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Sustainable Development - Rural Road Maintenance, a vital component
(Abstract)

With over 90% of the world ultra poor living in rural areas, access is essential for sustainable development & poverty eradication through improved livelihoods. However, resource allocations to rural roads are usually inadequate leading to network deterioration.. The selected maintenance system must be efficient, manageable and cost effective. Through the years, different types of maintenance systems have been applied, including group maintenance, length-person executed directly by the executing agency or through the private sector.

The widely applied length-person system has shown limitations in managing and keeping the network in acceptable condition. As the network increases it becomes more management intensive and difficult to monitor individual workers performance, at times leading to network deterioration. This is more visible when work is carried out using internal departmental staff.

Public private partnership in rural roads maintenance has started showing positive benefit to both the road users and beneficiary communities. The maintenance system developed by the Lesotho Department of Rural Roads is one such example of public private partnership that saw the development and application of an effective maintenance system. Under this maintenance system, private contractors are contracted to keep the road in serviceable condition throughout the contract period. This approach has significantly improved the condition of the rural road network at reduced annual maintenance cost.

This paper examines the various rural roads maintenance systems currently applied and analyses effectiveness, efficiency and simplicity in the delivery process. The paper also looks into the sustainability of the maintenance system and its reliance on local resources.

Sustainable Development – Rural Roads Maintenance, a Vital Component

Over 90% of the world ultra poor live in rural areas. Due to lack of acceptable transport access, rural areas are usually far from any form of development activities and remain isolated until the issue of access is addressed from both social and development angles. In most developing countries, there are in adequate rural road network and conditions of the existing rural road network are far from acceptable. Service provisions usually follow road transport and lack of it deprives communities, particularly those in rural areas, from receiving essential and basic services. A reliable transport access is one of the essential ingredients that lead to the improvement of the livelihood of the poor through the provision of services.

The need for an affordable and sustainable road maintenance system, especially on the unpaved and rural roads, has become increasingly evident. *A third of the \$150 billion invested in roads has been eroded through lack of maintenance*¹. Funding allocation to rural roads maintenance is usually very low and inadequate resulting in maintenance works being neglected to the extent the roads becomes non-existence. To overcome this critical and complex problem, governments have developed different strategies and approaches that will lay a foundation to sustainable maintenance system based on self-reliance and optimising the use of local resources.

Past Experience

Prioritisation of road works is generally based using only one conventional method of measure. Irrespective of the class and type of road, Vehicle Operating Cost (VOC) is widely used as a tool to prioritise roads that receive rehabilitation, periodic maintenance and improvement works. This prioritisation tool largely ignores social issues and was found to be inappropriate in the identification of priority rural and low volume roads. In fact, some countries have already started introducing factors that reflect and contributes to social cohesion in prioritising priority rural roads. The Lesotho rural roads prioritisation tool among others takes into considerations population served by the road, existence of social facilities such as schools and clinics and beneficiaries ranking. One of the programmes in Kenya also includes size of arable land as one of the factors in the prioritisation tool.

Financing of Roads

Until very recently, central government was the main source of funding for the maintenance of rural roads. Roads have to compete together with other government priorities such as health, education and defence. To make matters worse, at times wrong prioritisation of works are made in the distribution of the limited resources received from the government. Upgrading/construction works receive priority than periodic or routine maintenance interventions and main roads receive the highest allocation of resources. Rural roads receive the least allocation, thus limiting the movement of the community resulting in negatively contributing towards the livelihoods of communities living in the area.

¹ Ian G. Heggie: Management and Financing of Roads – An Agenda for Reform; 1995 The World Bank

In recent years, dedicated road maintenance funds are increasingly being established mainly using funds collected from vehicle operations. Distribution of these funds give low priority to rural roads that benefits the majority of the population, i.e. lower class of rural roads and the unclassified road network. Although the practical utilization of the funds are not yet clear, the Kenyan Road Fund makes an allocation to these low class of roads by *allocating 24% equally to all districts (to cover the maintenance of lower end of classified roads) and 16% equally to all constituencies in the country² (for the maintenance and improvement of unclassified roads)*. It is important that a transparent, all-inclusive and development-focussed funds distribution mechanism of maintenance funds be developed and made operational. It is only then the poor will be in a better position to receiving regular funding for the maintenance of roads.

Impact of poor rural roads on livelihood of the poor

Poor rural roads have a negative effect on the livelihood of the poor living in the area. Reduction in or lack of services of regular transport reduces the movement of people and farm products to and from the area. *Roads serve not only as physical connectors but also as communication connectors that expand poor people's options and their power to negotiate³*. The absence of reliable transport leads to isolation of communities and reduces the potential and growth of local economic development resulting from other knock-on interventions.

Implementing agents

In countries with limited resources, only internal departmental teams were largely acting as the main government arm of service delivery. With the increase in the road network, this approach has become difficult to manage. It demanded increased resource allocation, i.e. human, equipment and financial, and become management intensive. The approach created a huge strain on the implementing agency to the extent affecting the delivery of services. Due to lack of sufficient resources and cumbersome procurement system, equipment-running time was significantly low. In turn, this has contributed to the deterioration of the rural road network.

Late eighties have seen the start of a public-private partnership in the improvement and maintenance of rural roads. Through this partnership governments aimed to realizing at least two of their development objectives, i.e. reliable rural transport and employment creation, that will lead to achieving their ultimate goal, poverty reduction. Depending on the methods of delivery selected it may be necessary for the implementing agent, i.e. private sector, to be equipped with the necessary special skill required for the work.

In the case of private sector, interested contractors have been trained on the necessary skill required to improve and maintain unpaved roads using local resource-based methods of work prior to the award of contract. Following this training emerging local contractors were engaged in the delivery process of both unpaved main and rural roads. This has increased government's delivery capacity, i.e. reliable transport service and employment. As a result of this partnership with the local emerging contractors, the Department of Rural Roads (DRR) Lesotho has managed to carry out additional interventions, i.e. rehabilitation works, that were neglected through the

² The Kenya Roads Board Act, 1999; 6 January 2000; Section 6.2(d)

³ Deepa Narayan, et al: Voices of the Poor – Can Anyone Hear Us?; 2000

years. DRR then concentrated all its released human and equipment resources mainly to improvement/upgrading works. The table below shows the increased implementation capacity as a result of released resources.

Box 1 Increased capacity as result of private-public partnership – The Lesotho Experience						
Fiscal year	Expenditure, M'000				% Work by	
	Upgrading	Rehabilitation	Routine Maintenance	Total Annual	Direct team	Private sector
1991/2	3,560	0	4,251	7,811	100	0
1992/3	5,190	0	6,160	11,350	100	0
1993/4	6,188	0	4,843	11,031	56	44
1994/5	10,435	1,920	4,642	16,997	61	39
1995/6	10,182	4,008	5,616	19,806	51	49
1996/7	13,824	11,136	7,690	32,650	42	58
1997/8	11,054	6,842				

M - Maloti

NB: Red shaded part shows work carried out by emerging local contractors.

The participation of the private sector in the delivery process has resulted in increasing the capacity of the public sector to competently play its new role, i.e. contract management. At the same time, it has created the need to having an appropriate and pro development procurement tool with the relevant social clauses. In Lesotho and South Africa, the government has indicated its preferred work methods in the procurement document ensuring investments made in the sector contribute towards its development objective, i.e. employment creation and quality asset delivery, by making an appropriate technology choice.

Methods of operations

At times implementing agencies have not considered alternative approaches to the conventional methods of delivery including the use of labour-based methods of work for the improvement and maintenance of rural roads. Since the early seventies, an affordable means of road improvement and maintenance system that is based on widely available local resources was promoted in Kenya, Lesotho and Malawi. This approach has helped governments to improve and maintain mainly rural and unpaved roads to an acceptable standard and in the process create the much-needed employment to communities. The system had a significant benefit when it comes to routine maintenance and spot improvement of rural roads. It has created sustainability and self-reliance to improving and maintaining infrastructure. Currently labour-based methods of work are widely used in rehabilitation and maintenance of rural roads and off carriage maintenance on heavy trafficked and main roads.

Studies carried out in Africa and Asia have shown that the labour-based methods of work are not only deliver technically acceptable assets, but are also financially and economically more affordable than that of equipment-based improvement. A study carried out on Lesotho and Zimbabwe in 1995 on improvement and rehabilitation of rural roads has shown that the *labour-based approach is 49% cheaper in Lesotho and 23% in Zimbabwe in terms of economic costs. In addition about 43% of the costs are spent in the creation of employment whereas the conventional methods was able to*

spend to wages only 6% in case of Lesotho and 13% in Zimbabwe⁴. This reality will increasingly convince governments and practicing professionals to consider alternative approaches in providing an affordable and reliable road transport to the poor.

Appropriate prioritisation of roads supported by the right interventions using locally available resources to the extent possible will keep the infrastructure in an acceptable condition. The implementing agent has carefully to consider the type of intervention and the method of operation that will give maximum benefit and positively contribute in improving the livelihood of the poor. The table below shows the matrix that could be considered by the implementing agent during the planning period.

Box 2 Unpaved roads maintenance matrix: Level of priority/suitability of operation		
Type of intervention	Methods of Operation	
	Local resource-based	Equipment-based
Routine maintenance	High/Most suitable	High/Low
Spot improvement	High/Most suitable	High/Low
Periodic maintenance	Medium/Suitable	Medium/Suitable
Rehabilitation	Low/Suitable	Medium/Suitable

Sustainable rural roads maintenance

Sustainability of a rural road maintenance system could be measured by the level of reliable and uninterrupted service provided. With limited resources allocated to low-level rural roads, it has become increasingly important for implementing agents to carefully consider their interventions. Decisions on type of maintenance interventions have to carefully consider balancing primarily between an appropriate technology choice for the delivery of the services and identification of the most suitable interventions that provide maximum benefit with a minimum resources requirement.

Routine maintenance and spot improvement provide maximum benefit on the level of services to be provided. These two interventions could easily be implemented using widely available local resources optimising the benefit gained from the limited resources allocated to rural roads. *To maximize the beneficial effects of investments on socio-economic development greater attention needs to be given to low cost spot improvements⁵.*

Routine maintenance

Experience has shown that lack of routine and essential maintenance has resulted in the deterioration of the rural road network and in some instances to the loss of assets and/or increased resources requirement to bring the assets to an acceptable and usable standard. Routine maintenance on unpaved roads and off carriageway on high trafficked roads could easily be used using local resource-based methods of work. The work could be carried out by direct department staff, private contractors or by communities living in the area.

The length-person approach, assigning a section of a road to each worker, which was started in the eighties, is widely used. Road Agencies in Kenya and Lesotho are

⁴ Maria Lennartsson and David Stiedl: Technology Choice – Man or Machines; 1995

⁵ John Howe: Aspects of Rural Transport Infrastructure in Ethiopia; May 1992

widely using this approach to carry out routine maintenance on the unpaved road network. Depending on the terrain and volume of maintenance work, a maintenance responsibility of 1-1.5 km of road length will be assigned to each worker. The quality control and supervision of this work will be complicated and cumbersome as the network of the maintainable rural road net work increases. The supervisor spends most of his time travelling to and from the site. In the absence of a reliable means of transport, supervision of works will not be guaranteed and may result in neglecting the asset. This will be critical as the network increase.

Using the same length man approach, the work could easily be contracted out to private contractors. This will significantly reduce the management burden from the implementing department. At the same time it will increase the department's capacity to carry put other essential interventions.

Box 3 The Lesotho Experience

The Department of Rural Roads Lesotho, issues annual routine maintenance contracts to emerging local contractors. Depending on the area and density of the road in that area, each contractor will be awarded about 35- 50 km of road length to keep the road in good condition in accordance with the set standards. The base contract price is based on the engineers estimate and will be negotiated between the two parties before the signing of the contract. During initial years (1994 – 1999), attempts were made to all qualified and interested emerging local contractors.

How is the contract implemented? On monthly basis, the client together with the contractor carry out roads inventory and agree on the type of work required for that period that is in line with the expected input as detailed in the agreement. During the same period, both parties will assess the conditions of the road and achievements made against the instruction given by the client. The contractor will be paid for completing the maintenance work as agreed and to keeping the road in acceptable and passable conditions.

Conclusions

Road transport increases the development potential of an area and improves access to basic services. For rural areas, road transport is also one of the important links with outside facilities. Rural roads are not only transport access but also a sign of existence to the beneficiary communities. As such, it is essential that rural roads be given the importance they deserve during planning and execution and all factors including social benefits are carefully considered.

Only construction of rural roads cannot be a solution to the access problem faced by rural communities. It is equally a challenge to make the services reliable and less interruption. Consideration has to be given to an affordable regular maintenance based on local knowledge and resources. This approach will increase sustainability of the assets created and will improve long-term development planning of the area. Reliable road transport opens the door for sustainable development.