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Road Network Evaluation Tools (RONET) Version 1.0

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RONET

- Developed by SSATP together with expertise of the World Bank.

- Helps decision makers:
  - Monitor network condition
  - Plan allocation of resources
  - Assess consequences of macro policies

- Developed for the Africa region, but can be applied on any developing country worldwide

RONET Version 1.0

Structure
and
Data Requirements

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Current RONET Modules

- <u>Current Condition Assessment</u>: Calculates current road network statistics and monitoring indicators.

- <u>Performance Assessment</u>: Evaluates road network performance under different rehabilitation and maintenance standards (budget scenarios).

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Road Network Length Matrix

Matrix of Road Classes: Overall Network Evaluation

Network Type	Surface Type				
	Concrete	Asphalt	S.T.	Gravel	Earth
Primary					
Secondary					
Tertiary					
Unclassified					
Urban					

Traffic Category	Condition Category				
	Very Good	Good	Fair	Poor	Very Poor
Traffic I					
Traffic II					
Traffic III					
Traffic IV					
Traffic V					

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Total 5 X 5 X 5 X 5 = 625 road classes

RONET Inputs

Road Network Evaluation Tools

Version 1.0, 6/6/2007

Configuration	Inputs	Calculations	Outputs
C-Basic Configuration	I-Country Data I-Road Network Length	Current Condition Assessment	O-Length & Utilization O-Asset Value O-Roughness O-Network Distribution Charts O-Network Monitoring Indicators
C-Basic Configuration C-Standards Configuration	I-Country Data I-Road Network Length I-Historical Data	Performance Assessment PAM	O-Network Performance O-Road Works Distribution O-Road Works Summary O-Historical Data Comparison

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Road Network Length

Country XYZ - 2007

Road Network Two-Lane Equivalent Length (km)

Primary
Concrete

Traffic (AADT)	Condition (IRI)	Very Good 2	Good 3	Fair 4	Poor 8	Very Poor 12	Total
Traffic I	<300						0
Traffic II	300-1000						0
Traffic III	1000-3000						0
Traffic IV	3000-10000						0
Traffic V	>10000						0
Total		0	0	0	0	0	0

Primary
Asphalt

Traffic (AADT)	Condition (IRI)	Very Good 2	Good 3	Fair 4.5	Poor 8	Very Poor 12	Total
Traffic I	<300	0	0	0	0	0	0
Traffic II	300-1000	0	184	39	31	10	264
Traffic III	1000-3000	370	341	61	22	0	794
Traffic IV	3000-10000	0	0	0	0	0	0
Traffic V	>10000	2	97	16	2	0	117
Total		372	622	116	55	10	1,175

Secondary
Concrete

Traffic (AADT)	Condition (IRI)	Very Good 2	Good 3	Fair 4	Poor 8	Very Poor 12	Total
Traffic I	<300						0
Traffic II	300-1000						0
Traffic III	1000-3000						0
Traffic IV	3000-10000						0
Traffic V	>10000						0
Total		0	0	0	0	0	0

Secondary
Asphalt

Traffic (AADT)	Condition (IRI)	Very Good 2	Good 3	Fair 4.5	Poor 8	Very Poor 12	Total
Traffic I	<300	0	0	0	0	0	0
Traffic II	300-1000	0	41	32	17	0	90
Traffic III	1000-3000	0	0	21	6	0	27
Traffic IV	3000-10000	0	0	0	0	0	0
Traffic V	>10000	0	0	0	0	0	0
Total		0	41	53	23	0	117

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Country Data

Name and Year

Country Name	Country XYZ
Current Year	2007

Basic Characteristics

Land area (sq km)	121,000
Total population (million persons)	5.000
Rural population (million persons)	2.00
GDP at current prices ($ Billion)	4.600
Total vehicle fleet (vehicles)	150,000
Discount Rate (%)	12%

Traffic Growth and Pavement Width

Network	Annual Traffic Growth Rate (%/year)	Average Pavement Width (m)
Primary	3.0%	7.0
Secondary	3.0%	6.0
Tertiary	3.0%	5.0
Unclassified	3.0%	5.0
Urban	3.0%	7.0

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Country Data

Capital Road Works Unit Costs

Surface Type	Current Condition	Road Work	Two-Lane Unit Costs of Road Works ($/km)				
			Primary	Secondary	Tertiary	Unclassified	Urban
Concrete	Good Condition	Preventive Treatment	5,000	4,000	3,000	3,000	5,000
	Fair Condition	Resurfacing (Overlay)	45,000	36,000	27,000	27,000	45,000
	Poor Condition	Strengthening (Overlay)	130,000	104,000	78,000	78,000	130,000
	Very Poor Condition	Reconstruction	230,000	184,000	138,000	138,000	230,000
	No Road	New Construction	350,000	280,000	210,000	210,000	350,000
Asphalt Mix	Good Condition	Preventive Treatment	5,000	4,000	3,000	3,000	5,000
	Fair Condition	Resurfacing (Overlay)	45,000	36,000	27,000	27,000	45,000
	Poor Condition	Strengthening (Overlay)	130,000	104,000	78,000	78,000	130,000
	Very Poor Condition	Reconstruction	230,000	184,000	138,000	138,000	230,000
	No Road	New Construction	350,000	280,000	210,000	210,000	350,000
Surface Treatmeant	Good Condition	Preventive Treatment	2,000	1,600	1,200	1,200	2,000
	Fair Condition	Resurfacing (Reseal)	18,000	14,400	10,800	10,800	18,000
	Poor Condition	Strengthening (Overlay)	90,000	72,000	54,000	54,000	90,000
	Very Poor Condition	Reconstruction	180,000	144,000	108,000	108,000	180,000
	No Road	New Construction	300,000	240,000	180,000	180,000	300,000
Gravel	Good Condition	Spot Regravelling	3,000	2,400	1,800	1,800	3,000
	Fair Condition	Regravelling	8,000	6,500	5,000	5,000	8,000
	Poor Condition	Partial Reconstruction	17,500	14,000	10,500	10,500	17,500
	Very Poor Condition	Full Reconstruction	35,000	28,000	21,000	21,000	35,000
	No Road	New Construction	60,000	48,000	36,000	36,000	60,000
Earth	Good Condition	Spot Repairs	200	100	10	10	200
	Fair Condition	Heavy Grading	800	400	50	50	800
	Poor Condition	Partial Reconstruction	8,000	4,000	500	500	8,000
	Very Poor Condition	Full Reconstruction	25,000	12,500	1,500	1,500	25,000
	No Road	New Construction	40,000	20,000	2,500	2,500	40,000

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RONET versus HDM 4

- RONET is a macro model only
- Both requires country data input and calibration
- RONET requires input on road length, condition, traffic, pavement type, climate, terrain
- HDM 4 requires additionally pavement history, data on bases and sub-bases
- RONET slightly simplified deterioration equations
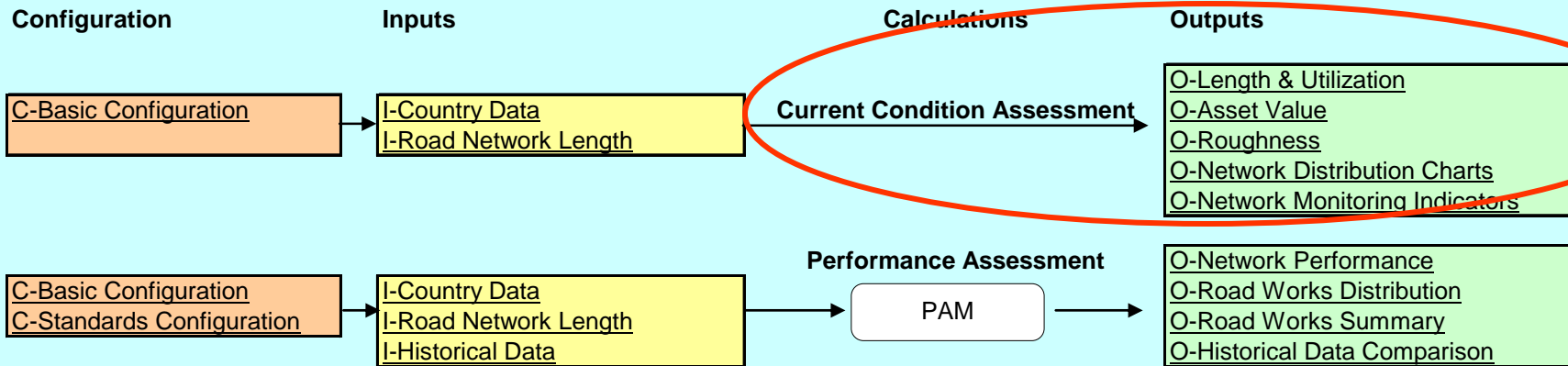- RONET much less "data hungry"

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RONET Version 1.0

Outputs

RONET

Current Condition Assessment

RQNET

Road Network Evaluation Tools

Version 1.0, 6/6/2007

Configuration	Inputs	Calculations	Outputs
C-Basic Configuration	I-Country Data I-Road Network Length	Current Condition Assessment	O-Length & Utilization O-Asset Value O-Roughness O-Network Distribution Charts O-Network Monitoring Indicators
C-Basic Configuration C-Standards Configuration	I-Country Data I-Road Network Length I-Historical Data	Performance Assessment PAM	O-Network Performance O-Road Works Distribution O-Road Works Summary O-Historical Data Comparison

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Results computed using Excel formulas and are updated automatically
when the inputs change.

Monitoring Indicators (1)

Monitoring Indicator

Network Length	
Road network length	km
Road network length that is unpaved	km
Road network length that is paved	km
Road network length that is paved	%
Network Density	
Road network per thousand land area	km/1000 sq km
Road network per thousand total population	km/1000 persons
Road network per thousand rural population	km/1000 persons
Road network per thousand vehicles	km/1000 vehicles
Road network per $ million GDP	km/million $
Paved road network per thousand land area	km/1000 sq km
Paved road network per thousand total population	km/1000 persons
Paved road network per thousand rural population	km/1000 persons
Paved road network per thousand vehicles	km/1000 vehicles
Paved road network per $ million GDP	km/million $

Monitoring Indicators (2)

Network Condition	
Percentage of road network in good and fair condition	%
Percentage of paved road network in good and fair condition	%
Percentage of paved road network with roughness 4 m/km IRI or less	%
Paved roads average roughness weighted by km	IRI, m/km
Paved roads average roughness weighted by vehicle-km	IRI, m/km
Percentage of unpaved roads that are all-weather roads	%
Network Standards	
Percentage of unpaved roads with 30 AADT or less	%
Percentage of unpaved roads with 300 AADT or more	%
Percentage of paved roads with 300 AADT or less	%
Percentage of paved roads with 10,000 AADT or more	%
Network Utilization	
Annual motorized vehicle utilization	million vehicle-km
Annual freight carried over road network	million ton-km
Annual passengers carried over road network	million pass-km
Average network annual average daily traffic	vehicles/day
Network Asset	
Current Road asset value	million $
Current Road asset value as a share of maximum road asset value	%
Current Road asset value as a share of GPD	%

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Result Examples

- Results presented here is the first attempt to apply the model to networks in specific countries (Ghana, Mozambique, Tanzania and Uganda)

- All data have been entered by the country representatives

- We do not know the quality of the data and in-country quality processes, and we cannot guarantee the correctness of the data

- Work in Progress, requires Country reviews

Mozambique All Roads
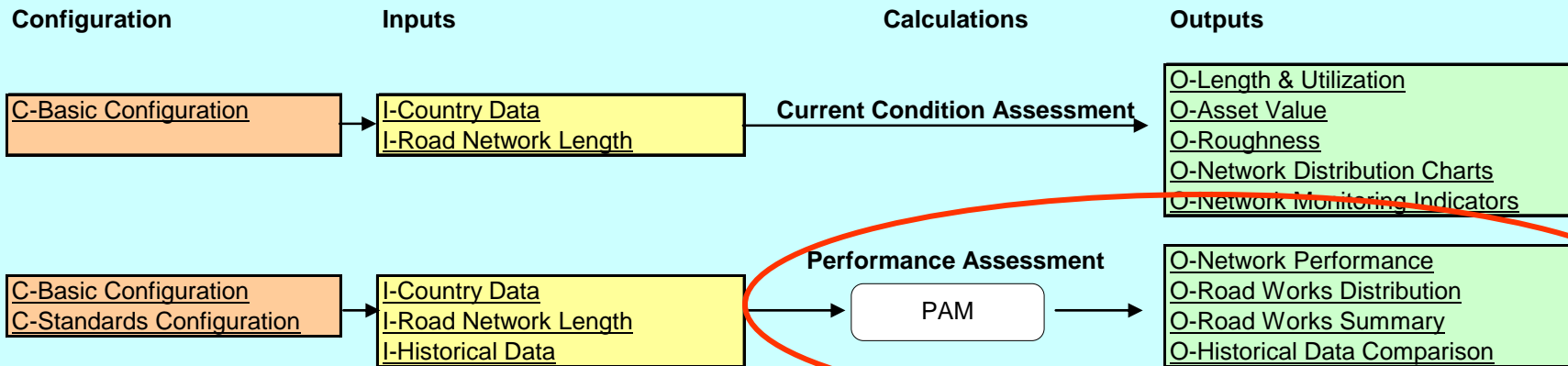
Network Length and Asset Value by Functional Classification

	Length (km)	Current Asset Value (M US$)
■ Urban	0%	0%
□ Vicinal	23%	2%
■ Tertiary	43%	15%
■ Secondary	17%	16%
■ Primary	17%	67%
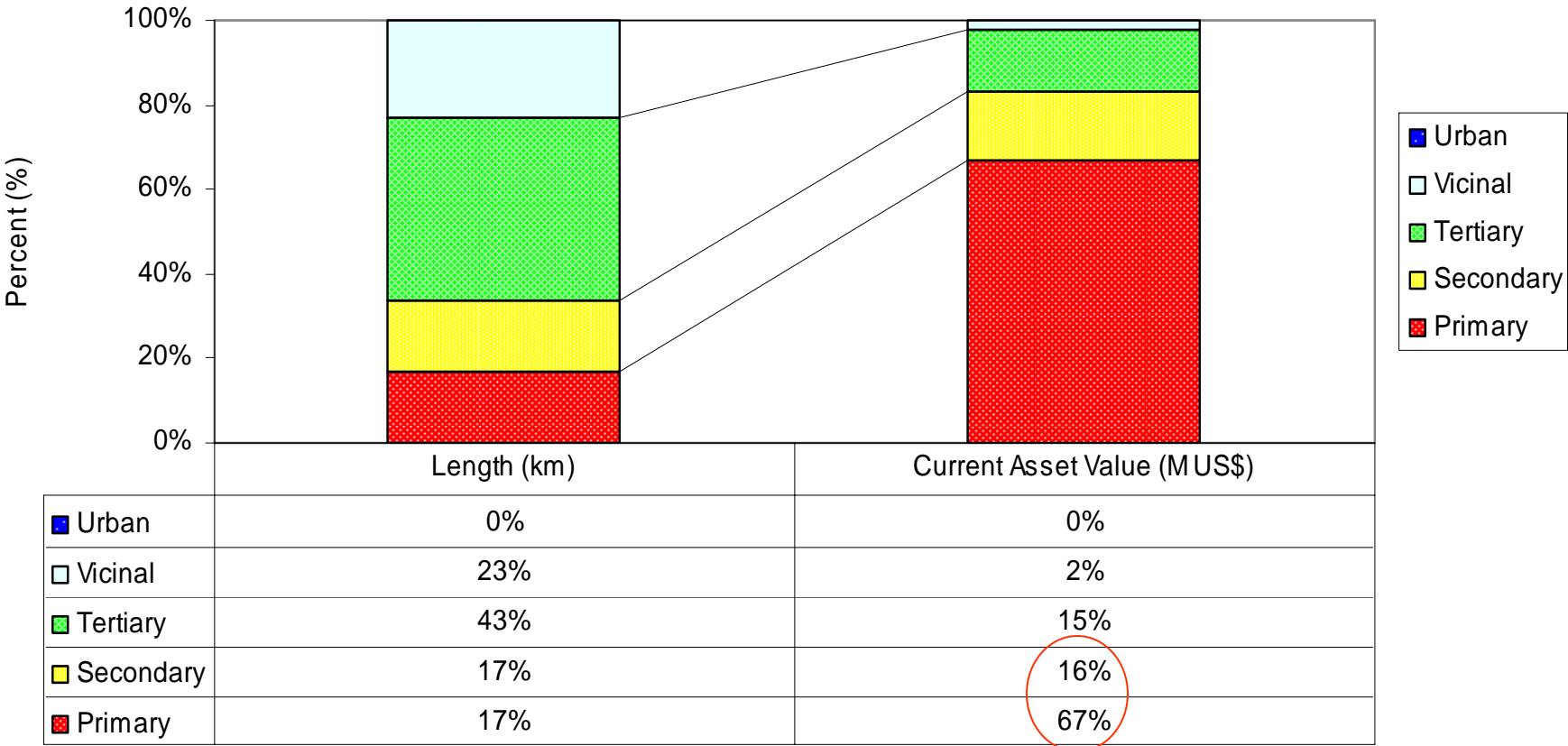
Performance Assessment

Road **N**etwork **E**valuation **T**ools

Version 1.0, 6/6/2007

Configuration	Inputs	Calculations	Outputs

C-Basic Configuration → **I-Country Data / I-Road Network Length** → **Current Condition Assessment** → O-Length & Utilization / O-Asset Value / O-Roughness / O-Network Distribution Charts / O-Network Monitoring Indicators

C-Basic Configuration / C-Standards Configuration → **I-Country Data / I-Road Network Length / I-Historical Data** → **Performance Assessment / PAM** → O-Network Performance / O-Road Works Distribution / O-Road Works Summary / O-Historical Data Comparison

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Results computed using Excel macros and are updated only after the PAM button is pressed (evaluation takes around 3 minutes).

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What are the Consequences of Applying Different Maintenance Standards?

Standards

Very High Standard
High Standard
Medium Standard
Low Standard
Very Low Standard
Do Minimum
Do Nothing
Custom Standard

Road Network

Performance Assessment

Consequences

Road Works
Financial
Economic
Condition
Asset Value
Road Users
Etc.
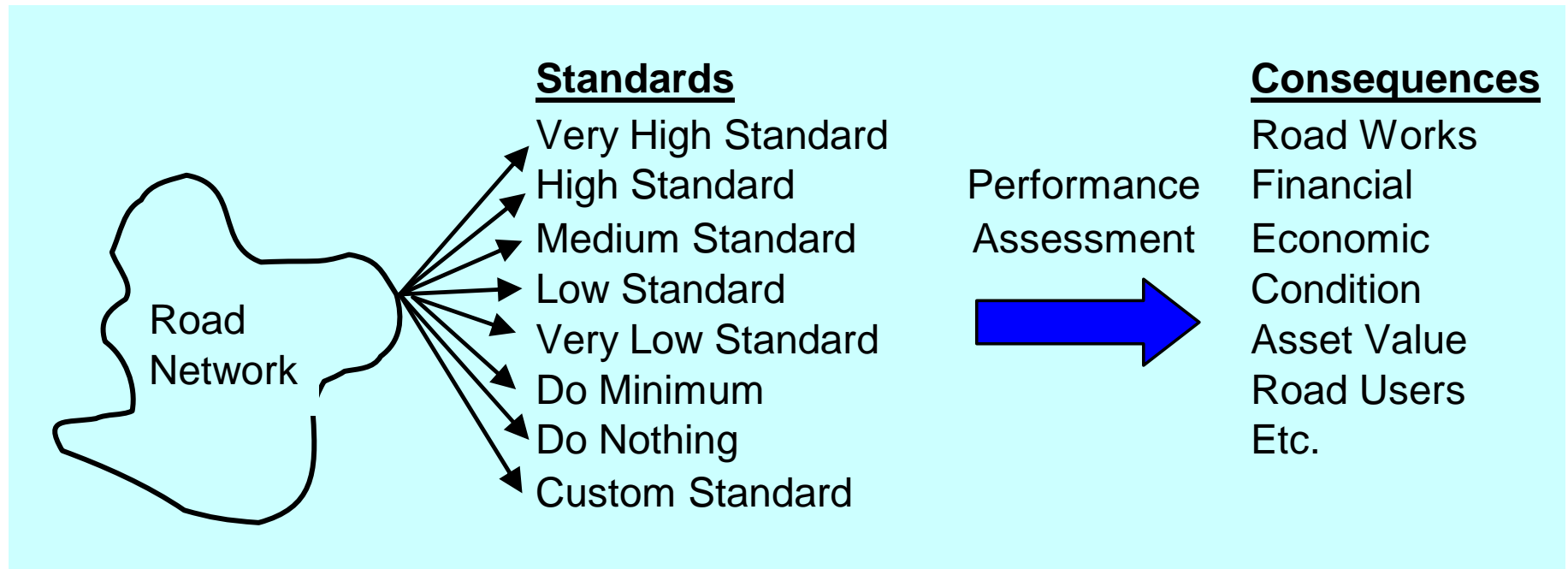
Mozambique All Roads under ANE
(29,238 km)

Road Agency and Road User Costs in Years 1 to 20

Costs (Million US$)

Road Agency   Road Users
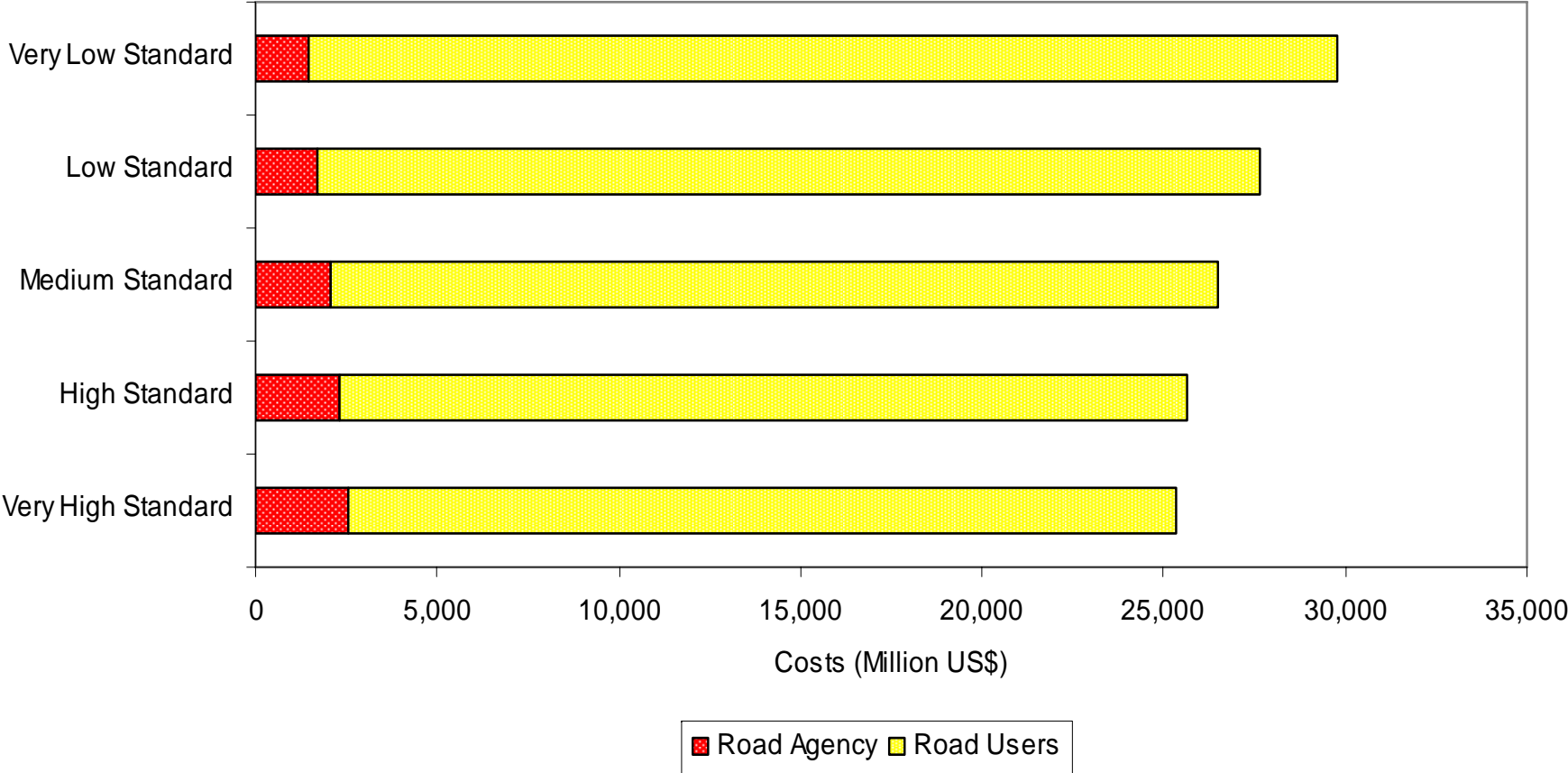
Mozambique All Roads under ANE
(29,238 km)

Road Agency and User Costs
Compared to the Very High Standard Scenario
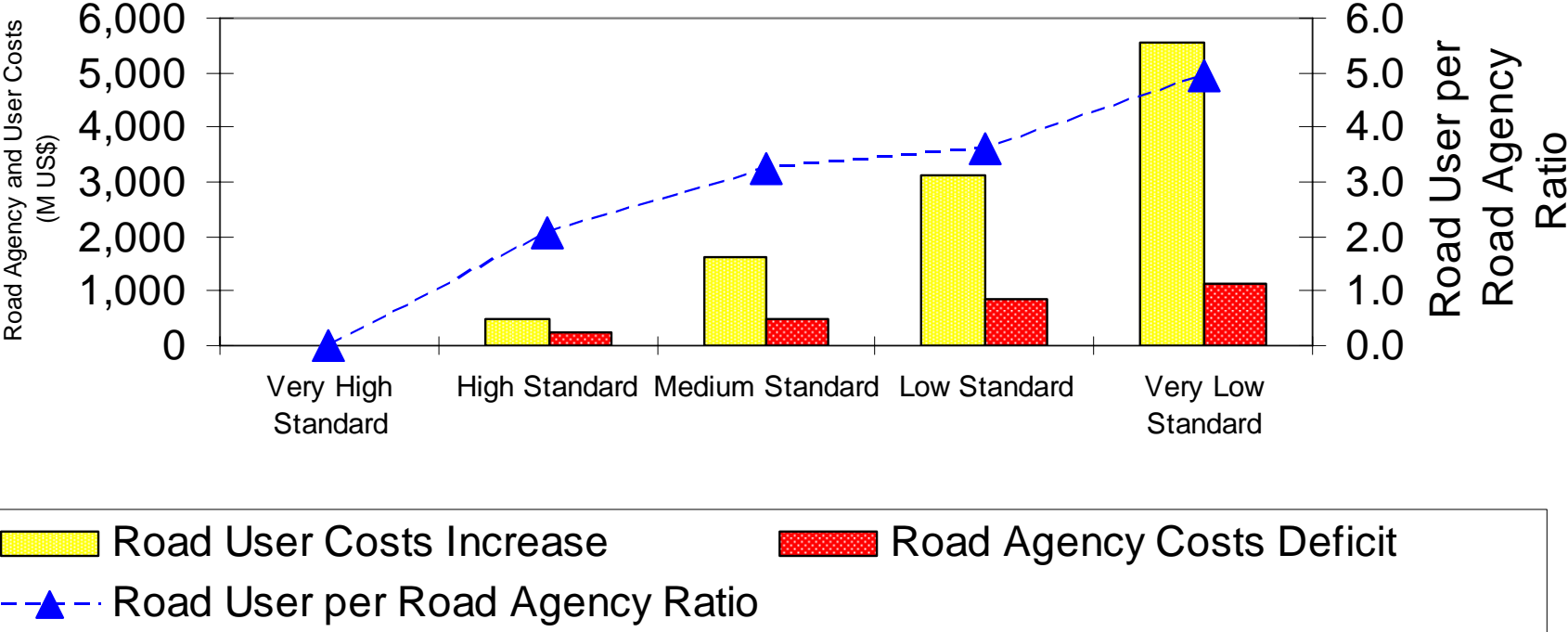
Case Studies
SSATP Working Paper No. 85-B

Country
Comparisons: Olav Ellevset, SSATP / The World Bank

Ghana: Godwin Brocke, Ministry of Transportation
Mozambique: Atanasio Mugunhe, National Roads Administration (ANE)
Tanzania: Joseph Lwiza, Tanzania National Roads Agency (TANROADS)
Uganda: David Lyiumbazi, Road Agency Formation Unit (RAFU)

R**NET

Year of Data-Sets

- Ghana   2005
- Mozambique   2006
- Tanzania   2007
- Uganda   2007

Country, Basic Characteristics

	Ghana	Mozambique	Tanzania	Uganda
Land area (sq km)	238,500	781,129	881,000	197,097
Total population (million persons)	21.343	19.92	36	28
Rural population (million persons)	11.99	15.98	28.8	22.4
GDP at current prices ($ Billion)	10.57	7.368	10.68	8.502
Total vehicle fleet (vehicles)	653,309	187,660	608,000	278,595

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The Case Studies

Main Roads Only

Main Roads Length & Utilization
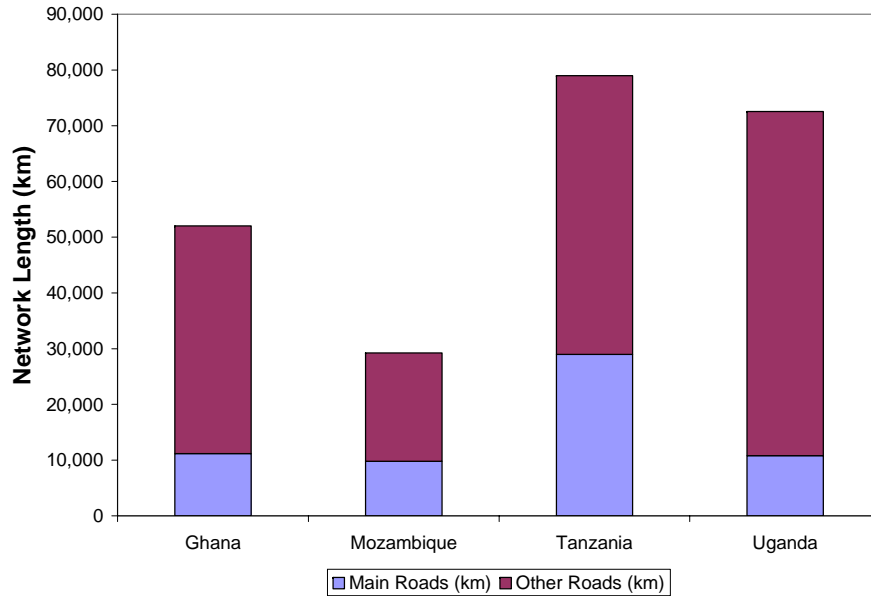
Main roads represent 27% of the total network length

Main roads represent 77% of the total network utilization
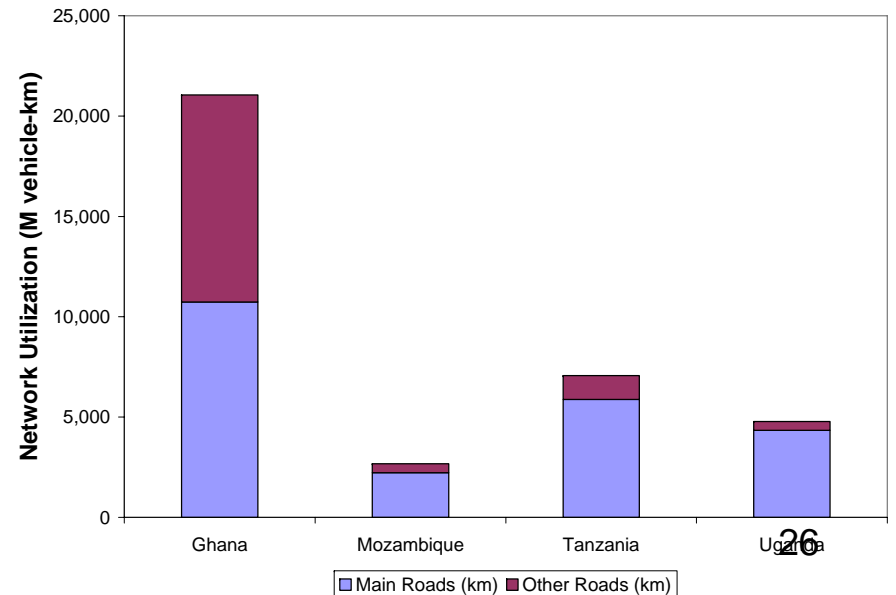
Network Condition

Network Monitoring Indicators, Main Roads				
Monitoring Indicator	Ghana	Mozambique	Tanzania	Uganda
Network Condition				
Percentage of road network in good and fair condition (%)	73.8	83.3	78.0	82.1
Percentage of paved road network in good and fair condition (%)	95.3	87.5	93.7	88.1
Percentage of paved road network with roughness 4 m/km IRI or less (%)	64.6	53.1	58.3	24.7
Paved roads average roughness weighted by km (IRI, m/km) (%)	4.47	4.91	4.30	5.73
Paved roads average roughness weighted by vehicle-km (IRI, m/km) (%)	3.94	4.63	3.67	5.67
Percentage of unpaved roads that are all-weather roads (%)	54.0	59.5	63.1	80.1

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Network Standards

Network Monitoring Indicators, Main Roads				
Monitoring Indicator	Ghana	Mozambique	Tanzania	Uganda
Network Standards				
Percentage of unpaved roads with 30 AADT or less (%)	1.2	19.2	20.7	2.6
Percentage of unpaved roads with 300 AADT or more (%)	31.2	2.2	10.2	29.5
Percentage of paved roads with 300 AADT or less (%)	0.0	40.2	12.3	13.9
Percentage of paved roads with 10,000 AADT or more (%)	13.9	0.2	2.5	8.2

Network Utilization

Network Monitoring Indicators, Main Roads				
Monitoring Indicator	Ghana	Mozambique	Tanzania	Uganda
Network Utilization				
Annual motorized vehicle utilization (million vehicle-km)	10,738	2,229	5,876	4,344
Annual freight carried over road network (million ton-km)	32,164	6,844	19,857	18,777
Annual passengers carried over road network (million pass-km)	73,140	15,484	45,032	25,226
Average network annual average daily traffic (vehicles/day)	2,632	623	555	1,100

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Network Assets

Network Monitoring Indicators, Main Roads				
Monitoring Indicator	Ghana	Mozambique	Tanzania	Uganda
Network Asset				
Current Road asset value (million $)	1,390.4	2,423.0	2,463.9	1,360.2
Current Road asset value as a share of maximum road asset value (%)	90.3	90.2	90.4	86.2
Current Road asset value as a share of GDP (%)	13.2	32.9	23.1	16.0

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Capital Road Works Unit Costs (US$/km)

Surface Type	Road Work	Ghana	Mozambique	Tanzania	Uganda
Asphalt Mix	Preventive Treatment	2,500	9,500	5,000	12,500
Primary Roads	Resurfacing (Overlay)	110,000	71,500	60,000	45,000
	Strengthening (Overlay)	170,000	250,000	100,000	130,000
	Reconstruction	250,000	400,000	300,000	350,000
	New Construction	400,000	650,000	350,000	600,000
Surface Treatment	Preventive Treatment	1,800	3,510	2,000	10,000
Primary Roads	Resurfacing (Reseal)	25,000	32,500	27,000	25,000
	Strengthening (Overlay)	60,000	107,310	80,000	75,000
	Reconstruction	160,000	300,000	254,000	250,000
	New Construction	220,000	450,000	304,000	400,000
Gravel	Spot Regraveling	900	2,400	2,708	5,000
Secondary Roads	Regraveling	12,000	45,000	8,462	10,000
	Partial Reconstruction	18,000	55,000	11,846	25,000
	Full Reconstruction	28,000	70,000	21,154	40,000
	New Construction	32,000	90,000	47,385	60,000
Earth	Spot Repairs	500	125	104	125
Tertiary Roads	Heavy Grading	600	250	426	250
	Partial Reconstruction	750	350	5,192	625
	Full Reconstruction	950	350	10,385	1,125
	New Construction	1,000	350	27,692	1,500

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Recurrent Road Works Unit Costs (US$/km/year)

Surface Type	Road Condition	Ghana	Mozambique	Tanzania	Uganda
Asphalt Mix	Very Good	900	1,100	1,000	1,875
Primary Roads	Good	1,200	1,200	1,250	1,875
	Fair	1,500	1,300	1,500	2,500
	Poor	1,750	975	1,750	6,250
	Very Poor	750	650	2,000	12,500
Surface Treatment	Very Good	600	1,000	1,000	1,500
Primary Roads	Good	900	1,200	1,250	1,500
	Fair	1,200	1,300	1,500	2,000
	Poor	1,500	975	1,750	5,000
	Very Poor	600	650	2,000	10,000
Gravel	Very Good	375	1,200	413	1,125
Secondary Roads	Good	470	1,200	506	1,125
	Fair	580	1,200	600	2,625
	Poor	660	900	694	3,375
	Very Poor	290	600	788	5,625
Earth	Very Good	40	100	125	50
Tertiary Roads	Good	60	100	157	50
	Fair	80	125	188	50
	Poor	100	125	219	100
	Very Poor	40	125	250	100

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Average Results for the Four Countries

Network Density

Road network per thousand land area (km/1000 sq km)	36.81
Road network per thousand total population (km/1000 persons)	0.55
Road network per thousand rural population (km/1000 persons)	0.76
Road network per thousand vehicles (km/1000 vehicles)	38.98
Road network per $ million GDP (km/million $)	1.59
Paved road network per thousand land area (km/1000 sq km)	24.65
Paved road network per thousand total population (km/1000 persons)	0.36
Paved road network per thousand rural population (km/1000 persons)	0.49
Paved road network per thousand vehicles (km/1000 vehicles)	25.41
Paved road network per $ million GDP (km/million $)	1.09

Network Asset

Current Road asset value per kilometer (million $/km)	0.15
Current Road asset value as a share of maximum road asset value (%)	89%
Current Road asset value as a share of GPD (%)	21%

Medium Standard Rehabilitation and Maintenance Requirements

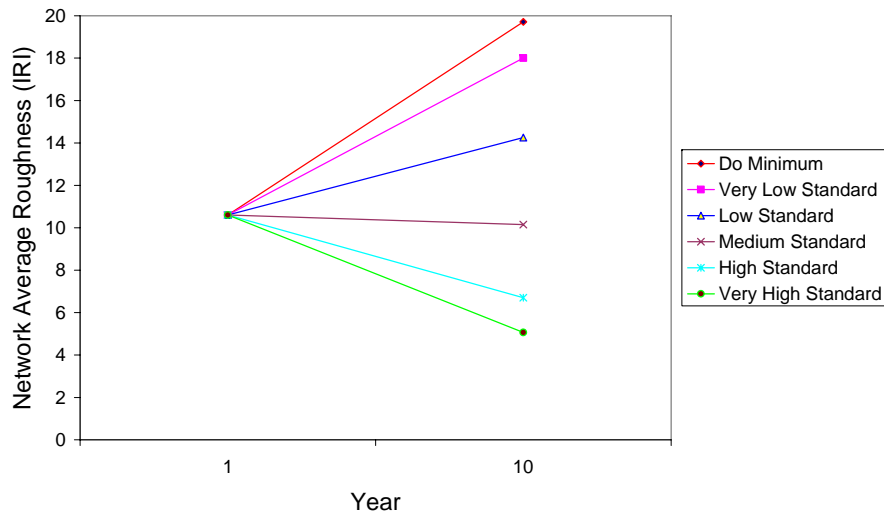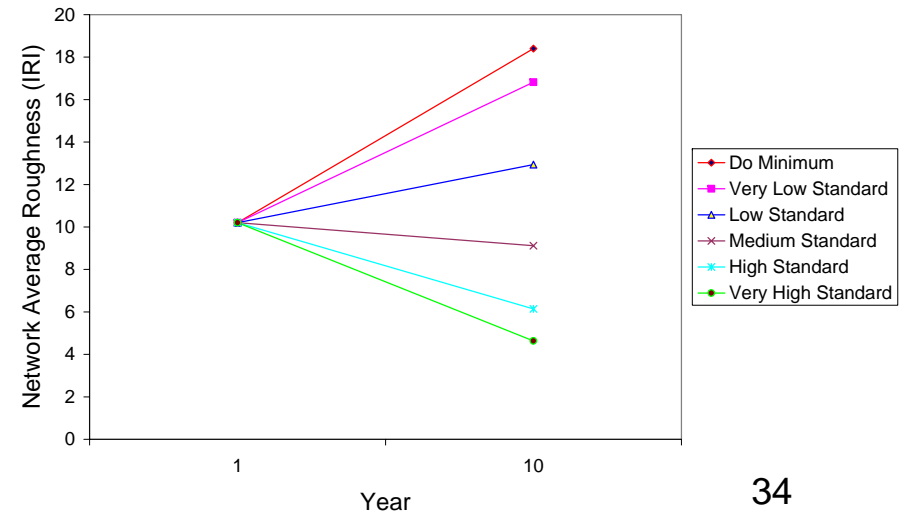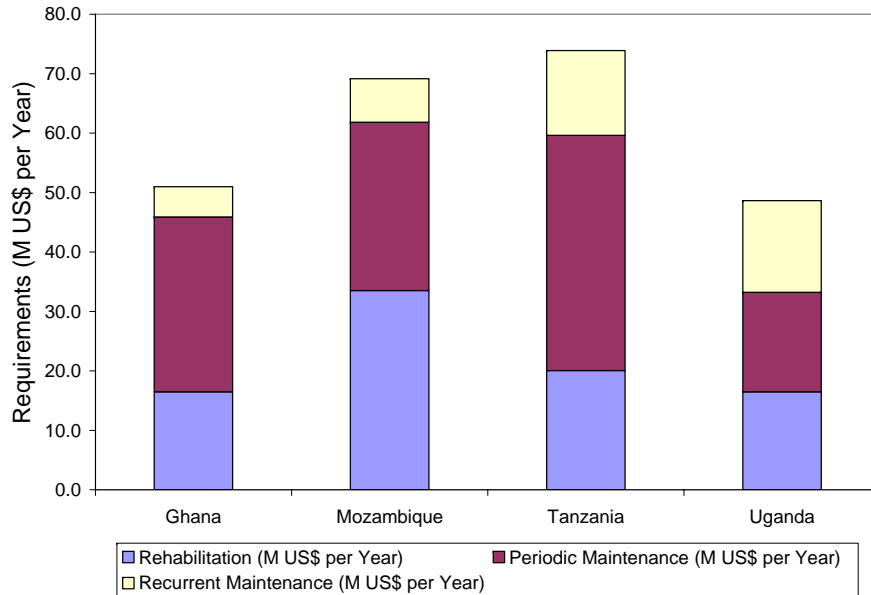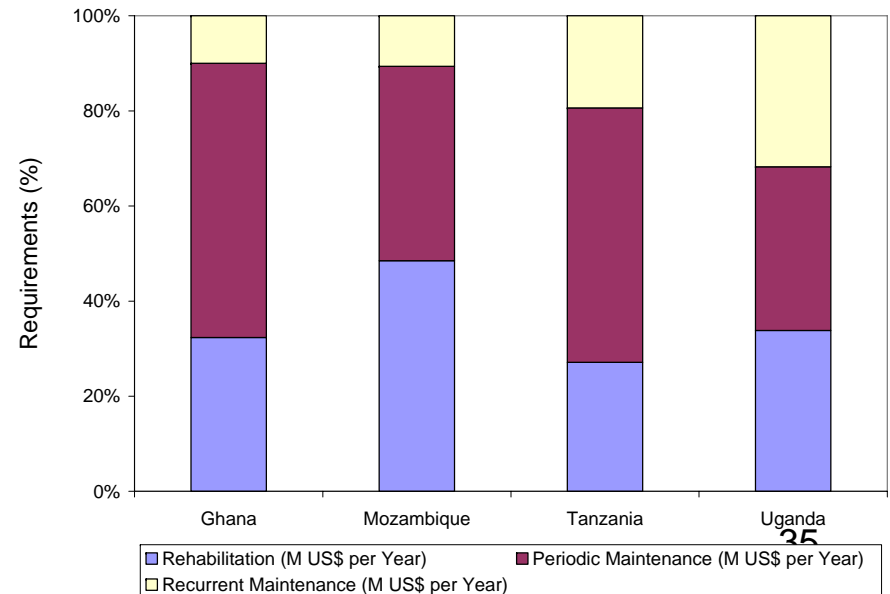|	
Annual rehabilitation and maintenance requirements as share of GDP (%)	0.66%
Annual rehabilitation and maintenance requirements (US$ per Year per Km)	4,574
Annual rehabilitation and maintenance requirements (US$ per Year per Vehicle-Km)	0.016
Rehabilitation expenditures as a share of total expenditures (%)	36%
Periodic Maintenance expenditures as a share of total expenditures (%)	46%
Routine Maintenance expenditures as a share of total expenditures (%)	18%

Main Roads Performance
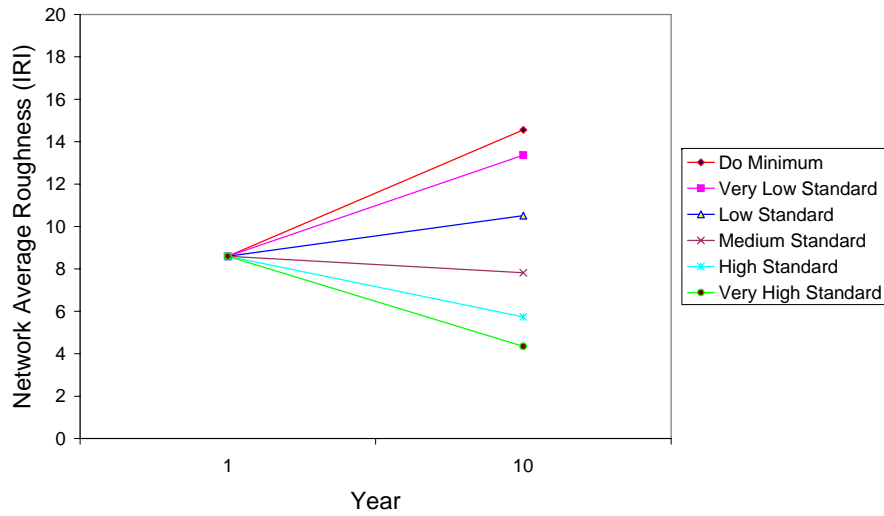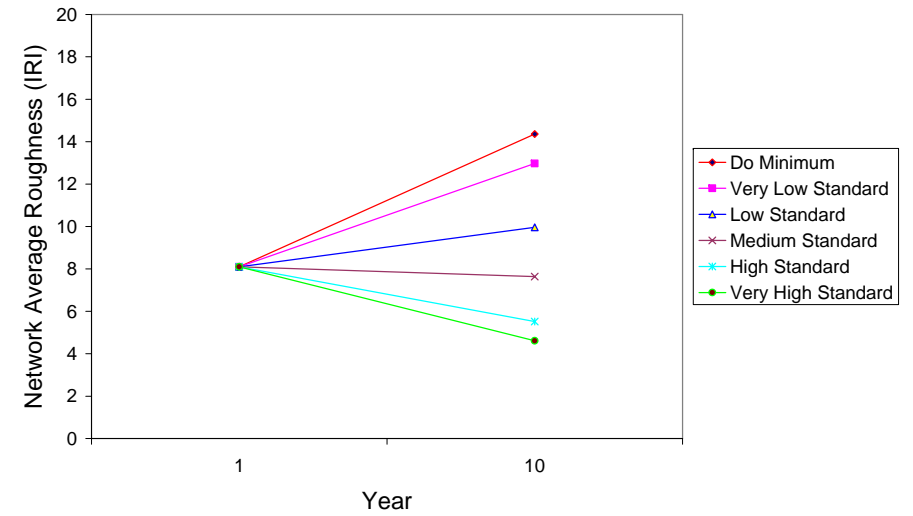
Medium Standard Maintains Current Condition

Main Roads Requirements

Annual Road Works Requirements for Medium Standard

Share of Annual Requirements:
Rehabilitation = 35%
Periodic Maintenance = 47%
Routine Maintenance = 18%

Main Roads Requirements

Annual Rehabilitation and Maintenance Requirements (M US$ per Year)

	Ghana	Mozambique	Tanzania	Uganda	Average
Very High Standard	71.6	85.1	98.9	62.1	79.4
High Standard	58.4	75.8	86.4	54.9	68.9
Medium Standard	51.0	69.2	73.9	48.7	**60.7**
Low Standard	40.4	56.7	57.5	32.7	46.8
Very Low Standard	14.7	48.9	38.3	31.2	33.2
Do Minimum	8.9	39.2	22.0	14.1	21.0

Annual Rehabilitation and Maintenance Requirements (M US$ per Year as Percent of GDP)

	Ghana	Mozambique	Tanzania	Uganda	Average
Very High Standard	0.68%	1.16%	0.93%	0.73%	0.87%
High Standard	0.55%	1.03%	0.81%	0.65%	0.76%
Medium Standard	0.48%	0.94%	0.69%	0.57%	**0.67%**
Low Standard	0.38%	0.77%	0.54%	0.39%	0.52%
Very Low Standard	0.14%	0.66%	0.36%	0.37%	0.38%
Do Minimum	0.08%	0.53%	0.21%	0.17%	0.25%

Annual Rehabilitation and Maintenance Requirements (US$ per Year per Km)

	Ghana	Mozambique	Tanzania	Uganda	Average
Very High Standard	6,409	8,680	3,409	5,735	6,058
High Standard	5,228	7,729	2,980	5,074	5,253
Medium Standard	4,562	7,052	2,549	4,498	**4,665**
Low Standard	3,616	5,776	1,983	3,025	3,600
Very Low Standard	1,311	4,984	1,321	2,879	2,624
Do Minimum	794	4,000	758	1,299	1,713

Annual Rehabilitation and Maintenance Requirements (US$ per Year per Vehicle-Km)

	Ghana	Mozambique	Tanzania	Uganda	Average
Very High Standard	0.007	0.038	0.017	0.014	0.019
High Standard	0.005	0.034	0.015	0.013	0.017
Medium Standard	0.005	0.031	0.013	0.011	**0.015**
Low Standard	0.004	0.025	0.010	0.008	0.012
Very Low Standard	0.001	0.022	0.007	0.007	0.009
Do Minimum	0.001	0.018	0.004	0.003	0.006

Annual rehabilitation, periodic maintenance and routine maintenance requirements represent for Medium Standard:

- **0.67% of GDP**

- **4,665 US$ per km-year**

- **0.015 US$ per vehicle-km-year**

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Main Roads Total Society Costs

Annual Society Costs per Year (M US$ per Year)

	Ghana	Mozambique	Tanzania	Uganda	Average
Very High Standard	4,291	1,029	2,445	2,318	2,521
High Standard	4,330	1,031	2,503	2,362	2,557
Medium Standard	4,425	1,048	2,662	2,490	2,657
Low Standard	4,558	1,064	2,892	2,675	2,797
Very Low Standard	4,964	1,137	3,200	3,047	3,087

Annual Society Costs per Year (M US$ per Year as Percent of GDP)

	Ghana	Mozambique	Tanzania	Uganda	Average
Very High Standard	41%	14%	23%	27%	26%
High Standard	41%	14%	23%	28%	27%
Medium Standard	42%	14%	25%	29%	28%
Low Standard	43%	14%	27%	31%	29%
Very Low Standard	47%	15%	30%	36%	32%

Society Net Loss Compared to Very High Standard (M US$ per Year)

|	Ghana	Mozambique	Tanzania	Uganda	Average
Very High Standard	0	0	0	0	0
High Standard	38	3	58	44	36
Medium Standard	134	19	218	172	136
Low Standard	267	36	447	357	277
Very Low Standard	673	109	756	729	567

Society Net Loss Compared to Very High Standard (M US$ per Year as Percent of GDP)

	Ghana	Mozambique	Tanzania	Uganda	Average
Very High Standard	0.0%	0.0%	0.0%	0.0%	0.0%
High Standard	0.4%	0.0%	0.5%	0.5%	0.4%
Medium Standard	1.3%	0.3%	2.0%	2.0%	1.4%
Low Standard	2.5%	0.5%	4.2%	4.2%	2.9%
Very Low Standard	6.4%	1.5%	7.1%	8.6%	5.9%

-Annual total society costs for Medium Standard represent 28% of GDP

- Annual total society cost net loss compared to Very High Standard for Medium Standard represent 1.4% of GDP

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Main Roads Road User Costs

Road User Costs Increase per Agency Deficit Compared to Very High Standard (US$ per US$)

	Ghana	Mozambique	Tanzania	Uganda	Average
Very High Standard	0.0	0.0	0.0	0.0	0.0
High Standard	3.9	1.3	5.7	7.2	4.5
Medium Standard	7.5	2.2	9.7	13.9	8.3
Low Standard	9.6	2.2	11.8	13.2	9.2
Very Low Standard	12.8	4.0	13.5	24.6	13.7
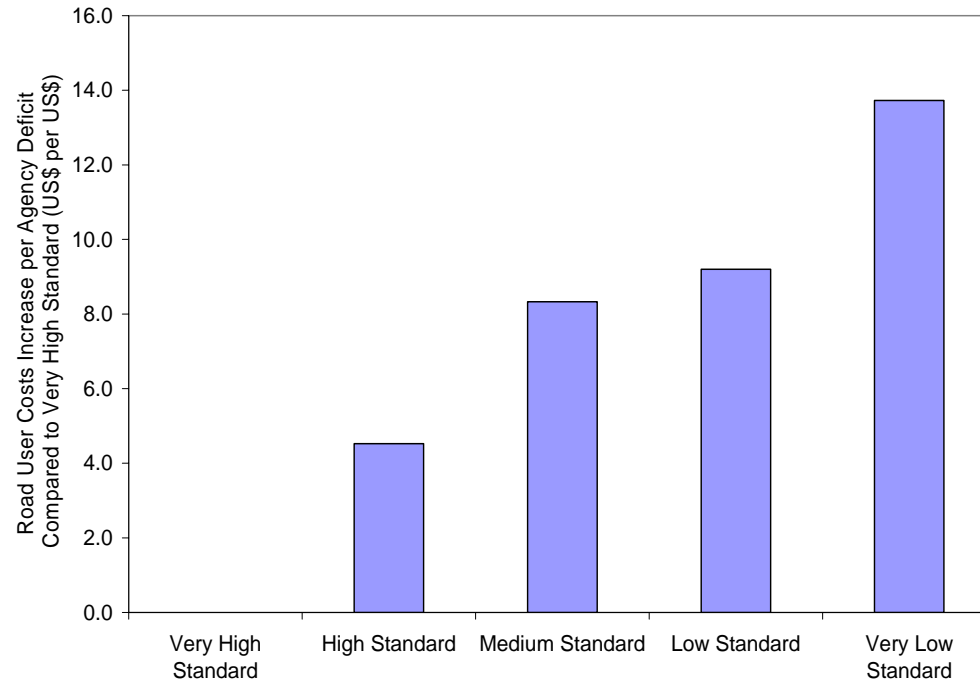
For Medium Standard, for every Dollar of road agency deficit, road users costs increase by 8.3 Dollars

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Experiences with Country Applications (1)

- No particular problems with data for model calibration

- Traffic level statistics from feeder/local government roads not available

- Unit costs strongly influence evaluations, and important to review individual unit costs and consistency of cost structure.

- Difficult to find sufficient data for all unit costs in many countries, and they will also vary substantially within the country itself.

Experiences with Country Applications (2)

- Separate analyses for all roads, and another one for main roads only, may avoid distortions from large, low-level networks with low traffic and uncertain unit costs.

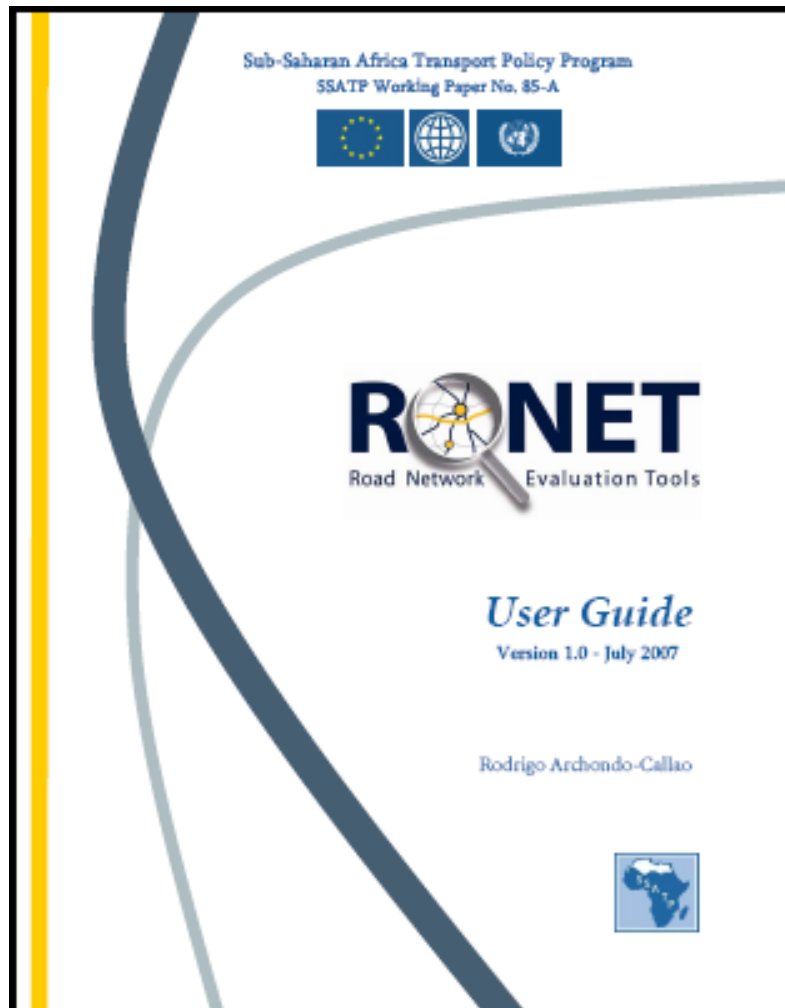- Separate calculations for roads under the same management institution would be an option.

Countries follow up

- For a next round of comparison and posting at SSATP's website, the Pilot countries should review and satisfy themselves with the input data quality
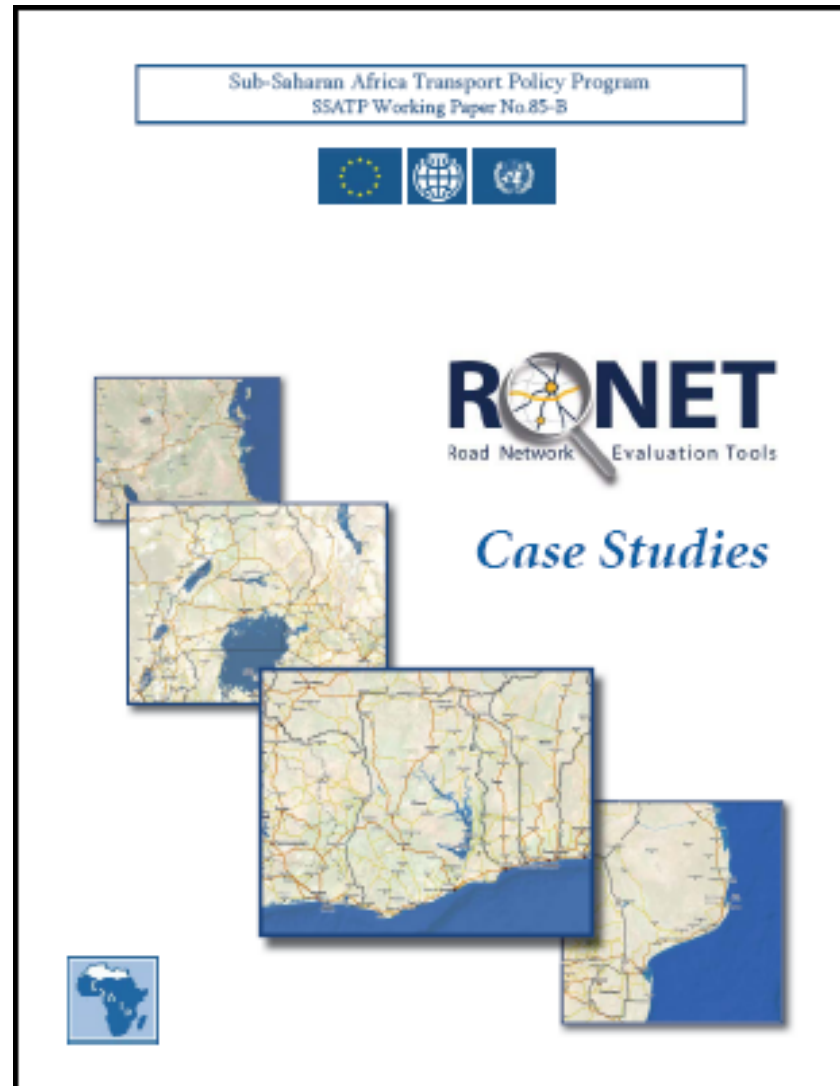
RONET Version 1.0

Available Documentation

RONET v1.0 User's Guide w/ CD

Case Studies
Ghana, Mozambique, Tanzania and Uganda

RONET Distribution

- RONET is available for free internet download at:

  http://www.worldbank.org/afr/ssatp

- RONET CD can be obtained by contacting:
  - Monique S. Desthuis-Francis (mdesthuis@worldbank.org)
  - Olav Ellevset (e-mail: oellevset@worldbank.org)

- Technical issues:
  - Rodrigo Archondo-Callao (rarchondocallao@worldbank.org)
  - Olav Ellevset

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What's Next for RONET

- **Dissemination**
- **RONET development**
  - Improved Version 1.1 under preparation
  - In French next year
  - New modules added to version 1.0, evaluating also a matrix of road classes
    - Road user charges
    - Life-cycle economic evaluation
    - Axle loading impacts
    - Accident impacts
    - Social impacts from transport sector interventions, SAM (?)
    - Rural Access Indicator (RAI) (?)
  - New tool that evaluates homogeneous road sections, suited to support programming of road works

Conclusions

RONET Version 1.0 may contribute well to:

- Getting network condition and asset value
- Budget forecasts
- Identifying challenging areas
- Country comparisons that now can be based on the same tool
- Fast and low-cost network evaluations

We encourage countries to start using it

Thank You !