

# LINKING INDIGENOUS KNOWLEDGE SYSTEMS, TRANSPORT AND RURAL DEVELOPMENT IN SOUTH AFRICA

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## ABSTRACT

This paper presents the linkages between indigenous knowledge systems, transport and rural development in South Africa. Making use of a case study approach, the paper draws data and information from eight (8) Comprehensive Rural Development Programme pilot sites located throughout South Africa. The paper further demonstrates the connection between indigenous knowledge systems, transport and rural development with local economic development, livelihood improvement and rural intervention options. The major findings demonstrate the need and resolve for utilizing and deploying indigenous transport knowledge systems to meet multiple rural development functions and purposes such as, namely: playing a pivotal role in improving and supporting transport access and mobility service levels. This is at the epicenter of propelling catalytic rural socio-economic development endeavors; advancing a case for grafting and filtering indigenous local level transport institutions and systems into mainstream rural transport governance institutions; and using the indigenous local level governance transport system to act as vanguards for improved transport service delivery. The paper concludes that indigenous transport knowledge systems can and should be packaged and enhanced to support and promote higher levels of growth and development in the rural landscapes of South Africa. In addition, the success stories of indigenous local transport systems can be exported to urban areas in developing countries. Such interventions are cost effective and advance simple solutions in a context of limited financial resources for the transport sector.

## Key Words

*Indigenous knowledge systems, transport, rural development, interventions, comprehensive rural development programme sites, South Africa*

## 1 INTRODUCTION

This paper presents the linkages between indigenous knowledge systems, transport and rural development in South Africa. The paper further demonstrates the connection between indigenous knowledge systems, transport and rural development with local economic development, livelihood improvement and rural intervention strategies options.

Indigenous rural transport and development or local level rural transport knowledge refers to a complete body of knowledge, know-how and practices maintained, developed and tested by peoples, generally in rural areas, who have extended histories of interaction with the natural environment (Nhemachena et al, 2011). These sets of understandings, interpretations and meanings are part of a cultural complex that encompasses language, naming and classification systems, practices for using resources, ritual, spirituality and worldview within the auspices of rural transport innovations, adaptations and interventions. This therefore provides the basis for local-level transport decision-making about many fundamental aspects of day-to-day life: for example trip choice, route, spatial distribution, journey times and average travelling speeds for engaging in

activities such as hunting, fishing, gathering, agriculture and husbandry; food production; water; health; and adaptation to environmental or social change (World Bank, 1999; Mashiri et al, 2008). Non-formal rural transport and development knowledge, in contrast to formal rural transport and development knowledge is handed over orally making use of “*learning by doing*” life experiences from generation to generation, and is therefore seldom documented.

Using indigenous knowledge in entrenching and boasting rural development enterprises enables indigenous peoples and local communities to actively participate in the decision-making process relating to access to markets, products i.e. inputs and the full production value chain including contributing towards fostering a better logistics framework (Department of Rural Development and Land Reform, 2010; Chakwizira & Nhemachena, 2010). Available literature (Kilkenny, 1998; FAO, 2004; IFAD, 2004; World Bank, 2008, Mashiri et al, 2008) confirms that investments in rural road construction and maintenance can have significant positive impacts on rural incomes and quality of people’s lives. On the other hand, there is a growing appreciation that, at the local level, a conventional motorised transport paradigm is not enough to cater fully for all rural transport and development movement, travel needs and demands (Chakwizira, 2010). This has led to the emergence of a new genesis to local rural level transportation planning and a host of appropriate access interventions. In this debate, locating and situating IKS rural transport value add to stimulating and sustaining rural growth and development is worth exploring.

The Comprehensive Rural Development Programme (CRDP) is Strategic Priority Number 3 within the government’s current Medium Term Strategic Framework (MTSF). The South African Government conceptualised the CRDP in 2009. It is considered different from previous government initiatives in rural areas because it is based on proactive and participatory community-based planning (DRDLR, 2009). A key thrust of the programme’s framework is an integrated programme of rural development, land reform and agrarian change (DRDLR, 2010). Transportation is a recognised strategic catalytic factor in fostering rural growth, development and social change (Johnston & Mellor, 1961; FAO, 2004; Mashiri et al, 2002; World Bank, 2008; Chakwizira & Mashiri, 2009). Therefore, focusing on rural transport infrastructure and services improvements is pivotal in oiling up the levers and drivers of rural development. Suffice to point out that transportation links rural based farms, factories and industries with markets, making it possible for finished products and industrial inputs to be available at the right time, at the right place, in the required form and desired quantities (IFAD, 2004; Chakwizira et al, 2008). The CRDP is premised on the following three phases:

- Phase I is an incubator or nursery stage of the programme – meeting basic human needs as driver;
- Phase II is the entrepreneurial development stage - relatively large-scale infrastructure development as driver;
- Phase III is the stage of the emergence of industrial and financial sectors - driven by small, micro and medium enterprises and village markets (DRDLR, 2010: 3).

All these phases require transport accessibility and mobility constraints to be removed if the full potential is to be realised. This is one reason why this paper focuses on integrating local level rural transport and development knowledge as an enabler in supporting and promoting an inclusive rural development implementation agenda and sustainability programme of action. Job creation has been identified as central to this three-pronged strategy (Nhemachena et al, 2011). The current model places para-development specialists or Community Development Workers (CDWs) at ward/village level as tasked with playing an instrumental role regarding job creation, in terms of training and mentoring identified community members to ensure gainful entrance into the mainstream economy. The refinement of the CRDP is taking place at eight pilot sites in South Africa. The pilot phase will continue for a minimum of two to three years. Following this phase, the CRDP will be scaled up to the national level. The CRDP upgrading exercise is expected to take full cognisance of respective provincial planning frameworks to ensure harmonious integration within provincial and local government strategies and plans. The expressed aim is to grow the pilot sites from an initial 8 pilot sites to a total of 60 sites by 2014.

### 1.1 Research Objectives

The following questions constituted the major study objectives, namely:

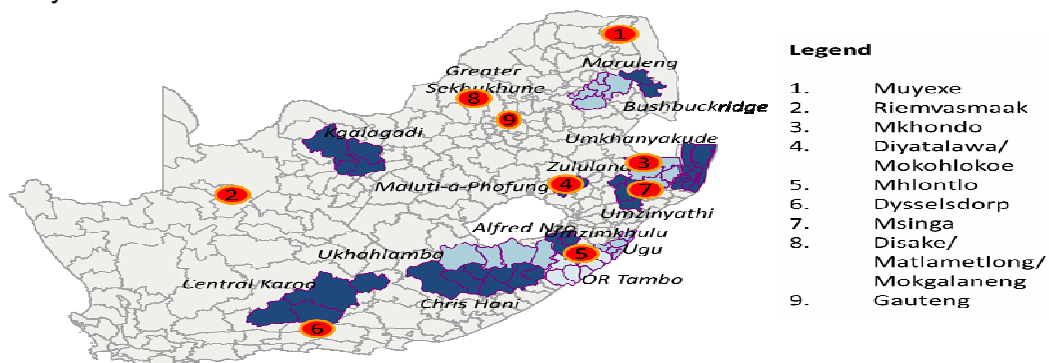
1. Describing the connection and linkages between indigenous knowledge systems, rural transport and rural local economic development in South Africa.
2. Identifying and recommending low cost rural transport indigenous knowledge orientated interventions for deployment in addressing access and mobility challenges and options that promote sustainable rural growth, development and environments.

## 2 **METHODOLOGY**

The paper's primary findings are drawn from case study results from eight (8) Comprehensive Rural Developments Programme pilot sites located throughout South Africa. The fieldwork study approach was participatory, extensively involving discussions based on an open-ended questionnaire with stakeholders, reconnaissance visits to potential and project areas, internal and external workshops and document analysis. Focus groups of up to thirty local people were assembled per CRDP site including: community leaders (e.g. Chiefs, Ward Councillors, etc.) with practitioners per theme such as African Indigenous doctors; farmers; artists and crafters etc.; representative of Community Based Organisations; elderly members of the community; youth etc. This particular paper tackled the linkages between transport and various aspects of traditional knowledge. The aim is to project and identify local level transport knowledge and application areas with a view to harvesting and up-scaling such inter-generational interventions to support and promote catalytic socio-economic growth and development.

### 2.1 Study Areas

Map 1 below shows the spatial distribution of the 8 CRDP pilot sites that constitute the focus of this paper's study.



Map 1: Location of CRDP Pilot Sites in South Africa in the context of the Integrated Strategic Rural Development Planning (ISRDP) nodes

Source: DRDLR, 2011

## 3 **LITERATURE REVIEW**

IK is a powerful resource of rural peoples and therefore a key element in the fight against poverty and social exclusion for many rural communities worldwide (World Bank, 1999; World Bank, 2006). IK rural transport and knowledge practices can be exchanged and transferred in a number of formats.

### 3.1 Rural Transport

A critical need in rural areas of many developing countries is for improved roads and tracks between homes and farms, grinding mills, forests, water sources, schools, health clinics and markets. Existing tracks and paths often preclude the use of any type of wheeled transport. However, rural transport projects often concentrate on providing major roads rather than on improving the small roads and tracks/feeder roads that most rural women (and men) use for local transportation. One possible reason for this is that women and IK have rarely been included in the planning of transportation interventions.

Statistics from Tanzania, Malawi, Zimbabwe and South Africa show that women and men in rural households have different transport tasks, and that women often carry a heavier burden in terms of time and effort spent on transport (Blackden and Wodon, 2006; Peters, 2001). However, with less access to and control over resources, women have fewer opportunities than men to use transport technologies that could alleviate their burden, and gender issues are still peripheral to much of rural transport policy and practice (Fernando and Porter, 2002; Mashiri et al, 2008; Mbara, 2008). Table 1 presents transportation tasks in rural Tanzania: hours per annum

**Table 1: Transportation tasks in rural Tanzania: hours per annum**

Task	Adult Females	Adult Males	Children
Water Collection	587	32	68
Crop Establishment	251	194	63
Crop Weeding	99	76	25
Crop Harvesting	91	64	23
Internal Marketing	9	4	1
Health	73	25	0
Grinding Mill	169	21	13
Trips to Market	227	51	0
Total	1,842 (71.6%)	492 (19.1%)	239 (9.3%)

Source: Barwell and Malmberg, 1987

Rural transport is closely related to the issue of collection of water and fuel wood. One way of easing the burden of women’s work is to increase their access to carrying devices, often referred to as intermediate means of transport (IMTs) – such as donkeys, wheelbarrows and carts – as well as improving the paths and roads over which they must travel. Women are responsible for many other transportation tasks, all of which could be made easier through access to improved transport technologies.

### 3.2 Connecting IKS, rural transport and local socio-economic development

Table 2 presents a summary of the main rural transport IK exchange systems. In seeking to gain maximum value from IK in the transport and local development spheres it is therefore important to match knowledge and transfer models with people’s culture, contextual realities and demands. The process of exchange of IK transport knowledge and practices within and between developing countries, between developing and industrial countries, between urbanized and rural areas involves essentially six steps.

**Table 2: Identification of Rural Transport Indigenous Knowledge Exchange Models and Systems**

Rural Transport Indigenous Knowledge system and practice	Rural Transport Application Model and Issues
<i>Recognition and identification of rural transport IK practice and intervention areas</i>	Some IK rural transport practices may be embedded in a mix of technologies or in cultural values, rendering them unrecognizable at first glance to the external observer (technical and social analyses may, therefore, be required to identify IK rural transport practices. For example the cultural gender in transport dimension to women and girls riding and using bicycles to address rural local level socio-economic requirements is normally discouraged (i.e. taboo) and prohibitive from a cultural dimension.
<i>Validation of rural transport knowledge impact and relevance to meeting socio-economic development mandates and dictates.</i>	This involves an audit of IK’s rural transport and socio-economic significance and relevance of an identified transport innovation, adaptation and intervention to solving rural development and growth problems. This should answer rural transport questions such as whether the intervention is reliable, not un-necessarily sophisticated and can be easily replicated to other similar environment with minimum changes. In addition, a rural transport IK should be tested for functionality in terms of how well the measure works, effectiveness in solving the identified problem and ease of transferability. While sledges can address the problem of bulk transportation of goods, is an easy IK transport model to transfer the environmental impacts makes the technology a non-effective long term bulk transport mechanism in the rural areas.
<i>Recording and documentation of IK rural transport systems and practices.</i>	The IK transport interventions recording and documentation especially inter-mediate technology cycle improvements are not properly recorded and documented presenting a major challenge because of this tacit nature of IK (it is typically exchanged through personal communication from master to apprentice, from parent to child, etc.). In some cases, modern tools could be used, while in other circumstances it may be appropriate to rely on more traditional methods (e.g., taped narration, drawings if available). In taking IK transport technology further, the need for reverse rural transport technology engineering is a project in itself. This also includes evaluation of modern rural transport enhancement technologies as used by locals in their villages.
<i>Storage of IK transport knowledge and practices</i>	IK transport knowledge and practice relics and glimpses of the system can be gleaned in retrievable repositories. Storage of IK transport knowledge and systems is not only limited to text document or electronic format but could include tapes, films, storytelling, gene banks, etc. Generating and developing a rural transport IK practice museum in local villages could be one practical way of recovering and mining this invaluable resource and in the process building a transport historical map and atlas of rural transport and development technology and attendant knowledge revolutions.
<i>Transfer of IK transport systems and</i>	This step should go beyond merely conveying the IK transport knowledge and practice to

<i>practices</i>	the recipient. It should further include the testing of the knowledge and practice in the new environment. Pilots are the most appropriate approach in this step; and seeking to perfect and integrate IK rural transport practices to fertilize and generate future rural transportation futures remains very important.
<i>Dissemination of IK transports systems and practices.</i>	Dissemination to a wider transport and non-transport community adds the developmental dimension to the exchange of knowledge and could promote a wider and deeper ripple impact of the rural transport indigenous knowledge transfer model.

Indigenous technologies, practices, and knowledge systems have been studied extensively by sector specialists and even more so by social anthropologists. However, most studies are descriptive. In addition they concentrate primarily on the social or ethnological aspects of knowledge rather than on the technical ones including mining rural transport technology and practice intervention areas and auditing the value add that this brings to rural growth and development. Existing literature contains limited information regarding the systematic transfer of local rural transport and indigenous technology knowledge across communities and cultures. Yet, there is considerable impressionistic evidence of IK transfer from traditional societies to industrial countries, from rural areas to urban areas (e.g. acupuncture, herbal medicine, rehydration salts, etc.) (World Bank 1999; World Bank, 2006).

### 3.3 Importance of Indigenous Knowledge for the Rural Transport and Development Processes

The issues described in the preceding sections suggest that indigenous knowledge as part of subsumed rural transport technology and interventions portfolio is an integral part of the development process of local communities. According to the 1998/99 World Development Report, local transport knowledge and practice, not capital, is the key to sustainable social and economic development. Building on local knowledge and by extension local rural transport knowledge constitutes the basic component of any country's knowledge system, and is the first step to mobilize existing and potential capital.

Moreover, there is a growing consensus that local transport knowledge exchange must be a two way street. A vision of local transport knowledge transfer as a sort of conveyor belt moving in one direction from the rich, industrialized urban areas and countries to poor, developing regions and rural areas is likely to lead to failure and resentment. "Governments and international institutions can certainly help countries and rural regions/communities with the daunting task of sifting through international experience and urban development intervention bias, extracting relevant transport knowledge and experimenting with it. But they will have the most success if they help developing countries and rural communities adapt rural transport knowledge to local conditions. Sharing knowledge with the poor, rural and marginal communities is most effective when we also solicit rural transport knowledge from them about their needs and circumstances" (Ghertner, 2006). Therefore, rural transport development activities, especially those that aim to benefit the poor and marginal rural communities directly, need to consider IK in the rural transport design and implementation stages of the process.

### 3.4 Rural transport interventions and indigenous rural governance systems

The challenge for the rural transport development community is to find better ways to learn about indigenous institutions and practices and where necessary adapt modern rural transport techniques to the local rural transport practices. Only then will global and national rural transport knowledge be rendered relevant to the local community needs. The key factor in the rural transport adaptation process is the involvement of those who possess indigenous knowledge. A study of 121 rural water projects in 49 countries found that 70 percent succeeded when the intended beneficiaries participated in project design, compared to a 10 percent success rate among programs where they did not (Hinne, 1993; Interdesign, 2005).

### 3.5 No rural transport indigenous knowledge and practice straight metal jacket

It is important to note, however, that not all indigenous rural transport practices are beneficial to the sustainable development of a local community; and not all IK can *a priori* provide the right solution for a given problem. In transport the obvious example is the use of the sledge in meeting rural transportation challenges. Before adopting IK rural transport practices, integrating the practice into development programs, or even disseminating it, practices need to be scrutinized for their appropriateness just as any other technology. In addition to scientific proof, local evidence and the sociocultural background in which the practices are embedded also need consideration in the process of validation and evaluation.

## 4 STUDY RESULTS AND DISCUSSION

### 4.1 Rural Transport Innovation, Interventions, Knowledge and Skills Transfer: Learning from IK

Rural transport innovation, interventions, knowledge and skills transfer can learn now and going into the future from the IK paradigm. One principle of the IK is that investigating first what local communities know about local level transport and movement patterns; the nature of trips, distribution and split and the local level transport modes and choice including the local level based technology support systems can improve significantly our understanding of local rural transport conditions and provide a productive context for activities designed to help the rural communities in particular and the society at large. In short, understanding IK can increase responsiveness to clients. Adapting international and national rural transport practices to the local setting can help improve the impact and sustainability of rural transport development assistance. Sharing IK rural transport knowledge and practices within and across communities can help enhance cross-cultural understanding and promote the cultural dimension and diversity aspect of development.

### 4.2 Rural Local Level Travelling Intelligence and Systems

Rural people usually travel in groups, usually in a single file. In this set-up there is a de-facto driver who leads in front and a conductor at the end who protects and is the rear guard. This is essential in traversing difficult or unknown territories especially areas known to be inhabited and visited by murders, rapist and muggers. This kind of "rural walking bus" concept is essential in wading off such attempts for village women, girls going to fetch or collect firewood as well as rural school children going and coming from School. This concept can even be applied in urban Schools as is being practiced in developed countries such as Australia and Britain. Here they have even introduced the cycling bus for a group of cyclists going to specific destinations. Such transport interventions are not only cheap, convenient, safe and efficient but also environmentally friendly. Pilot projects could be explored around this in South Africa.

### 4.3 Rural Transport and Business Logistics

Roads and transport are considered key elements of a country's infrastructure, and a substantial part of the development budget (typically representing  $\pm 20\%$  of total investment) is spent on rural roads and infrastructure maintenance and rehabilitation (World Bank, 1999). With such high expenditures, an important consideration in their provision is the standards to which the transport is constructed. Thus there is evidence of over-design of roads, particularly in the rural context where the measurable benefits (vehicle operating cost savings and time benefits) are small by comparison to the construction costs. Hine (1993), for example, suggests that 'the benefits of adding new vehicle access using simple methods is over one hundred times greater, from the viewpoint of farmers, than upgrading a similar length of earth track to gravel standard' (Hine 1993).

### 4.4 Length and Loads of rural goods movement by small farmers

Access to basic facilities can often be made easier by improving paths or water crossings which already exist, where these are close to the rural population. Intermediate means of transport (IMT) such as bicycles and carts, which can be used on rural paths, are often a useful means to eliminate the length of travelling time and increase the unit volume of goods transported to meet basic needs. Table 3 presents an international picture reading length and load of rural goods transported by small farmers.

**Table 3: Length and Loads of Rural Goods Movement by Small Farmers**

Indicator	Kenya	Malaysia	India	Bangladesh	South Africa	Western Samoa	Republic of Korea
Typical Distance of Transport	90% of trips $\leq 7$ km	75% of Trips $\leq 7$ km	90% of Trips $\leq 5$ km	Most trips $\leq 12$ km	78% of trips $\leq 7$ km	Most trips $\leq 5$ km	Most trips $\leq 10$ km
Average on Farm-Distance	0.8 km	1 km	1.5 km		2 km		
Average off-farm distances		10km	8.3km		12 km		
Loads transported	70% of all trips $\leq 25$ kg			Most trips $\leq 50$ kg	Most trips $\leq 35$ kg	Most trips $\leq 80$ kg	30-80kg

Source: DoRDLR, 2011

On farm transport comprises movements related to domestic needs, such as water and firewood collection, smallholder cultivation, grazing of animals and transport of farm inputs and outputs between house and fields. On-farm transport comprises trips to the market, to visits friends or to reach certain social amenities, for example, schools and health clinics. Off-farm transport relates more to the conventional perception of transport in that at least some of it takes place on a recognisable road, and sometimes, with a motorised vehicle (Source: Carapetis et. al. 1984, Barwell et. al. 1985). Another conclusion that emerged during studies in this period was the high cost of headloading (about US\$2 to US\$3 equivalent per ton-km, which is needed in the absence of road access and NMT vehicles (Pankaj, 1991).

A study of rural travel in Tanzania (Dawson and Barwell, 1993) showed that women undertake 75% of all transport tasks. However, women are less likely to be able to take advantage of rural transport improvements (such as better public transport services) as they are less likely to possess their own independent source of income. Table 4 presents comparative processing times of traditional, semi-mechanised and mechanical technologies. Transport development provides employment, but also raises exposure to traffic and traffic accidents. Road safety issues are particularly important, if for no other reason than that they are a major cost to society (consuming perhaps 1-2% of gross national product in lost output and the commitment of medical and police resources). In fact, according to a recent IFAD study in Uganda, where 75 per cent of journeys each day were found to be carried out on foot, road improvements actually made things worse for women by depriving them of tracks they had previously used and leaving them at risk of being run over (IFAD, 2007a).

**Table 4: Comparative processing times of traditional, semi-mechanised and mechanical technologies**

Operation	Time required to process 1kg of product (minutes)		
	Traditional	Semi-mechanised (improved hand operated)	Mechanised
Shelling Maize	8-15	3-5	0.03
Milling Maize	5	3	≤0.05
Threshing Rice	3	0.12-1.0	0.2
Dehusking Rice	6-12	4	≤0.012

Source: Cecelski, 1984

#### 4.5 CRDP Rural Transport Challenges and Realities

Table 5 overleaf presents the rural transport challenges in realities in CRDP sites. For example the North West Province CRDP pilot site is located in Moses Kotane Local Municipality, Ward 29. The pilot site consists of three villages: Disake, Mokgalwaneng, and Matlametlong with an estimated population of 16 005 people. The three rural villages border the Limpopo Province. The pilot site has no central economic hub and the nearest commercial centre is Northam in Limpopo Province and Mogwase in North West Province. However, Northam in Limpopo is nearer to the community and easily accessible compared to Mogwase which is in North West. The pilot site is characterised by poor infrastructure and basic service provision (e.g. poor access roads, water and sanitation etc); high levels of unemployment (residents mainly relying on social grants); limited employment on nearby mines (Dwaalboom and Kraalhoek) and subsistence agriculture (livestock and home gardening) (DRDLR, 2010). This description is an apt example of the rural transport access and mobility challenges facing CRDP pilot areas. Exploring scope and value addition that IMT transport and modes including supporting relevant infrastructure is important.

#### 4.6 Mechanisms to support IKS enterprise based industries and local initiatives

Access to markets by small farmers is key e.g. using Broad Based Black Economic Empowerment (BBBEE) scorecards to encourage purchasing from local small producers, and promoting consumption of local food. For both large and small farmers it is important to ensure a larger share of the retail price goes to producers rather than the packagers and retailers, through greater involvement in the value chain. It is also important that agro processing happens in rural areas. Access roads, pedestrian paths and rural transport are key in themselves but they are also an enabler for other services (e.g. mobile clinics, emergency services etc.) and linking agricultural production with markets and other modes of transport e.g. rail. Table 5 summarizes issues regarding some of the major CRDP sites in South Africa.

**Table 5: Major IKS and rural development headline Issue's in CRDP pilot sites in South Africa**

Pilot Site Name	Province	IKS practices	Growth, Development Constraints and Opportunities				
			Transport Access to Markets & Inputs	Traditional Leadership & Governance Systems	Product Full Value Analysis	Physical setting	Opportunities
Muyexe	Limpopo	Mopani worms Marula fruits	Roads are very bad. There is no banking system and community members have to travel to Giyani to access such and related services.	Scope for Mopani Worm and Marula Fruit producers to form associations or co-operatives which can galvanize into a forum such as Mopani Worms Association or Marula fruits Association.	Harvesting is usually done by women although youths are beginning to participate. Most respondents indicated that they usually collect mopani for home consumption (the worms forms part of the diet component for the Tshangani people but increasing harvesting this for market consumption.	Situated ± 30km from the Giyani central business district  High rate of unemployment and heavy reliance on Government grants	Industrial drying  Canning mopani worms e.g Jesbro foods  Strengthening -community mobilisation strategy, production/ha rvesting strategy, processing and value-addition strategy & marketing/dist ribution strategy
Riemvasmaak [Vredesvallei & Sending]	Northern Cape	Quartz mineral	A good tarred road connecting Vredesvallei Village to Kakamas town.  No daily transportation & public transport is only available on Monday, Wednesday, Friday and Saturday.			Area semi-desert.  Water shortages.	Needs a geological survey to establish extent of quartz mineral.  Absence of model incubator for projects.  Small scale mining.
Disake/Matlametlong/Mokgala neng	North West	Woodcrafts Leather – handbags, flat sandals, leather belts.	Poor access roads, electricity and telecommunications.  Weak local economy base High expenditure on transport.	To filter and vet developments so as to fast-track development meant to uplift communities.	Lack product competitiveness (local and international).  Leather in rural areas still an under-utilised resource.	Lacks nearby central economic hub.  Notham in Limpopo easily accessible compared to Mogwase in NW.	Invest North-West can help with marketing products.  SEDA (Small Enterprise Development Agency) supports small enterprises

Source: DoRDLR, 2011

## CONCLUSION

This paper concludes that indigenous transport knowledge systems can and should be packaged and enhanced to support and promote higher levels of growth and development in the rural landscapes of South Africa. In addition, the success stories of indigenous local transport systems can be exported to urban areas in developing countries. Such interventions are cost effective and advance simple solutions in a context of limited financial resources for the transport sector.

There is a wide range of technologies and techniques that could help address some of women's labour constraints. These include: improved stoves, rainwater harvesting schemes and intermediate transport devices that can reduce the time women spend on domestic chores such as



collection of fuel wood and water; improved hoes, planters and grinding mills that can increase the productivity of their farming tasks; improved techniques such as conservation agriculture that can reduce the time needed for labour-intensive tasks such as weeding; and cassava graters, oil-seed presses and other food processing equipment that can help them earn more income in less time and/ or with less effort. Tasks such as water and firewood collection, cooking, cleaning and child and health care take up inordinate amounts of women's time (World Bank, FAO and IFAD, 2008). Interventions aimed at reducing the time spent by women on domestic chores fall into two categories. These are:

- Integration of women's needs into mainstream infrastructure projects; and
- Projects aimed at delivering time- and energy-saving technologies directly to women.

Different aspects of rural development highlight that activities and interventions are so intertwined that it makes little sense to try to deal with any one aspect in isolation. Thus, IKS based rural transport interventions should not be dealt with separately from water supply, rural energy supply and health provision projects and programmes. Further, programmes that incorporate measures to reduce the time women spend in subsistence activities should have components that facilitate their increased involvement in income-generating activities.

## 5.1 Recommendations

### 5.1.1 *Entrenching and Replicating the Concept of Mobile Pedestrian Bridges*

Introducing and exploring further the concept of mobile footbridges. An example of an indigenous bridge intervention was located in Mpumalanga, Albert Luthuli Municipality. It was reported that one resident had constructed a pedestrian bridge out of wood and trees. This was made available by "local self-named Engineer/Artisan" to villagers as and when needed.

### 5.1.2 *Up-scaling use of water crafts for Inland waterways transport*

Locals were noted to make use of water crafts during periods of flooding and as well as to cross various inland water-ways en-route to different destinations. It is therefore recommended especially in context of observed climate change induced flooding that this practice be consolidated and village members be trained in the construction, assembly and maintenance of village rafts. These can be kept at strategic houses where local disaster community members reside or can easily access them especially in times of disasters.

### 5.1.3 *Incorporating Indigenous transport experts in reference groups*

Indigenous transport experts can be incorporated in local technology development and manufacturing teams. This can assist in up-scaling the local level transport technology equipment designs as well as decision making regarding siting and location of bridges, low level crossing as well as safe rural road routes designs and improvement plans etc.

### 5.1.4 *Road construction material and environmental sustainability*

Respondents indicated that the locals have a sound knowledge of the location and environmental sensitivity of deposit areas. Involving them can help in striking a healthy balance between exploiting local building and construction material for the road sector and minimizing serious environmental damage.

Clearly, improving the efficiency, and hence reducing the costs, of the transport sector is an important contribution to delivering sustainable development; yet this may not be a sufficient condition for yielding tangible benefits for the rural poor. For example, the construction of an improved all-weather road may be of little value to a rural community if transport operators fail to provide services along the new facility. And, as an example of extending this argument to other sectors and the interaction with transport, health facilities require effective means of access (including both roads and transport services), in order that they can effectively administer health care to the community.

### 5.1.5 *Local Labour and Skills*

Traditionally any village has always had labour and some form of input to contribute to the construction industry. People have always volunteered donkeys, oxen, carts to assist with pulling timber, carrying soils, bricks and stones to construction sites. Even where fire bricks or burnt bricks

were required, the local would assist. Such initiatives can be harnessed in the Expanded Public Works Programme (EPWP) but as well as in building communities. This kind of contribution plus land can act as incentives in attracting development and growth to rural areas. Indeed rural areas and communities are not without assets that contribute and can increase resource inflows to areas. A mind-shift from transport and local rural level investors in terms of looking at rural area investment portfolio and attraction from a different perspective is not only a requirement but a critical ingredient to boasting higher levels of rural development.

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