



IMPROVING RURAL ACCESSIBILITY AND CONNECTIVITY IN ASIA – A REGIONAL INITIATIVE

Background Paper for the Plenary Session 4:
“Accessibility and Connectivity – Central to
Achieving the SDGs” of the High-Level 14th
Regional Environmentally Sustainable
Transport (EST) Forum in Asia

ABSTRACT

There is significant evidence on the fundamental role of rural accessibility to reduce poverty by improving access to economic opportunities, education, and health services. Still, hundreds of millions of people in rural areas in Asia and the Pacific are trapped in poverty due to the inadequacy of the transport system. The background paper presents policy principles aiming at guiding and supporting the implementation of the 2030 Aichi Declaration. It further introduces the concept of a regional initiative to accelerate progress in rural accessibility in Asia, building on those principles.

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October 2021

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1. Introduction

Rural connectivity is a lifeline for roughly 50% of the population of the Asia-Pacific region. Rural areas across much of Asia and the Pacific are undergoing profound economic, social and demographic changes. Movement of people and goods, ideas, values, and cultural practices are being exchanged both physically and virtually across communities in different forms, creating new opportunities but also risks that have been heightened by the COVID-19 pandemic. In this regard, enhanced accessibility and connectivity in rural areas plays an important role in rural development and in enhancing economies of scale and agglomeration, expanding thus opportunities across multiple development dimensions.

However, COVID-19 has clearly shown how a lack of access to connectivity infrastructure and services is rapidly reversing gains made in the reduction of rural poverty over the past two decades and widening inequality gaps between people in urban and rural areas. Already prior to COVID-19, the majority of people suffering from extreme poverty in South and South-East Asia predominantly lived in rural areas. In Indonesia, for instance, despite the general progress in economic development, pockets of extreme deprivation persist in many rural locations. In 2019, one rural household in five did not have enough food for all members (World Bank, 2020a).

Rural connectivity has improved over the past decades with more and more roads built that link villages to cities. The Rural Access Index (RAI), which measures the proportion of the rural population who lives within 2 km of an all-season road, has increased in Asia. For instance, only 17% of the rural population had road access in Nepal in 2003 compared to 54% in 2015. In Bangladesh, 37% had road access in 2000 compared to 87% in 2015 (World Bank, 2006; World Bank, 2020b). The difference between the old and new RAIs must be considered carefully though, given that they were determined using fundamentally different methodologies and data (World Bank, 2016).

However, access to infrastructure connectivity in rural areas is still limited in most South and South-East Asian countries. Studies on transport connectivity have shown that in Afghanistan (33%) and Myanmar (34%) less than half of the rural population live within 2 km of an all-weather road. In Bhutan, Nepal, and Kazakhstan, less than 10% of the rural roads are paved (UNESCAP, 2017). Poor transport connectivity was identified as a major cause of peri-natal mortality in the hills of Nepal (Shrestha and Workman, 2008). Moreover, there are large disparities in access within the region and within countries. In Indonesia for instance, the share of villages with asphalted roads in 2018 amounted to 94% in Java-Bali while it was only 23% in Papua, and all other regions were still at least 20% points behind (World Bank, 2020a).

A diverse range of rural transport modes and services can be found in the Asia and Pacific region. In many rural areas, non-motorized transport modes, such as walking, cycling and riding animals, are still the predominant mode for first/last mile connectivity, while human and animal traction and agricultural machinery such as tractors are commonly used to carry agricultural produce. Informal sector entrepreneurs also provide services, including trucks, pick-ups, 'rural taxis', motorcycles, bicycles, and animal-drawn carts (UNCRD, 2015).

Against this backdrop, the present paper reviews the challenges in improving rural accessibility and connectivity in the Asia-Pacific region, presents evidence of impacts of rural transport policies and projects in improving access to economic opportunities and essential services such as education and health, in reducing poverty and inequality, and in contributing to achieving the SDGs. It proposes policy principles that form the basis for launching a regional initiative aiming at improving rural accessibility and connectivity in Asia.

2. Challenges in rural accessibility and connectivity

While most countries have good rural transport policies and strategies, many still need to strengthen their planning and project implementation capabilities. Lack of funding, coordination, technical know-how and capacities are often cited as bottlenecks to achieving anticipated progress (UNESCAP, 2017). While decentralization is considered as an opportunity for improving rural accessibility given the priority accorded by local governments to enhancing rural access and their proximity to rural communities, it may also represent a challenge. In Indonesia, decentralization has led to fragmented and weak institutions managing sub-national roads, making it very difficult for a coordinated approach to address the maintenance backlog. Public works departments at district level have limited capacity and lack training. They generally lack technical skilled staff, which contributes to less efficient maintenance work (World Bank, 2012a).

Accessibility is not merely the provision of roads or transport services. Accessibility involves whether people can get to key services at reasonable cost, in reasonable time, and with reasonable ease, given the inherent barriers they face in commuting (Engel et al., 2017). Many countries in the region have invested in their rural road network with a focus on rural road length. As a result, the rural road network has expanded significantly. The quality of the roads remains, however, a significant barrier to mobility of rural residents. Besides expanding rural road networks, upgrading and maintaining existing access represents a major challenge (UNESCAP, 2017). In Bangladesh, for example, the Local Government Engineering Department (LGED) has emerged as a nodal agency and a well-established maintenance planning and budget allocation system. However, only about 20% of the estimated requirement for rehabilitation and maintenance of all roads is allocated in LGED's budget each year (Sunil et al., 2020).

Additionally, investments in first/last mile transport systems including access roads, trail improvements and trail bridges, which would enable to connect remote settlements and farms, are often neglected. Some of the reasons mentioned include the limited capacity of the local governments in planning and mobilising finances, and the complexity of land acquisition. Finally, rural transport needs to be better integrated in a broader vision of the transport system, enabling thus to connect different levels (e.g., from village roads to regional and international networks) and hence contribute to connectivity (UNESCAP, 2019).

The transport system in most countries in Asia is not socially inclusive. While it is generally assumed that transport infrastructure is gender-neutral, with men and women benefiting equally, recent studies have shown that mobility patterns differ between men and women and the benefits accrued vary due to their assigned gender roles (ADB, 2011). Specifically, "mobility is experienced differently by women and men, as they use different modes of transport for different purposes and in different ways depending on their socially determined reproductive, productive, and community-related gender roles." (ADB, 2013). Concretely, women tend to bear a disproportionate share of transport burdens to fulfil their domestic, social and economic roles (World Bank, 2012b). The International Labour Organization (ILO) estimates a reduction of 16.5% in the participation probability of women in the labour market in developing countries, owing to the limited access to and safety of transportation. This indicates how inadequate transport can be the greatest obstacle for equal opportunities for women (Kurshitashvili et al., 2020).

Policy makers are challenged with a lack of gender-disaggregated mobility data crucial for developing solutions that are inclusive (UNESCAP, 2020a). Moreover, women are greatly underrepresented in the transport sector incl. in policy-making positions. The International Transport Forum estimated that in the Asia-Pacific region, women are found in fewer than 20% of transport jobs. The barriers to women's participation in transport work are influenced by persistent gender stereotypes about women's suitability for transport work, which deter women from entering the sector, shape their experiences in the job and can negatively affect retention (Wright, 2021). Studies have also shown that women are likely to experience "time poverty" and have the added pressure of juggling several tasks, which ultimately limits their ability to benefit (ADB, 2011).

Further, they are particularly underrepresented in senior roles in the transport, logistics and infrastructure sectors. As a consequence, gender perspectives are less likely to be considered in decision-making. Including women more systematically in the transport sector and in the decision-making processes is therefore essential for designing transport systems that respond to gender needs (UNESCAP, 2020c).

The number of elderly and disabled people is increasing in Asia. An estimated 690 million people in Asia and the Pacific have some form of disability, including physical disabilities, blindness or low vision, deaf or hard-of-hearing, those with cognitive/developmental disabilities, learning and psychosocial disabilities, and finally, those with multiple ones together (UNESCAP, 2019b). The transport system should thus be designed in a manner that is equitable, affordable, and responsive to all groups in the society, including men, women, children, elderly, and the disabled.

Whereas the socio-economic impact of rural transport projects has been demonstrated (see Ch. 3), they may also represent a risk, particularly for livelihood assets and the environment, if not adequately designed and implemented. A study on the impact of rural road developments on livelihoods in northern Laos revealed the “short-term benefits of the maize feeder roads on poverty alleviation and rural development, but also the negative long-term effects on agroecosystem health and agricultural productivity related to unsustainable land use” (Castella and Phaipasith, 2021). The authors conclude that whether roads do harm or good to local livelihoods lies in the capacity of local communities to negotiate the road for their own interest. This highlights the crucial importance of involving local communities in rural transport interventions from the design stage, and of ensuring community empowerment is an integral component of any rural transport project.

Rural road development can have negative environmental consequences such as deforestation, landscape fragmentation, increased landslides, the spread of invasive species and the threat to biodiversity (Charlery et al., 2016). Sound environmental impact assessments incl. the design and implementation of protective measures are considered as essential elements of any rural transport projects. Besides, labour-based road construction as opposed to the use of heavy machinery such as bulldozers can limit environmental impact while increasing the benefit in terms of employment and income. Green roads enable optimization of water harvesting, flood retention, sedimentation and erosion control, thereby reducing damage to the landscape surrounding the roads, reducing water-related damage, and making the beneficial use of water with roads possible. There is obviously a trade-off between the local short-term economic and social benefits of better access and the long-term ‘costs’ to the environment. Recent studies suggest new types of analysis to prioritize rural roads based on both their economic and social benefits, and their potential negative environmental impact (Hine et al., 2019).

Climate change impacts rural transport infrastructure (e.g. heavy rains, landslides, and erosion). In Bangladesh, for instance, more than half of all roads are exposed to flooding and large sections of the transport network are vulnerable to flooding and other natural disasters (ADB, 2021). This calls for a risk-based approach and innovation in road design and asset management. Resilient rural transport infrastructure is also an essential element to respond to disasters (e.g. support to remote communities in case of earthquakes, flooding, and conflicts).

A key challenge in developing transport connectivity infrastructure in rural areas is economic feasibility. This is due to low volume of traffic demand, low purchasing power, governance problems, and negative externalities, such as worsening road safety. This suggests that rural transport connectivity should not be viewed in isolation, but as part of a broader network of services, which in turn supports a wider economic and social system. Besides, illustrative calculations estimate that it may cost more than \$100 per head of population served to achieve universal access using higher volume rural roads, but only \$5 to \$10 per head served using basic access and motorcycle trails. At this lower level of costs, it may be possible for even the poorest countries to approach universal rural access by 2030 (Sustainable Mobility for All, 2019).

One of the major obstacles is the fact that rural connectivity has not received priority attention. Clearly, governments are faced with competing development priorities with global challenges such

as decarbonising transport requiring enormous investments. This calls for a reflection on how to put rural accessibility and connectivity higher on the political agenda, and what financing instruments, incentives, and support mechanisms could accelerate progress in rural access.

3. Evidence of impact of improving rural access

Transport-related measures have repeatedly been identified by academics and practitioners as effective ways to reduce poverty in Asia and the Pacific. A condition for development of a region is access to a wider transportation network as a way to reduce geographic isolation and provide rural communities the opportunity to access the mechanisms of free markets. This, in turn, helps transform local rural economies (Engel et al., 2017) and breaks barriers to social inclusion, which have hindered socio-economic progress substantially. The challenge of improved accessibility is not only to induce economic growth, but also to reduce inequality and eradicate relative poverty.

Accessibility of transport improves access to economic opportunity. One of the main arguments supporting this is that improved transport networks enable the rural population to access markets, especially for farmers, thereby incentivising them to move beyond subsistence farming and increasing agricultural incomes (Engel et al., 2017). Another argument in favour of improved accessibility is the expansion of farming output due to lower transportation costs. Accessibility increases agricultural productivity, which in turn is reflected in better home consumption, higher agricultural wages, better opportunities for off-farm employment, higher food security and ultimately reduced intensity and incidence of rural poverty.

A longitudinal study by Fan et al. (2008) conducted in India from the 1970s onwards found that education and rural road projects were the second most effective means of boosting agricultural growth and alleviating poverty, even in areas where agricultural potential is low, provided transport connectivity enables seasonal migration to bordering high-potential areas (Engel et al., 2017). Moreover, rural connectivity creates opportunities outside of agriculture; this notion is supported by India's rural road construction programme which has provided paved roads to more than 100,000 villages since 2000. Consequently, the share of workers in agriculture decreased by 10%, with an equivalent surge of wage labour market participation. Additionally, improving access can also support the development of rural tourism.

Evidence from various studies suggests a positive impact of rural roads on income and household consumption of grains and non-food items. The studies conducted in low income countries (incl. Bangladesh and Nepal) reported a substantial impact on income. It is interesting to note that the highest impacts were amongst the poorest and most remote communities. Further studies also suggest that rural roads have a positive impact on the choice of occupation and on job creation. Investment in rural roads consistently promotes an increase in non-agricultural employment. Besides, road construction and maintenance is itself a source of employment. The Department for International Development (DFID) funded Rural Access Programme (RAP) in Nepal uses labour-intensive construction and maintenance of transport infrastructure as an entry point for improving the poorest and most marginalised people in remote areas. Since its start in 2001, it has built 1,100 km of new roads and provided 19.5 million person days of employment for poor people (Hine et al., 2019). A study conducted in Indonesia indicates that if the main policy objective is to generate employment for low and unskilled workers, promoting labour intensive road construction will generate twice the number of jobs compared to capital-intensive road construction (ILO, 2010).

Transport access improves access to education. Low levels of education are both a fundamental reason for poverty and social exclusion and a result of it as well. Fan et al. (2008) found that direct public investments in education in India had the second highest impact on poverty reduction, followed by rural roads (Engel et al., 2017). Therefore, it is imperative that road and educational investments must go hand-in-hand and not be evaluated as separate from one another – safe and reliable all-season road access can lower barriers to school attendance of rural children.

Review of studies from different countries highlighted that improved rural roads and access to bicycles have a generally positive impact on school enrolment and attendance, particularly for younger children and girls. However, in one example (India) there was a decline in attendance of 14 to 20 years, which is interpreted as resulting from better access to employment opportunities (Hine et al., 2019).

Another key benefit of accessible transport is that it improves access to health services, which in turn improve rural livelihoods. Similar to education, human health can be viewed as both a cause and effect of poverty; those experiencing poor health – physical or mental – are less likely to succeed on competitive job markets, thus, having fewer resources and assets to exit poverty (Engel et al., 2017). In Pakistan, 58% of births in villages were assisted by a skilled attendant where there was road access, compared with 39% for women without road access (Norman, 2013). Adding the already poor supply of resources in rural areas such a clean water and sanitation, rural communities are at a much higher risk of mortality.

The evidence of the studies analysed by Hine et al. (2019) suggest a positive impact of rural roads on health through increased and faster access to health care resulting in improvements in the adoption of preventive health care practices and reduction in morbidity. Access to an all-season road was found to have significant positive impacts for women with increases in the awareness of contraceptives and the presence of women welfare committees within villages. Rural households were also found to be more likely to have access to potable drinking water.

Improved accessibility also results in enhanced social networks, and access to information and ideas. Improving rural access is also likely to accelerate digital connectivity. Further reported social impact of rural access projects include social cohesion, women empowerment, strengthening local expertise, and enhanced community resilience. However, it must be noted that these projects put emphasis on community mobilization and give a strong voice to communities in the design, implementation, and maintenance of rural access interventions. In those cases, the reported impact is related to the implementation approaches rather than improved accessibility. Rural access interventions that strongly rely on community construction were reportedly less affected by the COVID-19 pandemic. Trail bridge construction in Nepal, for example, has only slightly slowed down in 2020. Rural access interventions are also highlighted as effective COVID-19 response or economic recovery measures as they provide employment and income, contribute to food security (improved market access), and support the health supply chain (transport of medicines, oxygen, vaccine roll out). Finally, some organizations build on community construction of rural infrastructure incl. rural roads or bridges to promote cross-border cooperation in fragile border areas (“roads for peace”).

Rural accessibility is also considered as an instrument for disaster risk reduction. Because of their exposure to natural disasters, people in Bangladesh, for example, need weather and climate information including early warning on a constant basis. Lack of accessibility does not only limit access to early warning information but also to cyclone shelters, which substantially contributes to the number of casualties caused by extreme weather events (Ahmed and Eklund, 2019).

Rural access, besides being directly addressed in SDG indicator 9.1.1 (RAI), is thus also a pre-condition to achieve many other SDGs. Rural transport will contribute to poverty alleviation (SDG 1), food security (SDG 2), health (SDG 3), education (SDG 4), empower women in rural areas (SDG 5), facilitate access to clean water and sanitation (SDG 6), promote inclusive growth and economic opportunities (SDG 8), contribute to sustainable infrastructure (SDG 9 and 11), and increase climate resilience and adaptation in rural areas (SDG 13) (Sustainable Mobility for All, 2019).

4. Policy principles

UNESCAP is in the process of finalising a new regional action programme on sustainable transport development (2022-2026) by strengthening the social dimension of transport. Promotion of policy frameworks to improve rural, rural-urban, and peri-urban accessibility, addressing vulnerabilities and climate change impacts on rural infrastructure and their contribution to reduce poverty and inequality are some of the priority actions being considered within the new thematic areas “Inclusive transport and mobility”. The following policy principles are based on lessons from rural access interventions, particularly in Asia and the Pacific. They provide a discussion basis for guiding and supporting the implementation of the 2030 Aichi Declaration and ESCAP’s new regional action programme on sustainable transport development (2022-2026), with a focus on rural accessibility. They are also at the core of a regional initiative currently being initiated by Helvetas and UNESCAP to improve rural accessibility and connectivity in Asia (Annex A).

4.1 A systemic approach to rural accessibility

Lessons from rural access interventions confirm the importance to shift from an infrastructure-centred to a systems approach. Rather than focusing on building x km of roads, the question is how to effectively build the required capacities, institutions, and policies to ensure sustainable access. What are the bottlenecks in the current rural transport system, and what is the stakeholders’ vision for the future system? What system changes, such as capacity building, institutional and policy development are required to gradually transition towards the future vision? Adopting a systemic approach is expected to be more sustainable (changes are identified and promoted by permanent system actors rather than external ones) and conducive to large scaling up (system changes are integrated in a government programme from the start).

A systemic approach also helps identify promising cross-sector collaboration. Combining rural accessibility and market linkages (e.g. getting a good understanding of the demand for specific crops or products, and developing partnerships with the private sector), for example, is likely to multiply the socio-economic impact of rural transport initiatives. Other cross-sector initiatives such as rural transport and disaster risk reduction, climate resilience, rural tourism, or digitalization are expected to result in high development impact and, in turn, contribute to reducing inequality.

4.2 Focus on leaving no one behind (first/last mile access)

Considering the number of competing development priorities governments are faced with, a phased approach is proposed. Based on the lesson that the rural transport sector might have too often focused on the construction of feeder roads, a first phase could consist in focusing on the most remote communities by prioritising access improvement around the existing road network, for example, by building motorcycle trails, bridges, and access roads enabling to connect remote settlements and farms (first/last mile access). Those communities, given the difficulty in access, are usually left behind; they do not benefit from development investments in various sectors incl. education, health and hygiene. Besides, improving first mile access would significantly reduce post-harvest losses and facilitate agricultural marketing, thus contributing to small-holder agriculture, which provides one of the key pathways to poverty reduction through food security for people living in rural areas (Bradbury, 2018). Providing access to the most remote communities would turn the Agenda 2030’s core idea of leaving no one behind into reality. The proposed phased approach is in line with the 2030 Aichi Declaration’s concept of setting nationally relevant, short (2025), medium (2030) and long term (2050) targets.

4.3 Strengthening local governance

Rural transport initiatives have proved to be an appropriate entry point to strengthen local governance, incl. the effectiveness of district or municipal coordination, planning, budgeting, procurement, quality control, monitoring, and maintenance. They were particularly able to strengthen capacities of local governments in participatory processes, considering the voice of the communities incl. women and marginalized groups in formulating their demands, transparency (e.g., in the procurement process), and accountability. Such initiatives provided the opportunity to support the reflection on the appropriate distribution of roles and responsibilities between the central and the decentralized governments, incl. financing responsibilities (devolution of power, fiscal decentralization). They were opportunities to build the capacity of local governments to establish and facilitate a dialogue with the communities, strengthen social cohesion and prevent conflicts.

One of the lessons of the Nepal trail bridge sector development is that local bridge committees that were created early on represented the nucleus of local governance. Moreover, decentralization and strengthened local governance was one of the key elements enabling large scaling up of the trail bridge technology. It also proved to be a key element of rapid response (e.g. reconstruction after the 2015 earthquake) and a key ingredient of resilience (e.g. continued bridge building during the COVID-19 pandemic).

It is therefore suggested to ensure that rural access interventions systematically include strengthening capacities of local governments through training and coaching, institutional building, and sharing experiences and tools related to local governance. Additionally, it might be useful to pilot the integration of new tools such as GIS-based needs assessment tools in the local government's planning process (e.g. district development plans).

4.4 Integrating rural access sector development and humanitarian response

The proposed systemic approach implies strengthening the capacity of transport ministries, local infrastructure departments or road agencies in effectively developing their rural transport sector. This includes, for example, coaching the setting up of a rural transport unit, development of the regulatory framework, design of financing mechanisms for construction and maintenance, establishment of processes and instruments related to the coordination, financing, planning, and monitoring of rural transport efforts.

Capacity development efforts should also comprise emergency preparedness incl. prevention, mitigation and response to humanitarian emergencies. This might include the identification of critical infrastructure, preparation of contingency plans, incl. a budget for emergency response, and definition of coordination mechanisms with other Ministries and humanitarian actors.

Responding to the COVID-19 pandemic

COVID response is currently an urgent priority of many governments. In Nepal, for instance, the construction of one trail bridge provides an estimated 2,600 person-days of paid labour for a community. Enhancing rural accessibility is thus a good entry point to create jobs and income, improve food security (through the additional income and improved market access), and strengthen the health supply chain (e.g. transport of medicines, oxygen, and vaccine roll out).

4.5 Tackling climate change and building resilience

The integration of a climate lens into rural transport programmes incl. adapted road design and asset management is considered as an important element. ADB, for instance, is mainstreaming climate adaptation measures into its transport operations incl. preparing technical guidelines on the identification of critical infrastructure and on climate change adjustments for engineering

design. Moreover, experiences with green roads in different countries demonstrated the potential of the approach in enhancing resilience, both in terms of erosion control and water reuse opportunities for the local population. In parallel, environmental risks should be considered carefully, particularly deforestation and threats to biodiversity.

Building capacities of road agencies and other key actors in climate change consideration and promoting innovation and exchange of experiences related to climate resilient design standards, good practices for road asset management, and green roads will support mainstreaming of climate adaptation measures into rural transport programmes.

Green Roads for Water

There is probably no intervention globally with more impact on surface hydrology and landscapes as the construction of roads. Roads obstruct the flow of water, guide run-off, and accelerate it, and in the process trigger erosion and sedimentation. Moreover, particularly in rural roads, water is the main cause of damage. All this can be turned around by developing 'green roads for water' - These are roads that have secure transport functions combined with beneficial water management and climate resilience. The opportunities are abundant: road bodies and road crossing can be used to systematically harvest water; road bodies and culverts can control water levels in wetlands and agricultural areas. Integrating road and water development can contribute to flood protection, sand harvesting, regreening, nature protection and sand dune control. The Roads for Water Consortium is led by MetaMeta (an organization specialized in land and water management, headquartered in the Netherlands) and aims that by 2025, in at least 50% of the countries in Africa and 25% in Asia, 50% of all roads are water buffered.

4.6 Promoting women empowerment

Women have less access to employment generated in the transport sector (in construction and maintenance, transport services, and transport agencies) due to under-representation in engineering, cultural issues over women working outside the home, and difficulties of organising childcare (Tanzarn, 2019). However, there are good examples of rural transport initiatives in which more than half of the people involved in construction are women, or that promote women entrepreneurs.

A number of studies conducted in recent years in different countries resulted in the development of Guidelines for Mainstreaming Gender in Rural Transport. They provide a step-by-step guidance on how to mainstream gender in transport policy and planning, sector institutions, infrastructure improvement cycle, and provision of transport services using illustrative examples (Tanzarn, 2019).

Ensuring the dissemination of those Guidelines and other relevant documentation, piloting their implementation, and continuing to identify and document approaches that are effective in empowering women are important next steps to contribute to mainstreaming gender in the rural transport sector.

4.7 Sound planning and monitoring using new technologies

Considerable progress has been made in recent years in the use of new technologies for rural transport planning. A new methodology for measuring the Rural Access Index has been developed enabling thus to identify and prioritize needs more efficiently and hence better target transport investments. The new methodology relies on spatial data and techniques, and uses open source

data including population distributions from WorldPop¹, road networks from OpenStreetMap and rural boundaries from the GRUMP database (TRL Ltd., 2020.; <https://rai.azavea.com/>).

The new methodology has the potential to considerably facilitate rural transport planning and monitoring at local and national level. However, efforts are required to disseminate knowhow on the new methodology and integrate it into the local and central government's planning and monitoring procedures and instruments. This needs to be well coordinated with ongoing/planned international support to build the capacity of statistical systems in Low Income Countries. Additionally, this needs to be well integrated in local planning instruments such as district development plans reflecting community demand.

The use of new technologies such as drones, satellite imagery, mobile phone data and social media has the potential to improve additional rural transport functions such as road asset management. A better understanding of the potential of such technologies and their related risks, incl. data privacy breaches, is considered as a valuable element to enhance the efficiency of the rural transport sector.

The **Rural Access Index (RAI)** is one of the most important global development indicators in the transport sector and was adopted as the SDG indicator 9.1.1 to measure the progress of Target: 9.1: Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all. The index was developed by the World Bank in 2006 and aims at measuring the share of rural population who has access to all-season roads, conventionally, within 2 km, or equivalently, 25-minute walking distance. A roadmap has been developed to achieve Tier 1 by 2025. The custodian for RAI is World Bank, with the United Nations Economic Commission for Europe (UNECE), United Nations Environment Programme (UNEP) and the Asian Development Bank (ADB) as partners. A United Nations task team on Measuring Rural Access Index currently focuses on the roll out of the RAI.

ADB has initiated the **Asian Transport Outlook (ATO)** to strengthen the knowledge base on transport in Asia and the Pacific region. The ATO is developed in support of the planning and delivery of ADB transport sector assistance. At the same time, the ATO supports Asian governments in transport policy development and delivery. ADB is working with other interested parties in developing the ATO as an instrument to track the implementation of the Sustainable Development Goals, the Paris Agreement and other relevant international agreements on sustainable development in the transport sector. Likewise, the ATO also serves as input in regional transport initiatives, such as the ESCAP Regional Action Programme for Sustainable Transport Development in Asia and the Pacific, the ASEAN Kuala Lumpur Strategic Action Plan and the Environmentally Sustainable Transport Forum 2021-2030 Declaration on Sustainable Transport.

4.8 Integrating rural transport in regional connectivity efforts

Rural transport should not be viewed in isolation, but as part of a broader transport network, which in turn supports a wider economic and social system. "Vertical connectivity", or connectivity between micro-, meso-, and macro-level networks², is becoming increasingly important for the development of agricultural value chains; access to jobs in urban areas; the reduction of food loss and waste; rural tourism; health supply systems; disaster preparedness; and other dimensions of rural development (UNESCAP, 2019).

¹ WorldPop aims to provide an open access archive of spatial demographic datasets for Central and South America, Africa and Asia to support development, disaster response, and health applications. <https://www.worldpop.org/>

² From village surroundings to village local hubs, to market/town hub/service center, and finally to large town/city hub.

The concept of vertical connectivity might support targeting investments to rural transport infrastructure by considering, among others, the potential to connect rural areas with subregional, regional and international transport networks.

4.9 Piloting incentive mechanisms to promote rural transport investments

Results-based financing instruments targeted towards rural transport or first mile access might enable attracting additional donors and enhance funding for the sector. Additionally, modalities to systemically include first mile access as an integral component of larger transport, rural development, food security, or local governance programmes might also be a way to increase funding for rural transport. Incentive mechanisms might also support the promotion of rural transport initiatives. This could be in the form of a “leave no one behind award” rewarding projects with high impact in hard to reach communities, or a benchmarking instrument promoting competition among districts based on their performance in improving rural access. Collaboration at regional level might facilitate the design, piloting, and documentation of such instruments.

4.10 Promoting knowledge sharing and innovation

As several countries in the Asia and Pacific region share similar challenges related to rural accessibility, it is suggested to encourage sharing of experiences at regional level. This will facilitate the joint development and dissemination of tools, manuals, and recommendations focusing on common issues in the region. It will further enable the identification of knowledge gaps and the promotion of innovation. This could be done in close collaboration with research or academic institutions in the region, and in dialogue with global organizations and platforms such as SuM4All or IE-connect. The Communities of Interest (CoI) proposed within the framework of the 2030 Aichi Declaration are considered as an appropriate entry point to promote knowledge sharing and innovation.

Sustainable Mobility for All (SuM4All) is a platform for international cooperation on transport and mobility issues. Established in 2017, and hosted by the World Bank, the global, multistakeholder partnership, brings together more than 55 public organizations and private companies, including bilateral partners, multilateral development banks, U.N. organizations, inter-governmental organizations, and civil society with a shared ambition to transform the future of mobility. It leverages the knowledge, expertise, and influence of its Member organizations to assist countries worldwide in their ambition to attain the Sustainable Development Goals (SDGs) and sustainable mobility. One of SuM4All's four main goals is Universal Access.

Informing Transport Investments through Data Systems and Evidence. Advances in data and technology have created new opportunities to work on the evaluation of large infrastructure investments. The Impact Evaluation **(IE)Connect for Impact** programme³ is generating a significant body of evidence through the development of data systems and experimental and quasi-experimental evaluations that can transform the way we think of mobility as an economic force and at a scale that will substantially improve the evidence-base for policy making. The ieConnect for Impact programme is a collaboration between the World Bank's Development Impact Evaluation (DIME) group and the World Bank Transport Global Practice.

³ Impact Evaluation Connect for Impact: <https://thedocs.worldbank.org/en/doc/156371554223752892-0050022019/original/DIMEProgramBriefieConnect.pdf>

5. The way forward

Despite various efforts, there is much scope for improving overall planning, development, and maintenance of rural transport systems and services in Asia. The proposed regional initiative on rural accessibility and connectivity (Annex A) aims to address some of the systemic, institutional and policy challenges faced by the rural transport sector. Comments and feedback are welcome to further develop the proposed regional initiative. Interested governments are also welcomed to share their interest to pilot the proposed initiative.

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Annex A The Regional Initiative in a Nutshell

Accelerating Progress in Rural Access in Asia and the Pacific - A Key to Sustainable Development

Helvetas & UNESCAP are designing a regional initiative aiming at improving rural accessibility, and particularly first/last mile access, as a contribution to accelerating access to basic services and markets, “leaving no one behind”, and achieving the SDGs. The initiative links rural transport investments in selected countries with capacity building, institutional and policy development, and knowledge and innovation at regional level. Key elements of the initiative are summarized here.

Vision	<i>Universal Access</i> - A world where all people are connected to critical services (labour markets, markets, health, education)				
Goal	The population in the Asia and Pacific region, in particular disadvantaged women and men, has increased access to health, education, markets and jobs thanks to newly built and well-maintained rural transport infrastructure and services				
Outcomes	Capacities Communities, local private sector, local and central governments, universities have enhanced capacities (competences, motivation, influence) to contribute to affordable and equitable access for all	Institutions & Policies The institutional and policy framework is conducive to accelerating first/last mile access (government units, programmes, and funding instruments dedicated to rural accessibility; strategies, norms, standards, manuals and guidelines facilitate progress in rural accessibility while highlighting key principles such as inclusion)	Knowledge & Innovation Evidence is generated, translated into various knowledge products, and disseminated; new approaches and tools are piloted, documented and disseminated		
Strategy	The initiative combines implementation projects in selected countries (e.g., investments in rural transport, capacity building, strengthening institutions and policies) with regional knowledge and innovation activities (e.g., identification and documentation of good practices, impact assessment, tool development, regional events). It promotes partnership development among different actors to pool resources and knowhow to achieve the objectives most effectively.				
Principles	A systemic approach to rural accessibility	Focus on leaving no one behind (first/last mile access)	Strengthening local governance	Integrating rural access sector development and humanitarian response	Tackling climate change and building resilience
Principles	Promoting women empowerment	Sound planning and monitoring using new technologies	Integrating rural transport in regional connectivity efforts	Piloting incentive mechanisms to promote rural transport investments	Promoting knowledge sharing and innovation