



Arusha Rural Roads Conference
Session 2:

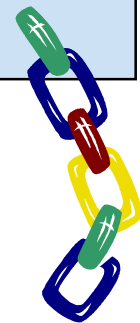
Planning and Managing Rural Roads

GTZ experience and plan for Government action

Arusha/Tanzania
26 Nov. 2009



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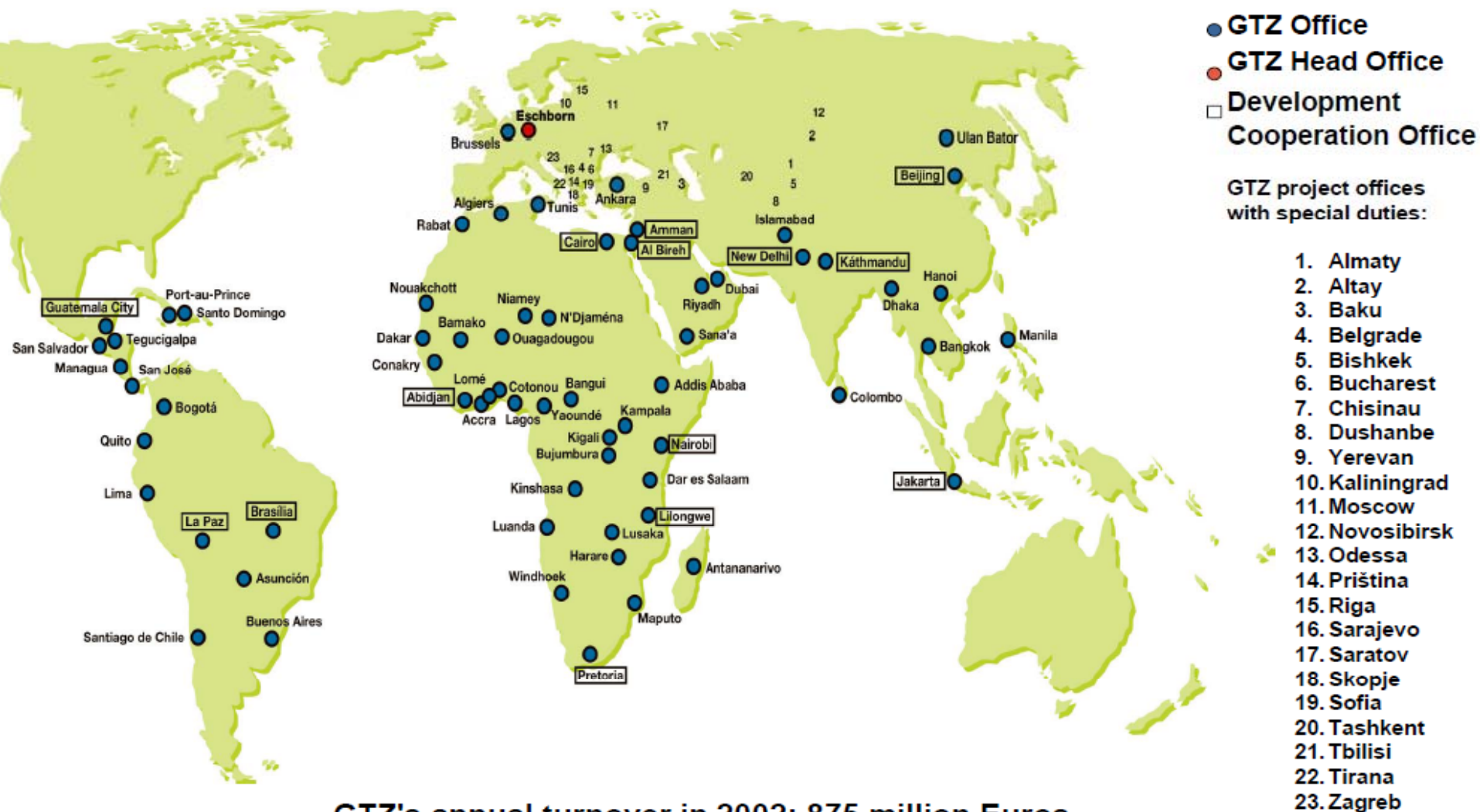


Content

- **A. GTZ background on RR** 3 slides.
 - Nepal, Cambodia, Ethiopia, Madagascar, Ghana, Tanzania, Ruanda
 - ADB, WB-SSATP, EU, Costa Rica
 - Road Management Initiative RMI
- **B. Key issues** 5 slides.
 - General Neglect, Chain of responsibilities, Role of the traditional economy, Urban and Rural areas, Rural economic growth
- **C. Findings for rural roads** 7 slides.
 - RR leading to Rural Markets, Market access from 2 directions, all-weather transport and its costs
 - RMI experience - lack of Finance and Organisation, fuel tax comparisons
 - RR organisation centrally for bridges, but locally for earth road access
 - Rural Bridges for RR and special role of district culvert production
- **D. Draft action plan for RR** 3 slides.
 - Who does what?

GTZ field offices around the world

2070 experts in 2700 development projects and programmes in 134 countries around the world



GTZ's annual turnover in 2002: 875 million Euros

Tsinghua University, Institute of Transportation Engineering, Nov 7, 2006, Beijing

Focus on Africa: Road Management Initiative RMI SSATP Road Sector Strategy



Road Sector
Analysis in Zambia,
Tanzania,
Mozambique and
Cote d'Ivoire
EU- Road sector
review in Rwanda

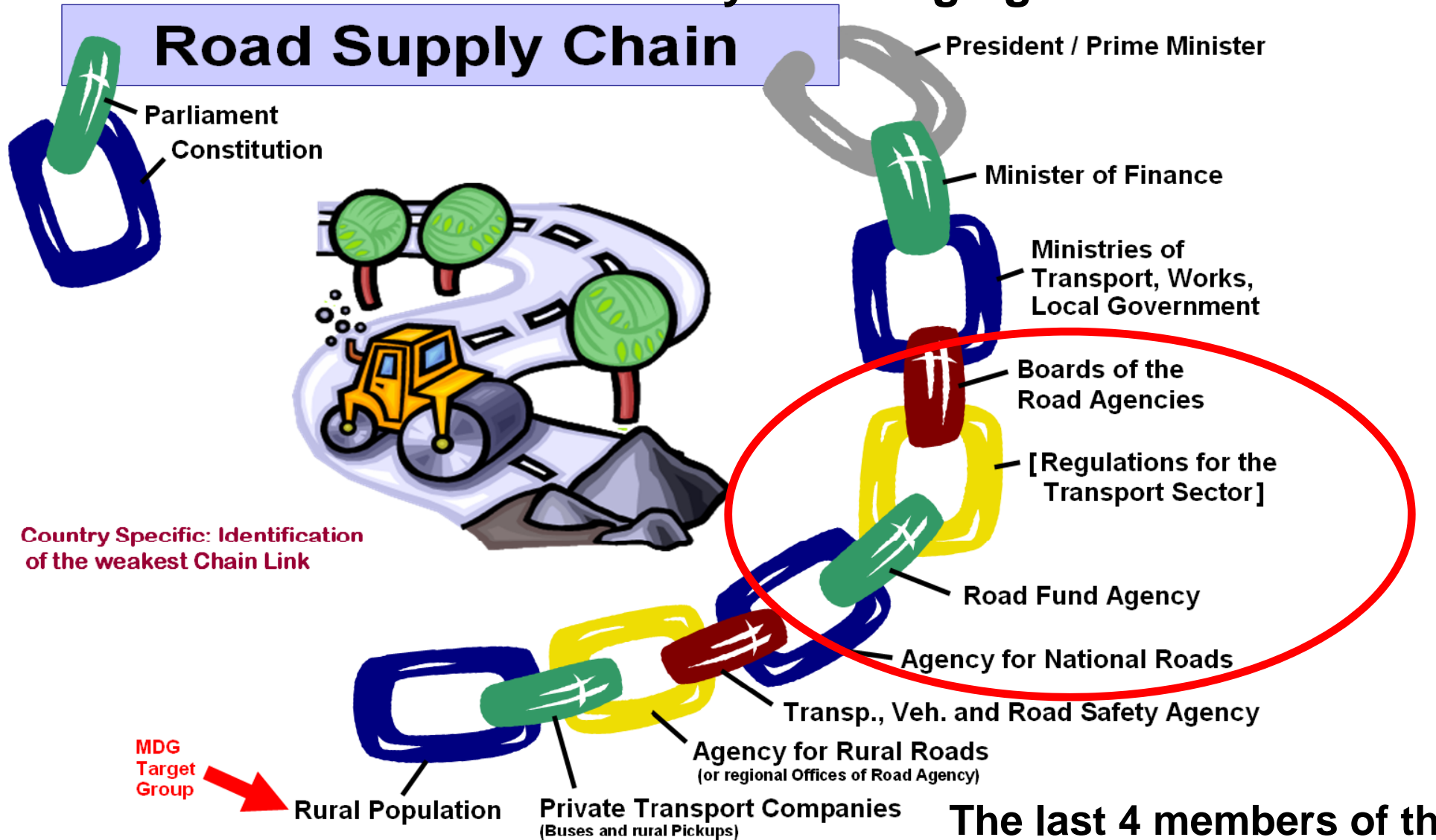
I. Key Issues of Rural Transport : The normal chaos, but who is responsible?

No drainage of roads, earth roads without wearing course, overloaded vehicles, lack of government regulations



Truck stuck on Earth Roads in Eastern Congo.

II. Key Issue: Who is responsible? The 12 answers incl. bureaucracy of changing institutions



Note: The yellow chain link (Agency for Rural Roads) has been identified to the most problematic one in the institutional reform process.

V. Key issue – International alarm: The most neglected is the most important and most difficult issue

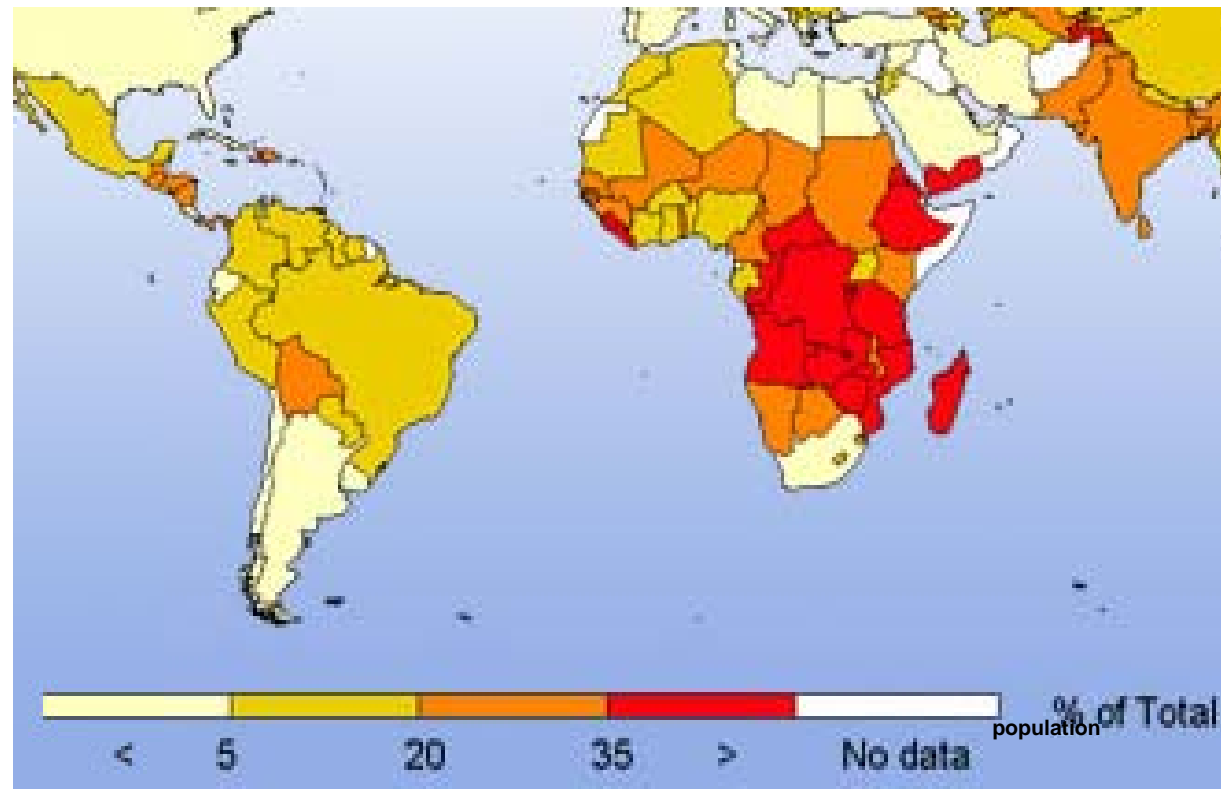
◆ The Transition from **subsistence to cash-crop** economy is the basic cultural change. For all the SSA governments this is a general goal for the rural sector

◆ Rural Roads have to provide access to the **traditional sector of the economy**. In SSA the majority of the population (80%) still live in the subsistence economy and form the target group of the MDGs (see FAO Map).

i.e. the heart of the matter of SSA is rural.

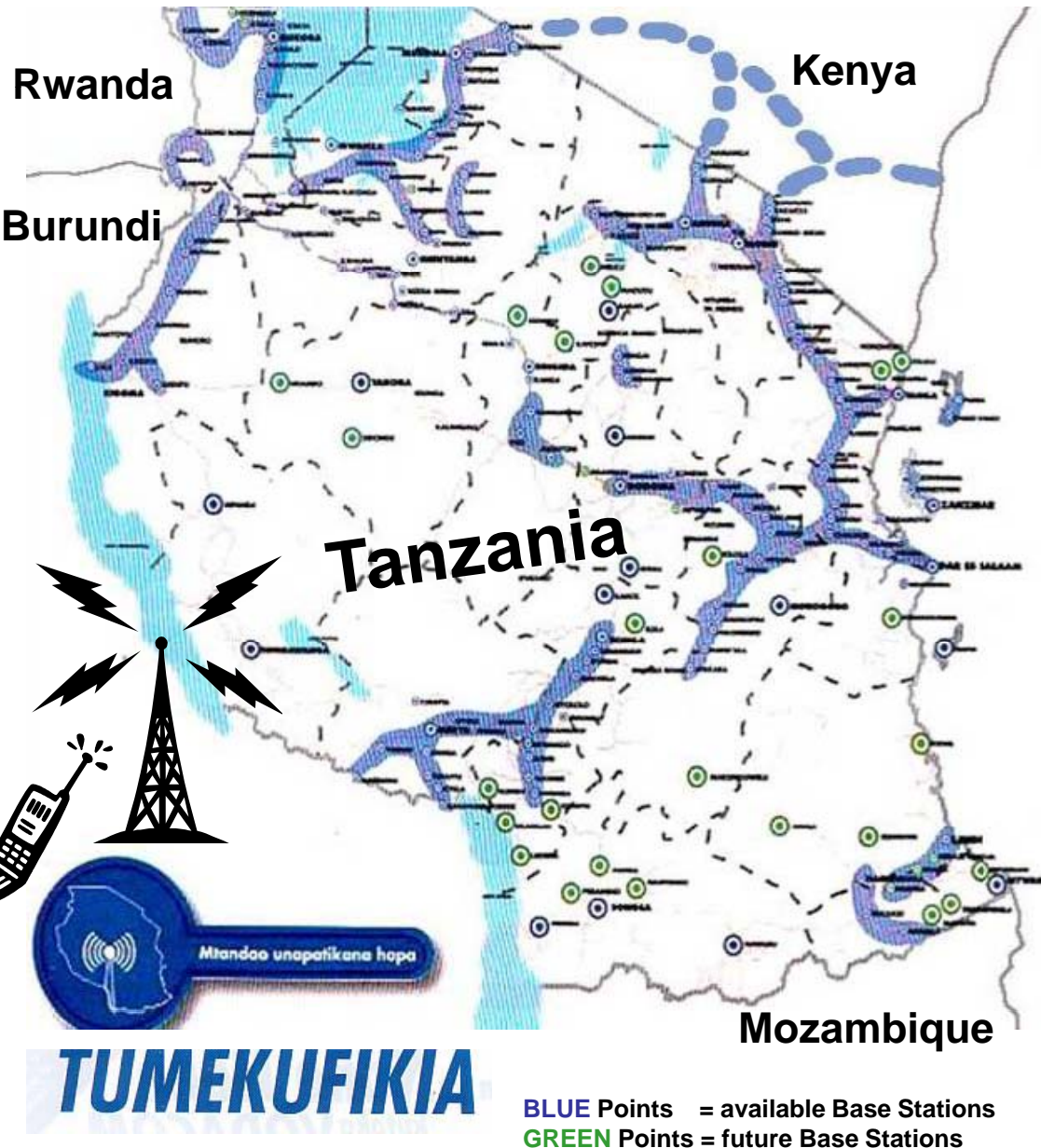


Official FAO Hunger Map 2005



Key issue of neglected Areas: Example Tanzania

Urban and Rural Areas



The development of the country – even in providing cellphones for cities and villages (10-20% of population) - follows the main, mostly asphalted roads. (see: blue strips) The rest of the country (c. 80% of the 37 mill. = 29 mill.) are rural areas.

Growth in the cities does not help so much for the overall average of a country, as long as 80% remain stagnant.

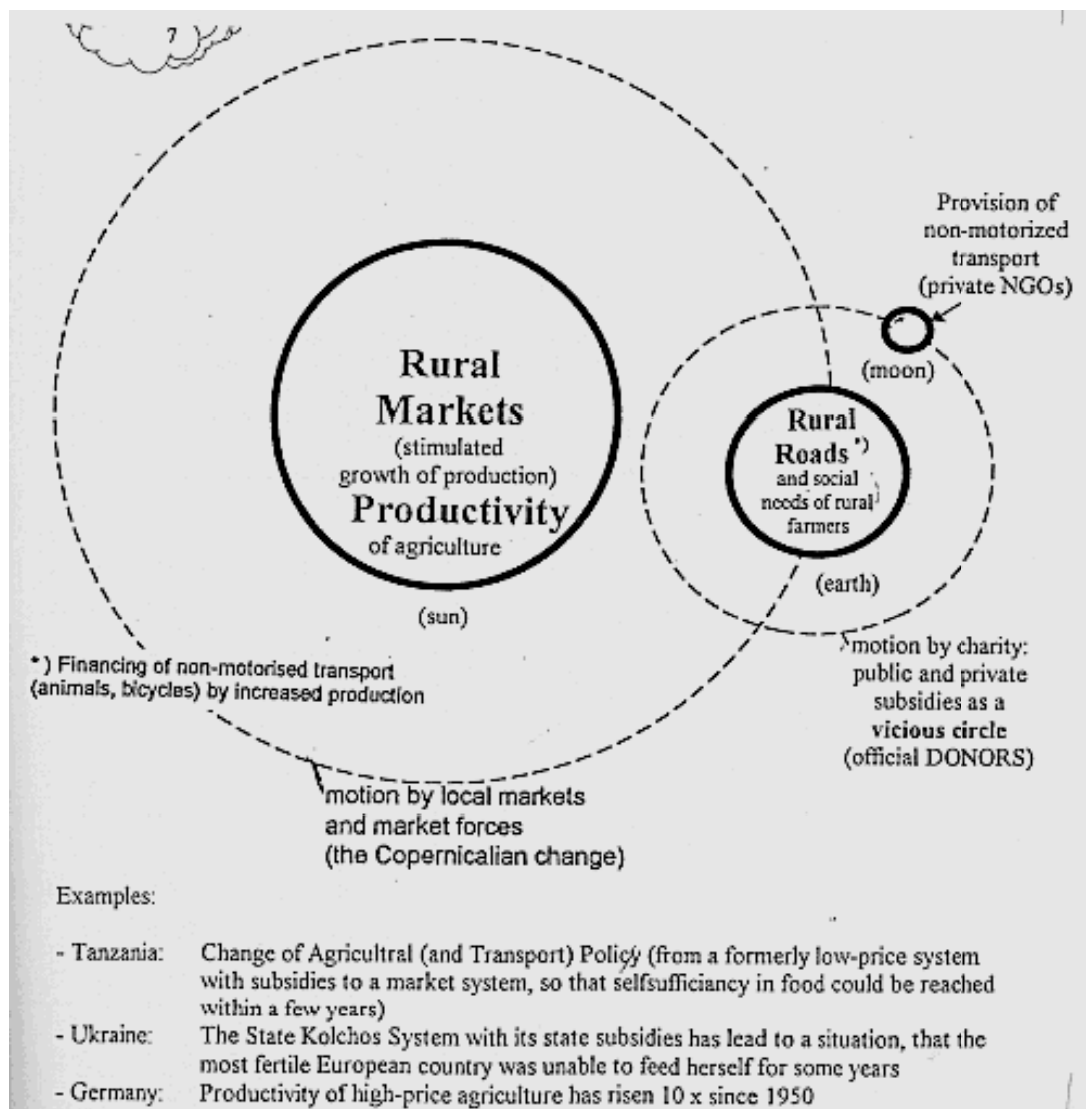
Conclusion of key issues: **Economic Growth needs Growth of Production and Growth of Rural Markets**



Rural Market in Rwanda without Market Installations

Main Findings for Rural Roads: 1. Change of goals

Rural Roads have to provide rural markets



I.e. Rural Roads are not an aim in itself

As there is a need for market exchange all the year round we need all-weather access and roads serving them

Rural Access to Rural Markets from 2 sides:

Farm to market tracks and market to highway roads



Farm-to-Market Track (Uganda)



	Farm-to-Market Tracks	Highway-to-Market Roads	Provincial / National Highways
Aver. Distance	0 - 15 km	0 - 90 km	
Owner	Farmers (non classified tracks)	Province / State	State
Caretaker (Stakeholder)	Marketing Board	Rural Roads Office	Roads Agency



Weekly Rural Market directly at Highway (Butare-Cyangugu / Rwanda). No special Highway-to-Market Road necessary.

Transport prices on rural tracks and rural classified roads

under the pre-condition of all-weather viability

B. Transport from Rural Markets to Farm Houses

Road Type	Vehicle Type	Transport Costs / km / ton
Earth	Bicycle, Animal Trailer, Headload	non-motorised Family Transport (>100 US Cents)

	Farm-to-Market Tracks	Highway-to-Market Roads	Provincial / National Highways
Aver. Distance	0 - 15 km	0 - 90 km	
Owner	Farmers (non classified tracks)	Province / State	State
Caretaker (Stakeholder)	Marketing Board	Rural Roads Office	Roads Agency

A. Transport to Rural Markets on Public Roads (ZAMBIA 2005)

Road Type	Vehicle Type	Transport Costs / km / ton
Asphalt	Truck	14 - 20 US Cents
Gravel / Earth	Small Goods Vehicle	30 - 100 US Cents

The RMI Experience for rural roads

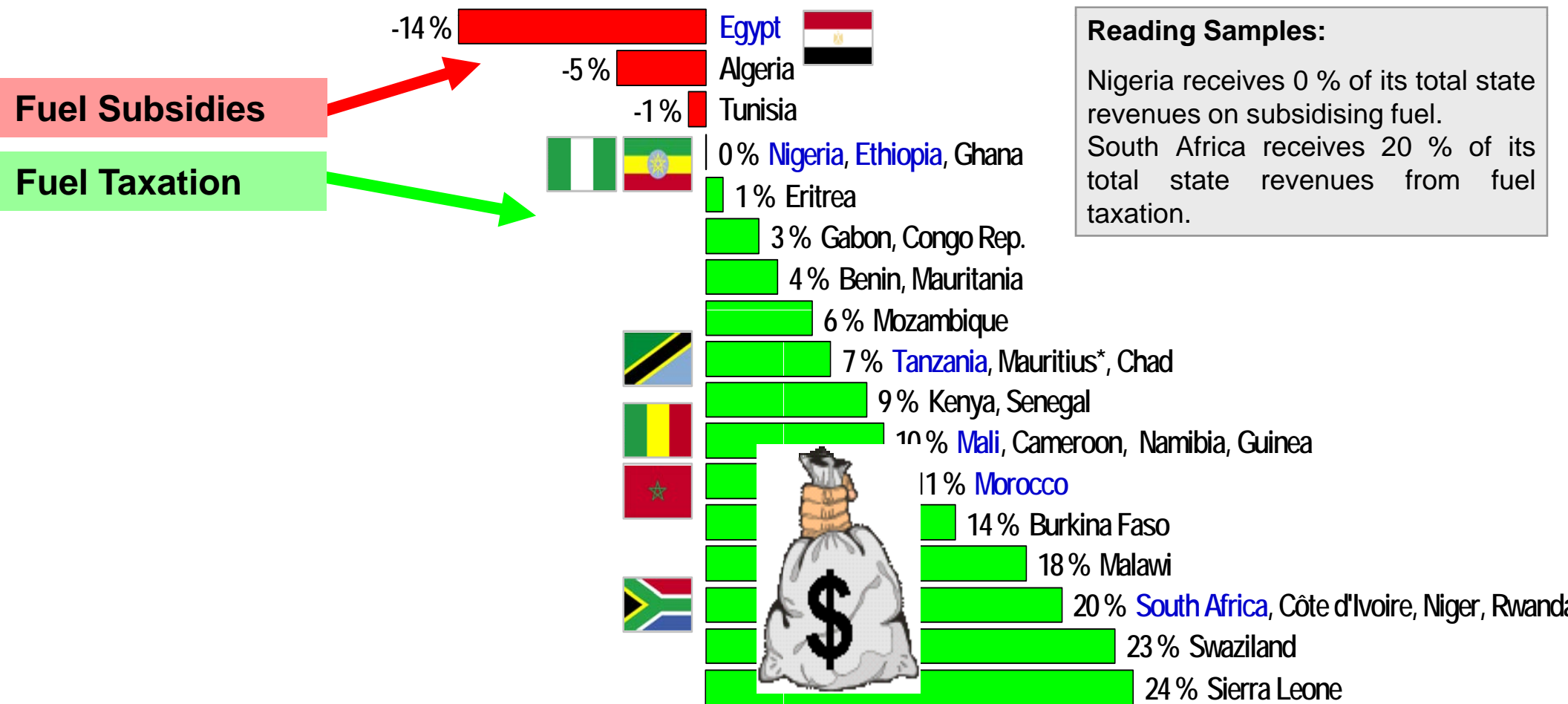
1. Solution from the top (Prime Minister)
2. Finance and Organisation as key bottlenecks
3. Finance based on fixed proportion (20-30% out of the ROAD FUND total means (i.e. min. 2 to 4 US Cents out of 10-16 US Cents/liter Road Fund Fee) nation-wide
4. Organisation not by ministry, but by a special RR Agency

Usage of the Road Maintenance Fund

(mostly based on Fuel Tax Revenues as Road Fee)

20% - 25% Rural Roads	70% Interurban Roads	10% Urban Roads
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Fuel Tax Contribution to Total State Revenues



Calculated Fuel Tax Revenues as % of Total State Revenues

Source: www.International-Fuel-Prices.com

Organisational set up for Rural Roads

- General Goal: Earmarked funds of the Road Fund are used exclusively for improvement of access to rural markets
- All-weather access is improved primarily by bridges and culverts which have to be designed by engineers and implemented and distributed by a central Rural Roads Agency.



Example Eastern D.R. Congo

Bridges and Culverts as main part of Rural Roads

Therefore in Rural Areas providing sufficient numbers of bridges and water crossings is more important than the quality of individual rural roads and tracks.



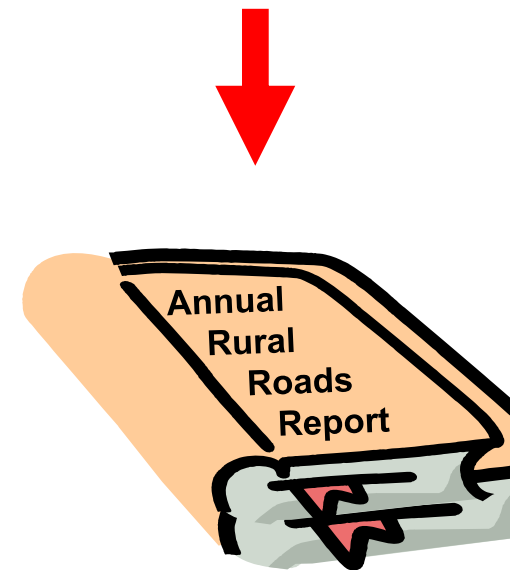
Lack of bridge provision by Rural Roads Offices in Kindu / East Congo
(Local Self-help)



Bailey Bridge system for Rural Roads in Kindu / East Congo (GTZ Project)
(Two double T-steel beams covered by iron plate for each lane)

Government Action Plan for Rural Roads II

- **MoT** provides map of the districts with bus and minibus lines use
- **Rural Roads Agency** provides annual Rural Bridges report
- **Culvert Production Centers** in the districts are asked by competing villages for bridge work.
- **MoLG** encourages village access work (earth work) by payment in kind (bicycles, trailers etc.)



(report by the RR Agency)

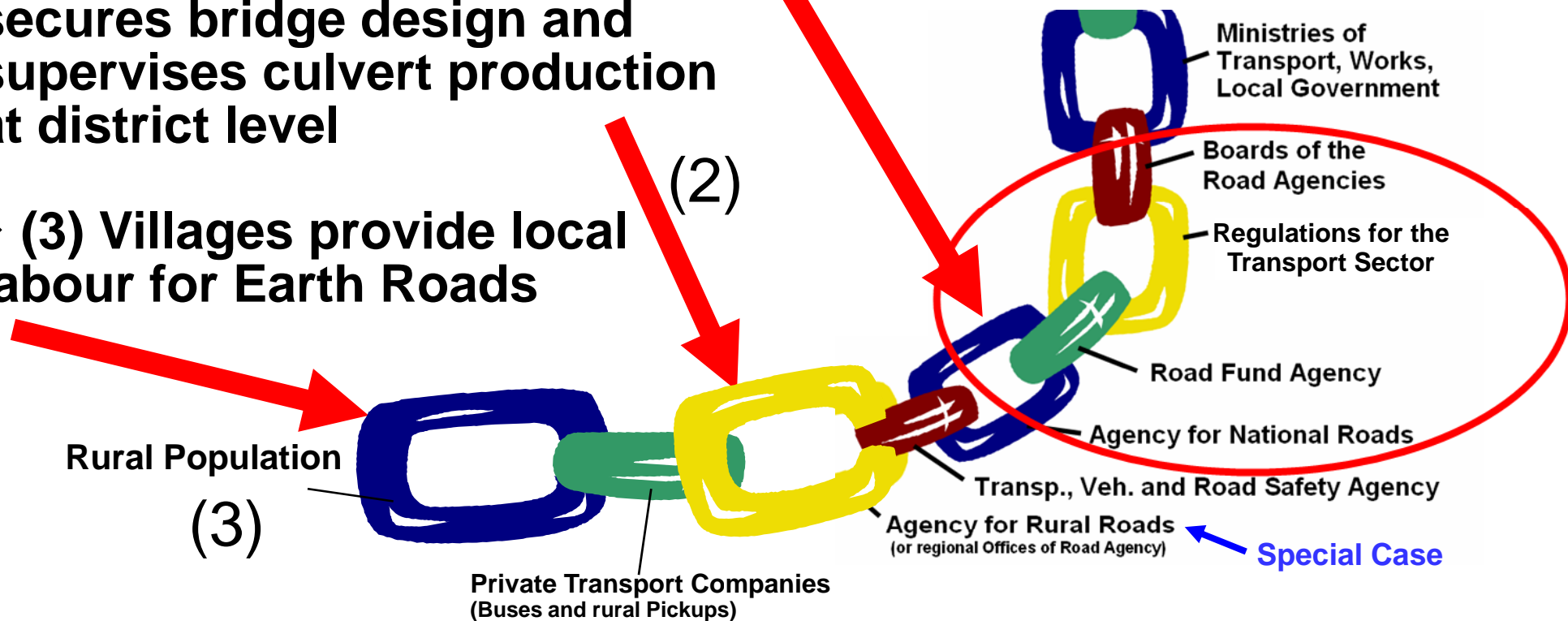
Conclusion

The three 3 elements for Finance and Organisation of rural roads management

♦ (1) Road Fund finances rural roads by min. 20% of its turnover (min. 2 US cents out of 10 UScents fuel levy) (1)

♦ (2) National Roads Agency secures bridge design and supervises culvert production at district level (2)

♦ (3) Villages provide local labour for Earth Roads (3)



**Thus by appropriate
Government Action
the chaos on our rural
roads can be tackled.**



Thank You

Key figures of the transport sector

In a market economy the road management is assessed first by meeting the maintenance requirements of financial capital, depending on the

total **Replacement Value** of the **Road Network**,

which in the Tanzanian example is **4.0 billion US\$** or

37 % of GDP (road “burden factor”)

of 10.9 billion US \$ (2004), (cf. Germany’s total road network is 22% of GDP), out of which by

experience in SSA **c. 2.5 % (= 100 million US \$ p.a.)**

are needed for annual routine plus periodic maintenance.

International Road Classification System

A comparison of existing road standards in different groups of countries

Traffic Density, Paving Standards and Relative Road Construction Costs in relation to annual GDP					Annual Gross Domestic Product per capita in US \$ (GDP)				
					0 - 350 \$	350 - 745 \$	745 - 2975 \$	2795 - 9206 \$	over 9206 \$
					Least Developed Countries	Low Income Countries	Lower Middle Income Countries	Upper Middle Income Countries	High Income Countries
Average Annual Daily Traffic (AADT)	Road Name	Allowed Single Axle Load	Type of Road Construction	Relative Road Construction Costs	LLDC	LIC	LMIC	UMIC	HIC
over 30000	4-lane turnpike	over 10 ton	asphalt concrete 22 cm	10					X
15000 - 30000	EU national road	over 10 ton	asphalt concrete 18 cm	8				(X)	X
5000 - 15000	EU provincial road	over 10 ton	asphalt concrete 14 cm	4			(X)	X	X
1000 - 5000	EU district road	over 10 ton	asphalt concrete 10 cm	2			X	X	X
400 - 1000	EU community road	over 10 ton	asphalt concrete 8 cm	1 (100 %)		X	X	X	X
120 - 400	2cm asphalt on gravel base	over 10 ton	double surface treatment 2 cm	0,4	X	X	X	X	
70 - 120	gravel road	over 10 ton (heavy truck)	20 cm base of CBR > 80	0,2	X	X	X	X	
35 - 70	gravelled road	over 5 ton (light truck)	20 cm base of CBR > 30	0,1	X	X	X		
15 - 35	earth road	over 1,5 ton (pick-up)	CBR > 20	0,05	X	X			
6 - 15	way	4-wheel drive	natural ground	0,02	X				
0 - 6	trail	non-motorized transport	-	-					

Note: Normally each country has 5 official road standards,

Data by GTZ Roads D

REPUBLIQUE DU RWANDA

Kigali, le 13/11/2007



OFFICE NATIONAL DES TRANSPORTS EN COMMUN

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L'ONATRA COM exploite actuellement 136 lignes de types ordinaires, 9 de types express, 2 de types internationales et 27 lignes urbaines. En tout notre réseau est composé de 214 lignes dont 174 exploitées et 40 lignes non encore exploitées, soit 81% de tout le réseau national.

Toute fois l'exploitation du réseau rural cause beaucoup de problèmes liés à l'état des routes

Le tableau ci dessous montre la situation actuelle du réseau rural :

LOCALITE	NOMBRES DE LIGNES	LIGNES EN BON ETAT	LIGNES EN MAUVAIS ETAT (MAIS EXPLOITEES)	LIGNES IMPRATICABLES
SIEGE	30	10	14	6
HUYE	16	4	10	2
RUSIZI	10	3	4	3
KARONGI	10	2	5	3
RUBAVU	6	1	4	1
MUSANZE	11	4	5	2
GICUMBI	12	2	9	1
NYAGATARE	15	6	6	3
NGOMA	26	3	20	3
TOTAL	136	35	77	24
% DU TOTAL	100%	26%	57%	18%

ONATRA COM presently operates 136 lines of normal type, 2 express lines, 2 international lines and 27 urban lines. Totally the net consists of 214 lines, out of which 174 are operated and 40 not yet operated, i.e. 81% out of the total national bus net. ¶
 However the operation of the rural net poses many problems because of the state of the roads. ¶
 The table below shows the present state of the rural bus net. ¶

Lines with bad road condition, (operated (77) ¶

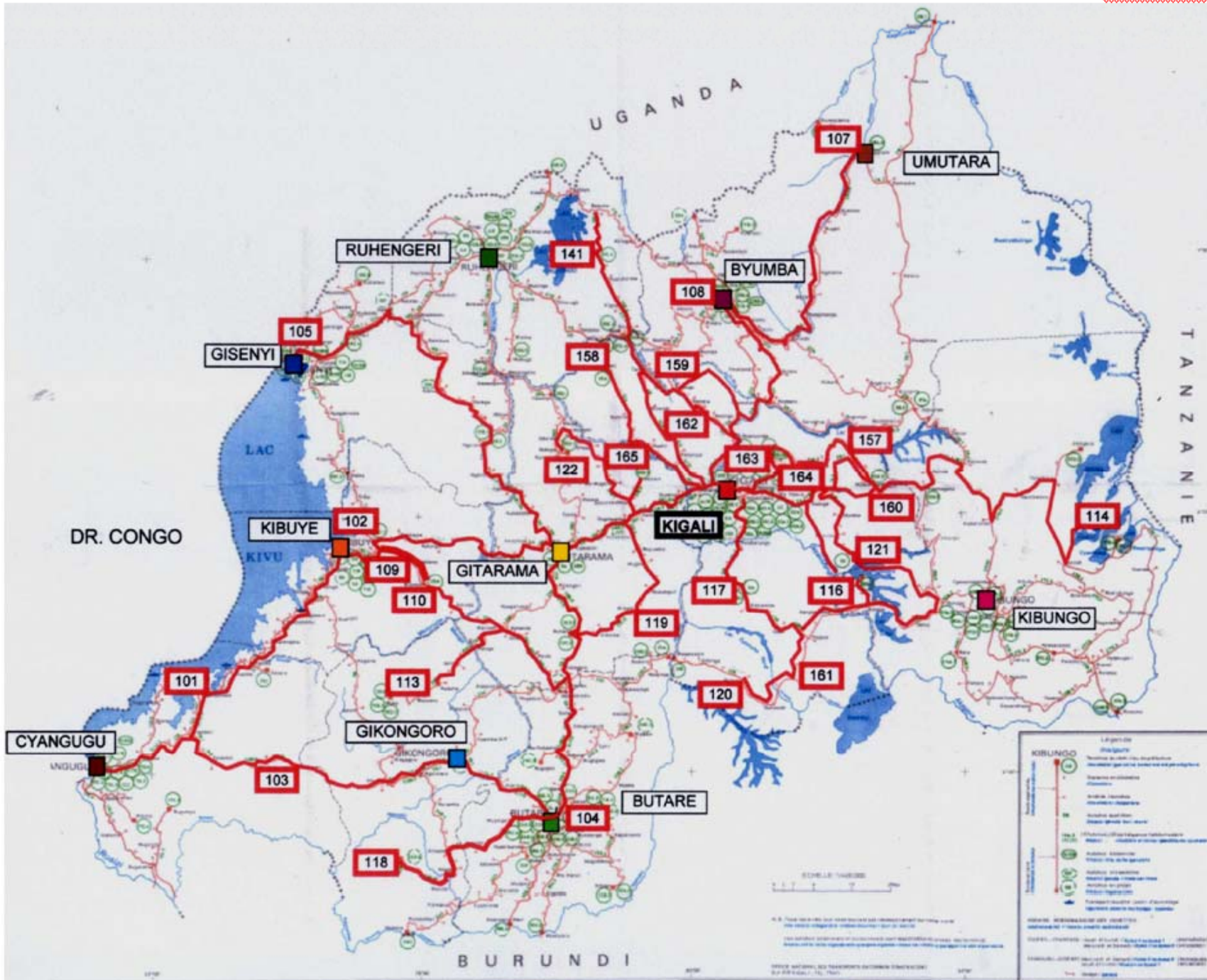
Non operational Lines (24) ¶


N.B : Le Ministère des Infrastructures a un projet de réhabiliter certaines de ces routes. Il serait judicieux si la priorité est donnée aux routes d'abord impraticables (24 lignes),

Rwanda 2008 Road Asset Value: 1029 million US\$

Replacement Value of the Road Assets of the 3 road agencies in Rwanda

Responsible Authority (Road Ag'y)	ROAD Classification	Road surface	Length (km) (longueur)	% of lgth	Remplacem't Value US\$/km	Replace-ment Value Million US\$	%
MININFRA	National Road N1S+2	Bitumen carpet	198	↑	825.000	163,4	16
MININFRA	National Road RN3 – RN14	Bituminous Double Treatment DST	877	20	600.000	526,2	51
MININFRA	National Road RN15 – RN40	Gravel road	1785	32	120.000	214,2	21
30 different DISTRICTS	District Road RD1 – RD79	Earth road	1838	33	30.000	55,2	5
Districts	Unclassified	Track	[~6650]		0	--	
Ville de KIGALI	Urban road VU	Bitumen	60	↑	750.000	45,0	↑
Ville de KIGALI	Urban Road VU	Gravel road	50	15	80.000	4,0	7
Ville de KIGALI	Urban road VU	Earth road	700		30.000	21,0	
Rwanda	TOTAL		5508	100		1029,0	100



Development or Recurrent Budget	RWANDA State Budget COFOG-LEDGER Classification	Field of Work and financial responsibility
	Development Budget (cut possible) Priority-3	1. New Construction 2. Reconstruction 3. Upgrading
	Priority-2????????	4. Rehabilitation (every 15 years)
????????	5. Periodic Maintenance every 9 years (asphalt) and 3-4 years (gravel)
	Recurrent Budget (budget cut?) Priority-No. 1	6. Recurrent Maintenance (yearly) 7. Urgent interventions (Bridge repair)
	Fuel levy, transit levy, vehicle tax etc acc to FER-Law	8. Road security measures 9. Studies and Control of Maintenance 10. Administration of ROAD Maint. FUND

1. Road Expenditures in the Development or Recurrent Budget?
2. Road Maintenance Fund for Periodic Maintenance !?

Protecting the Road Fixed Assets - Financial and technical means of ASSET MANAGEMENT for FER/RMF

MANUAL Accountancy and Balance Sheet in the Roads Sector

COFOG practices correspond to traditional European "cameralistic" budget. A "normal" balance contains all columns 1-4

Annual Statement (COFOG-accounts)		Property Statement (not in COFOG-accounts)							
column 1	column 2	column 3 (replaced by MANUAL Appendix: Fixed asset inventory)	column 4 (not considered)						
Revenues (yearly)	Expenditures (yearly budget)	Fixed Assets (accumul. value) patrimoine national with the road owner	Liabilities (accumul. debts)						
	<table border="1"> <tr> <td>recurrent budget</td> <td>development budget</td> </tr> <tr> <td>a) ROAD MAINTENANCE FUND expenditure</td> <td>Roads Dept. of Ministry (with donors)</td> </tr> <tr> <td>b) RMF administrative expenditures</td> <td></td> </tr> </table>	recurrent budget	development budget	a) ROAD MAINTENANCE FUND expenditure	Roads Dept. of Ministry (with donors)	b) RMF administrative expenditures		Present values of: a) National Roads b) Rural Roads c) Urban Roads d) Road pool (Present value = replacement value minus depreciation) ROAD AGENCY with Road Data Bank keeps ASSET RECORDS	a) foreign loans b) bank credits c) future pensions
recurrent budget	development budget								
a) ROAD MAINTENANCE FUND expenditure	Roads Dept. of Ministry (with donors)								
b) RMF administrative expenditures									

4 Main Issues:

1. Full Asset Records (sector Asset of 1000 million \$)
2. Competences of RMF/FER vs. MININFRA (recurrent vs. development expenditures)
3. Size of recurrent budget for RMF/FER
4. Dedicated Revenues for the RMF/RMF

II. → Road Fund financing in East Africa to be harmonised also¶

These losses in government revenues - due to lacking fuel price harmonisation in EAC – even in future may reach the amount of fuel levy paid by Rwanda into the Road Fund, which is **4003 million Frw** only in the year 2008. ¶

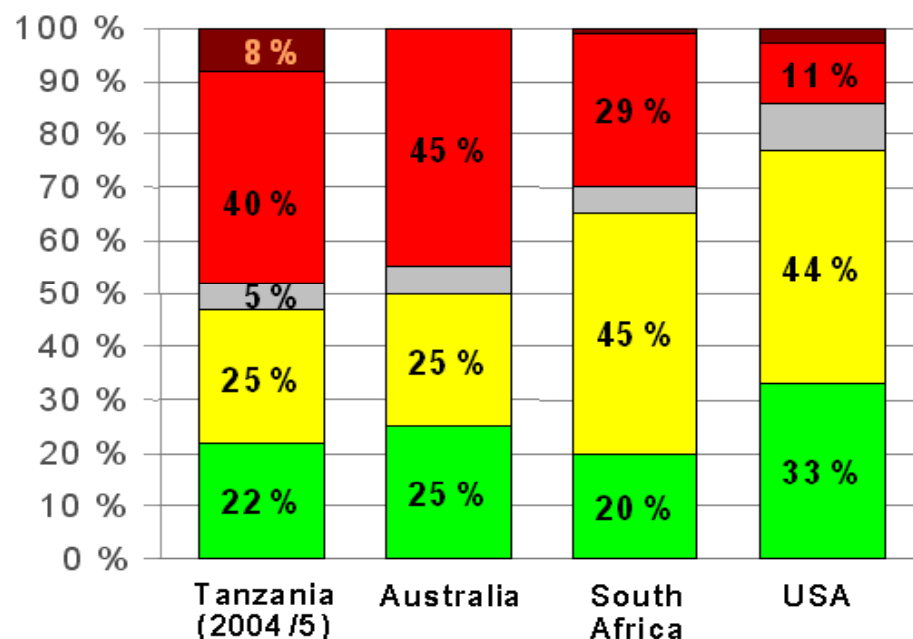
The fuel tax was **10%** of the sales price in 1990, when it was introduced, but today in September 2008 with the present at a sales price of 924 Frw/litre (1.68 US\$) the fuel levy of 20,33 Frw (0.037 US\$) represents **2.2%** only of the diesel sales price. ¶

If compared with other East African countries, the Rwanda Fuel Tax may be harmonised to East African and recommended standards also. ¶

Fuel Tax in Rwanda and EAC¶

□	□	<i>Fuel TAX per litre Diesel and Gazoline</i> □
1a □	RWANDA 2008 presently □	4 US Cents ²¹ □
1b □	Suggestion RWANDA (PWH Oct. 2005 for 2012) □	12.7 US Cents □
2 □	TANZANIA 2008 presently □	11 US Cents □
3 □	KENYA = 9 <u>Ksh</u>/litre presently¶ (in 2006 raised from 5.8 <u>Ksh</u> = 7.5 US Cents) □	11.7 <u>US Cents</u> □
4 □	Recommendation of the SSATP – Conferences African Transport ministers □	10 US Cents □

Periodic Road Maintenance vs. Rehabilitation



Road Maintenance Type	Annual Costs
Emergency Maintenance	
Rehabilitation (only if Periodic Maintenance was not done in time)	c.150.000 – 250.000 US \$ per km for Wearing Course Renewal and Base Course Renewal and possibly Drainage Renewal
Bridge Maintenance	
Periodic Maintenance (gravel: every 5 - 7 years asphalt: every 8 - 10 years)	c. 50.000 - 90.000 US \$ per km only for Wearing Course Renewal
Routine Maintenance (permanent/yearly)	c. 2.000 - 5.000 US \$ per km for Pothole Patching

Country Data Sources:

- ♦ Data Tanzania: TANROADS Business Plan (2005/6, App. E-5) and Quarter Plan 2004/5 (No 4 p. iii)
- ♦ Data Australia-SA-USA: 'Evaluation and Funding of Road Maintenance in PIARC Member Countries', PIARC C9 Evaluation 2005

Permanent Routine Maintenance:



Pothole patching is needed permanently.

Time for Periodic Maintenance has come:



A complete new road surface is needed now.

Time for Periodic Maintenance has passed:



A new road surface, a new base and a new drainage has become necessary (Need for Rehabilitation).