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

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Establishment of the RAI in 2005/2006
Rural Access Index: A Key Development Indicator

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TP-10
MARCH 2006
Definition of the RAI

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

An “all-season-road” is a road that is motorable all year round by the prevailing means of rural transport* … Predictable interruptions of short duration during inclement weather (eg heavy rainfall) are accepted ...

*In 2005 assumed to be ‘a pick-up or a truck which does not have four-wheel-drive’.
The Rural Access Index (RAI)

20 to 30 minutes walk = approx 2km
Measurement of RAI

Two main approaches:

(a) Household surveys that include information about access to transport.

(b) Map data to determine how many people live within the specified catchments of the road network.
Requirement for RAI

Adopted for the Results Measurement System (RMS) of IDA-14.

“...The Index was developed in response to the consensus led by borrowers that it identifies an important priority for poverty reduction strategies in view of the established links between physical isolation and poverty ...”
“2006” RAI data

64 countries - 32 IDA and 32 non-IDA

26 countries based on 5 types of household surveys
10 countries based on GIS analysis
22 countries estimated using modelling techniques*

*including Uganda and Zambia
Institutionalisation of the RAI

2006 - Intended to include a suitable question in regular household surveys (e.g., every 3 years)

Straightforward processing of survey data (“... one day of experienced statistical input...”)

→ *Why didn’t this happen?*
2016 - SDG Indicator 9.1.1
SDG 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.

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

*World Bank is the “custodian” of SDG Indicator 9.1.1*
UN Inter-agency and Expert Group on SDG Indicators (IAEG-SDGs)

- Internationally representative group with members from National Statistical Offices (NSOs).
- Recommended the initial 2016 list of SDG indicators.
- Recommends status of each Indicator (Tier I, II or III).
- Is reviewing the list of Indicators and in 2020 will recommend any additions, deletions, refinements or adjustments needed (reviewed again in 2025).
SDG Indicator “Tier” system (Note: Abbreviated)

Tier I: Regularly produced for at least 50% of countries.

Tier II: Conceptually clear, established methodology, but not regularly produced.

Tier III: No internationally established methodology or standards, but they are being developed.

Current rating of SDG Indicator 9.1.1, the RAI
2016 – World Bank

New technologies to measure the RAI
2015/2016

UKAid funding, through ReCAP, to update method of measuring the RAI

Pilot measurements in 8 ReCAP countries

Support moving SDG Indicator 9.1.1 to Tier II/Tier I
Proposed methodology: Conceptually the same, but measured differently using new data and technologies

- **Global definition:**
  - Share of the rural population who live within 2 km of an “all-season” ≈ “good or fair” road

- **Flexibility, depending on:**
  - What data do we have in our normal operations?
  - What data can we update regularly, as we implement road works?

- **Other issues:**
  - Proximity to road network or market etc.?
  - 2km or 5km or 25 minutes?
  - What roads?

- **See the methodology report**


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**Sustainability**

**Consistency**

**Simplicity**

**Operational relevance**
Taking advantage of available (and sustainable) spatial data, RAI is calculated by spatial software

• Where do people live?
  – Global population data are available

• Where does the road network exist?
  – Georeferenced road network (government-owned, open data)

• In what condition?
  – Data exist, though often fragmented
  – Relevant issues: How to maintain road asset management system?

• Overlapping the above, the RAI is estimated by spatial software

ReCAP RAI Status Review - SuM4All RAWG 23 May 2018 Leipzig
Comparison of 2006 and 2016 results

![Comparison of 2006 and 2016 results graph](image-url)
## Comparison of 2006 and 2016 Results

<table>
<thead>
<tr>
<th>Country</th>
<th>RAI 2006</th>
<th>RAI 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>Nepal</td>
<td>17</td>
<td>54</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>22</td>
<td>32</td>
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<tr>
<td>Kenya</td>
<td>44</td>
<td>56</td>
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<tr>
<td>Tanzania</td>
<td>25</td>
<td>53</td>
</tr>
<tr>
<td>Uganda</td>
<td>27</td>
<td>64</td>
</tr>
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<td>Zambia</td>
<td>17</td>
<td></td>
</tr>
</tbody>
</table>

- **Detailed GIS mapping of rural roads**: 87 in 2016 compared to 37 in 2006. In 2006, there was actually 17% less rural road coverage. Extensive rural road improvements have been made since 2006.
- **All-season network difficult to define in mountain areas**: The all-season network is difficult to define in mountain areas, making it challenging to accurately measure the RAI.
- **Approximate modelling methods**: Rural roads in Tanzania are now worse than in 2006?
- **Is some of the rural road network missing?**: Not in the 2006 report.

**Questions:***
- Is the definition of the boundary between urban and rural areas consistent between countries?
- Is the RAI in Tanzania worse than in 2006?
2018 – RAI Status Review
ReCAP RAI Status Review

- Concerns raised by ReCAP member countries; technical differences between new methodology and original methodology, and differences in results.

- Requirement identified for status review by ReCAP to determine appropriate way forward – 3 Task Groups:

  TG1: A status review and way forward recommendation
  TG2: Consolidation and Revision
  TG3: Application in ReCAP countries
ReCAP RAI Status Review - method

- Literature review & consultation with specialists
- Meetings at World Bank
- Consultations with AfDB, ADB, IDB
- Country visits Ethiopia, Uganda, Nepal, Bangladesh (roads authorities/departments & statistical offices)
- Wider consultation through ReCAP mailing list
Discussions at World Bank

- Background to the development of 2016 RAI measurements. Measurements for more countries have now been made.

- SDG Indicator definitions can only be changed in 2020 or 2025. Hence, leave Indicator 9.1.1 unchanged; better to add an additional, new, SDG Indicator if the RAI does not truly reflect rural access issues.

- A separate initiative at World Bank has estimated the RAI in over 100 countries using open data sources.
Regional development banks

African Development Bank
- RAI used as a project level impact indicator on 26 projects.
- Projects include strengthening the capacity of the NSO to measure the RAI.

Asian Development Bank
- Rural projects viewed from perspective of supporting agricultural production.
- Statistics priority is on Tier I and II SDG Indicators.

Inter-American Development Bank
- Lack of suitable data to measure RAI.
- Measure improvements in access to health centres, schools etc instead.
Country visits - Africa

Ethiopia
- Household survey methods used for 10 years to monitor progress with rural roads programme.
- GIS methods being used to measure average walking time to a road.
- RAI measurements used to measure impact of rural roads programme.

Uganda
- RAI is not used.
- Rural road mapping incomplete.
- Bureau of Statistics survey every 4 years includes assessment of distance to road, whether road is open all year round, and distance to public transport.
Country visits - Asia

Nepal

- Recently change to 753 urban and rural municipalities. Working to achieve road access to every municipality – Local plans & GIS data.
- Some roads closed in the rainy season, but health centres & schools beyond closures, and crops moved when roads re-opened.

Bangladesh

- Comprehensive GIS of all rural roads.
- Spreadsheet method of calculating RAI.
- High level of rural access (RAI = 84%)
- Only paved roads are all-season
National Statistical Offices

- The National Statistical Offices (NSOs) were visited as part of all four country visits.
- All NSOs were helpful. Some already had a brief to coordinate the measurement of SDG Indicators.
- Note that the SDG Indicators are about statistics, not engineering!
- Several countries had carried out recent household surveys which could have included an RAI question.
Wider consultation

- The RAI is not a very good indicator, but it is better than no indicator at all.

- Travel time walking to a road is a better measure than distance, different types of terrain have a major effect.

- Consider an integrated approach to rural transport, combining non-motorised and intermediate transport along trails and paths with motorised transport using rural roads.

- When roads deteriorate so that bus services cannot operate, motorcycles and three-wheelers provide an alternative.

- Also consider the reliability of the transport services available, for example travel opportunities/day.
Financing of infrastructure & maintenance

- What level of RAI can be achieved within realistic infrastructure spending?
- What level of RAI can be sustained by future road maintenance finance?
- See 2008 AICD analysis & recent Myanmar study.
- Maximum achievable RAI is country specific.

Graph: Thous

 Thousands of kilometers of "all-season" road

RAI

R² = 0.97

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

- 200 400 600 800 1,000 1,200 1,400 1,600

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Effect of use of motorcycles on RAI

- Extensive use of motorcycles in some countries.
- Motorcycles can access areas that larger vehicles cannot.
- Recent Liberia study highlights extensive use of motorcycles for access to healthcare, education etc.

→ Allow the measurement of an additional, extra, ‘country RAI’ value, for example the difference that considering motorcycles would make.
Moving from SDG Indicator Tier III to Tier II

- Need a well defined and widely accepted (eg by regional development banks) methodology.
- Need measurements for a significant number of countries (20 to 40?), and a clear plan for both many more country measurements and how all country measurements will be repeated in the future.
- Need to involve NSOs (as required by IAEG-SDGs).
Alternative methods of measurement

- The International Roughness Index (IRI) is measured by many different methods.
- Similarly, there is only one actual value of the Rural Access Index (RAI) in a country, however it is measured.
- To achieve a significant international coverage of RAI measurements as rapidly as possible, the RAI measurement methodology should allow the use of alternative measurement methods.
Accuracy

- The accuracy of each dataset needs to be assessed and published.
- Consider the accuracy of each data source, hence calculate overall likely accuracy, and possible error.
- When different methods give different results, they are measuring the same thing (RAI), so the accuracy ranges should overlap if the assessments are correct.
Correction factors?

- In some cases, there may be a known systematic error, for example some rural roads are missing.
- Where a known error exists, for example the rural road network is incomplete, estimate and apply a correction factor.
Nationally Appropriate Actions?

Suggested in discussion meeting at ADB:

- Learn from climate change ‘Nationally Appropriate Mitigation Actions’ (NAMA).
- Agree rural accessibility actions needed specific to a country (eg based on SuM4All recommendations?)
- Agree a method of monitoring progress towards achieving these actions.
- → Monitor progress. Could this be an SDG Indicator?
Recommendations
(1) RAI Database

- Develop a database of all UN countries.

- Details of when SDG Indicator 9.1.1 (the RAI) is expected to be measured, and the agency leading this measurement.

- Include details of existing measurements of the RAI.
(2) RAI Measurement Methodology Guidelines

- Allow alternative methods of measurement.
- Accuracy must be verified, preferably by NSO.
- In addition to the standard measurement of the RAI, allow an additional country value to be calculated, for example including motorcycles.
Overview of RAI Measurement Methodology

RAI Measurement Guidelines

Cost Data sources
Timescale Repeatability

Statistical method
- Household survey

Whole country method
- GIS analysis
- Spreadsheet analysis

Verification by NSO

Regional support from regional development banks & UN statistics specialists

Review and consolidation by World Bank
(3) RAI Web page

- Access to RAI Database and Guidelines
- Knowledge exchange
- Roles of organisations and contact points
(4) Schedule to move SDG Indicator 9.1.1 to Tier II

- Decide actions needed, financing, & dates
- Target November 2018
(5) Develop alternative SDG Indicator(s) for rural access

- Better reflect contemporary rural access issues.
- Address access to facilities and provision of transport services.
- Work with SuM4All RAWG – for 2020 SDG review
- Possible alternative approach of first assessing the quality of the national plan for rural access, and then measuring progress towards achieving it.
(6) Further research

- Consultation with additional organisations.
- Comparative studies between different methods of measuring the RAI.
- Potential use of smartphone data.
Application in ReCAP Countries

- Support measurement of the RAI in selected ReCAP countries.

- Regional coordination of RAI measurement by regional development banks.

- Determine the maximum sustainable level of the RAI that could be achieved in each country.
Discussion