New index maps relationships between poverty and accessibility in Brazil

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Researchers from the School of Engineering in Trinity College Dublin have developed a new spatial index that measures the connections between poverty and poor accessibility.

The research, recently published in the *Journal of Transport Geography*, builds on previous work that shows how poor transportation availability can result in poor access to health care and employment, hence reinforcing the cycle of poverty in this area of rural Brazil.

One in five people in extreme poverty in this region are forced to journey 10 km at least, mostly by non-motorised transports, in the hottest and driest part of Brazil to reach the nearest healthcare facility. This results in concerning health outcomes such as low life expectancy and high child mortality.

Transport planners in more economically developed countries use large amounts of data to plan and predict the usage of transportation networks. But because these data are expensive to collect and due to the large geographical size of Brazil, such datasets do not exist.

Information on where low-income populations live in rural areas is not available, so the Trinity researchers used the location of water cisterns as a proxy for rural dwellings to determine access to services.

The research developed a planning tool that enables local governments to measure the levels of poor accessibility among nearly 2,000 municipalities. The mapping tool also enables them to target funding and transportation interventions to alleviate multidimensional poverty where it is most needed.

The main findings of the research include:

- 53% of the rural low-income population is situated more than 5 km away from the closest basic healthcare centre
- 60% is more than 10 km from the nearest hospital
- 49% is more than 10km from the closest urban centre

Brian Caulfield, Associate Professor in Trinity's School of Engineering, and project coordinator, said, "Transport policy development is dependent upon good data which are often expensive to collect. The approach developed in this research enables municipalities to use existing databases to outline the extent of the rural transport poverty problem and to direct policies that can break the poverty cycle."

Rodolfo Benevenuto, Ph.D. Researcher at Trinity College Dublin and co-author of the research, added, "As poverty is perceived not only as a lack of income but also as a lack of access to life opportunities, transport planning and development can offer instrumental strategies to reach the global goal of eradicating extreme poverty by 2030. Accessibility measurements are essential to promote evidence-based guidance that can make transport interventions more effective in tackling poverty."

More information: Rodolfo Benevenuto et al, Measuring access to urban centres in rural Northeast Brazil: A spatial accessibility poverty index, *Journal of Transport Geography* (2019). DOI: 10.1016/j.jtrangeo.2019.102553

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