

# Strategy for Improved Road Asset Management in Southern Africa

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M.I. Pinard and W.D. Mbvundula, *Roads Department, Botswana*

Despite the dominant role played by road transport in the economies of the 10-country Southern Africa Development Community (SADC) grouping in (Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, Swaziland, Tanzania, Zambia, and Zimbabwe), this subsector faces a crisis from inadequate maintenance funding. More than half of the paved roads and just over 60 percent of the unpaved roads are now in fair to poor condition and require substantial repair. However, there is serious concern that the institutional, managerial, technical, and financial capacities of many of the road agencies are simply not adequate to cope with the increasing complexities of managing the maintenance and preservation of national road networks in a satisfactory manner. Radically new approaches are now required to return and maintain national roads in good condition. This paper identifies a range of policy options open to road agencies in the SADC region of Southern Africa as a basis for selecting appropriate courses of action aimed at improving approaches to road asset management.

**R**ising costs, reduced resources, increased use of the road network, and budget constraints have all combined to exacerbate the difficulties being faced by the 10 countries of the Southern Africa Development Community (SADC) region in Southern Africa (see Figure 1) in preserving the initial investments that have been made in their countries' road networks.

Over the past 20 years, lack of adequate maintenance has led to extensive deterioration of large sections of the SADC regional trunk road network. As a result, a significant proportion of the substantial investments made in roads has been lost and, worst, the economies of the region have been adversely affected by high transport costs.

The gravity of the road deterioration problem in Africa, including the SADC countries, has been quantified by the World Bank, which estimates that, because of inadequate maintenance over the past 20 years, \$45 billion (U.S.) worth of road infrastructure has been lost in the 85 developing countries studied (1). Ironically, timely preventive maintenance costing less than \$12 billion could have averted this unnecessary loss of infrastructure and, at the same time, facilitated the economic development of the SADC region.

The road maintenance crisis has now reached a stage where donors who have provided a substantial amount of money to finance the construction and rehabilitation of roads in Africa (estimated at \$600 million between 1981 and 1993 with a further commitment of \$200 million to the SADC region) are now expressing concerns and threatening to withhold further support if no concrete measures are taken to address the road maintenance problem so that future investments can be safeguarded.

It is patently clear that a priority effort is required in the SADC region to repair and maintain national roads

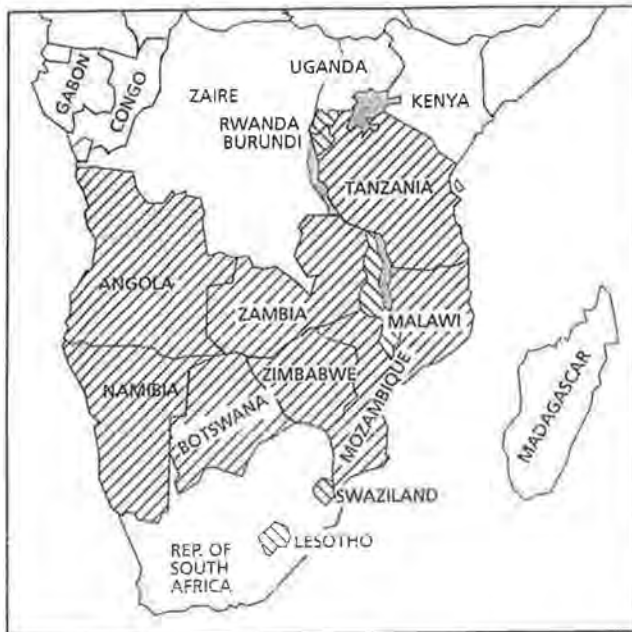


FIGURE 1 Southern African Development Community (SADC): Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, Swaziland, Tanzania, Zambia, Zimbabwe.

in good condition. However, there is serious concern that despite the financing provided by both donors and national governments, the institutional, managerial, technical, and financial capacities of many of the road agencies are simply not adequate to cope with the increasing complexities of managing the maintenance and preservation of national road networks in a satisfactory manner (2).

This paper identifies a range of policy options open to road agencies in the SADC region of Southern Africa as a basis for selecting appropriate courses of action aimed at improving road asset management. The paper is based on the experiences of a number of SADC countries that now recognize that past approaches have been unsuccessful and that radical new approaches are required to manage road networks in a cost-effective manner. To this end, various concerns related to the efficacy of current approaches to road maintenance in the SADC region are highlighted. A number of policy recommendations are then made with the overall objective of improving strategies for road asset management in the SADC region.

## OVERVIEW OF ROADS SECTOR

### Importance of Roads and Road Transport

There are just over 375 000 km of roads in the SADC region, including 170 000 km of main roads, 175 000

km of rural roads, and 24 000 km of urban roads. These roads are some of the regions biggest assets with current replacement costs estimated at \$30 billion. (Replacement costs are the costs of replacing all existing roads at current prices.) In terms of the magnitude of such assets, roads are far more important than either railways or airlines. Indeed, they provide the dominant mode of the region's passenger and freight transport, probably in excess of 80 percent and 90 percent, respectively, as well as the only form of access to most rural communities.

Typically, road spending absorbs 5 to 10 percent of SADC governments' recurrent budgets and 10 to 20 percent of the development budgets. In addition, road expenditures currently account for over 1 percent of regional gross national product. Thus, the roads sector plays a vital role in the economies of all SADC countries. They are an engine of growth and the key to unleashing the potential for increased production and incomes in the SADC region. There are telling examples where transport bottlenecks have put the brakes on growth, especially in agricultural production, and continue to constitute major constraints on the overall economic integration and development in the SADC region (3).

### Historical Development of Road Networks

Historically, road building in the postcolonial era of most of the SADC countries has rightly been given high priority as it has been viewed as an essential component of a comprehensive development program. As a result, significant achievements have been made in expanding the road networks across the region. However, building the infrastructure of institutions and trained personnel to maintain them has proven difficult. Ineffective maintenance has led to widespread and accelerating road deterioration—amplified in recent years because a large number of the roads built in the immediate postcolonial era of the 1960s and 1970s have reached the end of their useful lives and need rehabilitation or reconstruction.

### Impact of Poor Maintenance on Road Users

The economic costs of poor road maintenance are borne primarily by road users; in rural areas where roads often become impassable during the rainy season, it has a profound effect on agricultural output. On average, a dollar reduction in road maintenance expenditures results in an increase of \$2 to \$3 in vehicle operating costs (VOCs) (4). Far from saving money, cutting back on road maintenance is self-defeating as it

significantly increases the costs of road transport and raises the net cost to the economy as a whole.

Poor road maintenance also raises the long-term costs of maintaining the road network. Typically in the SADC region, maintaining a paved road over 15 years costs about \$60,000 per kilometer. If the road is not maintained and allowed to deteriorate over the 15-year period, rehabilitation will then cost about \$200,000 per kilometer. In other words, rehabilitating roads every 10 to 20 years is more than three times as expensive as maintaining them on a regular basis.

### Financial Implications of Poor Road Maintenance

As a result of the inadequate funding of road maintenance in many SADC countries, road conditions have deteriorated and road transport services have become unduly high—on average, 2.5 to 3 times higher than those of other regions of the world (5). Consequently, existing trade is performed at a very high cost, hindering much needed economic growth in the region. Such poor economic performance has meant that levels of gross investment and maintenance expenditures in many of the SADC countries have not been sufficient to maintain and preserve road infrastructure. Not surprisingly, the condition of national road networks has progressively worsened.

The foregoing facts quantify the compelling need and rationale for adequately funding road maintenance and subsequently performing it in a timely and cost-effective fashion.

### ASSESSMENT OF CURRENT ROAD MAINTENANCE PRACTICES

#### Factors Affecting Road Agency Performance

The key factors that affect the performance of a typical road agency in the SADC region may be grouped under the following headings: institutional, managerial, technical, and financial.

Despite the interdependence of those features within the organization of a road agency, their relative importance follows a hierarchical order in which the foundation is the institutional framework in which the managerial and technical expertise can operate in conjunction with adequate financial provisions. Thus, no amount of financial provision will compensate for managerial, technical, or, most importantly, institutional shortcomings of a road agency.

### Current Approaches to Road Maintenance Management

Road agencies in the SADC region have had broad responsibilities for planning, controlling, and executing construction and maintenance of road infrastructure. In practice, they have operated as both owner-operator and regulator of a transport facility that is generally regarded as a public good. In so doing, roads have tended to be managed like a social service that has not been subjected to any form of market discipline.

The institutional framework of road agencies has tended to be fragile and manpower problems have adversely affected their operations, which continue to suffer from high vacancy rates and reliance on contract personnel (6). A large amount of the maintenance work has been carried out through force account, with much reliance on plant and equipment provided from government plant pools "free of cost." Road expenditures are generally financed through budget allocations determined as part of the annual budgetary process. The lack of management systems has complicated the ability of most road agencies to allocate scarce funds to competing components of the road system and, further, to prioritize expenditures on road maintenance (7).

In terms of the regulatory aspects of road management, enforcement procedures are still very lax in most of the SADC countries. The net effect is a substantial overloading that is accelerating the deterioration of road networks (8). Grossly inadequate fines are little deterrence to this problem, which is exacerbated by bribery at weigh bridges and inadequate legislation for prosecution purposes (9).

Thus, in summary, road agencies face a far-ranging set of problems and factors that adversely affect road maintenance.

#### Current State of SADC Road Networks

In spite of their importance, and for a variety of reasons, a significant proportion of the road networks in many of the SADC countries is currently in poor condition. Based on recent surveys carried out in the 10 SADC countries, the results of which are summarized in Table 1, less than 50 percent of the paved main road network is in good condition. The situation is even more serious for unpaved main roads where less than 40 percent are in good condition.

#### Reasons for Current Maintenance Crisis

A number of factors contribute to the current crisis in road maintenance in the SADC region. These may be summarized as follows:

TABLE 1 Pavement Condition of Main Roads in the SADC Region

Main Road Type	Road Condition (Weighted Average %)		
	Good (PSI 2.5-3.0)	Fair (PSI 2.0-2.5)	Poor (PSI 1.5-2.0)
Paved	49	36	15
Unpaved	38	31	31

Good - substantially free of defects and requiring only routine maintenance. Unpaved roads need only routine grading and spot repairs.

Fair - having significant defects and requiring resurfacing or strengthening. Unpaved roads need reshaping or regravelling and spot repair of drainage.

Poor - having extensive defects and requiring immediate rehabilitation or reconstruction. Unpaved roads need reconstruction and major drainage works.

1. Traditional approaches to road management have focused mainly on new construction projects, relegating maintenance to a residual activity with little glamour. This bias is still evident in the road expenditures of some countries although, for the majority, capital expenditure has now been surpassed by recurrent expenditure.

2. There has been a tendency to design and construct roads on the basis of a "stage construction" strategy. Unfortunately, the assumption of timely maintenance and strengthening of these light pavements has seldom materialized, which, in combination with widespread overloading, has resulted in premature deterioration.

3. Lack of a perceived linkage between road conditions and the prices of goods and transport services has encouraged governments to minimize their own (road maintenance) expenditures with insufficient regard to the impact it has on total transport costs (road maintenance plus VOCs). As a result, road users, who are mostly in the private sector, bear the initial burden of increased transport cost and pass them onto the public in the form of higher prices.

4. Maintenance is normally financed under the recurrent budget, and recurrent revenues are nearly always in short supply. When resources are scarce, maintenance invariably suffers. Since donors are willing to finance rehabilitation under the development budget, often on a grant or soft loan basis, governments have therefore been misleadingly encouraged to capitalize road maintenance. As a consequence, rehabilitation rather than recurrent maintenance has now misguidedly become the optimal solution. Thus, some donors have become part of the problem rather than part of the solution.

5. Because of the disparity between public-sector and private-sector salaries, road agencies have generally been unable to attract or retain the necessary caliber of staff for efficiently carrying out their functions.

### Past Efforts at Road Maintenance Assistance

In the past, donor and other technical assistance efforts have concentrated largely on providing financial assistance for rehabilitation and technical manpower assistance for strengthening management operations within road agencies in Africa. As laudable as these efforts have been, they have lacked a comprehensive vision in that little attention has been paid to the adequacy of the all-important institutional framework of the road agency to support and sustain the financial or technical inputs. As a result, donor initiatives in the past have generally had little lasting impact due to shortages of qualified staff in the recipient countries.

The lessons of the initial outputs of the Road Maintenance Initiative (RMI) (10), which was launched by United Nations Economic Commission for Africa and the World Bank under the auspices of the Sub-Saharan Africa Transport Policy Program, provide important insights into the underlying causes of poor road maintenance in Sub-Saharan Africa:

1. Ministries of finance do not hold the financial key to facilitating road agencies' development of sustainable road maintenance policies. Instead, the involvement and support of the private sector, which uses the roads and pays for them, go a long way toward overcoming otherwise insurmountable bureaucratic obstacles.

2. Many of the endemic problems associated with poor road maintenance policies—weak programming and budgeting, undue emphasis on force account work, reliance on inefficient plant pools—were symptoms of a deeper problem. The real causes were weak or unsuitable institutional arrangements for managing and financing roads, together with the impact this has on staff incentives, staff motivation, and managerial accountability. Until the institutional framework is improved, it is almost impossible to overcome the numerous tech-

nical, organizational, and human resource problems that hamper road maintenance policy.

3. Attempts to improve road maintenance policies cannot focus on maintenance alone, nor can they focus only on maintenance of main roads. Poor road maintenance policies are a subset of the wider issues of managing and financing roads as a whole. If anything, the problems are most acute at the regional and district levels, where institutional weaknesses are greater and finances in shorter supply.

The lessons above provide powerful guidelines for formulating restructuring policies aimed at improving the maintenance and preservation of road infrastructure in the SADC region. The basic issues associated with these policies are discussed in the following section.

## POLICY REFORM—ISSUES AND OPTIONS

### Key Issues and Options

The lessons of the past, including those from the RMI initiative, point to a number of key issues that are critical for road agencies to focus upon to redress the deteriorating condition of the region's road networks. These may be broadly grouped as follows: awareness and understanding of the problem, institutional reform and human resources development issues, managerial and operational issues, technical issues, and financial issues.

### Preconditions to Policy Reform

#### *Key Concern*

Some policy makers within road agencies lack adequate awareness and understanding of the importance of road maintenance and the extent of the prevailing problem of road deterioration. This has often been found to be a cause for inadequate national commitment to tackle the situation.

#### *Policy Recommendation*

There is a need to mount campaigns for high government officials and other key individuals to raise the awareness and understanding of the road maintenance problem. This should involve workshops and seminars to sensitize all concerned as a basis for gaining commitments of national governments for supporting road maintenance initiatives.

## Institutional Reform and Human Resources Development Issues

### *Key Concerns*

1. Within the structure of government institutions, the road agency often lacks a clear mandate under compatible objectives, decision-making authority, and functional clarity of organizational structures to eliminate excessive bureaucracy and overcome operational inefficiencies. As a result, the organizations are cumbersome and largely ineffective as a framework for promoting a more commercial approach to management. Reporting lines are often long and tortuous; numerous support services, such as plants and equipment from government plant pools, that are shared suffer from conflicting priorities.

2. Most road agencies have an acute shortage of technically qualified staff due largely to comparatively poor terms and conditions of employment. In fact, the technical backbone of many road agencies has been either broken or severely crippled through loss of staff to the private sector or to parastatals. This has led to poor morale and motivation of local staff and has forced road agencies to rely on contract staff for their survival.

3. Roads in the SADC region are characteristically managed like a social service and not as part of the market economy, as is partly the case with other modes of transport, such as rail and air. As such, they are not subjected to any form of market discipline; managerial accountability is weak; and there is little incentive, either externally or internally driven, to ensure economic efficiency of expenditure.

### *Policy Recommendations*

Inflexible public employment policies, particularly in relation to salaries, benefits, and working conditions, make it most unlikely that road agencies will ever be able to attract, retain, and motivate technical and managerial staff in competition with the private sector. Consequently, *political decisions should be taken to commence the process of changing the regulatory framework for road agencies by transforming them into semiautonomous road authorities with the flexibility to pay staff adequately enough to retain the kind of talent needed and compete with the private sector.*

## Managerial and Operational Issues

### *Key Concerns*

1. Lack of reliable management information—including data on road conditions, traffic levels, current

costs, and work outputs—has impeded the ability of SADC road agencies to cost-effectively plan, budget, deploy, and control resources at their disposal for managing the road network. As a result, planning and management of the road network has been reduced to a certain amount of guesswork and intuition as to what is appropriate.

2. Inefficient government plant and equipment pools cater simultaneously to provision and maintenance of plant and equipment for a number of government departments. Real use rates are very low and the associated economic losses are very high compared to the private sector. The net result is very low efficiency of in-house maintenance operations.

### *Policy Recommendations*

There is now a need to establish road management systems that are appropriate and affordable for the scarce financial and human resources normally available within the administrative and institutional environment of the SADC region.

The role of the private sector should be viewed more positively, and governments in the SADC region should take measures to facilitate and sustain the greater involvement of local contractors in carrying out maintenance works.

### **Technical Issues**

#### *Key Concerns*

1. The inefficiency of road maintenance operations and poor use of personnel and equipment have prevented investments in road maintenance from being fully effective in many SADC countries.

2. There is often a lack of interest in labor-based methods, even in light of evidence that points to such work being more cost-effective in certain aspects of construction and maintenance.

3. The inadequacy of enforcement of vehicle load limits has allowed rampant vehicle overloading to accelerate the deterioration of roads and bridges.

4. Lack of uniformity of vehicle load limits in the region continues to hamper intraregional transport efficiency.

5. Inadequate fines for violating vehicle load limits provide little deterrent to suppressing the problem of overloading.

### *Policy Recommendations*

Consideration should be given to reducing force account work as well as reliance on public plant and

equipment fleets. In addition, training programs should be prepared on labor-based methods and the development of local contractor capacity, facilitated by the introduction of simplified bidding, supply, and disbursement procedures.

Measures should also be taken to expedite regional adoption of vehicle load limits and legislation to allow the introduction of these new limits as well as to increase fines in line with the economic damage caused by vehicle overloading.

### **Financial Issues**

#### *Key Concerns*

1. Road maintenance expenditures in virtually all SADC countries are well below the levels needed to keep the road network in a stable long-term condition. As a result, the overall network condition is worsening.

2. The flow of maintenance funds is erratic, and budget allocations are often cut on short notice in response to difficult fiscal conditions, resulting in unsustainable road maintenance policies.

3. Payments by road users bear little relationship to road costs, most charges being indirect and largely invisible. As a consequence, decisions on road spending are not determined by what users are willing to pay, and there is little scope for promoting economic efficiency in the use of the road network.

4. Cost accounting and financial and technical auditing procedures are weak and generally do not allow road agencies to determine either the true costs of maintenance or whether value for money is being achieved.

### *Policy Recommendations*

Adequate maintenance financing should be established by the introduction or increase of road user charges, as appropriate, to cover at least variable maintenance costs. In addition, financial cost-accounting systems should be introduced to promote greater financial accountability.

## **CONCLUSIONS AND RECOMMENDATIONS**

### **General**

During the past 20 years, a substantial proportion of the capital invested in the road networks of the SADC region has been eroded through lack of maintenance. The main problems have been institutional and financial and relate essentially to

- The inadequacy of the institutional framework within which roads are managed;
- An inadequate and erratic flow of funds;
- Poor terms and conditions of employment;
- Lack of clearly defined responsibilities;
- Weak management systems; and
- Lack of managerial accountability.

Those causes of poor road maintenance policies lead, in turn, to undue emphasis on force account work, ineffective use of plant and equipment, lack of interest in labor-based work, and lack of motivation and incentive to use resources efficiently.

### General Policy Directions

Solving the maintenance problems for the past will require fundamental reform of the way road networks are managed and financed in the SADC region. Although overall strategic decisions will continue to be influenced by political considerations, there is, nevertheless, considerable scope for improving the management and financing of roads to ensure they produce value for money. The strategy for improving them should include reform in four main elements, which may be summarized as follows.

#### *Institutional Reform and Human Resources Development*

The management of roads should be commercialized by improving terms and conditions of employment and introducing sound business practices with a view to subjecting them to some form of market discipline. This will entail setting up a semiautonomous road authority able to recruit and retain technically qualified staff with the ability to manage the road network on a commercially oriented basis.

#### *Managerial and Operational Issues*

Road management should take a "systems" approach through the introduction of a road management system and greater management involvement of road users. This is vitally necessary to allow managers access to management information, which is the basis for decision making, and to create a sense of ownership and commitment from road users that would otherwise be missing.

#### *Technical Issues*

Improvements in the efficiency of road maintenance operations will require greater use of subcontractors and

a move toward the privatization of government plant pools. Increased use of labor-based methods will also be required to use the abundant labor resources that are available in the SADC. More stringent enforcement of vehicle load limits and application of higher fines will also be required to reduce overloading and its attendant negative effects on pavements and bridges.

#### *Financial Issues*

Introduction of road user charges and a dedicated road fund will be required to place road maintenance on a sustainable basis by ensuring a stable and adequate flow of funds to road agencies. Financial cost-accounting systems will also introduce a certain amount of transparency in the road agency's operations and will give a clear picture of its overall financial health.

#### *Implementation*

Because of the varying situations among the SADC countries regarding the state of road maintenance, a full account will need to be taken of prevailing sociopolitical and institutional factors that affect implementation of any proposal. Nonetheless, implementation should be internally driven with a view toward achieving the ultimate objective of sustainable road maintenance, which must be conceded as a prerequisite for economic development. This will require strong commitments from the governments for reforming policies related to various aspects of road maintenance in the region.

Initially, a few pilot road agencies should be chosen from among the 10 countries of the SADC region for close monitoring by the SADC regional transport agency (the Southern Africa Transport and Communications Commission) to evaluate the effectiveness of their performance in carrying out road maintenance in accordance with the policy recommendations made herein. Simultaneously with this exercise, a framework of road sector performance indicators should be developed to provide measures of effectiveness and mechanisms for charting the success of the road agency in achieving predefined policy objectives. Such a framework is in keeping with the modern trend of monitoring performance and increasing accountability of those who provide services and are responsible for public expenditures (11).

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