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► **To cite this version:**

Monica Beuran, Marie Castaing Gachassin, Gaël Raballand. Are There Myths on Road Impact and Transport in Sub-Saharan Africa?. 2013. halshs-00830006

**HAL Id: halshs-00830006**

**<https://shs.hal.science/halshs-00830006>**

Submitted on 4 Jun 2013

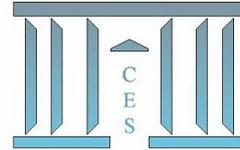
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## **Are There Myths on Road Impact and Transport in Sub-Saharan Africa?**

Monica BEURAN, Marie Castaing GACHASSIN, Gaël RABALLAND

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# Are There Myths on Road Impact and Transport in Sub-Saharan Africa?

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**Abstract:** As planned large investments in road infrastructure continue to be high on the agenda of many African countries, only few of these countries have actually amended their investments strategy. In many cases, there seems to be a preference for a *status quo* that can easily be explained by political economy factors driving the policies in the sector. This paper first presents data on the state of roads in Sub-Saharan Africa (length, density, condition) as well as on investments in the sector over the last decades. It then demonstrates how most countries' strategies are based on some misperceptions and recommends some changes to improve the developmental impact of roads investments. Better prioritization of investments, better procurement and contract management, better projects implementation and better monitoring are still needed, in spite of the efforts observed in the last 10 years.

**Keywords:** transport, roads, Sub-Saharan Africa, strategy, infrastructure, procurement.

**JEL Codes:** H41, O18, O55, R42

**Résumé :** Alors que les investissements routiers sont toujours en tête des agenda de la plupart des pays Africains, seuls certains d'entre eux ont modifié leur stratégie d'investissement. Il semble en effet existé une préférence pour le *status quo*, préférence due aux facteurs d'économie politique conduisant les décisions dans le secteur. Cet article présente tout d'abord l'état des routes en Afrique Sub-saharienne (longueur, densité, condition) et sur les investissements dans ce secteur sur les dernières décennies. Il démontre ensuite que la plupart des stratégies des pays concernés sont basées sur des perceptions erronées et recommande des changements pour améliorer les impacts développementaux des investissements routiers. Malgré les efforts observés sur les 10 dernières années, des améliorations restent à faire en termes de hiérarchisation des priorités, de gestion et d'acquisition des contrats, de mise en œuvre et de suivi des projets.

**Mots clés :** Transport, routes, Afrique Sub-saharienne, stratégie, infrastructure.

**Codes JEL :** H41, O18, O55, R42

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# 1. Introduction

The lack of an effective transport system is considered as one of the main impediments to economic development and poverty reduction. In Sub-Saharan Africa (SSA), road transport is by far the dominant transportation mode, carrying over 75% of passengers and freight. But more than 50% of these roads are in poor condition, mainly due to underfinanced and poor management of road maintenance (Zietlow 2007). Intra-regional connectivity is said to be overall deficient. The focus on road investments in SSA has become increasingly important for enabling growth and poverty reduction.

As yet, investment strategies have been mainly based on a too simplistic assumption that infrastructure would inevitably yield a large economic impact, whereas reality is much more complex<sup>2</sup>. For instance, access to roads and road condition along the main corridors in SSA are not as bad as expected. Also, some measures undertaken to tackle the cost of transport such as establishing one-stop border posts, commercialize road agencies or develop a rural access index seem not to have the predicted impact (even though rigorous evaluations still need to be carried out). Knowledge on the developmental impact of roads is improving and already calls for revising strategies. The objective is to enhance the impact of roads investments through better prioritizing investments and better monitoring procurement and projects implementation.

This is a particular need while a recent scaling-up of roads infrastructure investments has been launched and is being implemented. Hence, at the time of current or planned large investments in road infrastructure, many countries have not yet amended their investments strategy.

It is usually forgotten that a road infrastructure is only part of the investments needed for improved mobility and accessibility. Transport services, typically provided by the private sector, are equally important. However, the public sector sometimes proceeds to invest in infrastructure only to realize the private sector does not follow through in providing transport services. In order to maximize returns, it is important that investments in both are realized.

The paper is organized as followed. The next section presents a literature review based on a narrative survey and a quantitative analysis. The third section gives a picture of the situation in the road sector in SSA in the last two decades (i.e. trends in infrastructure endowments, roads quality and costs, spending trends), It reviews the institutional development in the sector and presents roads investments policies. The third section summarizes the recent research findings related to roads investments in SSA

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<sup>2</sup> Three key factors matter for the developmental impact of roads investments: *strategy* (by assessing the economic impact, selecting a technical solution, assessing sustainability of the selected technical option), *sector financing* (assessing revenues related to network size and unit costs) and *institutional support* (the institutional structure and various incentives among donors/governments/local authorities).

and the fourth section calls for some possible adjustments of road investments strategies in SSA. The final section concludes and proposes some areas for further research.

## **2. Literature Review**

The roads-poverty relation can be assessed 1) by focusing on the channels of the impact of roads on poverty or 2) by defining a poverty proxy as a function of road access.

Several channels can be identified. First, roads facilitate the provision of basic needs to the poor such as health and education (Mu and van de Walle, 2007; Khandker et al, 2009). Roads are also a complementary input for these provisions of human capital formation facilities to be effective (Gannon and Liu, 1997).

Second, roads ease access to markets. The greater availability of inputs and their reduced prices due to lower transport costs increase productivity as showed by Khandker et al (2010), Minten and Stifel (2008), or Gibson and Rozelle (2003) . In turn, production and income increase too (; Jacoby and Minten, 2009; Wondemu and Weiss, 2010; Stifel et al, 2012).

The last channel concerns employment. First, transport infrastructure can reduce poverty by creating employment and new job opportunities (Jacobs and Greaves, 2003). The construction and maintenance of a road are labor-intensive operations and can provide job opportunities to people living around. Ianchovichina et al (2012) show that "roads projects [have] a direct impact on creation of relatively low-skilled jobs". Second, the provision of roads also entails a greater and/or cheaper availability of labor markets. For example, Mu and van de Walle (2007) show that road projects in Vietnam increased employment opportunities by 11% for unskilled labor. Finally, the literature provides insights on the relation between road access and the two ways to define diversification of income sources: choice of the sector, and multiplication of activities.

The choice of the sector refers to the choice between agriculture and non-agriculture activities. Smith et al (2001) show that road rehabilitation projects in Uganda extended job opportunities in the service sector. In Tanzania, this kind of project developed job opportunities for non-agricultural employment (Lanjouw et al, 2001). Gollin and Rogerson (2010) show that large subsistence agriculture sectors are promoted by a lack of transportation infrastructure in Uganda.

The other way to think about diversification is as a multiplication of income sources. On the one hand, diversification occurs in remote areas as a way to deal with the local demand for multiple goods and

services (Barrett et al, 2001; Block and Webb, 2001). On the other hand, access to markets can help develop multi-activities since opportunities to diversify are greater (Gibson and Rozelle, 2003).

However, due to data limitation, it can be hard to disentangle the three channels and researchers may prefer to define a global impact of roads access on poverty. Various works report that road connectivity has a positive and significant impact on poverty. Evidence notably include Jacoby (2000), Bigman et al (2000), Jalan and Ravallion (2002), Deininger and Okidi (2003), Moguees et al (2008), Nuru and Seebens (2008), Dercon et al (2009, 2011).

The common limitation of all these works is that they generally cannot control for the typical endogeneity bias affecting the roads-poverty/development relation. Endogeneity can stem from a simultaneous determination issue coming from unobservable determinants. In fact, the decision to build a road is subject to various demands, such as geographical and topographic conditions that also determine economic condition. Simultaneous determination can also lead to biased estimates of roads impact because people do not randomly settle next to roads once they have been constructed. In particular, the localization choices of people are driven by specific individual characteristics that can also dictate their poverty status. In the same vein, a reverse causality issue may also be at work as the poverty status of a household can determine their localization choices alongside a road.

Van de Walle (2009) recommends the use of appropriate estimation methods such as difference-in-difference, Propensity Score Matching, and instrumentation.<sup>3</sup> The General Method of Moments is also used to deal with unobservable characteristics as in Jalan and Ravallion (2002), Dercon et al (2009, 2011) and Khandker and Koolwal (2011). Finally, the use of a general equilibrium context can also help in dealing with the endogeneity issue between road management and investment decision.<sup>4</sup> A more macro literature on transport and development (urbanization, trade) develops clever identification strategies based on new GIS dataset and historical perspectives: Atack et al (2009), Jedwab and Moradi (2011), Banerjee et al (2012), Storeygard (2012).

If this narrative survey seems to legitimate the massive roads investments implemented in SSA, Estache (2010) underlines that such studies make comparisons and generalizations difficult. However, Castaing Gachassin (2013) shows in her meta-analysis that the micro literature on the roads-poverty relation reports a true underlying empirical effect and that it is not due to a publication bias.

Therefore, roads help decreasing poverty in developing regions but knowledge about the heterogeneity of roads impacts is still limited. The next step for the empirical literature is to document the

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<sup>3</sup> See the papers of Khandker et al (2009, 2010) and Mu and van de Walle (2007) for examples of DD and matching, and Gibson and Rozelle (2003) for instrumentation.

<sup>4</sup> See Fan et al (2000) on India, Fan et al (2002) and Fan and Chan-Kang (2004) on China, Fan et al (2004) on Thailand, Fan et al (2005) on Tanzania.

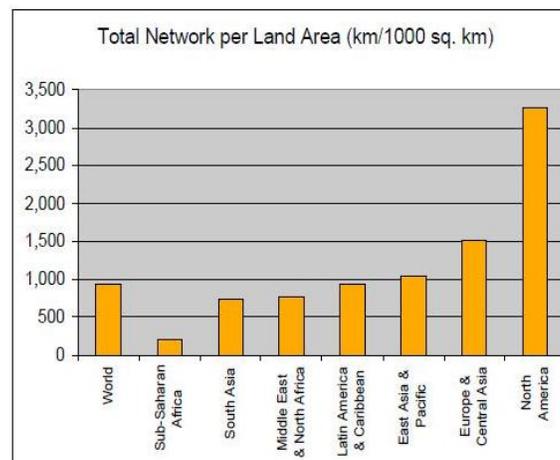
variety of effects and their conditioning to regional, local and individual characteristics to achieve efficiency in roads investments.

### 3. Data on Road Infrastructure in Sub-Saharan Africa

#### Road infrastructure endowments

Figure 1 below depicts the actual situation of all world regions for the total road network density in relation to land area. SSA lags far behind, with density that represents less than a quarter of the world average. Defining road density in terms of population<sup>5</sup>, the situation marginally differs (see Figure 2). This density is slightly lower than the Middle East's and the North Africa; and slightly higher than South Asia.

Figure 1: Spatial Density of Road Network

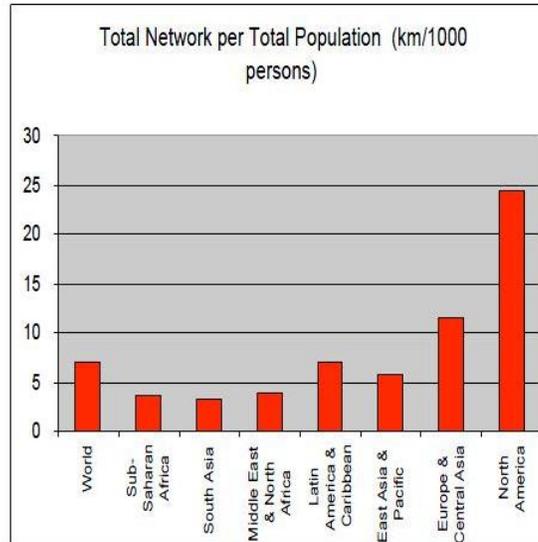


*Source: Gwilliam et al (2008)*

Figure 2: Total Road Network per capita

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<sup>5</sup> This is more accurate as the first measure partly reflects the low population densities in the region.



Source: Gwilliam et al (2008)

This general world description hides the heterogeneity experienced across African countries. On average in SSA road-to-population density is of about 3.7 kilometers per thousands of inhabitants; it ranges from 0.37 for Sudan to 35.7 for Namibia (see Table 1 below).

Table 1: Roads Density per country in SSA (in kilometers per thousands of inhabitants)

RANK	COUNTRY	DENSITY	RANK	COUNTRY	DENSITY
1	Namibia	35.67	24	Cape Verde	2.50
2	South Africa	8.44	25	Cameroon	2.36
3	Gabon	6.70	26	Sao Tome and	2.34
4	Equatorial Guinea	6.57	27	Burundi	2.27
5	Central African	6.41	28	Kenya	2.13
6	Zambia	6.37	29	Gambia, The	2.12
7	Botswana	5.89	30	Ghana	2.03
8	Chad	4.20	31	Mozambique	1.73
9	Congo, Rep.	3.84	32	Nigeria	1.69
10	Angola	3.81	33	Comoros	1.66
11	Guinea	3.69	34	Mauritius	1.63
12	Liberia	3.64	35	Rwanda	1.60
13	Lesotho	3.35	36	Togo	1.45
14	Guinea-Bissau	3.31	37	Senegal	1.44
15	Somalia	3.25	38	Mali	1.33
16	Congo, Dem. Rep.	3.21	39	Eritrea	1.17
17	Madagascar	3.17	40	Burkina Faso	1.14
18	Cote d'Ivoire	3.08	41	Benin	0.97
19	Mauritania	2.98	42	Niger	0.89
20	Swaziland	2.90	43	Ethiopia	0.46
21	Tanzania	2.59	44	Sudan	0.37
22	Sierra Leone	2.59			
23	Malawi	2.53			

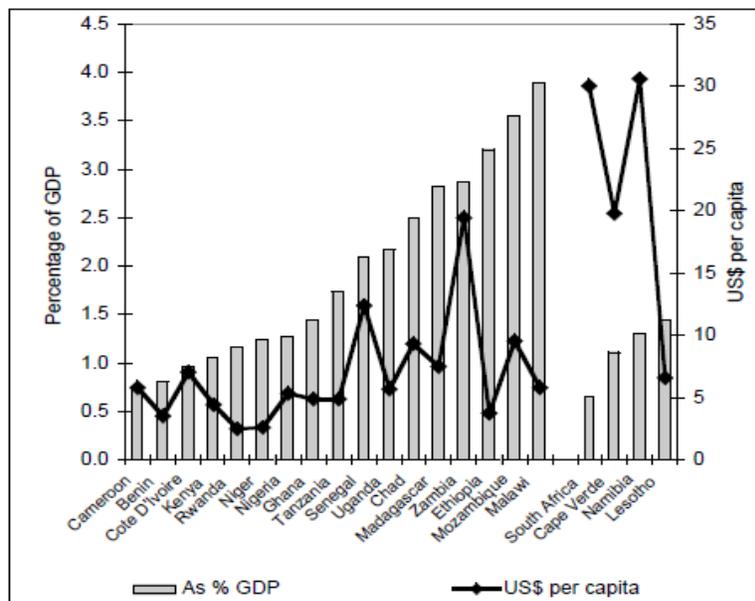
Source: World Development Indicators

These first figures and table only provide a snapshot that should not be used to infer policy recommendations. First, road density data are weak proxies to benchmark their economic impact since roads investments depend primarily on the size of a country and the location of settlements. Also, lengths and densities are actually not relevant objectives as expanding networks may not be necessary in the region. This also questions the fiscal sustainability of such projects which is hard to achieve in the region. Second, it does not inform on the issues of condition and quality which are at the core of the sector's challenges. Finally, the issues related to the governance of the road sector cannot be assessed with such data.

### Road infrastructure spending

In SSA, spending on roads accounts on average for less than 2 percent of GDP, i.e. approximately \$9,000 a kilometer for main road networks, compared to 1 percent in industrialized countries, or 2–3 percent in fast-growing emerging economies (Gwilliam *et al.*, 2008). Hence, there are important differences across the region: the spending ranges from less than 1 percent in South Africa to almost 4 percent in Malawi (see Figure 3).

Figure 3: Average annual expenditures on roads, by country, 2001-2005 (US\$ per capita and % of GDP)



Source: Gwilliam *et al.* (2008)

According to the World Road Statistics from the International Road Federation (IRF), maintenance expenditures are generally lower than construction expenditures. For example, in 2008 Burkina Faso spent about 68 million US\$ on maintenance and 193 million US\$ on construction, and

Tanzania about 124 million US\$ on maintenance and 182 million US\$ on construction. If some countries spend more on maintenance than construction (Ghana, Congo or Cameroon), on average capital expenditures actually represent two thirds of the total roads spending when needs should share equally between capital and maintenance operations (Gwilliam et al, 2008).

Investing in SSA's roads infrastructure is one of the priorities of donors<sup>6</sup>. Table 2 below presents the percentages of aid amounts disbursed by donors in the total spending of the country, computed for those countries for which expenditure data was available from the IRF. On average aid accounts for about 20% in the total spending but it varies a lot across countries.

Table2: Aid disbursements in total expenditures, by country

	<b>Total Expenditure(*)</b> million US\$	<b>Total aid (**)</b> million US\$	<b>Aid/Expenditure (%)</b>
Burkina Faso (2008)	260.96	23.9	9.15
Cameroon (2007)	527.39	71.1	13.5
Ethiopia (2003)	106.19	106.65	100
Ghana (2003; 2004; 2005)	123.1; 198.9; 257.4	69.94; 95; 149.4	56.8; 47.8; 58
Tanzania (2008)	356.94	112.42	31.5
Zambia (2005)	264.3	53.91	20.4

Source: World Road Statistics for expenditure data and OECD-DAC for aid data.

Note: (\*) includes maintenance and construction expenditures. (\*\*) includes DAC, EU Institutions and IDA disbursements.

As the figures presented above show, spending seems to be not an issue in the road sector. More than the issue of missing links, the problem of poor road maintenance mainly due to a capital bias seems to be at work here. Insufficient maintenance translates into substantial additional costs, as rehabilitation costs are several times higher than the cumulative costs of sound preventive maintenance. The issue is well-known since the end of the 1980s (Harral et Faiz, 1988), and was re-emphasized regularly for instance by the World Bank Development Report in 1994. According to the World Bank (2010) addressing under-maintenance in the road sector could save about \$1.9 billion a year in rehabilitation.

### **Road quality and costs**

Substantial variations across countries in the region also exist with regard to the quality of roads. According to Gwilliam *et al.* (2008) about half of the main network is in good condition, and an additional one-third is in fair condition. For rural networks only about a quarter is in good condition and a quarter in fair condition. Also, Carruthers *et al.* (2009) report that only 30% of the road network linked to

<sup>6</sup> Tables in the Annex 1,2 and 3 show aid disbursements over the period 2002-2009 from DAC members, EU Institutions and IDA.

regional connectivity is currently in good condition. Large variations across countries can be related to some extents to differences in GDP, or geographic and topographic conditions. But the quality of the institutional and financing framework of the road sector is the main determinant of these differences.<sup>7</sup>

According to Alexeeva *et al.* (2008), the average cost of the road works are quite similar, except for Kenya where the rehabilitation and reconstruction cost is particularly high , 955,755 US\$/km (see Table 3). The periodic maintenance works in Mozambique cost twice as high as in Zambia.

Table 3: Average cost per km of a 2-lane road by type of work<sup>8</sup> and type of road<sup>9</sup> (2007US\$/km)

Country	Rehabilitation & construction		Re-gravel	Upgrade to paved		Periodic maintenance
	Inter-urban	Urban	Inter-urban	Inter-urban	Rural	Inter-urban
Congo			68,094			
Congo (DRC)	228,872		65,750			
Ethiopia	388,207			322,373		
Ghana	261,052				114,566	
Kenya	955,755					
Mozambique	278,661					197,086
Madagascar			54,602			104,992
Malawi	420,838				56,874	
Nigeria	329,909	1,505,480				
Tanzania				348,209		
Uganda				420,220		
Zambia			25,005			87,946

Source: Queiroz *et al.* (2008).

### Institutional development

According to Bruschetti (2005), about 45 billion US\$ of road stock was wasted during the 1970s and 1980s as a consequence of inadequate maintenance, which could have been avoided if about only \$12 billion would have been spent on preventive maintenance. The common belief that emerged at that time was that Africa suffers from an under financing of maintenance expenditures, considered mainly as an institutional problem (OECD/ ECMT, 2007).

The first generation of earmarked road funds in Africa appeared in the late 1980s<sup>10</sup> as a solution. They were based on earmarking of fuel taxes as opposed to the previous financing mode through the general budget. However, the issue of inadequate maintenance remained and in the early 1990s

<sup>7</sup> See the next subsection on the institutional development of the African road sector.

<sup>8</sup> Rehabilitation/reconstruction, upgrade to paved, re-gravel, and periodic maintenance.

<sup>9</sup> Inter-urban, urban and rural access.

<sup>10</sup> Even some such arrangements date back to the 1930s.

development partners and governments of SSA recognized the need to set up new reforms. This was given concrete expression through the Road Maintenance Initiative (RMI) for SSA countries. The RMI aimed at increasing road sector's efficiency through establishing autonomous road agencies with an effective structure and clearly defined responsibilities, and creating Road Maintenance Funds financed by road users charges and managed by a Roads Board (with members from both public and private sectors). This also marked the emergence of the second generation of road funds based on seven design features: (1) a clear legal basis to protect against political interference<sup>11</sup>; (2) creation of road agencies for public works execution to allow the separation between funding and implementation<sup>12</sup>; (3) road user charges in form of fuel levies<sup>13</sup>; (4) funds directly transferred to the road fund to avoid the risk of diverting resources for financing other public expenditures revenues<sup>14</sup>; (5) users represented in the road fund board to ensure accountability<sup>15</sup>; (6) clear rules for the allocation of revenue to reduce discretion<sup>16</sup>; (7) independent auditing and public reporting of road fund activities to insure accountability<sup>17</sup>.

Despite these reforms and clear objectives, the progress has been slow; some inefficient practices still prevail, and a lot of funds are still used for rehabilitation work.

### **What are the underlying strategies behind roads investments?**

Roads investments in Africa are based on two key hypothetical assumptions:

1. Investments in roads **always** generate traffic and reduce poverty,
2. Roads in good condition produce large economic benefits **in any instance**.

The ineluctability underlying character of these assumptions biases the vision toward extremely large expected benefits leading to the idea that road network expansion would be largely compensated by the created benefits. Consequently, roads infrastructure costs are usually overlooked and there is hardly any analysis of the fiscal sustainability of the projects.

In terms of preferences, governments tend to favor (without necessarily acknowledging it):

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<sup>11</sup> 60% of countries with a road fund have such legislation.

<sup>12</sup> 65% of road funds have autonomous roads agencies responsible for project implementation, but the level of autonomy varies from limited to full responsibility.

<sup>13</sup> For 80% of the countries, they vary between \$0.03 per liter in Lesotho to \$0.16 per liter in Tanzania.

<sup>14</sup> Only a little more than 50% of the countries with a road fund channel at least 75% of the fuel levies directly to the fund without passing through the budget.

<sup>15</sup> Only half of roads funds boards are not dominated by a government representation; very few have a chairman from the private sector.

<sup>16</sup> 60% of the roads funds have defined explicit rules for allocating funds.

<sup>17</sup> Around 80% of the countries with road funds have annual auditing procedures in place but their quality should be taken with caution.

1. **Rehabilitation over maintenance:** Gwilliam *et al.* (2008) highlights what they call a “donor paradox”: while many reports have demonstrated the importance of maintaining roads in good condition and road sector reforms have focused on maintenance in Sub-Saharan Africa, this sector is still dominated by rehabilitation, leaving maintenance as a secondary priority. It is even more problematic since most countries can hardly afford to maintain their current road network and worsen the situation by further spending on upgrading and rehabilitation
2. **Trunks over rural roads:** Despite the fact that rural road network typically accounts for more than half of the transport network in developing countries, and, despite numerous political statements, investments in rural roads is marginal compared to trunk roads. This may be explained by the complexity of those investments and low returns in some cases.<sup>18</sup>

Furthermore, the strategies behind roads investments can be characterized with (excessive) generalization by lack of/limited prioritization of investments, uniqueness of technical solutions, and a mismatch between the needs and the returns on investments due to an equally distributed budget for rural roads regardless the variations among regions.

The current pattern of road investments excessively relies on assumptions (or beliefs) and is scarcely based on reality (i.e. data and facts). The following section synthesizes the most common assumptions on the African roads sector that could be qualified rather as “myths” as most often they do not hold. For each misperception, we present the common belief, the factual reality and open the discussion on possible policy recommendations.

## 4. The Main Possible “Myths”

### **What happens *en route* and at borders: transport delay and bribes**

The first common belief is that most transport delay happen *en route* and/or at the borders to the hinterland. Arvis *et al.* (2010) demonstrates that for land transport to landlocked countries in SSA over 50% of total transport time from port to hinterland cities are spent in ports. So contrary to what is usually perceived, delays on roads and at borders are in most cases marginal compared to cargo dwell time in ports (see Table 4 for the evidence along selected corridors).

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<sup>18</sup> As it will be demonstrated in the next section, the benefits of rural roads are often expected to be higher than they really are.

**Table 4: Average transport time breakdown between ports and hinterland along selected corridors in 2008**

in days	Port	Trans	Dry port	Border	Transp.	Clear.	TOTAL
<b>Douala-Ndj</b>	24	4	8			3	<b>39</b>
<b>MSA-Kam</b>	13	4	1		1	2	<b>21</b>
<b>DeS - Kam</b>	17	5	2		1	2	<b>27</b>

Source: Arvis *et al.* (2010).

Note: Douala-Ndj=Douala-N'djaména, MSA-Kam=Mombasa-Kampala, DeS-Kam=Dar-es-Salaam-Kampala. Trans is land transport time, clearance= clearance time at destination.

However, in Southern Africa, border-crossing time is of critical importance.<sup>19</sup> The advocated solution is the adoption of a one-stop border post (OSBP). Conceptually, this model is based on the idea that by removing one control, border-crossing time would be halved. However, customs clearance is scarcely done for exports at the border. Moreover, large investments are scarcely needed. Curtis (2009) advocated for: (1) simplified and reduced clearance procedures and (2) an effective border management institution gathering major stakeholders from both sides of the border in order to reduce the number of controls and agencies involved. Simplifying import clearance procedures is critical because at most, export controls account for less than a third of total border crossing time and customs account usually for half of import time<sup>20</sup>. Therefore, even though export control time would be divided by half, one sixth of total time would be gained. Hence, if customs clearance time would be halved, one third of total time would be gained.

A second belief is that bribes *en route* mainly explain high transport costs. Teravaninthorn and Raballand. (2008) demonstrated that the cost of fuel is actually the main source of variable costs (see Table 5). Rents and bribes to logistics providers are actually much higher than bribes en route but they are much less visible so that they are not given the same attention (Arvis *et al.* 2010).

<sup>19</sup> In 2008, it took 39 hours for a truck to transit northbound through Chirundu and 14 hours southbound (compared to 34 hours and 11 hours respectively for Beitbridge). The first OSBP was thus opened at Chirundu (between Zimbabwe and Zambia) in December 2009. So far it seems relatively premature to assess if this OSBP produced the expected results, especially in terms of simplified and reduced clearance procedures. Still, one-stop border posts are presently mushrooming in SSA.

<sup>20</sup> It is interesting to note that idle time for northbound transit is much higher than might be expected. It is on average 10.9 hours per transit, the main reasons being: (i) not handling documents on arrival, (ii) not crossing the border when able to do so, (iii) waiting at the border after clearance and before departing for the destination or (iv) carrying out activities (own business or social) when supposed to be on duty. Southbound delays are much less (ZRA – 5.6 hours, driver idle time – 4.4 hours), but still drivers do waste time (Curtis 2009).

Table 5: Variable costs breakdown in the four sub-regions (in percentage of total variable costs)

Corridor	Route Gateway-Destination	Fuel	Tyres	Maintenance	Bribes
West Africa	Tema/Accra-Ouagadougou	74%	16%	4%	6%
	Tema/Accra-Bamako	80%	9%	5%	6%
Central Africa	Douala-N'Djaména	60%	17%	10%	13%
	Douala-Bangui	60%	19%	9%	12%
	Ngaoundéré-N'Djaména	53%	11%	14%	22%
	Ngaoundéré-Moundou	38%	12%	23%	27%
East Africa	Mombasa-Kampala	79%	13%	6%	2%
	Kampala-Kigali	67%	31%	1%	1%
Southern Africa	Lusaka-Johannesburg	51%	48%	1%	0%
	Lusaka-Dar-es-Salaam	60%	38%	1%	1%

Source: Teravaninthorn *et al* (2008)

## Road expansion

The common misperception concerning road coverage is that it is insufficient, especially in rural areas where there is a need to expand the network so as to ensure connectivity of citizens in these areas at less than 2 kilometers from a road. In reality, this is a more complex issue.

First, the 2 km buffer (which is the main target for donors in SSA to improve road accessibility of rural population) does not seem to be an economic threshold. Increased rural road density has a positive impact on incomes but not the 2 km buffer. Using original household data in three countries, Raballand *et al.* (2010) found out that being at more or less than 2 km is not a major determinant for poverty. Therefore, some minimal road access is needed to impact income generation economically but investing to have rural population at less than 2 km may be considered as overinvestment.<sup>21</sup> Actually, most rural households are located at less than 5 kilometres from a road (even though they are not necessarily all-weather). Continent-wide, road access at less than 5 km does exist for a large part of the population: almost 60% of the population is situated at least at 5 km from a regional or national road when using GIS data (see Table 6).

<sup>21</sup> This finding is consistent with World Bank (2009.2). This research centered on Malawi finds out that the optimal transport time for higher agricultural growth is 2.2 hours. Assuming walking or bicycle at 4 kilometers per hour, the optimal transport distance for agricultural production from a road would then be over 8 kilometers (from an economic point of view).

Table 6: Sub-Saharan Africa road coverage

Buffer	Population covered (in thousands)			Percentage of population			Percentage of covered population	
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural
2 km	103,063	30,106	133,169	59.5%	17.2%	38.2%	77.4%	22.6%
5 km	144,074	56,721	200,796	83.1%	32.4%	<b>57.6%</b>	71.8%	28.2%
10 km	160,836	90,004	250,840	92.8%	51.4%	72.0%	64.1%	35.9%

Source: Raballand *et al.* (2010).

Second, it is usually assumed that despite increased size of roads networks, they remain sustainable as their expected benefits should exceed their costs. However, many SSA countries already face the issue of unsustainable road networks and may also explain why maintenance is not ensured for parts of the network. As an example, the annual cost of maintaining the paved and unpaved networks is estimated at USD 106.5 million and USD 133.3 million respectively in 2011 prices in Zambia. Maintenance expenditure should be fully financed from the fuel levy and road user charges. However, despite recent increases, their combined value was still only equivalent to USD 112 million in 2010, which is barely sufficient to maintain the paved network and leaves over negligible funds for the unpaved network (Raballand *et al.* 2011.2).

Third, road access does not necessarily mean accessing to transport. Raballand *et al.* (2011) draws lessons from an original randomized experiment in rural Malawi. They show that without subsidies, a road even in fair condition may continue to be used by non motorized means of transport. So, the presence of a road with a relevant level of quality is not the only solution to connectivity, the provision of transport services must be under scrutiny as well.<sup>22</sup> This can partly explain why walking or cycling is so widespread on most rural roads in Sub-Saharan Africa and why a road in good condition will most probably not lead to provision of service at an affordable price for the local population.

Finally, because of limited plot size that binds production volumes, most African farmers in rural areas have only a minimal transport requirement, generally too low to fully load a truck. Intermediate Means of Transport (IMTs) and the appropriate (not paved) road infrastructure should often be preferred over truck transport, as the volumes to be transported are generally limited and the distances are relatively short. For instance, Sieber (1999) demonstrated in Tanzania that adequate IMTs coupled with pathways could have, in some cases, more economic impact than rehabilitating secondary roads alone. The "last mile should not be a road for truck" (Raballand *et al.*, 2010).

<sup>22</sup> Evidence also exists on the fact that roads do not automatically generate efficient transport services in the case of international corridors (Teravaninthorn *et al.*, 2008).

## Road Condition

The misperception about insufficient road coverage and the related fiscal sustainability issue open the common belief that road condition in Africa is usually bad (especially on the major corridors), while improved road condition is believed to cut maintenance costs and user prices.

In reality, road condition on major corridor is not as bad as expected (see Table 7). Road conditions are worse in Central Africa comparing to the other sub-regions, but they are in a relatively good condition. This can be explained by massive recurrent investments in SSA along these corridors.

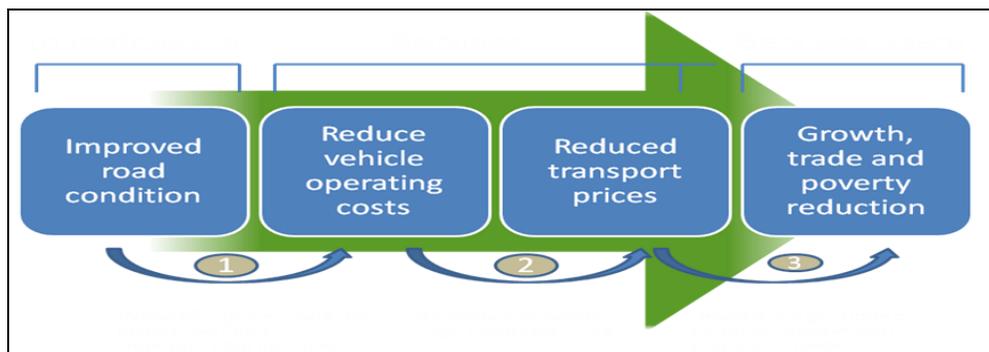
**Table 7: Roads condition along the main international corridors in Sub-Saharan Africa**

Region	Origin	Destination	Percentage of route in good and fair condition
West Africa	Tema/Accra	Ouagadougou	82
	Tema/Accra	Bamako	61
Central Africa	Douala	N'Djaména	45
	Douala	Bangui	53
	Ngaoundéré	Moundou	100
East Africa	Ngaoundéré	N'Djaména	61
	Mombasa	Kampala	86
Southern Africa	Kampala	Kigali	75
	Lusaka	Johannesburg	100
	Lusaka	Dar-es-Salaam	no data

Source: Teravaninthorn et al. (2008).

Moreover, the causal chain from improving road condition to an ineluctable poverty reduction and increase in trade (see Figure 4) is not that straightforward.

**Figure 4: The causal chain of road investments**



Source: authors' representation.

For each of the three links/arrows in the chain, several factors make the relation between road condition, Vehicle Operating Costs (VOC)<sup>23</sup>, transport prices and poverty reduction/growth in the African context complex.

First, vehicle operating costs are more reduced if trucking fleet is new and when roads are in poor condition (compared to fair), which means that rehabilitating a corridor in fair condition will probably have less impact than rehabilitating a corridor in poor condition, a common practice however in some countries.

Second, reduced transport prices depend mainly on the market structure of the industry. While transport costs are not necessarily higher in SSA than in many other parts of the world (see Table 8), transport prices are instead the highest in the world along international transport prices (see Table 9). It appears clearly that in SSA there is not an issue of costs but rather of profits, due in particular to profit markups and cartelization.

Also, while the focus has been for decades on improving regional integration to decrease transport prices through the signing of regional agreements and regional roads investments, without integration of trucking services<sup>24</sup>, reduction of transport prices is not likely to be achieved.

Table 8: Transport costs in several countries/regions of the world (2007)

	Central Africa	East Africa	France	Germany	Spain	Poland
Total transport costs (USD per veh-km)	1.87	1.33	1.59	1.71	1.52	2.18

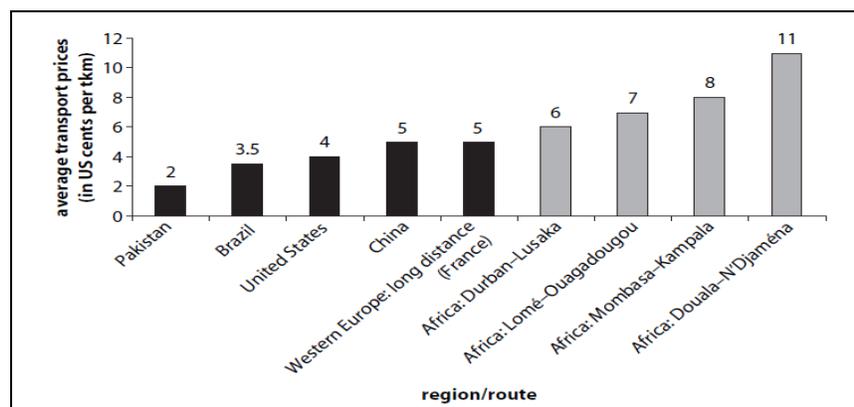
*Source: Teravaninthorn and Raballand (2008).*

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<sup>23</sup> In Sub-Saharan Africa, poor roads are perceived as being the main cause of high variable operating costs, since they increase fuel consumption, increase maintenance costs by damaging the vehicles, reducing the life of tires, reducing vehicle utilization because of lower speeds, and reducing the life of trucks. Results from Teravaninthorn and Raballand (2008) with HDM-4 (Highway Development Model) simulations show a mixed result: in two African sub-regions (West and Central), where traffic is low and the truck fleets are old, as long as international corridor routes are paved in a fair condition, road condition does not emerge as a major hindrance to transport efficiency. On the contrary, in Eastern Africa, on the main trade corridors, improving road condition would have a significant impact in reducing transport costs, even if the roads are in fair condition. But these cases are limited to a few corridor routes.

<sup>24</sup> See Raballand *et al.* (2008) for an overview of the various measures important for integration of trucking services.

**Table 9: Transport prices in several countries/regions of the world (2007)**



Source: Teravaninthorn and Raballand (2008).

Finally, the impact on growth and poverty reduction depends on the share of transport costs and the role of the transport constraint. If transport accounts for approximately 10% of input costs, reducing transport prices by 50% may not necessarily create a breakthrough in competitiveness of the products. It can be different if this ratio is close to 30% (which is more unlikely). Based on more systematic trucking surveys and data collection, especially along the main international corridors, recent research have demonstrated that infrastructure is only one factor in the production function of a transporter. Transport services prices largely depend on market structure/regulation and thickness of markets and therefore, in many cases in SSA, investments in infrastructure will not lead to reduced transport prices<sup>25</sup>.

## Governance

The previous subsection underlines the governance issue in the transport market that is characterized by cartelization. Here we demonstrate that the entire African road sector suffers from institutional weaknesses in particular its political economy, despite statements and incentives to reform it.

A related misperception concerns the idea that construction costs are the highest in SSA and will continue to be high because of low volumes and the geography of the continent. Construction costs are indeed high in SSA<sup>26</sup>, compared to work costs in other parts of the world. Even though low volumes, geography and distance to import construction play a role, governance in the construction sector seem to also explain the high level of construction costs. In Tanzania the impact is up to 60% (Messick, 2011); the

<sup>25</sup> Most developments below are explained in details in Teravaninthorn and Raballand (2008).

<sup>26</sup> Even though there is no systematic record and publication of such data. This assumption is rather based on anecdotal evidence.

Kenyan Roads Authority and the Kenyan Anticorruption Commission (Government of Kenya 2007) confirmed that “collusion was rife” in the sector. In 2010, the Office of the Auditor General in Zambia also documented widespread procurement and construction practices, which led to fraud and corruption and therefore inflate construction costs (see Table 10).

**Table 10: Results of audit of Zambian road projects**

<b>Results of Audit of Zambian Roads Projects</b>	
<b>Defect found in project</b>	<b>Percentage of contracts affected</b>
Improperly sized aggregate particles	44%
Too much clay	75%
Aggregates did not meet crushing strength	67%
Base thinner than required	81%
Surface dressing layers thinner than required	82%
Cement content less than specified	100%
Concrete samples weaker than required	50%
Source: Government of Zambia (2010).	

As high construction costs mainly derive from collusion and corruption occurrence, a great attention should be on procurement processes and the use of red flags<sup>27</sup> as well as during the execution of works.

Recent recommendations to improve the sector governance include the need of an Agency to coordinate road investment decisions and divide between funding and works supervision to reduce corruption. This follows the path of the second generation of roads funds. Remember that if the first generation of earmark funds<sup>28</sup> was designed to solve the under financing of maintenance, the second generation emerged with the additional aim to fight against collusion and corruption in the road sector (see Section 3). However, after some years of implementation of the reforms of the second generation, the results are far from what they were expected to be (Gwilliam and Kumar, 2003; Allen and Radev, 2006; Booth and Golooba-Mutebi, 2009; Roll, 2011; Pinar, 2012).

<sup>27</sup> See Alexeeva *et al.* (2008) for proxies to identify collusion and corruption practices.

<sup>28</sup> For references on the debate on whether there is need or not to earmark funds for the roads sector (and give autonomy to the institution in charge of managing earmarked funds), see McCleary (1989).

Being an issue of people or not, the managements of these agencies have found difficulties to work closely together, and this induced coordination costs for projects implementation. More importantly, boards do not seem to have been able to deter/fight political interference in projects selection or projects supervision (like pointed out in road audits in Zambia for instance). In a weak capacity environment, there may not be a large enough pool of talents to manage several different agencies. Finally, one of the most important shortcomings of this institutional setup seems to have been the increased lack of accountability of civil servants working in this sector. Due to its potential complexity, it is relatively easy for road fund staff or road development agency staff to blame the other agency or the Ministry of Works and Supply.

## **5. What does it mean for the future?**

### **Change strategy to better prioritization**

Roads prioritization is usually done by default after having allocated funding to highly visible projects without taking into account their impact on maintenance and on the sustainability of the network. However, prioritization should depend on the remaining budget after the difference between the budget allocation and the maintenance needs. After having estimated the maintenance needs of the main road network and the sustainability of the current network, the possible allocation for rehabilitation should be computed (taking into account public investment management and construction costs trends).

Based on that, a level of service for each economic class of roads needs to be defined (and requires various technological solutions). Due to the fact that some parts of the road network may probably not be rehabilitated, based on objective criteria (such as traffic volumes), different classes of roads should be defined.

Moreover, taking into account the service factor it is crucial since the relationship between infrastructure and transport prices is unlikely to be automatic in most parts of SSA.

With regard to rural roads, the current investment strategies are largely ineffective and do not consider agriculture potential. Therefore, it is important to redefine the rural access index, focus more on the missing middle and better coordinate interventions, and finally monitor allocation to road maintenance. Although social criteria are important for road planning and will continue to play a major role, economic criteria should be given more weight in order to make investments in road network more sustainable (see Box 1 for an example of how would look like a revised road planning strategy)<sup>29</sup>.

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<sup>29</sup> In this regard, a ‘hub and spoke’ concept, as defined by Starkey (2007) with conventional trucks transporting on conventionally engineered all weather roads (to district/secondary towns), and IMT’s feeding agricultural surpluses to collection points on basic access routes.

**Box 1: How Could Look Like a Revised Road Planning Strategy Compared to the Current Situation?**

Today, road allocation in secondary/rural roads is usually a function of three factors: (i) regional network length, (ii) the most urgent needs, (iii) political goals (which partially explains why funding is usually spread out and the most vocal or best connected MPs get the highest allocation in their region). Because of that, there is no strategic road planning; departments in charge of rural roads act when an emergency occurs or when political pressure become excessive. A revised road planning strategy would be based on objective data about (i) regional potential and current agricultural value, (ii) geo-referenced road networks with information on road condition and on problematic spots. Investment needs would be recomputed at the regional/local level. Based on this, some major investments would be carried out in priority in the most economically dense regions (mainly on the secondary and tertiary network). Due to budget constraints, some parts of the network would not be maintained and network expansion would not be sought, except on exceptional basis. The last mile would be the mandate of the Ministry of Agriculture or of local authorities and would be designed for IMTs only. This is the approach, which was adopted in Finland with the definition of level of service targets and a classification of roads per order of priority, per climatic conditions and traffic levels ; some roads benefiting from virtually 0 allocation and some from massive investments due to their “economic and strategic” value (see Isotalo 1995 for more details, especially annex 5).

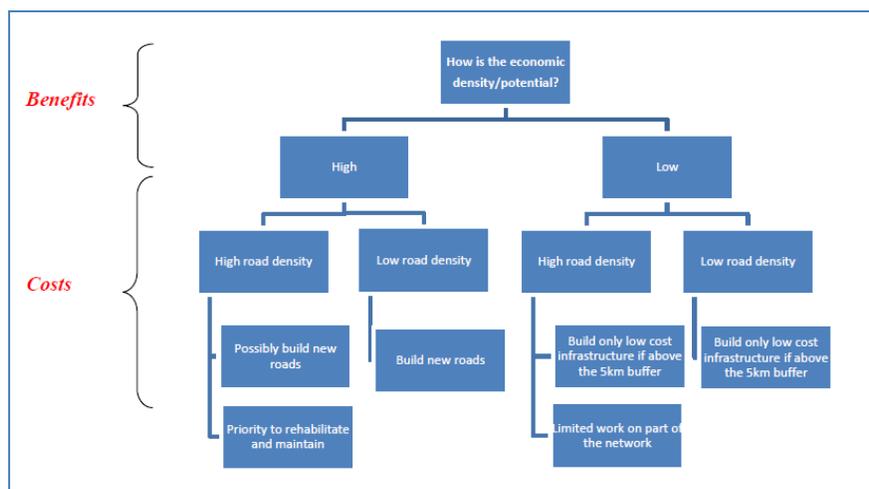
*Source: Raballand et al. (2010).*

With this end in view, a decision tree on planning decisions in the road sector can be drawn (see Figure 5)<sup>30</sup>.

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<sup>30</sup> There would be a need to research IMT options and costing of animal/animal cart/bicycle trailer/motorcycle trailer /single axle tractor/two axle tractor/locally assembled small trucks, as these may be low cost options in some areas.

Figure 5: A decision-tree on planning decisions in the road sector



Source: Raballand et al. (2010).

Finally, it is becoming increasingly important to support the use of country-specific trucking data in the economic analysis and design of road maintenance strategies. Country-specific trucking data are sparse in SSA. As a result, generic data with many theoretical assumptions are used in model simulations. Data from trucking surveys could greatly improve the quality of the analysis and lead to more realistic results. One example is the need to introduce in the models the actual purchase price of the trucks, since in West and Central Africa these are often bought second-hand, instead of using the price of new trucks. Using actual data would lead to different results, in particular reducing the possibility of overinvestment due to overestimation of investment benefits. If the investment analysis were done properly with realistic data, higher traffic levels might be needed to justify road improvements in some cases.

Also, some research/experiment should be carried out to enable basic access, especially in rural areas. Indeed, narrow roads or strip roads with either a – earth standard, b – half width paved <1,5m>, c – full width paved <3.0m> are usually suitable for IMTs and would reduce construction costs (since there is an economic viability problem in most cases). For instance, a narrow concrete road is sufficient to allow two loaded motorcycles to pass safely<sup>31</sup>; single track routes with off-pavement passing on robust shoulders for empty vehicles is also another option. Technical options should be much more differentiated

<sup>31</sup> Basic access interventions are defined as the least-cost investments which provide a minimum level of all-season passability. In a majority of cases, this means single-lane, spot-improved earth or gravel roads. In situations where motorized basic access is not affordable, improvement of the existing path network and the construction of footbridges may be the only alternative. Therefore the basic access approach should only employ the most appropriate and cost-effective interventions.

than what happens now since in many cases, there is an overinvestment in some communities and underinvestment in others.

### **Reduce unit costs by better monitoring procurement and supervision of works**

As emphasized previously, corruption and collusion with contractors has led to increased construction costs. Therefore, in order to improve value for money of road investment projects, it is high time to start to reduce corruption occurrence in road projects in SSA. This is obviously a difficult task. However, several instruments have been recently developed.

The first actual instrument advocated to reduce corruption and collusion is to **carry out of contract disclosure to the public**. It is demonstrated that generating information through regular publication, audits or frequent review of unit costs is important for the public in order to flag some obvious irregularities related to work projects. This is increasingly strengthened in many SSA countries. For instance, the Construction Sector Transparency Initiative (COST)<sup>32</sup> focuses on the importance of contract disclosure to the public to strengthen monitoring of road projects procurement. Kenny (2011) emphasizes that transparency and oversight are potentially powerful tools (and cheap) to reduce the development impact of corruption and advocates regular publication of contract and implementation details. This should (i) reduce legal costs of contracting; and (ii) help spread best practices and ease the process of learning lessons from failed approaches. However, due to legal reasons, it is difficult to provide the public with all the details regarding bidding prices. Besides, disclosure does not necessarily translate into better governance, unless a demand for accountability (Castalia, 2009.2). Non-state actors are also increasingly interested in “procurement watch” initiatives and strive to monitor more closely procurement processes in countries like Kenya or South Africa.

A second proposition is to **develop community monitoring** as a sort of compulsory requirement to improve governance in road contracts implementation. Increasing transparency depends critically on the community capacity for oversight<sup>33</sup>, and the supply-side willingness to redress the problems. But community cannot be conceived as a substitute for formal, professional audit and inspection functions (Castalia, 2009.3). The reducing corruption impact of community monitoring has not yet been definitively quantified (Castalia, 2009.3). The evidence of the Kecamatan Development Program in Indonesia suggests that its success is very much contingent on contextual factors and a combination of other

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<sup>32</sup> [Http://www.constructiontransparency.org/](http://www.constructiontransparency.org/). Four pilot countries were from SSA: Ethiopia, Malawi, Tanzania and Zambia.

<sup>33</sup> Although oversight can bring many benefits in terms of improving value for money and probity in the construction industry, it may have some limitations, such as adding costs (the overseer may become another bribe-demanding agent or may not have enough leeway to operate).

monitoring and audit activities (Olken 2007). These contextual factors may be determined early on in the project cycle, leaving little scope for a community oversight impact on corruption (Castalia, 2009.3).

Finally, conducting post-evaluation of projects selected randomly should be encouraged as recommended in Estache et al. (2010).

## 6. Conclusions and directions for future research

This paper presents data on investments in road infrastructure in Sub-Saharan Africa over the last decades. It demonstrates how research findings in this area question most of the current countries' strategies and recommends some changes to improve the developmental impact of roads investments. Better data collection and updated knowledge in transport in the recent years call for the need to adjust some of the assumptions (that should be qualified rather as “myths”) on which donor interventions have been based in SSA for years so that the waste of aid financing is the sector stops.

Despite evidence, several countries do not seem ready to amend their investments strategy mainly due to the political economy of the sector in favor of *status quo*. As highlighted by Benitez *et al.* (2010) four main power- and money-seeking motivations may explain the inertia in this sector: (i) *populism*: a strong eagerness to be *reelected*, whatever it takes; (ii) *patronage*: efforts to maintain power by an elite, a form of “club leadership”; (iii) an overly strong *industry-friendliness*, for currying future positions in the industry, for example; and (iv) *corruption*: the quest for money—*personal benefits that the politician wants to keep secret*.

To be comprehensive, donors' incentive framework should probably be amended: there should be greater emphasis on projects impact instead of disbursement. In this regard, documenting failures/successes and demonstrate how current strategies may have a perverse effect is essential.

In any case, suggesting changes is not without challenges since adjustments make more complex the design and implementation of projects. Yet, if changes are not implemented, in several years from now, there could be a backlash against infrastructure projects like it happened at the end of the 80's.

Finally, investigations should be developed in this area addressing several key questions for which answers are not straightforward, such as:

- How technically is possible to maintain a core network in fair condition?
- Is splitting responsibilities between various agencies (funding and implementation) useful?
- Does an independent road agency insulate from political interference?
- What should be the incentives to differentiate allocation per districts for roads/secondary network?

Without trying to address these questions, investments in road projects could lead to the same questioning of projects in the 2010s as in the 1980s when the expected development impact of road hardly materialize on the ground despite massive investments.

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**Annex 1: DAC members disbursements for road transport (million US\$)**

Recipient	2002	2003	2004	2005	2006	2007	2008	2009
Angola	0.122	0.003	0.003	0.155	0.004	N/A	N/A	N/A
Benin	11.956	18.452	13.647	11.248	9.455	20.535	22.179	32.254
Botswana	N/A	N/A	N/A	N/A	N/A	0.054	0.127	0.180
Burkina Faso	0.818	7.517	0.237	0.551	0.530	0.043	N/A	0.091
Burundi	0.471	N/A	N/A	N/A	2.197	0.004	0.211	0.665
Cameroon	15.606	14.300	8.332	1.718	0.969	9.523	13.826	2.439
Cape Verde	0.026	0.002	2.071	36.217	20.140	14.793	31.982	33.459
Central Africa Rep	9.825	1.826	1.782	2.243	2.860	0.436	0.181	0.185
Chad	2.207	N/A	1.176	1.496	0.111	N/A	N/A	N/A
Congo DRC	0.354	0.411	4.324	3.450	4.554	4.694	11.666	29.927
Cote d'Ivoire	1.414	0.002	N/A	N/A	0.020	N/A	N/A	0.005
Djibouti	N/A	0.065	0.077	N/A	0.001	N/A	N/A	N/A
Eritrea	N/A	0.154	0.662	1.788	3.505	0.331	N/A	N/A
Ethiopia	28.125	28.867	24.199	16.065	23.943	39.361	18.382	24.375
Gabon	14.033	10.991	15.672	4.764	7.639	4.585	4.264	7.719
Ghana	22.251	32.940	45.760	68.655	56.572	40.122	46.435	56.868
Guinea	0.037	0.005	0.010	0.010	0.116	0.017	0.475	0.062
Guinea-Bissau	0.003	0.001	0.003	0.001	0.041	N/A	N/A	N/A
Kenya	5.436	9.095	11.245	12.116	23.837	13.104	29.999	30.551
Lesotho	1.873	2.179	2.050	1.084	0.390	N/A	0.010	N/A
Madagascar	0.700	2.497	14.929	8.417	5.114	0.550	N/A	0.060
Malawi	1.387	2.098	2.862	1.969	0.540	0.213	3.569	4.710
Mali	5.682	0.386	0.286	1.155	2.759	5.934	0.151	0.438
Mozambique	15.370	21.992	9.723	36.549	22.136	18.378	18.287	27.729
Namibia	1.164	8.093	15.021	7.812	0.860	5.644	11.828	45.377
Niger	0.043	0.002	N/A	0.015	0.026	N/A	0.018	N/A
Rwanda	N/A	N/A	0.078	0.298	5.653	3.914	2.466	1.085
Sao Tome & Principe	0.003	0.021	0.996	1.099	0.491	0.420	0.002	N/A
Senegal	0.674	1.671	14.259	7.412	4.596	3.800	5.206	9.859
Sierra Leone	N/A	0.380	N/A	N/A	0.018	N/A	N/A	0.013
South Africa	N/A	0.200	N/A	N/A	N/A	0.067	/A	0.007
Tanzania	11.823	28.740	7.466	6.457	13.603	34.195	47.518	57.710
Togo	N/A	N/A	0.158	5.513	5.746	N/A	0.115	0.027
Uganda	10.282	2.280	4.016	0.765	1.741	5.019	2.136	1.928
Zambia	30.505	34.542	18.147	14.521	25.556	10.507	12.255	14.591
Zimbabwe	3.256	0.066	0.015	N/A	0.025	0.004	0.007	N/A

**Annex 2: EU Institutions disbursements for road transport (million US\$)**

<b>Recipient</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
<b>Angola</b>	0.125	0.008	0.362	N/A	N/A	N/A	N/A	N/A
<b>Benin</b>	19.429	42.599	41.221	14.664	2.769	17.356	52.997	25.203
<b>Burkina Faso</b>	31.091	26.817	16.629	19.687	38.186	89.624	13.905	11.752
<b>Burundi</b>	0.028	N/A	N/A	N/A	N/A	11.130	24.978	32.667
<b>Cameroon</b>	13.642	15.796	30.926	19.454	32.332	37.086	38.102	28.971
<b>Cape Verde</b>	N/A	1.669	3.650	2.498	5.853	6.659	13.256	0.303
<b>Central Africa Rep</b>	0.074	0.099	N/A	N/A	N/A	N/A	N/A	0.435
<b>Chad</b>	9.567	17.635	24.343	21.834	18.997	11.264	53.866	37.196
<b>Congo</b>	2.001	0.998	0.651	0.298	6.808	28.941	25.899	17.139
<b>Djibouti</b>	N/A	1.200	5.013	2.314	0.262	3.518	2.188	6.355
<b>Eritrea</b>	0.151	N/A	N/A	0.024	0.100	N/A	0.956	2.748
<b>Ethiopia</b>	21.348	24.594	19.539	47.230	102.261	94.774	151.088	45.510
<b>Gabon</b>	2.501	2.351	3.118	5.410	2.241	1.522	1.458	1.858
<b>Ghana</b>	0.909	9.825	8.443	29.999	21.246	23.449	33.502	24.177
<b>Guinea</b>	11.784	14.454	7.086	3.039	5.000	6.556	27.258	24.085
<b>Guinea-Bissau</b>	8.293	3.241	5.465	0.242	6.670	15.568	15.357	13.582
<b>Kenya</b>	N/A	17.672	31.156	39.058	35.441	23.124	10.890	0.863
<b>Lesotho</b>	6.809	11.085	3.156	1.055	1.818	0.478	6.859	N/A
<b>Madagascar</b>	3.132	25.428	61.147	75.215	77.183	89.578	51.342	7.595
<b>Malawi</b>	14.545	24.795	14.520	11.498	3.241	7.726	27.269	12.956
<b>Mali</b>	20.533	35.493	21.677	35.894	17.413	55.474	23.819	0.180
<b>Mauritania</b>	11.694	8.965	5.716	7.113	9.271	39.378	32.790	16.799
<b>Mozambique</b>	8.975	8.395	11.224	26.335	46.832	31.063	16.258	13.454
<b>Niger</b>	9.944	14.497	10.336	2.890	4.325	43.861	58.227	16.708
<b>Rwanda</b>	3.430	7.189	12.673	21.513	6.653	8.729	32.595	17.556
<b>Sao Tome &amp; Principe</b>	0.008	0.004	1.076	3.110	2.432	3.131	3.560	1.384
<b>Senegal</b>	9.867	7.908	7.960	14.045	17.651	25.892	40.394	53.198
<b>Sierra Leone</b>	1.690	2.589	7.427	16.623	11.978	7.663	11.736	25.391
<b>Tanzania</b>	10.225	12.425	39.200	71.307	56.367	36.322	11.132	3.634
<b>Uganda</b>	2.596	1.811	28.727	9.698	18.409	34.355	95.024	24.918
<b>Zambia</b>	8.634	11.308	9.780	32.949	27.645	1.286	45.806	8.827

**Annex 3: IDA disbursements for road transport (million US\$)**

Recipient	2002	2003	2004	2005	2006	2007	2008	2009
<b>Benin</b>	3.937	2.763	1.221	0.034	2.665	1.084	10.375	4.010
<b>Burkina Faso</b>	0.523	6.664	3.437	6.226	10.898	12.376	10.006	22.479
<b>Burundi</b>	1.913	2.622	5.219	4.856	11.592	11.101	5.631	4.454
<b>Cameroon</b>	7.420	9.012	5.663	8.343	14.677	8.036	19.173	19.993
<b>Cape Verde</b>	0.433	0.451	1.418	1.644	2.147	3.868	4.623	0.945
<b>Central Africa</b>								
<b>Rep</b>	N/A	N/A	N/A	N/A	N/A	0.215	1.361	6.217
<b>Chad</b>	N/A	N/A	N/A	0.744	0.509	0.581	1.214	3.500
<b>Congo DRC</b>	5.404	7.925	2.497	0.451	0.429	9.556	17.472	14.419
<b>Congo</b>	N/A	1.679	6.841	3.991	1.834	0.305	1.107	0.876
<b>Cote d'Ivoire</b>	18.345	8.115	9.992	-0.234	N/A	N/A	5.543	8.176
<b>Djibouti</b>	3.599	9.122	2.632	0.735	1.086	0.548	1.048	0.094
<b>Eritrea</b>	4.219	3.892	1.455	0.181	N/A	N/A	N/A	N/A
<b>Ethiopia</b>	84.580	53.186	73.914	54.030	54.388	52.920	96.910	129.947
<b>Ghana</b>	16.216	27.174	40.796	50.733	46.686	37.877	13.022	2.598
<b>Guinea</b>	2.349	3.791	3.192	2.191	3.512	2.241	4.849	N/A
<b>Guinea-Bissau</b>	N/A	N/A	N/A	N/A	N/A	0.219	0.689	0.674
<b>Kenya</b>	4.918	0.890	5.533	0.350	-0.094	21.281	33.284	29.160
<b>Lesotho</b>	4.685	3.416	1.293	N/A	N/A	1.535	3.986	5.712
<b>Madagascar</b>	2.825	8.884	32.683	17.338	43.227	41.662	26.698	6.746
<b>Malawi</b>	3.717	0.700	3.322	9.189	4.234	1.673	1.333	1.612
<b>Mali</b>	2.319	1.264	0.469	12.503	13.023	9.301	11.688	21.451
<b>Mauritania</b>	1.589	1.610	3.123	3.332	3.975	4.312	3.547	1.126
<b>Mozambique</b>	13.280	17.900	34.200	49.031	50.240	28.945	19.615	19.138
<b>Niger</b>	5.036	5.111	N/A	N/A	N/A	N/A	1.097	6.718
<b>Nigeria</b>	0.444	2.526	6.076	13.534	10.584	10.835	8.536	17.704
<b>Rwanda</b>	6.125	N/A	N/A	N/A	1.043	1.512	3.657	0.655
<b>Senegal</b>	2.076	4.836	15.729	25.776	22.099	19.838	10.772	9.278
<b>Sierra Leone</b>	2.534	1.166	1.568	1.263	2.678	1.947	5.949	4.673
<b>Tanzania</b>	11.388	17.073	18.985	6.604	14.676	51.168	53.767	25.270
<b>Togo</b>	6.759	-0.007	0.000	N/A	N/A	N/A	-0.237	0.541
<b>Uganda</b>	15.379	19.999	27.561	25.724	40.621	49.880	59.663	51.139
<b>Zambia</b>	6.932	6.696	20.573	6.442	16.803	10.881	16.999	8.285