatively, since the increase on the excise duty on petrol and diesel has already been implemented, a portion of the excise duty equivalent to that which would have been generated by the heavy vehicle licence fees (approximately Tshs 34.98 billion as discussed in section 5.4.1) should be diverted to the RF, to be in line with the Road and Fuel Tolls Act Cap 220.

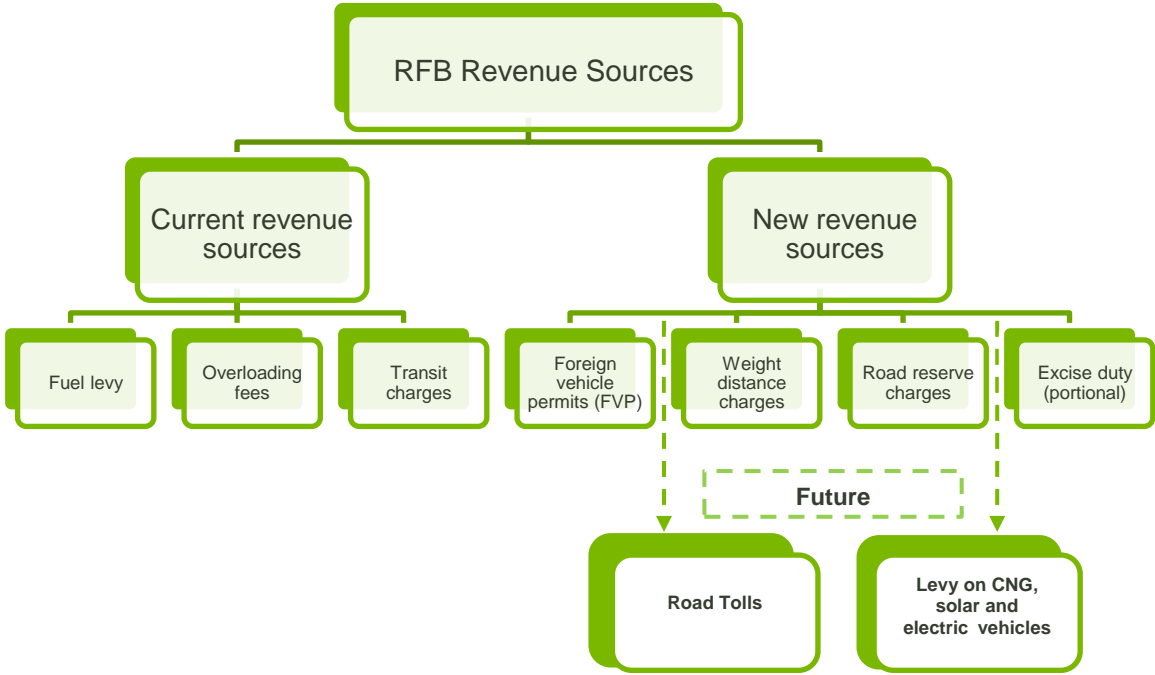
The revenue potential for FVP is low when compared to the current revenue sources for the RF. However it is a transit related charge and should be devoted to the RF according to the Road and Fuels Tolls Act Cap 220 R.E 2006 which mandates that transit fees should accrue to the RF. Further, foreign vehicles should be responsible for the damage they cause on the Tanzanian roads.

Currently there is no evidence of CNG, solar and electric vehicles in mainland Tanzania due to the economic and social circumstance of the majority of the population, which does not support the purchase of new vehicles, as pre-owned vehicles currently remain the preferred choice. However, it is expected that the country will follow the global trend in the future and at such time, measures must be put in place to recover the damage that these vehicles cause on the road. This can be done by introducing a levy on CNG similar to the concept of the fuel levy on petrol and diesel, and a once-off levy on solar and electric vehicles or the batteries on solar and electric vehicles.

The road reserve charges have strong revenue potential for the RF, especially from charges related to utilities within the road reserve. There however needs to be methods put in place to enforce these charges (approximately 6% of the total charges is currently being collected). There also needs to be verification in terms of the collection mandate. There is currently confusion between TANROADS and PORALG with regards to the jurisdiction for collection of billboard fees. TANROADS also currently does not collect billboard fees while there is mandate available for them to do so.

Direct road tolling has been implemented in many countries as an additional method to retrieve revenue for the purposes of road maintenance with great success, provided that the road in consideration has sufficient traffic levels to recover the cost associated with the construction and operational costs of the toll infrastructure and technology. It is recommended that the revenue from the toll roads are diverted to the RF as per the Road and Fuels Tolls Act Cap 220 R.E 2006, once the cost to implement the toll has been recovered. Road tolling is however only applicable for specific roads and not for the entire network.

A summary of the proposed revenue streams constituting the RF is shown in Figure 9-1 below.



**Figure 9-1: Proposed Revenue Sources for the RFB**

\*Overloading fees consist of fees recovered from overloaded vehicles at weighbridges and abnormal permit fees.

**9.1.1 Key findings and recommendations of current funding instruments for the RF**

**Fuel levy**

Based on the gap analysis of current fuel levy collections in section 4.3.1, the revenue collected by TRA and received by RFB correlate very well, which is indicative that there is no or little leakage of imported fuel for local use.

This could be due to the introduction of fuel marking in September 2010, which reduced adulteration malpractices, reduced the dumping of transit products in the local market and reduced smuggling malpractices. The adulteration of fuel was also reduced when taxes and levies on kerosene were brought in line with the taxes and levies of petrol and diesel, therefore removing the incentive for mixing kerosene with petrol or diesel.

It was also mentioned that there is a new type of live computer system at the Dar es Salaam port which monitors the connected pipes and open vessels, managed by TPA. This type of system reduces leakages on imports.

Overall there are good procedures in Tanzania to ensure the collection of taxes on local fuel and minimize the smuggling of fuel into the local market.

The adjustment of the other current funding instruments and introduction of new funding instruments will contribute to reducing the dependency on the fuel levy which currently amounts to 96-97% of the RF.

### Transit Charges

1. It should be noted that Road and Fuel Tolls Act Cap 220 (R.E 2006) dictates that *transit fees* revenue should accrue to the RF however currently the *transit charges* accrue to the RF. The “fees” portion can be regarded as a collective term for fees and other charges as long as they are transit related. Both transit fees and transit charges are collected by TRA however TRA is unclear on the definition of transit fees nor is there any legislation regarding the collection or charge levels of *transit fees*. For the FY 2015/2016, the revenue for transit charges was Tshs 9.06 billion while the revenue from transit fees was merely Tshs 312.91 million, as reported by TRA.

The revenue from transit fees and transit charges should be consolidated as a one line item and should accrue to the RF, as it is assumed that transit fees in fact refer to transit charges.

2. The TRA data from each border post is not in a user friendly format and many of the entries lack basic information such as the distances used for start and end journey and duration of stay. The current format does not allow the RFB to analyse the data to verify the accuracy of revenue received from this source.

### Recommendations

1. Consider a live data capturing system that can be automatically uploaded to a central system where it can be accessible to TRA and the RFB.
2. The live data system should be used to capture vehicle entry and exit data at the border post. An application similar to the “traffic ticker” (as explained in section 4.3.2.3) is suggested which runs on any android or tablet and can upload data to the server in real time. The application can also record GPS data such that the entry and exit border post utilized by a vehicle can be captured automatically. The application can require a login page such that the user of the application can be identified if the data has not been properly recorded.
3. The following data should be captured by TRA at the border posts : Vehicle registration, vehicle type (light or heavy), number of axles, type of goods, tonnage, date of entry, point of entry, destination, point of exit, date of exit, calculated duration of stay, calculated distance travelled, charge levied (USD/km), calculated transit charge. The data will be captured at the border post of entry and confirmed at the border post of exit.
4. Alternatively, the user of the foreign vehicle can apply online ahead of time, filling in the information categories listed in 3 above. The user can then transfer the money directly into the account of the RFB. This information can be confirmed by the officers at the border post. This will reduce the exchange of money at the border posts and reduce congestion at the border posts, as foreign vehicles can move through more quickly after completing the check.
5. The actual distance travelled by the foreign vehicles needs to be monitored as the driver of the vehicle may travel further than stated. The odometer reading on the vehicle is not always an accurate form of monitoring as it can be easily tampered with and is often faulty in older model vehicles.

One method to monitor the travelled distance is to divide the country into zones and issue stickers of different colours depending on the zone. The stickers should be printed on tamper proof paper to be issued at the border post with the date of entry. Stickers are to be checked by law enforcement within a particular zone. However, this method may be difficult to enforce considering the size of Tanzania.

Another method assuming that all border posts have network connectivity (e.g. 3G) is border posts with network enabled handheld devices with on-board cameras. The handheld devices would run a simple application allowing a border post official to record the number plate with the odometer reading with a photograph (for vehicle entering and leaving). A system could automatically calculate the charge rate. This method is still susceptible to tampering with the odometer, however, realistically it may be both difficult and expensive “to catch all fish in the sea”.

### Overloading fees at the weighbridges

1. Maintenance of WIM system – for weighbridges where a WIM has been installed, the WIM should be maintained regularly such that it can perform its function optimally which is to pre-screen overloaded vehicles and direct them to the static scale. WIM systems are usually installed at weighbridge stations with high traffic volumes. Non-functioning WIM systems increase the burden on the static scale. The WIM system at Vigwaza was malfunctioning at the time of the site visit which is indicative of lack of maintenance.
2. The WIM should be calibrated with the data at the static scale. There is currently no calibration of the WIMs. WIM data is only stored for a period of 3 months, where it is constantly replaced with the latest data.
3. Improvement on weighbridge reporting: currently weighbridge overload data from each region is sent to the TANROADS HQ office. It is understood that only the aggregated overloading values from each region is captured at the HQ office, and not per weighbridge. This method of data collection is ineffective and time consuming, and makes it difficult to analyse the overload trends across the country for planning purposes.

The following suggestions were made regarding the vehicle overload management system:

- i) WIM data should be integrated with the static scale data and uploaded to a central system. This will also assist with calibration of the WIM system as data from the WIM and static scale can be easily compared.
- ii) The static scale and WIM data should be uploaded to the central system at least once a day.
- iii) The central system should include a username and password to allow authorised persons to log in and draw reports, make searches and export reports to excel spreadsheets.

It was mentioned during consultation with TANROADS that they are in the process of introducing a live data capturing system for the static scales. It is currently in the design phase and will capture live data at 13 weighbridge stations. There will also be live streaming rooms at TANROADS, MoWTC and RFB to allow for constant monitoring.

4. It is recommended that new weighbridge stations or the upgrade of current weighbridge stations with high traffic volumes make preference for multi-deck scales rather than single deck scales. There are many factors that affect the accuracy of measurement of single-deck beams as explained in 4.3.3.3. Other than the accuracy of measurement, multi-deck scales allow vehicles to be weighed quicker, reducing the stacking distance for weighbridge stations with high traffic volumes.

Single deck scales can be used with great success on routes with lower AADTT where stacking is not the main concern. The gross combined mass (GCM) obtained from adding the individual axle or axle unit mass, however, could be overstated with as much as 2% in some extreme cases.

5. Additionally, current operations for axle load control are mainly concentrated on major corridors (trunk roads) towards the North and South of Tanzania, leaving a number of roads within the central region without any kind of enforcement making them susceptible to damage due to overloaded vehicles and hence rapid deterioration. Weighbridge stations should be strategically positioned on heavily heavy vehicle trafficked routes even if it is not a trunk road.

### Abnormal load permits

Previously, the abnormal load permits issued by MoWTC were recorded manually making the revenue difficult to monitor. Table 4-10 shows an anomaly in that the total revenue collected by MoWTC was less than that received by RFB for FY2015/2016, possibly due to inaccurate capturing of the revenue collection due to the manual recording process. It is understood that the issuing of e-permits greatly increased the efficiency of the reporting process, making it easier to monitor by the RFB.

Ideally, the abnormal permit form should also include certification that the load in question was physically checked and the verification reports to be part of the auditable office copy.

## 9.1.2 Key findings and recommendations for recommended devoted revenue sources for the RF

### Vehicle licence fees

If the vehicle licence fees are to be reinstated in the future, the following should be considered:

#### 1. A vehicle de-registration system is required

Currently, there is no official vehicle de-registration system in Tanzania and hence the current vehicle population is inflated.

It is recommended that the vehicles not being used anymore, be removed from the vehicle registry to avoid overstating the actual vehicle population. Vehicle owners should be encouraged to de-register their vehicle if it has become unfit for use or stolen via a de-registration system that is quick and easy to complete.

**If the vehicle licence fees are reinstated**, there should also be a stipulation that an unlicensed vehicle can be removed from the system automatically. For instance, if a vehicle licence has not been renewed for 3 consecutive years, the authority should automatically remove it from the system. To determine the live vehicle population, only the vehicles that are liable for annual licence fee renewal should be considered rather than the cumulative number of vehicles registered in the system.

Following the abolishment of the vehicles licence fees, it will be difficult to monitor the live-vehicle population.

#### 2. The licence fee structure

The recently abolished annual vehicle licence charging system was based on the motor vehicle engine size. This is not considered a fair charging system as it means that light vehicles with a large engine size may pay the same as trucks. Based on the calculated charge rate of the recently abolished licence fees in USD, light vehicles paid approximately (USD 87 per year) which was almost the same as light trucks (USD 94 per year).

If the annual vehicle licence fees are to be reinstated, the annual licence fee structure should rather be based on the GVM. Vehicles should pay according to their weight which is ultimately related to the damage they cause to the roads.

### Foreign vehicle permits (FVP)

1. There are currently no legislation and regulations pertaining to the collection or charge level of foreign vehicle permits. However, they are formally collected by TRA at the border posts, with the revenue collections formally published on TRA's website. The collection of these fees should be formalized to provide a statutory instrument to regulate these fees. Parts II and III of the Foreign Vehicle Transit Charges Act should be amended accordingly. Once the collection modalities and revenue flow have been established formally in the legislation mentioned, the revenue levels for FVP should be adjusted via the Finance Act going forward.
2. According to the Road and Fuels Act Cap 220 (RE 2006), transit fees should accrue to the RF. Foreign Vehicle Permits are transit related charges which allow foreign vehicles access to the road network and should accrue to the RF. The Transit Charge Act, Road and Fuel Tolls Act and the Foreign Vehicle Charges Act should all include the same definition of "transit charges" which should include foreign vehicle permits within the definition.
3. Based on consultation with stakeholders, the FVP is only collected from light vehicles and the permit is valid for a period of 3 months. The FVP should be extended to all vehicle types, not only light vehicles. It is understood that foreign vehicles entering Tanzania from the EAC are given a grace period of 7 days, based on comments from the steering committee. It is recommended that this grace period is removed as foreign vehicles should also contribute to the upkeep of the Tanzanian road network.

### Road reserve charges

1. The Roads Act, 2007 states that the relevant authority may permit any person or authority (in writing) to use the road reserve temporary under its jurisdiction. The authorised user must then remove such utilities and related developments at their own cost when the road reserve is required by the road authority.
2. The "Manual for Control of Advertisement within Road Reserve" is made under Regulation 8 of the Road User Regulation. This manual contains specifications and charges for various categories of advertisements within the road reserve. The LGA's however have their own bylaws regarding the specifications and charge rates for advertisements in the road reserve. These two need to be in line.
3. Currently, TANROADS does not collect revenue from advertisement in the road reserve and only charges an inspection fee. The LGA's do not collect revenue from utilities within the road reserve.
4. There is currently confusion between TANROADS and PORALG with regards to the jurisdiction for collection of billboard fees.
5. There is high revenue potential from road reserve charges particularly for the installation of utilities within the road reserve.
6. There needs to be proper enforcement of road reserve charges- TANROADS only collects 6% of the total charges issued for optical fibre in the road reserve.

### 9.1.3 Key findings and recommendations for the introduction of new funding instruments for the RF

#### CNG, electric and solar powered vehicles

If Tanzania is to follow the global trend of introducing alternate fuels in the vehicle market, a method for charging CNG, electric and solar powered vehicles to recover the cost they cause to roads must be considered through the following methods:

1. A levy on CNG is proposed for CNG powered vehicles. The proposed fee was calculated such that the CNG vehicle population generate the same revenue as currently collected from the fuel levy on petrol. The definition of “fuel” in the Road and Fuel Tolls Act will have to be amended to include CNG. It would be relatively simple to widen the application of the Act to include the fuel levy on CNG purchased for the propulsion of a vehicle. The levy on CNG should be collected in the same manner as the fuel levy, namely at the sale of first instance to the bulk purchasers and recouped from consumers on purchase at filling stations.
2. For the electric vehicles, two charging systems were examined - imposing a battery levy per kWh or imposing a once- off battery levy. In both alternatives, the required fee was calculated to generate the same revenue as currently collected from the fuel levy on petrol. The levy per kWh was found to be exorbitant and impractical, and a once –off battery levy fee is rather proposed. Similar for electric vehicles, a levy on the solar panel, the battery or solar vehicle itself is proposed.

#### Weight distance charges (WDC)

1. This system requires high-level compliance and implementation of modern technology to collect the desired revenue.
2. Implementation of this RUC in Tanzania may be very expensive considering the size of the country. Adopting country-wide tracking systems may only be limited to major corridors.
3. Could be administered in Tanzania if the technological risks can be mitigated, however implementation would take a number of years.
4. Users will be concerned that shipments or hazardous material transportation routes could be discovered and/or tracked by the wrong people (depending on the technology implemented).

## 9.2 Recommendations for the adjustment of new and current funding instruments for the RF

### 9.2.1 Deciding factors for fee adjustment

The TANRUC computer model, a tool designed by the consultant to assist with the adjustment of road user charges, allows the user to either manually input unit charges or select the calculated theoretical unit charge based on the cost responsibility of the vehicle. Based on the funding requirement scenario and funding instruments selected, there is an infinite number of solutions available for the adjustment of charge levels.



### 9.2.1.1 Scenario selection

The evaluation of the maintenance and development needs in mainland Tanzania was carried out using the HDM-4 programme, as explained in chapter 6 of this Final Report. The maintenance and development requirements were divided into a number of requirement scenarios, namely 1A, 1B, 2A and 2B. The requirement scenarios are based on **economic feasibility**<sup>17</sup> – scenario 1A and 1B include both economically feasible and non-feasible roads while scenario 2A and 2B include feasible roads only. The requirement scenarios are also based on specific types of maintenance and developments actions – scenario 1A and 2A include both maintenance and development while scenario 1B and 2B only include maintenance actions.

Funding scenarios 1A, 1B, 2A and 2B were analysed on both the entire network and classified road network as explained in Figure 6-9. A proposed combined scenario was also analysed after receiving comments from the steering committee, that maintenance should not be concentrated on economic feasibility but should rather be focused on improving accessibility within Tanzania, especially for the poor rural communities.. The proposed scenario is a combination of 1B and 2A. This combined scenario illustrates maintenance activities on all road links (irrespective of economic feasibility) and rehabilitation on links where it is economically feasible. A short summary of the scenarios and associated funding requirements are shown below in Figure 9-2.

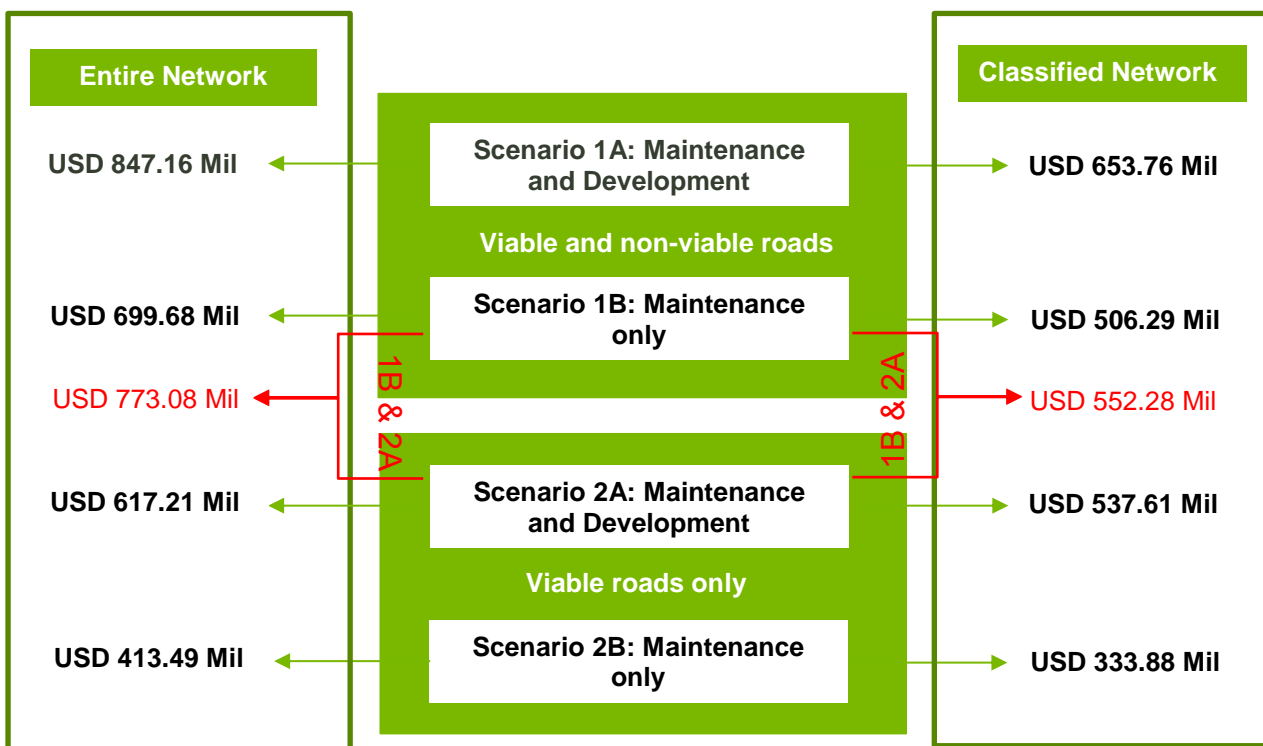


Figure 9-2: Summary of funding requirements

The combined scenario was selected as the preferred scenario due to the following reasons:

<sup>17</sup> The feasibility (viability) of the project is based on the net present value (NPV) which must be greater than 0 for the project to be viable. The NPV can be obtained by subtracting the present value of the costs from the present value of the future benefits.

- a) The RF was established primarily for road maintenance. At least 90% of the funds must be used for maintenance and not more than 10% should be used for development according to the Road and Fuel Tolls Act Cap 220 (R.E 2006), Part II. Development categorized under scenarios 1A and 2A include both rehabilitation and upgrade, thus the total development requirements surpasses the 10% limit (distribution shown in Figure 6-14 and Figure 6-15) for development as indicated by the Fuel Tolls Act Cap 220. The proposed combined scenario only includes rehabilitation as part of development, thus the development funding requirements for this scenario is more or less in line with the 10% limit.
- b) Chapter 6.6 shows the effect that each scenario has on the VOC, condition and asset value of the road network. The combined scenario is the preferred scenario due the advantageous effects on the paved road network. This scenario ensures that the asset value of the road network is maintained over the analysis period. The combined scenario, along with 1A and 2A result in the greatest reduction in the VOC.
- c) Road maintenance and development should be focused on improving accessibility, especially for poor rural communities regardless of whether they are economically feasible or not. This scenario illustrates maintenance activities on all road links (irrespective of economic feasibility) and rehabilitation on links where it is economically feasible.

#### 9.2.1.2 Network selection

It should be noted that the Road and Fuel Tolls Act Cap 220 (R.E 2006) refers to the use of Road Funds for **classified roads**. According to the RFB Proposal to Broaden the Revenue Base, 56,705km out of 108,946km of the PORALG network is unclassified and all roads on the TANROADS network are classified.

Based on the statement made in this Act, it is recommended that the **combined funding requirement scenario** on the **classified network** is selected, meaning that the funding requirements for the adjustment of road user charges is **USD 552.28 million**. The latest RF release was USD 300.69 million for FY 2015/2016, meaning there is a **current deficit of USD 251.58 million**.

#### 9.2.1.3 Fund scenarios

The adjustment of the charge levels of the current and proposed funding instruments for the RF are dependent on the funding requirement scenario selected, as well as the funding instruments selected in the TANRUC model. Therefore, based on the funding requirement scenario selected and the funding instruments included in the model, there are an infinite number of solutions available for the adjustment of charges. Two funding scenarios were devised, namely funding scenario X and funding scenario Y. The two funding scenarios were devised to provide an **indicator of the adjustment of RUC's for the RF**, based on the funding instruments recommended for the RF in chapter 5.6 . Funding scenario X includes two current revenue sources for the RF – the fuel levy and transit charges, as well as addition charges including the foreign vehicle permit fees recommended for devotion to the RF. Funding scenario Y includes two current revenue sources for the RF – the fuel levy and transit charges; foreign vehicle permit fees, road reserve charges, excise duty (portion) recommended for devotion to the RF, as well as the introduction of weight distance charges. The funding instruments for each funding scenario are summarized in Figure 8-3. The required charging levels for the respective funding scenarios, as discussed in chapter 8 are summarized in Figure 8-4 and Figure 8-5, to be used as an indicator for the adjustment of each of the funding instrument based on the damage that each vehicle type causes to the roads.

Funding scenario X will maintain the Roads Fund dependency on the fuel levy and requires a drastic increase in the fuel levy to meet the desired funding requirements. The charge levels for the FVP and

transit charges are the same for funding scenario X and Y as they are based on the vehicle cost responsibility of foreign vehicles.

Funding scenario Y is recommended as it reduces the dependency on the fuel levy and diversifies the funding instruments for the RF. The FVP and transit charges should be adjusted as a first stage approach as the devolution and introduction of new funding instruments (WDC, RRC and excise duty which form part of funding scenario Y) to the RF may take several years to implement.

**9.2.2 Recommendation for charge levels**

Based on the funding requirement of USD 552.28 million for the **combined scenario on the classified network**, the required charge level for the funding instruments in **funding scenario Y** is summarized in Table 9-1 below.

Table 9-1: Adjusted charge level per funding instrument based on funding scenario Y

Vehicle Type	Fuel Levy (c/l)		Transit Charge (USD/100 km)		FVP (USD/day)		RRC (USD/unit)		Excise duty (c/l)		WDC (USD/100km)	
	Current	Required	Current	Required	Current	Required	Current	Required	Current	Required	Current	Required
Motorcycle (petrol)	12.55	13.47		0.40		0.03		-	16.86	0.51	-	-
Light Vehicle (petrol)	12.55	13.47	-	0.80	0.22	0.81		-	16.86	0.51	-	-
Bus (diesel)	12.55	13.47	-	4.63		3.88		-	11.35	0.51	-	2.91
Light Truck (diesel)	12.55	13.47	6.00	4.01		3.00		-	11.35	0.51	-	2.66
Medium/Heavy Truck (diesel)	12.55	13.47	16.00	12.82		9.74		-	11.35	0.51	-	9.32
Non-vehicle related	-	-	-	-		-		Variable		-	-	-

A recommendation for the charge rates on the classified network to meet the combined funding scenario is discussed as follows:

- a) Note that the figures shown in the table above are based on vehicle cost responsibility. The only serve as an indicator for the adjustment of RUC’s. The user of the TANRUC model can adjust the figures manually, as desired.
- b) The devolution of the FVP, road reserve charges, a portion of the excise duty, as well as the introduction of weight distance charges to the RF drastically reduces the dependency on the fuel levy (fuel levy would only contribute 54% to the total RF compared to 96-97% currently). Further, only a small increase of USD 0.92 c/l in the fuel levy is required from the current rate of USD 12.55 c/l.

Section 8.5.1 discussing the elasticity of fuel illustrated that the demand of fuel is fairly inelastic meaning that an increase in the fuel price has a small effect on the demand of fuel. However, the

portion of fuel levies of the pump prices and portion of taxes, levies and duties of the pump price in Tanzania is high when compared to the other countries benchmarked in section 8.4.3. The excise duty on petrol and diesel was recently increased by 40 Tshs/l, following the abolishment of licence fees. Increasing the fuel levy will further increase the portion of taxes that constitute the fuel price, which may encourage users to evade levies and taxes on fuel. An increase of USD 0.92c/l (20.68 Tshs/l is considered acceptable, especially if implemented over a duration such as 3-5 years (6.89 Tshs/l to 4.14 Tshs/l increase per year)

- c) Based on the approximate heavy vehicle licence revenue calculated for the year 2015 (explained in section 4.5.2), the portion of excise duty required to generate the equivalent revenue of Tshs 34.98 billion was calculated as USD 0.51c/l (approximately 11.22 Tshs/l) on petrol and diesel. Note that this is not an increase in the excise duty but the portion of excise duty per litre of petrol and diesel that should be devoted to the RF.
- d) The road reserve charges are shown as variable as the cost for various billboards and utilities within the road reserve differs. The revenue generated from the RRC were used to adjust the other RUC's.
- e) The transit charges and FVP should be extended to all vehicle types.

### 9.2.3 Recommended implementation plan for adjustment of current and proposed funding instruments

#### 9.2.3.1 Implementation plan for combined scenario on classified network

It is recommended that the proposed increase is implemented at least over a 3-5 year period. To minimize the effects on the road user, a 5 year implementation plan is proposed by the consultant. The annual increase for the 5 year duration and the revenue generated per year is shown in Table 9-2 and Table 9-3 respectively.

Table 9-2: Adjustment of charge levels per funding instrument per year

Funds	Current charge level	Increase year 1	Charge level (2018)	Increase year 2	Charge level (2019)	Increase year 3	Charge level (2020)	Increase year 4	Charge level (2021)	Increase year 5	Charge level (2022)
<b>Fuel levy (USD cent/l)</b>											
Petrol levy (USD c/l)	12.55	0.18	12.73	0.18	12.92	0.18	13.10	0.18	13.29	0.18	13.47
Diesel levy (USD c/l)	12.55	0.18	12.73	0.18	12.92	0.18	13.10	0.18	13.29	0.18	13.47
<b>Transit Charges (USD/100km)</b>											
Motorcycle	0.00	0.08	0.08	0.08	0.16	0.08	0.24	0.08	0.32	0.08	0.40
Light Vehicle (Petrol)	0.00	0.16	0.16	0.16	0.32	0.16	0.48	0.16	0.64	0.16	0.80
Bus (diesel)	0.00	0.93	0.93	0.93	1.85	0.93	2.78	0.93	3.70	0.93	4.63
Light Truck	6.00	-0.40	5.60	-0.40	5.20	-0.40	4.80	-0.40	4.41	-0.40	4.01
Medium/Heavy Truck	16.00	-0.64	15.36	-0.64	14.73	-0.64	14.09	-0.64	13.46	-0.64	12.82
<b>Foreign Vehicle Permit Fees (USD/entry)</b>											
Motorcycle	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.03	0.01	0.03
Light Vehicle (Petrol)	0.22	0.12	0.34	0.12	0.46	0.12	0.57	0.12	0.69	0.12	0.81
Bus (diesel)	0.00	0.78	0.78	0.78	1.55	0.78	2.33	0.78	3.11	0.78	3.88
Light Truck	0.00	0.60	0.60	0.60	1.20	0.60	1.80	0.60	2.40	0.60	3.00
Medium/Heavy Truck	0.00	1.95	1.95	1.95	3.90	1.95	5.85	1.95	7.79	1.95	9.74
<b>Weight Distance Charges (USD/100km)</b>											

Funds	Current charge level	Increase year 1	Charge level (2018)	Increase year 2	Charge level (2019)	Increase year 3	Charge level (2020)	Increase year 4	Charge level (2021)	Increase year 5	Charge level (2022)
Motorcycle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Vehicle (Petrol)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bus (diesel)	0.00	0.58	0.58	0.58	1.17	0.58	1.75	0.58	2.33	0.58	2.91
Light Truck	0.00	0.53	0.53	0.53	1.06	0.53	1.60	0.53	2.13	0.53	2.66
Medium/Heavy Truck	0.00	1.86	1.86	1.86	3.73	1.86	5.59	1.86	7.45	1.86	9.32
<b>Diversion of Excise Duty (USD c/l)</b>											
Petrol levy (c/l)	0.00	0.10	0.10	0.10	0.21	0.10	0.31	0.10	0.41	0.10	0.51
Diesel levy (c/l)	0.00	0.10	0.10	0.10	0.21	0.10	0.31	0.10	0.41	0.10	0.51
Road reserve charges (USD/unit)	Variable	0.00	Variable	0.00	Variable	0.00	Variable	0.00	Variable	0.00	Variable

Table 9-3: Generate revenue per funding instrument per year (USD million)

Funds	Start year 2017	Year 1 2018	Year 2 2019	Year 3 2020	Year 4 2021	Year 5 2022
Fuel levy	277.50	281.59	285.68	289.76	293.85	297.94
Petrol levy	104.42	105.96	107.50	109.04	110.58	112.11
Diesel levy	173.08	175.63	178.18	180.73	183.28	185.83
Transit Charges	8.46	8.10	7.74	7.38	7.02	6.65
Motorcycle	0.00	0.00	0.00	0.00	0.00	0.01
Light Vehicle (Petrol)	0.00	0.02	0.03	0.05	0.06	0.08
Bus (diesel)	0.00	0.01	0.02	0.03	0.04	0.05
Light Truck	1.93	1.80	1.67	1.54	1.42	1.29
Medium/Heavy Truck	6.53	6.27	6.01	5.75	5.49	5.24
Foreign Vehicle Permit Fees	0.03	1.15	2.28	3.40	4.53	5.65
Motorcycle	0.00	0.00	0.00	0.00	0.00	0.00
Light Vehicle (Petrol)	0.03	0.04	0.06	0.07	0.09	0.10
Bus (diesel)	0.00	0.01	0.02	0.03	0.04	0.05
Light Truck	0.00	0.21	0.43	0.64	0.86	1.07
Medium/Heavy Truck	0.00	0.89	1.77	2.66	3.54	4.43
Weight Distance Charges	0.00	35.24	70.48	105.72	140.97	176.21
Motorcycle	0.00	0.00	0.00	0.00	0.00	0.00
Light Vehicle (Petrol)	0.00	0.00	0.00	0.00	0.00	0.00
Bus (diesel)	15.30	15.30	15.30	15.30	15.30	15.30
Light Truck	10.39	10.39	10.39	10.39	10.39	10.39
Medium/Heavy Truck	150.52	150.52	150.52	150.52	150.52	150.52
Diversion of Excise duty	0.00	3.11	6.23	9.34	12.45	15.56

Funds	Start year 2017	Year 1 2018	Year 2 2019	Year 3 2020	Year 4 2021	Year 5 2022
Petrol	0.00	1.15	2.30	3.45	4.60	5.75
Diesel	0.00	1.96	3.93	5.89	7.85	9.82
Road Reserve Charges	0.00	10.05	20.11	30.16	40.21	50.26
Total	285.99	480.21	498.23	516.25	534.26	552.28
Shortfall	-266.29	-72.06	-54.05	-36.03	-18.01	0.00

The revenue to be generated from the RRC in Table 9-3 above were based on the revenue potential supplied by TANROADS and PORALG for FY 2015/2016, as shown in Table 5-7.

### 9.3 Recommendation for disbursement of funds from PORALG to LGA's

PORALG's budget allocation calculations take into account a subjective measure of traffic volumes, road conditions, road surface and a continuously disputed road network length. The lack of accurate assessments of these measures is likely to result in improper allocation of funds. According to an operational guidance note by the World Bank (June 2005), road maintenance needs can be estimated through direct or indirect assessments. A direct assessment can be based on the output of a standardised road management system such as the World Bank's HDM-4. An indirect assessment, which is more applicable to PORALG, uses formulae related to road length, traffic, and other variables affecting maintenance needs. The indirect approach requires less technical capacity than the direct assessment approach, therefore making it user-friendly. In the indirect assessment approach, estimates can be based on available maintenance costs per kilometre for different types of roads. Considering the huge discrepancies in the reported road network length database in Tanzania, PORALG would have to first get a more precise measure of the road network length before applying this approach.

Moreover, in contrast to the limited road conditions used by PORALG, typical road maintenance assessments take into account a wider range of categories (i.e. very poor, poor, fair, good, and very good), compared to PORALG's 3-point scale (good, fair, and poor). The condition ratings used by PORALG are considered to be overly simplistic.

Lastly, the PORALG calculation for road traffic volume budget allocation to each of the five councils is a function of the number of LGAs under each council, instead of population. In order to accomplish a rational allocation of traffic volume budget to all five councils, it is important for PORALG to take into consideration the population ratios of the councils and allocate budgets according to those proportions.

Regarding the uncertainty of the extent of the road network under PORALG, it is understood that RFB is in the process of commissioning a study entitled "Consultancy Services Establishment of Baseline Road Network Identification and Inventory Data of Mainland Tanzania".

#### Condition and traffic surveys and frequency of data collection

Based on the working paper "Condition Assessment Guidelines" attached in Annex A of Volume 2, it is the opinion of the consultant that the condition data collected on behalf of PORALG is too simplistic and requires a review to better align it with that of TANROADS – which is fit for purpose and very close to best practice.

It is recommended that for network level condition assessments, with the primary purpose of maintenance and rehabilitation planning, road roughness surveys be undertaken at intervals of between 1 and 3 years depending on the road network size and resources available to undertake the surveys. In the case of the Tanzanian paved roads (8 333km), a single Class 2 laser profiler travelling at 30km/h (to allow for collecting other visual defect data manually) would be capable of covering the full paved

road network in a period of 2 months. It is therefore recommended that assessments of paved roads be scheduled to take place annually.

In the case of the Tanzanian classified unpaved roads (79 248km), a single survey vehicle equipped with a Class 3 response type device travelling continuously at 30km/h (to allow for collecting other visual defect data manually) would be capable of covering the full unpaved road network over a period of 2 years. It is therefore recommended that assessments of unpaved roads be scheduled to take place biennially. Should a higher frequency be desired, a second survey vehicle will be required.

It is recommended that as a standard, Class 2 Laser Profilometer IRI measurements be implemented on all paved roads and response type Class 3 measurements on unpaved roads in Tanzania irrespective of the implementing agent (TANROADS, PORALG etc) for which the equipment must be calibrated timeously.

### **Road management system**

DROMAS (District Road Management System) was envisaged as a road network management system to capture road condition data and assist with maintenance planning and management on the PORALG network. The operation of this system appears to be irregular and outdated. The frequency of road condition data updates, as well as the extent of condition data along the district road network is unknown.

It is also understood that there is no standard data collection manual for PORALG such as the “Collection Manual for Inventory and Collection Data” used by TANROADS. This means that the data collection methods used across PORALG are not harmonized, influencing the integrity of the data updated in DROMAS data.

A good road maintenance system is continuously updated with the necessary network data required for annual strategy and maintenance programmes, as well as the prioritization of maintenance activities. The quality of the data in the RMMS will assist in the allocation of funds for the LGA's as many of the inputs in the RMMS form part of the allocation criteria for the distribution of funds to the councils.

It would appear that the recently advertised RFB Terms of Reference for Tender No. IE/020/2014-15/HQ/C/04 has listed the review of the existing management systems of both PORALG and TANROADS as one of their objectives. It is understood that the TANROADS road management system and PORALG management system will be linked to the RFB Management Information System in the future.

If the RFB contributes to the maintenance of the RMMS and DROMAS, RFB should have the final say in specifying the data format and quality, as this will ultimately impact on the maintenance plans developed by the implementing agencies which will in turn impact on the funding received from RFB.

## **9.4 Recommendations to increase utilization of funds by implementing agencies**

### **9.4.1 Roll-over of funds**

The management of roll over funds are specified in the Performance Agreement of the implementing agency. The Performance Agreement specifies that:

- a) Rolled-over funds must be utilised in the following year to complete projects for which they were budgeted in the previous year. Specific Board approval for spending rolled-over funds must be sought and obtained from RFB within one month of the start of the new financial year;



- b) Rolled-over funds are not allowed to **exceed 25%** of annual funds released.

Based on section 7.2 large roll overs by PORALG were observed which are indicative of insufficient capacity.

In FY 2014/2015 the release to PORALG was approximately Tshs 187 billion. PORALG's reported rollover into FY 2015/2016 was Tshs 40 billion from FY 2014/2015, which is approximately 21% of the annual release for FY 2014/2015. It was also observed that the rollover funds are not completely utilized into the third and fourth quarter of the next financial year.

It is recommended that fund absorption be measured against performance agreement.

#### 9.4.2 Utilization of funds by implementation agencies for maintenance activities

Based on section 7.2, both TANROADS and PORALG show a decreasing trend in the financial performance of maintenance activities. Based on the sampling of the TANROADS maintenance contracts, as well as PORALG and TANROADS annual reports, the main reason reported for poor performance is delays in the procurement of contracts.

It was also mentioned in consultation with TANROADS that the contracts are only for a duration of one year. The delays in the procurement process in each FY means that the contractor starts work later. Depending on the delay, the road may already start to deteriorate, requiring more funds to maintain a particular road and has a negative influence on the overall performance. This can also be observed from the quarterly progress reports for TANROADS and PORALG, discussed in section 7. Majority of the maintenance works only start in quarter 3 and 4 of the financial year.

Below are suggestions to increase the utilization of funds for both PORALG and TANROADS.

- a) Implementing agencies should work on a **5 year programme for contracts**, to be revised every year (5 years rolling programme). This programme ensures that all basic planning, detail design and tender documents are ready in time for calling for tenders.
- b) Consider extending the duration of the contracts to reduce delays in the procurement process.
- c) Implementing agencies should compile tender documents for more projects than they intend to award. This will ensure that additional tenders can be advertised and additional contracts can be awarded quickly if needed.
- d) In cases of new contracts, tenders should be advertised well in advance, such that contracts can be awarded early in the financial year.
- e) Contract spending must be monitored closely such that under expenditure trends can be identified and addressed well before the end of the financial year.
- f) If an under expenditure trend is detected, the following should be considered:
  - i) Award another contract by utilizing existing completed tender documents as mentioned in c) above).
  - ii) Extend an existing contract (within limits) by adding a second contract to avoid going through the lengthy procurement process again. This means that the original contract budget is increased and another contract is awarded. This is normally allowed within limits, to a maximum of 20% increase on a contract. The advantage here is that there is no need to call for new tenders.

- g) Issuing out more PMMR contracts. PMMR contracts have the potential to reduce to cost of maintenance provided that they are managed and executed properly. They are also issued over a longer period (typically 5 years or more), reducing delays due to procurement associated with the traditional contracts which are revised annually. PMMR are performance based contracts which guarantee pre-determined service levels for the contract duration, beneficial to both the road authority and road users:
  - i) Rolled out on roads that are in a maintainable condition and for which very little or no rehabilitation is required.
  - ii) Future bidding documents should be carefully revised to incorporate the recommendations and lessons learned during the pilot project in Tanzania, as well as other countries.
  - iii) Funds allocated for road maintenance should be tightly restricted to road maintenance works only and not used for any substantial works to improve the road standards.
  - iv) Increase knowledge/capacity of contractors, consultants and TANROADS Regional Staff to manage PMMR Contracts effectively.
  - v) TANROADS should review training material developed in the Tanzania pilot project, and update to include lessons learned, as well as develop additional modules where necessary.
- h) Tanzania's road maintenance requirements increase each year with the expansion of the road network. However, a lot of the funds disbursed to PORALG get rolled over to the next year. These funds could have rather been disbursed to TANROADS which has a higher capacity to utilize the funds. Once PORALG shows increased utilization of funds, the allocation of funds can be revisited.
- i) Consider combining contracts to realise economies of scale, as it was found that the unit cost decreases as the value of the contract increases.
- j) Appoint contractors for specific contract sizes according to the limits specified by the CRB which will ensure that capable contractors are appointed based on their capabilities and that small scale contractors will be empowered.
- k) Based on the huge discrepancy between the physical and financial performance, it is evident that contracts are not being paid timely and it is proposed that this needs to be looked into as a matter of urgency.

## 9.5 Allocation of funds to development

Currently, the Road and Fuel Tolls Act Cap 220 (R.E 2006), Part II states that at least ninety percent of money in the RF must be used for maintenance and not more than ten percentage shall be used for roads development and related administrative costs.

Based on the assessment of maintenance and development needs in section 6.4, the distribution of the maintenance, rehabilitation and upgrade requirements varies for different requirement scenarios. Based on the requirement scenario selected, the development requirements may be more than the specified 10% in the Road and Fuel Tolls Act Cap 220. Two recommendations were made with regards to the development requirements:

- a) The statement in the road and tolls act should be revised to increase the allocation for development to cater for the actual road requirements. For roads where the upgrade is more economically viable than continual maintenance, the upgrade option is proposed which will in turn reduce the agency costs over the long term. Increased development will increase the length of the total paved network which currently contributes only 6.9% of the total road network in mainland Tanzania, increasing the asset value of the road infrastructure (refer to Figure 6-23 and Figure 6-24).

However, one should also keep in mind that the upgrade and rehabilitation of roads is very expensive. The RF currently does not have sufficient funds to meet the maintenance needs in Tanzania, thus it may be unrealistic for the RF to also fund development which may require large adjustments in the current and new revenue sources.

Furthermore, the capabilities of the implementing agencies is currently not in the position to absorb significant increases in funds.

- b) Based on the recommended combined requirement scenario, the development (rehabilitation) requirements constitute 12% of the total requirements equivalent to USD 64 million (approximately Tshs 141 billion). This large rehabilitation cost is due to the large backlog maintenance which has accumulated over the years. Backlog maintenance includes all maintenance works needed as a result of insufficient maintenance done previously due to lack of funds. Therefore, all maintenance on roads in poor condition can be included under this definition, because they should never have deteriorated into a poor condition if sufficient maintenance funds were available. It is proposed that this backlog maintenance in terms of rehabilitation on the paved network is recovered through a *backlog maintenance levy*- by applying a levy on the CIF.

Based on the current CIF (Tshs/l) on petrol and diesel and fuel sales for FY2015/2016, the percentage levy on the CIF was calculated to recover the rehabilitation cost of Tshs 141 billion as shown in the table below.

Table 9-4: Calculated levy on CIF

Fuel Type	Fuel sales FY2015/2016 litres	CIF (Tshs/l)*	% Levy on CIF	Revenue (TZS billion)
Petrol	1 121 240 000	899.73	5%	52.55
Diesel	1 914 910 000	882.23	5%	88.01
Total	3 036 150 000	-	-	140.56

\*Cap Prices June 2017 Dar es Salaam

Table 9-4 shows that a 5% levy is required on petrol and diesel to recover approximately Tshs 141 billion per annum. The effects of the proposed increased on the CIF and ultimately on the fuel price is shown in the table below.

Table 9-5: Impacts of a 5% backlog maintenance levy on the CIF and fuel price.

Fuel type	Increase in CIF (TZS/l)	New CIF (TZS/l)	Current pump price (TZS/l)*	New pump price (TZS/l)	Increase in pump price (%)
Petrol	46.87	946.60	2014	2060.87	2%
Diesel	45.96	928.18	1874	1919.96	2%

\* Cap Prices June 2017 Dar es Salaam

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# Appendix A

## Summary of project deliverables, meetings conducted and the project team

## Details of work executed

The dates of submission for deliverables are shown in the table below.

Table 10-1: Dates of submission

Milestone	Date of submission
Draft inception Report	25-Jul-16
Monthly report 1	5-Aug-16
Final inception report	8-Aug-16
Guidelines on assessing road condition	2-Sep-16
Report of Existing Revenue	5-Sep-16
Monthly report 2	9-Sep-16
Quarterly report 1	9-Sep-16
Development of training materials	12-Sep-16
Provision of Training on HDM-4 and RNET week 1	19-Sep-16
Provision of Training on HDM-4 and RNET week 2	3-Oct-16
Monthly report 3	10-Oct-16
Cost recovery guidelines for pavement damage due to overloading	17-Oct-16
Monthly report 4	15-Nov-16
Recommendation for New Sources of Revenue	17-Nov-16
Guidelines and ToR for conducting Technical Audits	25-Nov-16
Guidelines on establishing road maintenance needs	21-Dec-16
Quarterly report 2	21-Dec-16
Monthly report 5	21-Dec-16
Guidelines and ToR for conducting Financial Audits	27-Jan-17
Guideline for Eligibility for Road Fund Financing	27-Jan-17
Multiyear Road Maintenance Need Assessment Report	27-Jan-17
Monthly report 6	30-Jan-17
Guidelines for Adjustment of Road User Charges	3-Mar-17
Monthly Report 7	3-Mar-17
Report on Capacity building	12-Apr-17
Monthly Report 8	5-May-17
Computer Model	TBC
Draft Report	30-June-17
Workshop	TBC
Workshop report	TBC
Final Report	TBC

## Summary of meetings held

Meetings held with the client, stakeholders, as well as internal meetings during the project duration is summarized in the table below.

Table 10-2: Summary of meetings held during project duration

Meeting type	Institution	Date
Kick-off meeting	RFB	21-Jun-16
Stakeholder engagement	TANROADS	21-Jun-16
Client meeting	RFB	23-Jun-16
Stakeholder engagement	TANROADS	24-Jun-16
Stakeholder engagement	TANROADS	29-Jun-16
Stakeholder engagement	EWURA	23-Jun-16
Stakeholder engagement	MoWTC	24-Jun-16
Stakeholder engagement	GAPCO	24-Jun-16
Stakeholder engagement	CCTTFA	27-Jun-16
Stakeholder engagement	PBPA	28-Jun-16
Stakeholder engagement	DCC	28-Jun-16
Stakeholder engagement	MoWTC	29-Jun-16
Stakeholder engagement	MoFP	29-Jun-16
Stakeholder engagement	SUMATRA	29-Jun-16
Stakeholder engagement	TPA	30-Jun-16
Stakeholder engagement	DCCS	30-Jun-16
Stakeholder engagement	TRA	01-Jul-16
Client meeting	RFB	01-Jul-16
Internal Consultant Workshop	Aurecon	05-Aug-16
Stakeholder engagement	TRA	16-Aug-16
Stakeholder engagement	TANROADS	16-Aug-16
Stakeholder engagement	TRA	17-Aug-16
Client meeting	RFB	17-Aug-16
Stakeholder engagement	PORALG	18-Aug-16
Stakeholder engagement	TRA	18-Aug-16
Stakeholder engagement	MoWTC	18-Aug-16
Stakeholder engagement	Temeke Municipality	18-Aug-16
Stakeholder engagement	TANROADS	18-Aug-16
Client meeting	RFB	19-Aug-16
Stakeholder engagement	TRA	19-Aug-16
Internal Consultant Workshop	Aurecon	24-Aug-16
Stakeholder engagement	TANROADS	20-Sept-16
Stakeholder engagement	SUMATRA	21-Sept-16
Stakeholder engagement	TRA	21-Sept-16

Meeting type	Institution	Date
Stakeholder engagement	TRA	22-Sept-16
Stakeholder engagement	TANROADS	22-Sept-16
Internal Consultant Workshop	Aurecon	29-Sept-16
Internal Consultant Workshop	Aurecon	30-Sept-16
Internal Consultant Workshop	Aurecon	5-Oct-16
Internal Consultant Workshop	Aurecon	18-Oct-16
Internal Consultant Workshop	Aurecon	21-Oct-16
Sub-consultant workshop	Aurecon and CPCS	27-Oct-16
Client meeting	RFB	28-Oct-16
Internal Consultant Workshop	Aurecon	4-Nov-16
Internal Consultant Workshop	Aurecon	17-Nov-16
Internal Consultant Workshop	Aurecon	9-Dec-16
Internal Consultant Workshop	Aurecon	23-Jan-17
Client meeting	RFB	7-Feb-17
Client meeting	RFB	8-Feb-17
Internal Consultant Workshop	Aurecon	22-Feb-17
Capacity building	RFB	7-10 Mar-17
Workshop	Stakeholders, RFB, Aurecon	3 -August-17
Internal Consultant Workshop	Aurecon	10 August -17

## Technical staff employed

The Aurecon technical staff that contributed to the study are shown in the diagram below.

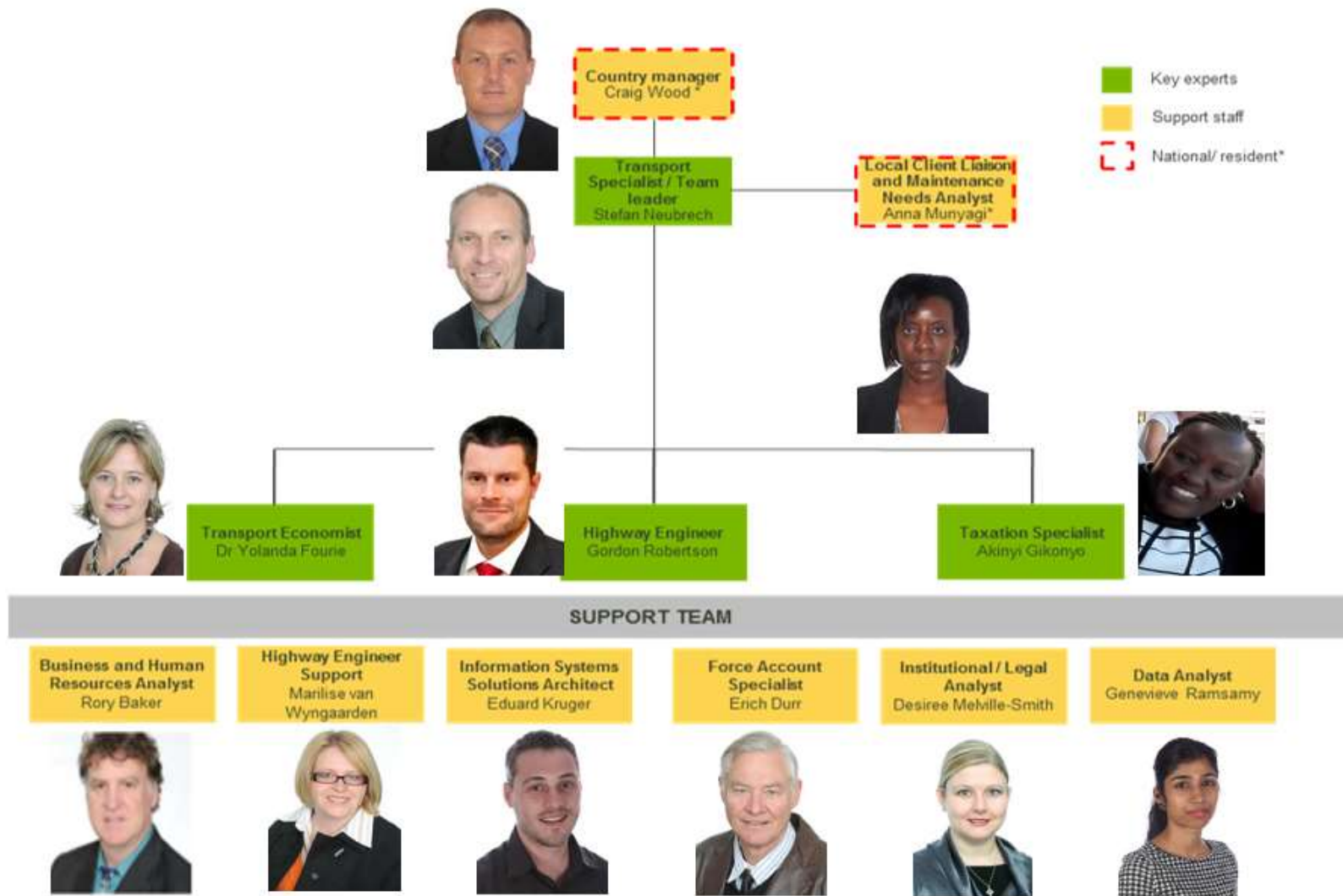


Figure 10-1: Technical staff employed

# Appendix B: Price elasticity in various countries



Table 10-3: Various estimates of the price elasticity of the demand of fuel

Source	Country	Short term price elasticity	Long term price elasticity
U.S. Department of Energy (1981)	USA	-0.1 to -0.4	-0.3 to -0.9
Sterner et al. (1992)	Summary of inter-national research	-0.10 to -0.24	-0.54 to -0.96
D.J. Graham & S. Glaister (2002)	Summary of inter-national research	-0.2 to -0.3	-0.6 to -0.8
S.A. Cloete & E. v.d.M. Smit (1988)	South Africa	-0.25	-0.37
S.D. Ngumeni (1994)	South Africa	-0.1 to -0.2	
Bureau for Economic Policy Analysis (1989)	South Africa	-0.31	
Bureau for Economic Research (2003)	South Africa		
- Petrol		-0.21	-0.51
- Diesel		-0.18	-0.06

Most of the international studies examined the price elasticity of the demand for fuel in the USA and Europe. The higher price elasticity of the demand for fuel in these countries can probably be attributed to the availability of close substitute forms of transport in the USA and Europe.

# Appendix C: Treatment Matrix

Roughness Level	Crack Level	Ravel Level	1 (0-300)	2 (300-500)	3 (500-1,000)	4 (1,000-3,000)	5 (>3,000)
1 (<3)	1 (<20%)	1 (<20%)	RM	RM	RM	RM	RM
1 (<3)	1 (<20%)	2 (>20%)	RM	RM	RM	RM	RM
1 (<3)	2 (>20%)	1 (<20%)	RM	RM	RM	RM	RM
1 (<3)	2 (>20%)	2 (>20%)	RM	RM	RM	RM	OVL30
2 (3-4)	1 (<20%)	1 (<20%)	RM	RM	RM	RM	RM
2 (3-4)	1 (<20%)	2 (>20%)	RM	RM	RM	SBSD	OVL30
2 (3-4)	2 (>20%)	1 (<20%)	RM	RM	RM	SBSD	OVL30
2 (3-4)	2 (>20%)	2 (>20%)	RM	RM	RM	SBSD	OVL50
3 (4-5)	1 (<20%)	1 (<20%)	RM	RM	OVL30	OVL30	OVL30
3 (4-5)	1 (<20%)	2 (>20%)	RM	RM	OVL30	OVL30	OVL50
3 (4-5)	2 (>20%)	1 (<20%)	RM	RM	OVL30	OVL30	OVL50
3 (4-5)	2 (>20%)	2 (>20%)	RM	SBSD	OVL30	OVL30	OVL50
4 (5-6)	1 (<20%)	1 (<20%)	RM	SBSD	OVL50	OVL50	OVL50
4 (5-6)	1 (<20%)	2 (>20%)	RM	SBSD	OVL50	OVL50	OVL50
4 (5-6)	2 (>20%)	1 (<20%)	RM	SBSD	OVL50	OVL50	OVL50
4 (5-6)	2 (>20%)	2 (>20%)	RM	SBSD	OVL50	OVL50	OVL50
5 (6-8)	1 (<20%)	1 (<20%)	SBSD	PATCH&SD	OVL50	OVL50	OVL50
5 (6-8)	1 (<20%)	2 (>20%)	SBSD	PATCH&SD	OVL50	OVL50	OVL50
5 (6-8)	2 (>20%)	1 (<20%)	SBSD	PATCH&SD	OVL50	OVL50	OVL50
5 (6-8)	2 (>20%)	2 (>20%)	SBSD	PATCH&SD	OVL50	OVL50	OVL50
6 (8-10)	1 (<20%)	1 (<20%)	PATCH&SD	RL20+OVL30	RL20+OVL50	RL20+OVL50	RL20+OVL50
6 (8-10)	1 (<20%)	2 (>20%)	PATCH&SD	RL20+OVL30	RL20+OVL50	RL20+OVL50	RL20+OVL50
6 (8-10)	2 (>20%)	1 (<20%)	PATCH&SD	RL20+OVL30	RL20+OVL50	RL20+OVL50	RL20+OVL50
6 (8-10)	2 (>20%)	2 (>20%)	PATCH&SD	RL20+OVL30	RL20+OVL50	RL20+OVL50	RL20+OVL50
7 (>10)	1 (<20%)	1 (<20%)	Recon ST	Recon ST	Recon ST	Recon AC	Recon AC
7 (>10)	1 (<20%)	2 (>20%)	Recon ST	Recon ST	Recon ST	Recon AC	Recon AC
7 (>10)	2 (>20%)	1 (<20%)	Recon ST	Recon ST	Recon ST	Recon AC	Recon AC
7 (>10)	2 (>20%)	2 (>20%)	Recon ST	Recon ST	Recon ST	Recon AC	Recon AC

# Appendix D: Sample of maintenance contract

Figure 10-2 and Figure 10-3 show that the smaller contracting companies have a bigger variation in the unit costs than the larger contracting companies.

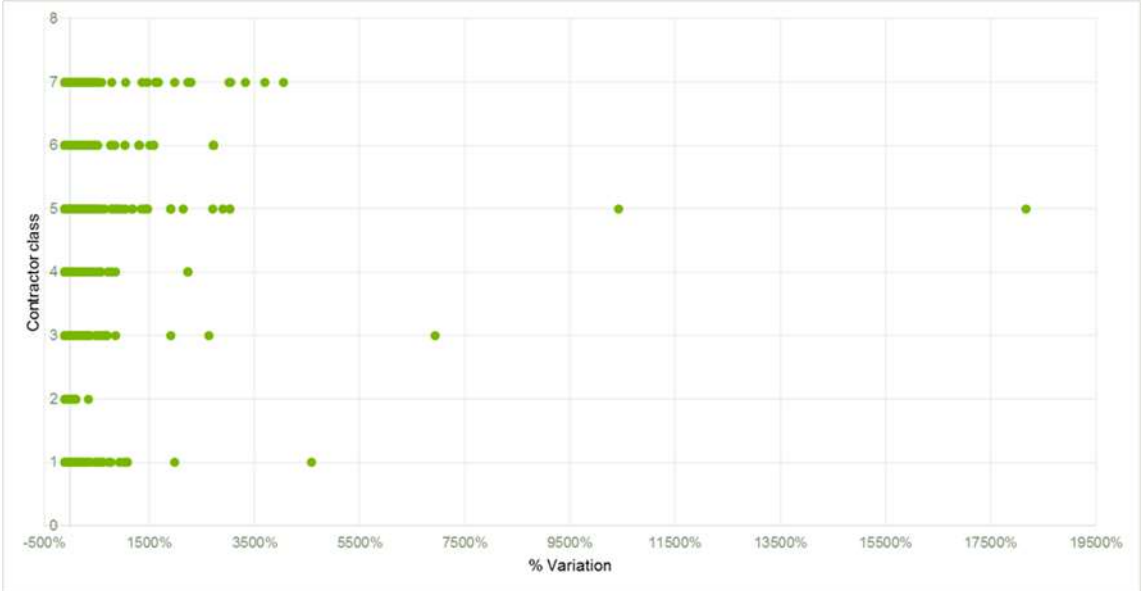
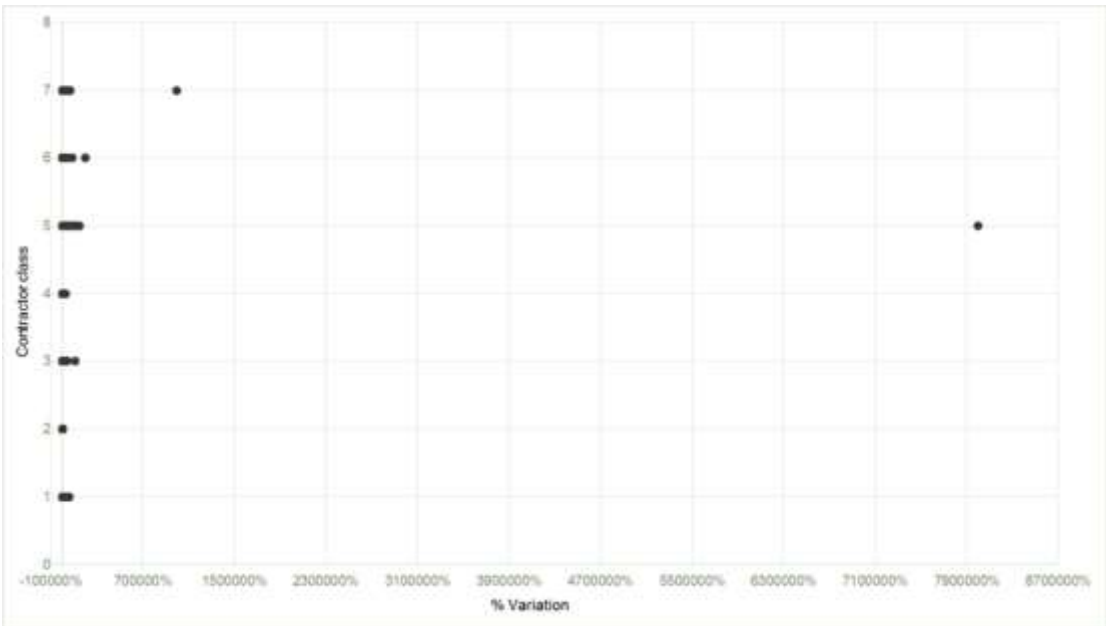


Figure 10-2: Contract class vs deviation of unit cost from average (all regions)



There are generally large variations in the unit costs across each region for both the large unit costs and small unit costs although the small unit costs tend to have the larger variation.

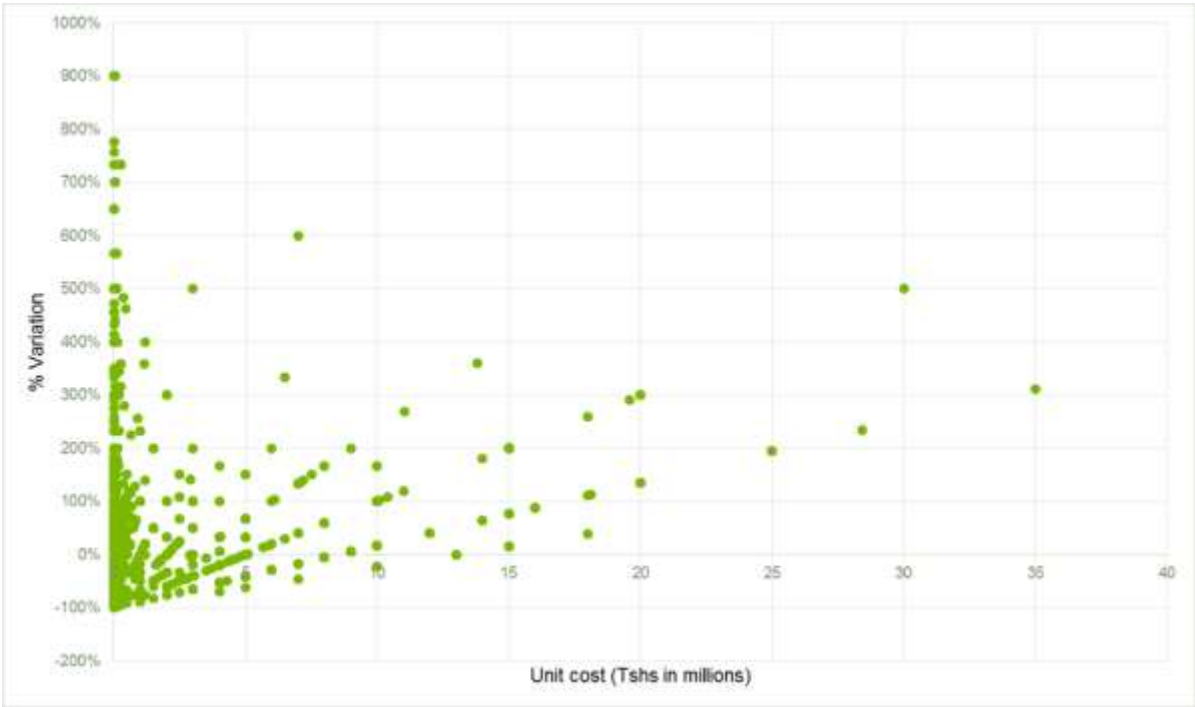


Figure 10-4: Unit cost vs variation from median unit cost Tanga

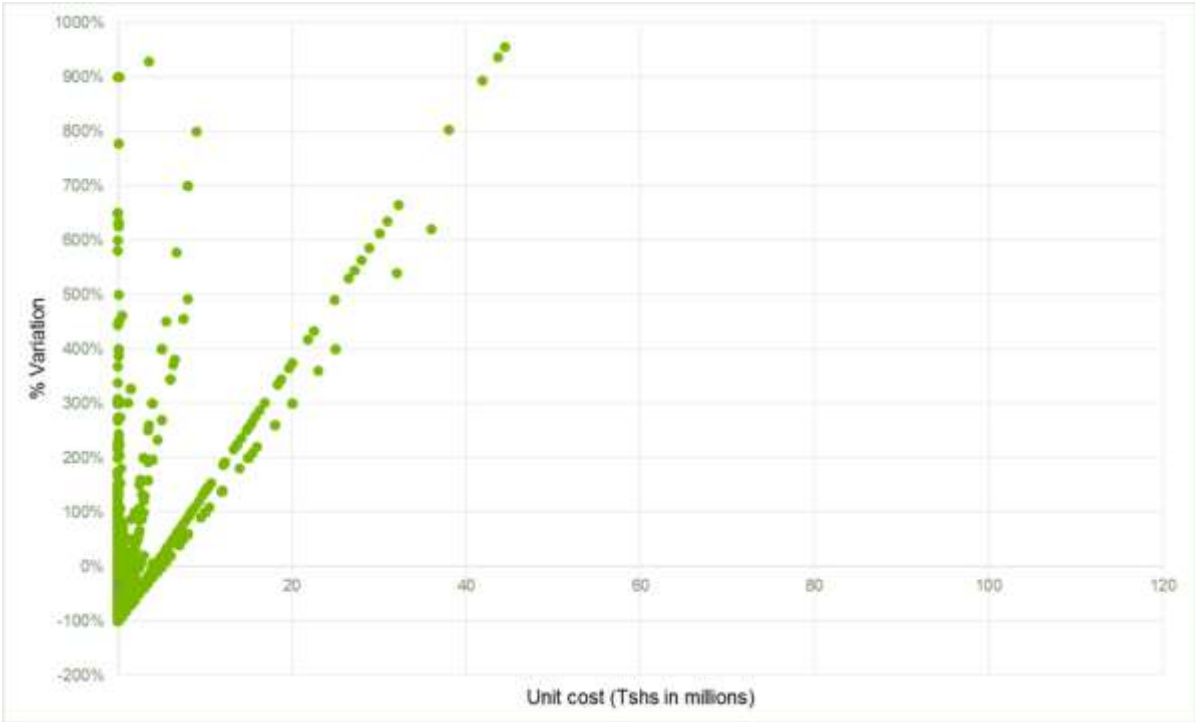


Figure 10-5: Unit cost vs variation from median unit cost Kagera

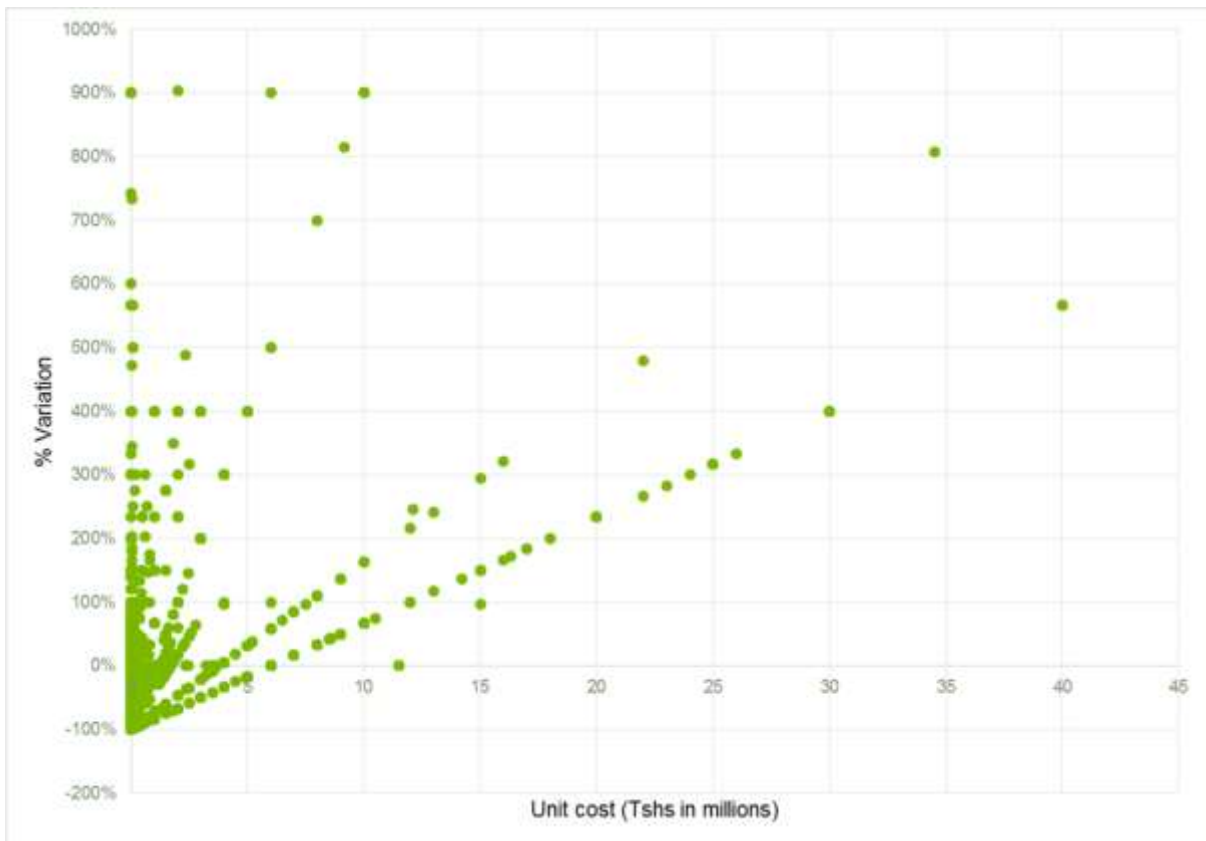


Figure 10-6: Unit cost vs variation from median unit cost Mbeya

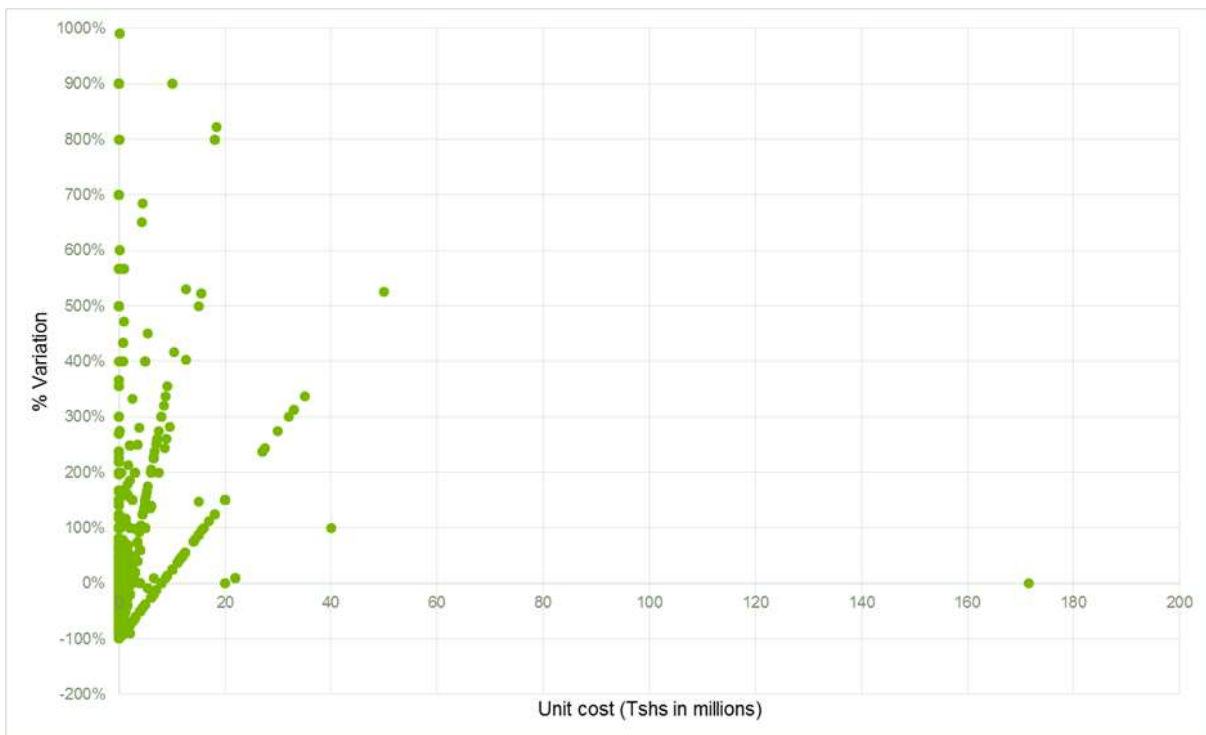


Figure 10-7: Unit cost vs variation from median unit cost Dodoma