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Rural connectivity in Africa: motorcycle track construction

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Motorcycle transportation has burgeoned in war-affected West Africa over the past decade. The penetration of motorcycle taxis deep into isolated rural communities has spread spontaneously and created direct and indirect employment opportunities for low-skilled youth, a category most susceptible to militia recruitment. Equally important, it has significantly contributed to lifting smallholder farmers out of poverty by reducing the costs of moving produce to markets, with motorcycles able to visit villages connected to feeder roads solely by footpaths. Nevertheless, state actors and international donors remain reluctant to allocate funds to rural track building/upgrading, preferring to stick to more conventional, but expensive, construction/rehabilitation of rural roads accessible to four-wheeled vehicles. Through a case study of Liberia – still recovering from two civil wars and an Ebola health crisis – this paper argues that the impact of bringing community access through track construction/footpath upgrading is significant, particularly because track construction lends itself par excellence to the involvement of the rural communities themselves.

1. Insufficient rural transport infrastructure as a major constraint for development in isolated communities

Poor countries face a huge task in mobilising resources to fund rural infrastructure projects. Annual infrastructure spending in Africa is estimated to be US\$45 billion per year (African Monitor, 2012). As much as two-thirds of this is financed by the taxpayer and infrastructure user, with the rest coming from private and external sources. While in many countries road user charges feeding into a road fund have contributed to maintenance spending, there is an absence of these charges in some of the poorest countries, including Liberia (the focus of this paper). In this small West African nation, existing maintenance spending is about half of what would be needed to secure the preservation of new investments in the future (AIKP, 2011). Given Liberia's great needs – nearly all roads and bridges were either seriously damaged or destroyed during the two civil wars (1989–1996 and 1999–2003) – and still recovering economy, finance for road construction and reconstruction is overwhelmingly dependent on international donors. The largest donor, the United States Agency for International Development (USAID), fully recognised the need for road construction when it stated 'Liberia cannot continue to break the cycle of poverty without an effective road network to connect its people and resources' (Nicholson *et al.*, 2014).

With the help of donor funding and (Chinese) foreign direct investment, the Liberian government has made concerted efforts in improving the road network in recent years, connecting the capital Monrovia with some of the provincial towns

and border crossings. However, the road network still falls far short of the country's needs in both coverage and quality. Many roads remain in a state of disrepair, and are not navigable during the 6-month-long rainy season. Furthermore, the extent of Liberia's rural transport network has yet to be fully inventoried and recorded. It is estimated that just 60% of the classified network was in good to fair condition (AfDB, 2013). When compared with benchmark countries, where between 80–86% of roads were in good to fair condition, it is clear just how far Liberia lags behind.

The government's Agenda for Transformation (AfT) – a 5-year development strategy for Liberia that was set out in 2013 by the Ministry of Planning and Economic Affairs – identifies weak infrastructure, and especially roads and power, as a major constraint on development (Mopea, 2013). The Ministry's cost data from December 2012, which set out the full roster of investments required under the AfT to 'launch the holistic transformation of citizen capacity, institutions and infrastructure', estimates the total cost of the 5-year programme to be US\$3.19 billion (AfDB, 2013). US\$1.95 billion is for high-priority infrastructure projects, of which expenditure on roads and bridges will make up 65% at US\$1.269 billion. The task of providing an effective road network that not only links major towns and cities but extends access to Liberia's more isolated communities is daunting considering Liberia's current gross domestic product, which the World Bank most recently estimated to be US\$2.027 billion in 2014. The African Development Bank has thus stated that scarcity of financing and other capacity deficits will not allow Liberia to address its

infrastructure deficits in the near term (AfDB, 2013). Until these deficits are addressed, many rural communities will continue to miss out on the benefits of development.

The agricultural sector is the mainstay for over 415 million people in sub-Saharan Africa, which represents roughly 55% of its population (African Monitor, 2012). The majority of these people are involved in (semi-) subsistence farming, a sector that is characterised by low productivity and which has stagnated for the last three decades. The lack of rural infrastructure is a major constraint on agrarian production. Moreover, the permanent or seasonal absence of road access constrains rural populations' access to essential services such as education and primary health care. With long distances to service centres and high transport costs, access to health services – especially maternal and child health, but also anti-retroviral treatment and vaccinations – is inevitably low (Porter, 2013). This became evident again in the 2014–2015 Ebola outbreak, which claimed more than 11 000 lives in the Mano River countries (Liberia, Sierra Leone and Guinea) and 5000 lives in Liberia alone, making it the worst outbreak in history. In brief, with little or no access to basic services and economic and social opportunities, isolated rural communities remain among the least developed communities in the world. In addition, a large youthful population combined with stagnant or low economic growth is recognised as a considerable threat to the stability of countries and a root cause for violent conflict (Urdal, 2006). In Liberia and neighbouring Sierra Leone, this crisis of youth in rural areas has been convincingly linked to the outbreak of the wars in these countries (Peters, 2011; Richards *et al.*, 2005).

Properly planned rural road links to the formal road network can create new markets and opportunities for isolated communities, spurring economic growth and allowing access to essential services. Over 70% of Africa's rural population lives more than 2 km from an all-season road, making the cost of transporting goods in Africa the highest in the world (Teravaninthorn and Raballand, 2008). In Liberia, only about 45% of households in the country have access to an all-season road within 5 km (Teravaninthorn and Raballand, 2008). Costly access to markets impacts growth potential, as farm gate prices for agricultural produce will be much lower than in more accessible locations. If markets have to be accessed on foot, or if delays are experienced because of a lack of viable transport options, sellers may arrive at a market too late to obtain a good price or to meet any potential purchasers (Porter, 2013). Connecting isolated communities to the road network reduces the cost of inputs and transport to markets, increases farmers' access to larger markets, facilitates trade flows and spurs value addition and crowd-in investments (African Monitor, 2012). Combined, these factors will give subsistence and smallholder agriculture a much-needed boost in productivity and allow subsistence farmers and isolated rural communities to start participating in the cash economy.

Clearly, a lack of connectivity seriously constrains agricultural production and rural development due to the resulting high costs of moving produce around. As stated by the Africa Community Access Programme (Afcap, 2015: p. 1) 'The challenge is to achieve sustainable access at justifiable cost and promote the availability of reliable and affordable means of transport in rural areas'. However, the next section of this paper questions whether the current focus on building a myriad of standard feeder roads directly to isolated communities at relatively high cost is necessarily the best way to achieve sustainable access for rural communities. Instead, it is argued that providing basic vehicular access through the construction of relatively inexpensive motorcycle tracks from villages to a central feeder road is sufficient to bring about the benefits associated with connecting isolated communities to the road network.

2. Motorcycle taxis as intermediate modes of transport

In the past decade or so there has been a rapid expansion in the activities of motorcycle taxis in sub-Saharan Africa. Kumar (2011) notes that, in contrast to South and East Asia, the ownership and use of motorcycles as personal vehicles is limited in sub-Saharan Africa. However, there has been a significant growth in the use of motorcycles as a commercial public transport mode. By far the most common motorcycles are those that are cheaply manufactured in China and India. The low cost of these motorcycles has been instrumental to their spread across the continent.

Czeh *et al.* (2012) observe that the number of commercial motorcyclists grew very quickly due to the lack of reliable and sufficient formal public transport in post-war Liberia. While the motorcycle taxi phenomenon started in Monrovia and the main up-country towns, they became a real game changer in areas where there was insufficient demand to support the traditional yellow taxis and minibuses. The potential for motorcycle taxi services seems to be enormous, with significant benefits for both operators and customers. For instance, Bürge and Peters (2010) note that motorcycle taxis are much more flexible than traditional shared taxis or minibuses: the latter travel on fixed routes, but motorcycle taxis are able to pick up passengers from any location and drop them exactly at their destination. This also allows producers to use motorcycle taxis to transport their produce to market, as taxis can be hired for journeys to or from more rural locations. Porter (2013) notes that motorcycle taxis often constitute the only transport service on offer in more remote rural areas since conventional taxis do not find it profitable to travel to those areas and, in any case, cannot easily negotiate unsurfaced tracks.

The number of motorcycles used commercially in Liberia is around 250 000, but the number of motorcycle taxi drivers was put at twice this number at around 500 000 in 2012

(Czeh *et al.*, 2012). This clearly shows that many motorcycles are used by two or sometimes three drivers, taking shifts, and therefore constitute a great mode of employment for young people. Many of these riders were attracted to the profession by the good wages that can be earned, which can be anywhere between US\$6 and US\$20 per day (Czeh *et al.*, 2012). Porter (2013) stresses the importance of these employment opportunities for hitherto unemployed and often low-educated and low-skilled young men. This type of employment is of particular significance for poor families 'even though ownership commonly rests elsewhere, often among urbanites and salaried professionals who find good profits in the business' (Porter, 2013: p. 16). In neighbouring Sierra Leone, it has been observed that many ex-combatants and ex-child soldiers have embraced the transport sector as a means to earn a living while avoiding the exploitative traditional agrarian institutions that played a part in youths turning to rebel groups during the war (Bürge, 2011; Menzel, 2011; Peters, 2007).

However, insufficient attention has been given to road access for motorcycles given their massively expanded role in many rural transport systems. Motorcycles need a firm cambered running surface and loaded cycles have a high ground pressure, which can be a problem during the rainy season. The construction of purposely designed tracks would reduce the cost per journey due to the less arduous nature of each trip, and thus increase the viability of farmers increasing production to earn cash incomes.

3. Motorcycle track construction as a cost-effective strategy in achieving community access in Liberia

Rural roads form the major portion of the road network in low-income countries but often carry low volumes of traffic. Feeder roads are constructed to serve as 'farm-to-market' roads, but in reality they often fail to reach close enough to the villages they are meant to serve. These villages typically only have footpaths to the feeder road. Walking is the most common means of transport in the rural areas of African countries. In such circumstances, produce must be transported as a head-load in a slow and arduous journey. Head-loading is generally undertaken by women and children, and increased output imposes greater burdens on them. Many villages are dependent on the existing extensive network of footpaths for access to the outside world, where markets and essential services are located (ITTL, 2002).

Feeder roads are constructed at considerable cost. In Liberia, the Ministry of Public Works (MPW) oversees primary, secondary and tertiary (feeder) road construction by international partners (see Figure 1 for the hierarchy of the rural road transport network). All construction of roads that fall into these categories must be built in accordance with the ministry's stringent specifications and adhere to international standards. These specifications, which include requiring feeder roads to

be at least 5 m wide, make construction very costly, at approximately US\$50 000–60 000 per kilometre. Bridges crossing waterways must be able to accommodate cars, minibuses and trucks, something that can significantly add to the costs per kilometre. In short, connecting isolated communities to the road network by constructing feeder roads that adhere to these stringent specifications would be prohibitively costly in the vast majority of cases and, given the limited public funds available to the Liberian government, would not make any economic sense.

Footpaths and tracks make up a significant portion of the transport chain (Figure 1), but they do not fall under the responsibility of the MPW. Rather, they are located on what is classified as 'customary land' and therefore these types of 'off-road infrastructure' can be built to any specifications seen as fit by the local communities. Existing rural paths and tracks have rarely been 'constructed', but have evolved over a period of time, with the passage of people, bicycles, carts and animals dictating their size and standard (ITTL, 2002). This evolution has generally resulted in a good alignment, which balances the shortest distance with the least effort in terms of avoiding obstacles and minimising hill climbing, though sometimes problems with natural paths and tracks do arise, making them difficult and sometimes dangerous for travellers (ITTL, 2002). Problems include marshy and water-logged areas caused by poor drainage; slipperiness and erosion caused by steep gradients; rocky sections; and difficult stream and river crossings (ITTL, 2002). These problems inhibit the movement of people and goods. Even movement by foot can be difficult, increasing transit time further, while motorcycle transport can be further limited due to the narrowness and condition of the paths and tracks. Rarely will a track be navigable by car, or at least not before significant activities have taken place, such as side brushing or (log) bridge repairs.

Simple improvements to paths and tracks can often bring substantial benefits to rural communities, making paths safer and easier to use. Some internationally supported projects have assisted rural communities to improve and upgrade their paths, including the Makete integrated rural transport project in Tanzania, the integrated rural transport project in Malawi and the Kosi Hill Area rural development programme in Nepal (ITTL, 2002). Evidence from Ghana suggests that ensuring basic connectivity to the road network is a key factor for rural communities in benefitting from infrastructure improvements. A now somewhat dated though insightful 1982 World Bank cross-sectional study of villages in the Ashanti region of Ghana, which aimed to determine how agricultural practices, costs and prices varied with accessibility within the region, found that connecting a village to a road head by converting a footpath to a vehicle track was calculated to have a gross beneficial effect of the order of a hundred times greater than improving the same distance of earth track to a good gravel road (Hine and Riverson, 1982). That is, while connecting a

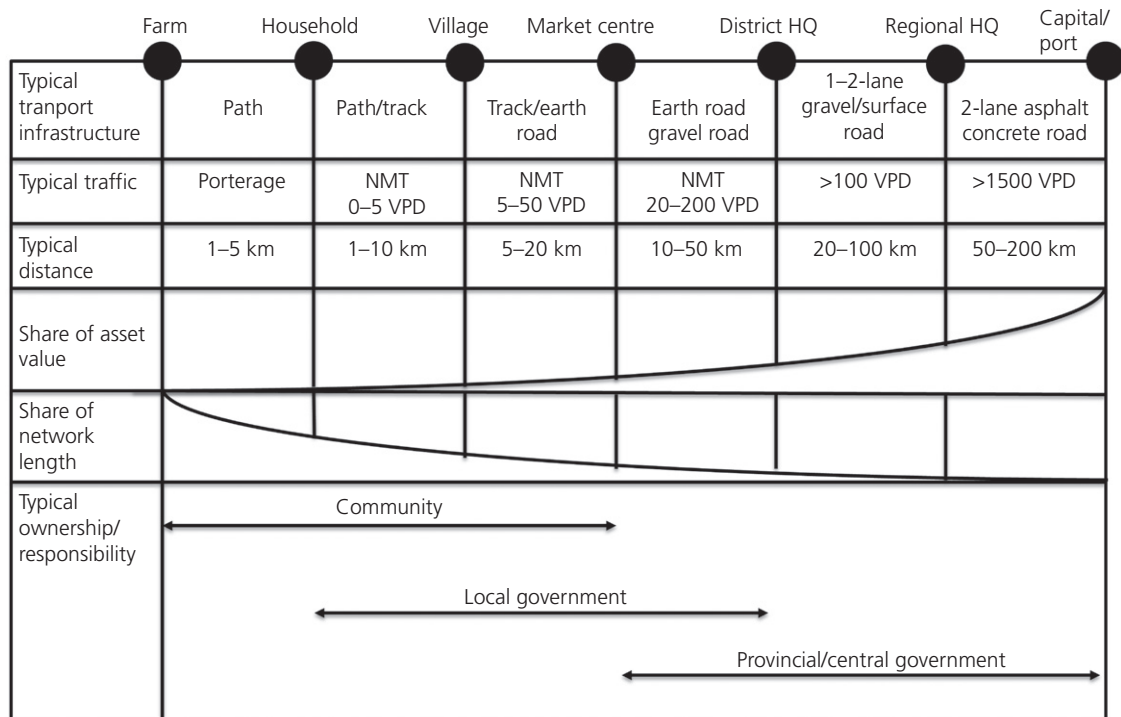


Figure 1. Farm to market transport chain and rural transport infrastructure (adapted from Lebo and Schelling, 2001); NMT = non-motorised transport; VPD = vehicles per day

village to a feeder road with a basic track has a huge beneficial impact, later upgrading that track to a standard road is of no real benefit.

Because head-loading is many times more expensive than vehicle transport, providing basic vehicular access has a substantial impact. In addition, greater improvements were experienced in villages that were originally the furthest from a vehicle-accessible road or track. The negligible effects of upgrading vehicular-accessible tracks to good gravel roads suggest that providing a basic level of connectivity for mechanised transport to the road network is pivotal. This then directly challenges the idea that roads should be built to the stringent specifications set out by the MPW and supported by the donor community. Given the spread of motorcycle taxis around Africa, it is likely that the construction of roads that adhere to the MPW's specifications will have little additional impact on previously isolated communities. Rather, the construction of the much cheaper motorcycle-accessible tracks would be a better strategy, and allow many more people to be reached with the same budget.

Considering the Liberian government's financial constraints, it is argued that bypassing the stringent specifications set out by the MPW and instead constructing or upgrading motorcycle

tracks that are narrower than the MPW's minimum 5 m requirements will bring about a similar level of improvement in isolated communities' access to economic opportunities and essential services but at a fraction of the cost. Typically, a 2 m wide track would cost around US\$3000-4000 per kilometre, so for each kilometre of feeder road on average 15 km of track could be constructed.

As opposed to the width of feeder roads, tracks are much narrower (Figure 2), which is a factor in reducing the cost per kilometre. Savings of a similar magnitude can be achieved for any bridges along the way, as they have to withstand a much lower load capacity and can be constructed from locally available material. As a result, more communities should be reached in a much quicker time frame than if no construction goes ahead until resources are mobilised for full feeder road construction.

However, making the tracks sufficiently wide so that ongoing traffic can safely pass is important. Clearing at both sides of the track is important too, so that visibility is improved, particularly in bendy terrain, and so that pedestrians are able to move out of the way if necessary. The safety of the rider, his or her passenger(s) and other road users remains a challenge for motorcycle transport in rural and urban Africa.

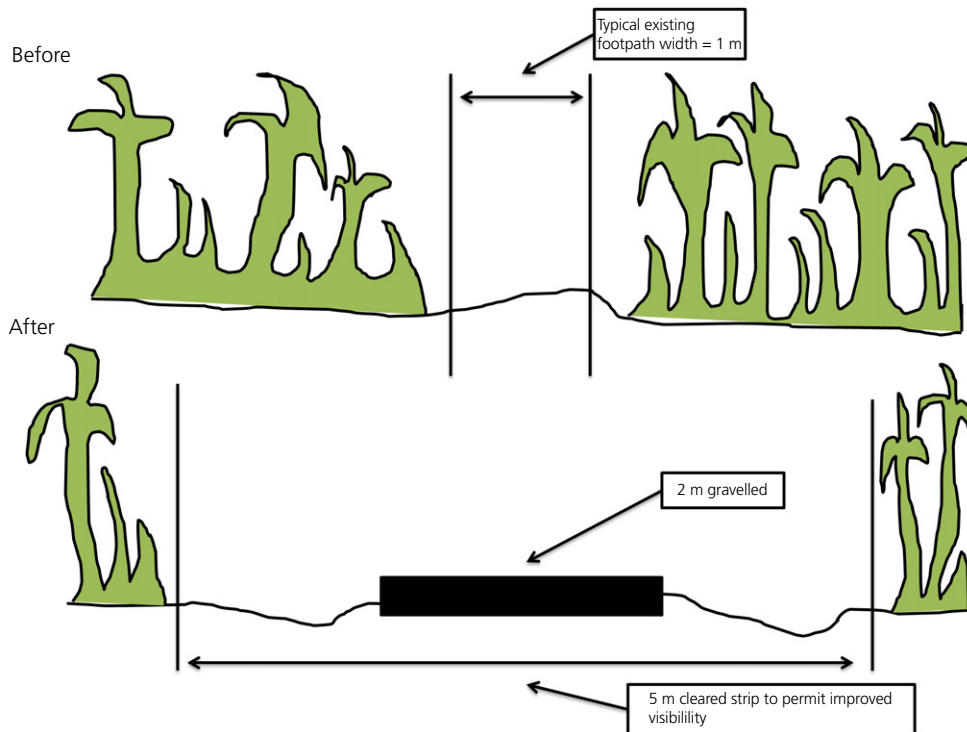


Figure 2. Illustration of how footpaths look before upgrades and how tracks look once upgrades are complete

4. A community-driven development (CDD) approach to track construction

The type of upgrade to be carried out should ideally be demand-driven. A mechanism of delivering development assistance called community-driven reconstruction (CDR), or community-driven development (CDD), is rapidly gaining popularity. The authors argue that CDR/D is particularly well suited for the construction of motorcycle tracks in post-war reconstruction settings. CDD emphasises the engagement of beneficiaries in the design and management of development programmes, often by giving communities direct control over key project decisions, and the CDD methodology has been applied to various types of development, including infrastructure, agriculture, health care and education (Fearon *et al.*, 2008). Fearon *et al.* (2008) state that CDD is widely seen as a mechanism for making development more inclusive, empowering the poor, strengthening governance and enhancing project effectiveness and sustainability.

This type of approach to delivering development assistance in this context has significant utility considering Liberia's recent history. As Fearon *et al.* (2008) note, northern Liberia was one of the areas hardest hit by the violence that engulfed the country, becoming a hotspot during the first war and re-emerging as the epicentre of the second war after 2000. In 2006, the International Rescue Committee (IRC) launched

a CDR programme in Lofa county, giving four premises as motivations for a CDR approach, which can be summarised as follows (Fearon *et al.*, 2008).

- That the cause of conflict often has its roots in poverty and a lack of democratic governance, which cannot simply be addressed at a central level and instead requires the empowerment of communities from the outset so that they drive their own recovery process, creating a sense of ownership of problems and solutions, and restoring the dignity and self-reliance that is often lost during wartime.
- That conflict often has the effect of creating divided communities where inhabitants distrust each other and the notion of government, creating tremendous social and physical barriers to peace and development, which require inter- and intra-community efforts to solve disputes and to foster reconciliation not only for disenfranchised groups, but for all members of the community.
- That special groups such as women, youth and ex-combatants are particularly impacted by war, and must be treated as equal participants in post-war efforts in order to facilitate the process of becoming active citizens and by restoring or providing opportunities for improved livelihoods
- That these goals are best realised when underpinned with concrete action that restores productive capacities.

The IRC's CDR approach generated a number of positive outcomes. First, the CDR programme had a measurable, positive impact on the level of community cohesion. Communities acted collectively to improve their own welfare after the CDR programme ended, with CDR communities significantly outperforming control communities in raising funds to implement various community projects. Second, exposure to CDR appears to have increased social inclusion in beneficiary communities, especially for marginalised groups. Behavioural evidence was powerful, with greater knowledge and awareness of the community project and faith in the chosen representatives, and survey respondents reported less social tension and exhibited greater acceptance of traditionally marginalised groups. Third, it was found that the CDR programme reinforced democratic values and processes, with survey evidence showing greater support for elections and participatory processes (Fearon *et al.*, 2008).

However, for any development activity that involves the community, it is important to be aware of the aforementioned community make-up and realise that villages and communities are not homogenous entities in which all members have the same interests. Rather, communities can be arenas of conflicting interests and stakes. Hence, particular attention should be paid to ensuring that the 'needs' communicated by the community are representative of the whole community and not only of a particular section of it (see also Archibald and Richards, 2002).

Generating a sense of ownership among beneficiary communities must be a key priority of any intervention, to ensure that tracks receive adequate maintenance once construction is completed. Genuine community ownership will ensure that tracks continue to provide good-quality, year-round access in the future. One mechanism available to communities for maintenance is the often obligatory 'community labour', which can be undertaken weekly or fortnightly. However, this is a contentious issue in both Liberia and neighbouring Sierra Leone as, in the past, the burden of community labour fell overwhelmingly on the youth, and particularly on those who belonged to weak lineages, while the benefits of the labour were mainly enjoyed by the chiefs and rural elites. The exploitation of youth by way of community labour happened to such an extent that it has even been linked to the outbreaks of the civil wars, or at least to a large reservoir of willing recruits (see also Peters, 2011; Richards *et al.*, 2005).

Boersch-Supan (2012) argues that things may have changed somewhat and that, now, young people do not necessarily refuse to contribute to community labour activities as such, but like to participate in the decision process of what activity will be executed under community labour. For sure, the maintenance of motorcycle tracks will be in the interest of most young people in isolated communities. There should be a process of continual consultation with community representatives to obtain information on track problems and guidance

on improvements to be carried out. Consideration should be given to the level of current and expected traffic so that tracks can accommodate various forms of intermediate modes of transport, including pack animals (where appropriate), bicycles, wheelbarrows, carts and motorcycles (ITTL, 2002). Making footbridges wide enough for other modes of transport such as cars, minibuses, vans and trucks is costly, making consultation about current and expected traffic particularly important for tracks that cut across water (ITTL, 2002). Again, it is possible to bypass the MPW's specifications for bridges, allowing an engineered timber bridge to be built that provides the required level of access at a fraction of the cost. Discussions should ascertain the required extent of improvements. At this stage, resource constraints should be made clear.

It is practical to require a small community contribution (around 10%) to the cost of imported materials to ensure that the requirements specified by the community are realistic, so that any construction meets a community's needs and capacity but does not wildly exceed its capacity for (maintaining) them, thus keeping costs at a justifiable level. Furthermore, labour and materials will be purchased from the community, so that as much of the infrastructure funds go to the community as possible while, as stated, the cost of construction is kept at a justifiable level. A model used by Cardno, the authors' industry partner, in rural road construction projects in Margibi county, Liberia, can further clarify this. Labour for clearing overgrown paths/tracks, digging up sand and gravel, sawing wood for bridge construction and so on is all provided by the local community but paid for by the development project at basic wage rates. All materials that can be sourced locally (sand, gravel, wood etc.) is bought from the community and paid for by the project as well. All materials brought in from elsewhere, such as cement or steel for bridges or culverts, are paid for by the project but 10% of the overall cost of the imported materials is charged to the community. However, rather than the community paying directly for this, these costs are deducted from the total wage bill, in effect reducing the daily wage for the community workers. Thus, if a community opts for a 3 m wide road, a concrete bridge and a seal that requires imported components, the daily rate for the labour of the community workers is (significantly) lower than if an engineered timber bridge and a seal constructed with locally sourced gravel had been chosen. Table 1 shows this in a very basic format.

Such a model can help communities make more realistic choices with regard to the level of infrastructural improvement they need, and will help them to appreciate the burden of maintenance costs prior to construction. However, a potential conflict of interests may be identified between rural elites, who may be interested in wider roads and stronger bridges given their often larger surpluses of produce, and those who are most likely to provide the local labour, that is, the young and sometimes marginalised youth.

| | Person days | Daily rate: US\$ | Rate after deduction: US\$ | Local resources: US\$ | Imported resources: US\$ |
|--|----------------|------------------------|----------------------------------|-----------------------------|--------------------------------|
| Using mainly locally sourced materials | | | | | |
| Side brushing | 100 | 5 | 4.475 | 500 | |
| Levelling of track | 100 | 5 | | 500 | |
| Hauling and spreading of gravel for track | 100 | 5 | | 500 | |
| Timber bridge | 100 | 5 | | 500 | |
| Timber | | | | 300 | |
| Imported materials for small structures | | | | | 1000 |
| Technical supervision | | | | | 1000 |
| Transport for supervisor | | | | | 100 |
| Total: US\$ | | | | 2300 | 2100 |
| 10%: US\$ | | | | | 210 |
| Available for payment to workers/suppliers: US\$ | | | | 2090 | |
| Less wood: US\$ | | | | -300 | |
| | | | | 1790 | |
| Total cost of track: US\$ | | | | | 4400 |
| Using more imported materials | | | | | |
| Side brushing | 100 | 5 | 2.7 | 500 | |
| Levelling of track | 100 | 5 | | 500 | |
| Hauling and spreading of gravel for track | 100 | 5 | | 500 | |
| Bridge | 100 | 5 | | 500 | |
| Concrete box culvert | | | | | 5000 |
| Imported materials for small structures | | | | | 2000 |
| Technical supervision | | | | | 2000 |
| Transport for supervisor | | | | | 200 |
| Total: US\$ | | | | 2000 | 9200 |
| 10%: US\$ | | | | | 920 |
| Available for payment to workers/suppliers: US\$ | | | | 1080 | |
| Total cost of track: US\$ | | | | | 11 200 |

Table 1. Daily rates in relation to the sourcing of materials, as implemented in a project run by the authors' industry partner, Cardno, in Margibi county, Liberia

If most of the material is imported, the level of the daily wage can drop so far that it will amount to unpaid and thus forced labour. However, given the fact that rural elites are often the ones who own the land and thus the local resources (such as sand, gravel and trees), they have a direct interest in using (i.e. selling) these materials to the project rather than proposing to use imported materials, resulting in a higher daily wage rate. Again, one of the key reasons to dedicate financial resources (in particular donor funding) to track construction rather than (solely) to feeder road construction is that while the latter often uses external contractors and imported materials, track construction uses local labour and resources. This set-up results in more cash entering the community, allowing it to benefit more from the increased connectivity. About 30% of the total construction costs (labour and materials) remains within the community. Therefore, communities will not only end up with

tracks connecting them to larger roads and centres, but also with cash in hand to invest in (cash-crop) farming or other livelihood activities.

5. Assessing the effectiveness of the proposed solution – current research

GIZ (Gesellschaft für Internationale Zusammenarbeit) is funding a pilot scheme to upgrade footpaths to tracks in two village clusters in Nimba county, Liberia. The international non-governmental organisation Global Communities was selected by GIZ as an implementing partner for the construction of tracks. An ESRC/DFID (Economic and Social Research Council/Department for International Development) research grant was secured by the authors to assess the footpath-to-track upgrades in early 2015. This project aims to assess the impact and thus cost-effectiveness of

(a) the construction of motorcycle tracks from villages to a primary road (i.e. the intervention argued for in this paper), (b) the construction of motorcycle tracks from villages to a feeder road and (c) the construction of an arterial feeder road (i.e. the current preference of the government of Liberia and international donors). Another village cluster, which will not benefit from the current cycle of road/track improvements, will act as a control village cluster.

A baseline survey was conducted in April 2016, with more than 230 household surveys, nearly 50 village surveys, 40 roadside surveys and market surveys in four locations. In addition, qualitative interviews with villagers and motorcycle taxi riders in both the treatment and control areas were conducted. The survey instruments were designed to assess villagers' current levels of production and expenditure on consumption and durable goods including education and health care, as well as the financial costs, time taken and level of effort associated with the transport of goods to market and access to essential services.

Global Communities has now commenced with community engagement in treatment areas, with track construction scheduled to begin in November 2016. Tracks are expected to take about 6 months to construct. An endline survey will be conducted in 2 years. While some development indicators may only manifest themselves in 5 or 10 years, the authors anticipate that, even after a single year, the tracks will start to make a noticeable difference to the lives of the previously isolated villagers.

6. Conclusion

This article has identified the lack of rural transport links to isolated rural communities as a major source of underdevelopment and poverty in rural areas of Liberia. While progress has been made in recent years in the construction or upgrading of major arterial roads, which are indeed welcome developments, low-volume roads are the principal mode of transport in rural areas. This portion of the country's road network remains insufficient in scale and standard, with many of the existing roads in various states of disrepair. Considering that motorcycle taxis constitute the main intermediate mode of transport in rural areas and that conventional taxis are a rare sight in these areas due to their high cost per journey, it is argued that the construction of standard feeder roads that adhere to the stringent specifications of the Ministry of Public Works is excessive due to their relative expense and the low marginal utility they bring as compared with motorcycle tracks.

Through a ESRC/DFID-funded research project, the authors hope to quantify the impact and contribution of constructing village to primary road motorcycle tracks and to assess if this is a cost-effective strategy to enable those living in isolated communities to enjoy the benefits of development, which include employment opportunities in both agricultural and

non-agricultural sectors, and allow access to essential services. If this is indeed the case, the relatively low cost of these motorcycle tracks will allow a greater length to be constructed for the same investment, so that a larger number of communities and individuals can be reached in a much shorter time frame than if no construction goes ahead until funds are mobilised for the construction of standard feeder roads.

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