

A LOCAL RESOURCE BASED APPROACH TO MAINTAINING AND PRESERVING RURAL LOCAL ACCESS ROADS ASSETS: SIYATENTELA INSTITUTIONAL FRAMEWORK AND GOVERNANCE CASE STUDY DISCOURSES

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Abstract

This paper focuses on a local resource based approach to maintaining and preserving rural local access roads assets using the *Siyatentela* project in Mpumalanga as a case study. The weaknesses of the existing rural local access road asset management institutions and the potential for improvements are discussed. On one hand the existing institutional structures provide a basic framework for rural asset road maintenance and preservation. However, on the other hand, the evolving structures present opportunities for both policy makers, project participants and beneficiaries in terms of strengthening the project further taking into account the life cycle requirements of people, roads and institutions interacting in this service delivery domain. A major recommendation of the study is that the *Siyatentela* institutional and governance structures require further strengthening for sustainable development to be assured.

Key Words

Rural access road, asset maintenance, preservation, institutional structure, governance, Siyatentela, South Africa

1. INTRODUCTION & BACKGROUND

Seeking to understand deeply the role and contribution of local resource based approach to rural and community access roads requires a review of the labour based initiatives in the road, transport and infrastructure sub-sector. An apt statement that captures the essence of building local community roads assets for development was provided by the late American President J F. Kennedy as “*It is not the wealth of nations that build roads but the roads that builds the wealth of a nation*” (IRF, 2009). Pushing the frontiers of rural deprivation and development back through stimulating socio-economic development in marginalised and previously disadvantaged rural communities still remains a challenge (COGTA, 2009). Local resource based strategy and basic access strategy are two key issues that underpin rural community asset development and provision (World, 2001). This provides credibility to local resource based spot improvement strategy approach. Abundant studies exist that confirm that problem sections on earth roads (e.g. weak soil/dust/hill/swamp) can be tackled using a wide range of proven low cost, local resource based spot improvement options and low cost structures (World Bank, 2006). In addition, local materials and labour can be used to construct durable, low cost structures for the road sector (Chakwizira *et al*, 2008)

The History of Local Resource Based Approach & Perspective to Rural Roads Asset Supply & Management: Three Phases of Evolution

The period spanning 1971 to date is a rich repository of the World Bank and the International Labour Organization (ILO), working in collaboration with several governments and other development agencies focusing on the use of appropriate technologies for civil construction be it in the road, transport, water, agriculture or environmental sectors (World Bank 2001; ILO, 2002; Clegg, 2003). The seminal study conducted by the World Bank in 1971 examined the technical feasibility of substituting labor for equipment in providing infrastructure requirements in low-wage countries (UNDP, 1994). Extensive and comparative studies including pilot studies confirmed that labour based substitution for equipment covering a wide range of construction activities was technically feasible and generally produced the same quality of product. In between the first and conclusive assessments, a World Bank study conducted between 1971 and 1973, examined the economic feasibility of labor-based methods by observing construction activities in India and Indonesia, where these methods had traditionally been employed. This study concluded that traditional labor-based methods of construction were not economically competitive when contrasted with modern equipment-based methods even if low wage rates are maintained (World Bank, 2001). The third phase of the World Bank study conducted over the period 1973 - 1976, refuted what the intermediate study had concluded. Instead it confirmed the observations of the first study and expanded the findings to include the fact that in low-wage countries, labor-based methods could be fully competitive with equipment-based methods, as long as workers were provided with adequate tools, good incentives, and effective management (World Bank, 2006; UCLG, 2004).

Local Resource Based Delivery Mechanism Models

There are three delivery mechanisms for expanding labor-based methods whether these are small-scale contractors; community contracting or household targeting interventions. *First*, there is the government-run model. This model places responsibility for all aspects of contractor development (including small contract administration and payment) with the government road agency. *Second*, is the delivery mechanism of the agency model, whereby the responsibility for all aspects of contractor development (including small contract administration and payment) lies with an independent nonprofit management agency or with for-profit consulting firms. *Third*, there is the development team model, whereby this responsibility is divided among the employer, a construction manager, and a materials manager (World Bank, 2006). Suffice to point out that hybrid models can exist depending on context specific resource and capacity endowments of areas where a local resource based project is being implemented.

Justification for Focusing on a Local Resource Based Community Access Development Approach

The World Bank Transport Business Strategy (2008-2012) presents instructional findings regarding rural road asset development in developing countries (World Bank, 2008). First, it is observed that approximately 1.2 billion of the world's poor still lack access to an all-weather road. In addition between 40 and 60 percent of people in developing countries live more than 8 kilometres from a healthcare facility. Few transport services exist in rural areas of developing countries especially deep and peripheral communities (IRF, 2009). In some rural regions of developing countries less than 15% of roads are paved (IRF, 2005). Without effective rural transport systems, the MDGs and the majority of rural development and poverty focused initiatives, agriculture and growth endeavours are substantially constrained (FAO, 2005). In short, if improvements are to be made towards tackling rural poverty and encouraging economic development one potential starting point is addressing the basic rural asset portfolio. A component of this is reviewed in this paper, which is the provision of local community access roads. This is analysed in the context of application of local resource based approach which is an extension (albeit inclusive) of the popular labour based technology approach.

Of the approximately 2.3 million km of classified roads in Africa approximately 21 per cent is paved (World Bank, 2006). In addition, approximately 2.0 million km of classified roads in SSA, only 14 percent are paved (IRF, 2005). Road maintenance is therefore a universal problem in Africa. It is estimated that approximately 1.7 million km of unpaved roads in SSA still need to be converted into sustainable paved routes including the unclassified routes not included in this estimate. Finding sustainable options and strategies for rural community access provision and maintenance is therefore of utmost importance. Recent studies in Sub-Saharan Africa confirm that one of the main reasons for the poor maintenance record of rural roads is the attempt to consolidate rural road rehabilitation and maintenance only at the local government level, instead of approaching the basic traditional units of the society, that is, chieftaincies, villages and extended families. These grass roots entities have vested interests in the well-being of their own roads.

Profiling Local Resource Based Approaches Benefits

Labour-based programs have many benefits. These benefits are briefly summarized hereunder. *First*, they provide a cost-effective alternative to equipment-based methods for both road rehabilitation and maintenance (World Bank, 2006). *Second*, they generate temporary employment for both men and women and at times permanent employment depending on how the program is structured (Mashiri *et al*, 2009). *Third*, labour-based methods save foreign exchange (FAO, 2005). *Fourth*, they inject cash into the local economy (Clegg, 2003). *Fifth*, labour-based construction methods facilitate the use of labour-based maintenance since, for example, it is much easier to maintain a hand-dug trapezoidal ditch by hand than to maintain a grader-dug V-ditch by hand (World Bank, 2006). *Sixth*, they transfer knowledge of labour-based road works to local communities -knowledge that will be useful for later maintenance (Deininger and Olinto, 2000). *Seventh*, they have environmental advantages - labour-based works use less fuel, emit less exhaust, raise less dust, and are less likely to seriously damage the terrain bordering a construction site. Labour-based methods require less manoeuvring space, especially when doing hill cuts and excavation work. *Finally*, they encourage the development of local industry for manufacturing hand tools and light road construction equipment.

Local Resource Based Potential Interventions Areas

Literature review spells out some of the range of activities for which labor-based methods produce better quality results than equipment-based approaches. These areas include:

- Creating embankments on very soft ground, producing drainage systems, undertaking shallow excavations with a high water table, selecting materials when excavating, exploiting small quarries, and performing routine maintenance on gravel and earth roads (ILO, 2002).
- In terms of suitability or ease of production, labor is better suited to produce the longer-lasting trapezoidal drains than is equipment, which can often produce only V-shaped drains (Mashiri *et al*, 2008).
- In addition, labor-based methods are more suitable for rehabilitating and maintaining narrow, winding roads in densely-populated urban areas, because bulldozers cannot maneuver well in such situations (FAO, 2005).

Activities for which labor-based methods cannot produce the same quality results as equipment-based include: underwater excavating, producing aggregates less than 15-20 mm in nominal size, piling, achieving certain surface tolerances, and compacting material (World Bank, 2006).

Local Resource Based Approaches & Institutional Responses

Since the mid 80s, many developing countries in Africa, Asia and Latin America have begun implementing important road and community access decentralization reforms in order to empower local authorities and strengthen cities and regions extending into rural access infrastructure provision and maintenance. The road and community access decentralization trend is also motivated by globalization, the growth of urbanization and the democratization processes that emerged post the 1970s era (World Bank, 2006). In Africa, Asia and Latin America, decentralization is considered as a key element in order

to promote democracy, socio-economic development and to reduce poverty (UNDP, 1994; COTGA, 2009). In addition, local resource based approaches are essential in developing children and the youth. Local resources if well directed can assist in providing cash and knowledge that is essential in improving home based support of educational and development needs.

2. PURPOSE OF THE PAPER

This paper seeks to make a contribution to the local resource based approach to rural community roads asset development and maintenance making use of the Siyatentela case study in South Africa. The major strengths and weaknesses of the local resource based approach are analyzed including making suggestion for institutional strengthening.

3. DISCUSSION OF STUDY FINDINGS & RESULTS

Project Overview

The Siyatentela programme, which was modelled on the relatively well-known Zibambebe program in KwaZulu-Natal targets jobless women households in rural areas to undertake routine maintenance on roads in close proximity to their homes. The programme started very modestly in the 2005/06 financial year in Ehlanzeni – one of the three regions in the Province with a budget of R300 000 and employing 10 women. The programme then expanded to all the regions with a budget of R1.5 million in 2005/06 and employing 55 women. In 2008, some 544 women are employed on a contract basis performing routine road maintenance on around 272 kilometres of rural roads in Ehlanzeni, Gert Sibande and Nkangala. The women are required to work 16 hours per week and receive a salary of R600 per month. Plans and projects to grow the programme to R10 million per year in the near future have since been approved.

It can be argued that these initiatives require a stronger legal framework such as can be found in India, where a National Rural Employment Guarantee Act (NREGA) 2005 was enacted to guarantee 90 days employment for rural people irrespective of sex, colour or creed. This is advanced on the pretext of each Province in South Africa has its own version of local rural labour based approach for addressing rural community roads maintenance requirements (e.g. Zibambebe (Kwazulu-Natal), Gundolashu (Limpopo), Sakha Sizwe (Eastern Cape), Siyatentela (Mpumalanga) *etc.* These are at best fragmented and ad hoc and institutionally there is legal scope for migrating and collapsing these into one national rural employment policy response. Such a transformation should also expand the application and scope beyond the rural roads maintenance projects, for example.

3. STUDY METHODOLOGY

Due to budget, time and other considerations, this study used a cross-sectional survey of data from forty rural households to evaluate the impacts of the Siyatentela road maintenance project. In addition to the cross-sectional household survey, we also used key informant interviews (regional managers, road superintendents/supervisors and ward councillors), focus group discussions and physical observations, project records to capture data for the evaluation of impacts. We rely on perceptions from the groups involved in the project to determine perceived impacts of the programme on socio-economic and other aspects of community wellbeing such as access to basic services. For the control, we base on perceived changes before and after the programme was implemented to help determine the impact the programme has had in the participating communities. The empirical analyses for the study were based on descriptive statistics using SPSS and Excel.

Study Institutional and Governance Conceptual Framework

The main institutional issue regarding rural roads maintenance relate to firstly, training and managing provincial and local level personnel . Secondly, the provision of adequate budgeting and funding to cover all aspects of local level road construction and maintenance. Thirdly, this relates to promoting good

governance and deepening democracy through empowering and mainstreaming women, youths and previously disadvantaged groups in rural local level roads construction, maintenance and sustainability. Figure 1 depicts the adopted institutional and governance framework generated in synthesizing and unpacking the local rural roads issues in South Africa. The described framework indicates the institutional and governance hotspots and or areas requiring strengthening in the quest to deliver better local roads construction and maintenance regimes in deprived and under-resourced rural communities.

Income earned from Project

Salary income and social grants; salary income and child support and salary income were reported to be the main sources of income for the households involved in the Siyatentela road maintenance project (Table 2). Agricultural activities also form an important income source for the households. The main agricultural activities of the households include small family gardens where they grow horticultural crops and maize both for family consumption and for selling. Institutionally small women agriculture enterprises should be developed as alternative pathways for fighting rural poverty.

Table 2: Main Sources of income for the household

Sample Size N=41

Income sources	Frequency	Percent
Salary & social grant	14	34.15
Salary & child support	9	21.95
Salary (Siyatentela)	8	19.51
Salary, social grant, & informal business	3	7.32
Salary, farming & child grant	1	2.44
Salary, social grant & child grant	1	2.44
Salary, farming, social grant & child support	2	4.88
Salary, informal business, social grant & child support	1	2.44
Salary income, farming, social grant, child support & pension	2	4.88
Total	41	100

Source: Research Findings, 2008

The above table shows that the income earned from the project is significant and can make a substantial impact on the household. Stopping the project will have a major impact.

Use of Money earned From Project

Table 3 shows how the money earned from the project is used. Only 12 per cent reported that all the money is used within the local community. 88 per cent of the project participants use the money in the local community, nearest town and major city. Making use of local-based labour provides an opportunity to retain money within the local communities to support local economic industries and services and hence contribute to local economic growth and development. Many of those who use the money in the nearest town and major city indicated that they get their money from the nearest town/major city and buy some of their needs such as groceries from there. This represents leakage of the funds that could be used within the local communities provided that the necessary opportunities to procure these products existed.. This provides scope for exploring the potential for establishing small entrepreneurs/coo-operatives institutions to service community needs such as school uniforms, groceries etc that could provide some way of developing the community.

Table 3: Where money earned from the project is used

Where money is used	Frequency	Percent
Local community	5	12.20
Local community and nearest town	24	58.54
Local community and nearest major city	4	9.76
Local community, nearest town and major city	8	19.51
Total	41	100

Profile of the roads beings maintained by the Siyatentela project

Seventy-eight percent of the households indicated that the road has been maintained and upgraded by graders in the last three months. This is done for works beyond the scope of labour based technology and also especially during the rainy season. Table 4 presents a summary of the frequency of road maintenance by graders in the study area. This represents an institutional healthy mix and response between the appropriate and wise allocation of equipment and labour based technologies.

Table 4: Frequency when road was last maintained and upgraded by graders

Sample size N=41

Time	Frequency	Percent
0-3 months	36	87.80
4-6 months	2	4.88
don't know	3	7.32
Total	41	100

Source: Research Findings, 2008

The roads that are being maintained by the Siyatentela project have important infrastructure that includes power and telephone lines running along the roads. There are also bridges along the roads. This supports the observation that the programme has a responsibility to oversee important assets and therefore the embedment of a commensurately strong institutional support system is desirable.

Table 5: Infrastructure that is found along the Road

Sample size N=41

Structure	(Yes) Frequency	Percent (%)
Power/telephone lines	41	100
Bridges	41	100
Total	41	100

Source: Research Findings, 2008

Occasional flash floods were reported to be a problem in the Siyatentela project areas. These occasional floods were reported to come without warning and often have severe negative impacts on the road infrastructure and in particular the drainage and bridges. The roads sometimes get eroded if there are heavy floods and litter and other material that is eroded during floods blocks drainage systems. The project participants also indicated that litter gives them problems especially near homesteads and in drainage ditches. The Siyatentela project has helped to greatly reduce some of the impacts of the occasional floods such as clearing clogged culverts. An important institutional gap is the need to complement the Siyatentela works project with general environmental community education and awareness. An initiative to place no littering sign posts along Siyatentela projects is underway.

Table 6 summarises the most common problems faced by women contractors working on the project.

Table 6: Most problems areas in working on the road maintenance project

Sample size N=41

Problem areas	Frequency	Percent (%)
None	5	12.20
Potholes & eroded areas	7	17.07
Next to households	11	26.83
Drainage drains/ culverts	18	43.90
Total	41	100

Source: Research Findings, 2008

The results from Table 7 indicate that most of the local community members especially the youth can now freely migrate to get off-farm employment in other towns and cities. About half reported that the roads are helping the community get access to potable water and 27% indicated that access to firewood has improved as a result of the road maintenance and upgrading. Those who reported that the road did not improve their access to firewood and potable water indicated that they do not use the main road to fetch firewood. It is important to note that the Mpumalanga Department of Roads and Transport is currently in the process of improving local access roads and paths through the integrated rural mobility and access (IRMA) project. It is this infrastructure that is employed to access local socio-economic needs such as fetching water and firewood. For potable water, the respondents reported that there is tap water (stand pipes) at some homesteads and hence they don't need to use the road to get their water. Institutionally a clear strategy and framework for addressing the provision and maintenance of local infrastructure such as footpaths, access roads, low level crossing etc require clear pronouncement and or ring fencing.

Table 7: Road improved access to off-farm employment, firewood and portable water

Sample size N=41

Variable	Frequency	Percent
Off-farm employment	34	82.93
Firewood	30	73.17
Water (potable)	19	46.34

Source: Research Findings, 2008

Training Provided

Table 8 shows that 85% of the women received training on the project. The women reported the training improved their skills and capacity to work on the project and engage in self help projects such as establishing poultry, gardening projects and extending and constructing own bricks houses.

Table 8: Did you receive training concerning the project

Sample size N=41

Received Training	Frequency	Percent
Yes	35	85.37
No	6	14.63
Total	41	100

Source: Research Findings, 2008

Institutionally the problem with this training is that it only focused on imparting skills that are directly relevant to the project. Scope for imparting life skills and entrepreneurial and business development skills that will offer options for alternative livelihood pathways is critical.

Skills learnt from the project

The women maintain only 5km of the road for the whole year and the rest of the road is maintained by the department of road and transport. The women received 1 day training on what they are supposed to do and any other issues concerning their work in the Siyatentela project. For example they were taught the reasons for clearing the side drainage along the road. The women reported that they also use the skills they learnt from the project in their homes-such as creating water drains, removing litter and keeping the home neat and tidy. The lack of a project institutional framework for handling foster care requirements is illustrated by the responses obtained as presented in table 11.

Table 11 Who takes care of the children and sick when at work on the project

Sample size N=41

Who takes care for the children and sick	Frequency	Percent
No one-they can stay on their own	17	41.46
My mother	13	31.71
Neighbour	8	19.51
Relative	3	7.32
Total	41	100

Research Findings, 2008

The main risks women face include rapists/thugs, accidents from high speeding cars and health risks from dust and burning explosive material that might be dumped with the rubbish along the road. On health related risks some of the women indicated that they have not been given masks and eye glasses as protection against dust and other dangerous materials for example when burning rubbish. To address the problems of potential rape and assault the project supervisors decided to have the women work as groups and not the required one person for every half a kilometer distance.

Occupational health and safety

The women reported that no-one has ever received training in occupation health and safety and there is no first aid kit for them at work. They indicated that they don't know anything about the issues; it was actually brought to their attention from the survey questions. To date, no physical injuries/accidents have been reported from working on the project.

Uniform, tools and equipment

It is widely discussed in literature that many labour-based construction projects are adversely affected by inadequate planning and quality of hand tools and equipment. Hand tools constitute the driving force for productivity in labour-based works and are critical items to consider when it comes to the progress of construction. Despite constituting a small proportion of the total project cost, many labour-based practitioners and contractors hardly direct any investments towards hand tools as their supply and capital provision are not perceived as important issues.

"We didn't plan for replacement from the beginning of the project. However, we have realised that some of the tools and equipment need to be replaced and we have planned for that now." – Regional project coordinator.

4. CONCLUSIONS

The benefits that can be derived from substituting labor and local resource based approaches for equipment are even more relevant today than when they first began to be studied in the 1970s. This is especially true for roads and community access as demonstrated through the Siyatentela case study discussed in this paper. In deep rural and isolated previously disadvantages communities of South Africa the need to address service delivery backlogs has been identified by the government as an area requiring urgent priority (COTGA, 2009). Rural community access roads are one such area that requires a face lift. Rural transport and travel patterns and behavior are mainly local, usually involving carrying of small

loads over short distances either on the back, head or in front. The majority of these trips are mandatory and cannot be substituted because they support the rural household livelihood system e.g. collection of water and firewood or accessing a field to till land or harvest crops etc. The primary infrastructure that supports these local rural transport systems and related livelihood includes footpaths, pedestrian bridges and low level crossings (ILO, 2002). Unemployment and underemployment levels in rural communities, as typified by the Siyatentela case study, are high. This paper further confirms and corroborates similar findings from elsewhere that concludes that where the conditions are right, labor-based programs can be successful in building assets and generating employment in a cost-effective manner. However, this paper has further argued that it is important to consolidate the success stories as exhibited by the Siyatentela case study through robust and intelligent strengthening of the related institutional and other support systems. Such improvements will reduce existing and potential weaknesses which can potentially reverse the gains achieved so far. At the same time the proposed strengthening can ground the programs within the real realities of rural socio-economic conditions such as the existence of female and child headed households. Multi-tasking and requirements for multi-skilling and upgrading governance systems that encourage genuine participation and local communities also needs attention. Auditing of such programs by the rural affected constituency directly and the compelling need to generate practical and sustainable pathways and exit strategies beyond the local resource based intervention. This paper has argued that rural local level roads construction and maintenance is much broader and should be conceived beyond the road sector itself. Rural local level roads maintenance and construction involves much more than low volume design and standard specification application, mobilization, deployment and employment of machinery and equipment to meet works specifications, use of alternative soil binders for road structures etc. It actually involves in addition clearly conceptualizing how roads can be used in community building and development. This raises the central question regarding the need to strongly craft governance and institutional strengthening in interventions aimed at bettering rural roads construction, maintenance in sync with poverty reduction and broader rural development overtones. Providing options and opportunities for integrating health, education and agriculture sector in improving the rural road network is a critical dimension. The contribution that public-private partnerships can play in this regard should not be under-estimated.

Recommendations

Rural community access roads in developing countries should make provision for the following issues for better performance and service levels. These recommendations are crafted and informed by the case study presented in this paper, namely:

- ***Employment intensive investment in infrastructure.*** This will lead to the development and transformation of the “usually” unclassified and largely undeveloped community rural access assets. In time a database of these roads may be generated which would make it easier for strategic decision making and prioritization of rural community access upgrading and proclamation to higher classes of roads etc..
- ***Encouraging and continuously providing opportunities for incubating local entrepreneurship development.*** This is important in broadening alternative pathways of fighting poverty and under-development in rural areas.
- ***Addressing the special needs of children including providing for foster facilities in the community/at roadside.*** This is important so that nursing mothers as well as those with children are not excluded from participating in the projects given child rearing and raising duties. This is also important so that children are provided with stimulating environments for child development rather than being left in the care of friends or well wishers without the requisite skills and knowledge for foster care and training.
- ***Community contracting.*** This may be important as a measure of graduating from household contracting and a way of developing the local people into a consulting firm. While it is indeed possible to create a year-round trafficable rural road network as a co-operative effort supported through community participation and government support, it is essential that the following pre-requisites be satisfied;

- Establishment and development of a legal and institutional framework to identify the road selected and qualifying for support.
- Government support and incentives to support individual roads to be maintained by organizations and to ensure accountability and continuous improvement in techniques for delivery. This can take the form of annual rural community access round robin competitive tendering. The idea being to minimize leakage and mismanagement of roads earmarked for rural community access development.
- Regular joint government and community outreach visit to project sites and communities should be part and parcel of the programme. The rationale being to identify early challenges and provide remedial action and measures.

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