# WBG SCORECARD FY24-FY30 METHODOLOGY NOTE

## WBG Client Context & Vision Indicators

The purpose of this note is to ensure the rigor, transparency, and reproducibility of the WBG client context and vision indicators included in the new WBG Scorecard FY24-FY30, as well as their alignment with the WBG's vision. Technical teams were asked to provide a sufficiently detailed methodology so that anyone who reads this note can understand its rationale, theory of change, data sources, and method of calculation.

Definitions included in this template are aligned to the WBG Scorecard paper endorsed by the Board on Dec 19th, 2023. The methods notes are living documents and will be subject to updating and revision pending operational inputs and implementation lessons over time.

| OVERVIEW | |
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| **INDICATOR NAME** | **Percentage of population with access to reliable transport solutions all year-round.** |
| **SUB-INDICATORS** | • Percentage of population with access to all-season rural transport infrastructure<br>• Percentage of population that has access to public transport |
| **OUTCOME AREA** | ☐Protection for the Poorest<br>☐Healthier Lives<br>☐Green and blue planet and resilient populations<br>☐Sustainable food systems<br>☐Affordable, reliable, and sustainable energy for all<br>☐Digital services<br>☐More and Better Jobs<br>☐No Learning Poverty<br>☐Effective Macroeconomics and Fiscal Management<br>☐Inclusive and equitable water and sanitation services<br>☒Connected Communities<br>☐Digital connectivity<br>☐Gender equality and youth inclusion<br>☐Better Lives for People in Fragility, Conflict, and Violence<br>☐More private investments |
| **SDG ALIGNMENT** | **See https://sdgs.un.org/ for further details on SDGs:**<br>☐ 1. No Poverty<br>☐ 2. Zero Hunger<br>☐ 3. Good Health and Well-being<br>☐ 4. Quality Education<br>☐ 5. Gender Equality<br>☐ 6. Clean Water and Sanitation<br>☐ 7. Affordable and Clean Energy<br>☐ 8. Decent Work and Economic Growth<br>☒ 9. Industry Innovation and Infrastructure<br>☐ 10. Reduced Inequalities<br>☒ 11. Sustainable Cities and Communities<br>☐ 12. Responsible Consumption and Production<br>☐ 13. Climate Action<br>☐ 14. Life Below Water<br>☐ 15. Life on Land<br>☐ 16. Peace, Justice and Strong Institutions<br>☐ 17. Partnerships for the Goals<br>List of specific UN targets (if applicable): |
| **UNIT OF MEASURE** | ☒Number of people ☐Number of countries ☐USD ☐GW ☐Hectares ☐tCO2eq/year<br>☐Other: _______________ [Please specify] |
| **LEGACY INDICATOR NAME** | ☐WB Old Scorecard indicator:<br>☐WBG Old Scorecard indicator:<br>☒N/A |
| **RATIONALE** | |
| **DEFINITION** | The percentage of the population that has safe and dependable transportation options throughout the year. In urban areas this measures the estimated share of urban population who can access a public transport stop within a walking distance of 500 meters (for low-capacity public transport systems) and/or 1,000 meters (for high-capacity public transport systems) along the street network.[1] In rural areas this measures the proportion of the rural population who lives within 2 km of |

[1] Low-capacity public transport systems include buses and trams, while high-capacity public transport systems include trains, ferries, and subways.

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| | an all-season road.[2] A country-level indicator is a weighted average of the rural and urban dimensions, weighted by the rural-urban population split in a given country. |
| **DEVELOPMENT RELEVANCE** | Transport connectivity is a key element that supports inclusive and sustained growth. In developing countries, particularly in Sub-Saharan Africa, the majority of agricultural production remains smallholder farming with limited access to local, regional, or global markets. Limited transport connectivity is also an important constraint to accessing social services, especially in rural areas where the majority of the poor live. Rural roads are particularly susceptible to the impacts of extreme weather events and flooding—access to all-season roads is key to ensuring continued accessibility and safety, enhancing overall climate resilience of the transport network.<br><br>Rural access is key to unleashing untapped economic potential and eradicating poverty in many developing countries. In the short term, transport costs and travel time can be reduced by improving road conditions. Over the longer term, this will support higher agricultural productivity and firms will become more profitable with the creation of more jobs, eventually helping to alleviate poverty. The Rural Access Index (RAI) is one of the most important global development indicators in the transport sector. It is the only indicator for the SDGs that directly measures rural accessibility, and it does so by assessing rural populations' access to all-season roads. The RAI was adopted as Sustainable Development Goal (SDG) indicator 9.1.1 in 2015. |
| **LIMITATIONS** | **Rural access**<br>While access to all-season roads offers a good representation of a population's overall accessibility and mobility, it can generate under-assessment in places where transportation by means other than rural roads (such as navigable waterways) are relevant. A key aspect of measuring rural accessibility is how to define an all-season road or "passability"[3] and whether there are reliable and timely road condition data exist showing all-season access.<br><br>Paved roads are more likely than unpaved roads to be all-season passable, but this is not always the case; passability depends on surface conditions as well as roads' exposure to rainfall and the specific topography of an area. Precipitation has a significant effect on the condition of unpaved roads, representing a significant factor in that condition's deterioration. Similarly, the gradient and altitude of roads also has an effect on their passability. Steep roads become impassable more easily due to the potential for scouring during heavy rainfall, as well as slipperiness from the road surface materials used. Paved roads in good or fair condition can be assumed to be all-season passable. Among paved roads in poor condition, those could be considered all-season if they are exposed to less than 10 meters (m) of accumulated rainfall per year and are located in areas with low-to-moderate slopes.<br><br>Putting unpaved roads aside is not realistic, as these often provide critical accessibility to rural populations. The following approximations can be made to determine all-season passability of unpaved roads. It can be assumed that gravel roads are all-season passable if they are exposed to less than 10 m of accumulated rainfall per year and are located in areas with low-to-moderate slopes. In the case of dirt roads, those that are exposed to less than 5 m of accumulated rainfall per year and located in areas with flat slopes are assumed to be all-season passable.<br><br>**Urban access**<br>The indicator is simple and globally consistent but does not fully highlight the quality and experience of walking access and public transport. The quality of the data to estimate the indicator varies across cities (for example, for the delimitation of a city or the location of public transport stops). Where these cannot be obtained from city administration or transport service providers, alternative sources are used. |

[2] An all-season road is a function of passability; paved roads are more likely than unpaved roads to be all-season passable, but not always. It depends on surface conditions as well as the roads' exposure to rainfall and the specific topography.
[3] A "passable road" is defined as a roadway surface that can be traveled safely at reasonable speeds.

**Urban-rural split**[4]

Aggregation of urban and rural population may not add up to total population because of different country coverage. There is no consistent and universally accepted standard for distinguishing urban from rural areas, in part because of the wide variety of situations across countries. Most countries use an urban classification related to the size or characteristics of settlements. Some define urban areas based on the presence of certain infrastructure and services, whereas other countries designate urban areas based on administrative arrangements. Due to national differences in the characteristics that distinguish urban from rural areas, the distinction between urban and rural population is not amenable to a single definition that would be applicable to all countries. Estimates of the world's urban population would change significantly if China, India, and a few other populous nations were to change their definition of urban centers. Because the estimates of city and metropolitan area are based on national definitions of what constitutes a city or metropolitan area, cross-country comparisons should be made with caution.

**Country coverage**

The percentage of population with access to rural transport solutions is not available for all countries.[5] The World Bank will increase the country coverage for this data over time.

## DATA AND CALCULATION

**DATA SOURCE(S)**

- **UN Habitat SDG Indicator 11.2.1:** Proportion of the population that has convenient access to public transport disaggregated by age group, sex, and persons with disabilities. This indicator is computed as the estimated share of urban population who can access a public transport stop within a walking distance of 500 m (for low-capacity public transport systems e.g., buses) and/or 1000 m (for high-capacity public transport systems e.g., trains, ferries) along the street network. Only public transport stops which are mapped are included in this analysis, which may include both formal and informal stops.[6]
- **Urban population (% of total population):**[7] Urban population refers to people living in urban areas as defined by national statistical offices. The data are collected and smoothed by United Nations Population Division.
- **Population distribution data:** Quality population distribution data are essential for correct measurement of rural access. In some countries, census data is available in a geospatially detailed, reliable format. For other countries, population distribution data sets have been developed by the international research community, interpreting subnational census data through various modelling techniques. For the RAI, WorldPop data has been found to provide a reliable estimate. That estimate can also be refined through engagement between national statistics offices and WorldPop to reconcile data at the level of enumeration areas.
- **Rural-urban data:** Related to population distribution data, an important challenge facing the index is the need for a consistent and reliable urban and rural definition to exclude urban areas from the calculation. The inclusion of urban areas would create a substantial upward bias in the RAI, because most urban residents have "access to roads," no matter how it is defined. Ideally, spatial data determining urban-rural boundaries are needed at a similar level of resolution as the population. As such data may rely on different definitions in different countries, globally produced urban extents may be used, such as the Global Urban Rural Mapping Project (GRUMP) v1 Urban Extent Polygons.[8]
- **Road network data:** Data on road locations may come from a number of sources. Ideally government data are used, as they are consistent with the road network for which road agencies are responsible and are relatively easy to merge with other operational databases. In countries where the road location data may not be detailed enough or is entirely

[4] This draws from https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS.
[5] The list of 28 countries covered using the World Bank's RAI methodology currently includes Armenia, Bangladesh, Burundi, Chad, Ethiopia, the Gambia, Iraq, Jordan, Kenya, Lebanon, Lesotho, Liberia, Madagascar, Malawi, Mali, Mozambique, Nepal, Nigeria, Paraguay, Peru, Rwanda, Sierra Leone, Somalia, South Africa, Tanzania, Uganda, United Arab Emirates, and Zambia
[6] https://data.unhabitat.org/documents/GUO-UN-Habitat::metadata-on-sdg-indicator-11-2-1/explore
[7] https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS
[8] https://sedac.ciesin.columbia.edu/data/collection/grump-v1

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| | missing, or where there is a large unclassified network, alternative data sources may be available, such as the open-source OpenStreetMap and the Global Road Inventory Dataset (GRIP).[9] GRIP also disaggregates paved, gravel, and dirt roads. If several different open-source datasets are used to map the road network, it should be ensured that roads are not artificially duplicated due to minor differences in alignment.<br>• **Road condition data:** The principle of the "all-season" road network remains central to the original concept of measuring the RAI. An "all-season road" is defined as a road that is motorable all year round by the prevailing means of rural transport (often a pick-up or a truck which does not have four-wheel drive). Predictable interruptions of short duration during inclement weather (e.g., heavy rainfall) are accepted, particularly on low volume roads. Road condition data is required for paved roads, incorporating the distinction between fair/good and poor.[10] Data sources include official government datasets (if recently updated) or alternatives such as satellite imagery (e.g., from the Copernicus API) that allow us to infer the condition through machine learning methods.<br>• **Rainfall and Slope data:** Several sources of data are available to infer the daily and annual precipitation intensity at a high spatial resolution. One option is the Copernicus Programme's (C3S, 2017) yearly accumulated precipitation data, which is made available freely at approximately 30km resolution for reference year 2022. World Bank staff are also able to access the GLDAS dataset of total monthly precipitation modeled globally by NASA for 2000 to the present.[11] Slope data is available from the Shuttle Radar Topography Mission (SRTM GL1) Global at 30m resolution.[12] |
| **METHOD OF CALCULATION** (CORE) | **Percentage of population with access to rural transport infrastructure:**[13]<br>The RAI indicator is measured by combining three sets of geospatial data: where people live, the spatial distribution of the road network, and road condition. The RAI method requires three main data sets: (i) population distribution, (ii) road network, by type of surface (paved, gravel, dirt), (iii) road condition for the paved network, (iv) precipitation, and (v) slope. Another data set is required to define "rural areas." The following steps are followed:<br>• Obtain spatial population distribution data at a high spatial resolution. For example, the WorldPop is among the best population distribution datasets that provides population counts at a resolution of 100m x 100m.<br>• Exclude urban extent data. For example, the Global Rural-Urban Mapping Project data set provides a raster data of urban areas.[14]<br>• Prepare the spatial road network data which includes the identification of all-season passability, based on the rules of approximation described earlier (different for paved vs. unpaved roads).<br>• Generate areas of 2km buffers around the road segments considered all-season.<br>• Compute the share of the rural population within the buffer areas out of the country's total rural population.<br><br>**Percentage of population that has convenient access to public transport:**<br>This sub-indicator measures the estimated share of urban population who can access a public transport stop within a walking distance of 500 meters (for low-capacity public transport systems) and/or 1000 meters (for high-capacity public transport systems) along the street network. This indicator is estimated by UN Habitat in the context of monitoring SDG 11.1.2. The method to |

[9] https://datacatalog.worldbank.org/int/search/dataset/0037825

[10] For the definition of good, fair, and poor condition roads, see *Transport & ICT. 2016. Measuring Rural Access: Using New Technologies. Washington DC: World Bank, License: Creative Commons Attribution CC BY 3.0*, available at https://documents1.worldbank.org/curated/en/367391472117815229/pdf/107996-REVISED-PUBLIC-MeasuringRuralAccessweb.pdf

[11] https://datacatalog.worldbank.org/int/search/dataset/0023663/GLDAS-Precipitation--01-01-2000---Present-

[12] https://portal.opentopography.org/raster?opentopoID=OTSRTM.082015.4326.1

[13] This section draws from *Transport & ICT. 2016. Measuring Rural Access: Using New Technologies. Washington DC: World Bank, License: Creative Commons Attribution CC BY 3.0*, available at https://documents1.worldbank.org/curated/en/367391472117815229/pdf/107996-REVISED-PUBLIC-MeasuringRuralAccessweb.pdf

[14] The Global Rural-Urban Mapping Project data consists of ten global data sets: population count grid, population density grid, urban settlement points, urban extents grid, land/geographic unit area grid, urban extent polygons, national boundaries, national identifier grid, and coastlines. See: https://sedac.ciesin.columbia.edu/data/collection/grump-v1

estimate the proportion of the population that has convenient access to public transport is based on five steps[15]: a) Delimitation of the urban area/ or city that will serve as the spatial analysis scope, b) Inventory of the public transport stops in the city or the service area, c) Network analysis based on street network to measure walkable distance of 500 m and/or 1 km to nearest transport stop ("service area"), d) Estimation of population within the walkable distance to public transport, and e) Estimation of the proportion of the population with convenient access out of the total population of the city.

**Delimitation of the urban area/ or city which will act as the spatial analysis scope**:
Use of the Degree of Urbanization (DEGURBA) as a workable method to delineate cities, urban and rural areas for international statistical comparisons. Countries are thus encouraged to adopt this approach for delimitation of the urban area/city, which will help them produce data that is comparable across urban areas within their territories, as well as with urban areas and cities in other countries.[16]

**Inventory of public transport stops**:
Data and information on types of public transport available in each urban area/ city, as well as the location of public transport stops can be obtained from city administration or transport service providers. In many cases, however, this information is lacking, incomplete, outdated or difficult to access. In these cases, alternative sources which have proven to be useful include open data sources (e.g., OpenStreetMap, Google and the General Transit Feed Specification - GTFS feeds), volunteered geospatial data, paratransit mapping, community-based maps, and point mapping using global positioning systems (GPS) or from high to very high-resolution satellite imagery (e.g., Google Earth). When information is available, characteristics of the quality, universal accessibility for people with disabilities, safety, and frequency of the service can be "assigned" to the inventory of public transport stops for detailed analysis and further disaggregation according to the statistical capacities of countries and cities.

**Network analysis based on street network to measure walkable distance of 500 m and/or 1 km to nearest transport stop ("service area"):**
To calculate the walking distance to each stop, data on a well-defined street network (by city authorities or from Open Sources such as OpenStreetMap) is required. The Network Analyst tool (in GIS) can be used to identify service areas around any location on a network. A network service area is a region that encompasses all accessible areas via the street network within a specified impedance/distance. The recommendation is to run the service area analysis for each public transport stop per applicable walking distance thresholds (500 m or 1 km), and then merge all individual service areas to create a continuous service area polygon. In urban areas where paratransit is the main mode of public transport, the use of street networks along which the carriers stop should be used in place of the designated stops. Cities and countries are encouraged to provide notes on their type of public transport system (whether formal, informal paratransit or a mix).

**Estimation of population within the walkable distance to public transport**:
The combined service area of 500 m walking distance to the low-capacity stops and/or 1 km to the high-capacity stops generated in (c) above is overlaid in GIS with high resolution demographic data. The best source of population data for the analysis is individual dwelling- or block-level total population, which is collected by national statistical offices through censuses and other surveys. Where this level of population data is not available, or where data is released at large population units, countries are encouraged to create population grids, which can help disaggregate the data from large and different sized census/ population data release units to smaller uniform sized grids. For more details on the available methods for creation of population grids, explore the links provided under the references section on "Some population gridding approaches." Once the appropriate source of population data is acquired, the total population with convenient access to public

[15] This section draws on https://unstats.un.org/sdgs/metadata/files/Metadata-11-02-01.pdf
[16] More details on DEGURBA and its application are available here: https://unstats.un.org/unsd/statcom/51st-session/documents/BG-Item3j-Recommendation-E.pdf

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| | transport in the city will be equal to the population encompassed within the combined service area for all public transport modes.<br><br>**Estimation of the proportion of the population with convenient access to public transport out of the total population of the city or urban area:**<br>Estimate the proportion of population with access to public transport within 500 m and/or 1 km walking distance out of the total population of the city or urban area. Each city for which a city-level indicator is estimated is included in a country-level indicator, with the weight assigned to the city being a function of the population size.<br><br>$\mathit{Share\ of\ population\ with\ convenient\ access\ to\ Public\ transport}\ (\%) = 100 \times \mathit{Total\ population\ within\ the\ merged\ service\ areas\ for\ low\ and}\ (\mathit{or})\ \mathit{high\ capacity\ public\ transport\ stops\ City\ Population}$<br><br>**Percentage of population with access to reliable transport solutions all year round:**<br>Estimated as the weighted average of the RAI and the country level estimate of the proportion pf the population with convenient access to public transport. The weight between RAI and the urban sub-indicator is a function of the rural-urban population split in any given country. |
| **METHOD OF CALCULATION** (DISAGGREGATION) | Disaggregation of indicators by dimensions such as country income groupings, regions, FCV status, and other country classifications are provided where minimum data requirements are met. |
| **VERSION** | Version 1. Revised May 22, 2024 |