

Status Review of the Updated Rural Access Index (RAI)

Final Report



Civil Design Solutions

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Cover photo: Rural transport scenes

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Abstract

The Rural Access Index (RAI) was defined in 2005 as the proportion of the rural population living within 2 km of an all-season road. Initial measurements of the RAI for 64 countries were published in 2006, but further systematic updates of the RAI did not take place. In 2016, Sustainable Development Goal (SDG) Indicator 9.1.1 was agreed with the same definition as the RAI, requiring regular update of RAI data for the majority of UN countries. With support from ReCAP, the World Bank developed updated spatial analysis techniques to measure the RAI, and trials were carried out in 8 ReCAP countries. However, concerns were raised about inconsistencies in the results, and limited involvement of pilot countries in the measurement process. This status review has been conducted to address these concerns with a view to accelerating progress with the updated measurement of the RAI. Recommendations made for ReCAP RAI Task Group 2 (TG2), Consolidation and Revision, include a proposed approach for ongoing measurement of the RAI by many more countries as rapidly as possible. Options are also outlined for possible alternative methods of measuring rural accessibility in the future.

Key words

RAI, ReCAP, Rural Access Index, SDG Indicator 9.1.1, Status Review

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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

Acronyms, Initialisms and Currencies

\$	United States Dollar (US\$ 1.00 ≈ provide conversion to local currencies)
ADB	Asian Development Bank
AfCAP	Africa Community Access Partnership
AfDB	African Development Bank
AICD	Africa Infrastructure Country Diagnostic
AIKP	Africa Infrastructure Knowledge Programme
AsCAP	Asia Community Access Partnership
BBS	Bangladesh Bureau of Statistics
CDS	Civil Design Solutions
DEC	World Bank Development Economics Vice Presidency
DoLIDAR	Department of Local Infrastructure Development & Agricultural Roads
ERA	Ethiopian Roads Authority
ESCAP	UN Economic and Social Commission for Asia and the Pacific
GIS	Geographic Information System
GPS	Global positioning system
IAEG-SDGs	UN Inter-agency and Expert Group on SDG Indicators
IDA	International Development Association
IDB	Inter-American Development Bank
IsDB	Islamic Development Bank
LGED	Local Government Engineering Department, Bangladesh
LSMS	Living Standards Measurement Study
NARAA	Nationally Appropriate Rural Accessibility Actions
NAMA	Nationally Appropriate Mitigation Actions
NSO	National Statistical Office
PMU	Programme Management Unit
RAI	Rural Access Index
ReCAP	Research for Community Access Partnership
SDGs	Sustainable Development Goals
SRAI	The RAI calculated by the 2016 “Spatial Rural Access Index” method
Sum4All	Sustainable Mobility for All
UBOS	Uganda Bureau of Statistics
UK	United Kingdom (of Great Britain and Northern Ireland)
UKAid	United Kingdom Aid (Department for International Development, UK)
UN	United Nations
UNRA	Uganda National Roads Authority

Executive summary

The results of a comprehensive Status Review of progress with the measurement of the Rural Access Index (RAI) are presented, including recommendations to achieve more rapid progress with the international measurement of the RAI, which is also now SDG Indicator 9.1.1.

The RAI was defined in 2005 as the proportion of the rural population living within 2 km of an all-season road. Initial measurements of the RAI for 64 countries were published in 2006, but further systematic updates of the RAI did not take place. In 2016, SDG Indicator 9.1.1 was agreed with the same definition as the RAI, requiring regular update of RAI data for the majority of UN countries. With support from ReCAP, the World Bank developed updated spatial analysis techniques to measure RAI, and trials were carried out in 8 ReCAP countries. However, concerns were raised about inconsistencies in the results, and limited involvement of pilot countries in the measurement process. This status review was carried out to address these concerns and recommend a way forward.

The assignment started with a review of literature about the RAI, following which a visit was made to Washington DC to meet the team developing the GIS based spatial analysis method of measuring the RAI. Discussions with interested parties at the World Bank focused on the measurement and use of the RAI, and the measurement of SDG Indicators. Discussions were also held with the Inter-American Development Bank.

The SDG Indicators are determined, and reviewed, by the UN Inter-agency and Expert Group on Sustainable Development Goal Indicators (IAEG-SDGs). The SDG Indicators were adopted in 2016, and changes are only possible at reviews due to be carried out in 2020 and 2025. SDG Indicator 9.1.1 is currently a Tier III indicator, a classification normally applied to Indicators for which an agreed methodology for measurement has not yet been agreed. To progress to Tier II, for which a methodology must be defined but regular widespread measurements are not yet made, initial measurements are needed for a significant number of countries. In addition, it must be possible to demonstrate that measurement will expand to a larger number of countries, and that measurements will be repeated.

Visits were made to the African Development Bank in Abidjan, Cote d'Ivoire, and to Ethiopia and Uganda, and then to Nepal, Bangladesh, and the Asian Development Bank based in Manila, Philippines. Meetings and seminars were held at the regional development banks. In each country meetings took place both with government departments responsible for rural roads, and with the National Statistical Offices (NSOs) involved in the measurement of SDG Indicators. An open request was made through the ReCAP circulation list for comments from anyone interested in contributing to this status review.

Following analysis of the findings of these consultations, specific recommendations have been developed for ReCAP RAI Task Group 2 (TG2), Consolidation and Revision. Key recommendations include that the original definition of the RAI should be retained, but that a new methodology document should be prepared. It is also proposed that alternative methods of measuring the RAI should be accepted, including both household-survey-based methods and GIS-based methods. In doing so, provision should be made to include expert statistical input, for example through the National Statistical Offices, to assess the consistency and accuracy of input data sets and verify the suitability of the method used in each country. It is considered unlikely that countries themselves will provide significant funding to assist in the measurement of the RAI, because it relates only indirectly to most established national methods of planning rural access.

Concerns have been raised that the RAI does not truly reflect the realities of contemporary rural access in some countries, for example where vehicles other than four-wheel vehicles are used, and conventional all-season roads are not essential. To accommodate this concern at national level, it is proposed that an additional country RAI could be calculated taking such factors into account, together with an explanation of why this was done. To address concerns by international specialists, it is suggested that an additional SDG indicator is proposed, which can take into account access to facilities such as health centres, schools and markets, and also the existence of appropriate and sustainable transport services.

1 Introduction

The Research for Community Access Partnership (ReCAP) is a programme of research and knowledge dissemination funded by the UK government through the Department for International Development (DFID). The aim of ReCAP (2014-2020) is to build on previous programmes of high quality research and take this forward to a sustainable future in which the results of the research are adopted in practice and influence future policy. The key stated outputs include the generation, validation and updating of evidence for effective policies and practices to achieve all-season, climate resilient, equitable and affordable rural transport.

As part of this initiative, ReCAP has supported this Status Review of the Rural Access Index (RAI). The review has been carried out by Civil Design Solutions (CDS), with project work starting in January 2018.

This status review has included consultation with the World Bank in Washington DC, with the African Development Bank in Abidjan, with the Asian Development Bank in Manila, and with four ReCAP member countries; Ethiopia, Uganda, Nepal, and Bangladesh. A desk study of relevant existing reports, and wider consultation by email, has been undertaken. The status review is intended to address concerns that have arisen with the implementation of the RAI, with a view to accelerating progress with the application and regular measurement of the RAI in a larger number of countries.

2 Background

The RAI is defined as ‘the proportion of the rural population living within two kilometres of an all-season road’. It was adopted as a development indicator for the Results Measurement System for IDA-14 (the 14th replenishment of International Development Association resources) in 2005. Two kilometres was selected as ‘typically equivalent to a walk of 20-25 minutes’ (Roberts et al, 2006). Initial measurements of the RAI (obtained by several methods) for 64 countries were included in the World Bank Report ‘Rural Access Index: A Key Development Indicator’ (Roberts et al, 2006).

In 2006 it was intended that the RAI would be updated every few years by including a suitable question in regular household surveys, for example the Living Standards Measurement Study (LSMS). By this method, it was originally estimated that it would only take one day of statistical analysis of the household survey data to update the national RAI value. The original definition in 2005 included an alternative methodology of overlaying the all-season rural road map onto a map of the rural population distribution. Some of the original 2006 measurements were carried out by this methodology using a Geographic Information System (GIS). Others were made using less reliable approximate modelling techniques.

Although the RAI has been widely used in studies and projects, the original 2006 data has not been systematically updated as originally intended. Following the establishment of the UN Sustainable Development Goals (SDGs) in September 2015, a set of 232 SDG Indicators was defined by the UN Inter-agency and Expert Group on SDG Indicators (IAEG-SDGs) in 2016 (UN, 2016). SDG Indicator 9.1.1 ‘Proportion of the rural population who live within 2 km of an all-season road’ was one of these 232 indicators and is the same as the RAI.

The World Bank, as the ‘custodian’ of SDG Indicator 9.1.1, had been working on a research programme since 2015 to develop a new methodology for measuring the RAI, and pilot measurements of the RAI using this new methodology were carried out in eight ReCAP countries in Africa and Asia with financial support from ReCAP. The pilot countries were Ethiopia, Kenya, Uganda, Tanzania, Mozambique, Zambia, Nepal and Bangladesh. The results of these pilot measurements, and the methodology for the new RAI measurement method, were published in the ReCAP/World Bank report ‘Measuring Rural Access: Using new technologies’ (World Bank, 2016).

In November 2016, the World Bank prepared a proposal for more widespread use of the new RAI measurement methodology. However, concerns were raised about inconsistencies in the results, and limited involvement of pilot countries in the measurement process.

Having been adopted as an SDG Indicator, the RAI urgently needs to be measured for as many UN countries as possible, and an agreed effective mechanism needs to be established through which regular future

updates will take place. The IAEG-SDGs has established a 'tier' system of classifying SDG Indicators. The RAI is currently on the lowest tier, Tier III, alongside other indicators, which do not yet have an established methodology for their measurement. To progress to Tier II, an updated methodology must be finalised, and it must be possible to demonstrate that systems are in place to collect and update RAI data in the future for a significant number of countries. To progress to Tier I, RAI data must be measured regularly for at least 50% of UN countries.

ReCAP has defined three task groups to move forward with the development and use of the RAI:

Task Group 1 (TG1): A status review and way forward recommendation

Task Group 2 (TG2): Consolidation and Revision

Task Group 3 (TG3): Application in Pilot Countries

This project is Task Group 1.

3 Research objectives and relevance

The objectives of this status review are:

- To assess progress with the measurement of the RAI using spatial methods; and
- To determine the actions needed to move SDG Indicator 9.1.1 (the RAI) from a Tier III SDG Indicator to Tier II, and eventually to Tier I.

The RAI is currently the only SDG Indicator specifically for rural access and is closely aligned with ReCAP activities.

4 Methodology

The schedule of project tasks is included as Annex 1.

The main tasks carried out were as follows:

- **Desk review and questions to address:** A desk review of key documents relating to the RAI was carried out. A list of questions that the status review should consider was then prepared and is included as Annex 2.
- **Visit to Washington DC:** The visit to the World Bank in Washington DC included meetings with the team developing the new measurement method for the RAI; learning more about the interaction between the World Bank Development Economics Vice Presidency (DEC) and the IAEG-SDGs; and a lunchtime seminar and video conference with World Bank staff with an interest in rural development. Simon Ellis, as Lead Transport Specialist at The World Bank, assisted both with initiating this status review and in organising meetings at the World Bank. Meetings also took place with the Inter-American Development Bank.
- **Interim deliverable - Interim Progress Statement:** Following the visit to the World Bank, an Interim Progress Statement was prepared, including outline proposals for ReCAP RAI Task Group 2 'Consolidation and Revision'.
- **Meetings in Africa:** Consultations took place with staff at the African Development Bank (AfDB) in Abidjan, followed by country visits to Ethiopia and Uganda.
- **Meetings in Asia:** Further country visits to Nepal and Bangladesh took place, followed by consultations with staff at the Asian Development Bank (ADB) in Manila.
- **Wider consultation:** A wider open consultation took place through an email request for comments circulated to the ReCAP mailing list. This included a link to the Interim Progress Statement.

- **Final deliverable - Final Report:** Preparation of the Final Report, including details of all tasks carried out, key findings, and recommendations for the way forward with TG2 and TG3.

5 History of the development of the RAI

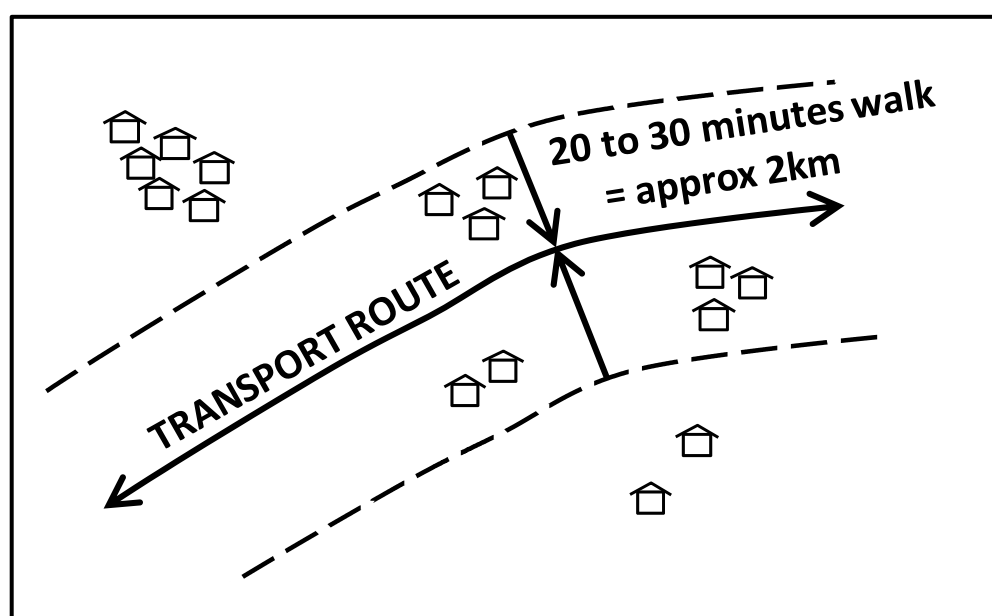
5.1 Establishment of the Rural Access Index (RAI) in 2005/2006

The Rural Access Index (RAI) is widely referred to as having first been defined in the World Bank Transport Paper TP-10 ‘Rural Access Index: A Key Development Indicator’ (Roberts et al, 2006). A more concise initial description of the RAI is included in Annex I of the report, entitled ‘Rural Access Index: Summary Sheet’, updated by Peter Roberts in September 2005. This starts with the definition:

‘Rural Access Index’ is the percentage of rural people who live within 2 km (typically equivalent to a walk of 20 minutes) of an all-season road as a proportion of the total rural population. An “all-season road” is 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.

The 2006 Transport Paper referred to a walk of 20-25 minutes. Some specialists have extended this to 30 minutes. However, the distance of 2 km as a proxy for this walk has been widely accepted and used. Hence, all data collection for the RAI is guided as illustrated in Figure 1. Within rural areas, the population of households within the 2 km boundary (regarded as having access to an all-season road), is compared with the total population of all households.

Figure 1 Measurement of the Rural Access Index (RAI)



Two approaches to the measurement of RAI were proposed in 2005. These entailed drawing respectively from:

- household surveys that include information about access to transport; and
- map data to determine how many people live within the specified catchments of the road network.

The RAI was adopted in 2005 as a development indicator for the Results Measurement System for IDA-14. Transport Paper TP-10 (Roberts et al, 2006) included initial measurement of the RAI for 64 countries; 32 IDA

countries and 32 non-IDA countries. Amongst these 64 countries, the RAI measurements for 26 countries were based on the results from five different types of household survey data, and for 10 countries were based on mapping/GIS analysis. The measurements for a further 22 countries were estimated using approximate modelling techniques. The method used for the remaining 8 countries is not clearly stated.

Measurement methods used for ReCAP partner countries were:

- Household surveys: Ghana, Kenya, Malawi, Tanzania, Bangladesh, Nepal, Pakistan
- Mapping/GIS: (none)
- SSATP (method unclear): DR Congo, Ethiopia
- Approximate models: Sierra Leone, Uganda, Zambia

In 2006, it was intended that a suitable question about ‘the distance or time taken to walk to an all-season road’ should be included in household surveys carried out every few years. There was also a suggestion that: ‘If at all possible, a second question should be included to ask about access to a reliable, all-season transport service. In the medium-term it is likely that the focus will shift to assessing the level of access to transport services rather than access to the road network, since not all sections of the network necessarily carry satisfactory services’.

Although the method by which the RAI data for each country was measured is shown in Annex III of the 2006 report, there is no information about the anticipated accuracy of the input data, and no attempt appears to have been made to assess the likely accuracy of each measurement.

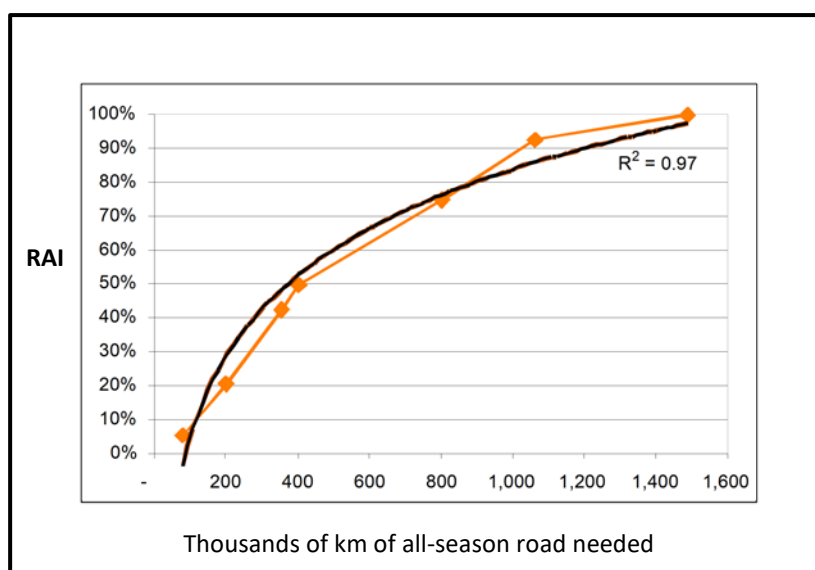
The variety of different methods used for the initial measurement of the RAI in 2006, and the lack of information about the likely accuracy of these measurements, raises doubts about the use of this data as a definitive baseline from which to measure changes that have taken place.

5.2 Update, application and use of RAI 2006 to 2016

The regular update of the RAI as an IDA-14 indicator does not appear to have taken place. Nevertheless, the RAI is widely known and understood, and has been used by development partners for regional studies and national rural development planning.

The Africa Infrastructure Country Diagnostic (AICD) included an update of RAI data for 24 countries in Africa, and some findings from analysis of this data were published in 2008. However, because this RAI data was generated using GIS-based methods it was not regarded by AICD analysts as suitable for direct comparison with the 2006 RAI data.

Figure 2 Additional length of road network needed to reach different levels of Rural Access Index



Source: Carruthers et al 2008

The AICD RAI data was used to consider the rural road infrastructure investment needed to achieve different levels of RAI (Carruthers et al, 2008), as illustrated in Figure 2. The length of all-season road infrastructure that would need to be constructed indicates the infrastructure investment required. An important conclusion was that, pragmatically, it might not be financially possible to achieve an RAI of over 50% in some African countries. Significantly, it was concluded that short-term improvements in the RAI would not be sustainable unless appropriate action was taken to ensure that improved roads would be maintained.

Over the past decade, various concerns have been expressed by transport and rural development specialists about the accuracy and usefulness of the RAI. Issues raised include:

- Even as the RAI was first defined in 2005, Peter Roberts used the 2 km distance only as an approximation for walking time, and he noted that what was important was the distance to an appropriate transport service. The existence of a road does not guarantee access to such a service.
- The actual distance walked in the same time through different types of terrain will vary.
- The boundary between rural areas and urban areas may not be well defined, and information about the rural population distribution and the location of roads may be inaccurate.
- The concept of a road being “all-season” is not well defined or widely understood, and records of roads kept by road administrations or local government do not normally make this distinction.
- The single, national value of the RAI, originally measured in 2006, can be used for making comparisons between countries; and could potentially be useful for monitoring long-term changes; but is not useful for local planning purposes.
- The extensive and rapid growth in the use of motorcycles in many developing countries has made very significant changes in the transport services available in some rural areas. A recent study in Liberia (Starkey et al, 2017) found that in some areas most rural people attending health centres, including women attending maternity centres, used motorcycle transport. Many school children also travelled by motorcycle. Motorcycle taxi services can reach areas beyond the normal road network and can provide a more responsive “on demand” service than other transport options, albeit generally at a higher cost.

5.3 UN SDG Indicator 9.1.1

Recommendations regarding SDG indicators are made by the IAEG-SDGs, whose members are drawn from the National Statistical Offices (NSOs) of a representative group of all UN countries, with membership rotating between countries. The IAEG-SDGs meets in November each year and prepares a report to the UN Statistical Commission in December each year.

SDG Indicator 9.1.1 is the same as the RAI, as shown in the extract from the 2016 IAEG-SDGs Report presented as Figure 3.

Figure 3 Definition of SDG Indicator 9.1.1

*Extract from Report of the Inter-agency and Expert Group on SDG Indicators (IAEG-SDGs),
16 December 2016*

From page 25/49:

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

Target:

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

Indicators:

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

9.1.2 Passenger and freight volumes, by mode of transport

Source: UNIAEG-SDGs, 2016

A tier classification system for all SDG Indicators was established in 2016 and was updated in 2017 as defined in Figure 4.

Figure 4 Definition of SDG Indicator Tier Classification

*Extract from Report of the Inter-agency and Expert Group on SDG Indicators (IAEG-SDGs),
19 December 2017*

From page 3:

A. Review of Tier classification and methodology development of Tier III indicators

8. The Expert Group clarified the criteria/definitions of Tier classification at its fifth meeting, as follows:

(a) Tier I: 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;

(b) Tier II: Indicator is conceptually clear, has an internationally established methodology and standards are available, but data are not regularly produced by countries;

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

Source: UN IAEG-SDGs, 2017

The RAI is currently on the lowest tier, Tier III, alongside other indicators that are regarded as not yet having an established associated methodology.

The December 2016 report of the IAEG-SDGs explained the mechanism for reviews of all SDG Indicators that will take place in 2020 and 2025. The criteria for these reviews is shown in Figure 5. Further details of the

timescale for the 2020 review were included in the December 2017 IAEG-SDGs report, with proposals for changes and possible deletions to be made by mid-2019.

Figure 5 IAEG-SDGs reviews of SDG Indicators in 2020 and 2025

Extract from Report of the Inter-agency and Expert Group on SDG Indicators, (IAEG-SDGs), 16 December 2016

From page 6/49:

22. Two comprehensive reviews of the indicator framework are planned, and their results are to be submitted for consideration and decision by the Statistical Commission at its 2020 and 2025 sessions. They could include the addition, deletion, refinement or adjustment of indicators on the basis of the following:

- (a) Indicator does not map well to the target;
- (b) Additional indicator(s) is needed to cover all aspects of the target;
- (c) New data sources are available;
- (d) Methodological development of tier III indicator has stalled or has not produced expected results;
- (e) Indicator is not measuring progress towards meeting the target.

Source: UN IAEG-SDGs 2016

Before 2020, the only changes to SDG Indicators that are possible are minor corrections.

5.4 Updated RAI measurements using spatial technologies in 2016

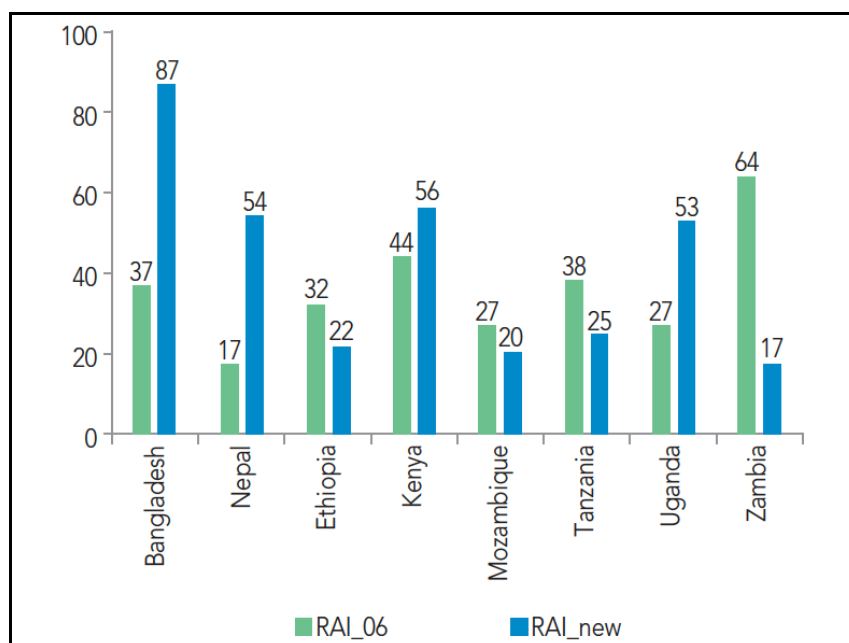
As the "custodian" of SDG Indicator 9.1.1, the World Bank started a research programme to develop a new methodology for measuring the RAI. A more reliable and sustainable method of measurement was needed to address the requirements for an SDG Indicator.

The new methodology adopted by the World Bank makes use of existing spatial datasets. Various international population datasets are available, for example *WorldPop* (2013). These datasets are progressively becoming more accurate. National road administrations and government departments are meanwhile developing georeferenced datasets of national road networks, and these datasets could be supplemented by other mapping sources, for example *OpenStreetMap*. As there is some difficulty determining which roads are "all-season", it was decided as a proxy to use good/fair/poor ratings of roads, determined from road asset management systems or other alternative data sources, to determine which roads should be included in the analysis. These datasets were then combined using a GIS. This method has the advantage of being able to generate regional and local values of RAI for analysis and planning purposes, as well as determining the national average.

ReCAP provided financial resources for pilot measurements of the RAI using this new methodology, which was applied in eight ReCAP countries in Africa and Asia (Ethiopia, Kenya, Uganda, Tanzania, Mozambique, Zambia, Nepal and Bangladesh). The results of these pilot measurements for the new RAI measurement method were published in the ReCAP/World Bank report "Measuring Rural Access: Using new technologies" (World Bank Transport & ICT, 2016).

A comparison between the original RAI values measured in 2006 and the values measured using the new methodology is shown in Figure 6. There are large changes for some countries, for example the RAI for Bangladesh increasing from 37% to 87%, and the RAI for Zambia reducing from 64% to 17%. It also seems implausible that the RAI has reduced in Ethiopia and Tanzania, when both countries have been working to improve their rural road networks.

Figure 6 Comparison between RAI results from 2006 and from 2016 for ReCAP countries



Source: World Bank Transport & ICT, 2016

There appear to be some discrepancies in the measured values shown for 2006 in Figure 6. In the 2006 data there was no measurement for Mozambique (shown as 27%), the RAI for Ethiopia was 17% (not 32%), and for Nepal was 15% (not 17%).

In seeking to understand the marked differences in results arising from the two different methodologies it should be noted that four of the 2006 measurements were based on household surveys, but using data from earlier years, namely Bangladesh (2000), Nepal (1995), Kenya (1997) and Tanzania (2000). The method used for Ethiopia (using 2003 data) is unclear. Uganda and Zambia (both using 2003 data) used an approximate modelling method, and the likely accuracy of this method is unclear. The above information about sources of 2006 data have been taken from Annex III of Roberts et al (2006).

To fully understand the differences between the 2006 and 2016 results shown in Figure 6, a more detailed study of the accuracy of the source data used would be needed, especially for the 2016 measurements. It is however noted that during the country visits described in Section 8, only Bangladesh showed confidence that the digital maps held by the government truly represented the extent of the rural road network. In Zambia, many unclassified roads not included in the classified road network might nevertheless provide all-season road access. More detailed investigations, with assistance from government staff in each country familiar with both the actual roads and the datasets used, might result in the estimation of correction factors for any such effects, as described in Section 10.14.

After completing the pilot measurements using the updated method in 2016, the World Bank prepared a proposal for more widespread use of the new RAI measurement methodology. However, as a result of concerns raised by ReCAP member countries a status review was required before ReCAP could fund further work.

5.5 Country level planning use of the RAI

Two examples of the use of the RAI for planning purposes were identified.

5.5.1 Timor-Leste

In Timor-Leste, the RAI was measured using GIS-based methods, and a government policy target for the improvement of the RAI over a 15-year period was then included in the National Development Plan (Eqbali, Athmer and Asare, 2017). This project also raised a number of issues about the quality of the datasets that are normally likely to be available for the measurement of the RAI using a GIS.

5.5.2 Myanmar

In Myanmar, the RAI was measured on a regional and national basis to assess the level of rural access available, and investment needs, as part of transport sector policy (Asian Development Bank, 2016). The extent to which the RAI could be improved was constrained by the cost of the infrastructure investment that would be needed.

5.6 The modern context of rural access

The original definition of the RAI from 2006 assumed that the ‘prevailing means of rural access transport’ was ‘often a pick-up or a truck which does not have four-wheel-drive’. This concept of an all-season road passable by a four-wheeled vehicle is widely understood to be what was intended and has been used for many previous measurements of the RAI. To maintain consistency with previous RAI measurements this should not be changed.

A recent study in Liberia (Starkey et al, 2017) illustrates how motorcycle transport is a very important factor in rural transport in some countries today. In a survey of the mode of transport used to attend health centres, a large proportion of the patients travelled by motorcycle, including patients attending a maternity hospital. Motorcycle transport was also used by many schoolchildren for travelling longer distances.

Motorcycle taxis can completely change how rural transport is provided. Instead of waiting for a bus, a request for a taxi can be made by mobile phone, and the motorcycle taxi may travel off the road and along tracks to allow collection closer to the house.

A current ReCAP project ‘Enhancing the understanding on safe motorcycle and three-wheeler use for rural transport’ (Bishop et al, 2018) aims to improve knowledge and understanding concerning effective ways of enabling rural people to benefit from the safe use of motorcycles and three-wheelers. As an example of the changes that have taken place in recent years, the number of motorcycles registered in Tanzania grew from around 50,000 in 2006 to over 800,000 in 2014. It is, however, necessary to recognise and take account of the increasing role that motorcycles can play in improving rural access in some countries. One of the key findings of this status review, is that in addition to the standard measurement of the RAI, a country specific alternative measurement can be defined and measured for comparison (see Section 10.15). This could potentially include motorcycle access.

6 Visit to the World Bank

Details of the meetings that took place at the World Bank are included in Annex 3.

The visit to the World Bank made it possible to discuss in some detail how the spatial method of measuring the RAI had been developed in 2015/2016.

The World Bank Development Economics Vice Presidency (DEC) represents the World Bank at IAEG-SDGs meetings, as an observer. The DEC representative who has attended IAEG-SDGs meetings provided the following additional information:

- (i) No further discussion of Indicator 9.1.1 has taken place in IAEG-SDGs meetings since this Indicator was initially defined.
- (ii) The World Bank is “custodian” of approximately 20 SDG Indicators, including 9.1.1.
- (iii) The World Bank has successfully requested moving at least three SDG Indicators from Tier III to Tier II and is familiar with the process for doing this.
- (iv) Moving from Tier III to Tier II is not simply dependent upon the number of countries for which measurements have been made. What is essential is to demonstrate the mechanism by which both initial measurement and then regular updates will take place. A proposal to move to Tier II could be made with as few as 15 or 20 countries, as long as it is quite clear that this will rapidly expand to regular updates by a large number of countries.

- (v) The National Statistical Offices (NSOs) have the deciding role in what happens with SDG Indicators. The NSOs do not have any specialist knowledge related to the RAI.
- (vi) If the definition of Indicator 9.1.1 (the same as the RAI) does not truly represent the reality of contemporary rural access, then rather than modify the definition of Indicator 9.1.1 it would be preferable to recommend an additional indicator that better models current rural access. Then, in due course, if such a new indicator becomes more widely accepted it could eventually supersede Indicator 9.1.1.
- (vii) If both the World Bank as custodian, and a country, independently measure the value of Indicator 9.1.1, it is not yet clear which value would take precedence for official UN statistics.
- (viii) The World Bank can request additional organisations to be added as partner agencies for an Indicator. However, it is unlikely that DFID would be accepted, as it represents only one country.

There was also an opportunity to discuss the global Sustainable Mobility for All (SuM4All) initiative, and to gain a better understanding of how the future measurement of the RAI could be coordinated with the SuM4All Rural Access Working Group.

A lunchtime seminar about the RAI status review was very well attended, with over 20 participants at World Bank HQ and several other members of staff joining the meeting remotely through video conference links. The discussion at the seminar was constructive and helpful. Topics covered in the discussion included the use of open source data such as OpenStreetMap to estimate approximate values of RAI; using multi-criteria analysis rather than just the RAI; the need for a data standard for road data; the likely accuracy of OpenStreetMap road centreline data in developing countries; the possibility of measuring RAI 'lite', an approximate value where there is no time or budget to collect accurate data; the need for a website or portal with tools and resources; and the lessons to be learned from the difficulties encountered in replicating the original 2006 RAI data in subsequent years.

7 Visits to Regional Development Banks

Summaries follow of the meetings that took place at regional development banks. Further details are included in Annex 3.

7.1 Inter-American Development Bank

Discussions at the Inter-American Development Bank established that the RAI is not known to be used in Latin America, and it is unlikely that suitable digital road network datasets exist for calculation of the RAI by GIS methods. Rural access planning in Latin America generally appears to consider access to facilities such as health centres and schools.

7.2 African Development Bank

Meetings at the African Development Bank (AfDB) included staff working with Transport, Agriculture, and Statistics. A small seminar was also held with a group of specialists, with video conference links to two other offices.

The AfDB has made extensive use of the RAI as a performance indicator on 26 projects, making measurements before and after the project to assess the impact on rural access. However, these RAI datasets only cover the project area. Only in one case, for Togo, were resources sufficient to make an RAI measurement for the whole country. AfDB works with NSOs to make these measurements, and projects include resources for capacity building on the NSOs.

The original Africa Infrastructure County Diagnostic (AICD) database has now become the Africa Infrastructure Knowledge Programme (AIKP). AfDB has been working with the NSOs in Africa to facilitate future updates of this database, but countries do not give priority to gathering statistics. AfDB has attended meetings of the IAEG-SDGs as an observer and has statistical skills to assist with the initiative to measure SDG Indicator 9.1.1.

7.3 Asian Development Bank

Asian Development Bank (ADB) activities to develop rural access focus on supporting agricultural production, looking from production areas outwards. A narrow track might be constructed to connect a settlement to a road, but most important are the smaller tracks providing access to the fields that are used many times every day, where localised improvements might be made to provide access for motorcycles and two-wheel tractors. Localised road and track improvements are often constructed in concrete because it is considered unlikely that maintenance will be carried out.

A small seminar was held with ADB Agricultural and Transport staff, with useful discussion of experiences relevant to the RAI, and how rural access is about access to facilities, not just providing roads. Of particular interest was a discussion about how progress was eventually made on climate change initiatives. The breakthrough was to stop imposing inflexible international solutions, and instead to allow each country to propose its own 'Nationally Appropriate Mitigation Actions' (NAMA). Perhaps, to address the local context, 'Nationally Appropriate Rural Accessibility Actions' are needed. An example of how this principle might be applied as an alternative indicator for progress in improving rural access is given in Annex 7.

ADB works with the UN Economic and Social Commission for Asia and the Pacific (ESCAP) to provide support to NSOs with the measurement of SDGs.

8 Country visits

Summaries follow of the meetings that took place during the country visits. Further details are included in Annex 3.

During each of the country visits, it was possible to visit the NSO as well as visiting the government office with responsibility for the roads.

8.1 Ethiopia

Access by rural communities to roads has been measured through household surveys for many years as part of monitoring of Ethiopian Roads Authority (ERA) activities, albeit not using precisely the same definition as the RAI. Recent measurements of the RAI have been made using GIS methods as part of the impact monitoring of a six-year rural access programme. An extensive GIS of the road network is held by ERA.

Ethiopia has recently become a member of the IAEG-SDGs. The indicator used for rural access planning is the average time to walk to an all-weather road. The baseline is 1.7 hours, and the target is 0.8 hours.

8.2 Uganda

The RAI does not appear to be measured in Uganda. However, the population within 2 km of a road is considered during project appraisal. Data on all road links are held in a GIS at the Ministry of Works and Transport, it might be possible to overlay population data and make an approximate calculation of the RAI. Vehicle driving speed is used to assess good/fair/poor condition for rural roads.

The Uganda Bureau of Statistics (UBOS) conducts a National Service Delivery Survey every 4 years. The 2015 survey report includes questions about how access is made to the nearest road, and whether the road is useable all year round. It provides an assessment of the distance to different classes of road and includes an assessment of the distance to the nearest public transport. However, UBOS does not currently measure the RAI in terms of its specific definition.

8.3 Nepal

Nepal has recently implemented a major administrative restructuring. Previously there were 75 Districts; now there are 7 Regions and a total of 753 Municipalities and Rural Municipalities. In future, the Municipalities will be responsible for the maintenance of rural roads. Each of the Districts was previously responsible for preparing detailed District Transport Master Plans.

A GIS is available that includes all District roads, but rural access roads are not included. Comprehensive digital mapping, prepared in 1995 but not updated, is available, including a layer with the positions of every household. That household location data has been used to distribute population data equally between all household locations. The population within 2 km of a road is considered for planning purposes as one of the criteria used to prioritise road developments. The government plans to ensure that there is road access to every Municipality. A telephone survey has recently taken place to prepare a list of Municipalities that do not yet have road access.

Blacktop and gravel roads are considered to provide all-weather access, while earth roads are considered to be only fair-weather roads. Many Municipalities only have an earth road for access, which is likely to be impassable during the rainy season. Health centres and schools are located in the Municipality. Crops are moved after the rainy season, after roads are reopened. If a patient needs to go to hospital during the rainy season, they will if necessary be carried.

The Central Bureau of Statistics carries out household surveys. The 2011 LSMS survey includes a question about access to facilities, and how long it takes to get to them. The size of the statistical sample of households is intended to achieve 95% confidence.

RAI has not been measured and doesn't appear to be used as a logical framework indicator for projects. In the past, 80% of the rural development budget has been spent on roads.

8.4 Bangladesh

Bangladesh has a comprehensive rural road inventory database of all rural roads, and a comprehensive GIS showing the centrelines of all rural roads. The database and GIS are also held in each Upazila, the second lowest tier of regional administration. The data is updated once a year.

There are only paved and earth roads. Paved roads, which include brick roads, are constructed on embankments so that they are not normally affected by flooding, and are considered to be all-season roads. Earth roads are essentially sand roads, are not on embankments, and become impassable for motorised vehicles after heavy rain, even before significant flooding occurs.

The RAI has been measured in Bangladesh using a spreadsheet method. Every settlement has been assessed to determine whether it is within 2 km of an all-season road. Census population data is then added up in the spreadsheet for all settlements within the 2 km boundary and compared with the total rural population to calculate the RAI. The RAI is currently used to support prioritisation of road improvement projects, but a new method of multi-criteria prioritisation, including access to facilities, has been developed to replace the use of the RAI for prioritisation in the future.

Household surveys are regularly carried out. A new method of measuring the RAI was proposed during discussion between the Local Government Engineering Department (LGED) and the Bangladesh Bureau of Statistics (BBS). Household data with GPS coordinates currently being collected by BBS could be analysed in a GIS using LGED rural road GIS centreline data to determine how far each household is from an all-season road.

9 Wider Consultation

After the Interim Progress Statement was published on the ReCAP website, a message was circulated through the ReCAP email list, which has approximately 1,700 recipients. This included a link to the Interim Progress Statement, and an open request for any comments about the measurement and use of the RAI.

Six responses were received, from the USA, India, Sri Lanka, Tanzania and Peru. These provided useful input from specialists, researchers and people working on the ground to improve rural access. Further details of these responses, with summaries of the comments received, are included in Annex 4.

Particular issues that were raised included:

- Travel time walking to reach a transport service would be a better measure than distance.

- The type of terrain, varying between flat plains and steep mountain slopes, has a major influence on how long it takes walking to reach a road.
- Distances ranging from 0.5 km to 5 km were suggested, rather than a fixed 2 km, possibly with more than one distance zone.
- In transport logistics, the 'last mile' and 'first mile' mile are critical bottlenecks.
- There is no widely accepted definition of an all-season road.
- Too great a focus on rural roads can lead to a misallocation of public resources. In some cases, there may be insufficient population or agricultural production to attract motor transport services.
- An integrated approach to rural transport is needed, combining non-motorised transport and intermediate means of transport using rural trails, paths and tracks with motorised transport using rural roads.
- In some countries there are transport focal points, for example in villages, which are then served by private or public transport services. In such cases, the walking distance from such focal points is a key parameter to be minimised.
- Population census data may realistically only be collected every ten years.
- Some countries have fairly detailed digitised road networks for GIS analysis; other countries do not have such data.
- Motorcycles and three-wheelers are changing how rural access is provided.
- If rural roads are not maintained, they deteriorate to a point where bus services can no longer use them. An emerging trend is that when this happens three-wheelers and motorcycles, which can still negotiate dilapidated roads, provide a service instead.
- The cost of rural transport services per vehicle km should also be considered.
- The reliability of transport services including frequencies, for example travel opportunities/day, could also be measured.
- Some countries, such as India and China, have developed alternative performance indicators.

10 Key findings

10.1 Application of the RAI

Each country has developed its own planning processes, adapted to local needs. The RAI does not play a central role in the routine planning of developments to improve rural access. In general, local planning processes consider the actual locations of key facilities, including health centres, schools and markets, and how access to these facilities will be provided or enhanced.

Even where it was observed that RAI is currently measured and considered, in Bangladesh, a new prioritisation method has already been developed that includes access to facilities, and it is intended that this new method will supersede the use of the RAI.

Some elements of RAI thinking are observed in local methods, such as using a 2 km zone for the population affected in Nepal, and using the average distance to a road as an indicator in Ethiopia.

The RAI has been used for planning purposes, for example in Timor-Leste and Myanmar, but this is for the preparation by a consultant of a National Development Plan, rather than as part of a routine government process.

The RAI is regularly used as a progress or impact indicator for development projects. In particular, the AfDB has used the RAI as an indicator to assess the impact of many transport projects on rural access and has been working to strengthen the local capacity to make such measurements.

Measurement of the RAI for project monitoring purposes has been made through both household survey and GIS methods. In Ethiopia, household surveys have been carried out regularly for many years for monitoring of the national road investment programme.

10.2 Achieving IAEG-SDGs Tier II status

Achieving Tier II status for SDG Indicator 9.1.1 requires more than just making initial measurements of RAI for a certain number of countries. It is also necessary to demonstrate how measurements will be extended to a much larger number of countries, and how regular updates will take place. Evidence of coordination with NSOs is also expected by the IAEG-SDGs.

10.3 Achieving IAEG-SDGs Tier I status

Achieving Tier I status for SDG Indicator 9.1.1 would require measurement and regular update of the RAI in at least 50% of the 193 UN countries, hence in at least 97 countries.

10.4 Funding of RAI updates

Almost all RAI data collected since the original 2006 dataset has been measured using development partner funds in support of development projects. National governments would only fund measurement if there was a benefit to the country. It appears that many national planning processes use other indicators for setting priorities and monitoring progress, and as a result the RAI is not of any immediate use in those countries. If data is to be updated regularly in a large number of countries, low cost methods of collecting and processing data must be used.

10.5 Population data

The *WorldPop* population data seems to be widely accepted in the development community as the most up to date population data available. However, each country has its own population census data, and should be able to provide growth predictions to update data since the last census. NSOs may recommend the use of local population data instead.

When the RAI is measured at project or regional level, for example for project impact assessment, there might also be a possibility that funding will be available to survey the location of each settlement or house using GPS, or from satellite images, or by some other method, in which case the population of each settlement or house must also be determined as an input for GIS analysis.

One issue with population data is making sure that the correct boundary between rural and urban areas is used. Where cities and towns are expanding rapidly, the administrative boundaries between urban and rural areas may be out of date.

10.6 Road network centreline data

Many countries maintain a GIS road centreline database of national roads, and possibly regional roads, but it is relatively rare to find an official detailed digital network of rural access roads.

If a GIS-based method is used it is therefore essential to work closely with the national organisation, or organisations, responsible for the management of the rural road network to determine an appropriate digital representation of the rural road network to be used for measurement of the RAI. The NSO should have a role in verifying that a suitably accurate representation of the rural road network has been used. In some cases, some form of correction factor may need to be applied to allow for missing roads. Any such approximation must be prepared in consultation with the NSO.

10.7 Road condition data

Many countries maintain some form of condition measurement for all national roads, and possibly regional roads, but few countries maintain any detailed records of the condition of rural roads.

The application of good/fair/poor ratings varies extensively between countries. In some cases, the rating is based on an assessment of the actual condition of the road, either by visual inspection or an estimation method such as average travel speeds, but in some cases it is only based on the type of road surface. It is questionable whether such differences in measurement make this a suitable variable for making comparisons between countries, depending on the availability and cost of data in each individual country.

10.8 The all-season road network

The principle of the “all-season” road network remains central to the original concept of measuring the RAI. It is essential to determine whether access to facilities and services is available all year round, and hence the passability of the road throughout the year is an essential factor in this aspect of contributing to poverty reduction.

The current World Bank spatial method for estimating the RAI assumes that unpaved roads must be in “good” condition (according to the national roads authorities) to provide all-season access. Paved roads may be in “good” or “fair” condition. This approach could lead to underestimating the RAI, as unpaved roads in “fair” condition and paved roads assessed to be in “poor” condition may still provide all-season access.

When GIS methods are used, if a suitable data layer for the all-season rural road network is not available, a method statement is needed that explains why the road data layer used is believed to be a sufficiently accurate representation of the all-season rural road network. This method statement needs to be verified both by the organisation, or organisations, responsible for management of the rural road network, and by the NSO.

If a systematic and consistent error is believed to exist between the GIS road network used and the actual all-season road network, a statistically appropriate method of addressing this should be agreed with the NSO. For example, a correction factor might be applied to the calculated value of RAI.

10.9 Use of household surveys

The household survey method has been well established for many years as an effective means of gathering statistical data for countries. The World Bank has played an important role in developing and supporting the use of household surveys throughout the world.

Methods of achieving appropriate levels of accuracy have been developed and tested by statisticians, and many NSOs have developed the capacity to carry out household surveys and analyse the resulting data to monitor progress in many different aspects of the development of a country (Grosh and Glewwe, 1995).

There is no evidence to suggest that measurement of the RAI by household surveys should be less accurate than is needed for an SDG indicator. The number and selection of households surveyed is based on well-established statistical principles designed to achieve the levels of accuracy required.

A disadvantage of using household survey methods is that only one value of RAI is normally calculated for the whole country; although it should be noted that some household surveys, such as one currently underway in Bangladesh, are also designed to provide some regional data. However, it has become evident that the RAI is not normally considered useful by countries for local planning purposes, and they prefer to use their own locally adapted measurement methods for local planning. The main use of the RAI is therefore to measure overall trends and provide comparisons for development partners and other agencies. The overview RAI figures provided by household surveys can be sufficient for the measurement of SDG Indicator 9.1.1.

The main issue with the use of household surveys for the measurement of RAI appears to be failing to identify in advance when suitable surveys are to be carried out and then ensuring the inclusion of an appropriate question. The marginal cost of including an extra question in routine household surveys that are already

planned and financed is negligible. Many opportunities to measure the RAI during routine household surveys appear to have been missed over the last decade. A suitable question could be included in any one of several different types of household survey that are carried out by NSOs.

Household surveys are not carried out in every country, and in many cases they are financed at considerable cost by development partners to measure progress on many different issues. Whenever a household survey is carried out for other purposes, there is the possibility of a straightforward and low cost method of adding additional country level measurements of SDG Indicator 9.1.1.

There is also the possibility that household surveys already exist for some countries that could be used to calculate additional values of the RAI. Many of the household surveys used to measure some of the original 2006 values of the RAI are likely to have been repeated and might have included a suitable question.

10.10 Use of GIS-based methods of calculating RAI using country data

The accuracy of GIS-based methods of calculating the RAI are critically dependent upon the accuracy of the input data sets, specifically population data and definition of the all-season road network.

Population data should generally be fairly good, using either *WorldPop* data or the national census with appropriate population growth rate corrections. If *WorldPop* is used rather than the national census, the NSO should have an opportunity to make a comparison between these two sources of population data and provide a comment on the likely accuracy of *WorldPop* as a source data set for the calculation.

An accurate GIS representation of the all-season road network is more difficult to achieve, since very few countries currently appear to have comprehensive GIS mapping of the rural road network. Even if road centrelines are recorded there is unlikely to be comprehensive accurate data indicating which of these roads can be regarded as all-season roads. Nevertheless, the road engineers responsible for the maintenance of each section of the rural road network should possess a good working knowledge of which roads are likely to remain open throughout the year. A local assessment will need to be made in each country of what corrections might need to be made to compensate for inaccuracies in the available digital road network. To assess the error that might be occurring, a detailed comparison might for example be made, in a statistically selected sample of rural areas, between RAI values calculated using the available GIS road network and RAI values calculated using the estimated all-season road network. In close coordination with the NSO to quality assure the process, a correction factor could then be estimated as a correction to RAI values calculated using the GIS.

10.11 Approximate calculation of RAI using open source data

As part of ongoing research, the World Bank has made approximate estimates of the RAI in over a hundred countries, to investigate what could be possible using open source data sets readily available on the Internet, such as *WorldPop* population data and OpenStreetMap road centrelines. Example calculations use crowd sourced versions of the primary and secondary road network that are available online, as well as some tertiary and track road networks, as opposed to the official government road network. The results for each country vary depending on which online source of population data is used, and the values measured are generally different from other calculations of the RAI. There is potential for a research activity to study the differences between the RAI values calculated using this approximate estimation method from open source data, and RAI values calculated using more accurate local data sources and which include quality assurance through involvement of local road sector expertise and NSOs. If a systematic difference can be understood and the factors causing it can be quantified, it might, for countries where no other method of measurement is viable, be possible to derive a method of making approximate RAI measurements, using open source data and a country specific correction factor.

10.12 Other methods of measuring the RAI

During this status review two other methods of calculating the RAI were identified, both in Bangladesh. One method is already in use, and the other is as yet untried.

The first method uses a spreadsheet. The national census provides population data for every settlement of village in the country. An assessment is made, for each settlement, of whether an all-season road is within 2 km of the settlement. The population figures are then added up in a spreadsheet to give the total rural population for settlements inside the 2 km distance, for comparison with the total rural population, enabling the calculation of the RAI. This method is useful for planning purposes, identifying settlements requiring additional roads.

A second alternative method of measuring the RAI was suggested during a discussion between the government department responsible for rural roads in Bangladesh (LGED) and the NSO. A household survey was already in progress, which included details of the occupants of each household and recorded the GPS coordinates of the household. Although the household survey did not include a question about the distance to a road, Bangladesh does have a comprehensive GIS map of all rural roads. The GIS could therefore be used to calculate the distance from each household to an all-season road, enabling the derivation of the RAI based on a statistical sample of households.

The RAI is a straightforward and easily understood concept, and it is likely that other innovative methods of measuring the RAI may be developed in other countries. To maximise the number of countries in which the RAI is measured, and also to improve the potential for regular future updates, other methods using local skills and local datasets should not be excluded. However, it is essential that a rigorous approach is adopted to verify the validity of any measurement, through NSOs or other statistical resources.

10.13 Application of new technologies in the measurement of the RAI

The potential for applying new technologies, such as satellite imagery, in the measurement of the RAI was identified as a subject to be considered during this review. The AfCAP 'Guideline on the use of high tech solutions for road network inventory and condition analysis in Africa' (Workman, 2017) provides a useful reference on technologies that might be considered. In particular, there are a number of technologies that might be used to identify the location and condition of a road.

However, such technologies are generally costly to apply, and currently there is no significant financing available for the measurement of SDG Indicator 9.1.1. For the RAI it is essential to identify whether a road is an all-season road, passable all year round by a 4-wheeled vehicle, and this single parameter, which it is not easy to measure using high tech solutions, is far more important than any information that might be available about other aspects of road condition. However, if the location of the centrelines of the rural road network is already being determined by high tech methods for other purposes, this could be useful for the measurement of the RAI, although all year passability will need to be assessed.

One technology that might prove useful in the future is the ability to use GPS to track the location and speed of smartphones, as is currently done, for example, by Google Maps to measure traffic speeds. Google can display the current traffic speed for any road for which data is available, and also keeps historical records of average traffic speeds at every time of day for each road.

As mobile phone signals reach extensive areas of the rural population in many countries, it might become possible to crowd source data of vehicle movements and speeds. Patterns of travel along routes would then show the actual roads and tracks actively used by transport services. Travel speeds would give a good indication of road condition. Historical records would show which roads are used throughout the year, and hence are all-season, and which roads are closed for part of the year.

10.14 Use of correction factors to address known inaccuracies in source data

When a systematic error is identified, for example when it is known that extent of the rural road network is under-represented in a GIS analysis, a suitable country or region specific correction factor must be calculated and applied. The method used to calculate any such correction factors must be fully documented, and should be reviewed by a statistician, preferably from the NSO, to confirm that the correction factor is appropriate.

10.15 Calculation of alternative values of RAI to reflect changes in modes of rural access

In some countries, it might be apparent that rural transport is now dominated by alternative modes of transport such as motorcycles rather than conventional four wheel vehicles.

In such circumstances, a standard measurement of the RAI is still required, as SDG Indicator 9.1.1.

However, the methodology for measuring the RAI should also allow the measurement of a second, alternative value, based on the local interpretation of all-season access to a transport service within 2 km. This might, for example, include tracks regularly used by motorcycle taxis. Such alternative values should be accompanied by a detailed explanation of why such a second value was measured, and be subject to the same method verification by statistical specialists as the standard value of RAI. Such measurements will provide helpful input to the development of more suitable measurements of rural access in the future.

10.16 Possibility of an additional SDG Indicator for rural access

Many countries have developed alternative methods of assessing rural access requirements for national planning purposes; examples include assessing access to facilities such as health centres, schools and markets.

In 2020, the IAEG-SDGs will also be assessing the possibility of adding further SDG Indicators. There is an opportunity to develop a new SDG Indicator that more closely reflects the measurements that countries are actually making.

Two types of Indicator might be considered, and one, or both, could potentially be put forward to the IAEG-SDGs for consideration:

- (i) An indicator that attempts to combine all of the different factors currently being considered in rural access planning.
- (ii) An Indicator based on a two-stage process. First, establish rules for what the local planning process to improve rural access should include and how targets for the development of rural access should be determined. Second, as an SDG Indicator, measure progress towards achieving these targets.

10.17 Technical capabilities available in countries

A high level of technical competence in the use of GIS and information technology was observed in each of the four countries visited, either within the relevant government organisation or through specialist local consultants. Although this level of expertise might only be available at head office, it is clear that the skills necessary to carry out any GIS analysis that might be needed are quite likely to be available to the organisations that will be making RAI measurements.

10.18 National Statistical Offices (NSOs)

The National Statistical Office (NSO) in each country has an important role to play in assisting in assuring the quality of both the data and the method used to measure the RAI in each country.

All of the National Statistical Offices visited demonstrated good technical capabilities to support any statistical analysis that may be needed, and potentially could assist in assessing the statistical accuracy of the data sources and analysis methods that are likely to be used for measuring the RAI. It was also apparent that capacity development support to the NSOs could be made available, if needed, through the regional development banks, and also through regional UN organisations with statistics gathering capabilities, such as UN ESCAP and UNECA.

10.19 Interaction with other initiatives

10.19.1 Sustainable Mobility for All (SuM4All)

The Rural Access Working Group of the SuM4All initiative brings together many of the leading experts in rural access and has an important role to play in coordinating and supporting international activities to improve rural access. In particular, this appears to be the most suitable group to assist in considering the possibility of creating an additional SDG Indicator for rural access. If a decision is made to take this forward, it could then help design one or more suitable additional SDG Indicators for consideration by the IAEG-SDGs.

10.19.2 ReCAP High Tech

The ReCAP high tech solutions project (GEN2070A) has so far concentrated on the potential for new methods that can be used to collect road inventory and condition data for road asset management. Such detailed measurements are not required for measurement of the RAI, and it is unlikely that sufficient funding can be made available to use such technologies in a critical mass of countries. However, there might be potential for new smartphone apps to monitor vehicle movements in order to identify the all-season road network, as described in Section 10.13.

10.19.3 HDM-4

The prioritisation methods used in rural access development are generally different from the economic prioritisation techniques that HDM-4 was originally developed to support. Over 15 years ago the Roads Economic Decision Model (RED) was developed by the World Bank as an alternative analytical tool to help improve the decision-making process for the development and maintenance of low volume roads. RED uses a simplified spreadsheet-based economic evaluation process, with reduced and more straightforward input data requirements, and is able to take into account social service delivery and environmental impacts.

There could be an opportunity to explore whether HDM-4 could be used or adapted in some way to assist in achieving a balance between investments in all of the different levels of the road network, from local farm access, to village access, to regional access, to access to urban areas. Although the RAI might not be used for detailed planning of individual rural access roads in such an analysis, it could potentially provide an indication of the general extent of rural access roads that it would be financially possible to construct and maintain in localised rural areas. It would be useful to engage further with HDMGlobal about whether there could in future be an opportunity to include rural development, and RAI measurements, in HDM-4.

11 RAI Working Group

An international RAI Working Group has been established by the ReCAP PMU to support the future development of the RAI. The membership of this working group includes the World Bank, DFID, AfDB and ADB.

The first meeting of the RAI Working Group took place on 1st March 2018. Issues addressed included an update on progress with the RAI status review, information about how the IAEG-SDGs operates and how data is gathered and processed for the SDG Indicators, and discussion about how SDG Indicator 9.1.1 can be moved from Tier III to Tier II. Plans were also made for a presentation of the ReCAP RAI status review at a meeting of the SuM4All Rural Access Working Group (RAWG) held in Leipzig on 23rd May 2018.

12 Recommendations for ReCAP RAI TG2 ‘Consolidation and Revision’

Recommendations for RAI Task Group 2 ‘Consolidation and Revision’ are provided in Table 1.

Table 1 Recommendations for ReCAP RAI Task Group 2 ‘Consolidation and Revision’

	Recommendation	Recommended Action Party
TG2.1	<p>RAI Database</p> <p>Develop an RAI database of all UN countries.</p> <p>To include details of when SDG Indicator 9.1.1 is expected to be measured for each country and which agency is expected to lead this measurement.</p> <p>The database should also include details of all known existing measurements, including project and regional details, with a summary description of the method used.</p> <p>Further details of the recommendation for this database are included in Annex 5.</p>	<p>World Bank to develop and manage the database.</p> <p>ReCAP may provide support for the design of the database.</p>
TG2.2	<p>RAI Measurement Methodology Guidelines</p> <p>Develop new detailed RAI Measurement Methodology Guidelines.</p> <p>An overview of the recommended methodology is shown in Figure 7, and further details are included in Annex 6.</p> <p>In addition to the standard measurement of the RAI as originally defined, allow for the possibility of an alternative country specific extra measurement, for example taking into account the all-season track network used by motorcycles, as described in Table 2.</p>	<p>ReCAP, coordinated with World Bank and the regional development banks.</p>
TG2.3	<p>RAI web page</p> <p>Establish a web page for the exchange of knowledge about the measurement of the RAI / SDG Indicator 9.1.1.</p> <p>To provide access to the database of known and planned measurements of the RAI, and to the RAI Measurement Methodology Guidelines.</p> <p>The web page should also explain the roles of all of the different parties involved in measuring the RAI, and provide contact points in each organisation.</p>	<p>World Bank</p>
TG2.4	<p>Schedule to move SDG Indicator 9.1.1 to Tier II</p> <p>Prepare a schedule of actions that need to be taken to move SDG Indicator 9.1.1 to IAEG-SDGs Tier II status.</p> <p>To include details of sources of financing, and dates by which tasks must be completed.</p> <p>The target to move to Tier II should be November 2018.</p>	<p>RAI Working Group</p>

	Recommendation	Recommended Action Party
TG2.5	<p>Develop alternative SDG Indicator(s) for rural access</p> <p>Develop one or more additional, alternative SDG Indicator(s) to provide additional relevant assessments of contemporary rural access.</p> <p>A summary of requirements for measuring rural access, including the potential for developing new indicators, is included in Table 2.</p>	SuM4All Rural Access Working Group
TG2.6	<p>Further research</p> <p>Carry out additional research activities:</p> <ul style="list-style-type: none"> (i) Consultation with additional organisations (ii) Comparative studies between different methods of measuring the RAI (iii) Potential for future use of smartphone data <p>Additional details of these proposed research activities are given in Table 3.</p>	ReCAP

Figure 7 Overview of proposed RAI measurement methodology

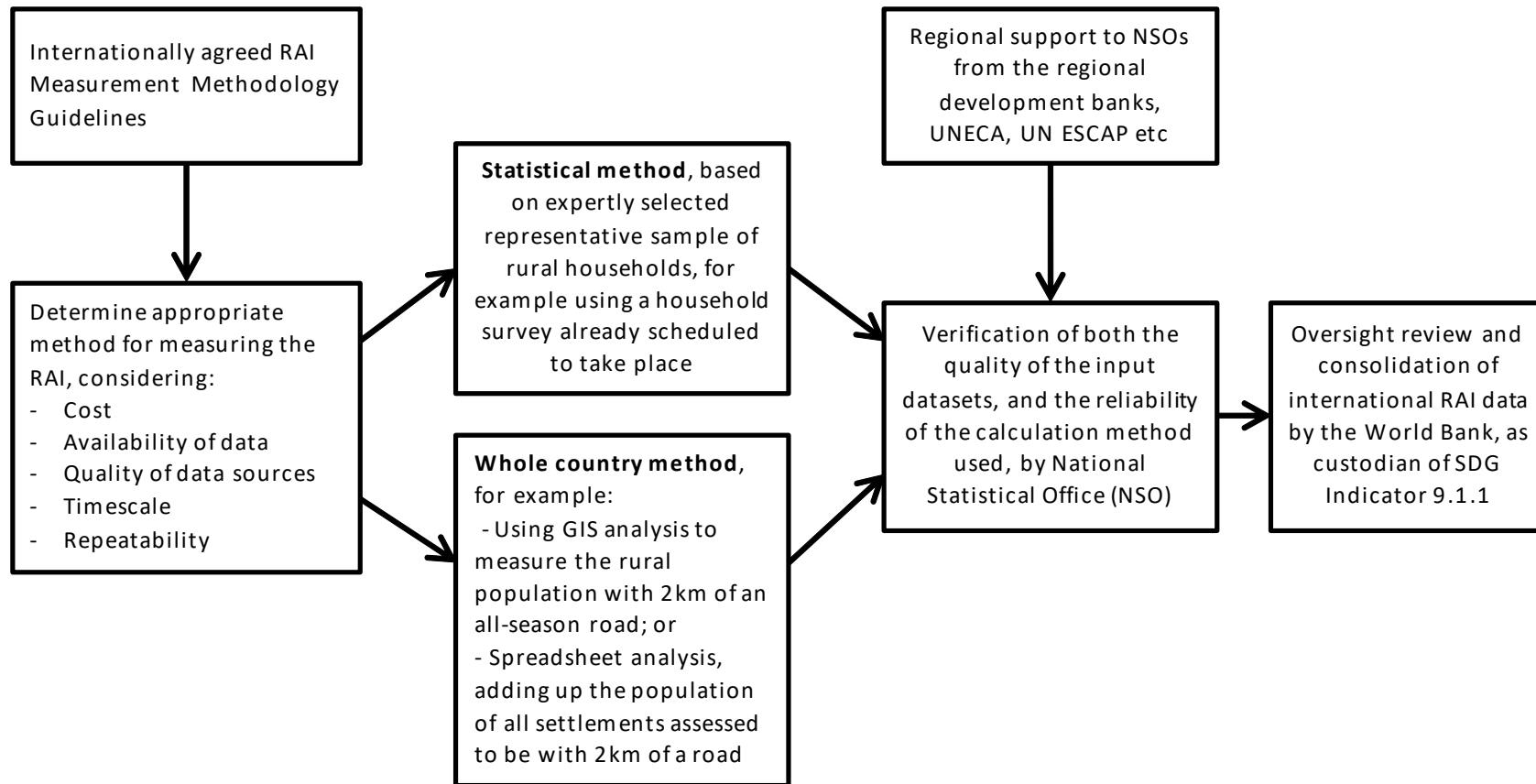


Table 2 Summary of requirements for improving the measurement of rural access

Requirement	Approach	Comments
Progress SDG Indicator 9.1.1 (the RAI) from Tier III to Tier II.	Measure the original Rural Access Index for as many countries as possible, as rapidly as possible.	Allow the use of alternative methods of measuring the RAI to enable progress as rapidly as possible. Involve the National Statistical Office (NSO) in reviewing the quality of source data sets and verifying that the method used is appropriate.
Address national concerns that the RAI does not truly reflect the reality of contemporary modes of rural access.	Allow the measurement of one <i>additional</i> value of the 'country RAI' modified to take into account local issues.	Only one additional value may be added. Reasons for using an additional measurement must be clearly explained (for example rural transport is dominated by modes of transport that do not require a conventional all-weather road), and a clear methodology must be explained and reviewed by the NSO to the same quality standard as the conventional RAI measurement.
Address international concerns that the RAI does not address the full range of rural accessibility issues, such as access to facilities (health centres, schools, markets etc.) and the provision of appropriate sustainable transport services.	(i) Develop an alternative, additional, SDG Indicator that better reflects the full range of rural access issues.	Cooperation and liaison with the SuM4All initiative could assist in developing a suitable SDG Indicator.
	(ii) Develop an alternative approach of assessing the compliance of the national rural access development plan with an internationally specified standard, and then measure progress towards achieving this plan. Annex 7 includes a proposal for how this might be done.	The SuM4All initiative could assist in developing an international standard of what a national rural access development plan should include, and how progress against such a plan can be measured.

Table 3 Potential further research activities

Research activity
<p>(i) Consultation with additional organisations</p> <p>As the initiative to measure the RAI progresses further, further consultation should be considered with additional organisations. Specific organisations with which it was not possible to have discussions during this status review, but which could provide additional useful input, are listed in Annex 8</p>
<p>(ii) Comparative studies between different methods of measuring the RAI</p> <p>To assist in understanding the inaccuracies that might result from using different measurement methods, it would be useful to carry out a comparison of measuring the RAI in the same country using different methods. Two countries where data could be made available fairly easily to attempt such a comparative study were identified during this status review.</p> <p>In Ethiopia, access to roads has been measured for many years using a household survey method as part of routine annual monitoring of the rural roads programme. Recent measurements have also been made using GIS-based methods.</p> <p>In Bangladesh, independent measurements of RAI have already been made using a spreadsheet method, and using a GIS-based method. The household survey currently being carried out in Bangladesh could enable a comparison to be made with a statistical sampling method.</p>
<p>(iii) Potential for future use of smartphone data</p> <p>In the future, it is likely that more extensive use of smartphones with GPS and an appropriate app installed might make it possible to accurately map local transport services routes, and also to identify which rural roads are open all year and hence are all-season roads. Further research could establish whether this is really a practical possibility, and if so, in which countries it might be possible to carry out such measurements, and when it might realistically become feasible to capture such data in a manner that will on analysis yield meaningful results.</p>

13 Recommendations for core activities for TG3 ‘Application in ReCAP Countries’

Recommendations for ReCAP RAI Task Group 3 ‘Application in ReCAP Countries’ are given in Table 4.

Table 4 Recommendations for ReCAP RAI Task Group 3 ‘Application in ReCAP Countries’

	Recommendation	Action by
TG3.1	<p>RAI measurement in all ReCAP countries</p> <p>Determine how the RAI can be measured for each ReCAP country in accordance with the new RAI Measurement Methodology document; determine an appropriate action party to lead each measurement; how funding can be secured; and estimate when a measurement will be available.</p> <p>In selected cases, provide support for the measurement.</p>	ReCAP.
TG3.2	<p>Regional coordination of RAI measurement by regional development banks</p> <p>Review how the RAI can be measured in each country in the region in accordance with the new RAI Measurement Methodology Guidelines, determine an appropriate action party to lead each measurement, and estimate when a measurement will be available.</p> <p>Provide support to identifying sources of finance to assist individual countries.</p>	AfDB, ADB
TG3.3	<p>Determine the maximum sustainable level of the RAI that could be achieved in each country</p> <p>An assessment of the maximum level of the RAI that it is likely to be possible to achieve in each country should be determined, taking into account both initial investment costs and long term infrastructure maintenance resources.</p>	AfDB, ADB

14 Conclusions

A comprehensive status review has been carried out to assess progress with measurement of the RAI, which is also now SDG Indicator 9.1.1, and recommendations have been to progress the measurement of the RAI in as many countries as possible, as rapidly as possible.

Key results from this status review are:

- The original definition of the RAI, the proportion of the rural population within 2 km of an all-season road, should be retained.
- Action should be taken as soon as possible to move SDG Indicator 9.1.1, the RAI, from a Tier III SDG Indicator (not regularly being measured) to a Tier II SDG Indicator (regularly measured for a significant number of countries). The possibility of later moving to Tier I (regularly measured for at least 50% of UN countries) should also be considered.
- The RAI is mainly used by, and measurements paid for by, the development partners. Countries have their own methods of planning rural access, normally based on access to facilities such as health centres, schools and markets. It is unlikely that countries themselves will provide significant funding to assist in the measurement of the RAI.
- The measurement of the RAI needs to be coordinated and managed internationally.
- Alternative methods of measuring the RAI should be accepted, to accommodate the different data sets available in different countries.
- A realistic target level needs to be set for the RAI in each country, taking into account the resources available to maintain rural infrastructure in the future.
- Contemporary rural access issues, including alternative modes of rural access such as motorcycles, can be addressed through additional measurements in addition to the standard RAI, and through defining additional rural accessibility indicators.
- National Statistical Offices (NSOs) have a role to play in determining how to achieve the required accuracy of measurement using the sources of data available in each country.

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WorldPop dataset and documentation, 2013 onwards. <http://www.worldpop.org.uk/>

Annex 1 Status Review Task Schedule

Task Chart - Status Review of the Updated Rural Access Index (SRAI)																					
SCHEDULE & TASKS	2018																				
	January					February					March					April					May
	1	8	15	22	29	5	12	19	26	5	12	19	26	2	9	16	23	30	7		
Project week:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19		
Phases of work defined in Terms of Reference																					
Inception reporting																					
Project implementation and preparation of Draft Final report																					
World Bank/DFID Discussions and Preparation of Final report																					
Milestones/Deliverables																					
1. Inception Report																					
2. Interim Progress Report																					
3. Draft Final Report																					
4. Final Report																					
Travel plan (provisional)																					
UK																					
Washington DC, USA																					
Africa (Cote d'Ivoire, Ethiopia, Uganda)																					
Asia (Nepal, Bangladesh, Philippines)																					
Task 1: UK - Initial Meeting and Inception Report																					
Task 2: UK - Desk review and list of questions to be addressed																					
Task 3: Washington DC - Meetings with World Bank and SRAI team																					
Task 4: UK - Interim Report and review of progress																					
Task 5: Wider consultation with rural development specialists and countries																					
Task 6: Africa - Meetings with AfDB and country visits																					
Task 7a: Asia - Country visits, meetings with ADB																					
Task 7b: Draft Final Report																					
Task 8: UK - Review and Final Report																					
Days of input																				Total	
Stephen Vincent	2	3	4	3	3	4	4	2	3	3	4	4	2	2	3		2			48	
Robert Geddes	1				1					4	4				1			1		12	
Hamish Goldie-Scot					2			2							2			1		7	

Annex 2 Questions considered by RAI status review

ReCAP Status Review of the Updated Rural Access Index (RAI)

Questions to be addressed

Likely source of information:

Development Partners



National Viewpoint



Specialists



1(a) How can 9.1.1 (as RAI) be moved from SDG Indicator Tier III to Tier II and eventually Tier I?
(Tier III concept approval; Tier II defined & significant data being collected; Tier I over 50% of countries)

DevPartner

- How can measurement of RAI be rapidly extended to many more countries?
- How can measurement of RAI be institutionalised to achieve regular updates?
- Can measurements for developed countries increase the number of countries?

1(b) Does Indicator 9.1.1 need to match the definition of RAI exactly?
- Could Indicator 9.1.1 be worded to include alternative measurement methods?
(For example, 9.1.1 in terms of transport service, RAI as an approved method to measure

DevPartner

→ Could allow country level measurement alternatives, and support innovation)

2. Sources of data for RAI

2(a) Household survey data

DevPartner

- Why was the intended household survey method not institutionalised?
- What household survey measurements have taken place since the 2006 report?
- Is suitable data still being collected in some national household surveys?
- Would it be worthwhile to implement the household survey method as originally intended?
- How accurate are household survey measurements?

2(b) Population data

DevPartner

- What population datasets exist?
- How accurate is the population data available?

2(c) National road network data

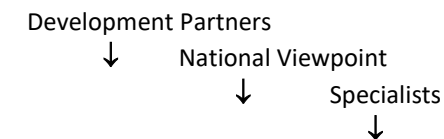
DevPartner National Specialist

- What proportion of developing countries already have accurate mapping of rural roads?
- How accurate are road network data sets, and how can accuracy be assessed?
- What impact do errors in the road network have on measurement of RAI?
- What difference is there likely to be between the 'all-season' and 'good/fair' road network?

ReCAP Status Review of the Updated Rural Access Index (RAI)

Questions to be addressed

Likely source of information:



2(d) Application of new technologies - What new technologies can assist in determining the all-season road network? - What accuracies can be achieved by different new technologies? - What case studies are available to support the use of specific new technologies?	DevPartner National Specialist
2(e) Availability of the input data needed - What obstacles exist to making the input data needed available?	DevPartner National Specialist
3. Calculation of RAI	
3(a) Accuracy of calculation - Should all RAI calculations include an assessment of the likely accuracy of the results?	DevPartner National Specialist
3(b) Quality assessments - What quality management is included in the procedures to measure RAI? - Should all RAI data sets include a quality rating indicating likely overall accuracy?	DevPartner National Specialist
3(c) Differences between 2006 measurements and new measurements - What analysis exists to explain the differences between the 2006 and recent measurements?	DevPartner National Specialist
3(d) What computer and data facilities are needed to calculate RAI? - What facilities are needed for the household survey method? - What facilities, including software, are needed for GIS-based methods? - Are the facilities needed available in most developing countries?	DevPartner National Specialist
3(e) Skill requirements - What skills are needed to collect data, calculate RAI, and make practical use of results? - Are these skills available at national level?	DevPartner National Specialist

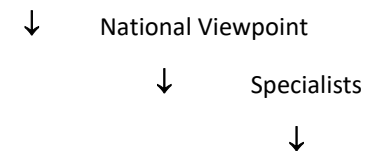
ReCAP Status Review of the Updated Rural Access Index (RAI)

Likely source of information:

Development Partners

Questions to be addressed

Draft at 08 February 2018



- 3(f) Alternative methods of calculating RAI
 - Should countries be able to propose alternative methods to calculate RAI?
 - If alternative calculation methods are proposed, who should verify them?

DevPartner National Specialist

4. Management of RAI data

- 4(a) What RAI data already exists, and where is it stored?
 - Who currently holds what RAI data?
- 4(b) International register of known RAI data
 - What registers already exist of known RAI data?
 - Is a coordinating register needed, and if so who would maintain it?
- 4(c) Data management facilities
 - What data management facilities are needed in each country?
 - What data management facilities should exist internationally?
- 4(d) Standardisation
 - What standardisation is possible with datasets held for other uses?

DevPartner National Specialist

DevPartner Specialist

DevPartner National Specialist

5. Institutionalisation of RAI update

- 5(a) Existing systems for regular update of RAI
 - Is most RAI data normally only updated when required by development partner projects?
- 5(b) Update of RAI data
 - Should development partners be responsible for monitoring RAI updates?
 - Should each country take responsibility for updating its own RAI data?

DevPartner National Specialist

DevPartner National Specialist

ReCAP Status Review of the Updated Rural Access Index (RAI)

Questions to be addressed

5(c) Further action needed
 - What action is needed to institutionalise the update of RAI?

6. Use of RAI data

6(a) Comparison between countries
 - Does RAI provide an accurate, and useful comparison between countries?

6(b) Time series data
 - Does RAI provide useful time-series data?

6(c) Perception of how useful RAI is
 - Is RAI perceived to be important by education specialists?
 - Is RAI perceived to be important by health specialists?
 - Is RAI perceived to be important by transport specialists?
 - Is RAI perceived to be important by planners?
 - Is RAI perceived to be important by economists?
 - Is RAI perceived to be important for selling rural produce?
 - Is RAI perceived to be important for employment opportunities?
 - Is RAI perceived to be important by rural development specialists?

6(d) National/Regional/Local/Project planning
 - How extensively is RAI used for planning by national governments?
 - How extensively is RAI used for planning at regional and local level?
 - How is RAI data used in planning activities?

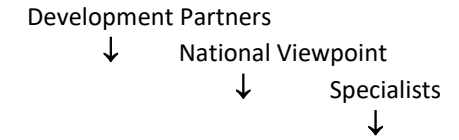
Likely source of information:



ReCAP Status Review of the Updated Rural Access Index (RAI)

Questions to be addressed

Likely source of information:



10. Action needed

10(a) Detailed recommendations on the way forward for ReCAP RAI TG2

10(b) Recommendations on core activities for ReCAP RAI TG3

Note: *This list of questions was prepared to assist in guiding the investigations of the ReCAP RAI Status Review, as far as the timescale and resources available permitted.*

Annex 3 Meetings

INCEPTION PHASE

12-Dec-2017

ReCAP RAI Status Review Inception Meeting at Cardno offices in London

Attended by:

ReCAP: Gerome Rich (at start), Annabel Bradbury, Les Sampson, Jasper Cook

CDS: Stephen Vincent (SV)

- History of ReCAP involvement with RAI (ReCAP)
- DFID is looking for innovative solutions
- Need clear status review statement of where RAI is now, and where it needs to go
- Status review not solving the problems, but identifying issues that need to be solved
- Explanation of CDS RAI status review methodology (SV)
- Proposed travel schedule (SV)
- ReCAP to review draft list of questions to be addressed as early as possible
- Discussion of documents relevant to desk review
- Discussion of contacts relevant to consultations

05-Jan-2018

Skype meeting with ReCAP PMU

Audio conference with Annabel Bradbury, Les Sampson, Jasper Cook

- Discussion prior to Jasper Cook meeting in USA with DFID/World Bank
- Concern at World Bank that RAI might be dropped as a UN SDG Indicator
- ReCAP concern about different definition of RAI used by World Bank RAI team
- DFID concern about delay in making progress with additional RAI pilots

12-Jan-2018

Skype meeting with ReCAP PMU

Audio conference with Annabel Bradbury, Les Sampson, Jasper Cook

- Briefing following meeting in USA
- Agreement that RAI definition should continue to use an 'all-season' road
- World Bank has continued to pilot RAI in additional countries, unknown to DFID/ReCAP
- RAI working group to meet every 3 months, first meeting end of February
- Jose Luis Irigoyen at World Bank would like to see further discussion with DFID/ReCAP

15-Jan-2018

Meeting with Paul Starkey, Reading

- Many years of experience with non-motorised and all forms of rural transport
- Some knowledge of development of original RAI in 2006
- Participated in discussions with World Bank team during recent development of RAI
- Discussed studies of rural transport in Africa (including Liberia 2017)
- Discussed changes in rural transport over the last decade
- Discussed recent impact of rural motorcycle transport for health, education & market access

Meeting with John Hine, Crowthorne

- Many years of experience working with rural transport in developing countries
- History of development of original 2006 RAI for IDA 14
- Original intention of using household surveys to measure RAI
- Other household survey statistics now widely used for many other purposes
- Whether access is possible is far more important than the condition of a road in rural areas
- Prepared review comments on World Bank 2016 RAI Phase 2 proposal to ReCAP
- Discussed studies of rural transport in Africa (including Liberia 2017)
- Some studies show that HDM-4 benefits based on roughness very inaccurate

Meeting with Kevin McPherson, at TRL, Crowthorne

- Reviewed transport statistics data collection in Ethiopia and Uganda in 2006
- Knowledge of state of the art transport sector data collection and processing

17-Jan-2018

Meeting with Elizabeth Jones at DFID in London

- DFID expectations from the ReCAP RAI status review
- RAI working group, ReCAP/World Bank/DFID, to meet as soon as possible
- Importance of RAI as a UN SDG Indicator, needs to move from Tier III to Tier II (or Tier I)
- UN SDG Indicator review processes and role of UN IAEG-SDGs
- RAI used in DFID business cases, is understood at senior levels and by non-specialists
- Contact points in various organisations for consultation

19-Jan-2018

Skype meeting with ReCAP PMU

Audio conference with Annabel Bradbury, Les Sampson, Jasper Cook

- Is the UN process of getting SDG Indicator 9.1.1 from Tier III to Tier II outside project scope?
- Concern that World Bank is proceeding without sufficient consultation with ReCAP/DFID
- Inception Report is an opportunity to get clear direction from DFID on priorities
- RAI Working Group members should see Inception Report before meeting
- ReCAP quality review of Inception Report will take two weeks before issue
- Ask Atsushi if it would be useful to hold RAI Working Group meeting during WB visit

VISIT TO WASHINGTON DC

Monday 12-Feb-2018 - Meetings at World Bank

Atsushi Iimi, Senior Economist, Transport, Africa

Adam Diehl, Operations Officer, Transport & ICT Global Practice

- World Bank did not have any money for measuring RAI
- First concept note to DFID in February 2015
- Second phase currently using WB operations budget
- Using smart phones for good/fair/poor assessment, with GPS coordinates
- In Malawi hired local consultant, 30,000 km
- Where are bottlenecks – priorities – sustainable, consistent measurements
- Zambia – some roads missing, not official roads – roads beyond classified network
- RAI data at local level for investment decision making
- Motorcycle taxis – countries defined what rural access is
- World Bank – data for development – capacity building process
- 9.1.1 “might be dropped” – talk to Umar – Methodology accepted – “thresholds of coverage”

Umar Serajuddin, Senior Economist, Development Data Group

- The IAEG-SDGs – was agency driven – now country driven
- The World Bank reports on 20 SDG Indicators out of a total of 270
- Umar represents the World Bank as an Observer at the IAEG-SDGs
- Manages World Development Indicators work programme
- A lot of expertise at World Bank – every year WDI document looks at trends
- 2016 SDG trends, 2017 Atlas
- Data since 1966
- Nothing further has happened with Indicator 9.1.1 since it was defined
- At the IAEG-SDGs meeting in Bahrain Umar presented 4 indicators, 3 were moved to Tier II
- Could put 9.1.1 forward to move to Tier II later this year – data now for 22 countries
- Need a road map for how measurement will be extended to more countries
- No questions in the IAEG-SDGs about the updated 9.1.1 work programme
- One issue – work more with NSOs, NSOs want to be engaged
- Uses various data from ministries, satellite images – not just household surveys
- Tremendous potential – need to bring countries on board
- DFID – delay in funding
- World Bank role – harmonisation across the world
- But - Different opinions about change of definition of 9.1.1, issues about usefulness
- Example – variations in measurement of infant mortality – IAEG → group agreed to harmonise
- Could request IAEG-SDGs to set up a group for 9.1.1 – limited life span sub group, or involve IAEG
- Take 2020 review seriously – bring people together in November 2018-04-09
- Could add an additional indicator – let two indicators compete and see which is accepted
- Example of indicators 3.8.1 and 3.8.2
- Better to have specific but narrow indicators
- Best not to change definition of 9.1.1
- Clear indicators rather than generalised
- ILO use more admin data; World Bank household surveys
- Could DFID be a partner agency for 9.1.1? Umar could ask UN – but countries normally through NSO
- UNEP and UNECE – partner agencies for 9.1.1 but not really doing anything so far
- Find suitable discussion group of stakeholders – perhaps at WB Annual Meetings rather than IAEG
- World Bank discussion group would be easy to organise – and could support Atsushi’s work
- Consultation group could include DFID, results could be presented at IAEG
- WB Meeting is in Oct, just before the IAEG-SDGs in Nov – maybe phone meeting over summer first
- Country consultation about method – cost, leniency, fitness for purpose
- LSMS has a African focus – Gates Foundation
- 2020 review deadline, need DFID funding to move work forward

Tuesday 13-Feb-2018 – Meeting at World Bank

Atsushi Iimi, Adam Diehl

- Country consultation was through local World Bank staff talking with organisations providing data
- Reached out to other MDBs, Nancy Vandycke is representative on MDB working group
- Problem – methodology needed to be clear to everyone
- Also work in progress at World Bank to measure RAI using OpenStreetMap – 120+ countries
- Long term financing – data hosted on World Bank system
- Provide data and methods, let people make their own calculations
- Financing – data collection – road condition updated through countries own budgets
- But different countries have different opinions on road condition ratings
- In Timor Leste the road agency has approved data
- Sierra Leone and Liberia – don't have good quality data
- RAI is useful for health, education etc
- Madagascar uses other indicators
- Talking to Latin American unit – use of RAI in agricultural development
- Why did the original 2006 RAI fail?
- Disadvantage having only one national measurement from RAI
- In Bangladesh the RAI seems high
- Require local condition data from country road asset management systems
- Any improvement in road condition results in improvement in RAI

Wednesday 14-Feb-2018 – Meeting at World Bank

Nancy Vandycke, Lead Economic Advisor

- Meeting to discuss the SuM4All initiative
- Earlier involvement in funding of RAI work, now delegated to Atsushi
- Pressure from UN – very few transport indicators, only 10 in SDGs – RAI only one WB custodian
- Atsushi and DEC – also alternative using OpenStreetMap
- World Bank now only has 200 transport staff
- Rural transport of interest to the global community – but those interested not bringing resources
- SuM4All brings everyone together
- RAI worked started well with DFID (ReCAP) funding
- What happened? Miscommunication? Second phase of RAI work was not funded as expected
- Many people unhappy – more money was expected from DFID – WB feeling of being let down
- If the RAI is not part of the SDGs it will be bad for ReCAP and bad for DFID
- \$1.5M needed for next stage of RAI work – one methodology
- RAI was dropped from IDA two years ago, not enough data
- SuM4All provides a global tracking framework – add other indicators, eg for motorcycles
- ReCAP is part of the SuM4All Rural Transport Working Group – there are 5 Working Groups

Thursday 15-Feb-2018 (Meetings also attended by Annabel Bradbury, ReCAP PMU)

World Bank internal seminar to discuss the ReCAP RAI status review

Chaired by Simon Ellis, by video conference link to Europe

Attended by over 20 people in in Washington DC, and video links to Jordan, Uganda and Zambia

Introduction by Simon Ellis

- Talking about the RAI since 2006, but never been able to get data collected regularly
- But it is the only SDG Indicator for rural transport
- Problems with the data
- Unable to replicate between countries. Costs are problematic
- Atsushi has demonstrated how the RAI has big impacts on production and agriculture
- Seeds of hope with new technology – road condition data, satellite data, GPS tracking
- Purpose of this status review to take stock – since 2006 – where are we today? Look to the future
- Look to keep the RAI as an SDG Indicator

Presentation about ReCAP by Annabel Bradbury

Presentation about the RAI Status Review by Stephen Vincent

Discussion

- Any differences in access by gender? Basic RAI value is just % of total rural population
- Use of motorcycles – not necessarily available to the poorest
- Is 2km threshold appropriate?
- Difference between all-weather and all-season – not the same for motorcycles

Presentation about the World Bank 2015/2016 RAI measurements by Atsushi Iimi

Presentation about RAI estimation using Open Data Sources by Tatiana Peralta Quiros

Discussion

- Vietnam OpenRoads – Content Management System: ORMA-Vietnam
- Keep track of data collected
- Look at analytics “go further than just RAI” – Multi-criteria prioritisation
- Conceived as open source road asset management, rather than just Excel files
- Master road network
- Possibly Moldova & Lao next
- Export road network – road roughness captured with RoadLab Pro smartphone app
- Know where roads are relative to hospital, ports
- Overlay risk maps – flood, landslide, earthquakes etc
- Missing standard for road data – working with TRL on it
- Need to link RAI with other tools
- Can all-season be dropped?
- Would you go to UN and say this is RAI today? If too much discussion might be dropped
- Network or service? Service more difficult
- Road network – as defined by government
- OpenStreetMap – doesn’t consider if road are part of national network
- Road users don’t care whether a road is registered in the inventory
- For motorcycles, tracks are also part of the network
- OpenStreetMap – more users lead to better quality data, more sustainable
- Vietnam is not using OpenStreetMap
- Accuracy – 10% or 90% - some form of indicator better than no indicator
- Service – lowest common denominator
- RAI is a compromise – other indicators better for planning projects – use what is available
- Proposal for RAI ‘lite’ – when there is no time or budget – using open source data
- RAI now calculated for 140 countries using open source data
- Three classes of road used
- In urban areas EC considers density and settlement size
- OpenStreetMap started in 2009 “The open alternative”
- OSRM – open source routing – works out travel time between two points very rapidly
- Based on tagged speed – Mappex traffic layer
- Issue is not accessibility, it is resources
- How to provide connectivity to health facilities etc
- DFID focussed on RAI and how to sustain
- Need a website – portal – with tools and data resources
- World Bank spends more on rural roads than anything else
- World Bank needs the RAI – but lesson from Peter Roberts – couldn’t replicate measurements

Meeting at Inter-American Development Bank (IDB)

Lauren Montes Calero & Anna Camilo, Infrastructure and Environment Department, Transport Division

- IDB uses information from the Ministry of Works
- Density of roads
- Classified road network – as a list of roads in a table

- IRI measurements, but not updated
- Specific requirements in project development
- How far are schools/services from where people live?
- Send request to government, government replies with summaries
- There is access to household surveys, but databases may not be in public domain
- Transport division does not deal with household surveys
- Ask for info for a specific project
- Could contact some IDB transport specialists
- Strategic Partnerships for Development – evaluating all projects for IDB
- Try to link to SDG Indicators
- IDB projects mapped against IDB indicators
- Rural – mostly – productivity, social development, poverty reduction, access to schools & hospitals
- Reduce transport costs, improve connectivity
- Why invest in specific roads – for example connect “n” people to a school, etc
- Data – Haiti – mapped roads
- Pilot in Bolivia – satellite data – position & condition of roads
- Nicaragua – many more motorcycles – mainly in urban areas
- Road safety a problem in Latin America
- Motorcycle version of Uber in cities
- No seminars on rural access at IDB in recent years
- Nicaragua, Paraguay, Peru, Panama – Developing road networks
- Rural/Urban concept varies between countries
- Classification of roads varies between countries

Friday 16-Feb-2018

Meetings at World Bank

Atsushi Iimi, Adam Diehl, Umar Serajudin, Annabel Bradbury

- Need to follow up with countries
- Tension between what people want to do and what is possible
- Beware of data graveyards, data is not useful if it is not used
- IAEG-SDGs – members are not experts on topics – following checklists
- Methodology needs to pass the experts to be signed off
- Needs discussion, formal collegial process
- NSOs have dedicated people, but cannot conduct NSO consultations
- SuM4All could provide stamp of credibility
- Could have a side meeting at the spring meeting of the IAEG-SDGs
- SDG Indicator 9.1.1 was presented to the IAEG-SDGs in Mexico
- No further discussion of Indicator 9.1.1 by the IAEG-SDGs
- If there was any discussion, the Secretariat would make contact
- No danger of 9.1.1 being deleted, a lot of activity around it
- Struggling to get it moved up to Tier II
- How much momentum is there – no good reaching 30 countries and sticking there
- Could request Tier II with just 15 or 20 countries, if there is a road map for many more
- Need clean, crisp, clear method
- Problem with Tier III, donors happier to fund Tier II
- Umar has defended the position of 6 or 7 other indicators
- This November, can propose to move to Tier II – at worst will stay as Tier III
- No dishonour in requesting and being turned down
- Who send SDG Indicators to UN? – NSOs want to send rather than custodians
- Countries would not like OpenStreetMap
- Need to pass the test of the people in the discipline – eg SuM4All
- Possibility of proposing a new SDG Indicator, as well as 9.1.1
- Poverty Indicator is a problem \$1.90 for all countries

- Possible capacity building if useful for national use
- Country can set standard, but also picture of the world – country specific metadata
- Umar will join the RAI Working Group
- Useful for DFID to move fast
- Helps that there are already some measurements
- Road map for working with countries, work with line ministries, make it happen
- Atsushi & Adam to brief Umar before the April IAEG-SDGs meeting
- Country links to NSOs / Roads Depts
- World Bank has an obligation to work with country agencies

Atsushi Iimi, Adam Diehl, Umar Serajudin, Annabel Bradbury

- World Development Indicators (WDI) – is there a gap?
- ReCAP only covers 17 countries
- Coordination, discussion of how to move things forward at World Bank

Franz R. Drees-Gross, Director, Transport and ICT Global Practice

Annabel Bradbury, ReCAP PMU

- Global Practice of 310 people
- Infrastructure Finance & Management
- Global solutions Group (GSG)
- Assets etc will include rural – budget for operations
- Countries but services from central group
- SuM4All is a developing partnership, World Bank is providing some funding
- Briefing on ReCAP RAI status review activities this week
- Recommended discussion of RAI at Leipzig SuM4All meeting in May

Meeting at Inter-American Development Bank

Ernesto Monter Flores, Transport Lead Specialist

- Working with SuM4All and Nancy Vandycke
- RAI is not commonly used in Latin America
- In Latin America, a lot of countries don't have a rural road network
- Raphael Capistan, working in Peru, is working on rural road projects
- IDB usually works on the primary and secondary road network
- There are a few rural road projects
- How useful is RAO for planning?
- Need to engage with governments, and countries
- Some countries decentralised, some centralised
- Brazil, Mexico, Argentina – State
- Rural projects – empower countries how to prioritise – rural roads complex
- Paraguay & Peru – Participatory prioritisation
- Communities, criteria → programme funded by IDB
- Talk to governments and local people
- Chile – developed roads with one lane – limited traffic
- A lot of requests to build roads
- Maintaining roads not as visible
- Key – must be sustainable – including finance

VISIT TO AFRICAN DEVELOPMENT BANK (AfDB) IN ABIDJAN, COTE D'IVOIRE

Thursday 08-Mar-2018 (Meetings also attended by Annabel Bradbury, ReCAP PMU, and Rob Geddes, CDS)
Jean Kizito Kabanguka, Division Manager, OITC.1, Transport & ICT Infrastructures Dept.

- Welcome to AfDB
- Schedule of meetings

Mariam Yinusa, Principal Financial Economist, Agriculture and Agro-Industry Dept.

- New AfDB strategy for agriculture 2016-2025
- Before more infrastructure development, now agriculture value chain
- More holistic approach, support high agricultural potential areas
- Government deals with classified roads, AfDB more feeder roads
- RAI only used as an indicator, not for policy making - RAI does appear in some logframes
- Monitoring – agricultural production, level of irrigation, area of cultivation, incomes, sales
- RAI is widely understood
- African Union overarching policy, AfDB more on the ground, UNECA produces Africa data

Maurice M Mubila, Chief Statistician, Economics & Social Statistics Division

- AICD database became AIKP, Africa Infrastructure Knowledge Programme
- Data collected by consultants, AfDB provides capacity building every 3 years
- More than 40 countries have identified a focal person for AIKP
- NSO in each country worked with one focal person for each sector
- But transport includes road, rail, water and air, really need expertise for each
- Some data collected by countries, including data from household surveys
- No updates of RAI, but some road condition survey data
- Consultant using RNET to estimate road investments needed to reach sustainability
- 14 countries reporting data on roads
- RAI – don't have capacity at AfDB for GIS analysis
- This year working on SDG 7, combined activity of AU/AfDB/UNECA/UNDP
- UNECA – Transport – African Centre for Statistics
- Initiative in 2015 to train team to work on AIKP data was not sustained
- World Bank 2006/7 AICD data needs to be updated
- Household surveys intended to be carried out every 5 years, but some countries unable to do this
- Population census generally every 10 years
- Countries don't give priority to statistics; the World Bank has more resources
- Recommendation to talk with Alberto Nogales about AIKP data updates and collection of RAI data

Friday 09-Mar-2018 (Meetings also attended by Annabel Bradbury, ReCAP PMU, and Rob Geddes, CDS)

AfDB internal seminar to discuss ReCAP RAI status review

Jean Kizito Kabanguka, Division Manager, OITC.1, Transport & ICT Infrastructures Dept.

Jean-Pierre Muimana Kalala, Chief Socio-Economist, OITC.1, Transport & ICT Infra. Dept.

Atchia Stefan Yanic, Transport Policy and Planning Officer, Infra. & Urban Dev. Dept.

Alfred Latigo, Executive Director, Global Institute for Development Evidence

Richard Malinga (in Pretoria), covering Namibia, Zambia, South Africa

Jeremy Ag?? (in Nairobi), covering Tanzania and 8 other Anglophone countries

Presentations about ReCAP by Annabel Bradbury

Presentation about the RAI Status Review by Stephen Vincent

Discussion:

- Keep original definition of RAI
- Any changes through new indicator
- Good/Fair/Poor ratings are not standardised
- RAI is not immediately relevant for prioritisation
- Need simple data collection methods using data sources that are already available

- Need flexibility on what data can be collected, country by country
- Funding issue – countries struggling to maintain roads – no money for data collection
- Could measurement of RAI be financed through NSOs?
- Urban development – shortage of urban data – UN Habitat/UNECA
- UNECA had a programme of continuous household surveys, could include transport question
- Ownership of RAI should be with NSOs and countries
- Gender disaggregation would be useful – but men and women may use different transport modes
- Need holistic approach to rural access at policy level
- Pay attention to accuracy and integrity of data – avoid “forged” data

Presentation about AfDB use of RAI by Jean-Pierre Kalala

- RAI used routinely as 1 of 10 standard indicators in AfDB logframes for projects affecting rural access
- 26 road projects have used the RAI as an indicator
- The zone of influence of the road project is identified, including associated feeder roads
- Either whole districts, or a specified corridor width measured, no standard specification
- Motorcycles and GPS may be used to position each village
- Household surveys before and after the project may also be used
- Road maps from the Ministry responsible for transport, population data from census statistics
- In Cameroon MAPBOX satellite images were used to locate villages
- The full report for Chad is in English
- The AfDB includes a funding component for NSOs, depending on project time and finance available
- Typically 0.35% of the budget of a project is for monitoring by the NSO, including road condition
- Capacity development of NSOs is supported.
- The concept of “all-season” roads is understood by the NSOs
- Only in Togo was there enough budget to fund an RAI survey of the whole country
- Suggest making comparisons with World Bank 2016 method in Togo and Cameroon
- A population census is underway in Cameroon, AfDB is working with Cameroon NSO

Discussion:

- Sierra Leone: Intention was good, but feeder roads dropped from project, hence no change in RAI
- Zambia: World Bank has large feeder roads programme, AfDB working with WB
- Liberia: Included a small component for data collection, RAI for 10km each side of road
- MDBs are observers on the IAEG-SDGs
- Need unified approach & methodology to move Indicator 9.1.1 from Tier III to Tier II
- AfDB will be a partner in this activity

Meeting with Agriculture, Human and Social Development Dept.

Basil Jones, Adviser to the Vice President and Special Envoy on Gender

Koffi Mark Kouakou, Principal Statistician-Economist, Agriculture, Human & Social Dept.

Alfred Latigo, Executive Director, Global Institute for Development Evidence

- Specific interest in gender in infrastructure
- Disaggregated data by gender very useful to assist in policy making
- Africa Infrastructure Development Index – Infrastructure is as important as governance
- Big debate – how to move from project gender statistics to national gender statistics
- Needs capacity building and funding to support data collection
- Meeting 2 years ago to harmonise household surveys, including gender data
- Bring engineers together with statisticians
- Make sure data collected properly at project level, statistical methods to extend to national level
- Uganda Bureau of Statistics (UBOS) is one of the top NSOs in Africa
- UNECA tried to improve data in 6 countries, but will this be sustainable?
- Concerns about the quality of the consultant TA to support NSOs in measuring AfDB indicators
- Need to build capacity across all NSOs in Africa, needs a harmonised plan & methodology
- See the “Multi-Dimensional Poverty Index”, Oxford University, spatial map covering the world
- Some contacts provided at UNECA and UBOS

VISIT TO ADDIS ABABA, ETHIOPIA

Monday 12-Mar-2018

Yitagesu Desalegn, Manager of Ethiopian Roads Authority (ERA) Road Research Centre

Rob Geddes, CDS

- Planning of meetings in Addis Ababa to discuss RAI

Central Statistics Agency (CSA)

Esayas Muleta, National Statistics Data Quality and Standards Coordination Director, CSA

Fekade Asfar – Statistician, CSA

Yitagesu Desalegn, Manager of ERA Road Research Centre

Rob Geddes, CDS

- Ethiopia recently became a member of the IAEG-SDGs
- The SDGs are being monitored by the National Planning Council (NPC) working with CSA and sectors
- To obtain the RAI, CSA would consult with road sector and NPC, no data is available at present
- The Rural Facilities Survey 2014 produced GIS maps of every wereda showing social facilities & roads
- Roads in the 2014 survey are marked as “all weather” or “dry weather”
- The 3rd Population Survey was carried out in 2007, GIS-based but not all households recorded
- Planning is advanced for 4th Population Survey, which will be fully digitised to household level
- Data will be captured on tablet computers in the field

National Planning Council (NPC)

Solomon Tesfasilassie Tegegne, Development Projects Implementation Monitoring Director

Yitagesu Desalegn, Manager of ERA Road Research Centre

Rob Geddes, CDS

- Road sector is highest priority in government, with 20% to 30% of government budget
- ERA is responsible for collecting data, including the RAI
- The National Growth and Transformation Plan (national development plan for Ethiopia) includes road sector indicators:
 - Length of all-weather roads
 - Time to reach an all-weather road (baseline 1.7 hours, target 0.8 hours)
 - Road density
 - Roads in good condition
 - Share of asphalt surfaced roads
- ERA provides this data each year, used by NPC to evaluate performance of ERA
- Household surveys are carried out every 5 years by the CSA

Ethiopian Roads Authority (ERA)

Ato Abiy Eguale, Team Leader, Regional Roads Support Team

Yitagesu Desalegn, Manager of ERA Road Research Centre

Rob Geddes, CDS

- Monitoring data is collected annually by WT Consult
- Report is sent to Ministry of Finance, Ministry of Transport, and NPC
- Data includes average time to walk from village to nearest all-weather road
- WT Consult is collecting some good/fair/poor road condition data, but only limited sample
- Universal Rural Roads Access Programme (URRAP) progress limited by inadequate funding
- 2015 ERA road condition survey included municipal and wereda roads
- Most Agriculture Growth Programme (AGP) and Productive Safety Nets Programme (PSNP) were not included in 2015 survey
- AGP and PSNP roads are regarded as mainly “dry-season” roads
- Total network is 100,000 km, held on a database at ERA, visual condition data in database, but not IRI
- More than 50% of the road network is “all-weather”, all URRAP roads are designed as all weather
- Some AGP and PSNP roads are being upgraded under URRAP
- GIS mapping of RAI values in Ethiopia prepared by Mohammed Nuru, a GIS specialist

Tuesday 13-Mar-2018

Mohammed Nuru, GIS specialist

Rob Geddes, CDS

- Calculated the RAI 4 months ago for a World Bank project
- Impact of URRAP rural roads on reducing poverty 2010 to 2016 in Ethiopia
- URRAP roads all engineered
- Didn't have good/fair/poor ratings
- Used all-weather as all-season, excluded earth roads
- PSNP roads engineered, labour based employment welfare programme
- World Bank used government data for the 2016 RAI measurements
- Complete inventory and condition survey of entire country in 2015/2016
- Mohammed was manager of survey of 6 out of 10 regions
- Combined/Harmonised all data for whole country & created database for ERA
- Condition included rutting, potholes etc for 2km sections
- 100,000 km is actually 80,000 km, including all engineered and unengineered roads
- Calculated RAI using GIS, using *WorldPop* 100m grid population data
- World Bank 2016 calculation is more conservative
- GIS analysis of travel time to nearest road, displayed on computer
- ERA has GIS software, but not skilled GIS specialists
- Excluding urban population – who decides? Ministry responsible for urban areas

Teferra Mengesha, General Manager, W-T Consult P.L.C.

Rob Geddes, CDS

- Prepares annual data for ERA/CSA, mapping and monitoring survey
- Mentioned recent presentation from Bangladesh about RAI at ILO regional seminar
- Has been measuring 20 MDG Transport Indicators for 20 years
- Final Report completed 2 weeks ago, can be requested from ERA
- Single country level RAI, used by CSA for welfare monitoring, using household survey method
- Survey every 3 years, statisticians at CSA/W-T Consult estimate years between
- RSDP SDG reports very detailed, include data about health centres, schools etc
- Contact CSA for copies of all surveys
- Government funded survey every 3 years, sample of households for 25% of weredas in each region
- GPS data on location of key facilities
- Initial survey + 2 years of follow up
- Recent surveys 2014/15, 2015/2016, 2016/2017, but no further follow up yet
- GIS-based mapping and statistical analysis now all with ERA
- Average distance to an all-season road is used, not RAI
- Population varies greatly between regions, aggregate RAI figures misleading
- Collection of suitable data is a problem with RAI
- Existence of a road does not guarantee access to a transport service
- Expenditure on transport in rural areas is very low – people prefer to walk and save money
- Motorcycles only used in urban areas and by government officials in rural areas
- In rural areas people are too poor to buy motorcycles, walking dominates
- Pace of change very slow in Ethiopia
- RAI not so relevant, indicator of transport service more useful
- ERA website should include RSDP performance report each year
- EU performance indicators for variable tranche sector budget support, monitored last 3 years by ERA:
 - Area less than 2km from an all-weather road
 - % of Kebele with access to an all-weather road
 - Kebele served by regular transport services

Alemayehu Endale, ReCAP Country Coordinator (ERA)

- Brief coordination discussion

VISIT TO KAMPALA, UGANDA

Wednesday 14-Mar-2018

Eng. Dr. Mark Rubarenzya Henry, Head Research and Development, UNRA

Rob Geddes, CDS

- Planning of meetings in Kampala to discuss RAI

Thursday 15-Mar-2018

Eng. Dr. Mark Rubarenzya Henry, Head Research and Development, UNRA

Dr. Emmerentian Mbabazi, Research Fellow, Directorate of Network Planning and Engineering, UNRA

Eng. Isaac Menya, Network Engineer, UNRA

- Difficult to find Uganda Bureau of Statistics (OBOS) data, not available online
- UNRA GIS only includes national roads
- Improving roads leads to growth in the population
- People move closer to roads when roads are improved
- A lot of motorcycles in use in the countryside in Uganda
- Verified national road network is now 20,544 km, pavement management system set up 2011/2012
- Local government has no standard method of defining road location and condition
- Earlier plan (TSDMS 2007) for local government to send data via MOWT to UNRA not happening
- JICA study in 2014 covered district, urban and community roads, everything except UNRA roads
- Included accelerometer road condition surveys
- Planned another study in 2016, but no development partner funding
- Household surveys are part of the national census every 10 years
- Also some extra household surveys, one fairly recent, but nothing about transport
- Small study in Luweero, using satellite imagery, good information but at high cost
- Prioritisation of road improvements for rural roads:
 - Road Asset Management System (RAMS) installed in Districts
 - District Council – politicians decide which roads to upgrade
 - Everybody has their own ideas
- UNRA developing improved method of prioritising work on national roads
- National – combine technical needs, National Development Plan, National Transport Master Plan, but also include recognition of political manifesto
- Shortfall in maintenance funding
- Road Fund operates more like a first generation road fund
- Must intervene within one month of heavy rain to minimise maintenance costs
- There is a national road asset valuation, loss of value will demonstrate effect of delayed intervention
- MOWT has a GIS installed by JICA
- Other organisations have GIS skills (eg electrical, water)
- Many GIS specialists being trained at Makerere University
- Recommended contacts for rural development at Islamic Development Bank

Drake Bagyenda, Ministry of Works and Transport (MOWT) (by telephone)

- Not measuring RAI in Uganda
- Population within 2km of a road is part of project appraisal
- 2015 most recent data collection, although supposed to be updated every year
- All road links in GIS, would be interesting to superimpose population data and calculate RAI
- Needs top management support to make progress with data update
- Local governments could be given access to GIS data
- MOWT could provide data to UBOS if any updates become possible
- Condition data good/fair/poor determined by vehicle driving speed
- Need a service provider to collect data

Eng. Michael Akankwasa, Manager Road Development, UNRA

Dr. Emmerentian Mbabazi, UNRA

Rob Geddes, CDS

- Not seen RAI used on an UNRA project
- Looked at examples of current project logframes to see what indicators are being used
- Project indicators – example: measure passenger fares, vehicle travel times, average daily traffic

Friday 16-Mar-2018

Meeting with the Uganda Bureau of Statistics (UBOS)

Grace Bulenzi, Principal Officer Coordination Services

Peter Opio, Director Business and Industry Statistics

William Anguyo, Principal Statistician

Paul Okudi, Senior Statistician

Rob Geddes, CDS

- Mr Opio has attended three IAEG-SDG meetings since 2016.
- He was not aware of the RAI.
- Proposals for new indicators or upgrading of an indicator are first presented to the expert group in a closed meeting and discussed. The meeting is then opened to “the public” (observers, civil society, NGOs) and a vote taken on adoption/upgrading of the indicator.
- UBOS collects data on the length of the road network from UNRA and the districts (district road network should be collected from the MOWT, but UBOS regard the MOWT data as incomplete).
- UBOS has started to request condition data on the roads from UNRA and the districts in terms of good/fair/poor. MOWT has a definition of “good/fair/poor” in terms of road features (e.g. bridges) and condition (potholes etc). The condition data is required for a National Development Plan indicator “Quality and Stock of Infrastructure”, which includes roads.
- The last population census was carried out in 2014. The next census is expected in about 2022 depending on availability of funds. UBOS has a projection of the population from the 2014 to 2022.
- UBOS conducts the National Service Delivery Survey every 4 years. It assesses the performance of the government in providing basic services (water, health, education, transport, etc). The 2015 report is available on the web site.

Page 310 of the National Service Delivery Survey report 2015 includes the rural transport indicators that are being collected. They include:

ACCESS TO ROAD INFRASTRUCTURE

- What type is the nearest road to your household? *Trunk road (tarmac)/ Trunk road (murrum)/ Feeder road/ Community Road*
- How do you access the nearest road from your household? *Walking/ Bicycle/ Motorcycle/ Boat/ Other (specify)*
- Is the road usable all the year round?
- IF NO: Why? *Bad weather/ Bad terrain/ Potholes/ Poor drainage/ Bushy roads/ Insecurity/ Other (specify)*
- What is the major constraint you find when using this road? *None/ Bad weather/ Bad terrain/ Potholes/ Poor drainage/ Bushy roads/ Insecurity/ Other*
- What is the distance from your household to the nearest public transport point/stage?
- Do you incur any expense to reach the nearest public transport stage?
- IF YES: How much do you pay for the public transport?
- What is the distance from the household to the district headquarters?

STATE OF ROADS

- What is the distance from the household to the nearest Trunk road (tarmac)/ Trunk road (murrum)/ Feeder road/ Community road
- Is there a *[each type of road]* in this Sub County?
- How has the maintenance of *[each type of road]* in this Sub County changed in the last 2 years? *Improved/ Same/ Worsened/ Don't Know*
- What is the MAJOR constraint you find when using the *[each type of road]* in Sub County? *None/ Bad weather/ Bad terrain/ Potholes/ Poor drainage/ Bushy roads/ Insecurity/ Other*
- What is the frequency of the constraint? *Common/ Not common/ Not applicable*
- Who are the main actors in the repair of *[each type of road]*? *Central Gov't/ District/ Municipality/ Sub-County/ Private individuals/ Community/ Other*
- On a scale of 1- 5, how do you rate the quality of service offered *[by each of the main actors]*? *Very Poor/ Poor/ Average/ Good/ Very Good/ Don't Know*
- What is the frequency of grass cutting alongside the *[each type of road]*? *Weekly/ Monthly/ Quarterly/ Ad hoc/ Other (specify)/ Don't Know*
- What is the frequency of grading of *[each type of road]*? *Monthly/ Quarterly/ Bi-annually/ Ad hoc/ Other (specify)/ Don't Know*

William Anguyo is responsible for the transport indicators in UBOS and should be contacted if there are further queries.

VISIT TO KATHMANDU, NEPAL

Sunday 18-Mar-2018

Meetings at Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR)

Jeewan Guragain, Senior Divisional Engineer, DoLIDAR

- A major administrative restructuring is taking place in Nepal at the moment
- There is now no local government ministry, everything is done through 7 new provinces
- The future of DoLIDAR is not decided, local municipalities will manage roads in the future
- A new Roads Act is still in draft
- New structure – Strategic Roads & Highways, Provincial Roads, and Local Roads
- Local roads will be managed by 753 Municipalities
- Municipalities are of two types, Urban and Rural
- DoLIDAR sets Norms and Standards
- Bridge standards are being revised
- Department of Roads & Highways will still be responsible for major roads
- DoLIDAR has complete electronic maps of all community roads
- Before, there were 75 Districts in Nepal
- Each District had World Bank, ADB, SDC DFID projects, 2 or 3 roads in each District
- DoLIDAR has District Technical Offices in each District
- The Municipalities will have funds to develop projects, requested to use DoLIDAR standards
- DoLIDAR prepared District Transport Master Plan Guidelines
- DoLIDAR also assisted with support on the phone and through consultancy
- Mainly District Road Plans, started in 1998
- Between 2012 and 2016 all 75 District Transport Master Plans updated with DFID assistance
- Rural Access Programme now in third stage, RAP3, covering 10 Districts
- Some GIS data is available for the District Transport Master Plans
- Statistics of Local Road Network 2016, detail of 57,000 km of roads, all in PDF file
- SRN – Strategic Road Network (Department of Roads)
- DRCN – District Road Core Network
- VRCN – Village Road Core Network
- But former District and Village roads (DRCN & VRCN) are now all with Municipalities
- Surface types:
 - Blacktop – all weather
 - Gravel – all weather
 - Earth – fair weather

Er. Jeevan Kumar Shrestha, Director General, Joint Secretary (Technical), DoLIDAR

Jeewan Guragain, Senior Divisional Engineer, DoLIDAR

- DG was at SuM4All meeting in Washington DC in January
- Planning exercise in progress to identify rural municipalities and wards not connected by road
- 753 Municipalities and Rural Municipalities, 48 Rural Municipalities not connected
- Results of survey provided, with list of wards not connected

Jeewan Guragain, Senior Divisional Engineer, DoLIDAR

- Before there were 75 Districts – now Districts only exist for monitoring purposes
- Reorganised into 7 Provinces, already in law, two years to implement
- Elections December 2017, each Province Committee will decide the name of the Province
- Will also decide the main central town for each Province
- Roads decisions now at three levels – National, Provincial, Municipality
- Devolved decisions from central government to Provinces and Municipalities
- The existing District Master Plans do not match the new organisation
- GIS demonstrated with census data for each ward, gender and household data
- Household surveys every 10 years, most recent 2011
- 75,000 km of roads, 44,000 km are in the GIS, all District roads

- 31,000 km of village roads missing, listed in statistics but no GIS centrelines
- Before, until July 2017 – annual road maintenance plan, good/fair/poor ratings
- Planning budget – detailed plan before for each fiscal year
- In future Municipalities will decide plans and budgets
- Good/Fair/Poor ratings in report (not in GIS) based on Blacktop=Good, Gravel=Good, Earth=Fair
- 250% tax on cars, motorcycles are much lower cost
- In rural areas people use public transport to carry goods, not so many motorcycles in rural areas
- Note motorcycle helmets worn by drivers, but not by passengers, fairly recent change in the law
- Remote mountain areas just subsistence farming
- When road is built no money to use transport – need to generate income to be able to use the road
- Programmes to generate income – forestry, small manufacturing, rice, potatoes
- “Transport is changing Nepal” – before 80% of District budget spent on roads
- Roads are the key change in rural areas
- 30% blacktop and gravel, 70% “other roads” (earth)
- Earth roads: bulldozer/grader; no side drains; steep gradient; sharp corners; cutting sides too steep
- Hence earth roads only open in the dry season, closed July to Sept wet season
- Festival in September, offices closed for 7 days, city people to countryside, demand roads re-opened
- Crops to market in dry season, after roads re-opened
- Road safety a sensitive issue
- In rural areas old vehicles, wet conditions, heavily loaded buses – accidents, sometimes many killed
- Decisions by politicians – politicians want new roads
- Maintenance by lengthmen, groups of 4/5 local village people, 11 days/month
- Committees of 7 to 11 people decide what needs to be done, ask Municipality for money
- No routine maintenance, National roads use lengthmen
- Villages demanding roads stay open, not closed during rainy season
- With political changes might not collect data for 5 years or more
- List of wards/Municipalities without access recently prepared by telephone survey (DG discussion)
- Access for telephone survey was just an earth road, not an all-season road
- Doesn't appear to be anyone at the Ministry of Federal Affairs & Local Govt dealing with the SDGs
- The Department of Survey has a GIS map of all settlement names
- Priorities set by cost per population, taking population at centre of municipality
- Method defined in District Transport Master Plan (DTMP) Guidelines 2012
- Road cost estimated by cost/km
- Dolidar.gov.np – download document Statistics of Local Road Network (SLRN) 2016
- Guidelines for rural road standards in DTMP 2012
- DoLIDAR currently training 135 Municipalities in the use of GIS and GPS
- Mobile communications available for almost all households in Nepal

Sunday 18-Mar-2018

Meeting at Nepal Central Bureau of Statistics (CBS)

Pramod Raj Regmi, Director, also Information Officer, CBS

- LSMS surveys have taken place in 1995, 2003, and 2011
- A further LSMS survey is tentatively planned for 2019
- A Labour Survey is in progress 2017/2018
- Example from household survey 2003/2004
 - Road facility: 44% bad, 42% fair, 13% good
- Panel studies as well and some of the same households from previous surveys
- See website 2011 LSMS → Sectoral Statistics → Poverty & Labour → Survey Report NLSS 2010/11
- Survey questionnaire – Page 133, section 3 Access to facilities - How would you travel?/How long?
- Detailed list of 24 facilities, mode of travel/transport/travel time
- The National Planning Commission is consolidating SDG Indicators – see report at NPC.GOV.NP
- 2017 NPC National Review of SDGs → SDG Road Map → Indicator 9.1.1 measure using NLSS by CBS
- Before 4,000 Wards, now 753 Municipalities
- Ward boundaries have changed with recent administrative changes, future comparisons difficult

- Old Village Development Committees (VDC) (4000?) combined into new Municipalities
- Before every VDC had 9 Wards
- The World Bank and DFID have provided assistance with the NLSS
- CBS is part of NPC
- No accuracy assessment of data sets is published
- Population census is exact
- NLSS – size of sample of households to give 95% confidence
- DG of CBS visited UN in New York 2 weeks ago (SV - timing roughly date UN Statistical Commission?)
- Not familiar with *WorldPop* data set
- Nepal has census population data and regional growth rate predictions

Meeting at Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR)

Jeewan Guragain, Senior Divisional Engineer, DoLIDAR

- In most cases each VDC is the same as 1 Ward
- In some cases parts of VDCs have been combined to create a new Ward
- Jeewan has edited all population data in GIS to match new Ward boundaries
- Using 2011 population data, without applying growth
- Government plan to provide road access to all remaining Rural Municipalities
- Before used 2km buffer each side of the road to determine population affected using GIS
- In 1995 the location of every house was surveyed by Dept of Survey (assistance from Finland?)
- All topological data is now in a GIS, with 10 layers of data, including a layer for buildings
- Population distributed equally to each building for analysis of population within 2km
- Rural Access Improvement Development Project (RAIDP) - hundreds of km mainly blacktop
- Plan or Nepal – First dry season access to all old VDCs; All-season later when resources permit
- Before – Health post in each VDC, lots of schools, volunteers trained in each VDC
- Swiss build rough stone paved roads, unsuitable for ambulances, didn't improve healthcare
- Schools were already nearby anyway
- Tractors can use rough roads all year
- When roads closed, in emergency hand carry people to hospital (rich people hire helicopter)
- 80% of rural development budget on roads, people want roads, even bulldozed tracks
- Priority to connect all Rural Municipalities, then Wards within each Municipality
- Department of Survey 1995 data has not been updated, new roads are not added
- Logframe indicators for RAP3 – Access: "Maintained road passes through VDC"
- Within a VDC it could be 1 day's walk, to move crops, produce, everything
- RAI not used as an indicator

VISIT TO DHAKA, BANGLADESH

Wednesday 21-Mar-2018

Meetings at Local Government Engineering Department (LGED)

Abdul Monzur Md. Sadeque, Executive Engineer (Planning), Planning Unit, LGED

- Road classifications in Bangladesh
- Roads & Highways Dept – National Highways / Regional Highways / District Roads
- LGED – Upazila Roads / Union Roads / Village Roads A / Village Roads B
- 489 Upazilas in database, parts of some of which may be urban, are sub-divisions of Districts
- Access Database of all LGED roads
- Annual survey of IRI for Upazila and Union Roads
- Rainy season May to August, heaviest in July, finishes in August, start inspections in October
- LGED office in every Upazila, If a road needs maintenance, prepare estimate,
- Try to update condition of village roads but not regularly monitored
- Road closures due to bridge or culvert collapses recorded
- Once a year each Upazila exports the updated Upazila road database to HQ
- Inventory details include length; width; embankment height; IRI; AADT Commercial Vehicles/day
- Detailed socio-economic data including schools, industries, markets, health centres located along road
- Includes data specific to Bangladesh, typhoon shelters
- Huge database, all kept up to date, LGED provides to government
- Includes construction and maintenance history for every road, for asset management
- Extra maintenance because of flooding, Emergency Maintenance Fund 10% of every year's allocation

Md. Sohel Rana, Senior Assistant Engineer, GIS Unit, LGED

Abdul Monzur Md. Sadeque, Executive Engineer (Planning), Planning Unit, LGED

- There are only paved and earth roads
- Only paved roads are considered all-season for RAI, earth roads not passable in rain
- Where access to a village is by boat, not considered to have access for measuring RAI
- Paved roads include herringbone brick (HBB) paved roads
- Badly damaged roads not considered passable for RAI
- Key factor is can a road be used by motorised traffic, not strictly based on IRI values
- Now 492 Upazilas in Bangladesh, 489 are in the database (two newly created)
- Settlement areas also shown in GIS
- Population data approximate, estimated by an experienced officer using 2011 census data
- No population growth applied to 2011 data
- Detailed GIS maps held for all Upzilas
- GIS maps updated July to October each year during the rainy season
- Roads database and GIS merged around October each year
- System has been in place for 10 years, since GPS survey was made in 1998
- Criteria for prioritisation of road improvements are:
 - Engineering
 - Social
 - Political
- The 2km distance is being explained to politicians
- Planning documents need to explain how each project is linked to achieving the SDGs
- Each project needs to be linked to specific SDGs
- The Prime Minister was involved in the preparation of the SDGs, and is an advocate of the SDGs
- Achievement of the SDGs is discussed in parliament
- Other indicators for planning improvements:
 - Type of road – Upazila (highest) / Union / Village A / Village B (lowest)
 - Traffic
 - Socio-Economic Connectivity – Markets, Education, Healthcare
- ReCAP study – method for measuring prioritisation score (see report), developed locally
- So far only applied in one District, needs time to apply to all 64 Districts

- This methodology will take precedence over RAI
- Motorcycles widely used in remote areas, owned not taxis
- Normally 4 wheel vehicles used
- Bureau of Statistics concerned about accuracy
- Will need funding to implement Upazila Development Plans
- Plan to prioritise improvements and update Upazila Development Plan maybe every 5 years
- World Bank obtained road network from LGED for 2015/2016 RAI measurements
- Very detailed plotted GIS Upazila maps shown

Meeting at Bangladesh Bureau of Statistics (BBS)

Md. Alamgir Hossen, Deputy Director and Project Director, BBS

Abdul Monzur Md. Sadeque, Executive Engineer (Planning), Planning Unit, LGED

- RAI all-season road, but if there is a good road there still might be no transport service
- Household Income & Expenditure Survey (HIES) in 2005, 2010 & 2016
- Next HIES survey planned in 2019
- HIES used to measure poverty
- 2010 survey included distance to health centre
- Another household survey in progress at the moment
- Citizen household survey, SDG 16, good governance
- Current survey includes 20m accuracy GPS location for each household
- Survey of 6,400 households, enabling Division level analysis
- Designed for 95% accuracy at Division level, 2% design effect
- Sample set by expert committee, based on statistical sample of the population
- Could have included a question to measure RAI
- Suggestion for alternative new method of measuring RAI:
 - Use current household survey for population with location
 - Use GIS to measure distance to LGED GIS road network
 - Can be disaggregated by gender and other population data
- Bangladesh has not participated in the IAEG-SDGs
- Could check Bangladesh population data against *WorldPop* data
- SDG Indicator Implementation and policy support is through the General Economics Division (GED) of the Bangladesh Planning Commission
- Main contact for the SDGs is the Prime Minister's Office (www.sdg.gov.bg)

Thursday 22-Mar-2018

Field visit to Keraniganj Upazila, Dhaka District

Abdul Monzur Md. Sadeque, Executive Engineer (Planning), Planning Unit, LGED

Mohammed Shahjahan Ali, Upazila Engineer, LGED

G.M. Iftekhar, Assistant Engineer, LGED

Mohammad Nurul Islam, Sub Assistant Engineer, LGED

- Local copy of GIS and database in Upazila office
- Keraniganji Upazila:
 - 100% RAI – all population within 2km of paved road
 - 621 Roads, 859km of roads, area 166.23 sqkm
 - 160km of paved flexible pavement
 - 67km of herringbone brick paved
 - 67km of reinforced concrete roads
 - 565km of earthen (unpaved) roads
- Paved roads always open all year
- No large floods in this Upazila
- Heavy rain earth roads are muddy and slippery, unsuitable for taxis, people walk
- Dry season Taxis and 3 wheelers use earth roads
- 12 Unions in this Upazila, 4 Unions towns/urban, 8 Unions villages, Union roads normally paved
- Approx 2 million people in Upazila, mostly urban, all urban roads maintained by this Upazila

- Periodic maintenance every year, pothole repairs, annual programme
- Budget sufficient to repair roads each year
- Herringbone bricks used when embankment newly constructed, more flexible for settlement
- Later, after settlement, change from herringbone bricks to flexible pavement
- Concrete used in areas that might be subject to flooding or water damage
- Field visit to observe state of roads, and difference between paved and earth roads

Meetings at Local Government Engineering Department (LGED)

Abdul Monzur Md. Sadeque, Executive Engineer (Planning), Planning Unit, LGED

- RAI measured by spreadsheet method, 84% for the whole of Bangladesh
- Islands in wetlands etc not connected
- 1980s LGED strategy to establish “growth centres” → 2,100 growth centres defined
- 1984 onwards first assignment for LGED connect growth centres with all routes
- Tremendously helpful for the rural economy all over Bangladesh
- First organised planning exercise for rural roads across all of Bangladesh
- Took around 15 years to connect all growth centres
- Also other parallel activities
- Riverine – river used for transport

VISIT TO ASIAN DEVELOPMENT BANK (ADB) IN MANILA, PHILIPPINES

Monday 02-Apr-2018

David Salter, Southeast Asia Department, ADB

- Cambodia Action Plan 20 years ago, IRAP multi-criteria analysis for investment priorities
- “Applying urban analysis to rural areas”
- Planning – What infrastructure is needed to support development
- First – look at what already exists, where do people see potential?
- Work from production → outwards
- ADB current approach:
 - Connect the settlement to the road – maybe 2m wide concrete strip
 - Spot improvements, maybe 1m - 1.2m concrete strip, along frequently used tracks
 - Tracks much more frequent daily use (get to fields etc) than main 2m access
 - Tracks for bicycle, motorcycle, 2 wheel “tractors”
 - Use concrete because gravel unsustainable, never maintained
- Vietnam & Laos – Motorcycles with trailers
- Gurus of roads use gravel or laterite roads – not sustainable – no money to maintain
- Project for “productive rural infrastructure” – component to support value chain
- Vietnam & Laos – replaced conventional feeder roads project – don’t work
- Transport planners – look top down
- Agriculture – production upwards – more intuitive, countries understand
- 70% of country fully/partially involved in agriculture, but not making money
- Infrastructure essential but not sufficient
- Ability to respond to the market & diversify
- 1996 method looked at population with 2km boundary of roads, Cambodia report
- Link to economic assessment – economic returns for population within zone
- Also look at population density in zone
- ADB works on discrete investments
- Mobility rather than access
- Local tracks far more used each day than occasional road access further afield
- Building weirs, need to include bridge for pedestrians, motorcycles, 2 wheel tractors
- Laos, Cambodia, Vietnam and Thailand – 2 wheel tractor with handlebars is “beyond subsistence”
- Subsistence – using buffalo
- In Thailand roads and electricity went in together, along the same routes, still good today
- Compare roads with electrification, % of the population connected
- Thailand – District – Health / Education / Markets
- Vietnam – Commune level
- Measure production instead of access
- Important word “appropriate” missing from definition of Target 9.1 – must be financially sustainable

Tuesday 03-Apr-2018

ADB internal seminar to discuss ReCAP RAI status review

David Salter, Southeast Asia Department, ADB

Michiko Katagami, Principal Natural resources and Agriculture Specialist, ADB

Stephen J Peters, Senior Energy Specialist, ADB

Ko Sakamoto, Senior Transport Specialist, ADB

+ 3 others

Presentations about ReCAP by David Salter

Presentation about the RAI Status Review by Stephen Vincent

Discussion:

- Central/West Asia – Moldova, Uzbekistan, Kirgizstan etc
- Soviet era – large density of roads – roads now in very bad shape
- Tajikistan – tried to maintain roads – unsustainable now – before detailed passport for each road

- ADB engagement with SDG Indicators – SuM4All, Rio+20 – RAI discussed many times
- Regional Development Banks said: Are we missing something when we only talk about RAI?
- How many countries have a policy on rural access?
- Track at least the intention to improve rural access – still part of the debate, or just RAI?
- Focus on RAI – More what can SDGs change? Different country to country
- In Mongolia there is access even without roads – In mountains in China 2km might take 2 hours
- Discuss – What should be targeted? What can be committed?
- Bad experience with household surveys, road outside but not connected to road network
- GIS may be better to reduce errors
- Example – village in India – small cooler allows selling produce when price is right – needs road access
- Links to other SDGs
- Agriculture – farm to market – inputs, outputs, distributor – transaction cost distance/time/cost
- Logistics index 2016 & 2018 – huge differences
- Interest in DMCs – to achieve goals – eg pipeline funding → project
- Cost of collecting datasets – household surveys 30/40 Euros/household – sustainability?
- Statistics office at ADB – agriculture statistics project coming to an end – could they add RAI?
- Rural access to what? – SDG themes health, education etc – each has a different value
- Agriculture – access to production / Health different access
- Need best results for planning → better decisions
- Cambodia/Vietnam border – motorbikes pulling trailers with 50 people – RAI is useful
- Country ownership has been missed in the debate
- Parallel with climate change – “breakthrough”
- South Korean delegate proposed “Nationally Appropriate Mitigation Actions” (NAMA)
- Before, climate change all top down, lack of support – NAMA → many countries signed up
- Propose “Nationally Appropriate Accessibility Actions”

Smita Nakhoda, Senior Results Management Specialist, ADB

- SDG coordination role for ADB
- UN ESCAP is the holder of statistical data for the region, UNSTATS for Asia
- ADB has not been directly involved with SDG Indicator development, or with the IAEG-SDGs
- Economic Research & Cooperation Department (ERCD) dedicated to building capacity to collect data
- ADB ERCD working with NSOs in ADB countries
- ADB convened at least two meetings of NSO representatives from around 20 countries
 - Social protection monitoring
 - Disaggregation – eg by gender, using ICT for data gathering
- Statisticians know how to work with NSOs
- Tier III indicators not central at the moment
- Forces for achievement – linked to process for monitoring – virtuous circle
- Results driven approach – Monitoring → Accountability
- See Disaster Risk Reduction Index Target 1.5 Indicator 1.5.3 – “fraught”
 - Uses Sendai agreement for Disaster Risk Reduction
 - Could something similar be done for achieving national rural access plan?
- ERCD has a rich network of collaboration links with NSOs in Asia
- Collects bottom-up data, key indicators compendium
- ESCAP provides capacity building for NSOs, also has good contacts
- For info – ADB will be hosting the Global Infrastructure Forum
 - Last mile infrastructure – role in realising SDGs
 - MDBs addressing infrastructure gap

David Salter, Southeast Asia Department, ADB

- How to support access appropriate to achieving SDGs, for each SDG?
- Maybe propose new SDG Indicator similar to 1.5.3
 - Could SuM4All specify how a national “mobility plan” should be prepared
 - Then SDG Indicator to measure progress towards “mobility plan”

Annex 4 Summary of comments received from wider consultation

Received from	Summary of comments
<p>Asif Faiz Former Highways Adviser, World Bank</p>	<ul style="list-style-type: none"> • Reference to TRB Transport Research Circular E-C167 ‘ The Promise of Rural Roads: Review of the Role of Low-Volume Roads in Rural connectivity, Poverty Reduction, Crisis Management, and Livability’ (Faiz A, 2012)*, and previous comments made to ReCAP about RAI. • Surprised RAI is an SDG indicator, but at least there is a rural access indicator. • Travel time would have been a better SDG indicator than RAI. • RAI is counterintuitive. In transport logistics the ‘last mile’ and the ‘first mile’ are critical bottlenecks, can account for 28% of supply chain costs. • 2km in mountainous areas not easy in an emergency. • World is fast urbanising, RAI will improve over time even if nothing is done. • No accepted definition of an all-weather or all-season road. • India and China have devised an alternative measure to assess rural road connectivity, % of rural settlements above given population threshold connected by paved road or road passable by motor vehicle most of the time. <p>*From reference Faiz A, 2012:</p> <ul style="list-style-type: none"> • Donor focus on rural roads can lead to grave misallocation of public resources in areas where there is neither the population density nor the scale of agricultural production to attract motor transport services. • Raballand et al., 2010, recommended abandoning 2 km buffer zone as not an economic threshold. From studies in three African countries identified a ‘Rural Transport Trap’, where anticipated truck traffic is not generated; motorcycles, bicycles, carts, pedestrians and donkeys instead. • Need to re-examine concept of rural accessibility; with network of rural trails, paths, tracks etc. integrating non-motorised transport and intermediate means of transport with motorised transport.
<p>Diogenes Ampan Wejin Peru</p>	<ul style="list-style-type: none"> • Asking whether indigenous and traditional transport has been considered. • Would like to receive the Final Report, and could contribute information about indigenous and traditional transport in the province of Condorcanqui in Peru.

Received from	Summary of comments
<p>Subhmay Gangopadhyay ReCAP Technical Panel, India</p>	<ul style="list-style-type: none"> • Why should the distance of 2km or 20-25mins walk be considered? Could we consider ranges up to 500m, 500m to 1km, 1km & above? • With availability of digitised road networks, household surveys are time consuming and inaccurate in comparison. • Different criteria for RAI due to large variations in population density from country to country. • Accessibility of the last mile more appropriate as it fulfils the transport demand requirement.
<p>Ashoke Kumar Sarkar Director, Birla Institute of Technology & Science (BITS) Pilani, Rajasthan, India</p>	<ul style="list-style-type: none"> • List of projects and papers on rural accessibility topics for many studies in India provided. • RAI data has been collected in a few areas in the states of Rajasthan and Himachal Pradesh in India, sponsored by the National Rural Roads Development Agency (NRRDA) in India. • In India, the Pradhan Mantri Gram Sadak Yojana (PMGSY) guidelines consider a habitation connected if there is an all-weather road within 1.5 km or 0.5 km depending on whether in plain or hilly areas. NRRDA assigned a project to make comparisons for selected areas between RAI and the PMGSY guidelines, both in Rajasthan (plain terrain) and Himachal Pradesh (hilly terrain). • Population data is only updated when the census is conducted every 10 years. • Digital road network data is generally available for GIS in India. • RAI can be used to make rough comparisons between levels of accessibility in different regions or countries, but is not useful for detailed planning. • Comparisons between the plains in Rajasthan and the hilly areas in Himachal Pradesh highlight the importance of considering the type of terrain. • The 2016 method of measuring RAI has too many parameters, and some are difficult to assess in developing countries. • Need to modify the definition of the RAI. Develop a new index which is simple and does not require a variety of data. • A new indicator has been developed in India with two components, one captures the level of existing accessibility, the other quantifies the difficulty level for inaccessible habitations. Case study application is in progress. • New technologies, such as using drones, may make regular data collection more straightforward.

Received from	Summary of comments
<p>Granie Jayalath Road Development Authority, Sri Lanka</p>	<ul style="list-style-type: none"> • In Sri Lanka, concern is to reach the “bus service start point”. Hence a performance indicator of the time taken to reach a public/private mobility service point would be sensible. • Most important parameter is walking distance to reach reliable mobility service point. • 2 km threshold on flat terrain, but needs adjustment on rolling or mountainous terrain. • Most significant rural mobility issue in Sri Lanka is that what has been planned is not what exactly goes on the ground. • Status of mobility varies spatially and temporarily even within a village because of growing use of three wheelers and motorcycles. • One or two decades earlier, sole mobility was walking + private/ public transport. But local authorities fail to maintain bus routes, and as a result bus services are terminated. Emerging trend of using three wheelers and motorcycles instead, as they can still negotiate the dilapidated roads. • Management approach – once a road is built or rehabilitated, local governing bodies leave it until it structurally collapses. • In Sri Lanka the village road network is quite dense, but all roads are not accurately mapped. Rural commuters have many alternative roads, footpaths, stair steps etc. to reach focal points. Hence exact status of accessibility is difficult to assess. • Need to have a rural access system worth monitoring. A village typically has a focal point, such as a bus start/end point, which has evolved naturally and involves a walk of 0.5 km to 15 km for commuters. Need to establish optimum focal points with a last walk of 1.5 km to 2 km using GIS. Also identify shortest roads to connect focal points to national roads using GIS. Once established, then worth monitoring with a suitable Rural Mobility Index (RMI).
<p>Barton Willilo Transport Economist & Exec Director, STET International (Tanzania) Limited Dar es Salaam, Tanzania</p>	<ul style="list-style-type: none"> • The 2 km access to the road network overlooks several key factors crucial to the rural population. • For an additional indicator try to incorporate: <ul style="list-style-type: none"> - Access to rural transport services including motorcycles - Cost of rural transport services per veh-km - Reliability of transport services including frequencies (travel opportunities/day) • Inclusion of these parameters would make a fairer comparison between different rural communities with 2 km, although there are still access issues for different types of terrain.

Annex 5 Recommendation for RAI Database

A database needs to be created of all existing and anticipated measurements of the RAI for every UN country for which measurement might be considered.

This database is a management tool, to support the coordination and management of the process of measuring the RAI/SDG Indicator 9.1.1 for as many countries as possible, as rapidly as possible. This database will only provide a high level overview of the existence of each measurement or each plan to prepare a new measurement. Additional details of each measurement should be held by the provider, or potential provider, of the dataset, preferably with a hyperlink from the text in this database to the provider's data.

A small number of descriptive text fields should be used, rather than many more prescriptive data value fields. This will allow the maximum flexibility to accommodate measurements derived from different sources and prepared by different methods.

All known existing measurements of RAI should be added to this database, including national, regional, and project-specific measurements. For each RAI measurement, the information in the database should include the date of the measurement; the agency responsible for preparing the measurement; a description of the geographic extent of the measurement; a description of the method used; and an assessment by a statistician of the likely accuracy of the measurement.

Planned future measurements of the RAI should also be entered into the same database, with the anticipated date of measurement; the agency responsible for ensuring that the measurement takes place; a description of the geographic extent of the measurement; and a description of the method to be used.

Where no measurement of RAI is expected to be made, an alternative entry should be made in the date field to indicate this; the agency that has determined that measurement is not possible should be entered; and the reason that measurement will not be possible should be entered in the methodology field.

If this database is correctly established, and fully populated with data, it will then become possible to interrogate the database to prepare a graph of how many countries will have RAI data available each year in the future. It will then soon become evident whether Tier I status can be achieved, with 50% of UN countries.

Annex 6 Recommendation for RAI Measurement Methodology Guidelines

A definitive RAI Measurement Methodology document needs to be prepared. This should only contain information about how the RAI should be measured and how the quality of each measurement can be assessed and assured.

There is only one definition of the RAI, which is straightforward and easily understood by all parties involved in the measurement of the RAI.

A number of different methods of measuring the RAI have been used in the past, and further developments in how the RAI could be measured are likely in the future. The value of the RAI is not dependent upon the method used to calculate it. Whichever method of measurement is used, there is only one real value of the RAI on the ground, and each method is attempting to measure this value as accurately as possible.

If SDG Indicator 9.1.1 is to progress rapidly to Tier II status, and possibly eventually to Tier I status, it will be essential to find the most straightforward and cost-effective way of making a measurement in each country. The RAI methodology document must allow for the potential use of any statistically valid measurement method.

In order to make the best use of the data already in each country, and to minimise the cost of measuring the RAI in a particular country, local adaptation of an existing method, or innovation to develop a new measurement method, may be needed. Quality assessment of the specific method to be used in each country is therefore essential before the measurement and calculation of the RAI takes place. This quality assessment must be done by an experienced statistician, in consultation with the agencies that will be providing the necessary data. In each case, the NSO should be involved in this quality assurance process, if possible.

Two basic types of measurement method are possible:

- (i) A method based on an expertly selected statistical sample, which is then assumed to be representative of the whole country, for example a household survey. This type of method will normally only provide one value of the RAI for the whole country.
- (ii) A method based on gathering and analysing data for the whole country, for example a GIS-based method. This type of method can also normally provide a regional breakdown of data.

Statistical sampling methods have been developed by statisticians to reliably provide the accuracy needed for indicators such as the SDG Indicators. The World Bank has supported the application of household survey methods in many countries over many years. However, a household survey based method could only be used for measuring the RAI if such a survey is already being carried out, and paid for, for another purpose, so that the marginal cost of including one extra question in the survey is negligible. This method may only be useful in a limited number of countries. A starting point should be to contact the NSO in any country where measurement is needed to find out whether any household surveys are planned.

It is likely that many new measurements will be made using some form of GIS method, using data for the entire country. Where possible a standardised method should be used, but this must take into account dataset factors relevant to each individual country. In particular, very few countries have a comprehensive road centreline dataset that includes all rural access roads. It may be necessary to compare a set of statistically selected samples of the digital road network with the actual road network, to determine whether there is a consistent systematic error in the representation of the road network, and then to consult with the NSO to determine how to compensate for this error in the calculation.

It is also unlikely that detailed digital records already exist of which rural roads can be considered to be all-season roads, and which cannot. Either a survey must be carried out to determine this, for example through the government department responsible for rural roads, by asking local roads engineers to annotate a list of roads to identify roads that are expected to remain open, or an alternative method of deciding the all-season road network must be determined. For example, local roads engineers might suggest that the road surface type, or an existing good/fair/poor condition rating, has a close correlation with the all-season network. It might, again, be necessary to work with a statistician to identify a suitable representative sample of roads, and then verify such an assertion with local roads engineers. Even where there is not a direct correspondence

between the parameter suggested and the all-season road network, it might nevertheless be possible to identify an element of correlation, as a result of which a statistician might be able develop a correction factor to compensate for the difference identified.

It will also be necessary to normalise datasets to the date on which the measurement is to be calculated, for example applying regional growth rates to census data collected in a particular year. It is likely that the NSO will have an important role to play in assuring the quality of the measurement of the RAI. The potential role of the NSO and all other interested parties, particularly the engineers familiar with the location and condition of local roads, should be clearly explained in the RAI methodology document.

The possibility of additional quality reviews should also be considered, through regional coordination with organisations familiar with local statistics and methods, such as UNECA and UN ESCAP, and also a final quality check by statistical specialists at the World Bank, as custodian of SDG Indicator 9.1.1

The RAI methodology document should be reviewed by, and agreed with, the regional development banks, to ensure a common understanding of how the RAI should be measured. Other regional organisations that may also have a role in supporting the measurement of the RAI, in particular UNECA and UN ESCAP, should also have an opportunity to review the methodology.

Figure 7 in the main report presents an overview of the proposed methodology for measurement of the RAI.

In some countries, there may be a concern that the RAI does not truly reflect the reality of current rural access, for example in countries where the dominant type of rural transport utilises motorcycles. The RAI methodology should include a provision that in such cases, in addition to the standard measurement of the RAI, the country may also make one alternative measurement of rural access. This must include a complete description of the alternative measurement method used, and also the reason that it is believed that this method more accurately reflects the reality of rural access.

Annex 7 Proposal to use Nationally Appropriate Rural Accessibility Actions

This proposal has been developed as a result of a discussion that took place at a seminar about the ReCAP RAI status review that was held at the Asian Development Bank (ADB) on 03 April 2018.

Reportedly, early discussions to address the effects of climate change were making limited progress towards agreement on a standardised set of actions. A breakthrough occurred with the suggestion that, as an alternative, each country should propose 'Nationally Appropriate Mitigation Actions' (NAMA). This concept, of allowing each country to propose the actions that were considered by that country to be appropriate, rapidly gained momentum, breaking the deadlock, and enabling a way forward to be agreed.

Hence, at the ADB seminar, the suggestion of developing nationally appropriate accessibility actions was put forward.

The suggestion here is to develop a framework within which 'Nationally Appropriate Rural Accessibility Actions' (NARAA) can first be developed, and then used to monitor progress.

Each country:

- (i) has different rural accessibility issues to address;
- (ii) uses different combinations of modes of rural transport;
- (iii) has specific infrastructure investment resource constraints; and
- (iv) has specific infrastructure maintenance constraints.

Sustainability is central to achieving the SDGs. Even if financial resources external to the country can be mobilised to develop rural access infrastructure, sustainable rural accessibility solutions also require sustainable transport services, and will only be useful for a short period of time unless a sustainable maintenance regime, including long term maintenance financing, is also established.

A two-stage process is therefore proposed for monitoring progress towards appropriate sustainable rural accessibility.

1. For an individual country, agree a specific set of Nationally Appropriate Rural Accessibility Actions (NARAA) to be achieved by 2030. These must comply with guidelines specified by an appropriate international body. These guidelines should preferably be agreed by an internationally representative group of country representatives. It is suggested that these guidelines are developed by the SuM4All initiative. Basic principles to be complied with:

- All aspects of rural access must be addressed, including access to all facilities needed including health centres, schools and markets.
- Provision of appropriate transport services must be addressed, as well as providing the necessary infrastructure.
- All prevailing methods of rural transport should be considered, and safety and security aspects (for examples for the use of motorcycles) should also be addressed.
- The intended final scenario for rural access must be financially sustainable. If new infrastructure is constructed, a sustainable mechanism for providing the financial resources to maintain this infrastructure must be included.
- A monitoring methodology must be included, with a single composite measurement indicator that has a base value of 0% in 2016 when the SDGs were adopted, and a value of 100% in 2030 if all of the NARAA are implemented as recommended. The contribution of each component action should be apportioned appropriately.

2. Monitor progress towards achieving these NARAA. The composite progress indicator should be measured each year. This could potentially be used as an SDG Indicator.

Annex 8 Further consultation

Within the limited timescale and resources of the Status Review, it was not possible to hold meetings or discussions with the following organisations. It is likely that these organisations might provide further useful comments on the measurement and/or application of the RAI.

- United Nations Economic Commission for Africa (UNECA)
- United Nations Economic and Social Commission for Asia and the Pacific (UN ESCAP)
- The Islamic Development Bank (IDB)
- European Union (EU)
- Agence Française de Développement (AFD)
- German Development Agency *Deutsche Gesellschaft für Internationale Zusammenarbeit* (GIZ)
- HDMGlobal