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Promoting rural access and mobility in Northern Namibia: an integrated approach

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Abstract

The Namibian Government, with support from Germany through its agency GIZ, is developing an integrated transport master plan for Ohangwena, Omusati, Oshana and Oshikoto Regions in Northern Namibia. Planning studies considered all urban, inter-urban and rural transport modes. This paper discusses rural access issues and reviews options for improving rural mobility. It draws on international experiences and discussions with rural residents, transport operators, private-sector suppliers and national, regional and local authorities. Rural stakeholders consulted differed by gender, age, occupation and abilities and included users and operators of several transport modes.

Rural people need access to medical services, schools, markets, employment, income-generation and other services. Individuals have their own priorities, but all want timely, dependable, affordable, comfortable and safe transport services. Multi-client taxis, minibuses and buses operate on Namibia's inter-urban roads. Small gravel and earth roads generally lack 'conventional' transport services. Operators of pickups ('bakkies') carry passengers for reward, although these are seldom dedicated passenger transport services. The fares (10¢ USD per kilometre) and relative discomfort appear acceptable, but unreliability is problematic. With bakkies in most villages, emergency transport is generally available. Some people use bicycles and motorcycles but Namibia presently lacks a 'critical mass' of users to stimulate efficient private sector support services.

Rural people in Northern Namibia expressed interest in motorcycles that provide major rural transport benefits in many countries. These and other transport options need assessing in context (sandy tracks, annual inundations, unique socio-economic situation). Pilot assessments are suggested to determine affordable, effective and safe rural transport options. These could include bicycles, electric bicycles, motorcycles and three-wheelers for individuals, and for linking villages to roads with transport services. Pilot scheduled services using passenger-friendly pickups could be developed. The vision is promotion of assessed, proven and complementary rural transport services throughout the regions, with training, safety and support systems.

Keywords:

Rural mobility, Rural access, Transport services, Namibia, Transport Master Plan

Namibia and its Ohangwena, Omusati, Oshana and Oshikoto Regions

Namibia, in Southern Africa, covers 824,292 km² and is the 34th largest country in the world (GRN 2016a). However, with population of about 2.2 million, it is one of the least densely populated countries (World Bank, 2016). Namibia is bordered by South Africa in the south, Angola and Zambia in the north and Botswana to the east (and it touches Zimbabwe in the east of Zambezi). It is demarcated into 14 regions. The climatic zones are arid, semi-arid and subtropical. The central, southern and coastal areas constitute some of the most arid landscapes south of the Sahara (GRN, 2016b).

Namibia's population has grown from 1.4 million, at independence in 1990, to 2.2 million in 2011. It is growing at an annual rate of about 1.4% (NSA, 2012). Namibia's population is mainly rural, although 43% of the population live in urban areas (NSA, 2012).

Ohangwena, Omusati, Oshana and Oshikoto (the focus of this paper) are four important north-central regions and are amongst the most populated of the 14 regions of Namibia (see Figure 1). They are home to about 850,000 people or 40% of the Namibian population (NSA, 2012). Despite rapid urbanisation, 83% of the northern regions' populations lived in rural areas in 2011 (NSA, 2012). Ohangwena and Omusati regions are the least urbanised with 5-10% of their populations living in towns (NSA, 2012).

Namibia is classified as an upper-middle income country, with a national per-capita Gross Domestic Product (GDP) of almost USD 6000. Much national income derives from minerals, fish and livestock. Despite great economic development since independence, Namibia has not yet unified its historical legacy of dual economies (NPC, 2012). It remains a country with extreme income disparity and a high unemployment rate of 28% (NSA, 2015a). In 2011, Namibia's Human Development Index (HDI) was 0.625, ranking the country 120 out of 187 (NPC, 2012). Its economic development is strongly dependent on neighbouring Southern Africa Development Community (SADC) states, notably South Africa and Angola.

Namibia's size, population pattern and national wealth greatly influences its transportation systems. Road transport has about 90% of the transport market share and most inter-urban roads are paved and in good condition (RA, 2015). However, traffic volumes are low. The average traffic on paved roads is only 766 vehicles per day. The

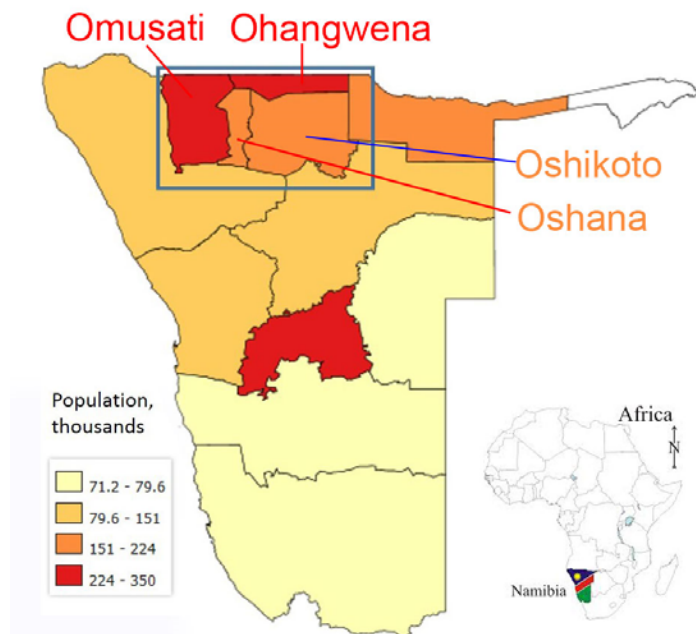


Figure 1. Map of Namibia showing central northern regions and regional populations.

Source: after NSA, 2015b,

traffic on 80% of unpaved roads is below 50 vehicles per day (RA, 2015). Although vehicle ownership is increasing rapidly in the country, it is relatively low in the four north-central regions. In the Oshikoto, Oshana, Omusati and Ohangwena regions, 75,600 vehicles were registered in 2015, about twice that of 2006 (MWT, 2017). The current vehicle ownership of the four regions is about 14 vehicles per 1000 persons, compared to 110 nationally (MWT, 2017). The provision of transport services is generally low throughout the regions and almost non-existent in remote rural areas. Transport services are limited to taxis in urban areas and along paved main roads. Inter-urban and regional transport is complemented by minibuses and some long-distance buses on major inter-urban roads.

Transport Master Plan for Ohangwena, Omusati, Oshana and Oshikoto

Recognising the importance of transport in northern Namibia, the Namibian Government decided to develop a Master Plan for Sustainable Transport for the four north-central regions. This will build upon the experience of the 2014 Sustainable Urban Transport Master Plan (SUTMP) for Windhoek and its MoveWindhoek project. The Ministry for Works and Transport (MWT) and the Ministry of Urban and Rural Development (MURD) are taking the lead. The 'Transport, Mobility, Logistics' project is being supported by the German Government through the German Federal Ministry for Economic Cooperation and Development and its implementing agency Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, who assigned GOPA Consultants to facilitate the development process of the Master Plan.

The Master Plan project has been undertaken in two phases. Phase 1 started in October 2014 and developed a scoping study to assess the current situation, challenges and development perspectives. It prepared a preliminary list of possible projects and measures to address the issues, concerns and challenges raised by stakeholders. Phase 2, was launched by the project steering committee in March 2016. The master plan is due to be completed in early 2017. Implementation is due to start after Cabinet approval, which is expected in late 2017. The master plan (a draft at the time of writing) will recommend a set of strategic interventions or initiatives (MWT, 2017). These are intended to assist the MWT and MURD and the relevant Regional Councils and Local Authorities to deliver and/or facilitate improved transportation infrastructure, facilities and services which meet the needs and expectations of users. The strategy will involve issues of accessibility, mobility and connectivity and will include air, rail and road transport modes. The road transport will encompass both infrastructure and transport services, and will include urban, peri-urban, rural, inter-urban and international transport. This paper focuses on the issues and strategies for rural transport services and in particular how women, men and children living in the remote villages can reach markets, hospitals, schools and other services.

Participatory methods to assess rural mobility situation and options in Namibia

While the term 'Master Plan' might suggest a centralised planning methodology, the integrated planning process necessitated a participatory approach to ensure the opinions of the many types of rural residents were heard. Between May and August 2016, visits were undertaken to many villages in the target area, and rural residents were asked about their travel needs and their views on possible mobility options. The discussions and surveys drew upon the rural transport services rapid appraisal methodologies developed by the World Bank (Starkey, 2007) and AfCAP (Starkey et al, 2013b). Villagers consulted differed by age, occupation, gender, abilities and transport needs.



Figure 2. Participatory interviews with rural residents helped understand issues
Photos: Paul Starkey

Discussions were held with school teachers, operators of different transport types (including bicycles and motorcycles), passengers, people walking and people waiting for transport (see Figure 2). Other relevant stakeholders interviewed included transport suppliers and servicing facilities. National and regional officials were consulted and they were also involved in planning meetings in which initial findings and suggestions were presented and jointly explored.

Much of the information in the rest of this paper is based on the views of the many people interviewed during the Master Plan surveys and the related planning discussions. It also reflects lessons from the situations and ‘best practices’ shared from other countries in the region and the world, as highlighted in the following section.

Importance of rural access and mobility

Good access is a requirement for poverty reduction and rural economic and social development. Rural people require access to health facilities, schools and other key services. They also need access to economic opportunities, including markets (agricultural sales, household purchases), employment and income generating opportunities. They may also wish to access government facilities, take part in governance and democratic processes and be able to participate in religious, sporting and family events. Rural access depends on appropriate infrastructure (notably roads, bridges, trails and paths). Mobility may involve walking and carrying, which may be appropriate for short distances and where other means of transport are inappropriate or unavailable. Land transport can also involve work animals, bicycles, carts, motorcycles, three-wheelers, cars, pickups, trucks and various sizes of buses (minibuses, midi-buses and large buses). Each transport mode has its advantages and disadvantages and particular infrastructure requirements. Roads, by themselves, do not provide access, unless there are means of transport. If people do not own appropriate means of transport, they must depend on transport services provided by other people.

In rural Africa, including in Northern Namibia, most people do not own their own motorised transport. Therefore, if they need to travel far to access health, education, markets or economic opportunities, they have to make use of rural transport services. Until recently, rural transport services were a neglected aspect of development, and the problems were generally ignored on the assumption that local, informal-sector entrepreneurs would meet people’s needs. The Africa Community Access Partnership (AfCAP), funded by UKAid, has supported several recent studies on rural transport services in Africa. AfCAP is continuing to promote research, information exchange and evidence-based policy improvements in this neglected area.

AfCAP-funded studies on rural transport services in Cameroon, Kenya and Tanzania found people of different gender, age, occupation and abilities wanted transport services that were available, affordable, dependable and predicable, timely, convenient, safe, secure and comfortable. Various types of people have different priorities but availability, affordability and timeliness are often the most important issues (Kemtsop and Starkey, 2013; Njenga, Opiyo and Starkey 2013; Willilo and Starkey, 2012 and 2013; Starkey et al, 2013a). While people prefer safe and comfortable vehicles to dangerous ones, observed behaviour in numerous countries suggests many people are prepared to overlook comfort and safety in the interests of affordability and timeliness (Starkey, 2016a; Starkey, 2016b). This partly explains the huge growth of motorcycles and motorcycle taxis in many countries of the world. There is evidence from many countries in Africa, Asia and Latin America that motorcycles (and to a lesser extent three-wheelers) are extremely important for rural mobility. They are often the most common vehicles on rural roads, and may carry most people (passenger-kilometres per year) and goods (tonne-kilometres per year). Their issues of cost, comfort and safety are eclipsed by the benefits they provide in their availability, timeliness and ability to travel to villages and houses off the road, according to women and men of many different characteristics (Starkey, 2016a). Motorcycles also provide local employment for operators and many economic and social opportunities for users. For example, in Tanzania, motorcycle numbers increased from 2000 in 2003 to nearly one million in 2015 (Bishop and Amos, 2015) providing employment and opportunities for tens of thousands of rural people. To promote better motorcycle safety, AfCAP has funded the development of a training curriculum for motorcycle drivers, suitable for Tanzania, and elsewhere, and investigations into the roles motorcycle drivers can have in improving safety practices (Transaid, 2015a, 2015b; Bishop and Amos, 2015; Bishop, Malekela and Matheka, 2015).

Current rural transport situation in Northern Namibia

In recent years there has been significant investment in the national road network. Asphalt roads in good or reasonable condition now connect most Namibian towns. On these operate long-distance buses, minibuses and multi-occupancy taxis (jointly ‘conventional’ transport services). There has also been on-going investment in gravel, all-season, feeder roads. ‘Conventional’ transport services have not become common on these roads, although rural taxis may operate on some of the feeder roads.



Figure 3. The default means of rural transport is walking
Photos: Paul Starkey

The Rural Access Index (RAI) is an international measure of access. While there is on-going work on this indicator (Imi and Diehl, 2016), it is currently defined as the percentage of the rural population living within 2 km of an all-season road (Roberts, Shyam and Rastogi, 2006). Surveys suggest that about 70% of Namibia’s agricultural

population live within two kilometres of an all-season road (asphalt or gravel) and are generally within 2 km of transport services (NSA, 2015a). This suggests Namibia's RAI is around 70%. This is high (good) relative to sub-Saharan countries, but is low relative to middle-to-high income countries. However, the same survey results suggest that 24% of the population live more than 6 km from an all-season road and public transport services, including 11% of people over 10 km away (NSA, 2015a). So in the interests of the sustainable development aspiration of 'leaving no one behind', there is an important need to ensure rural transport services and/or mobility for large numbers of rural people.

Rural residents living several kilometres from a road have few mobility options, as most households do not own any form of motorised transport. There is walking and carrying (the default option for most people: see Figure 3), cycling for the few people owning bicycles or travelling in someone else's 'bakkie'. The bakkies are generally the only available form of motorised transport between the remote villages and the towns and services to which people need to travel. However, they present many problems for rural women, men and children. They tend to be unreliable and unpredictable; they are not timely and they can be expensive, particularly if they have to be persuaded to make special trips. They are difficult to access for older and vulnerable persons (they have no steps or seats in the back payload area) and people are often crowded together, standing in the back (see Figure 4). However, from discussions with people in remote villages, the uncertainty and unpredictability of transport are greater concerns than fares and comfort. Rural people prefer low fares, comfort and safety, but their priorities are transport that is available and timely.



Figure 4. Existing pickups ('bakkies') have no facilities designed for passengers
Photos: Paul Starkey

One key remote rural transport need is for evacuation of a sick person, or a woman in labour, in an emergency. That used to be a very serious issue, and people reported travelling in a donkey cart or being carried by neighbours. The increasing ownership of private bakkies in recent years means that most villages or settlements have one or two bakkies based in them. Whether or not these are used to provide public transport services, most families where bakkies are owned are ready to take people to hospital in a genuine emergency. They may charge a fee (USD 10-30), but emergency transport is generally available, and more timely than any ambulance coming from a nearby town would be. Access to emergency transport is no longer the crucial issue it used to be.

In the remote rural areas, bakkie owners are seldom focussed on 'public transport' provision. In urban, peri-urban and inter-urban environments, taxi and minibus owners may invest in providing transport services and build up fleets of vehicles that may be leased to drivers to gain income from providing transport services. In remote rural areas, bakkie owners off-set their costs and supplement their incomes by carrying people into

town, when they are going, or when they think there may be demand. For example, a bakkie owner may commute to town, and on the way stop off at the nearby transport pickup and set down points (often at bar areas known as ‘cuca-shops’) to accept passengers. Other owners may wish to travel to a business or facility in town, and will also stop off to pick up passengers. If their business in town is not vital, they may wait to see if there are enough passengers to cover their costs, and will only go if there are (say) 10 passengers wanting to travel. They may be willing to wait for an hour or two to see if enough people turn up. For the return journey, there may also be long waits and unpredictability for the passengers. Passenger fares are typically USD 0.70 to 1.40 per person per trip for distances of 7-20 kilometres. This is about USD 7-10 cents per person kilometre which is relatively high for communal transport service in Africa. The carrying of agricultural produce and other passenger goods is charged in addition.

Proposed strategy for evaluating and improving rural transport services

Discussions with rural women and men, young and old, farming families, people with disabilities, school teachers and pupils, people in authority and operators of various forms of transport have provided information on the key constraints. A review of international best practices, and consultations with rural residents, regional authorities and other key stakeholders have also provided strategic directions for progressively overcoming the access problems in the short, medium and long terms. A strategy is being considered to enable all four regions to achieve the vision of better, convenient, affordable and sustainable mobility and access to markets and services for rural people.

Due to the unique combination of topographic, climatic, geographic, socio-economic and cultural characteristics of northern Namibia, the optimal combination of appropriate transport services and technologies needs to be evaluated. Therefore, a pilot project (incorporating several elements) will assess appropriate transport services and transport technologies, based on Namibian needs and positive experiences from other countries.

Initial efforts would concentrate on promoting and assessing various methods for improving mobility for people living within identified and suitable transport catchment areas. As the four regional authorities have relatively little experience relating to rural transport services and intermediate means of transport, this would be done sequentially, within one region in the first instance. This will allow adaptive approaches, promotional methodologies and assessment methods to be developed. In this way, the many lessons relating to the different means of transport, organisational responsibilities, promotional methods, training requirements, supply systems, demand management, safety issues and economic viability could be carefully assessed in one region, prior to wider promotion and adoption. After two years, comparable, adaptive promotional systems would be initiated within other transport catchment areas in the three other regions that would build upon the lessons and experiences of the pilot studies. The mix of transport technologies, the promotional processes and organisation and the related training and support systems would be determined by the evaluated lessons of the initial pilot work.

The initial promotional strategy would be based on understanding the different mobility requirements of the many types of rural stakeholders, differing by gender, age, occupation, abilities and their access to funds. Similarly, the strategy would recognise that rural residents also differ greatly in the distance between their homes and their local transport hubs, nearby all-season roads and the nearest key services (shops, markets, schools, clinics, employment, etc). Households, and their transport requirements, are

also affected in different ways by the annual flooding of the ‘oshanas’ (extensive, low-lying areas surrounding villages that are often flooded from January to March).

The strategy would be based on the premise that while most people aspire to on-demand, affordable door-to-door ‘conventional’ transport, the economic reality is that many people will have to walk some distance to reach a ‘bus-stop’ (or transport pickup/set-down point). Scheduled ‘conventional’ public transport service in rural areas might include bakkies and passenger trucks on rough roads, and taxis or minibuses on paved roads. In planning new transport services, the aim would be to have most households within two kilometres of a suitable pickup/set-down point, although this may not be economically viable in all remote rural locations. However, through the promotion of intermediate means of transport (bicycles, electric bicycles, motorcycles and three-wheelers), the prospects of having households with door-to-door mobility would be greatly enhanced. These intermediate means of transport would be much more affordable to own than cars or bakkies. Moreover, they can be used as on-demand transport services to take people from their houses to transport pickup/set-down points either within the villages, or along nearby roads. It has been noted how successful motorcycle taxis have been in many countries in Africa and elsewhere.

The strategy would be to develop the complementary transport systems found in many countries where ‘conventional’ transport services provide services along transport corridors and where intermediate means of transport are used by people to access these transport corridors. The strategy would involve promoting improved bakkies and passenger-trucks where these can be economically viable through carrying sufficient passengers to cover their operating costs while charging affordable fares. Simultaneously, promoting the ownership and use of intermediate means of transport would allow rural residents to access these transport services. Some intermediate means of transport are already used in small numbers (see Figure 5) and are well-suited to short-distance journeys with small loads. In many countries people can obtain employment and income by using intermediate means of transport to meet the localised, short-distance transport demand for ‘feeder’ transport (typically for distances of just one to ten kilometres to allow access to the longer-distance transport).



Figure 5. Bicycles and motorcycles are already used in small numbers.

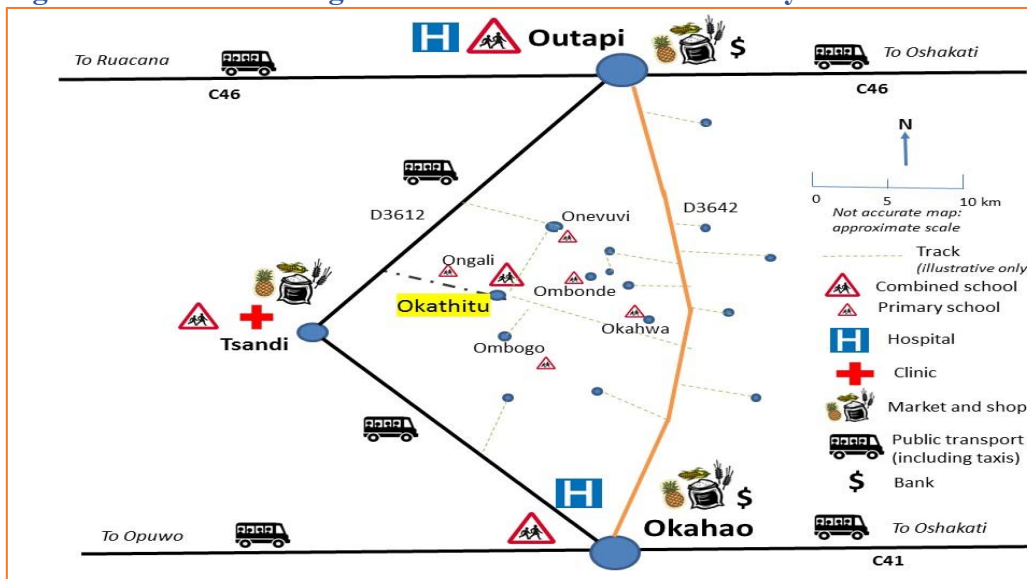
Photos: Paul Starkey

Developing the complementary transport systems would have practical implications relating to supply and maintenance provisions, training systems and infrastructure. The strategy should ensure the provision of appropriate training and safety advice as well as the sustainable, long-term provision of supporting infrastructure, supplies and maintenance systems.

Initiation of a pilot rural transport services project

The Omusati Region has been selected to pilot the technologies and operational systems. This is a predominantly rural region where 48% of the households rely on subsistence agriculture (NSA, 2015a). The regional town, Outapi, is small, but growing rapidly. The second small town is Okahao, and between them, on the paved road, is the very small town of Tsandi. The area around the small village of Okathitu is considered particularly suitable for the first pilot assessments (see Figure 6). This transport catchment area contains about 3000 people and the main village is an appropriate distance from main roads and towns. Although ten private bakkies are owned, there is a clear need for better transport. Okathitu village has a combined school that is 10 km from the nearest all-season road. It also has a bicycle workshop serving existing bicycle users. The workshop is linked to a similar workshop in the regional capital of Outapi. The owner of the workshops is interested in supporting the development of motorised transport, including electric bicycles and motorcycles. Without such workshop facilities it would probably be impractical to promote electric bicycles. In Namibia, these are currently comparable in price to motorcycles, but with much less capacity for income-generation. However, the bicycle workshop is prepared to hire them out on a daily basis, in the same way that motorcycles are hired out by their owners in many countries. This will permit the small-scale trialling of the technology without great financial risks to users or financing agencies.

Figure 6: Schematic diagram of Okathitu area and nearby towns and services



Route-based transport services for villages using improved bakkies

Bakkies are widely used to transport people and their goods in numerous countries. In Namibia (and most of southern Africa) they are generally used without modification. However, in many countries (including Myanmar), they are ‘improved’ for passenger transport with sideways-facing rear bench seats, canopies (to protect from sun and rain) and steps for better passenger access. Such multipurpose vehicles provide better access and comfort when carrying people and their goods, but can still be used for dedicated freight transport to carry agricultural produce, building materials, livestock and other goods. Similarly, where there is greater transport demand, small freight trucks (such as Toyota Dynas) can be similarly modified to carry people and/or goods on rough roads.

A pilot scheme would be developed in collaboration with the regional and local authorities and representatives of the key national ministries. Subject to appropriate planning and agreements, scheduled public ‘improved bakkie’ (or passenger truck) services would be initiated to serve the rural villages around and along the D 3642 gravel road between Outapi and Okahao that currently lacks regular transport services. Designated village pick-up/set-down points would be agreed. The initial investment in improved bakkies (and/or passenger trucks) would be based on potentially sustainable operating models. The modalities for the routes, timetables, fares and funding procedures would be planned and discussed with the key stakeholders that would include the remote rural residents (potential users) and their traditional leaders, existing local bakkie owners (potential operators and/or competitors), existing rural transport operators on the Outapi and Okahao route (potential operators and/or competitors) and the regional and district authorities (potential regulatory and supervisory bodies). Involving the key relevant stakeholders from the outset should ensure sustainable community-supported operational systems are adopted, with local stakeholders feeling they have ‘ownership’ of the principles and ideas (irrespective of the ownership of the vehicles). This would be essential to ensure the new services have a degree of ‘community’ regulation to prevent (or report) abuses of the vehicles and to prevent any possible disruption to the services due to inappropriate competition or resentful actions.

Assessment of intermediate means of transport for rural transport

While regular, scheduled ‘improved bakkie’ services serving all villages in Northern Namibia would be highly desirable, this is unlikely to be realistic. In low-, middle- and high-income countries, sustainable ‘conventional’ rural transport services generally operate along clearly-defined routes (transport corridors) where there is a ‘critical mass’ of fare-paying passengers to keep the services viable. Away from such routes, people have to use personal transport, small-scale, point-to-point transport (taxis, motorcycle taxis) or community-based rural transport services (which are generally subsidised). Therefore, improved bakkie services in the four regions will have to be complemented by other forms of transport, particularly ones that will permit people to travel from their villages to transport corridors where they can find regular ‘conventional’ transport services. The emphasis with the intermediate means of transport would be on increasing local mobility and access to transport services operating on the main road network. Some intermediate means of transport, namely motorcycles and bicycles are already in use in small numbers (see Figure 5).

From discussions with villagers, and from considering the experience of other countries, options for improving mobility between villages/settlements and the road network include bicycles, electric bicycles, motorcycles and three-wheelers. Three-wheelers, in this context, refer to the larger-wheeled ‘motorcycle-based’ three-wheelers suitable for rural use, rather than the small-wheeled, scooter-based ‘Bajaj-type’ three-wheelers that are more-suited to urban environments. All these intermediate transport modes can carry different types of loads of passengers and/or freight. They all have advantages and disadvantages as illustrated in Table 1. They can be operated for individual use, or can provide simple transport services for other people. Interestingly, despite widespread unfamiliarity with the various technologies, rural men, women and young people in Northern Namibia were positive about all these possible options, including motorcycle taxis. This was in contrast to much less positive reactions from civil servants in the capital city of Windhoek.







The pilot project would aim to improve access to schools through bicycle schemes developed in collaboration with schools. These would be linked to secure bicycle parking, bicycle clubs and training in bicycle safety and maintenance. In addition, pilot school transport systems would be developed for isolated combined schools. Most pupils are within reasonable walking distance of their local primary schools, but some face transport problems with the larger distances required to walk to the more widely dispersed combined schools. Therefore, transport between the more distant feeder primary schools and the combined schools would be piloted. With community support and use of vehicles benefitting from project investments (improved bakkies and/or three-wheelers), it should be possible to develop sustainable, small-scale school transport systems, appropriate for isolated rural schools. Pupils travelling to more distant schools would make use of bicycles or a 'feeder transport' service to reach a main road, and travel on from there.

All types of vehicle may struggle in deep sand and flooded conditions, and evidence would need to be gathered concerning the most appropriate mix of rural transport options for the northern regions of Namibia. In the first instance, a range of technologies would be promoted in conjunction with appropriate training and support facilities, including safety training and maintenance of vehicles. Lessons would be acquired from other countries, including, for example, a recent motorcycle training curriculum developed in Tanzania (Transaid, 2015a, 2015b). In addition to training in safety and safe driving, there would be promotion of the use of safety equipment on cycles, motorcycles and three-wheelers (including, suitable protective helmets and high-visibility tabards for identifying motorcycle drivers). Enforcement of safe driving would also be promoted through community awareness and associations of motorcycle operators.

Increased mobility (by walking or by any means of transport) tends to increase the risk of accidents, crashes and injuries. Negative publicity following any injuries/crashes could lead to some opposition to the trials. To reduce such risks, the project must be rigorous with its safety training and from the outset it must also collect clearly-documented evidence of any benefits (social, economic, health, educational, employment, etc.) resulting from the increased mobility that may offset any unfortunate 'costs' that might occur.

The pilot assessments would emphasise the 'feeder-service' nature of the intermediate means of transport. Appropriate facilities would be developed at suitable locations (pick-up and drop-off points) alongside the main transport routes, where people would transfer between 'conventional' transport services and the small-scale 'feeder transport' (improved bakkies, bicycles, electric bicycles, motorcycles, three-wheelers). These may involve shade/shelter, secure parking for cycles and if appropriate, battery-charging and maintenance facilities. The use of intermediate means of transport to travel along main roads would be actively discouraged, as these roads are considered very dangerous. Traffic volumes are low but cars and other vehicles travel very fast, and pay little attention to smaller road users. If intermediate means of transport have to drive into the towns, they would be encouraged to use off-road trails and road-side trails (as do many existing cyclists and motorcyclists). If numbers of bicycles and motorcycles increase, there will be scope for developing existing side-trails as integral parts of the maintained road network.

Table 1: Summary of transport options to be trialed and assessed in remote villages

Vehicle	Advantages	Disadvantages	Suggested uses
Bicycles <i>(Photo: Namibia)</i> 	Flexible, low cost individual transport, can be pushed or carried through sand or water. Few safety risks.	Hard work in sand. Difficult in rainy season. Punctures. Dangerous if used on main roads without cycle lanes.	General promotion with emphasis on school pupils
Electric bicycles <i>(Photo: Namibia)</i> 	Like bicycles but much easier to use particularly in sandy conditions.	Much more expensive than bicycles. Requires supporting infrastructure.	Available for daily hire in village(s) with charging and maintenance by supplier
Motorcycles <i>(Photo: Namibia)</i> 	Very flexible for small scale transport of people and goods. Extremely important in many countries with sustainable, profitable operations, including small-scale transport services (taxis) providing employment and very good village access.	Difficult in sand and flooded conditions. Little protection if crash. Crashes can lead to arm, leg and head injuries if used at high speeds. Dangerous if used irresponsibly or if on main roads with insensitive traffic.	Promote safe uses, including small scale transport services. Encourage sustainable local supplies, maintenance and financing systems. Promote training and safety compliance.
Three-wheelers <i>(Photo: Myanmar)</i> 	Like motorcycles but greater loads (passenger and/or freight) and more stability.	More expensive than motorcycles (this can be offset by greater loads, if demand). Third wheel may be impractical on ridged tracks, so not suitable for all areas. Need wider trails.	Use for simple village transport services (similar to current bakkies but cheaper capital and running costs). Possible use in off-road school transport.
Bakkies (improved) ** <i>(Photo: Myanmar)</i> 	Proven 4x4 all-season access. More passenger comfort from modifications. Best option for on-demand emergency medical transport, if available and affordable.	Expensive to buy, operate and maintain. Due to costs, generally only provide transport services for several people so not affordable for 'on-demand' transport.	Support modifications to improve passenger comfort on existing vehicles. Possible use in school transport.
Passenger trucks <i>(Photo: Myanmar)</i> 	Operate as large bakkies, carrying passengers and/or freight. Robust and good clearance on sandy and flooded roads.	More expensive and so require larger loads to justify investment. No front-wheel drive so four-wheel rear axle may be needed if soft conditions.	Possible use for transport services on earth or gravel roads where demand is significant.

Medium-term measures

The short-term pilot project will start in one region (for two years) and successful experiences will then be replicated in the other regions. Within five years, there should be concrete evidence concerning the economic viability and operational practices of improved bakkies and passenger trucks. Similarly, there will be clear lessons on the potential uses and value of the various types of intermediate means of transport (bicycles, electric bicycles, motorcycles and three-wheelers) and suitable technologies, supporting facilities, training requirements and safety standards to apply. Based on the results in the initial phase, plans can be developed by the relevant authorities to replicate the introduction of the successful technologies. Similar methodologies would be employed relating to identifying appropriate transport corridors and catchment areas with continuing emphasis on sustainable operational systems, support and maintenance facilities, training and safety. However, greater private sector interest is anticipated with proven examples of the growing transport services markets possibly spreading 'spontaneously' into other areas.

Conclusions

Good rural access is known to be crucial for agricultural production, socio-economic well-being and economic growth. It depends on the provision of rural roads and the availability of transport services. Operators of public transport vehicles generally only operate on good roads and/or where there are large numbers of people requiring transport at the same time. Dispersed, rural populations living in settlements away from roads, have particular access problems. In many countries in the world, the problem of dispersed demand and lack of roads is being eased through the use of motorcycles and motorcycle taxis, that can be readily available and timely, and can travel along paths and trails. Rural transport research supported by AfCAP has been documenting the benefits of motorcycles and three-wheelers as well as the policy and training implications to ensure the safety of drivers and passengers.

Although Namibia is a middle-income country, with a good road network, people in remote rural areas in the northern regions face severe problems of access, with almost no rural transport services. The government of Namibia, with German-funded GIZ support, has been developing a Master Plan for four northern regions, that will cover rail, air and road transport. It will address issues of infrastructure and transport services in urban, inter-urban and rural conditions.

The rural transport services planning for northern Namibia involved visiting remote villages and learning of the problems of access for different types of people, and how they are influenced by the sandy trails and seasonal flooding that characterise village access. National, regional and local authorities and key stakeholders in the supply, regulation and maintenance of different types of transport option were also consulted. Lessons from best practices in other countries were shared and discussed. It was agreed that the unique circumstances of northern Namibia required trials of a range of transport options to see which were best suited to the local environmental and socio-economic conditions. Therefore, as part of an integrated Master Plan, there will be facilitated and monitored pilot schemes. These will assess both intermediate means of transport and robust, user-friendly, multi-purpose vehicles that can carry both passengers and freight to and from villages. Intermediate transport modes will include bicycles, electric bicycles, motorcycles and motorised three-wheelers. These may be used for individual mobility as well as provide timely, point-to-point, on-demand transport services.

Modified pickups (bakkies) and light trucks will be used to pilot scheduled transport services on new routes serving villages. All technologies will be promoted with appropriate emphasis on training, safety and sustainable supply and maintenance systems. The medium-term vision is to have complementary rural transport services that have been proven to be sustainable, effective, acceptable and suitable to different types of local people. These should provide timely access to the main road network and to markets, hospitals, schools and other facilities, so improving rural lives and livelihoods and national socio-economic development.

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