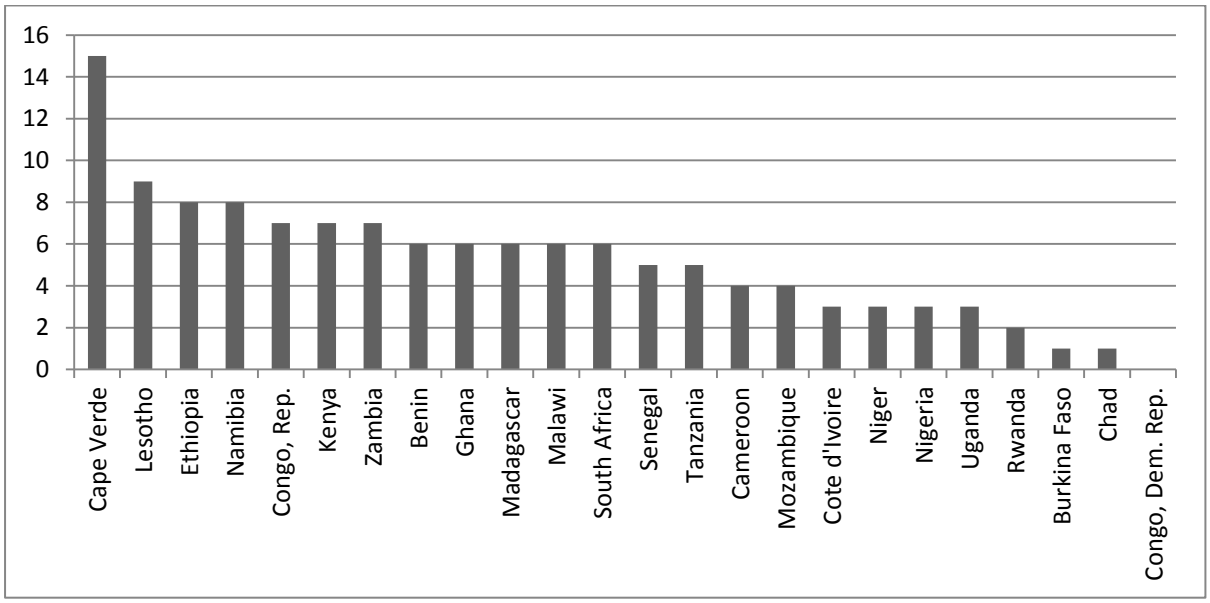
As of 2008, public spending on this sector by African governments was estimated to be US$ 29.8 billion annually. Of this amount, US$ 20.4 billion went to operation and maintenance with the remainder (US$ 9.4 billion) being spent on capital expenditures (Briceño-Garmendia, Smits and Foster, 2008). As shown in the in the above table, almost above 45 percent of infrastructure spending was allocated to operations and maintenance, whilst 55 percent went to capital expenditure. The private sector has been an important source of investment in Africa and accounts for more than a third of capital expenditure in African infrastructure. However, it must be noted that this expenditure is focused mainly in the ICT and transport sectors.

African governments through the NEPAD and AU Assembly have made various commitments which focuses on infrastructure development in Africa. Amongst these include, the NEPAD's Short Term Action Plan (STAP) which was established in 2002 to address specific infrastructure development problems including facilitation, capacity building, physical and capital projects, and studies required to prepare future projects. At the 18th Assembly meeting, the AU has endorsed the AU has endorsed the Programme of Infrastructure Development in Africa (PIDA) and it has resolved to; Increase public financing on infrastructure and promote public-private partnerships to speed up infrastructure development; Promote innovative financing mechanisms reflecting a real commitment by Africa to speed up infrastructure development on the continent.

Figure9: Infrastructure: Total spending - public sector (percent of GDP) - Latest Year Available, period 2001-2008



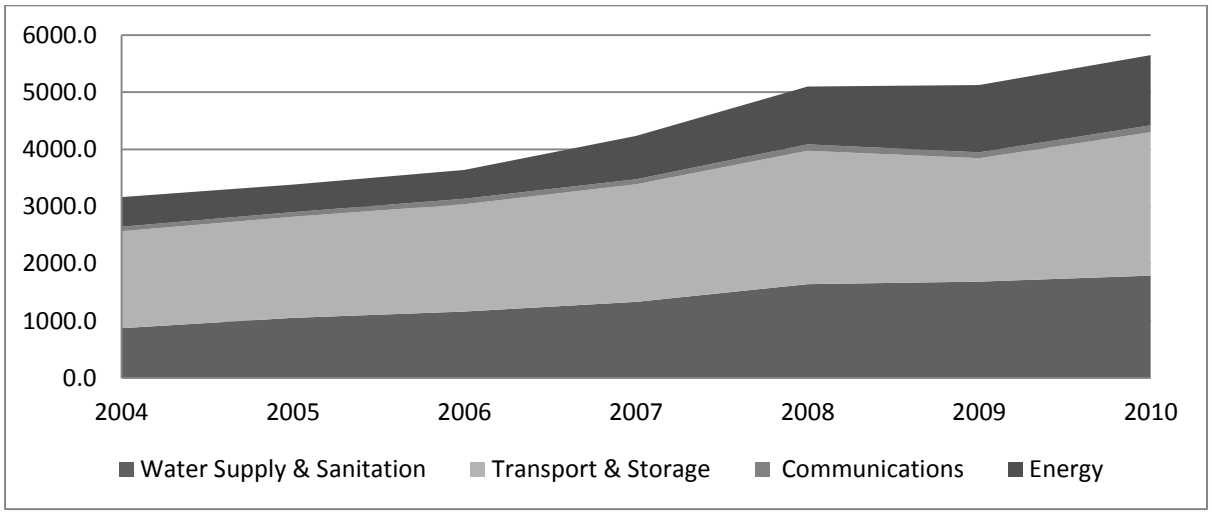
Source: World Bank/AICD, 2012

Sub-Saharan Africa, on average has been spending 5 percent on infrastructure development. Low income African (fragile) countries were spending 3 percent of GDP on infrastructure while middle income countries were spending 6 percent of GDP infrastructure. Cape Verde (15 percent), Lesotho (9 percent) and Ethiopia (8 percent) and Namibia (8 percent) have spent on their infrastructure development.

Apart from the above initiatives, of the key commitments from African governments to rural infrastructure has been through the support of CAADP. Governments have committed to spend 10 percent of public spending on agricultural development. According to the RESAKSS study (2012) only 6 African countries have thus far met the Maputo commitment to allocate 10 percent of their public spending on the agriculture sector.

Development partners' support to Africa's infrastructure development reached US$ 5.6 billion in 2010, a steady increase since 2005.In 2010, 44 percent of the aid went to transport infrastructure and 31 percent was allocated to water and sanitation. The energy sector received 21 percent of the ODA while the communication sector received only two percent of the ODA.

Figure10: ODA disbursement from DAC countries to SSA Economic infrastructure (US$ millions- 2010 constant prices)



Source: OECD-DAC, 2012

The Infrastructure consortium for Africa(ICA) (2010) reports that total commitments for infrastructure in Africa in 2010, from all sources, amounted to US$ 55.9 billion, up by 44 percent from US$ 38.9 billion in 2008. ICA members contributed to over half the amount - US$ 29.1 billion. The private sector contributed US$ 13.8 billion and China committed US$9 billion. Other contributors include Arab funds and India which contributed US$ 4 billion. North African countries received 30 percent of the ICA funding commitment and South Africa received 25 percent. The report further notes

that the average disbursement rate of bilateral members amounted to 27 percent and 42 percent from multilateral donors.

China has been an important financer for African infrastructure development. The China's Foreign Aid white paper (2011)states that one of the basic features of the country's foreign aid policy is to help build up self-development capacity in other countries. This has benefitted Africa, with China's aid focussing on creating and strengthening domestic capacity and infrastructure development. According to the white paper, 61 percent of China's concessional loans go to infrastructure development. Schiere and Rugamba (2011) point out that China's commitments to African infrastructure were US$ 9billion in 2010. The investment in African infrastructure has also remained stable at around US$ 5 billion per year from 2005 to 2009. For 2010, the ICA estimates that there has been a significant step-up of 80 percent (amounting to US$ 9 billion) of Chinese investments in African infrastructure. Furthermore, China's own experience of developing rural infrastructure needs to be looked at in the context of South-South triangular co-operation.

The financing requirement

The Africa infrastructure country diagnostic (AICD) estimates that US$ 93 billion per year is required to develop African infrastructure. Major investments in building, maintenance and the operation of infrastructure assets are required to reverse the current infrastructure backlog. Africa's current spending is US$45 billion; there is thus a financing gap of US$ 48 billion. The financing requirement for low income countries is generally high, especially for fragile low income countries which need to spend 42 percent of their GDPs to address their infrastructure development backlog. The investment requirement for middle income and oil exporting countries is relatively lower.

Table 4:Sub-Saharan Africa's infrastructure needs, 2006–15, by sector

	US$ billion a year	GDP share (%)	Water supply and sanitation	Energy	ICT	Transport
	Year		Shares			
Middle income	17.92	6.62	4.89	80.93	0.95	13.23
Oil exporting	18.73	8.97	16.84	41.97	3.14	38.05
LIC-nonfragile	24.15	21.4	16.87	48.42	3.54	31.17
LIC-fragile	16.38	42.92	10.96	56.99	2.34	29.71
Africa	74.9	11.69	13.39	56.9	2.57	27.14

Source: Briceño-Garmendia, Smits and Foster, 2008

The biggest share of investment needed is in the energy sector. Middle income countries such as Nigeria and South Africa need 80 percent of infrastructure investments in their energy sectors while the average SSA country requires 56 percent. The transport sector accounts for 27 percent of the total investment requirement. According to the report produced for CAADP, US$ 36 billion is needed for irrigation, US$ 62 billion for building rural roads, US$ 37 billion for operation and maintenance, and US$ 2.8 billion for trade-related capacities over the period 2003-2015. This excludes rural electrification and ICT investment requirements.

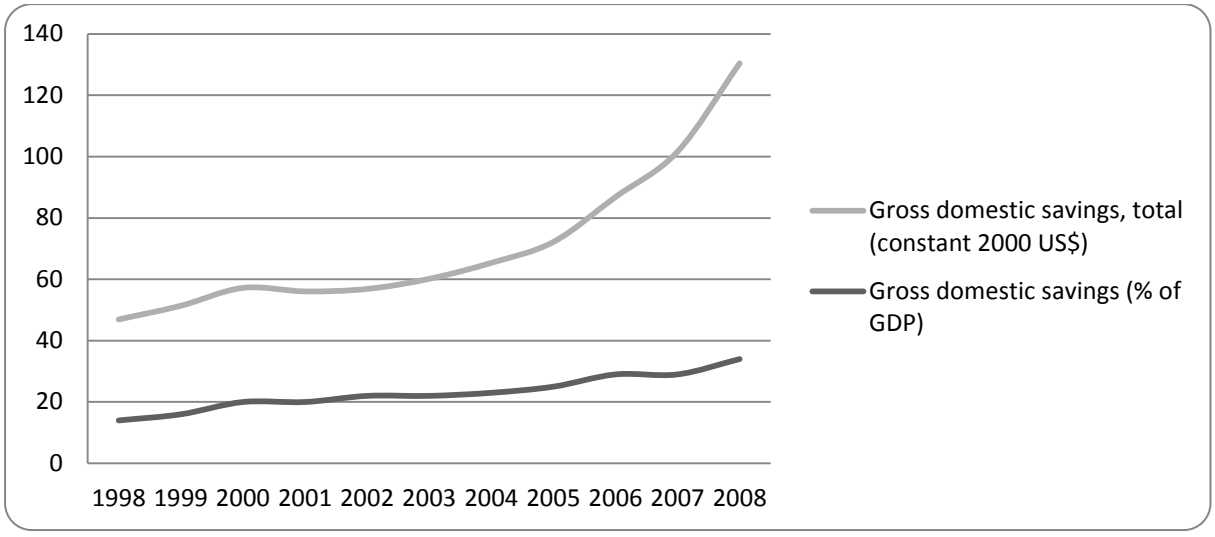
F. Africa's options to finance rural infrastructure investment

The primary source of infrastructure financing in these countries remains domestic**.** It should be noted that Africa's robust economic performance in the last 10 years, fuelled in part by the commodity boom, has positively affected the potential for domestic resource mobilization in private domestic savings and public revenue generation. It has broadened the tax base in most African countries. Unfortunately, many African countries have been unable to harness this potential due to their under-developed financial sectors and under-capacitated tax administration systems. The current state of the financial sector on the continent reveals that less than 10 percent of economically plausible citizens are able to bank. It is imperative to develop Africa's capacity to mobilize its domestic resources for its development so that it can reduce its dependency on external flows and create greater policy space, including providing positive signs to donors and potential investors.

Domestic investment

Rural infrastructure investment needs to bank on the growth of gross domestic savings. Sub-Saharan African countries' gross domestic savings have shown a dramatic increase in magnitude as well as as a percentage of GDP. By 2008, gross domestic savings has reached US$ 130 billion, a 132 percent increase from 2001 levels. The gross domestic savings rate increased from 20 percent in 2001 to 34 percent in 2008. This phenomenon bodes well for the continent and will fundamentally affect the course of its economic development. Despite increases in the levels of domestic savings in Africa which according to studies currently stands at 34 percent, these remain lower than developing Asia's47 percent.

Figure 11: Gross domestic saving in SSA (developing)



Source: African Development Indicators, 2010, World Bank

Africa's domestic financial intermediaries must be adequately equipped to channel savings such as these into infrastructure investment. An underdeveloped financial sector will present a challenge in mobilising more domestic savings and in channelling these resources to infrastructure investment programmes. Africa needs a functioning financial system that can mobilise resources effectively and allocate them to the most productive investment opportunities; the demand for financial intermediation from households and firms is high despite low income levels. However, the African financial system has failed to meet the demand for financial intermediation mainly because it is fragmented and segmented. Most of the financial sector in Africa is dominated by banks and even where non-banking financial institutions exist, their influence generally remains largely marginal compared (Aryeetey, 2004).

Local currency bonds have emerged in Kenya and South Africa as an option to leverage domestic resources for infrastructure development. The Kenyan government has issued infrastructure bonds (long term) to finance infrastructure projects. The bonds can be used as collateral for bank loans and corporate bond tax incentives. Between 2009 and 2011, the country raised US$ 1 billion in this manner. In South Africa, the Standard Bank Group has issued commodity-linked bonds which are denominated in the local currency. These initiatives can be used as options for other African countries to explore (Brixiova, *et al.* 2012).

Pension funds

Pension funds are potential sources of finance for infrastructure investment. They can provide sizable domestic long-term finance and can be used to acquire funds either directly, by means of investments in specific projects, or indirectly, via investment in special infrastructure funds to finance infrastructure projects. There is a need to design infrastructure financial instruments that are attractive to pension funds (i.e. which are more liquid, less risky and volatile) (Vives, 2000).

The experience of the Pan-African Infrastructure Development Fund (PAIDF) would be vital in doing so and could also show SSA countries how to broaden participation of private and civil-service pension funds in African infrastructure development. The PAIDF is attempting to attract African pension funds by offering them a 25-year infrastructure equity fund. It has targeted a commitment of at least US$ 1 billion from African pension funds for the end of the fiscal year (2006/2007). It also aims to raise US$ 3 billion (Manuel, 2006) by attracting international pension funds. The potential of the pension fund industry is extensive. Loxton and Bonorchis (2005) have quoted past SA President Mbeki as saying that nine civil-service pension funds on the continent collectively held more than US$ 120 billion. It is thus clear that the potential of pension funds to provide long-term capital for infrastructure investments is immense.

Leveraging public revenue

Whilst private financing is emerging as an important source of infrastructure finance, especially in the ICT and transport sectors, public revenue has traditionally been the main source of finance for infrastructure projects with high social but low financial returns (Brixiov, 2011). It is thus less likely for the private sector to invest in rural infrastructure. Therefore, the onus falls largely on the public sector to prioritise this largely public need. It must be both direct financer and act as a catalyst for private finance.

A study by the AFDB/OECD reports that Africa's average tax revenue as a share of GDP has increased since the early 1990s from 22 percent of GDP in 1990 to 27 percent in 2007. This growth in tax revenues has been driven by increasing resource revenues in resource rich countries. However, other countries find it difficult to increase their tax revenues despite introducing reforms (North-South Institute, IMF, 2010). According to the AFDB/OECD study on the tax effort index in 47 African countries, 18 countries have the potential to raise additional tax revenues if appropriate reforms are introduced.

The challenges faced by African countries in raising tax revenues are mainly due to the pervasiveness of the 'hard to tax' sectors (such as the informal economy), limited capacity of revenue administrations, widespread tax evasion and fraud, misuse of transfer pricing techniques, difficulty in taxing extractive industries, overuse of tax preferences, and trade liberalization (OECD/AFDB, IMF, and North-South Institute). The tax reforms needed include the removal of tax preferences, proper handling of transfer pricing abuses by multinational enterprises and taxing the extractive industries fairly and transparently. Strategies that target the 'hard to tax' sectors enhance fiscal legitimacy and to seek international cooperation must also be developed. The G20, EU and G8 have committed to support African countries in domestic resource mobilization. This can be used to leverage and build the capacity of revenue authorities.

Despite the fact that the bulk of infrastructure spending is financed via public funds, the transparency of national budgets especially with regards to the allocation of

infrastructural expenditure between rural and urban areas is not clear at best. There is a clear case for independent budget analysis and advocacy initiatives that can improve budget transparency and the poverty focus of government expenditure priorities. While the structure of the budget process makes substantial changes in expenditure priorities difficult to achieve, budget groups directly contribute to positive impacts on budget allocations and improved implementation, thereby increasing the accountability of decision-makers (Robinson, 2006).

Stopping the illicit financial outflows

Plugging illicit financial outflows could also make capital available for infrastructure. A recent estimate by the Global Financial Integrity (2011) report on illicit outflows states that in 2009 around US$ 56 billion has left the continent. This is lower than 2007 and 2008, when outflows peaked. In 2009, they declined by 7.5 percent from 2008 levels. The estimate cites Nigeria and South Africa and a number of small oil producing countries as having been most adversely affected by the illicit outflows. Halting these and creating an attractive investment environment could help to make capital available for rural infrastructure investment.

Leveraging the Diaspora remittances

There has been an increased recognition of the value of remittances as a source of development finance in Africa. The Diaspora savings for SSA are estimated by Ratha and Mohapatra (2011) to be 30.4 billion, and nearly US$ 53 billion for the entire African continent including North Africa. This is a sizable amount which can be leveraged by adopting foreign current accounts at African banks, and issuing Diaspora bonds. Ethiopia has issued Millennium Corporate Bonds, targeted at Ethiopians residing at home and abroad, to finance infrastructure projects. This Diaspora bond is expected to raise finance capital for the state owned Ethiopian Elective Power Corporation. Ratha *et al.* (2009) have estimated that SSA can raise up to US$ 5-10 billion per year via this mechanism.

Innovative Financing for Development (IFD)

Policy makers must explore the possibility of leveraging Innovative sources of finance for rural infrastructure development**.** This is already occurring to counter the limitations of existing forms of public finance in addressing financing gaps, climate change and other natural disasters. The interest in innovative finance for development can be traced to the Monterrey consensus for development finance which notes that it is important to"… recognize the value of exploring innovative sources of finance …. to study where possible other source of finance for development." Recently, the G8 summit stressed "the need to go beyond aid and mobilize other resources as stated in the Monterrey consensus, including domestic resources, innovative financing, migrant remittances, market instruments used by development banks and private sector flows."

The leading group on innovative financing for development [10] has attempted to identify alternative sources of finance to complement official development assistance. This has been fuelled by the shortcomings of official development assistance which include its unpredictability and volatility. The most popular innovative financing position thus far has been the Financial Transactions Tax (FTT) and Currency Transactions Tax (CTL) and is gaining some political support. These instruments should be leveraged for rural infrastructure development.

The High Level Panel on Infrastructure appointed by the G20 in Seoul (2010) has identified three key issues in exploring innovative financing for infrastructure investment. These are (1) ensuring a strong and sustainable supply of bankable projects, (2) creating an enabling environment for infrastructure investment and (3) making funding available under appropriate terms. The report notes that it is important to explore innovative financing approaches to further leverage public resources as well as development finance institutions' capital to support infrastructure investments. An increased level of private sector funding will enable and ensure that a higher portion of resources is available to the much needed traditional public investments in infrastructure.

G. Challenges

The rural infrastructure challenge differs across countries in terms of access and quality. Briceño- *et al.* (2008) attribute this to Africa's widely varying quality of existing infrastructure and circumstances, which affect people's access to institutional and technical resources. For instance in North Africa, countries have highly developed irrigation systems, and certain African countries have above average access to rural roads. There are also differing challenges in middle-income countries (Cape Verde and South Africa), resource rich countries with economies that are heavily reliant on petroleum or mineral revenues (Nigeria and Zambia), fragile states emerging from conflict (Côte d'Ivoire and the Democratic Republic of Congo), and low-income countries that are neither fragile nor resource rich (Senegal and Uganda) .

There is a huge rural infrastructure backlog resulting from decades of under investment, lack of maintenance, and destruction and dilapidation due to conflict. Access to infrastructure is very limited as only 30 percent of the rural population has access to rural roads, whilst only 25 percent of the irrigation potential of the continent is being utilised. Only seven percent of rural households are estimated to subscribe to mobile services. The quality of infrastructure is generally poor and infrastructure service costs are relatively high. This lack of access to infrastructure services constrains the region's agricultural growth and limits its market access.

Prioritisation of urban and large scale infrastructure projects at the expense of rural and small scale infrastructure means that the latter is very often in a very poor state. This is true of current programmes that are purported to be inclusive. Rural infrastructure is usually seen as part of the agricultural sector development plan as reflected in the CAADP and will thus only be allocated a share of the agricultural budget, rather than being catered for from the proceeds of a separate infrastructure development budget.

To reverse this infrastructure backlog will require major investments in building, maintenance, resources and operation. The AICD estimates that US$ 93 billion per year is required to develop African infrastructure. As current spending is US$45 billion, there is a financing gap of US$ 48 billion. The CAADP estimates that US$36 billion is needed for irrigation, US$ 62 billion for building rural roads, US$ 37 billion for operation and maintenance thereof, and US$ 2.8 billion is for trade-related capacities in rural areas over the period 2003-2015. The cost of rural infrastructure investment is inflated due to the low population density in rural areas. It is estimated that over 20 percent of the population lives in dispersed settlements where typical population densities are less than 15 people per square kilometre; hence, the costs of providing infrastructure for them are comparatively high. This has investment and operational implications for African countries to build, maintain and operate rural infrastructure.

It is an enormous challenge for African countries to meet the financing gap so as to build and improve rural infrastructure. Most of them, especially fragile states and low income countries, lack financial resources and the requisite technical and institutional capacity. The resources needed to develop rural infrastructure are often beyond what available to these countries, and the problem is further compounded by the fact that rural infrastructure is less likely to attract private investment. This is significant because more than a quarter of investment on infrastructure comes from this sector. Rural infrastructure will have to depend on public investments and official development assistance.

Lack of appropriate technical and institutional capacity to develop and maintain rural infrastructure is also a challenge. Suitable institutional arrangements and infrastructure delivery systems are needed to reduce the cost of rural infrastructure investment and to ensure smooth operation and maintenance. In most countries, rural infrastructure services are provided by the public sector which at times is unresponsive, inefficient, and lacking in financial autonomy, accountability and transparency. Strengthening public institutions that provide public goods and services can also significantly reduce costs while improving the quality of services provided (Fan, 2004). In making rural infrastructure more inclusive and productive, it is critical to see the benefits that can be derived from the decentralisation of infrastructure services. The added benefits of decentralization are the participation of users themselves. Community participation in rural infrastructure construction and maintenance is crucial for financial incentives to work efficiently and to institute a legal framework for such activities.

H. Conclusion

There is sufficient evidence and experience to demonstrate that rural infrastructure is fundamental to unlocking the African Moment. In a continent where the majority of people depend on smallholder farming for their livelihoods, investment in rural infrastructure to support productivity and reduce input costs, and improving market access can have a multiplier effect in reducing poverty. The Chinese and Asian experiences demonstrate that a green revolution is possible. These countries have reduced poverty over three decades by investing in agriculture, including rural infrastructure.

African grassroots communities have been calling for the prioritisation of rural infrastructure development for a long time. In our interaction with them through the Poverty hearings, Citizen Consultations and the Pilot study of the Grassroots Focus Index these appeals have been consistent. Rural infrastructure is their top priority.

Despite this overwhelming evidence in support of rural infrastructure as a key lever for African development, investment in this sector rarely becomes part of the African development agenda. Whilst it is recognised as one of the pillars of the CAADP, African countries and their international partners' failure to allocate resources to this programme reflects their lack of genuine commitment.

Africa lacks sufficient and adequate rural infrastructure to support smallholder famers. A mere 34 percent of the continent's rural population have adequate access to rural roads, while only 14 percent have access to electricity, and seven percent to telecommunication. Where available, the service quality is usually poor due to the lack of proper operation and maintenance. In addition, road networks are usually in a poor state due to years of neglect and under-maintenance. Furthermore, the infrastructure services are often unaffordable for grassroots communities. African countries need to prioritise rural infrastructure by allocating adequate resources to existent programmes such as the CAADP and PIDA. It is imperative that African governments provide leadership and commitment and not mere resources to catalyse the agricultural revolution that will reduce poverty and increase food security on the continent.

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Annexure tables:

Annex table 1 Quality of rural roads (Tertiary roads)

Country	Fair	Poor	Good
Angola	20	20	60
Benin	23	43	34
Botswana	31	34	35
Burkina Faso	63	28	9
Burundi	40	20	40
Cameroon	32	26	41
Central African Republic	40	20	40
Chad	39	20	40
Congo,Dem.Rep.	30	21	49
Congo,Rep.	24	12	65
Côted'Ivoire	29	30	41
Eritrea	40	20	40
Ethiopia	32	25	43
Gabon	40	20	40
Gambia,The	20	25	55
Ghana	51	36	13
Guinea	40	20	40
Kenya	49	11	40
Lesotho	31	24	45
Liberia	40	20	40
Madagascar	10	5	85
Malawi	44	42	14
Mali	39	22	39
Mauritania	40	19	41
Mauritius	77	20	3
Mozambique	21	35	44
Namibia	33	25	43
Niger	31	24	45
Nigeria	31	33	36
Rwanda	0	0	100
Senegal	21	18	61
Sierra Leone	34	18	48
SouthAfrica	31	24	45
Sudan	20	22	58
Swaziland	40	20	40
Tanzania	31	24	45
Togo	40	20	40
Uganda	40	20	40
Zambia	16	30	54
Zimbabwe	25	29	47
Average	33	23	43
Median	32	21	41

Source: Calculations by Alberto Nogales based on AICD RONET Summary Outputs, June 2010

Annex table 2: Quality of the water and sanitation infrastructure (WSS: Continuity of water service (hours/day)

	2005
Congo, Dem. Rep.	11.00
Ethiopia	24.00
Kenya	6.64
Tanzania	23.41
Uganda	23.00
Madagascar	8.00
Malawi	19.83
Mozambique	13.87
Zambia	17.90
Benin	24.00
Burkina Faso	23.00
Cote d'Ivoire	24.00
Ghana	11.33

Source: African infrastructure knowledge programme, 2012

Annex Table 3: quality of the ITC infrastructure (ICT: Number of main line faults (per 100 main lines per year))

	2001	2002	2003	2004	2005	2006	2007
Chad	60.75	..	..	..	..	..	..
Gabon	57.00	54.00	50.00	..	..	..	..
Comoros	51.11	55.82	..	..	..	..	..
Eritrea	62.54	53.34	..	..	..	..	..
Kenya	..	149.00	149.10	130.40	145.40	..	..
Sudan	..	..	..	17.00	95.50	..	..
Tanzania	20.40	24.00	..	..	..	..	..
Mauritania	..	..	128.00	..	..	..	..
Angola	..	..	..	..	..	..	..
Lesotho	69.17	72.84	..	..	..	..	..
Madagascar	77.50	42.50	..	..	..	..	..
Mauritius	56.84	41.47	..	..	..	..	..
Mozambique	80.00	70.00	65.00	66.00	52.00	..	..
Namibia	51.50	42.20	40.40	32.60	35.10	34.80	..
South Africa	52.80	48.20	47.60	43.30	47.00	48.50	..
Swaziland	85.00	100.00	..	..	..	..	34.00
Zambia	90.82	90.80	..	..	..	..	..
Benin	6.00	..	..	..	..	..	..
Burkina Faso	51.08	19.66	..	..	..	..	..
Cape Verde	46.00	44.40	44.40	39.60	..	..	..

Cote d'Ivoire	99.00	81.00	..	..	..	..	..
Ghana	67.42	48.00	..	..	..	..	..
Guinea	..	1.57	..	..	..	..	..
Guinea-Bissau	..	..	..	..	..	..	..
Mali	..	..	..	..	..	..	..
Niger	104.55	..	..	..	..	..	..
Senegal	17.28	..	..	..	..	..	..
Togo	4.62	6.19	..	..	..	..	..

Source: African infrastructure knowledge programme, 2012