

Sustainable Socio-Economic Development In Nigeria: A Case For Road Infrastructure Maintenance

Dr. Uche R. B. Emeasoba,
Department of Estate Management, University of Nigeria, Enugu Campus
Tel: 08037242471 E-mail: ucheemeasoba78@yahoo.com
Prof. J. U. Ogbuefi
Department of Estate Management, University of Nigeria,
Enugu Campus
Tel: 08063468767 E-mail: joseph.ogbuefi@unn.edu.ng

Abstract

Roads are among the vital assets of any nation. Apart from carrying people, vehicles and goods, roads also provide avenues for such service apparatuses as water, electricity, sewerages, etc. thereby serving as a veritable tool for socio-economic development. A close look at the Nigerian road network reveals the enormous infrastructural systems problems. These problems, in the main, are more maintenance related. Since the provision of roads is cost intensive, one would have expected appropriate maintenance to safeguard them from total deterioration which ultimately leads to eventual rehabilitation or reconstruction with its cost implications. Regrettably, this is not so in the country for no sooner these road infrastructure are commissioned than they are abandoned to dilapidate. Roads, like any other development assets function maximally over the whole period of their economic life when regular maintenance is applied. This paper therefore examined the road maintenance situation in Nigeria and concluded that there is virtually no noticeable road maintenance culture in the country. It therefore proffers pro-active road maintenance strategies for sustainable socio-economic development and good governance.

Keywords: Infrastructure, Road Maintenance, Sustainability and Economic Development.

1. Introduction

Virtually all human activities require the provision of infrastructure. Both developed and developing nations are heavily dependent on infrastructure especially roads, railways, electricity, water supply and housing for their social and economic activities. Good roads make crucial contributions to economic development and growth and provide important social benefits. Poorly maintained roads constrain mobility, significantly raise vehicle operating costs, increase accident rates and their associated human and material costs, and aggravate isolation, poverty, poor health, and illiteracy in rural communities. Urbanization is occurring rapidly around the world particularly in developing countries, with its attendant demand on infrastructural facilities. According to World Bank (2002), urban areas are potential dynamic engines of growth and governments need to take steps to make their cities more conducive for economic growth. There is, therefore, need to provide good living and working environments and for this to occur, provision and sustainable management of infrastructure, especially roads, are imperative.

In many developing countries like Nigeria, local, state and national governments usually provide the physical infrastructure which is vital for economic growth and development. In some cases, they provide an enabling environment for others to provide such facilities, especially housing. According to Ismail (1987), the most phenomenal amount of road construction in Nigeria took place in the period 1973 to 1980. Since then, more road networks and other infrastructure have been constructed.

A critical look at the nation's urban centers and the conditions of the intra- and inter- city road network shows that the problems of Nigeria is not with road construction but with its maintenance. Since the construction of roads is cost intensive, one would have expected that serious attention would be paid to safeguarding them through regular maintenance. Regrettably, this is not so in the country for no sooner these roads are commissioned than they are abandoned to dilapidate. Nigerian roads have been plagued by a number of problems among which are faulty designs, low carriage capacity, inadequate drainage system, poor funding for road maintenance, and poor maintenance culture, which significantly reduced the utility of the roads. Potholes, dislocated pavements, fallen bridges, etc, are visible along most roads in the country. These problems have made it difficult, expensive and more arduous to move products and services from producers to consumer, which often lead to loss of man-hours and high cost of goods and services. The annual loss due to bad roads in the country is

valued at N80 billion, while additional vehicle operating cost resulting from bad roads is valued at N53.8 billion, bringing the total loss per annum to N133.8 billion (Federal Ministry of Work & Housing in CBN Occasional paper No 27, 2003). This figure does not take into account the other emotional and physical trauma that people go through while plying the roads and the consequent loss in productivity.

The poor conditions of the roads are compounded by some road contractors who cut across newly constructed roads while laying utility materials such as water pipes and telephone cables. It is trite that infrastructure which are not maintained are bound to deteriorate and depreciate in value. Such infrastructure constitutes environmental degradation to sensitive observers. According to GIZ (2004), good road maintenance shows that a state actively promotes its economy and makes efforts towards good governance. Sutherland (2012) is of the view that a solid well-maintained road network is one of the factors that foreign investors look at when deciding to invest in any country.

However, some developing countries including Nigeria have tended to favour new constructions, rehabilitations, or re-constructions, of roads over maintenance. This has led to a steady increase in the number of roads that need repairs. In sub-Saharan Africa, for every one kilometer of road rehabilitated, an estimated three kilometers of road fall into disrepair, leading to a net deterioration in the total road network (World Bank 2003). This amounts to one step forward and three steps backwards, which is retrogressive in nature. Road infrastructure maintenance can be assumed nonexistent in the country as evidenced by the deplorable conditions of most existing road networks. Responsible government officials use these deteriorating roads without raising qualms and where the public raises alarm, nothing much is done. A typical example is the deplorable condition of the Enugu-Onitsha Expressway as shown in figs. 1, 2 & 3.



Fig.1 Source: Author's field work (2012)



Fig.2 Source: Author's field work (2012)



Fig. 3 Source: Author's field work (2012)

Figs 1, 2 & 3: Segments of Onitsha-Enugu Expressway at 9th Mile Corner, Ngwo Enugu.

Most 'Trunk A' roads like the Oba-Nnewi-Okigwe Road, Benin-Ore Road, Enugu- Port-Harcourt Road, etc and a host of others across the country are virtually impassable. Where small pot-holes are not immediately filled-up, they enlarge and within a short time become impassable, causing road accidents and possible loss of

lives and properties with the attendant implications on the socio-economic development. Traffic movements become chaotic on such roads as evidenced in fig.1. A journey from Enugu to Onitsha, a distance of about 104 kilometers, takes about three hours due to the deplorable condition of the Road.



Fig. 4: *Source: Author's field work (2012)*

The road in fig.4 is a federal government trunk 'A' road linking Nnewi, a commercial town in Anambra State, to Okigwe an urban area in Imo State, yet no maintenance was carried out on this road until it got to its present deplorable condition. Some government officials responsible for road maintenance prefer total reconstruction to preventive or curative maintenance for their personal selfish interests; see fig. 5 which is part of Enugu-Onitsha Federal dual-carriage road now under total reconstruction.



Fig.5 *Source: Author's field work (2012)*

Unless there is a change of attitude as regards our road infrastructure maintenance, realizing that we need

not only build but also maintain, Nigerians will be making history and destroying it immediately. A country that goes on building infrastructure but fails to effectively manage them burns its wealth and resources (Udo-Akagha, 1983). Proper maintenance of the nation's road infrastructure is as important as the actual construction.

This paper, therefore, examines the road infrastructure maintenance system in Nigeria with a view to proffering a sustainable road maintenance strategy for socio-economic development of the nation.

1.1 Road Maintenance

Sustainable maintenance of roads is essential to protect road investment, to allow efficient use of roads, to ensure that road-users have a safe and comfortable journey, and to minimize intrusion, through diversion of roads, for those who live and work in the proximity of roads. Road maintenance ensures longevity and long-term sustainability of road infrastructure.

According to the Federal Ministry of Works, road maintenance means the preserving and keeping of road structures as near as possible in their original state. It consists of correcting deficiencies that developed as a result of poor design, age, use and the effects of the elements, and taking steps to prevent or delay the development of other deficiencies (CBN, 2003).

The goal of maintenance is to preserve the assets, not to upgrade it. It includes minor repairs and improvements to eliminate the cause of defects and to avoid excessive repetition of maintenance efforts. For management and operational convenience, road maintenance is categorized as routine, periodic and urgent.

Routine Maintenance comprises small-scale works conducted regularly and aims at ensuring the safety of existing roads in the short-run, and to prevent premature deterioration of the roads (PIARC, 1994). Frequency of activities varies but is generally once or more a week or month. Typical activities include roadside verge clearing and grass cutting, clearing of silted ditches and culverts, patching, and pothole repair, crack sealing, seal coats etc.

Periodic maintenance covers activities on a section of road at regular and relatively long intervals in order to preserve the structural integrity of the road.

Urgent maintenance is undertaken for repair that cannot be foreseen but requires immediate attention, such as collapsed culverts that block a road, removal of fallen trees, broken down vehicles, erection of warning signs and construction of diversions.

Nigerians in principle prefer urgent maintenance to other categories. There is, however, no urgency attached to their action as a collapsed bridge may stay for months unattended to by relevant authorities even where the road users waste long critical man hours on alternative routes. This situation is avoidable with routine and periodic maintenance.

1.1.1 Importance of Road Maintenance

Good roads are veritable tools for socio-economic development of any nation. A safe and serviceable road network, achieved through sustainable road maintenance, brings immediate and sometimes dramatic benefits to road users in particular and the nation in general through improved access to hospitals, schools, and markets; improved comfort, speed, and safety; and lower vehicle operating costs. The roads not only carry people, vehicles and goods, but also other service apparatuses, such as water, sewerage, electricity, and telephones that are essential for maintaining acceptable standard of living. In addition, the road network is the first thing most tourists or other visitors to any city see, and consequently creates the first impression of an area.

For road users' benefits derived from using roads to be sustained, road construction must be followed by a well programmed maintenance activities. Without regular maintenance, roads could rapidly fall into disrepair, preventing realization of the long-term impacts of road improvements on development, such as increased agricultural production.

Postponing road maintenance results in high direct and indirect costs. If road defects are repaired promptly, the cost is usually minimal; if defects are neglected, an entire road section may fail completely, requiring full reconstruction at three times or more the cost, on average, of maintenance.

Delayed maintenance has indirect costs as well. Neglected roads steadily become more difficult to use, resulting in increased vehicle operating costs (more frequent vehicle repairs, more fuel use) and may also result in reluctance by commercial transport operators to use the roads. The commercial transport operators in Cross River and Akwa Ibom States of Nigeria in the second quarter of 2012 decried the poor state of inter-states and intra state roads in the area and threatened to withdraw their services of transporting goods and passengers along the roads if immediate maintenance was not executed on the roads. This threat, if implemented, would impose a heavy burden on the economy as passengers and freight services would be curtailed, with serious implications on the economic and social development opportunities.

1.1.2 Economic Benefits of Road Maintenance:

Road maintenance reduces vehicle operating costs. Other economic benefits include:

- **Employment Creation:** Road maintenance agencies create employment for various categories of citizens and help in poverty alleviation. Road maintenance agencies like DFRRI, FERMA etc provide employments to thousands of Nigerians.
- **Agricultural Production:** Good road maintenance provides links between rural and urban areas for free flow of agricultural products.
- **Industrial Development:** The level of industrialization of any economy depends largely on the condition of its road network. Good road network is a catalyst for industrial growth.

A well functioning and integrated road system also:

- Stimulates national development and enhances the quality of life for all.
- Allows markets to operate by enabling the seamless movement of goods and people.
- Provides vital links between spatially separated facilities and enables social contact and interaction.
- Promotes economic development by increasing access to labour and physical resources thus facilitating the realization of a country's comparative advantages.

In spite of the above benefits, the road infrastructure in Nigeria has suffered from lack of maintenance by the federal, state and local governments.

1.1.3 Road Maintenance Funding

All roads, to a large extent, need certain levels of maintenance to be able to withstand the daily demands of modern traffic, and to extend their life span. Timely and appropriate maintenance is much more important today that construction costs are soaring at an alarming rate and government agencies fiercely compete for available funds.

In order to put the roads in good state of repair, adequate funding is imperative. Without funding, the best thought-out maintenance ideas would never materialize.

As at 2003, the total road network in Nigeria was estimated at 194,000 kilometers (CBN Position Paper No. 27, 2003). The Nigerian road system is classified into four broad categories:

The Federal Trunk 'A' Roads: These are under Federal Government ownership and they are developed and maintained by the Federal Government.

The Federal Trunk 'F' Roads: These were formerly under state ownership, but were taken over by the Federal Government, with a view to upgrading them to Federal highway standards.

The State Trunk 'B' Roads. These are under the ownership and management of the component States.

The Local Government Trunk 'C' Roads: These are under Local Government ownership and management.

Each tier of government has the responsibility for planning, construction and maintenance of the network of roads under its jurisdiction. Of this road network, federal government is responsible for 17 percent, while the state and local governments are responsible for 16 percent and 67 percent respectively (see table 1). With the highest percentage of roads in Nigeria being under the local government and without direct subvention from the federal government or sufficient internally generated revenue, the conditions of many Nigerian roads are compromised. Most of the federal, state, and local governments' roads in Nigeria are impassable and virtually abandoned.

Ismail (1987) reports a time in the past when the Public Works Department (P.W.D.) showed leadership in the maintenance of roads. Those were the time of Road Overseers when surveillance on our roads was sustained. Such outfits are no longer in existence although they are still very relevant and even capable of offering employments to the teeming unemployed youths in the country.

The question is how much should be allocated to road maintenance? Maintenance costs vary with road conditions, traffic volume, geographic location, climatic conditions, work methods, technical equipment, and other factors (Burningham, 2005).

According to Burningham (2005) the rule of thumb given at the international level is that 80 percent of the road budget should be spent on the 20 percent of the network that carries 80 percent of the national traffic, and this should include urban, rural, and inter urban roads in the network. In Nigeria, very heavy traffic carrying roads such as Benin-Ore Road, Port-Harcourt- Enugu Road and Enugu- Onitsha Road are in a very poor state of repair.

Table 2 shows the maintenance costs of two-lane roads in all regions calculated in \$ per kilometer. In Nigeria, one dollar currently exchanges for approximately N162 in the open market.

From table 2, it is evident that routine maintenance is cost saving and should be adopted.

Table 3 shows the appropriation for road maintenance in Nigeria. Columns 4 and 5 give a clear picture of the paucity of road maintenance funding in Nigeria. In none of the years as shown, except year 2001, was appropriation up to 10 percent of proposed fund and even at that, the amount finally released for each year was grossly inadequate, thus the abysmal conditions of the roads.

1.1.4 Sources of Road Maintenance Fund: Fund for road maintenance may be sourced from the following:

- i. Property Rating:** This is a veritable source of underwriting the cost of road infrastructure maintenance. Income from rating will greatly complement the resource of governments in paying back the heavy cost of road maintenance.
- ii.** Annual vehicle license obtained from every category of vehicle
- iii.** Parking fees and fines from illegal parking, road worthiness testing fee, licenses of public service vehicles and services.
- iv.** Road user charges which include fuel tax, vehicle registration tax, vehicle import taxes, drivers' licenses and road tolls.

These funds can be used to augment government meager allocations for road maintenance. The high level of corruption in Nigeria is, however, a clog in achieving good road maintenance as money realized from these sources are most often misappropriated. Also contributing to the problem is the high evasion of tax payments by average Nigerians.

1.1.5 Road Maintenance Contract

There are many types of road maintenance contract among which are:

- Normal Measurement Contract/Admeasure Contract
- Performance Based Contract
- Length Worker Contract

Normal Measurement Contract: This is a short term contract suitable for periodic maintenance and rehabilitation. Under this contract, required quantities of each activity are listed on a bill of quantity (BoQ). The price is submitted and used by the road agency to assess bids and award contracts.

The quantity of completed work that meets the technical specification is measured monthly and the contractor is paid for that quantity multiplied by the contract unit rate.

Performance Based Contract: This is a long term contract for routine maintenance or both rehabilitation and routine maintenance but not for rehabilitation alone. It is suitable for a mature road agency that can establish and follow transparent checking and auditing procedures, and a mature contractor that can innovate to meet performance standards and reduce its own costs. It is unsuitable if funding cannot be ensured for the entire contract period.

Here a contractor is paid monthly based on performance outputs measured against standards stated in the contract rather than inputs. Penalties are imposed if the outcomes for a specific activity fail to comply with the contract standard, and payment may be reduced or suspended until the necessary repairs are done. Corruption tends to decline in this contract method.

Length Worker Contract: It is a long term contract for routine maintenance if contractors are adequately trained and supplied with needed equipment and materials.

It is a type of contract for one outfit to implement routine maintenance work on an allocated length of road (normally 1-2km). The contractor is paid monthly based on a specified work time. Performance standards should be specified and contractors should be paid for performance rather than attendance (Heggie and Vickers, 1998).

The type of contract to adopt in any country will depend on the country's socio-economic and political situation. For countries like Nigeria where most contracts are politicized and tainted with corruption, "the performance based contract" is suitable because of safety valve against corruption and other advantages such as penalty imposed for faulty or poor execution of work. If this method is adopted in the country, the incidence of substandard and abandoned road maintenance project would be grossly minimized.

Another method that may be considered in the country is the "length worker contract" method. This would provide employment opportunities to the teeming unemployed youths.

This method is similar to the road overseers of the pre-independence period and, barring corruption on the part of the sub-contractor, would be suitable to put our roads in a sustainable condition (Heggie and Vickers 1998).

One would rather proffer a new type of contract termed 'Government/Contractor based Contract'. In this type, the government as the owner of all materials needed for road maintenance viz: asphalt, sand, etc, will supply the materials for the work while a percentage of the contract sum would be negotiated and paid to the contractor for his expertise and other labour costs. Where this method is adopted, use of substandard materials would be eliminated, economizing of materials would be eliminated, and demand for variation of contract sum which results in abandonment of contract would equally be eliminated thereby leading to a sustainable and well maintained road network in the country.

1.1.6 Recommendations

For road infrastructure to support the desired socio-economic development in Nigeria, the following recommendations are proffered:

- Government should pay adequate attention to road maintenance especially routine maintenance, as it saves costs.
- Government/Contractor joint contract should be adopted as it provides for a sustainable and well maintained road network in the country.
- There is need for a structured approach to road maintenance that ensures the safety of the network, while minimizing the need for reactive maintenance
- The private sector may be given the right to operate and maintain a road over an agreed length of time at no cost to the government as the entrepreneur will recover his maintenance cost from toll charges. Governments should, however, negotiate the toll fee with the contractor to avoid over-charging.
- Water ways and railways should be revitalized to complement road service.
- As a result of the increasing cost of road maintenance, some funds realized from road-related activities should be channeled to road maintenance.
- Road overseers of the pre-independence period should be re-introduced to carry out routine maintenance of the road network.
- Adequate road drainage system should be incorporated in any road construction design to safeguard the road fabrics.
- Since there is paucity of funds allocation to road maintenance, it is necessary to:
 - i. Maintain existing roads before funding new ones.
 - ii. Make sure maintenance is done today, and even every day because by tomorrow it will be much more expensive (PIARC 1999).

1.1.7 Conclusion

This paper shows that one of the important assets of any nation is its road infrastructure network and this can only be preserved through adequate maintenance, preferably preventive maintenance.

Since good roads play a vital role in the development of any nations, to effectively maintain them requires adequate funding, transparency, and good governance. These conditions are however virtually absent in Nigeria due mainly to government functionaries' attitude to road infrastructure maintenance as they prefer complete rehabilitation of roads to maintenance exercises.

Unless these attitudes change as regards road infrastructure maintenance, realizing that we need not only build but also maintain; the country will be making history and at the same time immediately destroying it.

Proactive road maintenance, therefore, is the only way out of the deplorable conditions of the nation's road infrastructure system.

References

- Burningham, S. and Stankevich, N. (2005) *Why Road Maintenance is Important and How to get it done*, World Bank Transport Note No. TRN -4
- CBN Occasional Paper Series No 27, 2003. *Highway Maintenance in Nigeria: Lessons from other Countries*.
- GIZ (2004) *Road Maintenance, the Foundation of Development* down-loaded from www.giz.de on 21-7-2012
- Heggie I.G. and Vickers P. (1998) Commercial Management and Financing of Road, Technical Paper No. 409, World Bank Washington, D.C.
- Ismail, T.O. (1987) *The Nature of Property Maintenance in Modern Nigeria*, Paper Presented of the 17th Annual Conference of the Nigeria Institution of Estate Surveyor and Valuers held at Enugu, March 1987.
- Nwachukwu, I. (2011) Nigeria's Infrastructure yet to meet Requirements for Economic Development, *Business Day*, 9/3/11 Down Loaded on 4/11/11.
- PIARC (World Road Association), (1994) *International Road Maintenance Handbook: Practical Guidelines for Rural Road Maintenance* Vol. 1 of IV. Roadside Areas and Drainage, Financed and Coordinated by ODA and TRL.
- PIARC (World Road Association), 1999 *Save your Country's Roads* also available at the PIARC website. Downloaded on 9/12/12.
- Sutherland, N. (2012) Poor Infrastructure and maintenance of Roads *Jamaican Observer* Friday June 08
- Udo-Akagha, S. (1983) *Our Landed Property, We need not only to build, but also to Manage* Paper Presented at the 13th Annual Conference of the NESV at Ibadan, 27-30th January.
- World Bank, (2002) *An Assessment of the Private Sector in Nigeria*, The Bank Group, Washington D.C., Retrieved from: www.journals.cambridge.org/production/action/cjoGetfulltext?fulltextid.
- World Bank Rural Thematic Group (2003), *Rural Transport in Multi Sectoral and Community Driven Projects*, World Bank, Washington, D.C.

Table 1
Structure of Road Ownership

	Federal Roads (km)	State Roads (km)	LG Roads (km)	Total(km)	Percentage
Paved main Roads	26500	10400		36900	19%
Unpaved main Roads	5600	20100		25700	13%
Urban Roads			21900	21900	11%
Main Access Roads			72800	72800	38%
Village Access Roads			35900	35900	19%
Total	32100	30500	130600	193,200	100%
Percentage	17%	16%	67%	100%	

Source: Central Bank of Nigeria Occasional Paper Series No 27, 2003

Table 2
Maintenance Costs of Two-Lane Roads, All Regions, 2000 US Dollars per/km

Work Class	Work Type	Predominant Work Activity	Min	Max	Mean
Routine	Routine Maintenance	Unsealed 2b highway	277	1,740	989
		Bituminous 2L Highway	656	5,580	2,199
Periodic	Grading	Light Grading	51	205	110
		Heavy Grading	323	876	522
	Gravel Resurfacing	Regravelling	1,997	65,038	15,326
	Bituminous Pavement	Fog Seal	2,805	15,783	8,946
	Unsealed	Unsealed Preventive Treatment	2,009	6,965	4,266
	Surface Treatment Resurfacing	Slurry Seal of Cape Seal	4,452	27,520	9,780
		Single Surface Treatment	5,295	38,607	18,937
		Double Surface Treatment	10,684	45,277	27,039
	Asphalt Mix Resurfacing	Asphalt Overlay < 40mm	12,878	82,320	38,095
		Asphalt Overlay 40 to 59 mm	21,021	126,131	68,713

Source: Burningham and Stankevich (2005)

Table 3
Appropriation for Road Maintenance

Yr	Amount proposed (N)	Amount Appropriated (N)	Amount Released (N)	Appropriation as a % of Proposal	Release as a % of Appropriation N
1999	5,000,000,000.00	470,895,625.00	470,895,625.00	9.0	100
2000	10,000,000,000.00	450,000,000.00	401,171,769.00	4.5	89.2
2001	5,600,000,000.00	1,656,000,000.00	474,493,008.00	29.6	28.7
2002	10,307,931,221.14	274,000,000.00	178,688,448.70	2.7	65.2
Total	30,907,931,221.14	2,850,895,625.00	1,525,248,850.00	9.2	53.5

Source: CBN Occasional Paper Series No 27, 2003