

# Consolidation, Revision and Pilot Application of the Rural Access Index (RAI)

Policy Guide and Roadmap to Achieve SDG Tier 1 Status  
TG3



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## Abstract

This project provides additional support to implement the uptake and embedment of the Rural Access Index (RAI). The RAI has also been adopted as Sustainable Development Goal (SDG) 9.1.1. This report is concerned with providing policy guidance and a roadmap to achieving towards achieving IAEG-SDG Tier 1 status by 2025.

The report gives key reasons as to why RAI is an important part of wider rural development policies and programmes. Stakeholders must be clear on where RAI fits into the bigger picture of Sustainable Mobility and the Sustainable Mobility for All (SuM4All) Global Roadmap of Action (GRA), and on how it can be used as part of a suite of indicators, policies and programmes to improve and monitor rural development. It also emphasises that RAI should not be applied universally, but should take account of other modes of transport and services, local maintenance capacity, the environment, and potential future transport modes and services. It also describes how presenting RAI as absolute numbers (of persons who live further than 2 km from an all-season road) can be more relevant to policymakers and so help uptake and embedment.

The report summarises some of the other assistance being provided by the international community. This includes general support to National Statistical Offices (NSO), specific support to NSOs on implementation and promotion of the SDGs, support to NSOs on maximising use of big data and new technology, platforms being established to aid in publication and dissemination of data, and accelerator labs being set up around the world to enable training. It is important that any efforts to help the uptake and embedment of RAI are tied in with these efforts to avoid duplication of effort and to leverage the work going on in other areas.

The report includes a roadmap for RAI to achieve IAEG-SDGs Tier 1 Status by 2025. This includes recommended activities such as including RAI in IDA replenishments, publishing the supplemental guidelines on relevant websites of the UN, World Bank etc. and publicising the RAI and raising awareness of how to measure it. Recommendations on data and recording of metadata are also included. This will require cooperation and collaboration among many of the agencies and programmes that are already involved in rural development programmes, assistance to national statistics offices, and the SDGs. A programme for implementation towards 2025 is also included.

## Key words

RAI, Rural, Roads, Access, Poverty, Index, SDG, Geospatial, SuM4All, Global Roadmap for Action, GRA

### **Research for Community Access Partnership (ReCAP)**

#### **Safe and sustainable transport for rural communities**

ReCAP is a research programme, funded by UK Aid, with the aim of promoting safe and sustainable transport for rural communities in Africa and Asia. ReCAP comprises the Africa Community Access Partnership (AfCAP) and the Asia Community Access Partnership (AsCAP). These partnerships support knowledge sharing between participating countries in order to enhance the uptake of low cost, proven solutions for rural access that maximise the use of local resources. The ReCAP programme is managed by Cardno Emerging Markets (UK) Ltd.

[www.research4cap.org](http://www.research4cap.org)

## Acronyms, Units and Currencies

ADB	Asian Development Bank
AfCAP	Africa Community Access Partnership
AfDB	African Development Bank
AsCAP	Asia Community Access Partnership
DFID	Department for International Development
EIB	European Investment Bank
FAO	Food and Agriculture Organisation of the United Nations
GBP	British Pounds
GCRF	Global Challenges Research Fund
GHG	Greenhouse Gas
GPSDD	Global Partnership for Sustainable Development Data
GRA	SuM4All Global Roadmap of Action toward Sustainable Mobility
GSMA	Global System for Mobile Communications or GSM Association
GTF	Global Tracking Framework
HDI	Human Development Index
HDM-4	Highway Development and Management system, version 4
HIC	High Income Country
HLG-PCCB	High-Level group for Partnership, Coordination and Capacity-Building
HLPF	UN High Level Political Forum on Sustainable Development
IADB	Inter-American Development Bank
IAEG-SDGs	Inter-agency and Expert Group on SDG Indicators
IDA	International Development Association
ILO	International Labour Organisation
IMT	Intermediate Means of Transport
IRF	International Road Federation
ISDB	Islamic Development Bank
ITDP	Institute for Transportation and Development
LIC	Low Income Country
LSS	Living Standard Surveys
MDA	Ministries, Departments and Agencies
MDB	Multilateral Development Bank
MIC	Middle Income Country
NSO	National Statistical Office
NSS	National Statistical System
OSM	OpenStreetMap
PIARC	World Road Federation
PIDA	Programme for Infrastructure Development in Africa
PMU	Programme Management Unit
RAI	Rural Access Index
ReCAP	Research for Community Access Partnership
RSDS	Regional Strategies for the Development of Statistics
SDG	Sustainable Development Goal
SuM4All	Sustainable Mobility for All
TG1	Task Group 1
TG2	Task Group 2
TG3	Task Group 3
TOR	Terms of Reference
TRL	Transport Research Laboratory
UK	United Kingdom (of Great Britain and Northern Ireland)
UKAid	United Kingdom Aid (Department for International Development, UK)
UK ONS	UK Office of National Statistics
UN	United Nations
UNCRD	United Nations Centre for Regional Development
UNDESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNECLAC	United Nations Economic Commission for Latin America and the Caribbean
UNEP	United Nations Environment Programme
UNFPA	United Nations Population Fund
UNGP	United Nations Global Platform
UNSC	United Nations Security Council

UNSD  
VNR  
WHO  
WRA  
WRC

United Nations Statistics Division  
Voluntary National Review  
World Health Organisation  
World Road Association  
World Road Congress

## Executive Summary

The Rural Access Index (RAI) is defined as the “proportion of the rural population who live within 2 km of an all-season road”. In 2016, the World Bank partnered with the Department for International Development (DFID) of the United Kingdom and the Research for Community Access Partnership (ReCAP) to develop a new methodology (World Bank, 2016) using geospatial techniques. The RAI was adopted as Sustainable Development Goal (SDG) Indicator 9.1.1 in 2016, using the geospatial methodology developed in 2016. In 2018, ReCAP initiated this project to develop a harmonised approach to data collection and measurement of the RAI that is relevant, consistent and sustainable.

So far the project has published Supplemental Guidelines (TRL, 2019) to accompany the 2016 World Bank methodology, which clarified data collection, put in place clear quality assurance standards, and provided robust analytical methods to meet international standards. This should enhance the RAI’s reliability as an indicator (in terms of accuracy and repeatability) and should increase the number of countries routinely collecting RAI data. The RAI was promoted to SDG Tier 2 status in December 2018. This third phase, TG3, provides additional support to implement the uptake and embedment of RAI with a view to reaching SDG Tier 1 status.

This report sets out a guide to the policy interventions necessary to support the sustainable measurement of RAI. It also provides a Roadmap to achieve Tier 1 status on the IAEG-SDGs scale by 2025. The report describes key reasons why RAI is important as part of rural development policies and programmes, and how it fits into the bigger picture of sustainable mobility and the Global Roadmap of Action. It also describes necessary support to National Statistical offices (NSOs), including promotion of SDGs, maximising the use of big data and new technologies, platforms to aid reporting and dissemination of results, and other initiatives designed to build capacity in this area. A key part of the policy initiative is to encourage countries to incorporate the measurement of SDG 9.1.1 in their National Statistical Systems, which would require it to be measured on a regular basis.

ReCAP have developed a calculation tool for the RAI, which should be trialled on the UN Global Platform in the near future, with a view towards generating feedback and developing the tool for countries to use independently to measure RAI.

The Roadmap is designed to facilitate SDG 9.1.1 reaching Tier 1 by 2025. The key to achieving this is cooperation and collaboration among many of the agencies and programmes already involved in rural development. An organigram shows the many and various actors involved in supporting the measurement of SDGs, from the UN, Multilateral Development Bank and Unilateral Donors to Foundations and independent bodies. There are of course also the actors at the country level, from the NSOs to roads authorities and survey departments.

The Roadmap sets out several steps to support the progression towards Tier 1 by 2025. The activities have been suggested based on recommendations from this paper and from the TG2 final report published under this project. Some of the key activities include publishing the Supplemental Guidelines on World Bank and UN SDG websites; publicising and coordinating RAI with roads agencies, planning agencies and national statistics offices (NSOs); convening workshops with partners; expanding the current list of co-partners to include Islamic Development Bank, Inter-American Development Bank and others; promoting RAI at regional conferences and events; piggy-backing other SDG promotion activities; documenting metadata, supporting mapping and population data; producing and publishing webinars; and carrying out further research into methods of measuring the RAI.

A programme of activities has been produced with the necessary steps and timings to achieve Tier 1 status by 2025. This requires that 50% of UN countries are regularly measuring RAI, and that the results are regionally representative. This will include countries that will start to measure RAI under TG3 of this project.

## 1 Introduction

The Rural Access Index (RAI) was developed by the World Bank in 2006 and is one of the most important global development indicators in the transport sector. The RAI is defined as the “proportion of the rural population who live within 2 km of an all-season road”. The 2006 methodology for calculating RAI was based on household surveys and had several issues with inconsistency across countries and a lack of sustainable regular updates (Roberts, 2006). In addition, the approach was felt not to be spatially representative and of limited operational usefulness, resulting in weak client ownership.

In 2016, the World Bank partnered with the Department for International Development (DFID) of the United Kingdom and the Research for Community Access Partnership (ReCAP) to develop a new methodology (World Bank, 2016). The 2016 methodology took advantage of geospatial techniques and data collected using innovative technologies.

The RAI was adopted as Sustainable Development Goal (SDG) Indicator 9.1.1 in 2016, using the geospatial methodology developed in 2016. The above methodology document is referenced in the SDG 9.1.1 [metadata](#).

In 2018, ReCAP initiated this project to develop a harmonised approach to data collection and measurement of the RAI that is relevant, consistent and sustainable. The project is designed to facilitate scaling up implementation of the RAI across UN member countries. The first phase under Task Group 1 (TG1) was completed in 2018 and included a comprehensive review of the status of the RAI to date (Vincent, 2018). It included a detailed history of the development of the RAI and gave several references to key documents.

The second phase under Task Group 2 (TG2) consolidated existing and proposed approaches to data collection and refined the RAI methodology in collaboration with the World Bank and other stakeholders. TG2 published [Supplemental Guidelines](#) to the RAI methodology which clarified data collection, put in place clear quality assurance standards, and provided robust analytical methods to meet international standards. This should enhance the RAI’s reliability as an indicator (in terms of accuracy and repeatability) and should increase the number of countries routinely collecting RAI data. The RAI was promoted to SDG Tier 2 status in December 2018.

This third phase, TG3, provides additional support to implement the uptake and embedment of RAI with a view to reaching SDG Tier 1 status. This report under TG3 describes:

- Key reasons as to why RAI is important as part of rural development policies and programmes. Stakeholders must be clear on where RAI fits into the bigger picture of Sustainable Mobility and the Global Roadmap of Action, and how it can be used as part of a suite of indicators and policies and programmes to improve and monitor rural development (see Section 2).
- Assistance provided by the international community including general support to National Statistical Offices (NSOs), specific support to NSOs on implementation and promotion of the SDGs, support to NSOs on maximising use of big data and new technology, platforms being established to aid in publication and dissemination of data, and accelerator labs being set up around the world to provide training. It is important that any efforts to help the uptake and embedment of RAI are tied in with these efforts to avoid duplication of effort and to leverage the work going on in other areas (see Section 3).
- A roadmap for RAI to achieve SDG Tier 1 Status by 2025. This will require cooperation and collaboration among many of the agencies and programmes that are already involved in rural development programmes, assistance to national statistics offices, and the SDGs (see Section 4).



## 2 RAI as part of Rural Development Policies

This section describes how RAI must be considered as part of a wider policy framework for rural development. It sets out how RAI can be used as an indicator at global, regional, national, sub-national and project levels. It also discusses how targets for RAI should not be applied universally but should take account of other modes of transport and services, local maintenance capacity, the environment, and potential future transport modes and services.

### 2.1 RAI and Sustainable Mobility

As identified in the Sustainable Mobility for All (SuM4All) Global Roadmap of Action toward Sustainable Mobility (GRA) (SuM4All, 2019a) and a companion paper on Universal Rural Access (SuM4All, 2019b). The RAI is only one of a set of principal indicators that form the global tracking framework for transport (GTF) as shown in Table 1, (SuM4All, 2019a). Only the RAI at present is part of the SDG framework.

**Table 1- GRA Policy Goals and Aspirational Targets (SuM4All, 2019a)**

Policy Goal (sub-goal)	Principal Indicator	Aspirational Target	Data Source
Universal Access (rural)	Rural access index (percentage)	100%	World Bank
Universal Access (urban)	Rapid transit to resident ratio (km/million)	>40	Institute for Transportation and Development (ITDP)
Universal Access (gender)	Female workers in transport (percentage)	50%	International Labour Organisation (ILO)
Efficiency	Logistics Performance Index (Value 0-5)	5	World Bank
Safety	Mortality caused by road traffic injury (per 100,000 people)	0	World Health Organisation (WHO)
Green Mobility (GH Emissions)	Transport-related GH Emissions per capita (tons of CO <sub>2</sub> per capita)	<0.3	International Energy Agency (IEA)
Green Mobility (Air Pollution)	PM2.5 air pollution annual exposure (ug/cu.m)	<10	Global Burden of Disease Study
Green Mobility (Noise Pollution)	Number of Urban Dwellers Exposed to Excessive Noise Levels	n/a	n/a

The GRA (SuM4All, 2019a) identifies several other supporting indicators for universal access for rural roads, as seen in

Table 2.

**Table 2- Other Supporting Rural Road Indicators for Universal Access (SuM4All, 2019a)**

Rural Roads Infrastructure Supporting Indicators
<ul style="list-style-type: none"> <li>• Proportion of rural roads in “good and fair condition”</li> <li>• Percentage of markets accessible by all-season road</li> <li>• Percentage of national government budget spent on low volume rural transport infrastructure</li> </ul>
Rural Roads Services Supporting Indicators
<ul style="list-style-type: none"> <li>• Percentage of the rural population with access to affordable and reliable passenger transport services</li> <li>• Ratio of national to local passenger transport fares (collection of data on rural passenger transport US\$ per km for short distance and long distance trips which would be disaggregated by most common modes e.g. bus, motorbike, other IMT)</li> <li>• Percentage of household monthly expenditure spent on transport</li> <li>• Percentage of rural population with at least daily transport service – from Living Standards Surveys (LSS)</li> <li>• Percentage of households that make one motorised trip per month</li> </ul>

- Vehicle fleets per motorised transport mode (public transport and all other modes, such as, taxis and shared taxis, informal / paratransit (if possible) and motor cars, motorised two-wheelers (annual update)
- Number of public transport journeys by mode of transport (annual update)
- Vehicle km offered per public transport mode (annual update)
- Number of public transport stops per area (annual update)
- Percentage of the population within 500 m of a frequent public transport stop/station
- Average income (percent) per resident spent on transport (affordability)
- Passenger km travelled by public transport by mode of transport (annual update)

The GRA (SuM4All, 2019a) identifies more than 180 policy measures to improve sustainable mobility. Of these, several are directly relevant to improving the rural road infrastructure under the Regulatory and Institutional toolkit and the Engineering and Technology toolkit – see Table 3. These are related to the planning, design, construction and maintenance of rural road assets.

**Table 3- GRA policy measures to help improve rural road infrastructure (SuM4All, 2019a)**

Thematic Area	Policy Measure
<b>Regulatory and Institutional Toolkit</b>	
Plans and Strategies	<ul style="list-style-type: none"> <li>• Develop an integrated national transport plan</li> <li>• Plan for a multi-tiered rural access approach</li> <li>• Plan for integrated multi-modal transport networks</li> </ul>
Institutional Design, Cooperation, and Coordination	<ul style="list-style-type: none"> <li>• Coordinate planning across government agencies [...] including but not limited to the coordination of response to extreme weather events</li> </ul>
Capacity Building and Human Resource Development	<ul style="list-style-type: none"> <li>• Build Capacity for Local Path and Road Maintenance</li> </ul>
<b>Engineering and Technology Toolkit</b>	
Technical Standards	<ul style="list-style-type: none"> <li>• Establish Technical Standards for Transport Infrastructure</li> <li>• Set and Implement Climate Change Adaptation Standards</li> </ul>
Asset Construction	<ul style="list-style-type: none"> <li>• Expand the All-Season Road Network</li> <li>• Improve First and Last Mile Access Infrastructure</li> </ul>
Design and Deployment of Programs and Initiatives	<ul style="list-style-type: none"> <li>• Adopt Building Back Better Principle for Reconstruction</li> <li>• Map the Full Extent of the Road Network</li> <li>• Identify Risks and Vulnerabilities to Extreme Weather Events</li> <li>• Monitor Weather Events and Develop Warning Systems</li> <li>• Develop Asset Management Standards and Plans</li> <li>• Establish Approaches to Feeder Road Asset Management - establish reliable approaches to asset management of feeder roads, with communities performing routine maintenance in rural paths and roads, where feasible, and contractors performing periodic maintenance, based on reliability, availability, maintainability, and safety (RAMS) approach</li> </ul>
Program or Project Cycle	<ul style="list-style-type: none"> <li>• Evaluate Long Run Transport Infrastructure Needs - Evaluate long-run infrastructure finance needs including the existing backlog of deferred maintenance (i.e., infrastructure gap).</li> <li>• Use a Robust Framework for Project Prioritisation for the allocation of public infrastructure funding to infrastructure projects and associated services.</li> <li>• Establish Selection Criteria for Feeder Roads Projects - and disseminate these widely among rural communities with a view to attracting their participation in the process.</li> </ul>

The GRA (SuM4All, 2019a) also identifies several policy measures to improve rural transport services, as shown in Table 4.

**Table 4- GRA policy measures to help improve rural road services (SuM4All, 2019a)**

Thematic Area	Policy Measure
<b>Regulatory and Institutional Toolkit</b>	
Regulations for Transport Services	<ul style="list-style-type: none"> <li>Reform regulations to allow and support vehicle sharing programs (cars, bicycles, scooters), transportation networking companies (TNCs), and demand-responsive transport solutions, with a focus on last mile connectivity to high capacity modes</li> </ul>
<b>Engineering and Technology Toolkit</b>	
Design and Deployment of Transport Services	<ul style="list-style-type: none"> <li>Ensure Access to Transport Services in Underserved Areas</li> <li>Develop Online Platforms for Rural Transport Services</li> <li>Conduct Accessibility Evaluation and Mapping</li> </ul>

The RAI measures only one aspect of rural infrastructure development and must be part of a broader suite of indicators covering both infrastructure and services. The RAI must therefore be part of a wider policy framework for rural development.

## 2.2 Target RAI

As seen in Table 1, the GRA identifies an ‘aspirational target’ of 100% for the RAI. While many developed countries have an RAI approaching 100%, this should not be seen as a target for all countries.

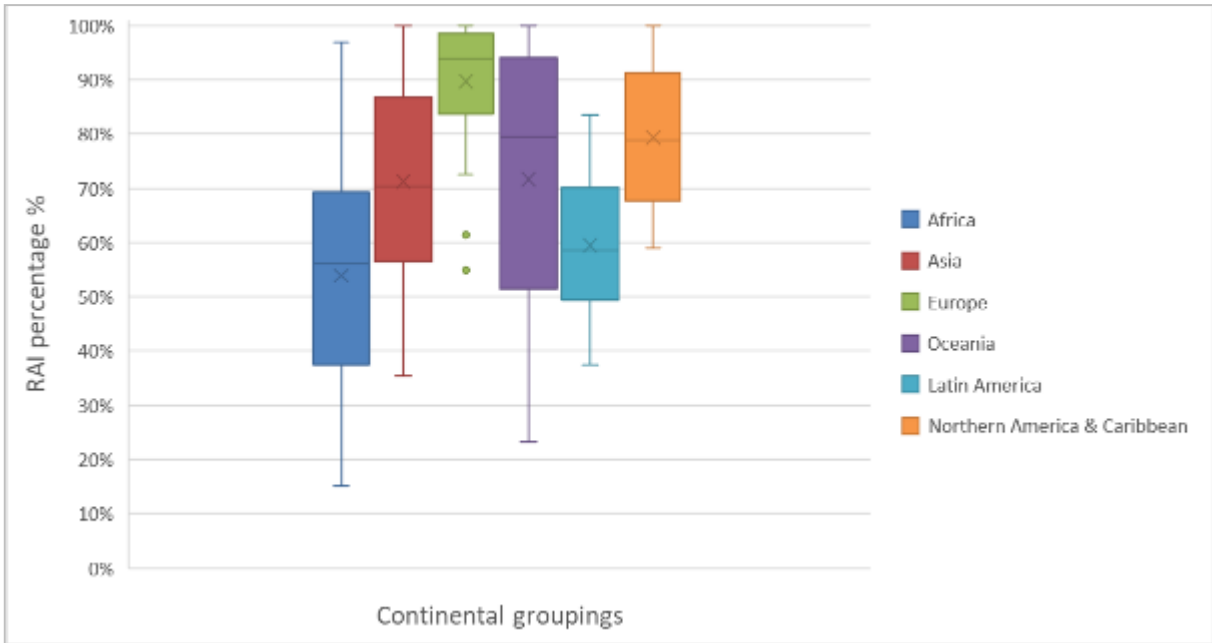
First mile or last mile connectivity is not intended to imply all-season road access. Connectivity can be by a system of engineered trails and footbridges as in Nepal, or designated river navigation channels and jetties as in Bangladesh, or a system of solar lit beacons and marked desert trails in Sudan. There are many more such examples: most rural settlements in the Amazon, Orinoco, Congo and Upper Nile River basins, have no or limited hinterland road access. The outer islands of the archipelagos of Indonesia and Philippines, and South Pacific Islands rely heavily on coastal shipping. Similarly, vast regions of Siberia, the Russian steppes and Mongolia depend on rail. The deltas of Mekong, the Ganges-Brahmaputra and Indus rely on water transport. It is simply not possible, nor desirable, to address last mile connectivity by all-season rural roads in many situations.

In addition, in South Asia and increasingly in Africa, motorcycles and autorickshaws (motorised three-wheelers) are the mainstay of personal mobility and account for a growing share of rural commerce. ‘All-season’ for motorcycles and autorickshaws is not the same as ‘all-season’ for 4-wheeled vehicles. In the not too distant future, self-driving all-terrain vehicles, or drones, could provide an important transport service.

Rural access should not be narrowly focused on roads, and without regard for conservation or for protection of fragile zones, or the impacts of climate change. It must also take account of the ability of a country to maintain its existing and future road network infrastructure.

The following graph (Figure 1) shows the centring and variation in RAI based on quartiles for countries in different regions (using the ‘default’ RAI calculated by the Azavea web-based [RAI Measurement tool](#) with open source data in 2019).

Figure 1 - RAI by Continental Group



### RAI Measurement Tool

It should be noted that the RAI measurement tool uses open source data such as WorldPop, OpenStreetMap and GRUMP urban/rural boundaries. This data is not ratified by country governments and has been used to demonstrate the potential application of the tool. At present it is not possible for countries to measure RAI directly using the tool. The tool is however expected to be included on the UN Global Platform as a demonstration version to prompt future development. The long-term aim of the UN Global Platform is to provide tools and services for NSOs to be able to use big data to calculate statistics and indicators.

For each grouping, the boxes contain the data between the lower end of the 2<sup>nd</sup> quartile and the upper end of the 3<sup>rd</sup> quartile. The 'X' represents the median number for that grouping. The graph also shows the minimum and maximum values in each grouping, with outliers shown as dots.

This is not to say that countries in Africa should not aspire to the same levels of RAI as countries in Europe (in fact, the highest RAI values in Africa are higher than the median values for Europe). But it does give a basis for looking at RAI according to different country groupings. Similar analysis could be conducted, for example, on archipelago countries, or on countries with important inland waterway networks, or on countries with vast swathes of desert or steppe lands, to allow comparison to other countries of similar characteristics.

Phase 2 of this project (TG2) produced a paper 'Secondary RAI Measurement; Options and Methodology' that discusses how a new indicator might take account of local infrastructure that would not be included in the standard RAI measurement. Examples include motorcycle trails and navigable waterways. It describes how accessibility factors may be used to include roads as accessible to motorcycles that are not accessible to larger vehicles, and explains how 'tracks' and 'paths' from OpenStreetMap (OSM) may be incorporated into that calculation. Regarding navigable waterways, it describes how locations of features such as jetties can be incorporated into such an indicator. Countries with high reliance on motorcycles or inland waterways or coastal transport could aspire to RAI values of similar countries within such groupings, and could consider other indicators (in addition to RAI) in order to measure progress towards their development goals.

## 2.3 Regional Agreements

There are several examples of regional events and conferences that have produced agreements and commitments relating to rural development and sustainable transport.

The **Ashgabat Statement** arose out of the first-ever Global Sustainable Transport Conference on 26-27 November 2016, in Ashgabat, Turkmenistan. It reaffirmed commitment to support efforts to provide communities in rural areas in developing countries with access to major roads, rail lines, and public transport options that enable access to economic and social activities and opportunities in cities and towns and that unleash productivity and competitiveness of rural entrepreneurs and smallholder farmers. Addressing these circumstances will be among the essential steps needed to fulfil the 2030 Agenda for Sustainable Development and its promise to — leave no one behind.

The **Vientiane Declaration** in 2017 demonstrated a commitment by government authorities, development agencies, civil society, academia, the private sector, and other relevant stakeholders in the Environmentally Sustainable Transport (EST) Forum<sup>1</sup> region to promote inclusive, affordable, accessible and sustainable rural transport infrastructure and services, in order to facilitate improved access to basic utilities and services including health and education by the rural poor and vulnerable groups. The Declaration expresses a commitment to “assign due priority to rural transport projects and initiate the development of national strategies and policy frameworks to improve rural transport connectivity to wider local, national and regional transport networks”. This is very much in line with what RAI is designed to measure. The UN Centre for Regional Development (UNCRD) produced a [‘2030 Road Map for Sustainable Transport in Asia: Aligning Government Policy with Sustainable Development Goals \(SDGs\)’](#) which was presented in Vientiane. It noted that “there is no KPI from the Bangkok Declaration for 2020 that is directly relevant to SDG indicator 9.1.1” [the Bangkok Declaration for 2020 was a commitment for a decade of action plan from 2010 to 2020 on sustainable transport].

The United Nations Economic Commission for Latin America and the Caribbean (UNECLAC) hosted a regional workshop for member countries to present their Voluntary National Reviews (VNRs) of SDG readiness in February 2020. The main objective of the meeting was to promote exchange and learning between peers, thus contributing to the strengthening of countries' capacities to deal with the opportunities and challenges of the VNR process. The workshop also focused on the appropriation and implementation of the 2030 Agenda for Sustainable Development at the national level.

All such events and conferences are opportunities at which to promote RAI and to reaffirm its importance to policy.

## 2.4 RAI at National Level

The identification and development of policies and indicators for rural development is typically the responsibility of a ministry of planning or its equivalent in a country, with significant inputs from agriculture, transport, education, health, housing and other ministries. As described above, the RAI must therefore be part of a wider policy framework for rural development, and its inclusion in a country's statistical system must be planned and agreed early in the planning phase for any rural development programmes. The events and conferences referenced above help set the framework and overarching objectives for national rural development.

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<sup>1</sup> Afghanistan, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, People's Republic of China, Indonesia, India, Japan, Republic of Korea, Lao PDR, Malaysia, Maldives, Mongolia, Myanmar, Nepal, the Philippines, Pakistan, Singapore, Sri Lanka, Thailand, and Viet Nam

## 2.5 RAI at Sub-National Level

RAI should also be considered for policy development at sub-national level.

For the largest countries (Russia, Canada, USA, China, Brazil, Australia, India), each state or equivalent has its own rural development policies and goals with varying degrees of autonomy. All policy measures and indicators discussed above can equally be considered at this level. RAI at the national level for these countries has little real meaning.

In most other countries, except for the smallest island nations, there is some degree of local government with policy mandates for rural development. To a large extent the policy measures and indicators will be dictated by national government institutions, but if the RAI is embedded at the national level, then it can also be a useful tool at the sub-national level too. It is relatively easy for tools such as the Azavea RAI Measurement Tool to calculate sub-national RAI, therefore the reporting burden is not onerous.

## 2.6 RAI as Absolute Numbers

To date, RAI has been presented as (and is defined as) an *index* (“the percentage of rural population living within 2 km of an all-season road”). However, in addition to that percentage value, it is also important to consider the absolute numbers of people impacted by lack of all-season access.

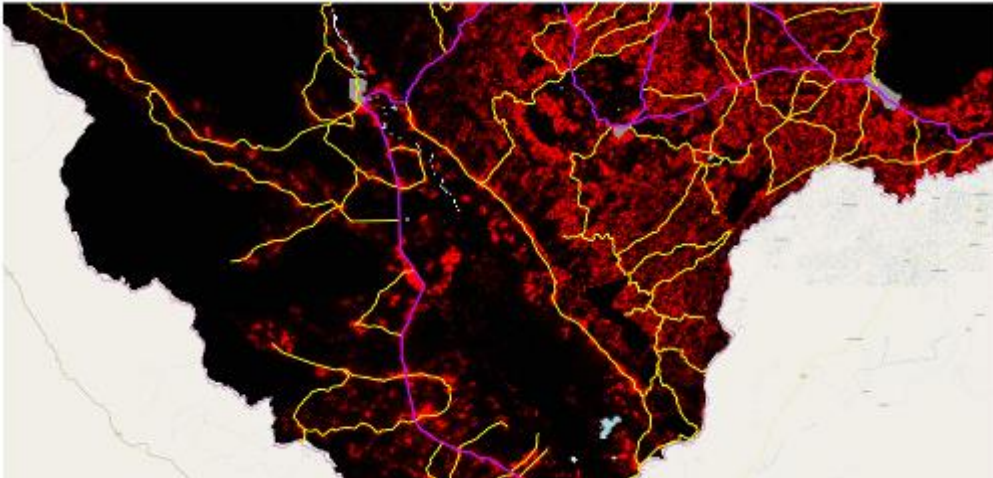
Presenting absolute numbers at regional and global levels has an immediately challenging impact through quantifying the scale of the rural access problem, while a regional RAI % tends to lose meaning at the higher level. The figures in Table 5 are estimates for 2019, based on open source data and calculated by the Azavea RAI Measurement Tool. “420 million people in Africa without access to an all-season road” is a much more powerful statement than “Africa has an RAI of 53%”.

**Table 5 - RAI World and Regional Estimates**

Region	Population (millions, 2019)			RAI
	Total	Rural	Living >2 km away from an all-season road	
Africa	1,317.7	908.4	421.1	53.6
Americas	1,057.3	222.7	71.0	68.1
Asia	4,632.8	2,590.6	658.9	74.6
Europe	757.1	190.6	19.8	89.6
Oceania	37.4	12.8	7.4	42.2
<b>World</b>	<b>7,802.3</b>	<b>3,925.0</b>	<b>1,178.2</b>	<b>70.0</b>

Also, when planning and programming projects, it is easy to identify on maps the actual locations that currently have limited rural access, and to quantify the numbers of people that would be impacted by individual road construction or maintenance projects. Figure 2 for example shows population density based on WorldPop data (low densities in black, higher densities in red) with the existing road network overlaid on top. That figure was produced as a by-product of the RAI calculation process for pilot countries under TG2. As projects are completed, it will be easier to demonstrate the impact of projects through absolute reduction in the number of people without access, rather than a small increase in RAI.

Figure 2 - Accessibility Map



Thus, presenting RAI as an absolute number at global, regional, national and sub-national scales helps to make it more relevant to policy-makers at all levels, and should be used to promote its calculation.

### 3 Support to Statistical Systems

This section summarises assistance provided by the international community to statistical systems and indicators. This assistance can be categorised as: general support to National Statistical Offices (NSOs); specific support to NSOs on promotion and implementation of the SDGs; support to NSOs on maximising use of big data and new technology; development of platforms to aid in publication and dissemination of data; and setup of accelerator labs and training facilities. It is important that any efforts to help the uptake and embedment of RAI are tied in with these efforts to avoid duplication and to leverage the work going on in these areas.

#### 3.1 Stakeholders involved in national and international statistics and indicators

Figure 3 shows the key stakeholders involved in international statistics and indicators. Those involved in measuring SDG 9.1.1 are highlighted, including the World Bank as custodian and UNECE, UNEP and ADB as partners. A brief description of these stakeholders can be found in Annex A.

The UN hosts the SDGs, and many UN bodies are involved in driving progress towards the goals and monitoring through the indicators. Multilateral Development Banks and regional organisations also play a key role in delivering the SDGs.

#### 3.2 General Support to National Statistical Offices

The Partnership in Statistics for Development in the 21st Century (PARIS21) was formed in 1999 and is a forum and network to promote, influence and facilitate statistical capacity development and the better use of statistics. Following the formation of the SDGs in 2015, an agreement was made on a National Strategy for the Development of Statistics (NSDS), which provides a country with a five to ten year strategy to develop their capacity across the entire national statistical system (NSS). PARIS21 also promotes the Regional Strategies for the Development of Statistics (RSDS), which is a masterplan for regional statistical development.

PARIS21 carries out assessments to identify the necessary statistical infrastructure for a country to develop its NSS, and has developed a leadership training programme to support leadership and management of NSOs.

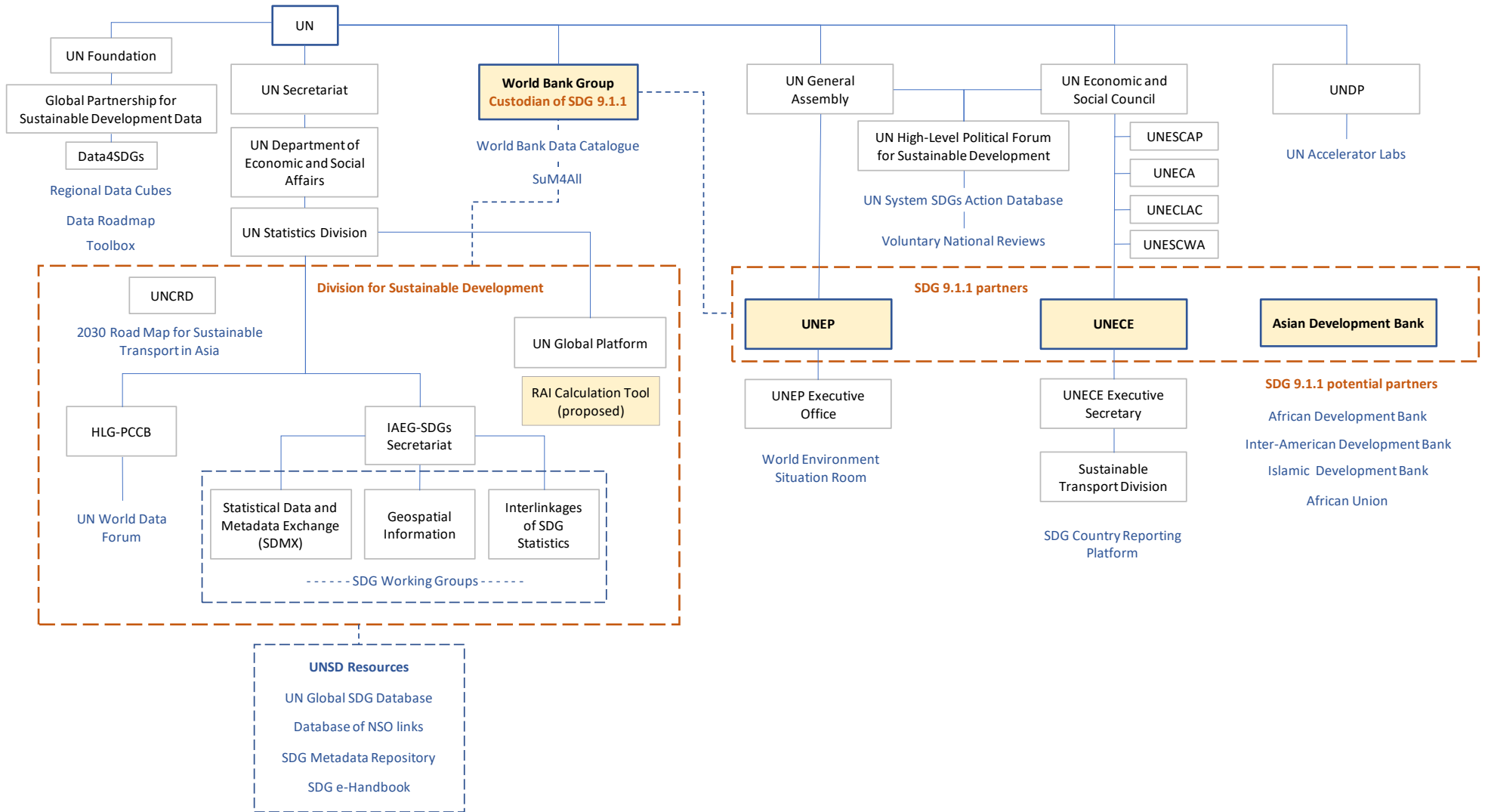
UNESCAP also adopted a declaration in 2018 that will strengthen NSS, called ‘Navigating Policy with Data to Leave No One Behind.’ This is designed to identify collective actions to advance the Asia and Pacific regions’ progress towards the 2030 Agenda for Sustainable Development, by innovative use of new data sources to inform policymaking.

UNDP has produced a guidance note on ‘Data for Implementation and Monitoring of the 2030 Agenda for Sustainable Development’ (UNDP, 2017). It explores options for aligning the 2030 Agenda with national monitoring and evaluation frameworks, whilst prioritising SDG indicators for national monitoring, strengthening national statistical capacities, and leveraging partnerships and innovations. A [Data Ecosystems Mapping Project](#), piloted in six countries, assessed key areas of support for NSO’s, including:

- Capacity building
- Infrastructure development
- Modernisation of legislative frameworks
- Data collection, dissemination and use



Figure 3 - Organigram of SDG Stakeholders



The UNDP Guidance Note recommends opening up NSS to non-official stakeholders and innovative data approaches, providing incentives for governments and private sector to share untapped existing administrative data that might be useful for the SDGs, considering infrastructure requirements such as ICT, coordinating donors' assistance on data and statistics, and strengthening collaborative partnerships. This document contains useful information on areas that need to be focused on for support in a national policy.

Many donors also have programmes to strengthen NSS at country level. In 2013 the OECD (2013) produced a brochure on strengthening national statistical systems to monitor global goals, which was part of a series of 11 elements that would play an important role in shaping the SDG agenda and framework. There are also a number of projects under way to support NSOs, implemented by donors, institutions and High Income Country (HIC) statistical organisations. The United Kingdom Office of National Statistics (UKONS), for example, is supporting Ghana, Kenya, Rwanda and UNECA.

### 3.3 Support to NSOs for SDGs

It is a challenge for many countries to measure all the 232 SDG indicators. Some of the challenges are highlighted by Dang and Serajuddin (2019), where the authors report that in 2019 data is only available for just over 50% of all the indicators and is only available for 19% of what is needed for comprehensively tracking progress across countries and over time. The issues around coordination between different government agencies are highlighted; these were also recognised in the RAI project under TG2. The authors reflect on some of the main challenges to data collection and processing, and suggest some simple but cost-effective solutions, proposing a three-step process to measure SDGs, with each subsequent step providing more granular data than the last. They also suggest imputation of data to fill data gaps.

As there are so many SDG indicators (232) and resources are scarce, especially in the poorest nations, some countries have decided to prioritise which indicators they will measure. This can be done based on the IAEG-SDG Tier system, where countries prioritise the indicators that have a higher Tier level.

This has been implemented in the Philippines, for example. Following a series of workshops in 2017 to explore how the Philippines could undertake effective measurement of the SDG indicators, the Philippine Statistics Authority (PSA) Board passed Resolution No. 9: Approving and Adopting the Initial List of Sustainable Development Goals for Monitoring in the Philippines. That [board resolution](#) set out a commitment to measure SDG indicators following principles that were agreed at the workshops, which includes prioritising Tier 1 indicators, but considering addressing data gaps for Tier 2 and 3 indicators in the Philippine Statistical Development Plan 2017-2023. This provides clear guidance on which SDG indicators should be measured, how they should be measured, and at what frequency.

The Global Partnership for Sustainable Development Data (GPSDD) has developed a [data roadmap](#) process. This helps countries to align existing national plans, activities, and priorities to strengthen data ecosystems and enable data-driven decision-making for sustainable development. GPSDD supports countries at the national and sub-national levels to develop and implement government and multi-stakeholder data ecosystems for sustainable development. Data roadmaps help enable the use of real-time, dynamic, disaggregated data to achieve and monitor the Sustainable Development Goals. The [Data4SDGs Toolbox](#) is designed to support efforts to implement roadmaps. It addresses institutional, policy, technical, resource and capacity issues, and will help countries to cope with the demands of real-time, dynamic and disaggregated data to effectively monitor the SDGs.

UNDP has conducted several SDG Indicator Baseline Report reviews, usually in conjunction with local national statistical offices. These reviews typically identify the national indicators that countries are currently collecting, match them against the SDGs where possible, and assess the readiness of the countries to calculate and report on SDGs.

The [UN Sustainable Development Knowledge Platform](#) includes the status of Voluntary National Reviews (VNRs), which are regular and inclusive reviews of progress towards the 2030 Agenda for Sustainable Development, at the national and sub-national levels, which are country-led and country-driven. They aim to facilitate the sharing of experiences, including successes, challenges and lessons learned, with a view to accelerating the implementation of the 2030 Agenda. The VNRs will serve as a basis for the regular reviews undertaken at the High-Level Political Forum (HLPF) on sustainable development. There is also a [Handbook](#) for the preparation of VNRs.

The UN [SDG e-Handbook](#) is a tool designed for national statisticians to enable them to monitor progress made in the implementation of the SDGs, based on data produced by their NSS.

### 3.4 Strengthening SDG reporting

The UN Statistical Division maintains a database of National Statistical Offices around the world, with links to their [websites](#) and [country profiles](#).

UNECE is a partner with World Bank on SDG 9.1.1. UNECE maintains a site with links to all SDG reporting platforms for UNECE countries and countries that participate in UNECE; 62 in all. This [Country Reporting Platform](#) site provides links to National SDG information/action platforms, as well as web platforms for data on SDGs.

There have been various efforts to strengthen and standardise the national reporting of SDGs, including implementation of several platforms with support from UK Office of National Statistics and DFID.

The World Bank has also established a [Data Catalog](#) where SDG indicator results and metadata can be published and disseminated. The World Bank, as custodian of the RAI, publishes data from a country to this catalogue once it has been quality assured. As custodian, the World Bank is also responsible for producing inputs into the SDG Global Progress Report, and producing National SDG reports including lessons learned, which will feed into review and improvement of the methodology in future, along with potentially new data sources and methodologies (such as mobile phone network data, machine learning etc.). These data, reports and analyses are fed into the UN Statistics Division for publication, as noted above.

The UN [Global SDG Database](#) provides access to data compiled through the UN System in preparation for the Secretary-General's annual report on "Progress towards the Sustainable Development Goals".

The UN SDG [Metadata Repository](#) is part of the Global SDG Database. It reflects the latest reference metadata information provided by the UN System and other international organisations on data and statistics for the Tier 1 and Tier 2 indicators in the global indicator framework.

The UN Global Platform (UNGP) provides a [Global Platform](#) for learning about trusted data, projects, applications, services and partners. It is hoped that eventually it will provide data, tools and services with which to calculate SDGs and other indicators (including RAI). It currently contains tools and services to make imagery, mobile phone network data, and social media data, available for statistical practitioners. An [article on the RAI](#) can be found on the UNGP with a link to the project page for all documentation. Ultimately all relevant RAI documents relating to RAI should also be made available on the UNGP itself.

The UN System SDG Implementation [online database](#) is designed as a repository of UN actions, initiatives and plans on the implementation of the 2030 Agenda and the sustainable development goals (SDGs). It allows the user to search all of the UN system entities for their actions in support of the 2030 Agenda.

The UN Environment Program (UNEP) is a partner with World Bank on SDG 9.1.1. It has established a [World Environment Situation Room](#), which is designed to implement the Big Data initiative. It has a role in global environmental policy relevance and impact. The site includes geo-referenced, remote-

sensing and earth observation information that is integrated with statistics and data on the environmental dimension of sustainable development and is very much focused on environmental and country policy makers and other stakeholders. It supports the environmental dimensions of Agenda 2030. At present the Situation Room is still under development and is being established in at least 20 cities around the world. It does not currently have an indicator for rural access, only for access to passenger cars and railway density. A key policy aim should be to incorporate RAI as one of the indicators on the World Environment Situation Room site.

### 3.5 Strengthening the NSOs to maximise use of new data and technologies

Data and the way in which it is processed is changing how traditional statistical processes are undertaken. This has an impact on how National Statistical Offices (NSOs) or their equivalent in a country, can harness data for sustainable development monitoring. Badiie et al (2017) argue that to maximise the use of data and use it for evidence-based decision-making they must improve data accessibility by adopting open data policies. The authors however recognise that there are still vast differences in the capacity and capability of NSOs around the world. The situation is undoubtedly improving with continued support from High Income Countries (HICs), but many country NSOs still lack the means of producing high quality data. The authors stress the importance of support to NSOs to strengthen their production and use of statistics, and change their mindset towards producing more open and transparent data. An example from the RAI project is the reluctance of some trial countries to provide road network data in Geospatial formats, despite the existence of several freely available online mapping platforms. The authors also argue that Geospatial data are essential for monitoring environmental conditions and can be combined with traditional data through innovation. They use the example of combining household surveys with such data to enable disaggregation by spatial characteristics such as proximity to roads or population density, two of the key factors for RAI.

Wu Hongbo (UN Under-Secretary General) at the [World Data Forum in 2017](#) noted that it is “essential” to strengthen national statistical capacities, especially in countries where financial and human resources are lacking, in order to meet the data challenge presented by the Sustainable Development Goals. He stated that “All national statistical offices should become the new data hubs to gather and provide the necessary data to inform policies and monitor progress.” He advocated for governments, international organisations, business, academia and civil society to join forces and work together.

The UNDP [Accelerator labs](#) are a new way for UNDP to ‘reimagine development for the 21st century’. Sixty labs have been established to serve 78 countries, working together with national and global partners to find radically new approaches to development challenges and accelerate progress on the SDGs. They are supported by the Germany Cooperation, the Qatar Fund for Development, and the Italian Agency for Development Cooperation. The labs will test and scale new solutions to challenges, by:

- Building on locally-sourced solutions, finding things that work and expanding on them
- Rapid testing and iteration to implement what works and go beyond the obvious solutions
- Combining the best understanding, ideas and expertise to generate collective knowledge
- Accelerating progress by bringing expertise, creativity and collective intelligence to bear

The Global Partnership for Sustainable Development Data has an initiative to develop and implement regional data cubes. These online tools harness Earth Observation data and satellite technology to help countries monitor and report on development, most commonly agriculture, deforestation, and urbanisation, among others. An example is the [Africa Regional Data Cube](#). In terms of RAI, satellite data can be useful to identify roads that are not included in the classified network, provided that the resolution and date of the imagery is appropriate. It can also be used as a background to GIS

processing to check the accuracy of existing road networks. In the future it is likely that satellite imagery will also become useful in designating the all-season status of rural road networks.

### 3.6 Embedment of RAI in the National Statistical System

It is clear therefore that there is a lot of ongoing effort related to statistics and indicators in general, and the SDGs in particular.

At the national level, the National Statistics Office (NSO) or its equivalent is mandated within a country to collect, compile, analyse, abstract and publish statistical information on a wide range of topics. Many other government departments can collect and compile statistics related to their area of expertise, but the NSO typically takes a coordinating role to ensure adherence to fundamental statistical principles across all agencies, and to minimise redundancy and inconsistencies.

Essentially, the RAI should fit into any other reporting process that the country already follows. Typically, the finance or planning ministries are responsible for overall definition, reporting and publication of national indicators, and the RAI should fit into those reporting processes. In some countries, the NSO may be part of the finance or planning ministry, while in others it may be a separate organisation.

The NSO in a country should liaise with other agencies (roads agencies, development agencies, mapping agencies etc.) as necessary and incorporate the RAI into its national statistical system along with the other SDGs. The NSO should send the data to the custodian agency for validation and, once accepted, it should publish the indicator internally on relevant country websites.

One important mechanism in achieving this is via the [UN E-handbook on Sustainable Development Goals Indicators](#). The handbook is targeted towards national statisticians to enable them to monitor progress made in the implementation of the Sustainable Development Goals based on data produced by national statistical systems. For each indicator, it lists the name, target and goal; the definition and rationale; the data sources and collection method; method of computation and other methodological considerations; data disaggregation; references; and international organisations for global monitoring.

The [SDG metadata link for 9.1.1](#) already contains all of this information for the RAI based on the 2016 methodology. It is important for RAI promotion that the:

- World Bank (as custodian) update the UN SDG metadata to also refer to the 2019 Supplemental Guidelines produced under TG2. Annex B of this report contains a recommended update to SDG 9.1.1 to reflect the Supplemental Guidelines.
- World Bank work with UNSD to update the UN E-handbook on SDGs with the Supplemental Guidelines.

## 4 Roadmap to achieve Tier 1 status by 2025

### 4.1 SDG Tier Classification Criteria

The aim of this Roadmap is to set out a clear path to SDG 9.1.1 achieving Tier 1 status on the UN Tier Classification scale for SDG Indicators. The aim is to achieve Tier 1 status by 2025.

There are two key groups in the UN Division for Sustainable Development, under the UN Department of Economic and Social Affairs. These are the Inter-Agency Expert Group for SDGs (IAEG-SDGs) and the High-Level group for Partnership, Coordination and Capacity-Building (HLG-PCCB) for statistics for the 2030 Agenda for Sustainable Development. Both groups are indicated in the organigram in Figure 3.

The IAEG-SDGs maintains a Tier scale for Indicators, with Tier Classification Criteria from Tier 1 to Tier 3. The definitions for these tiers are shown in Figure 4 (IAEG-SDGs, 2020).

Figure 4 - IAEG-SDGs Tier Classification Criteria

**Tier 1:** Indicator is conceptually clear, has an internationally established methodology and standards are available, and data are regularly produced by countries for at least 50 per cent of countries and of the population in every region where the indicator is relevant.

**Tier 2:** Indicator is conceptually clear, has an internationally established methodology and standards are available, but data are not regularly produced by countries.

**Tier 3:** No internationally established methodology or standards are yet available for the indicator, but methodology/standards are being (or will be) developed or tested.

At present the RAI is at Tier 2, having been promoted from Tier 3 in December 2018. A conceptually clear methodology has been established and SDG 9.1.1 has been measured in at least 36 countries under this methodology.

The HLG-PCCB provides strategic leadership for the sustainable development goal implementation process as it concerns statistical monitoring and reporting. It aims to establish a **global action plan** for sustainable development data. This includes:

- Providing strategic leadership
- Promoting National Ownership
- Recommending priority areas for statistical capacity building
- Facilitating modernisation and harmonisation of data infrastructure
- Leveraging results from the data revolution
- Promoting engagement between the statistical community and other stakeholders
- Advising on UN World Data Forum on sustainable development data

## 4.2 Survey of RAI Reporting

At the end of 2019, phase TG2 of this project identified 34 countries that had measured RAI since 2016, either using the 2016 methodology or some variant of it. At the end of February 2020 under phase TG3, the project team set up an online survey to try to identify other countries that had calculated, or were planning to calculate, the RAI. The questionnaire was sent to 70 additional countries using the team's personal contacts or via contacts supplied by the Transport Global Practice in World Bank. The questions are given in Table 6.

**Table 6 - RAI Questionnaire 2020**

Q1.	Have you calculated the Rural Access Index (RAI) within the past 5 years? If so, please give the RAI value(s) and the year(s) of calculation.
Q2.	If you have calculated RAI recently, has it been formally included as part of your country's SDG reporting process?
Q3.	Please give a brief description of the methodology used to calculate RAI, including the date and source of road network data (e.g. from recent GPS survey, or from on-line mapping platforms), the date and source of population data (e.g. from national census, or from on-line sources), and how you interpreted the 'all-season' aspect.
Q4.	Is RAI included as part of any policies and programmes to improve rural accessibility in your country?
Q5.	Are you planning to calculate RAI in 2020? And if so, what methodology are you planning to use?

The survey identified that several countries had calculated RAI (or some variant of it) and had built it into their rural accessibility policies and programmes yet were not formally reporting it as SDG 9.1.1 nor reporting it to World Bank or to any custodian partners. Other countries were considering calculating it RAI but were unaware that a methodology had been published.

These results reinforce the need for greater efforts to promote awareness on the published 2016 Methodology and the 2019 Supplemental Guidelines. Engagement with countries and/or regional groupings will encourage more countries to calculate the RAI, submit it to the custodian, and ensure that it gets published as part of the SDG process. Detailed activities to publicise and coordinate RAI are given below.

World Bank as custodian should consider conducting a similar questionnaire in future (perhaps at end of year 2021 or 2022) to help identify countries to support in order to help achieve Tier 1 status in 2025.

### 4.3 Activities for the Action Plan

The following activities are suggested based on recommendations from this report and from the [TG2 Final Report](#) published under this project.

#### 4.3.1 Inclusion in IDA replenishments

It is recommended that World Bank as custodian look to include the RAI in IDA replenishments, to boost the importance of RAI and to encourage more countries to start measurement. RAI was previously part of IDA 14. Between July 2017 and June 2018, 5,931 km of roads were constructed through IDA grants and loans, so there is a recognition that accessibility has an influence on poverty. It was not possible to include RAI in IDA 19, but it would be beneficial to have a policy to incorporate it in the next replenishment for IDA 20 in 2023. This would provide 2 years of IDA focus before the 2025 target date.

#### 4.3.2 Publish the Supplemental Guidelines

It is recommended that World Bank as custodian:

- i. Endorse the Supplemental Guidelines as an accompaniment to the 2016 methodology, by publishing them on the WB Data Catalog.
- ii. Work with UNSD to update the metadata on the UN SDG website for 9.1.1. Annex B of this report contains a recommended update to this metadata.
- iii. Work with UN to update the [SDG e-Handbook](#) to include 9.1.1. The handbook is designed for national statisticians to enable them to monitor progress made in the implementation of the SDGs, based on data produced by their NSS.

#### 4.3.3 Publicise and Coordinate RAI

It is recommended that World Bank and other stakeholders work to publicise and coordinate RAI. This publication and coordination should include all of the aspects mentioned in Section 2 of this report, including emphasis on RAI as one of a suite of indicators in the Global Roadmap for Action (GRA); presentation on aspirational targets of RAI for different environments such as small island, archipelago, extreme terrain etc; demonstration of the virtues of absolute numbers for RAI in addition to the % index figure; discussion of other supporting or parallel indicators that could be developed for example to take account of motorcycles and navigable waterways.

The following activities should be included:

- i. Inclusion of RAI in the **UN High-Level Political Forum on Sustainable Development (HLPF)**. This forum has a central role in the 2030 Agenda at a global level. It provides a platform for follow-up and review of the 2030 Agenda and the SDGs. The HLPF meets annually for eight days every September, and the theme for the 2020 meeting is “Accelerated action and transformative pathways: realising the decade of action and delivery for sustainable development”, with 51 countries due to resend their Voluntary National Reviews.
- ii. Emphasise / market / publicise RAI effectively to the NSOs, Planning Agencies and Roads Agencies through WB, UNSD and any other agency providing support to those organisations.
- iii. Convene partnership workshops, involving partners. WB should look to broaden the base of MDB partners to include Islamic Development Bank, Inter-American Development Bank and others. There would also be great benefit to having additional regional organisations on board, such as the African Union.
- iv. Promote RAI at regional conferences and events, and fully explain the publication process. Many countries do not know about RAI, or are focused solely on existing Tier I indicators and so have not considered RAI. As described above, for example, linking projects with the 2030 strategy should motivate Asian countries to measure RAI, with the active involvement of ADB as a new partner to RAI.



- v. Work with any SDG monitoring or promotion activities to encourage national statistical offices to actively consider 9.1.1 as part of their statistical development plans.
- vi. Piggy-back onto existing SDG development efforts. If any development partner (UN, UK-ONS, DFID, WB etc.) is undertaking any project relating to SDGs or the reporting platforms, it would be beneficial for the WB RAI unit as custodian to contact them and inform them of the status of RAI, documentation, training materials, default RAI tool etc. If funding becomes available an extra 1 – 2 weeks of consultancy for support specifically on RAI would greatly benefit in kick-starting any efforts to measure the indicator.
- vii. Piggy-back onto existing Roads Projects (especially rural roads projects). Partners can help to identify these and motivate cooperation.
- viii. A key policy aim should be to incorporate RAI as one of the indicators on the UNEP World Environment Situation Room site. At present the status of this site is unclear, but the potential for it to promote RAI is significant.
- ix. Record who is reporting RAI. As identified throughout this project, it is surprisingly difficult to determine which countries currently record and report RAI. A list of countries with links to their online reporting platforms is maintained by the UNECE [Task Force on National Reporting Platforms](#), but that only covers UNECE countries, and requires searching through these websites country-by-country. SDG 9.1.1 is not currently covered in the global [Sustainable Development Goals Report](#) because at the time of last publication it only covered Tier 1 and Tier 2 indicators (RAI was only promoted to Tier 2 in December 2018). An online survey has been started of NSOs/planning agencies under TG3, and the results of this will be shared with the WB at the end of the project.
- x. Develop video material. In order to support the measurement and reporting of RAI, it would be beneficial to have a series of videos available on an online platform. These videos would provide guidance on how to incorporate RAI into policy, data collection, processing and analysis necessary for RAI measurement, as well as a detailed GIS guide for the calculation. Video material will be produced under TG3 in the form of regional webinars, but there is scope to produce more detailed training videos for future use. This should be linked through to the WB Data Catalog.

#### 4.3.4 Document and Record Metadata

Documentation and recording of the method of calculation of RAI is a fundamental principle of statistics. Recording the metadata is important, otherwise it is not transparent and not repeatable. The custodian should enforce this and the metadata should be stored in the World Bank Data Catalog.

#### 4.3.5 Road Network Mapping

- i. WB and partner agencies should provide in-country support to improve road network mapping as part of ongoing projects. This data is important not only for RAI, but for many other planning and statistical functions. There needs to be coordination among the various agencies to ensure that there are no overlaps or omissions, and that common standards are followed. A definitive online map of the road network in any country provides a wealth of benefits to national and international, government and non-government agencies, to local businesses, and to the general public. This can be achieved very easily (perhaps 3-6 months of effort within a country). Initial assessment of need in a country might only take 1 week.
- ii. For many reasons, not only for RAI, it would be helpful for such mapping to be published in OSM. WB / DFID already provide direct support for this in many projects. First and foremost, there should be coordination among the various roads agencies in a country to collate and improve their data sets (irrespective of whether it gets into OSM or not). It is noted that in a few cases the road network is considered as sensitive data and it may not be possible to reconcile with OSM.

#### 4.3.6 *WorldPop*

- i. Country NSOs should engage with WorldPop to ensure that the population data published on the WorldPop platform is correctly reconciled to the latest national census and is reconciled with the lowest level of aggregation available, as noted in the Supplemental Guidelines (Workman & McPherson, 2019). Endorsement of any data source by the NSO is important for any indicator to be published as an official data source. WB as custodian (and UN partner agencies) should assist in this effort through encouraging NSOs to engage with WorldPop.
- ii. Also recommended is further targeted engagement with roads agencies to demonstrate the availability of such data for planning and prioritisation purposes. The by-products of this geospatial methodology for RAI are potentially important for future rural development planning and road network planning, but roads agencies are typically not aware of the availability and use cases for such data. NSOs cannot be solely relied upon to provide that outreach.

#### 4.3.7 *Keeping up-to-date with new technologies*

- i. It is recommended that the custodian review the RAI methodology every 3-5 years – to take account of new tools, technologies, platforms – Facebook, UN Global Platform, and the Azavea RAI Measurement Tool etc.
- ii. The UN Expert Group on Statistical Methodology for Delineating Cities and Rural Areas is looking at a universal way to define rural and urban areas, any recommendations from that group in future should be carefully considered in relation to RAI and other SDGs.

#### 4.3.8 *Further development of the RAI Measurement Tool*

- i. It is recommended that the RAI Measurement Tool developed by Azavea under TG2 is continued. In the short term it should be established on the UN Global Platform, but with restricted use. Exposure on the UN Global platform as a proof of concept tool that can be utilised and developed in a research and development environment should motivate feedback on its use and enable further development to suit the requirements of measuring RAI. There are also potential uses for other indicators that could be explored through this route. This is a powerful tool and it should help with the promotion and sustainability of the RAI in future.
- ii. The RAI tool could also be extended to calculate RAI at sub-national boundaries, which would give it potential additional traction in roads agencies as a planning and prioritisation tool.

#### 4.3.9 *Further Research on RAI*

It is recommended that further research on RAI is conducted. There have been several studies in the past that demonstrated correlation between RAI and poverty, for example. However, with a refined RAI methodology, further study is warranted. This could include studies to compare RAI and the Human Development Index (HDI), which is a composite measure of health, education and income.

#### 4.3.10 *Monitoring of Progress*

Monitoring of progress of the Action Plan should be achieved through the World Bank [Data Catalog](#); and through the SDG Reporting Website.

#### 4.4 Prioritisation

Within the scope of TG3 of this project the team are aiming to initiate and support the measurement of RAI for between three and five new countries. These countries will be selected from the results of the RAI survey and contacts made through existing projects and links. The team will carry out an exercise to determine the quality of data available, gauge the level of interest to participate and assess the capacity of the countries to carry out RAI measurement with remote support. The countries will be selected on this basis, and to provide a regionally representative spread of results, as required by the IAEG-SDGs Tier system.

Other countries who express an interest in measuring RAI will also be encouraged to continue, using existing resources such as the Supplemental Guidelines and other documentation that is currently available on the ReCAP website, but should eventually be made available on the custodian's platform and UN platforms.

#### 4.5 Roadmap Programme

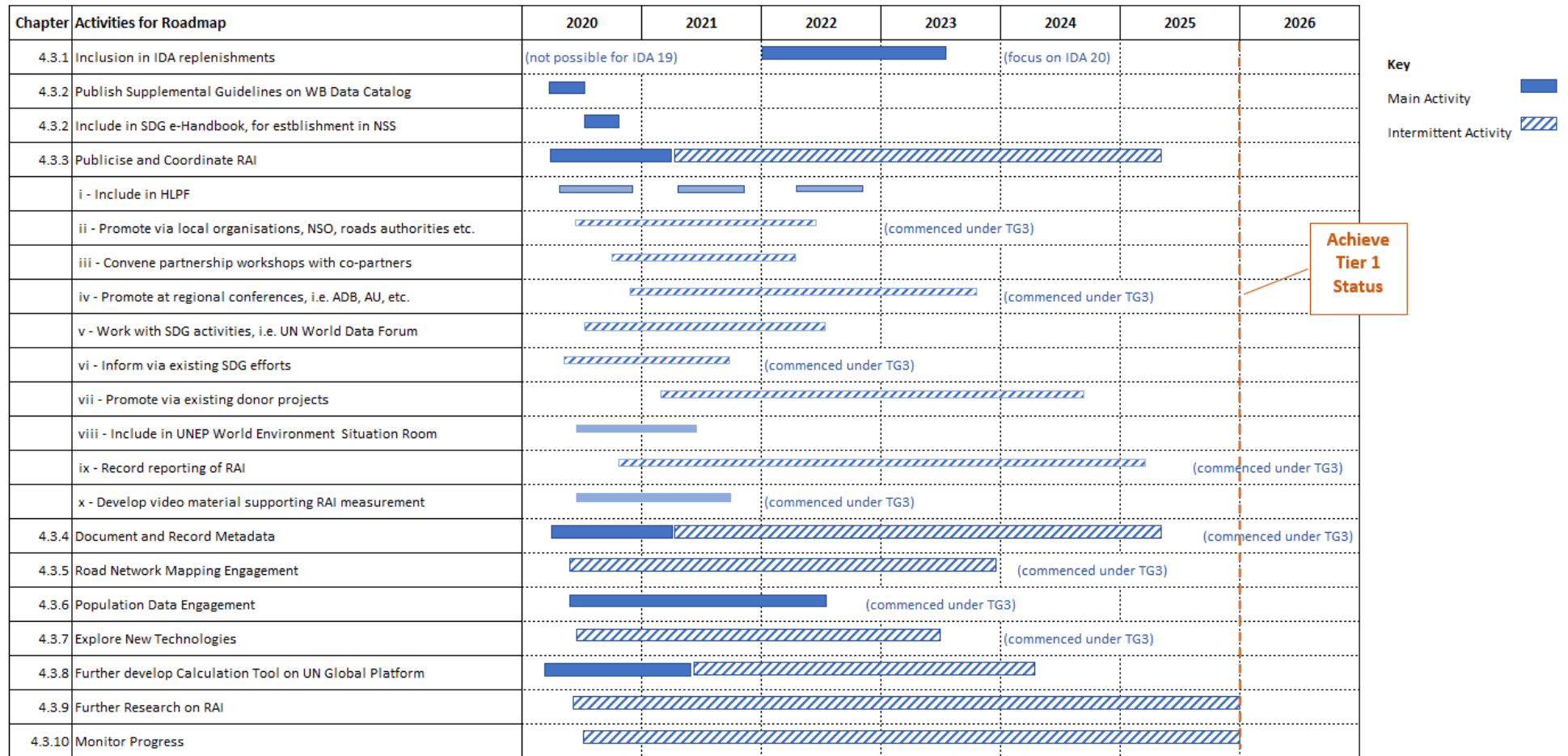
A programme of implementation has been developed to show the key steps necessary to support policy development and produce sufficient RAI measurement results to encompass 50% of all UN countries by 2025. This programme is shown in Figure 5.

The programme shows the key activities set out in Section 4 of this report. It should be noted that the bars on the programme show the key duration of activities over the coming five years, even though in reality the majority of activities will be intermittent throughout that time.

It is expected that the meeting of IAEG-SDGs to assess the status of existing indicators will be in the second half of 2025, and that applications for promotion to Tier 1 will be required several months beforehand. Therefore activities have been planned to culminate towards the end of 2024 in preparation for the assessment.

It should also be noted that some of the planned activities have commenced within the TG3 phase of the current project, as shown on the programme.

Figure 5: Programme to achieve Tier 1 by 2025



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## Annex A Stakeholders Involved in Statistical Systems and Indicators

The **UN High-Level Political Forum on Sustainable Development (HLPF)** is the main UN forum on sustainable development and has a central role in the follow-up and review of the 2030 Agenda at a global level. It provides a platform for follow-up and review of the 2030 Agenda and the SDGs. The HLPF meets annually for eight days in September, and the theme for the 2020 meeting is “Accelerated action and transformative pathways: realising the decade of action and delivery for sustainable development”, with 51 countries due to resend their Voluntary National Reviews.

Other key **UN** bodies involved in the SDGs are:

The **UN Secretariat** is a key organ of the UN and hosts several departments organised along departmental lines. The **UN Department of Economic and Social Affairs (UNDESA)** is one department under the UN Secretariat, and includes two Divisions that are integrally involved with the SDGs:

- The **UN Statistics Division (UNSD)**
- The **UN Division for Sustainable Development** includes the two bodies IAEG-SDGs and HLG-PCCB:
  - The IAEG-SDGs established and manages the UN SDG Tier system, which is the key criteria against which the SDG indicators are measured.
  - The HLG-PCCB provides strategic leadership for the sustainable development goal implementation process. It is working towards a global action plan and organises the annual UN World Data Forum.

The **UN Economic and Social Council (UNECOSOC)** promotes sustainable development towards the core aim of the 2030 Development Agenda for sustainable development. It operates at the centre of the UN’s work on all three pillars of sustainable development—economic, social and environmental.

- The **UN Economic Commission for Europe (UNECE)** is a partner for SDG 9.1.1. It is one of five regional commissions established by the UN in 1947, with the others being for Africa, Asia and the Pacific, Latin America and the Caribbean and Western Asia. UNECE’s main aim is to promote pan-European economic integration, and has 56 member states, including some in North America and Asia. UNECE has a Sustainable Transport Division and hosts an SDG Country Reporting Platform for members.

The **UN General Assembly (UNGA)** is one of the six main organs of the UN and has a mandate to work on the wide range of international issues covered by the UN Charter, including development. It represents all 193 Member States of the UN and meets annually in September.

- The **UN Environment Programme (UNEP)** is a partner for SDG 9.1.1. It is the leading global environmental authority and sets the global environmental agenda. It promotes implementation of the environmental aspects of sustainable development within the UN system.

The **UN Development Programme (UNDP)** is the lead UN development agency and works in some 170 countries and territories. It supports countries to achieve the SDGs through integrated solutions. They focus on achieving the SDGs through partnerships with government, private sector, civil society and citizens.

The **UN Foundation** was established in 1998 with a donation of \$1 billion from philanthropist Ted Turner. It acts as a strategic partner to the UN to help mobilise ideas, people and resources for collaborative action. The UN Foundation is also the host organisation for the Global Partnership for Sustainable Development Data.

The **Global Partnership for Sustainable Development Data** was established in 2015 at the UN General Assembly, with the United Nations Foundation to serve as its host organisation. It was formed to help stakeholders across countries and sectors fully harness the data revolution for sustainable development, using this new knowledge to improve lives and protect the planet, whilst leaving no one behind. The Global Partnership is a growing network of 300 members, including governments, the private sector, civil society, international organisations, academic institutions, foundations, statistics agencies, and other data communities. It has a number of initiatives under a 'Data4SDGs' banner including Regional Data Cubes, Data Roadmaps, and the Data4SDG toolbox.

The **World Bank** is one of the world's largest sources of funding and knowledge for developing countries. Its five institutions share a commitment to reducing poverty, increasing shared prosperity, and promoting sustainable development. The Bank Group works with country governments, the private sector, civil society organisations, regional development banks, think tanks, and other international institutions on issues ranging from climate change, conflict, and food security to education, agriculture, finance, and trade. It is also custodian of the RAI, developing the original 2006 methodology and the updated 2016 methodology, has funded collection of RAI in several countries, and has generally worked to promote and embed RAI as part of the SDGs. Its rural roads projects have included requirements to measure and publish RAI, for example in Rwanda and Ethiopia.

The **International Development Association (IDA)** is the part of the World Bank Group that helps the world's poorest countries. It provides grants and long-term loans at zero or very low interest. It is largely funded by contributions from governments of the richer members of the World Bank, with additional funds from the International Finance Corporation (IFC). The latest IDA replenishment has provided commitments of \$82 billion for IDA 19, which covers fiscal years 2021 to 2023. Between July 2017 and June 2018, 5,931 km of roads were constructed through IDA grants and loans, and there is a recognition that accessibility has an influence on poverty. It was not possible to include RAI in IDA 19, but it would be beneficial to have a policy to incorporate it in the next replenishment for IDA 20. This is a long-term policy goal.

The **Asian Development Bank (ADB)** envisions a prosperous, inclusive, resilient, and sustainable Asia and the Pacific, while sustaining its efforts to eradicate extreme poverty in the region. ADB assists its members, and partners, by providing loans, technical assistance, grants, and equity investments to promote social and economic development. ADB has developed a Strategy 2030 to respond to the region's changing needs and to align with major global commitments. The fifth operational priority of Strategy 2030 is Promoting Rural Development and Food Security, with a focus on rural roads, market infrastructure, and agri-logistics centres and networks to enable the integration of producers, agribusinesses, and consumers in the national, regional, and global food systems. Linking with this strategy should motivate Asian countries to measure RAI, with the active involvement of ADB as a new partner to RAI. If other regional MDBs could follow suit the chances of reaching Tier 1 would be greatly improved.

The **African Development Bank (AfDB)** aim is to spur sustainable economic development and social progress in its member countries, thus contributing to poverty reduction. While it does not currently prioritise rural infrastructure in its programmes, it is nevertheless interested in becoming a partner of the RAI. The AfDB has used the RAI at project level to monitor the success of individual projects. An example of this is the Nigeria Rural Access and Mobility Project, which was focused on the rehabilitation of feeder roads in Cross River State, and which had a key logframe target to increase the RAI from 20% in 2007 to 40% in 2020.

The **African Union (AU)** was formed in 2002 to increase cooperation and integration of African states to drive Africa's growth and economic development. The AU's Agenda 2063 is Africa's blueprint and master plan to develop a continental level framework and guideline for policy development and implementation in key sectors, which includes rural infrastructure. This stems from a recognition that global poverty is overwhelmingly rural, but that it goes beyond the urban/rural divide and it is

essential to coordinate rural development initiatives for sustainable livelihoods through global, regional, national and local levels. The Rural Economy Division of the Department of Rural Economy and Agriculture within the AU is coordinating a Rural Infrastructure Policy Framework to improve value addition, employment, productivity and incomes, and some interest in incorporating RAI as a policy in AU was shown in late 2019. If RAI were recognised as a key indicator for rural poverty by the AU, it would greatly enhance the measurement of RAI in Africa. Some NSOs such as the Uganda Bureau of Statistics have modified their [strategic plans for statistics](#) to accommodate Agenda 2063 and the SDGs. The AU has regular events to discuss Agenda 2063 and SDG progress that could be used to promote the RAI.

The **Inter-American Development Bank (IADB)** works in 26 countries in Latin America and the Caribbean. It provides loans, grants and technical assistance, as well as conducting research in the area of development. The bank is currently focusing on social inclusion and equality, productivity and innovation, and economic integration. The IADB aligned its current institutional strategy to the 2030 SDG Agenda, with the focus on a new SDG theme each year. The Bank is more focused on securing investment to produce measurable impacts in line with the SDGs, and is less involved in supporting the measurement of the SDGs.

The **Islamic Development Bank (IsDB)** is a multilateral development bank that promotes social and economic development in member countries and Muslim communities worldwide. There are 57 member countries across four continents, engaging with 1 in 5 of the world's population. The IsDB group is committed to the SDGs and supports the implementation of the 2030 Agenda according to the needs and priorities of its member countries. It adopts a collaborative approach in partnership with bilateral and multilateral development financing institutions, the private sector and civil society.



## Annex B Recommended Update to Metadata for SDG 9.1.1

Goal: 9 Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation

Target: 9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all

Indicator: 9.1.1. Proportion of the rural population who live within 2 km of an all-season road

Goal: 9 Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

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Indicator: 9.1.1. Proportion of the rural population who live within 2 km of an all-season road

## Institutional information

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### Organization(s):

World Bank

## Concepts and definitions

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### Definition:

The indicator (commonly known as the Rural Access Index or RAI) measures the share of a country's rural population that lives within 2 km of an all-season road.

### Rationale:

Among other factors, transport connectivity is an essential part of the enabling environment for inclusive and sustained growth. In developing countries, particularly in Africa, the vast majority of agricultural production remains smallholder farming with limited access to local, regional, or global markets. Isolated manufacturing and other local businesses (except for those related to mining) often lag behind in the global market. Limited transport connectivity is also a critical constraint to accessing social and administrative services, especially in rural areas where the majority of the poor live.

Rural access is key to unleashing untapped economic potential and eradicating poverty in many developing countries. In the short term, transport costs and travel time can be reduced by improved road conditions. Over the longer term, agricultural productivity will be increased, and firms will become more profitable with the creation of more jobs, eventually helping to alleviate poverty.

To make good investments, quality data are required. Since resources are limited, it is essential to understand where the most critical unmet needs exist, and monitor efforts made over time. In the transport sector, there are few global indicators. The quality of roads is often unknown and a matter of concern in developing countries. In Africa, the Road Management Initiative, started by the Africa Transport Policy Program in the late 1990s, developed a road sector database, which includes road network condition data such as the share of roads in good or bad condition. But this database is largely outdated and insufficient.

The Rural Access Index (RAI), originally developed by the World Bank in 2006, is among the most important global development indicators in the transport sector, providing a strong, clearly understandable and conceptually consistent indicator across countries. It measures the proportion of people living in rural areas who have access to an all-season road within a walking distance of approximately 2 kilometres (km). Although the underlying methodology has been updated to leverage additional sources of data, the RAI remains the most widely accepted metric for tracking access to transport in rural areas.

The RAI has four primary benefits: sustainability due to its reliance on already existing data, consistency in methodology across countries and time, simplicity in understanding, and operational relevance for the government agencies responsible for generating and aggregating the underlying data.

### **Concepts:**

The indicator is measured by combining three sets of geospatial data: where people live, the spatial distribution of the road network, and road passability. The use of spatial data has various advantages. It can help ensure consistency across countries. The level of spatial resolution is broadly the same regardless of the size of the country or subnational boundaries. Any given norm of connectivity (for example, 2 km distance from a road) is uniquely and unambiguously applied for all countries.

**Population Distribution** - Quality population distribution data are essential for correct measurement of rural access. In some countries, census data is available in a geospatially detailed, reliable format. For other countries, population distribution data sets have been developed by the international research community, interpreting subnational census data through various modelling techniques. For the RAI, [WorldPop](#) data has been found to provide a reliable estimate. That estimate can also be refined through engagement between the national statistics offices and WorldPop to reconcile data at the level of enumeration areas.

**Rural-Urban Definition** – Related to population distribution data, an important challenge facing the index is the need for a consistent and reliable urban and rural definition to exclude urban areas from the calculation. The inclusion of urban areas would create a substantial upward bias in the RAI, because most urban residents have “access to roads,” no matter how it is defined. Ideally, spatial data determining urban-rural boundaries are needed at a similar level of resolution as the population. As such data may rely on different definitions in different countries, globally produced urban extents may be used, such as the [Global Urban Rural Mapping Project](#) v1 Urban Extent Polygons.

**Road Network Data** – Data on road locations may come from a number of sources. Ideally government data are used, as they are consistent with the road network for which road agencies are responsible and are relatively easily merged with other operational databases. In countries where the road location data may not be detailed enough or entirely missing or where there is a large unclassified network, alternative data sources may be available, such as the open source [OpenStreetMap](#).

**Road Condition Data** – The principle of the “all-season” road network remains central to the original concept of measuring the RAI. An “all-season road” is defined as a road that is motorable all year round by the prevailing means of rural transport (often a pick-up or a truck which does not have four-wheel-drive). Predictable interruptions of short duration during inclement weather (e.g. heavy rainfall) are accepted, particularly on low volume roads. A road that it is likely to be impassable to the prevailing means of rural transport for a total of 7 days or more per year is not regarded as all-season. Note that some roads agencies use the term “all-weather” to describe their roads, however “all-weather” typically means “paved” and should not be confused with “all-season” which can include unpaved roads too.

It is important to determine whether access to facilities and services is available all year round, and hence the possibility of the road throughout the year is an essential factor in this aspect of contributing to poverty reduction. Information on the condition of the road network is frequently maintained by road agencies as part of their operational responsibilities.

The traditional road inventory survey can collect data on road condition, including the International Roughness Index (IRI), at a high level of information quality, to determine whether a road is “all-season”. For the purpose of the RAI, the road condition threshold is generally set at an IRI of less than 6 meters/km

for paved roads, and an IRI of less than 13 meters/km for unpaved roads. When IRI is not available, other types of condition assessment may be used if comparable. The use of smartphones with GPS are being investigated in order to accurately map local transport services routes, and identify which rural roads are open all year and hence are all-season roads. These condition thresholds should only be used, however, where there is reliable road condition data available. The parameters should be calibrated to the local conditions, i.e. checks should be made to determine that paved roads in poor condition are largely not all-season, and that unpaved roads in fair or poor condition are largely not all-season. The parameters can be adjusted accordingly to the local conditions, based on a systematic and documented study.

In the event that accurate road condition data is not available, then accessibility factors provide an alternative means to road condition for identifying “all-season” roads. This alternative approach is broader based, more sustainable and should facilitate international comparison. It does not require ground measurements of road condition to be made. Accessibility factors determine the likelihood of a road being all-season, or the risk of a road being inaccessible, and are closely aligned with the intent of the original 2006 study, i.e. *“accessible all year with the prevailing mode of transport”, and “... may be temporarily unavailable during inclement weather”*.

#### **Comments and limitations:**

The Indicator relies substantially on data collected by road agencies and national statistics offices for their operational work. As such, its update is dependent on the frequency of update of the road condition surveys and national census. When these data sets are not from the same year, the basic principle to be followed is that a more stable data set should be used with more flexibility. For instance, a national rural roads program could dramatically improve the quality of roads in a certain locality in a relatively short term, while population data are fairly stable over five years. In such a case, the road quality data would be considered as an anchor, with the closest or adjusted population data applied.

The Indicator depends heavily on the quality and extent of the underlying spatial data. The extent of the road network data, and how well it reflects the reality on the ground, can be a particular issue. Verification against open source data and satellite data where possible is recommended. More data are always better. Efforts should also be made to collect detailed road data, including on tertiary or feeder roads, which may not be covered in the existing spatial road network data regardless of whether government or open data sources are used. If condition data is not available, then use of accessibility factors can be considered.

The 2 km norm of access may not be as applicable in all areas. In extremely mountainous countries, for example Nepal, there has been significant research into walking times and preparation of accessibility maps that take into account mountainous terrain, locations of rivers and footbridges. However, for global consistency purposes and comparability across countries, the 2 km distance threshold has been maintained (equivalent to a 20-30 minute walk in most regions).

While the RAI provides an objective benchmark for assessing access to transport in rural areas, “universal” road access of 100% should not be set as a target. First mile or last mile connectivity is not intended to imply all-season road access. Connectivity can be a system of engineered trails and footbridges as in Nepal, or designated river navigation channels and jetties as in Bangladesh, or a system of solar lit beacons and marked desert trails in Sudan. There are many more such examples: most rural settlements in the Amazon, Orinoco, Congo and Upper Nile River basins, have no or limited hinterland road access. The outer islands of the archipelagos of Indonesia and Philippines and South Pacific Islands rely heavily on coastal shipping. Similarly, vast regions of Siberia, the Russian steppes and Mongolia depend on rail. The deltas of Mekong, the Ganges-Brahmaputra, Indus rely on water transport. It is simply not possible, nor desirable, to address last mile connectivity by all-season rural roads in many situations. In addition, in South Asia and growingly in Africa, motorcycles and autorickshaws are the mainstay of personal mobility and account for a growing share of rural commerce. “All-season” for motorcycles and autorickshaws is not the same as “all-season” for 4-wheeled vehicles. And in the not too distant future, self-driving all-terrain vehicles, or drones, could provide an important transport service.

Rural access should not be so narrowly focused on roads, and without regard for conservation or for protection of fragile zones, or the impacts of climate change. It must also take account of the ability of a country to maintain its existing and future road network infrastructure.

## Methodology

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### **Computation Method:**

The indicator is calculated by overlying three basic geospatial datasets: population distribution, road location, and road passability. The RAI is calculated as the rural population within a 2 km buffer of a good road divided by the total rural population of the country.

First, the spatial distribution of the rural population needs to be determined. This involves obtaining the population dataset for the country, either from country sources or global datasets such as WorldPop.

Next, the road network should be merged with road condition assessments, either in terms of IRI if available, or visual assessment. Those roads with a quality not meeting the threshold of the RAI (not providing “all-season” access) should be excluded. In general, the RAI adopts a road condition threshold is generally set at an IRI of less than 6 meters/km for paved roads and an IRI of less than 13 meters/km for unpaved roads. If IRI is unavailable, alternative assessments of road condition may be used, if comparable. If road condition data is not available, then Accessibility Factors can be defined to identify those roads at highest risk of impassability. A 2 km buffer should be generated around the road network meeting the condition threshold or highest risk. Urban areas should be removed from both the road data and the population data.

Finally, the rural population living within the 2 km buffer should be calculated. The final RAI is determined by dividing this portion of the rural population with the total rural population.

### **Disaggregation:**

Due to its nature as a geospatially derived indicator, the RAI can be calculated at subnational levels down to the level of granularity of the underlying datasets. While the World Bank will only report country level results for SDG monitoring, subnational results can be calculated for country use.

### **Treatment of missing values:**

- [At country level](#)  
No gap filling is done to report national numbers.
- [At regional and global levels](#)  
This is a country specific indicator and no aggregation is currently planned.

### **Regional aggregates:**

This is a country specific indicator and no aggregation is currently planned. As additional country level data becomes available aggregation may be possible at a supranational level.

### **Sources of discrepancies:**

Relying heavily on national data, differences in national systems undoubtedly are reflected in the top level indicator (including road quality classification, national census methodologies, etc.). Use of globally derived datasets such as WorldPop may result in somewhat different results from national data if the NSO has not engaged with WorldPop. However, an assessment of sample countries indicates that these discrepancies are likely limited in their impact of the overall result.

### **Methods and guidance available to countries for the compilation of the data at the national level:**

The World Bank, as custodian agency, and UK Department for International Development (DfID), have developed and published a full methodological document for the RAI, including detailed descriptions of various data sources, variations on the standard methodology, and a step-by-step guide. In addition, a GIS tool has been developed to calculate the RAI from provided data sets. These resources and others are being collected into an online portal for the Rural Access Index.

### Quality assurance

Within the World Bank, the Transport Global Practice is in charge of the collection and validation of RAI data and results. The Global Practice archives the datasets obtained from NSOs and road agencies and then harmonizes them, applying common methodologies. Where NSOs and road agencies calculate the RAI using their own data and methodologies, the Transport Global Practice is responsible for reviewing the underlying data and assumptions and validating the results for inclusion in the global SDG dataset. The objective is to ensure that the data generated, curated, and disseminated by the World Bank are up to date, meet high-quality standards, and are well documented and consistent across dissemination channels. World Bank country staff works in close collaboration with national statistical authorities on the data collection and dissemination process.

## Data Sources

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### Description:

Data on population distribution are typically sourced from WorldPop or national census results, depending on the reliability and spatial granularity of country systems. Road location and quality data are provided by the national road agencies responsible for their upkeep. Accessibility factors are defined by national roads agencies in collaboration with national statistics offices and other agencies as appropriate.

### Collection process:

A partnership between NSOs, national road agencies, and the World Bank as custodian agency is necessary to effectively generate RAI results. In some countries, World Bank transport staff work closely with national agencies, with data generation and calculation of the RAI built into a broader engagement. In other countries, NSOs and road agencies provide RAI results directly to the World Bank as custodian.

## Data Availability

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### Description:

As of 2019, data is readily available for more than 30 countries, with consultations ongoing for a number more. While data is available for some Asian and Latin American countries as well, Africa accounts for the largest share of the available information. Consultations are underway to engage with additional countries.

### Time series:

Due to the long update cycle of national road condition surveys, the RAI is not expected to be updated on an annual basis, but instead aligned with national systems. This implies a likely 3-5 year time frame for update. Current data spans the period from 2009-2019, with 1-2 data points per country.

## Calendar

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### Data collection:

Source collection is ongoing by the Transport Global Practice of the World Bank in coordination with NSOs and national road agencies.

### Data release:

The World Bank Group is committed to releasing available RAI updates on a yearly basis.

## Data providers

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The World Bank typically receives data from national road agencies and NSOs directly. As the underlying calculation relies primarily on road agency data, such agencies are generally the primary counterpart for RAI data.

## Data compilers

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Within the World Bank, the Transport Global Practice is in charge of the collection and validation of RAI data and results. The Global Practice archives the datasets obtained from NSOs and road agencies and then harmonizes them, applying common methodologies. Where NSOs and road agencies calculate the RAI using their own data and methodologies, the Transport Global Practice is responsible for reviewing the underlying data and assumptions and validating the results for inclusion in the global SDG dataset. The objective is to ensure that the data generated, curated, and disseminated by the World Bank are up to date, meet high-quality standards, and are well documented and consistent across dissemination channels. World Bank country staff works in close collaboration with national statistical authorities on the data collection and dissemination process.

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The Sustainable Mobility for All initiative provides input and leverages the RAI in its global tracking framework. More information here: <http://sum4all.org/>

## Related indicators

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None

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