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Going Beyond Measuring the Rural Access Index in the Philippines

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Abstract:
Crafting sound policies and planning projects for rural development require both reliable and sufficient qualitative and quantitative data. Among the many global Sustainable Development Goals (SDG) indicators, SDG 9.1.1. - "Proportion of the rural population who live within 2 km of an all-season road" is one of the indicators that can provide policymakers on rural development quantitative figures relating to road accessibility. Road accessibility particularly in rural areas plays a vital role in the social and economic lives of the people living in those areas.

This paper aims to measure the SDG 9.1.1, technical referred to as Rural Access Index (RAI), using the methodology from the initial work of the World Bank taking into consideration various assumptions and limitations. This paper will also relate RAI with other social and economic indicators such as poverty rates and regional gross domestic products to explore possible relationship of RAI and other existing indicators.

RAI will help policymakers plan future road projects in the rural areas and formulate rural transport programs that will provide better lives to the people in rural areas.

Keywords: Sustainable Development Goals; rural development; poverty

1. Introduction:

The 2030 Agenda for Sustainable Development, more commonly known as the Sustainable Development Goals (SDGs), is a set of goals, targets, and indicators that United Nations (UN) member states agreed to pursue attainment by the year 2030[1]. The primary aim of the SDGs is to have an inclusive and sustainable life for every people, regardless of their gender, age, race, and other vulnerabilities and the protection of the planet and the environment.

In order to track the different goals set, the indicators act as the measurement tool to see how far or close are the countries in attaining the targets. Of the many SDG indicators, SDG 9.1.1. - "Proportion of the rural population who live within 2 km of an all-season road" or Rural Access Index (RAI) is one of the indicators that can help policymakers craft plans and projects towards rural development related to road accessibility. Road accessibility plays a vital role in the social and economic lives of the people living in those areas.

The World Bank has initially proposed a methodology on how to measure RAI or a country's rural population that lives within 2 kilometers of an all-season road. Based on this proposed methodology, countries are developing improvements on how to adopt it in the conditions available to their country and consider other factors that can affect the generation of the RAI (such as presence of bodies of water, altitude). Astrologo, et. al. (2019) presented during the 62nd International Statistical Institute (ISI) World Statistics Congress (WSC) 2019 the adoption of the Philippines of the proposed methodology of the World Bank, which was introduced by the Asian Development Bank through a project, with some modifications. The methodology was tested in Davao Region (and its provinces) which was identified to have road development as part of its development agendas. The paper showed that with some modifications to the proposed methodology of the World Bank that the Philippines may generate RAI for the whole Philippines, its regions and provinces. It also opened the door for more research on the improvement of the methodology to include other factors that may affect the computation of RAI.

In this paper, the computation of the RAI for the whole Philippines will be done. This will enable for the comparison of the level of accessibility of the rural population to an all-season road. Additionally, this paper would want to do comparison of the RAI and other social and economic indicators can be done to support the need to have road developments as way to alleviate social and economic struggles being experienced by the people living in rural areas.

2. Methodology:

The computation part of this part is divided into two main parts. The first part deals with the computation of the RAI for the whole Philippines at the regional and provincial level. The second part focuses on the comparison of the RAI with social and economic indicators at the regional level, at the very least.

2.1. Computation of RAI

The process for the computation of the RAI is based on the methodology presented by Astrologo, et. al. (2019) during the 62nd ISI WSC 2019 in Kuala Lumpur, Malaysia. The data needed to compute RAI are as follows:

1. Gridded population distribution map
2. Administrative boundary maps with urban-rural classification
3. Road network maps

The 2015 gridded population distribution map which was used in the previous paper and in this paper was downloaded from the WorldPop website while the administrative boundary maps with urban-rural classification and road network maps were from the Philippine Statistics Authority (PSA). The software to be used will be the open-source QGIS software.

To discussed briefly the method presented by Astrologo, et. al. (2019), the computation of RAI is divided into three parts: (1) Estimation of the rural population at the desired administrative level, (2) Estimation of the population living within the 2-kilometer radius from an all-season road, and (3) Actual computation of the RAI.

For the purpose of the study, an all-season road is categorized as national, provincial, city, or municipal roads.

2.2. Comparison of RAI with Social and Economic Indicators

After the RAI for the whole Philippines has been computed, social and economic indicators published by the PSA, namely some indicators from the National Demographic and Health Survey (NDHS) 2017 and the Gross Regional Domestic Product (GRDP) will be used to generate insights on their possible relationship of RAI.

3. Result:

Among the 16 regions of the Philippines (the National Capital Region is excluded since the whole region is considered as urban), the Region I (Ilocos Region) has the highest RAI or highest rural population living within 2-kilometer from an all-season road with 83.159% while the Cordillera Administrative Region has the lowest RAI of 23.797% of the rural population living within 2-kilometer from an all-season road. Table 1 summarizes the RAI of the 16 regions of the Philippines.

Region	Rural Population ('000)	Rural Population within 2-km from an all-season road ('000)	RAI
Region I (Ilocos Region)	3185.1	2648.7	83.159

Region III (Central Luzon)	5120.6	3999.9	78.114
Region VII (Central Visayas)	3648.5	2790.8	76.490
Region V (Bicol Region)	4301.7	3288.6	76.450
Region VIII (Eastern Visayas)	3472.8	2616.3	75.337
Region IV-A (Calabarzon)	4480.2	3347.8	74.725
Region VI (Western Visayas)	5204.9	3696.7	71.023
Region II (Cagayan Valley)	2928.6	2059.0	70.304
Region X (Northern Mindanao)	3109.0	2184.2	70.253
Region XI (Davao Region)	3279.5	2229.8	67.992
Region XIII (Caraga)	2068.3	1395.2	67.458
Region IX (Zamboanga Peninsula)	2755.2	1766.4	64.112
MIMAROPA Region	2160.8	1378.7	63.805
Region XII (SOCCSKSARGEN)	3207.7	1921.7	59.910
Autonomous Region In Muslim Mindanao (ARMM)	1813.4	895.8	49.396
Cordillera Administrative Region (CAR)	1175.6	279.8	23.797

Table 1. Rural Access Index of the Sixteen (16) Regions in the Philippines

For the provinces, the top five provinces with the highest RAI are Batanes, Marinduque, Ilocos Norte, Cavite, and Southern Leyte, respectively. On the other hand, the five provinces with the lowest RAI are Basilan, Mountain Province, Benguet, Ifugao, and Kalinga. Tables 2 and 3 provide summary of the five provinces with the highest and lowest RAI, respectively.

Province	Rural Population ('000)	Rural Population within 2-km from an all-season road ('000)	RAI
Batanes	11.8	11.4	96.221
Marinduque	201.5	189.8	94.191
Ilocos Norte	500.3	462.7	92.492
Cavite	413.1	381.2	92.277
Southern Leyte	344.7	316.3	91.772

Table 2. Rural Access Index of the Five (5) Provinces in the Philippines with the Highest RAI

Province	Rural Population ('000)	Rural Population within 2-km from an all-season road ('000)	RAI
Basilan	137.9	0.0	0.000
Mountain Province	151.6	0.9	0.601
Benguet	325.1	5.6	1.736
Ifugao	196.2	12.8	6.548
Kalinga	182.7	41.4	22.693

Table 3. Rural Access Index of the Five (5) Provinces in the Philippines with the Lowest RAI

Comparing the RAI of the regions with the key indicators of the NDHS 2017 the following insights were found.

1. CAR and ARMM which has the lowest RAI among the 16 regions has the highest incidence of population with unimproved source of drinking water at 15.4% and 29.1%, respectively. Likewise, ARMM has the lowest percentage of population with improved sanitation facility at 35.4%.
2. In terms of pregnancy among women aged 15 to 19 years old, the three regions with highest teenage pregnancy are Davao Region, SOCCSKSARGEN, and Northern Mindanao where two of these regions (Davao and Northern Mindanao) has a RAI higher than 60%.
3. Percentage of births delivered in a health facility and percentage of births attended by a skilled provider remains to be the lowest in ARMM (region with the second lowest RAI) at 33.6% and 28.4%, respectively.
4. Vaccinations on children aged 12 to 35 months on ARMM remains to be the lowest among all the 16 regions regardless of the type of vaccine.

On RAI and GRDP, excluding NCR and CALABARZON (regions with the extremely high contribution to the GDP of the Philippines), surprisingly CAR (lowest RAI) has a higher contribution to the GDP at current prices than ARMM (second lowest RAI) comparing 1.7% for CAR and 0.7% for ARMM.

4. Discussion and Conclusion:

Computing for the RAI is still a work in progress even in the international level. No one methodology has been agreed upon to be used to compute RAI. There are many factors being considered in the improvement of the methodology of RAI.

However, even with this initial methodology proposed by the World Bank, RAI can be used to look into the situation of rural communities in a country. From the few results shown above, we can see that RAI has some connections with the social and economic indicators being computed by the national statistics offices.

This paper provides an initial look on the possibility of incorporating aspects of rural accessibility to the policies on rural development. This paper may not have provided a clear answer on the connection of RAI and the social and economic aspects of rural communities but it opened more questions to policymakers. Some of which are as follows:

1. Do we need to build more all-season roads to improve the RAI and allow for more accessibility to rural areas?
2. Do we move the people living in rural areas nearer the existing all-season roads?
3. What are the costs and the effects of doing either of the two above-mentioned proposal?

Lastly, it would be good to provide a comprehensive look into the relationship of RAI and the other social and economic indicators that were not looked into in this paper and have it done at a lower administrative level such as province or city/municipal level.

References:

1. United Nations (2015). Transforming our world: the 2030 Agenda for Sustainable Development
2. Astrologo, Jr., C.J., San Buenaventura, P.A.R., Bantang, J.A.O. (2019). Measuring the Rural Access Index in the Philippines. 62nd International Statistical Institute World Statistics Congress 2019. Kuala Lumpur. Malaysia
3. WorldPop (n.d.). Population Data. https://www.worldpop.org/
4. Philippine Statistics Authority and ICF (2018). Philippines National Demographic and Health Survey 2017: Key Indicators. Tables 2.2, 3.2, 7, 13, and 14.2. Quezon City, Philippines and Rockville, Maryland, USA. https://psa.gov.ph/sites/default/files/Philippines%20NDHS%20KIR.pdf
5. Philippine Statistics Authority (2019). 2018 Gross Regional Domestic Product. Quezon City. Philippines. https://psa.gov.ph/content/gross-regional-domestic-product