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**Achieving Poverty Eradication through Improved, Inclusive and  
Equitable Transport Systems**

**(Background Paper for EST Plenary Session-2)**

**Final Draft**

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This background paper has been prepared by by Sabrina Engel, Madan B. Regmi and Peter O'Neill, Transport Division, ESCAP for the Tenth Regional EST Forum in Asia. The views expressed herein are those of the author only and do not necessarily reflect the views of the United Nations.

# **Intergovernmental 10<sup>th</sup> Regional Environmentally Sustainable Transport Forum in Asia**

14-16 March, 2017, Vientiane, Laos People's Democratic Republic

## **Achieving Poverty Eradication through Improved, Inclusive and Equitable Transport Systems**

Background paper for the plenary Session 2:  
Achieving Greater Food Security, Women Empowerment, Poverty Eradication through Improved, Inclusive and Equitable Transport System

## 1. Introduction

Poverty is location specific. This does not mean that every incidence of poverty can be attributed to the location the person is living in. There is clear evidence, however, that geographically remote and isolated areas are more likely to accommodate a high ratio of people living below or around the poverty line than in densely populated or well-connected areas respectively. In 2005, globally at least 70 per cent of the 1.4 billion people living in extreme poverty were rural, whereas the ratio is even more pronounced in South Asia (the region with the highest total number of rural poor) and South East Asia, with three quarters of the poor population living in rural regions (International Fund for Agricultural Development 2011). These tendencies are stable and pointing towards a systematic and exacerbating socio-economic comparative disadvantage of rural populations, which needs to be counterbalanced through effective policies.

The relationship between remoteness and poverty has been extensively explained through the detrimental effects of isolation, meaning that if rural communities do not have access to all-season road or inland waterway, connecting them to other markets, urban or peri-urban settlements, development is significantly impeded. These associations between remoteness, isolation and poverty can be observed in the Asia and the Pacific region. Here, 40 per cent of the rural populations are not connected to a wider transport network through a reliable road link, totaling 700 million people (United Nations ESCAP 2015, 103). Evidence from Lao People's Democratic Republic supports the notion of isolation by demonstrating that poverty incidence in unconnected rural villages has been found to be much higher than the national average but also higher than the rural average (Warr 2007).

This relationship should not be confused with causality, in a sense that poverty can be exclusively ascribed to isolation or remoteness. Rather, a multitude of factors determine the livelihoods of rural populations and the variety of rural life has to be acknowledged. As an example, people adhering to different socioeconomic groups but experiencing the same location specific transport disadvantage will have a different likelihood of being impoverished (Lucas 2012). On a household level, poverty can be defined as an asset problem. Since moving out of poverty is associated with personal initiative and enterprise (International Fund for Agricultural Development 2011), certain household characteristics prevent people from exiting their current deprived circumstances. Families can lack the human assets (lack of education, health related problems), natural assets (no private land or declining access to commonly owned resources, physical assets (poor quality housing), financial assets (incomes below the poverty line and no access to formal credit), social capital (small network of relatives and neighbors with little asset holdings themselves and political assets (a person's ability to voice their needs and influence political decision making), which when combined and accumulated can result in persistent poverty traps. Poverty exit is, consequently, determined by the household-specific asset base, which threatens to keep victims trapped in a vicious circle of chronic poverty as subsistence is their main priority and they have no capacity to mobilize additional assets, like investments into professional qualifications or into political mobilization of marginalized groups (Bird, McKay and Shinyekwa 2010).

Depending on the composition of those disadvantages, the symptoms of poverty can impose themselves on the individual level (being a woman), the household level (not having one literate person and a high dependency ratio), the group level (caste system or ethnic minorities), as well as the region (remoteness and unfavorable conditions). Interactions between levels exist and aggravate the effects for the individual (Bird, Hulme, et al. 2002).

It can, thus, be inferred that rurality (being a regional deprivation) does not work in isolation from other poverty-related factors. While geographic isolation is one cause for poverty (affecting the regional level), the rural poor live in poverty partly because they live in rural areas and partly due to other poverty-related factors (Bird, Hulme, et al. 2002), which are typically unequally distributed between and within countries

(International Fund for Agricultural Development 2011). According to Lucas (2012), transport disadvantage, which is specific to an entire community or region and social disadvantage, which is specific to individuals, households and groups, directly and indirectly interact to cause transport poverty, thus handicapping the affected person even further. The result of such an accumulation of disadvantages is inaccessibility, which, in turn, leads to social exclusion. This mechanism explains why transport-related deprivations and geographic isolation particularly negatively affect vulnerable socio-economic groups, and why rural poverty is persistent. Transport planners need to understand the role that transport connectivity plays in the lives of the demographic segments they want to address and the effectiveness and efficiency of various measures, such as providing road access or enhancing the usability of inland waterways. It needs to be acknowledged that poverty is more than the lack of financial liquidity- it limits people's capabilities to participate in the labor market and access health and educational facilities. Special attention should also be given to the livelihoods of women, which differ greatly from those of their male counterparts, as well as their levels of accessibility.

Effective transport-related rural policies can be powerful enablers of the attainment of many of the United Nations' Sustainable Development Goals. Through directly pursuing SDG 9 (build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation) as well as SDG 10 (reduce inequality within and among countries), an indirect contribution can be made to SDG 1 (end poverty in all its forms everywhere), SDG 2 (end hunger, achieve food security and improved nutrition and promote sustainable agriculture), SDG 3 (ensure healthy lives and promote well-being for all at all ages) and SDG 4 (ensure inclusive and equitable quality education and promote lifelong learning opportunities for all), while upholding the principles of SDG 5 (achieve gender equality and empower all women and girls).

Aim of this paper is to offer transport policy suggestions for rural and isolated areas of countries in the Asia and the Pacific region. For that purpose, the impacts of location and policy on poverty will be highlighted first, followed by the state of accessibility in Asia and the Pacific. In the second part, effective and pro-poor public transport policies will be identified, aiming specifically at the improvement of access to income-earning opportunities, education and health services.

## **2. Poverty and Place**

Certain geographic regions are more prone to poverty incidence than others. An example for this would be the fast and accelerating economic growth in cities as opposed to rural areas, which can be explained through the benefits of agglomeration, i.e. increased efficiency of production, markets and social exchange. At the core of such place-based underdevelopment is the physical capital of the region (Bird, McKay and Shinyekwa 2010), including the natural environment (geographic location and isolation, climate and natural resource endowment). Even though with time the relative investment in infrastructure also substantially contributes to the physical capital of a place, it has to be emphasized that rural areas are rural precisely because they lack at least some geographic advantages compared to more densely populated areas (Blank 2005). The fact that urban settlement evolved in response to favorable climatic conditions, locations or the presence of valuable resources, highlights the strategic disadvantage of remote communities and their exposure to poverty.

A variety of proxies for poverty have been employed to research the relationship between place and poverty, including household spending, multidimensional poverty indices, arbitrary poverty lines and income per day, and there is clear evidence for the above outlined mechanisms. In their research conducted in Central Asia, Anderson Pomfret (2004) found that household location was the most important explanation for the variation in expenditure per capita, followed by household composition and education. Bird, Hulme, Moore, and Shepherd (2002) argue that the endowments of an area explain a substantial proportion of poverty and this holds true even once household-specific characteristics have

been controlled for.

Still, today policy makers do have the tools to shape rural life and counteract poverty through targeted initiatives, such as investments in road infrastructure and public services. Even though low population densities, isolation and partly social stigmata against people from those areas make both public and private investments in rural regions comparatively unattractive, they are crucial for raising their overall asset base to a level that allows for socio-economic progress and a substantial alleviation of poverty.

### **3. Poverty and Policy**

It has been argued that place is the root cause for regional underdevelopment and accumulations of incidences of poverty can be found in geographic disadvantages. Nevertheless, these physical deprivations through time also manifested themselves in other disadvantages such as systematic social exclusion. Rural poor populations have been to a great extent marginalized despite comprising hundreds of million people in Asia and the Pacific alone. The cause for this neglect is largely the lack of voice of rural poor, who live far from the economic and political centers of their respective regions and countries. Decision makers are less likely to travel through unpassable areas or on unpaved roads to get to the most remote places, causing information failures, i.e. politicians do not dispose of the necessary information to make appropriate decisions on behalf of the people (Bird, McKay and Shinyekwa 2010).

One major consequence of this invisibility is that regional differences within countries are not only large but growing over time. Regional inequality is reinforced through the uneven allocation of political attention and public resources, such as investments in roads, education and health services (Anderson and Pomfret 2004). In this sense remoteness means that the further away a community is located from political and economic centers, the more they sink below the national and even rural average of social service provision (Bird, McKay and Shinyekwa 2010).

Furthermore, public investment should even out the detrimental effects of market failures, which are over proportionately occurring in rural remote regions. Resources are being extracted at a price that does not reflect the true cost and value thereof, public and private investments remain below the necessary minimum level and where growth occurs it often fails to benefit poor households (Bird, Hulme, et al. 2002).

### **4. State of Accessibility in Asia and the Pacific**

Academics and practitioners alike have repeatedly argued in favor of transport-related measures in order to reduce poverty in rural parts of Asia and the Pacific. Through connecting remote populations to a wider transportation network, barriers to social inclusion ought to be depleted. Aim is to enhance accessibility, where it has been previously lacking to an extent to which socio-economic progress is hindered substantially.

Accessibility, however, is more than the mere provision of a road link. In general, it has been defined as the ease of reaching desired destinations given a set of available opportunities, while facing intrinsic barriers to travel from the origin to the destination. Barriers to access can be found in the time and financial costs of the journey, as well as in the season and weather dependency of the transport modes (especially regions affected by the monsoon and other extreme climate events), the availability of public transport, the feeling of comfort and security and knowledge about transport and user's trust in it. These barriers are significant in rural areas of Asia and the Pacific region and are experienced to a varying extent by people with different socio-economic backgrounds. At the same time, opportunities are determined by individual factors, such as a person's employment status, and journey specific factors like units of distance or time. Ultimately, accessibility can be condensed down to the question whether people

can get to key services at reasonable cost, in reasonable time and with reasonable ease (Niemeier 1997, Kanuganti, et al. 2015, Handy and Niemeier 1997).

Depending on their level of remoteness, rural communities are considerably disadvantaged in terms of accessibility of essential public services. Region and service availability, however, are not independent events. Since accessibility comprises elements of journey times, road access alone might not substantially enable poor demographic segments, as social services might be generally less available in sparsely populated regions and too distant from the village to reach. Accordingly, considerable regional variations exist within countries in this regard (Anderson and Pomfret 2004). A study conducted in the Central Asian countries of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan found considerable variations in the availability of hospitals, physicians, kindergartens, primary and secondary educational facilities within the countries. On top of that, transport infrastructure, including paved roads, were also unequally distributed. In Kyrgyzstan, for example, particularly mountainous areas and the agricultural south were negatively impacted by low levels of accessibility, both due to rough geographical conditions and underdeveloped public infrastructures (Anderson and Pomfret 2004).

The association between inaccessibility and poverty can be observed in Table 1. It shows the relative difference in poverty between comparable households in different regions of Kyrgyzstan.

Table 1: Intensity of Household poverty of Regions of Kyrgyzstan  
in Comparison to Household Poverty in the Capital City Bishkek (Anderson and Pomfret 2004, 13f)

	<b>1993 (before transition to market economy)</b>	<b>1997 (after transition to market economy)</b>
Rural Chuy (province surrounding Bishkek)	+27%	+27%
Urban South	+24%	+65%
Rural South	+68%	+83%
Urban Mountainous Regions	+18%	+80%
Rural Mountainous Regions	+85%	+105%

Firstly, it can be inferred from this that rural regions are fundamentally more likely to witness high levels of poverty than urban areas. While in 1993, households in urban mountainous areas were 18 per cent poorer than households in the capital city Bishkek, having comparable household characteristics, this figure is much higher for the rural equivalent (85 per cent). Moreover, the transition to a market economy demonstrated that geographically disadvantaged settlements do not possess the assets necessary to reap the benefits of free market mechanisms. In order to tackle poverty, public spending has to be allocated in a way that benefits isolated communities.

From the previous analysis the following question can be derived:

*In which way do rural access policies have the potential to reverse the detrimental effects of unequal physical endowments of geographic regions and enhance access to wider economic opportunity, education and health?*

## **5. Inclusive Rural Access Policies**

Access to a wider transportation network has been defined as a condition, without which rural development cannot be prompted effectively (Starkey and Hine 2014). The main reason for this is that by reducing geographic isolation, rural communities are being given access to the mechanisms of free markets, which, in turn, ought to transform local rural economies through agglomeration. Policy planners can use a variety of tools to enhance rural connectivity, such as designing, upgrading or constructing new road links, providing public transport services or enabling effective as well as resourceful modes of using inland waterways. The challenge in any case is to select strategies that do not only induce economic growth but that also reduce inequality, eradicate relative poverty. Nevertheless, it has been argued that roads by themselves do not carry any inherent value for rural communities unless they enable accessibility of key socio-economic institutions, such as clinics, schools and markets, which is a great contributor to wealth generation (Nidup 2016). The worth of a newly established road link increases with the number of nodes connected to the link (Cromhout 2016).

The following paragraphs discuss some policy direction for planning and improvement of rural access that can address poverty reduction, improve access to economic opportunity, education and health.

### ***5.1. Pro-Poor Investments in Rural Transport Infrastructure***

For decades the social development sector has been debating whether investments should focus on high potential areas, i.e. currently underdeveloped regions that dispose of some economic potential, in order to create “growth poles” with positive spillover effects. In practice, these projected benefits largely failed to happen in more remote rural areas. Instead, comparative disadvantages of low potential areas have been aggravated, causing them to further lag behind (Bird, McKay and Shinyekwa 2010). Household data from Nepal, where roads are the prominent transport mode, supports this notion. Whereas an extensive provision of road access did deliver benefits to poor rural households, it was not tailored enough to notably reduce income equality (Jacoby 2000). While economic growth has been found to be the most effective enabler of poverty reduction, more so than pro-poor policies (Li 2014), a study conducted in Indonesia found that it is less effective in remote areas than in non-remote areas (Friedman 2003). Consequently, emphasis needs to be put on targeted programs that ensure pro-poor growth, while avoiding a further increase in regional inequality. Taking a resource-based perspective can be a means to accomplish that. According to Starkey and Hine (2014), transport-induced growth has mainly failed to benefit poor demographic segments because they lack the resources to take advantage of the opportunities awarded by access. Again, in order to address rural poverty it needs to be emphasized that rural poverty is a household phenomenon (Duncan 2007), meaning that different households and individuals dispose of varying human, natural, physical, financial, social and political assets bases (Bird, Hulme, et al. 2002). While comparatively affluent (in this holistic definition) households are typically the first ones to reap the benefits of improved road access and not the chronic poor who are experiencing disability, low education levels and high dependency ratios (Duncan 2007).

In terms of transport modalities, the varying impacts of road links have been researched comparatively thoroughly. According to Starkey and Hine (2014), a study of spatial data from Africa demonstrated the positive impact of reduced travel times to larger towns on agricultural productivity. Investments in minor rural roads were found to be the most economic means of cutting travel times, thus enhancing accessibility for rural farmers. In the People’s Republic of China (hereafter China), rather than the construction expressways, low-volume rural roads have produced the greatest return on investment. Furthermore, the cost/benefit ratio of low-quality rural roads was four times that of high quality roads for the national GDP, while simultaneously lifting far more (rural and urban) poor out of poverty per yuan invested (Sieber and Allen 2016, Fan and Chang-Kang, Road Development, Economic Growth, and Poverty Reduction in China 2005). A study conducted in the Lao People’s Democratic Republic specifies

the types of roads with respect to weather-dependency. The results clearly support the upgrading of roads that are not designed to carry vehicles to dry season roads, because they enable a reducing in poverty incidence that is 17 times that of upgrading dry season roads than all season roads, as well as the six fold effect on GDP (Warr 2007).

Evidence from Timor-Leste, on the other hand, suggests that the task of road maintenance might be a crucial factor in the enhancement of subjective wellbeing, stressing the importance of all-weather road access and road quality rather than the construction of new roads (Chongvilaivan, Taniguchi and Rabanal 2016). Evidence from the Asia and the Pacific region points towards the need to solve the last-mile problem, via investment in community roads, paths and trails in order to meet the accessibility needs of small-scale farmers. Warr (2007) argues that providing road access to communities that have been entirely isolated through construction is highly pro-poor. Still, upgrading and construction are both needed to create balanced, sustainable and pro-poor socio-economic growth.

Transport alone does not provide the universal solutions for the challenge of generating inclusive rural development. Still, it is a fundamental condition for poverty reduction (Starkey and Hine 2014). Additionally, conditions and requirements specific to the countries of Asia and the Pacific, like disposable asset bases, people's entitlement to resources and opportunities and the agro-ecological potential, have to be accounted for in the formulation of any strategy, as well as the livelihoods and constraints of the local poor. As an example, in regions that have low initial levels of market development, small road improvement projects could have substantially higher impacts, particularly if combined with complementary social and economic policies, such as initiatives aiming at raising adult literacy and diminishing historically founded discrimination against ethnic minorities who are systematically excluded from participation in the wider political and economic life (Warr 2007).

## ***5.2. Enhancing Women's Mobility***

In the pursuit of sustainable and inclusive rural transport policy needs to specifically take into consideration the livelihoods of rural women. The traditional female roles in a lot of rural Asian households are loaded heavily with responsibility that differs greatly from that of men (Hettige 2006). Taking care of the children and all other (vulnerable) family members, maintaining household-centric tasks, their daily schedules are fragmented between the different tasks which require their attention.

However, many rural women do not want to remain in situations imposed on them by religious, social and cultural tradition (Ahmed, 2008, cited in Ahmed & Nahiduzzaman 2016). Rather, they aspire to engage in skill development and social interactions with the potential of increasing their quality of life as well as their chances of earning their own income. What has to be emphasized is that women's education and labor participation are important to raising the living standards of their respective households, and, consequently, that of the wider community (Ahmed and Nahiduzzaman 2016). Poverty exit would be facilitated, firstly, through a strengthening of their household's asset base, and secondly, through the diversification of their livelihood portfolios.

Nevertheless, their variety of routine tasks leave them time and energy impoverished (Hettige 2006) and prevent them from participating in such activities, while rural transport infrastructure does not account for their specific needs, such as their preference for late departures from the village and early returns (Starkey 2016). Rural women are very unlikely of owning their own vehicle but their transport burden is high due to the multiple different daily tasks they need to perform (Ahmed and Nahiduzzaman 2016). Despite their higher need for efficient transport modalities, they are oftentimes systematically disadvantaged, because they do not have a separate travel budget at their own disposal (Bird, McKay and Shinyekwa 2010, Hettige 2006).

Accounting for social factors plays a crucial role in meeting the transport needs of rural women. As an example, social norms massively shape the way that people interact with each other and the way they are expected to behave in public. According to Blank (2005) social norms refer to commonly observed behaviors, which is fundamentally based on past common experience and can refer to common history within an ethnic, racial or gender group. They are enforced by social sanctions, whereas their disregard can lead to disapproval among friends and family. Examples include early marriage for girls, preventing the pursuit of higher education, or the expectation that women are not supposed to travel alone in general. Policies that do not reinforce such existing social norms are rather likely to be effective, even if the economic incentive for engaging in the intended behavior is present (Blank 2005). It is not enough to simply create transport link to a community, if social norms discourage women's ability to make use of the new infrastructures.

Transport services and the planning of infrastructure has to understand the gender-specific barriers to transport accessibility, including women's limited budgets, their preference of safe and uncrowded vehicles (Starkey 2016), and their multiple social obligations, requiring them to be present at specific places at specific times.

### ***5.3. Improving Access to Economic Opportunity***

One of the main arguments of researchers in rural development is, that through market access rural producers would be incentivized to move beyond subsistence farming, as potential agricultural incomes justify the effort of intensified labor and other inputs (Bird, McKay and Shinyekwa 2010). Another argument in favor of expanding farming output for the sake of sales, i.e. transport costs. The price for delivering their goods to the next market will be a decisive factor for farmers with low financial capital, because long and tedious travel routes bare high opportunity costs (Bird, Hulme, et al. 2002). The projected effects of improved agricultural productivity are, therefore, an increase in farmers' incomes and in home consumption, higher agricultural wages but also better opportunities for off-farm employment, lower food prices, higher food security and ultimately reduced intensity and incidence of rural poverty (Fan, Yu and Jitsuchon 2008). In areas with high potential in this sense, a connection to the wider transport network facilitates market entry for commercial firms, trading in high value crops and engaging in contract farming with local small-scale farmers (Asian Development Bank 2016). However, as mentioned above, substantial disparities exist with respect to the agro-ecological endowment, that disadvantaged communities might be rather unlikely to unleash the potential of commercial agriculture, particularly if they are not even able to meet her basic needs (Benson et al, 2005 cited in Bird, McKay and Shinyekwa 2010). Still, the importance of agriculture in poverty reduction cannot be neglected. In a large scale longitudinal study conducted in India from the 1970s onwards, researchers (Fan, Gulati and Thorat 2008) found robust evidence that public investments in agricultural research were the most effective in boosting agricultural growth and alleviating poverty, followed by education and rural road projects. What is more, investment in rural roads had a significant positive impact on agricultural wages. This can also hold true for regions where agricultural potential is low, under the condition that transport connectivity enables seasonal migration to bordering high-potential areas (Asian Development Bank 2006). Consequently, if rural transport connectivity has the potential to unleash a rural region's agricultural potential it can be an avenue for poverty reduction through economic growth and market development.

If rural policy planning is to induce a transformation of rural economies for the purpose of sustainable development, a purely agricultural focus is not enough, as this would mean that communities remain stuck in the primary sector, which is prone to price fluctuations and climate-related crises. In fact, off-farm work is being regarded as a crucial poverty interrupter, but it tends to be clustered in areas with well-developed transport infrastructure (Bird, McKay and Shinyekwa 2010). With an increase in rural connectivity and simultaneous rising incomes of farmers, individual opportunities arise for them as well

as for other members of the community. Ideally, there are avenues for smallholder farmers for the establishment of non-farming enterprises, as the reliance on agriculture is connoted with high risk and pressure to continuously increase production. Bird et al. (2000, cited in Bird, Hulme et al. 2002) concluded that the poorest households are trapped because of their little diversified livelihood portfolios. Successful routes out of poverty occurred where households first diversified within agriculture via high-value crops, then including non-farm activities and, finally, specializing on the latter. Transport infrastructure is equally essential for non-farm businesses as they need to efficiently procure raw materials and sell manufactured goods. Nevertheless, constraints exist in the form of lack of access to credit, nonagricultural skills, information on new activities and input and output markets (International Fund for Agricultural Development 2011). It cannot be assumed that through the provision of road access alone, all of the projected processes will be triggered. Rather, complementary policies aiming at reducing these barriers are urgently required.

Besides farmers' sources of income, rural roads should contribute to the livelihoods of the share of population that does not dispose of agricultural assets via a structural transformation of the local economy. A large data set from India's rural road construction program that provided paved roads to 100,000 previously unconnected villages since 2000 supports this notion. The share of households and workers in agriculture decreased by 10 per cent, while an equivalent surge of wage labor market participation occurred. The authors (Asher et al. 2015, cited in Sieber and Allen 2016) explain this through a facilitation of access to external labor markets via commuting or short-term migration. Similarly, Randa (2011, cited in Sieber and Allen 2016) observed not only an increase in working hours after road construction in rural Nicaragua, but also a graduation process of labor. The most disadvantaged groups were able to move from unemployment to agricultural work, while newly created service sector jobs were taken by previous farm workers.

#### ***5.4. Improving Access to Education***

Even though enabling rural populations to participate in the labor market, rural development policies need to look beyond the element of deprivation in the attempt of alleviating poverty in a sustainable manner. Fan, Gulati and Thorat (2008) found that in India direct public investments in education had the second highest impact on poverty reduction, followed by rural roads. Low levels of education can be regarded both as a fundamental reason for poverty and social exclusion and a result thereof. In areas where not only the road network is sparse but also educational facilities are scarce (Bird, McKay and Shinyekwa 2010), accessibility is naturally low due to long distances and high opportunity costs, meaning that the hours in which a child is commuting to and from school cannot be spent in a productive manner in and around the household. It is the poorest households, in turn, that mostly depend on their children's labor to sustain themselves, thus aggravating their educational disadvantage. Road and educational investments should, consequently, not be evaluated in separation of one another, as safe and reliable all-season road access has the potential to lower barriers to rural children's school attendance.

Evidence from the mountainous regions of the Lao People's Democratic Republic, where only half of the overall road network can be relied upon, clearly shows that villages with no road access discourage school attendance for boys and girls, as well as per capita expenditure on education (Warr 2007). Still, literacy and skill development are important enablers of poverty exit, because in a market-based economic system labor is rewarded for its productivity. As a result, person-specific abilities and skill sets manifest themselves in a variation of incomes across society (Anderson and Pomfret 2004). In an assessment study on the Rural Infrastructure Program (RIP) II in Bangladesh, significant positive educational developments have been identified in terms of primary school attendance (+0.65 per cent), lower secondary school attendance (+26 per cent) as well as upper secondary school attendance (+16 per cent) (KfW, 2013, cited in Sieber and Allen 2016). This higher positive impact on secondary school attendance reinforces the role of rural transport infrastructure in poverty alleviation. A difference in

difference study comparing wealth segments between 2007 and 2012 in rural Bhutan showed that higher school education had significant explanatory power for the wealth of the richest households, while very poor and poor households did not dispose of the asset base to invest in the future of their children in a similar fashion (Nidup 2016). Rural transport policies need to make a meaningful contribution to even out current inequalities in the access to educational opportunities.

Nevertheless it has to be emphasized, that imbalances do not only exist with respect to access but also to the quality of rural teaching. As remote areas are disadvantaged socially, economically and politically, resource flows from central and regional governments to local institutions can be unreliable, qualified teaching staff is less likely to be attracted to those communities (Bird, McKay and Shinyekwa 2010, Bird, Hulme, et al. 2002). Consequently, rural poor populations have to pay for disproportionately high shares of their disposable incomes to send their children to school, in return of quality that is worse than anywhere else (Anderson and Pomfret 2004). Additionally, rural education might also be delivered in inappropriate forms that do not account for local life, such as male teachers being responsible for young girls, teaching in the national rather than the local languages, in a culturally insensitive manner or ignoring the seasonality of rural livelihoods (Bird, Hulme, et al. 2002).

Within the group of rural children, girls are systematically disadvantaged regarding their opportunities to pursue education. Studies from developing economies strongly point towards a pro-male bias in parents' attitudes towards education, as well as substantial disadvantages on the labor market, leading to lower rates of female schooling. On the one hand, parents might not recognize the value of a prolonged investment their daughters' education, particularly when societal convention projects an early marriage that involves dependency on the husbands' income. Simultaneously, the current labor market might not encourage qualified female participation. Nevertheless, human capital investments in girls' have been found to rise once employment opportunities for women that require more education have increased (Messer and Litschig 2015). This implies that investments in transport connectivity have multiple effects on poverty through education. Education has very high direct impacts on agricultural productivity and poverty reduction. Secondly, through transport-induced market development, new avenues for education could open for girls as the labor market evolves in their favor. More specifically, however, girls are also discouraged from pursuing their education due to personal safety concerns while commuting to and from school, including fear of sexual assault and other physical abuse (Messer and Litschig 2015). Transport policies and interventions should be targeted at young girls and women, making their trips faster and safer, so as to reduce barriers to schooling and enhance girls' chances of accumulating skills and knowledge.

Taken together, education is essential in improving impoverished rural people's lives and providing them with meaningful opportunities for skill development and income earning. For this task, transport and direct education policies need to be combined in a way that reflect local circumstances and substantially reduce barriers to education to an extent that justifies prioritizing studies over work. Ultimately, the accumulation of human assets has to be enabled.

### ***5.5. Improving Access to Health***

Together with access to education, academics and policy makers usually emphasize the importance of access to health services for the improvement of rural livelihoods, and similarly, human health can be viewed as both an effect of poverty as well as a reason for it. For people who are experiencing poor physical or mental health, are less likely to succeed on competitive job markets, thus have fewer assets for the attempt of exiting poverty.

Access to health has been described as the "ability of a population to receive appropriate, affordable and quality medical facilities when needed" (Kanuganti, et al. 2015, 311). From this definition it can be

inferred that transport is a crucial element in overcoming the geographic separation between people and medical facilities. High opportunity costs of getting to distant medical institutions prevent rural people from consuming preventive health services, maternal health care, medication and fast emergency care. Combined with deficiencies in potable rural water supplies and sanitation, rural communities are at much higher risk of (maternal and infant) mortality (Bird, McKay and Shinyekwa 2010). In fact, physical isolation is one of the most crucial determinants of the mortality rate in developing economies (Kanuganti, et al. 2015). Here, disability largely stems from preventable conditions strongly linked to communicable, maternal and perinatal diseases and injuries. Very poor health, which is a large contributor to chronic poverty, is a feature of remote rural life (Bird, Hulme, et al. 2002) and a result of political neglect. Evidence from Papua New Guinea further emphasizes that a cut in travel time to the nearest main road link to 2 - 3 hours significantly lowers the headcount ratio by over 5 per cent (Gibson and Rozelle 2003).

It can, however, not be assumed that through a connecting link to the wider transport network alone, prospective patients will always be able to dispose of those services. Whereas there is, for example evidence from the Lao People's Democratic Republic, that rural villages without road access suffer from significantly higher rates of sickness (Warr 2007), the act of connecting rural villages has been found to produce mixed results in improving the health of local communities. An evaluation of the Indian government initiative Prime Minister Gram Sadak Yojana (PMGSY) unveiled that connected villages have an accessibility score to health services of 70 per cent, while unconnected villages have a score of 40 per cent, indicating that the impact of rural road construction on the accessibility of medical facilities is merely 30 per cent. One reason for this is that a road link might not reduce travel times enough to justify a trip due to the long distances, as well as well as the lack of affordable transport modes (Kanuganti, et al. 2015). Furthermore, it has been found that the more remote and economically marginal a region is, the more likely the locally provided health services are to fall below the rural average (Bird, Hulme, et al. 2002). This detrimental effect of distance on the provision of effective medical care has even been documented in cases where citizens have been protected through universal health protection. In Thailand, for example, people are less likely to make use of free health services, the farther the travel distances and in Viet Nam the relationship held true for the lowest income households but not higher ones (Kirduang 2011), stressing the crucial factor of affordability of transport services over the mere provision of roads. In wider economic regions, which are marked by underdevelopment, the network of the entire health system might be too sparse to, to see any effects of road access on the accessibility of clinics, as they will still be beyond the reach of affected villages. Such scenarios call for investments on the other end of the transport route. More specifically, health services should be delivered to a cluster of neglected villages in order to minimize travel times while, simultaneously, maximizing service quality (Kanuganti, et al. 2015).

Accessibility is strongly linked to the first of the three delays in health care, i.e. (1) the initial decision to seek health care (especially peri-natal care), (2) reaching the medical facility in time and (3) receiving appropriate treatment at the facility (Starkey & Hine, 2014). Perceived distance, lacking information, lacking means of public transport services and the subjective feeling of safety and comfort lower the likelihood of seeking treatment. Moreover, the access to health is determined by the quality and affordability of the local services, which if perceived as bad can further discourage the utilization of health services while resorting to alternative treatments at home or such available within their proximity. For policy planners this implies that a meaningful improvement of rural health care provision might be facilitated through the provision of transport connectivity. Whilst road construction, for example, might make services more approachable (if travel time is reduced sufficiently), but before any effective policy intervention can be made, the local health care needs as well as the status quo of the health network have to be assessed thoroughly (Kanuganti, et al. 2015). Only then, targeted programs combining transport-related, health care and social measures can be developed and, ultimately, delivered.

Women's health care in rural setting is largely also a transport problem, and a substantial one too. The Maternal and Infant health, in particular, is affected by the availability and quality of the local transport services (Bird, Hulme, et al. 2002). Each day around 830 women worldwide die due to preventable pregnancy-related causes, whereas 99 per cent of these cases are located in developing countries, and the likelihood of being affected is higher for women living in rural or poorer areas. What is more, most of the 303,000 women's deaths in 2015 could have been prevented. The Asia and the Pacific region is over proportionally affected by this health issue, with one third of worldwide casualties taking place in South Asia alone. The barriers for enabling safe childbirth to women in remote areas are diverse, ranging from lack of information over the prevalence of alternative cultural practices (World Health Organization 2016). However, distance and poverty are main hurdles when it comes to reproductive health care, thus increasing the pressure to making women's health a key objective of transport policies.

### **Case Study: Maternal Health in Papua New Guinea**

Papua New Guinea, a developing country with a rural population of 87 per cent of 6.4 million inhabitants, the transport infrastructure is poorly developed and the health system performance declining, leaving remote populations isolated and between 37 and 53 per cent of pregnant women without skilled care during childbirth. The results of these deficiencies are devastating. Papua New Guinea has the second highest maternal mortality rate in Asia and the Pacific and one of the highest in the world with 733 maternal deaths in 100,000 live births. Intriguingly, however, between 60 and 78 per cent of pregnant women seek antenatal care at least once from their health care provider, implying that rural women do recognize the importance of professional medical advice during pregnancy. So why is it that these high figures do not translate to birth itself, even though rural women are aware the importance of medical assistance?

Researcher identified a multitude of reasons for why rural women in Papua New Guinea gave birth at home and/or without medical assistance. Firstly, social barriers kept them from going to the hospital, as the pregnant women were not the only decision makers in this scenario. Rather, they are under the pressure to comply with the opinions of their husbands, mothers, mothers-in-law, grandmothers and even traditional birth attendants and village-based health care workers. Secondly, where women had been prepared to go to the hospital, many transport-related barriers prevented them from doing so. The long distances and inadequate or unavailable transport services relate to the first delay in healthcare, i.e. the decision to seek help, whereas the urgency of labor enforces the risk of the second delay in healthcare, i.e. the delay to reach care in time. So, with the prospect of having to walk long hours and having to give birth on the way, women tend to opt for a comparatively safe situation in their own home, possibly with assistance from local birth attendants.

The inadequacies of the local transport system, be it the provision of hard infrastructure or that of public and private transport services, and social customs interact in a powerful manner, thus creating strong and dangerous barriers to health access. This accessibility problem can be exemplified by the difficulty of poor rural women in labor, trying to find a vehicle which would take them to the hospital. Naturally, the women in the hinterland of Papua New Guinea do not have the financial assets to be able to afford their own car or motorbike. Alternatively, private operators are likely to deny them service due to the ingrained belief that blood associated with menstruation and childbirth has poisonous properties. This holds true particularly for men. Taken together with the lack of affordability of ambulances and even community-based transport, women are often being left behind in unsafe environments that threaten their own life and that of their unborn children.

For transport policy may have the potential to improve maternal health in the long run. Still, such an endeavor requires a coordinated, socially acceptable blend of infrastructure investments and service provision. In the case of Papua New Guinea, short term health-centric interventions are needed, such as

motherhood education and birth preparedness, which involve key family members (husbands, mothers and mothers-in-law). Eventually, policy planners have to identify ways to lower travel times to clinics and hospitals.

*Source: Vallely, et al. (2013)*

## **5.6. Rural Transport Services**

One of the biggest misconceptions about rural accessibility is that providing villages with a road will automatically lead to market development and reduce journey times for poor demographic segments (Bird et al., 2002). Due to the lack of a variety of assets that impoverished households are experiencing, they are in many cases not able to extract substantial value from the provided infrastructure. As their financial capabilities are limited, using their own motorized vehicle is in many cases no option. Consequently, the role of public transport services cannot be overemphasized in the attempt of connecting disadvantaged rural populations. However, especially in developing countries, the supply of public transport in rural regions is inadequate, thus further impeding the mobility of those people most, who most rely on them (Kanuganti, et al. 2015).

Rural users' preferences and needs are shaped by their everyday lives and to a large extent dependent on people's disposable incomes. Besides affordability, rural dwellers favor transport modes that are predictable, dependable and timely, because negative experiences with unreliable services strongly discourage travel. This has substantial detrimental effects on the intended outcomes of the previous infrastructure investment, i.e. economic growth, market development and a rise in labor participation. Particularly, when targeting poorer households, their priorities need to be understood in order to enable actual mobility of people and goods. In general, they would choose the cheaper transport mode over a pricier option that might provide more comfort or safety (Starkey 2016). In terms of the accessibility concept this implies that for the rural poor, the "reasonable cost" aspect of getting to key services is the most important factor, ahead of "reasonable time" and "reasonable ease".

Where price is the final decision making factor, the quality of the service can be compromised. Rural public transport modes can take various forms, ranging from large busses over midi-busses and minivans and motorcycle taxis. Each of them is appropriate in different terrains and on different road surfaces and each of them is associated with different levels of comfort and safety. In recent years, motorcycles have become the most common vehicle type on low-volume roads, and due to their low cost per passenger and their flexibility also the dominant form of rural transport service. However, the use of motorcycle taxis combines multiple sources of risk, such as the ignorance of helmet laws, bad road conditions, unfavorable weather, accommodating an illegal number of passengers, lack of insurance and qualification (no driver's license) (Starkey 2016). Taken together, these adverse conditions put users at a high risk of being involved in road traffic accidents. This notion is amplified by WHO data (2015). While globally nearly a quarter of all road traffic deaths are among motorcyclists, the South-East Asian region and the Western Pacific region making a disproportionately large negative contribution to this statistic, each accounting for 34 per cent of the world's motorcyclist deaths.

There is a systematic political neglect concerning the establishment of rural transport services in the Asia and the Pacific region, where very few financial and human resources are allocated to the development, regulation and planning of this sector. This holds true for both governments and aid agencies. Attention is typically focused on rural infrastructure investments and maintenance as well as on urban / inter-urban transport services. The expectation that once transport infrastructure has been established, the private sector will eventually meet the demand for rural transport did foster some small scale entrepreneurship. However, these operators are struggling to sustain themselves without systematic institutional guidance (Starkey 2016).

It cannot be denied that roads without transport services run the risk of forgoing the intended benefits of the initial investments. The true potential of infrastructure investments be it in rural roads or inland waterways, is only released if rural populations are being given complementary, affordable, timely and comfortable modes of transport (Kanuganti, et al. 2015). The development and use of local solutions via small- and medium scale private operators needs to be encouraged, as they might be available, feasible and affordable. Thus, they can substantially enhance rural people's mobility. It is true that over regulation could inhibit these undertakings (Starkey 2016). Still, rural poor households should not have to make the tradeoff between mobility and personal safety. Local governments should find a way to effectively enforce traffic laws and explore new ways of enhancing passengers' wellbeing and safety. As an example, regional governments could provide free safety instructions and incentivize lawful behavior, or even equip rural communities with motorcycle helmets free of charge.

## **6. Conclusion and Recommendations**

This paper analyzed the effects of rural accessibility on poverty reduction, in terms of access to economic opportunity, education and health. It has been argued that the geographically disadvantaged regions are less likely to experience the mechanisms of agglomeration and substantial market development. Furthermore, the resulting low population density and the adverse climatic and topographic conditions in rural regions in Asia and the Pacific discourage public investments in diminishing the diverse reasons for isolation of rural communities. Rural households experience a variety of interacting deprivations, relating to their human, financial, physical, social and political assets. For poor families, transportation can be powerful in connecting them with wider economic opportunity, be it in the accumulation of financial assets through the access if out-of-town labor markets or the formation of human capital via education and an improvement of their health status. These insights were essential in deriving the following inclusive policy recommendations:

### ***6.1. Targeted Infrastructure Investments***

Areas with high and low agricultural potential should be identified so that situation-appropriate policies can be applied. Governments should put focus on the lower end of the rural road network like footpaths and feeder roads, in order to address the last mile problem. Providing some basic infrastructure where there has been previously no connection whatsoever has been found to be highly pro-poor. At the same time, local circumstances have to be factored in. Many countries in Asia and the Pacific region are subject to substantial seasonally varying weather conditions. Here, the upgrading of existing infrastructure might be more important in addressing poor households. A blend of construction, upgrading and maintenance activities is recommended depending on the local priorities.

### ***6.2. Rural Transport Services***

As poor households have substantially higher opportunity costs in trying to use rural transport systems to their benefit, investments have to acknowledge rural people's living conditions and daily routines. While infrastructure investments are crucial for poverty alleviation, they have to be accompanied by complementary investments in appropriate transport services at a feasible cost. Furthermore, locally-operating private entrepreneurs should be supported with training and possibly even subsidies. This could improve service availability and quality alike and as a result significantly increase the likelihood of enhancing the rural poor's mobility. For them, financial constraints are the most salient in the decision to take a trip to social institutions or elsewhere, and long distances divert time from productive activities around the house.

### ***6.3. Enhance Access to Labor Markets***

While agricultural incomes are expected to rise in areas that have the necessary geographical assets, a shift to off-farm work is necessary for sustainable poverty exit. Transport systems should, therefore, facilitate access to labor markets and short term regional migration and commuting. Coordinated and reliable public or private transport services, again, are required to enable poor people's employment in external markets and consequently, transform the local economy in the long run.

#### ***6.4. Enhance Access to Social Institutions***

In rural settings of Asia and the Pacific, access to health and educational services respectively is only partly limited by inadequate transport systems. Rather, poverty is a major restricting force to mobility and the consumption of social services. The poorer the household, the higher the opportunity costs of travelling to schools or hospitals. Transport policies need to significantly decrease travel times to a level that is justifiable by impoverished households. Besides the time factor, the quality of the institutions is a major decision factor. In very distant rural regions public investment should, therefore, prioritize the provision of additional hospitals and schools for larger cluster of villages. Multiple key stakeholders like transport authorities, health providers, social services and local governments should collaborate to synergistically produce strong outcomes on behalf of the rural poor. Villages in medium distance from the closest facilities, on the other hand, could benefit over proportionally from the provision of a road link.

#### ***6.5. Enhance Women's Mobility***

All barriers to accessibility are amplified for women, whose welfare and economic integration is essential to achieving sustainable economic growth and a notable reduction in rural regions of Asia and the Pacific. Social, religious and cultural constraints, such as local expectations as to how to behave in public, dictate rural women's ability to access vital social institutions and markets which would have tremendous positive impacts on themselves, their families and the community. Therefore, policy makers need to take a gender focus and design solutions that target rural women specifically. Transport systems have to enable the socially conform use of transport services. Additionally, programs with the purpose of educating villagers and reducing these barriers should be implemented. These could include the provision of vehicles with appropriate seating, no overcrowding, at affordable prices and at times that fit the daily schedules of rural women.

A transport strategy can be an enabler of pro-poor development but it has to be formulated as part of a wider poverty strategy (Blank 2005). The local circumstances and specific deprivations of rural people have to be thoroughly understood if transport developments are supposed to benefit impoverished groups specifically. In general, it can be said that because rural poverty is a multidimensional phenomenon, one-dimensional attempts at solving the problem are unlikely to succeed. This is why transport policies have the potential of alleviating poverty, but only in collaboration with other sectors.

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