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The dimensions of rurality: Implications for classifying inhabitants as 'rural', implications for rural policy and implications for rural indicators

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Abstract:

Abstract Discussions on the meaning of rurality continue. The FAO is pursuing an international definition of “rural” (Offut, 2016) and the USDA/ERS has recently reviewed its rural definition (National Academies, 2016). Our objective is to discuss the dimensions of rurality in order to discuss: The classification of individuals as ‘rural’; The implications for rural policy; and The implications for rural indicators. Rurality is a spatial concept. The key dimensions of rurality are the density and the distance-to-density of the localities of individuals, enterprises, or institutions. Thus, the dimensions of density and distance-to-density define “rurality”. Many characteristics of rural actors are correlated with rurality. However, these characteristics do not define rurality. The meaning of rural policy follows from the two dimensions of rurality -- the consideration of the two rurality dimensions of any policy would constitute “rural” policy. The preparation of statistical tabulations and the desire to target public policy requires the determination of the spatial grid (i.e. the boundaries of each locality) and the thresholds for density, and for distance-to-density in order to classify localities. These thresholds do not define “rurality”. The choice of the threshold simply classifies actors along the continuum of density and distance-to-density.

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The dimensions of rurality: Implications for classifying inhabitants as ‘rural’, implications for rural policy and implications for rural indicators¹

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Abstract

Discussions on the meaning of rurality continue. The FAO is pursuing an international definition of “rural” (Offut, 2016) and the USDA/ERS has recently reviewed its rural definition (National Academies, 2016).

Our objective is to discuss the dimensions of rurality in order to discuss:

- a. The classification of individuals as ‘rural’;
- b. The implications for rural policy; and
- c. The implications for rural indicators.

Rurality is a spatial concept. The key dimensions of rurality are the density and the distance-to-density of the localities of individuals, enterprises, or institutions. Thus, the dimensions of density and distance-to-density define “rurality”. Many characteristics of rural actors are correlated with rurality. However, these characteristics do not define rurality.

The meaning of rural policy follows from the two dimensions of rurality -- the consideration of the two rurality dimensions of any policy would constitute “rural” policy.

The preparation of statistical tabulations and the desire to target public policy requires the determination of the spatial grid (i.e. the boundaries of each locality) and the thresholds for density, and for distance-to-density in order to classify localities. These thresholds do not define “rurality”. The choice of the threshold simply classifies actors along the continuum of density and distance-to-density.

Introduction

Discussions on the meaning of rurality continue unabated. The Food and Agriculture Organization is pursuing an international definition of “rural” (Offut, 2016), the World Bank has updated its methodology for determining the accessibility of the rural population to ‘good’ roads (World Bank, 2016) and the USDA Economic Research Service has just completed a review of its rural definition (National Academies, 2016).

The objective of this paper is to discuss the dimensions of rurality as a basis for a discussion on:

- d. The classification of individuals as ‘rural’ or ‘urban’;
- e. The implications for rural policy; and
- f. The implications for rural indicators.

Rurality is a spatial concept. The key dimensions of rurality are the density and the distance-to-density of the localities of actors (individuals, enterprises, or institutions). In other words, the dimensions of density and distance-to-density define the rurality of the geographical localities of actors. Many characteristics of rural actors are correlated with rurality. However, these characteristics do not define rurality.

The meaning of rural policy follows directly from the two dimensions of rurality. Specifically, the consideration of the implications of the two rurality dimensions of any given policy would constitute “rural” policy. For example, the consideration of density and distance-to-density would constitute the “rural” in rural development policy. This attention to rurality has been instituted as “rural proofing” or a “rural lens” in a number of jurisdictions.

There are various ways to delineate the grid or the spatial boundaries of geographical localities and to measure their density, and distance-to-density. This paper reviews the considerations required to implement these measures. The exact choice of measures will depend upon the analytic objective being pursued.

The preparation of statistical tabulations and the desire to target public policy requires the determination of the spatial grid (i.e. the boundaries of each locality) and the thresholds for density, and for distance-to-density in order to classify localities or regions. These thresholds do not define “rurality”. The choice of the threshold simply classifies actors associated with the localities at given points along the continuum of density and distance-to-density.

For many purposes, analysts should consider the broader regional milieu within which each community is located. Similarly, for an analysis of regions, analysts should consider the mix of rural versus urban communities that comprise each given region.

The dimensions of rurality

Rural is a spatial concept (Reimer and Bollman, 2010; World Bank, 2009). Whether it is used for statistical, analytical, personal, or polemical objectives, “rural” implies something about the geographical location of its object. Even where “rural” is used in a metaphorical sense, it implies actors in localities with low density and/or a long(er) distance to higher density localities.

Conceptually, rurality refers to individuals residing in geographical localities as specified by two dimensions:

- their density; and
- their distance-to-density.

Frequently, density may be indicated by the population size of a locality and distance-to-density may be indicated as the physical distance or the money and /or time expended to travel to a locality of high(er) density. A detailed discussion of measurement issues is provided below.

Thus, individuals are more ‘rural’ if they reside in localities with a relatively low(er) population and /or with a relatively long(er) distance to high(er) density localities. Urban localities are those with a relatively high(er) density. Variations on these generalizations create a large number of possible propositions regarding the impacts of density and distance-to-density on opportunities and behaviour as suggested below.

The relationship between density and distance to high(er) density localities is most usefully represented as a continuum—as illustrated in Figure 1. Individuals residing in a locality in the upper-right-hand part of this diagram are residing in a smaller town (i.e. higher rurality in the density dimension) that is adjacent to an urban or metro centre (i.e. lower rurality in the distance-to-density dimension). Metro-adjacent individuals have easier access to urban or metro jobs and services (e.g. hospitals²) and a market to sell their goods and services. At the same time, they are living in a small-town locality (i.e. higher rurality in the density dimension). These individuals likely experience a small town “way-of-living” (perhaps less air pollution, less crime, fewer traffic jams, etc.) but are able to access a metro market and metro services. Individuals residing in a locality in the lower-left-hand part of this diagram cannot (easily) access the market or services of an urban or metro centre (i.e. high rurality in the distance dimension) but are residing in a larger town (i.e. lower rurality in the density dimension). These individuals are constrained to “small-town” or “small-city” opportunities (e.g. employment or services) but are living in a locality with a higher population density that would support the availability of many services, such as found in a regional service centre.

² The characteristics of a locality do not define the rurality of a locality. Here, examples are used simply to illustrate the point. Although larger hospitals may be associated with larger localities, one would not expect a one-to-one relationship between a larger hospital and a larger locality. To repeat, the examples in this paper are simply illustrative examples.

Figure 1

| The Two Dimensions of the Rurality of Localities (on a scale from 1 to 10): Density and Distance-to-Density | | | | | | | | | | | |
|--|---|---|---|---|---|---|---|---|---|---|---------------------------------------|
| Index of rurality in the DISTANCE dimension (from lower rurality (i.e. shorter distance) to higher rurality (i.e. longer distance)) | Index of rurality in the DENSITY dimension (from lower rurality (i.e. higher density) to higher rurality (i.e. lower density)) | | | | | | | | | | |
| | 0 {low rurality, high density} | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 {high rurality, low density} |
| 0 {low rurality, short distance} | | | | | | | | | | | |
| 1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 {high rurality, long distance} | | | | | | | | | | | |

- **Operational definitions**

The specification or choice of empirical measures of density and distance-to-density requires one to answer three questions.

1. What are the options for delineating the geographic boundaries or selecting the geographical units (i.e. a geographical grid such as community, county, region, etc.) that is most suitable to understand the issue being studied?
2. What are the options for empirical measures of density and distance-to-density?
3. What are the options for establishing thresholds of the empirical measures for:
 - a. The tabulation and publishing of statistical tables; and / or
 - b. The designation of “rural” localities for targeting policies and programs.

- **The choice of geographical units for the empirical measures**

The first operational choice required is the geographical unit (e.g. neighbourhood, town, county, regional district) which best represents the “places” or “localities” appropriate for the issue being studied (du Plessis *et al.*, 2010)³. For example, the choice of spatial unit will depend upon whether one is studying an issue with a neighbourhood focus (e.g. day care), an issue administered at the county level, or an economic development issue to be considered for a functional economic area. This choice will, in turn, represent the “locality” in the grid in Figure 1.

For many community-level issues requiring community-level data, there will also be a need to know the characteristics of the region within which the community is embedded. Similarly, for many regional-level

³ Note that du Plessis *et al.* (2001) provide operational definitions of “rural”, not theoretical ones.

issues, it may be important to know the characteristics or mix of communities within the region (e.g. all are small(er), all are large(r), one large(r) community, etc.) as well as how the population is distributed within the region. For example, Isserman (2005) emphasizes the importance of the mix of the population in rural vs. urban communities within each of rural and urban regions.

If the data are not available for the theoretically appropriate geographic grid, there will be a loss of information. For example, if community-level data is the appropriate spatial grid but data are only available at the county level, then one is missing the variation among the communities in the county as the county-level data will only show the (population-weighted) average for all communities in the county. This approach will generate (perhaps very) different empirical relationships between the rurality measures (density and distance-to-density) and the behaviour or outcome that is the object of the analysis. In fact, one would expect (very) different estimates of the size of the empirical relationship between each of the independent factors and the behaviour or outcome being analyzed.

- **Measuring density (as a continuous⁴ variable)**

The choice of this measure will be determined by the analytic question being considered. Typically, the population size of the locality would be an appropriate choice. In some cases, the population per square kilometre might be more appropriate. However, there may be specific investigations that would call for a density measure such as the density (number) of social networks (perhaps on a per capita basis) or the density (number) of individuals diagnosed with diabetes (again, perhaps on a per capita basis), as two examples. For analytical questions, generally, the chosen measure of density would be entered as a continuous variable in the empirical analysis. Data availability may also constrain the choice of the appropriate geographic grid for the empirical estimate of density.

⁴ Waldorf (2006) emphasizes the advantages of a continuous measure. Rurality is treated as a relative attribute and not as a categorical attribute generated from arbitrary thresholds that creates the impression of homogeneity / similarity with a category and also creates the impressions of large difference between categories. Thus, a continuous measure avoids “the ‘threshold trap’ that pigeon holes counties”). Secondly, the persistence or degree of change in rurality can be assessed over time by monitoring the change in the continuous index. Finally, the index can be applied to different spatial scales / spatial grids.

○ **Measuring distance-to-density⁵ (as a continuous variable)⁶**

The choice of the measure of distance-to-density would also be determined by the analytic question being measured. For example, the transportation of goods would likely require a different set of measures compared to the transfer of services (such as the transfer of accounting services or travel agent services by the Internet).

The road distance might be suitable for many analytic questions. More likely, the time cost and/or the money cost of making the trip would be a more suitable measure. The question of distance to “where” will depend up the question(s) being investigated. For example, the measure of the distance to daycare versus the distance to a brain surgeon versus the distance to sell your crop of organic peaches would each need to be implemented in different ways. In addition to the money or time cost of distance, for some cases, such as the distance to attend university, the issue of distance may also involve psychological, emotional, cultural, and familial costs (or perhaps benefits) that need to be considered as part of the measure of distance-to-density.

For analytical questions, generally, the chosen measure of distance would be entered as a continuous variable in the empirical analysis.

Data availability is always an issue. For example, if the analyst is searching for a measure of distance to a university, perhaps the ideal data would be the longitude and latitude for the exact location of the university. However, the analyst might be constrained to use the distance to the centroid of the municipality (or the boundary of the municipality) where the university is located.

⁵ The 2009 World Development Report of the World Bank acknowledged a third “D”, namely “division” (World Bank, 2009, Chapter 3) which includes:

- the thickness of borders (e.g. tariffs, non-tariff barriers) for the transfer of goods, services and people from one jurisdiction to another; and
- ethnic / cultural / language differences (“divisions”) that sometimes constrain the transfer of goods, services and people from one jurisdiction to another. For example, one might imagine a person standing outside a health centre in any cell of Figure 1 and being unable to access the health centre due to issues of skin colour or ethnicity.

Thus, access to services (or access to a market for one’s goods or services) is often determined by more than density and distance-to-density. However, the dimensions of density and distance-to-density remain as the key rurality dimensions. Also, Cappa (2007), among many others, lists many other factors, in addition to ‘distance’, that determines the ability of individuals to access services.

Below, we discuss the remoteness / accessibility / availability indexes computed by Alasia *et al.* (2017). They are explicit that they are providing a geographic (or spatial) index of remoteness / accessibility / availability and they are not considering other factors implied in a discussion of accessibility or availability (such as can one afford the cost of the trip, can one take this trip with a wheelchair plus social, cultural, language, etc. factors that might prevent “access”).

⁶ Laurent (2013) notes that the role of distance within and between territories invites a discussion of territorial justice, territorial equality and territorial cohesion. The choice of statistical indicators should include both the (in)equality of opportunity of individuals and the (in)equality of outcomes of individuals. Laurent also notes that territorial units are institutions in the sense that they are social constructed and are re-constructed as the constraints / advantages of a territorial unit are changed over time by political, economic, and social interventions.

A number of countries have generated remoteness or accessibility measures of the distance to urban centres. For Canada, Alasia *et al.* (2017) have distinguished between the (admittedly highly correlated) concepts of “remoteness” and “accessibility” (or availability). They note, generally, “that “remoteness” has been used in broader and more general terms to identify isolation in physical terms, while the concept of “accessibility” has been used predominantly in social research to assess availability of services and the barriers to access services, often at the individual level. The concept of accessibility is always qualified as access to something; thus, the concept of accessibility is used to capture the possibility of access as determined by geographic proximity.” (p. 6)

Slightly more broadly, we may consider “remoteness” to be conceptualized as a general overall measure of the distance / remoteness to a centre providing consumers (i.e. a “market”) for one’s good or services and / or providing services (such as health services, educational services, retail services, etc.). Then, “accessibility” (availability) may be conceptualized as the distance / remoteness to a specific service (e.g., heart surgery, corporate accounting expertise, technical college, furniture store, etc.).

Alasia *et al.* (2017) note (along with many others) the various ways to implement a measure of remoteness / accessibility:

- “as-the-crow-flies” (a straight line from point A to point B, regardless of the quality of the roads, etc.);
- physical distance along existing roads (using a road network file);
- time to travel from point A to point B (which accounts for quality of roads and accounts for time on a ferry, train, airplane, etc. for localities not connected to the road network); and the
- cost of travel (which recognizes the differing cost of toll roads, trains, ferries and air flights to travel a given distance).

They argue that “cost of travel” provides a better continuous index of the degree of remoteness of each given locality. For each geographic unit in Canada, they used a gravity model that calculated the cost of travel to each population centre (of 1,000 or more residents) within a 2 ½ hour time to travel and using the population size of each population centre, they calculated a population-weighted index of remoteness from each locality to a population centre.

Following on the idea that “accessibility” is often used in terms of the accessibility to a given service (e.g. hospitals, retail stores, etc.), they then calculated an index of accessibility to access a selected number of services by weighting the cost of travel by the gross revenue (say, for retail stores) at all destinations within a 2 ½ drive from the given locality. Not surprisingly, each accessibility index was highly correlated, but not perfectly correlated, with the overall remoteness index.

This met their objectives:

- “First, the index was expected to ensure coverage of all Canada at a detailed geographic scale;
- Second, the index was envisioned as a continuous measure, as opposed to categorical measures;
- Third, the focus on the “remoteness and accessibility” concepts used for the index was limited to that of physical proximity, as opposed to other dimensions that are intended to capture economic, social and cultural barriers or distances.” (Alasia *et al.*, 2017, p. 8).

The third point explicitly recognized that non-spatial factors are not included (see footnote #5).

Dijkstra and Poelman (2009) use driving time to a city of 50,000 as an index of remoteness. A region was classified as remote if more than 50% of the people in the region were more than 45 minutes driving time from the centre of a city of 50,000 or more.

The USDA/ERS (Cromartie and Nulph, 2016; Cromartie *et al.*, 2016) has calculated a Frontier and Remoted (FAR) index which they have used to generate four FAR categories of remoteness (Table 1). The calculated index is based on the travel time by road to reach the edge of centres of different sizes. The four FAR groups are assigned based on the combination of driving time and the size of the nearest urban centre.

Table 1

| Frontier and Remote (FAR) categories designated by the USDA / ERS | | | | | |
|--|---|---|---|--|-----------------------|
| Frontier and Remote (FAR) categories | Population of place of residence | Time to travel by road to edge of population centre of: | | | |
| | | 50,000 or more | 25,000 to 49,999 | 10,000 to 24,999 | 2,500 to 9,999 |
| | | which is a proxy for the access to services such as: | | | |
| | | <i>Higher-order services such as advanced medical procedures, major household appliances, regional airport hubs and professional sport franchises</i> | <i>Mid-level services such as clothing stores, car dealerships and movie theatres</i> | <i>Lower-order services such as grocery stores, gas stations and basic health care</i> | |
| FAR 1 | Less than 50,000 | 60 minutes | | | |
| FAR 2 | Less than 25,000 | 60 minutes | 45 minutes | | |
| FAR 3 | Less than 10,000 | 60 minutes | 45 minutes | 30 minutes | |
| FAR 4 | Less than 2,500 | 60 minutes | 45 minutes | 30 minutes | 15 minutes |

Sources: Cromartie, John and David Nulph. (2016) “**Documentation: USDA 2010 Frontier and Remote (FAR) Area Codes.**”

(Washington, D.C.: USDA, ERS) (<https://www.ers.usda.gov/data-products/frontier-and-remote-area-codes/>) and Cromartie, John, David

Nulph and Gary Hart (2016) “**Mapping Frontier and Remote Areas in the U.S.**” (Washington, D.C.: USDA, ERS)

(<https://www.ers.usda.gov/amber-waves/2012/december/data-feature-mapping-frontier-and-remote-areas-in-the-us/>).

The World Bank (2016) adopted the strategy of Roberts *et al.* (2006) in order to assessing the accessibility of the population to road transportation by:

- a) determining the proportion of the rural population that lived with an approximate walking distance of 2 kilometres to a road in “good” condition; and by
- b) determining whether the road as in “good” condition. From an engineering perspective, this would include paved roads in good or fair condition and unpaved roads in good condition.

Their updated methodology moved from the use of data from population surveys (as used by Roberts *et al.* (2006)) to:

- a) using the population grid from the WorldPop product where the location of inhabitants is interpolated to a grid of 100 meters; and
- b) using various road network files (depending upon the country) for
 - a. location; and
 - b. quality of the roads. They acknowledge that the quality of the data on road quality is variable across countries. The IRI (International Roughness Index) is available to assess the quality of paved roads in some countries.

The advantages of this methodology are:

- a) generally, the calculations can be performed for sub-national areas;
- b) the index can be updated as new population data and improved data on road and road conditions become available.

Thus, for analytic and policy development purposes, for each subnational area, one can assess whether the road network needs be extended and / or whether existing poor-quality roads need to be upgraded to allow accessibility of the inhabitants.

Asher *et al.* (2017) present a careful analysis of the cost of distance between rural villages and their district's administrative centre where they hold constant the distance to a population centre (market town or regional service centre) by considering localities on opposite side of a district border but which are equally distant to a population centre. They find that the physical distance between citizens and the district administrative centre means that the citizens who reside further from their district's administrative centre have fewer roads, schools, health centres and less irrigation. Two factors may explain these results – the supply of public goods may be less due the cost of administrative officials to monitor the situation and the demand for public goods may be less because of the cost of local citizens to communicate their needs to distant administrative officials.

In addition to the calculation of the travel cost to a centre (to sell goods or services or to access goods and services), we might now recognize “aspatial peripherality” (or “peripherality” that is independent of spatial location or distance). For example, Copus (2000) discusses aspatial peripherality in terms of weak telecommunications networks, fewer skills in dealing with social media, weak networks among small and medium size businesses, less embeddedness of civil society, ineffective institutional networks and / or poor local<>global linkages.

- **Establishing thresholds for classification into groups**

In order to generate a statistical tabulation of the characteristics of individuals, enterprises, or organizations along the rural<>urban continuum, one needs to select a threshold of density and a threshold of distance-to-density. In addition, some government agencies need rurality thresholds⁷ for targeting government programs.

- **Thresholds for density**

Statistical agencies (almost) always classify their population into rural and urban groups by assigning a threshold for the population size of a settlement (built-up area). One participant at the National Academies (2016) workshop had tried to determine the original justification for the threshold of 2,500 inhabitants for the USA classification of rural versus urban but the available files in the government department did not provide any rationale for the choice. Statistics Canada has used a threshold of 1,000 inhabitants for the rural-urban classification for at least 100 years and it is equally unlikely that the original rationale for this threshold could be uncovered.

For analysts who are able to assign their own thresholds, the choice of a threshold should be influenced by the research question. In some cases, one will wish to understand the regional context within which each smaller locality is embedded or, in other cases, one will want to understand the mix of communities that constitute a given region (Isserman, 2005; Partridge and Rickman, 2006).

- **Thresholds for distance-to-density**

Statistical agencies in a number of countries assign a distance threshold. For example, in the USA, the Rural-Urban Continuum Codes (RUCC) (also known as Beale codes) classify counties non-metro based

⁷ Some government programs adjust the size of the subsidy based on the degree of rurality of the locality. For example, one participant at the National Academies (2016, p. 83) workshop noted that the U.S. Rural Development water program used priority points to allow a region to get extra points if it is far below the population threshold.

on a density criterion. Then, a distance criterion is applied in order to classify non-metro counties into two groups: metro-adjacent and non-adjacent to metro. Specifically, a non-metro county that is metro-adjacent would need physically adjoin a metro county and have at least 25% of its employed labour force commuting to central metro counties (Cromartie, 2016). The Urban Influence Codes (UIC) also assign adjacency based on being physically adjoined to a metro county and having at least 25% of its employed labour force commuting to central metro counties. However, a different group of categories were specified – for example, for each non-metro county that is metro-adjacent, is it adjacent to large metro area, a small metro area or a micropolitan area? More recently, sub-county geographical units have been used to delineate Rural-Urban Commuting Area (RUCA) Codes and the FAR index, discussed above.

The rural and small town definition that is used in Canada (du Plessis *et al.*, 2001) is based on a density criterion of 10,000 inhabitants (in a given census sub-division (CSD) (i.e., incorporated towns and incorporated municipalities) plus a distance criterion based on observed commuting flows (specifically, less than 50% of resident workforce commutes to a CSD of 10,000 or more). These density and distance-to-density thresholds are illustrated schematically in Figure 2.

The regions delineated as predominantly rural regions by the OECD are classified into two groups – predominantly rural regions close to a city and predominantly rural remote regions (see Brezzi *et al.*, 2011).

For analysts who are delineating their own thresholds, the choice of the threshold should be driven by the issues being analyzed.

Figure 2

| The Two Dimensions of the Rurality of Localities (on a scale from 1 to 10): Density and Distance-to-Density | | | | | | | | | | | |
|---|--|---|---|---|---|---|---|---|---|---|---------------------------------------|
| Index of rurality in the DISTANCE dimension (from lower rurality (i.e. shorter distance) to higher rurality (i.e. longer distance)) | Index of rurality in the DENSITY dimension (from lower rurality (i.e. higher density) to higher rurality (i.e. lower density)) | | | | | | | | | | |
| | 0 {low rurality, high density} | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 {high rurality, low density} |
| 0 {low rurality, short distance} | | | | | | | | | | | |
| 1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 {high rurality, long distance} | | | | | | | | | | | |

Rural and small town (outside Census Metropolitan Areas (CMAs) and outside Census Agglomerations (CAs))

These thresholds illustrate (in a notional sense) the operational definition of "Rural and Small Town" areas where the vertical line represents a population "density" of 10,000 or more in the population centre and horizontal line represents a "distance" threshold measured by whether 50% or more of the employed residents commute to the population centre (du Plessis et al., 2001).

• **Implications**

From an analytical point of view, the most important purpose for defining the dimensions of "rurality" is to understand and measure how one's position in geographic space might affect behaviour or outcomes. This means that these behaviours or outcomes should not be included as elements of the definition of rurality, but as potential correlates of rurality or urbanity. Indicators such as the percent of the labour force in agriculture, levels of education, income, attitudes to hunting, or even the feeling or perception of rural identity should remain independent from the theoretical and operational definitions of rurality so that theories and hypotheses regarding the impacts of each dimension of rurality can be empirically tested (Cloke et al., 2006; Halseth et al., 2010; Woods, 2009; Alasia, 2010; Partridge et al., 2007a, 2007b, 2008, 2011).

This separation of rurality dimensions and potential correlates includes the interpretation of "rural" as a social representation or construct (Halfacree, 1993 and his comments in the report by the National Academies (2016, p. 38)). This approach suggests that how people perceive or imagine "rural" geographic space will influence behaviour. "Rural" as a social representation should be considered as a potential hypothesis independent of the spatial aspects of density and distance-to-density, rather than a defining characteristic. By separating the definition of rurality using the dimensions of density and distance-to-density from its social construct characteristics, it becomes possible to explore potential empirical relationships between these two elements rather than confound them within the same definition.

The same approach should be used when rurality dimensions are treated as a proxy for indicating the "needs" for targeting a policy or program. If the target is unemployment, health services, or capacity to

initiate development programs, then a direct assessment of the “need” would seem to be a more efficient approach than using the dimensions of rurality to target a policy or program. A program targeted at need and capacity should use an independent index of need and capacity rather than an index of rurality in order to implement its initiatives.

This approach means that the characteristics of people in any locality do not define their rurality. The effort to define “rurality” is not an effort to generate a socio-economic classification but to ascertain whether or not their location in geographic space has an independent influence on their behaviour or outcomes.

The thresholds adopted for “place” and “distance” inadvertently (and unfortunately) give preference to certain objectives, infrastructure, and institutions over others. The choice of any given threshold will tend to provide the impression that every locality in the group is the same. They are certainly the “same” with respect to the classification variable but they would be expected to be (and empirically are) very different in many other respects. This will (or will appear to) diminish important diversity of social, institutional, and political factors within the delineated spatial grouping.

Perhaps obviously, the schematic in Figure 1 represents the situation at a given point of time. Over time, there are changes in both the advantages and the disadvantages associated with both density and distance-to-density. There may be a change in the population size of the locality or a nearby urban centre. There may be changes⁸ in technology (e.g., the Internet) that reduces the costs of some transactions across space. Notably, the price⁹ of distance has been declining over time (Bollman and Prud’homme, 2006). In addition, Lichter and Brown (2011) speak of “changing spatial boundaries” and Lichter and Ziliak (2017) speak of “new patterns of spatial interdependence”.

In summary, the conceptual definition for the rurality of localities is density and distance-to-density. Operational decisions regarding the way to measure density and distance-to-density should be specified on the basis of the objectives of the specific issue being considered.

Finally, the analyst should take care to ensure that the behaviour or outcomes of individuals, enterprises, or institutions are clearly defined (theoretically and operationally) in a way which keeps them separate from the theoretical and operational definitions of rurality. Only in this way can analysts learn from the empirical analysis instead of suffering the tautological error of finding that the relationships are true by how they are defined.

- **Discussion**

Early analysis of rural qualities and places occurred as a contrast to urban ones. Analysts used the distinction to describe a wide range of contrasting characteristics: economic, productive, social, and political (Engels & Marx, 2005; Simmel, 1950; Weber, 1966). These analyses rarely included empirical studies of specific places, so the challenges of operationalization seldom emerged.

It was only in the latter part of the 20th Century, that a simple contrast of rural and urban regions and the strong identification of agricultural production with rural places faced challenges on empirical and

⁸ “. . . from a dynamic perspective, remoteness is literally endogenous . . . If hope springs eternal for some remote rural communities, it must spring from the endogeneity of remoteness.” (Irwin *et al*, 2008, p. 91).

⁹ One might think of the “price” of distance as the component of the price of a loaf of bread or an automobile, etc. that is attributable to the component of the retail price that is typically called the expenditure for “freight”. For transporting services (such as an accountant providing accountancy services to a business in another locality), technology has changed the “delivery price” from the money and time expenditure to transport a paper copy of the documents to the Internet expenditure to transport an electronic copy of the business accounts.

analytical grounds. The reframing of agricultural organization and community characteristics (e.g., Goldschmidt, 1947) and the proliferation of detailed case studies in the North American context (e.g., Hughes, 1963) raised concerns, both conceptual and operational, about the simple contrast between urban and rural places. One of the strongest challenges emerged as international comparisons were made in the search for common indicators of rural and urban places. Driven by the desire for international comparisons, analysts were faced with many different meanings and indicators of “rural” in places as diverse as Greece, Norway, Germany, the USA, or Canada (Eurostat, 2015; OECD, 1994). This was reinforced by debates among researchers regarding the explanatory significance of spatial conditions themselves in the face of diverse social, cultural, and power dynamics within rural regions (Alasia, 2010; Cloke, 2006; Halfacree, 1993; Halseth *et al.*, 2010; Partridge *et al.*, 2007a, 2008; Partridge, 2017; Woods, 2009).

As a result of these debates and analyses we are now in a much better position to address both the theoretical and operational challenges of understanding rural issues. Analysts now pay more attention to the way in which they define “rural” and “rurality” – often with a distinction between their definition and the characteristics associated with it. At the same time, we have a plethora of empirical studies which examine those characteristics – using a variety of rural classifications.

For example, from 1998 to 2012, Statistics Canada published a series of “Rural and Small Town Canada Analysis Bulletins”¹⁰ that provided a profile of the rural and urban population in Canada. As in other countries, rural residents tended to be older on average, have fewer years of formal education, and have higher unemployment rates due to the intensity of seasonal industries. The OECD rural policy reviews between 2007 and 2014 provide additional examples of both theoretical discussions and empirical analysis of predominantly rural regions. Most recently, Del Real and Clement (2017) reported on a rural survey (The Washington Post and the Kaiser Family Foundation, 2017) that showed the usual socio-economic differences between individuals classified as “rural” versus those classified as “urban” based on a set of thresholds of density and distance-to-density.

The interpretation of these studies still requires careful attention to the dimensions of rurality that have been used. For example, is the unit of analysis appropriate for the issues of concern? Are the measures of density and distance-to-density independent from the characteristics considered? Fortunately, authors of both theoretical and empirical studies are now more likely to make their concepts and procedures more explicit.

Implications for rural policy

Although there may be policies which are directed specifically at or to rural places or actors, few, if any, of them have outcomes which are exclusive to those places or actors. At most, they differentiate “narrow” rural policies (those which are targeted specifically to rural localities, actors, or issues) from “broad” policies (those which might have an impact on such localities, actors, or issues, but are not specifically targeted to them (OECD, 2008).

- **Rural policy analysis is the application of a rural lens (also known as rural proofing) to policy proposals**

Rural policy analysis is a consideration of the density and distance-to-density implications of (almost) every policy proposal. Each policy of a government, enterprise, or institution would be considered for their potential outcomes, benefits, and/or costs along the continuums of the rurality dimensions.

¹⁰ Available at <http://www5.statcan.gc.ca/olc-cel/olc.action?objId=21-006-X&objType=2&lang=en&limit=0>.

Typically, a rural policy analyst would ask if the objectives of the policy proposal could be enhanced or made more effective by adjusting the policy or its implementation for citizens, businesses, or institutions in various combinations of low(er) density and high(er) distance-to-density locations. These considerations have been constituted as rural proofing or as a rural lens in a number of jurisdictions. For a number of years, this was one task of the former federal Rural Secretariat in Canada (Clemenson, 1994; Agriculture Canada, 2001; OECD, 2001, 2006a (p. 112), 2010; Hall and Gibson, 2016). Other examples include the initiatives of the U.K. Department of the Environment, Food and Rural Affairs (2013), the Rural Ontario Municipal Association (2015a, 2015b), Huron County (2014a, 2014b) in Ontario, Canada and the European Network on Rural Development (2017).

Although (virtually) all public policies are “rural-related” (i.e. have density and distance-to-density implications), many policies are only indirectly related to the geographical characteristics of rurality (Halseth *et al.*, 2010; Young, 2006). Even agricultural policy, for example, is not solely a rural policy issue (Bollman, 2006b) due to urban-based and metro-adjacent farming. Similarly, policies explicitly formulated as “rural policy”—like “Québec’s Politique nationale de la ruralité”—create important issues of an urban nature such as the allocation of financial resources for urban concerns. Broad policies such as those of finance, economic development, labour, health, education, transportation, and social welfare require specific consideration of their implications for different density and distance-to-density conditions.

Rural development policy is an explicit consideration of density and distance-to-density implications in the design and implementation of (community, social, or economic) development policy. In other words, the application of a rural lens or rural proofing would constitute the “rural” in any development policy.

There has been a long history of development policies and programs targeted to rural areas. The discussion of rural development emerged from a focus on regional or sub-national economic development which started in the mid-1900s in Canada and in other OECD countries. This approach has undergone important changes (Harriss, 1982). The OECD has represented these changes in three major paradigms: the Old Rural Paradigm, the New Rural Paradigm (2006a, 2006b) and now as Rural Policy 3.0 (OECD, 2017a, 2017b) (Table 2).

Table 2

| Changing paradigms of rural development policy since the mid-1900s | | | |
|---|---|---|--|
| | Old Paradigm | New Rural Paradigm - 2006 | Rural Policy 3.0 –Implementing the New Rural Paradigm |
| Objectives | Equalisation | Competitiveness | Well-being considering multiple dimensions of: i) the economy; ii) society; and iii) the environment |
| Policy focus | Support for a single dominant resource sector | Support for multiple sectors based on their competitiveness | Low-density economies differentiated by type of rural area |
| Key actors & stakeholders | Farm organisations and national governments | All levels of government and all relevant departments plus local stakeholders | Involvement of: i) public sector – multi-level governance; ii) private sector – for-profit firms and social enterprise; and iii) third sector – non-governmental organisations and civil society |
| Policy approach | Uniformly applied top down policy | Bottom-up policy, local strategies | Integrated approach with multiple policy domains |
| Rural definition | Not urban | Rural as a variety of distinct types of place | Three types of rural: i) within a functional urban area; ii) close to a functional urban area; and iii) far from a functional urban area |

Source: OECD (2017a, 2017b).

The old traditional paradigm focused on sectors (e.g. agriculture, forestry, mining, energy) as strategic for rural development. Central governments focused on increasing the efficiency of primary production,

including the building of a transportation infrastructure for trade. Rural communities competed for large firms in their search for solutions to community decline—without realizing that success often meant on-going decline since increasing efficiency meant that fewer workers were required to produce more¹¹. The subsidies provided by communities to firms meant that the communities had fewer remaining funds for other community development initiatives and the centres of control became more distant from community-level influence.

In 2006, the OECD published *The New Rural Paradigm* that challenged this old view and proposed an approach which was more bottom-up, multi-sectoral, and focused on investments rather than a strategy of subsidies (OECD, 2006a, 2006b). Through a series of extensive national and comparative studies, this new approach was illustrated and documented in a valuable array of both qualitative and quantitative analyses of rural development and the policies that contribute or inhibit it (See the OECD Rural Policy Reviews for Mexico (2007), Finland (2008), Scotland (2008), Netherlands (2008), Italy (2009), Germany (2009), China (2009), Spain (2009), Quebec (2010), England (2011), and Chile (2014)).

The work of the OECD has continued over the last 10 years and contributed to several critiques and refinements of the *New Rural Paradigm* which provide more details regarding the economic and social mechanisms supporting effective policies. These proposals are identified as “*Rural Policy 3.0*” in Table 2. Key elements include the reaffirmation of multi-sector collaboration among the public, private, and third sectors for strong rural policy, the explicit identification of the economy, society, and the environment as multiple objectives for the policy, and the role of distance-to-density by recognizing “functional urban areas” as a point of reference for rural localities.

As with any policy discussion, the focus of attention will depend on the issues being considered. For example, if economic development is the focus, Partridge and Olfert (2011) argue that one should not talk about rural development—rather the focus should be on regional development (i.e. the development options for a functional economic area) . In this case, the options and the expected outcomes will differ based the degree of rurality (i.e. density and distance-to-density) of the functional economic area (Stabler and Rounds (1997), Stabler and Olfert (2002), Munro *et al.* (2011), Ashton *et al.* (2013)).

Implications for rural indicators

Statistical tables often present a profile of data for observations classified as “rural” using given thresholds for density and for distance-to-density.

First, to emphasize, these thresholds do not define rural. Density and distance-to-density define rurality. The thresholds simply classify individuals into groups along the continuum of the dimensions of density and distance-to-density.

Thus, any given set of thresholds will generate a portrait of the average statistics for observations in the group – and the characteristics revealed in the tabulated data would be different for each alternative set of thresholds for density and distance-to-density.

One would expect it to be reasonable to want to tabulate every socio-economic indicator for the population classified as ‘rural’ and for the population classified as ‘urban’ (Col. 1 and Col. 2 in Table 3). This may be considered as indicators of the status of the urban population and the rural population.

¹¹ Schultz (1972) has noted the pervasiveness of the “increasing value of human time”. This has driven the substitution of machines for workers meaning more output can be produced with fewer workers.

Given a set of statistics for a group of observations classified as “rural” (Col. 2), the next (and arguably most important) step would be to apply a “rural lens” to the tabulated data in order to query:

- What is the role played by low(er) density in the observed data?
- What is the role played by long(er) distance-to-density in the data?

and then to query whether there is an opportunity for policy to improve the well-being of “rural” actors.

For example, statistical tabulations typically show that the population in a rural area has a lower level of educational attainment. What is the role of the selected grid (selected boundaries) and the density and distance-to-density in this finding? Are the designated geographical units so large that they are insensitive to pockets of higher education within the region – or so small that they overlook the role of broader regional collaboration? Did low(er) density or long(er) distance-to-density mean that people with higher levels of educational attainment moved away to find jobs (or those who left for education were not able to return due to the lack of jobs)? Did low(er) density or long(er) distance-to-density mean that the availability and quality of the schools or colleges in the locality caused a lower level of educational attainment? Was the lower level of educational attainment observed because many retired people (with lower than average levels of education) have chosen to move to the locality after their retirement? These questions will help to determine the role of rurality in understanding the reasons for the observed data of lower levels of educational attainment in rural areas (Col. 3 in Table 3).

Table 3

| Socio-economic indicators for the rural population (Col. 2) versus 'rural' indicators (Col. 3) | | | |
|---|-----------------------------|---------------|---|
| Example of socio-economic indicator | Geographical classification | | Possible 'rural' indicator (i.e. what is the role of the rurality dimensions in the results reported in Col. 2 ?) (i.e. what is 'rural' about educational attainment ?) |
| | Urban | Rural | |
| | Col. 1 | Col. 2 | |
| Highest level of educational attainment | (insert data) | (insert data) | |
| ... Possible 'rural' indicator | | | Col. 3 |
| ... Were schooling opportunities constrained by the small population size in the locality? | >>>>>>>>>>>>>>>>> | | (insert data) |
| ... Was schooling curtailed by the distance to schooling opportunities? | >>>>>>>>>>>>>>>>> | | (insert data) |
| ... Does a low level of schooling appear in the data because everyone with a higher level of schooling has left the locality due to the lack of local (rural) jobs? | >>>>>>>>>>>>>>>>> | | (insert data) |

Summary

Rurality is a spatial concept. As noted by Shucksmith and Brown (2016b) “people still solve the challenges of everyday life in geographically bounded communities.” (p. 664)

Density and distance-to-density are the spatial dimensions of localities that define the rurality of the inhabitants. All other factors that may be associated with rurality are characteristics that are found within specific locations. They are characteristics of rural people, enterprises, or institutions. However, it is the density and distance-to-density dimensions that define rurality.

These concepts are not changing. However, the prices, costs, advantages, and disadvantages of each of the two rurality dimensions changes over time. Thus, for example, the measure of distance-to-density may be physical distance (e.g. kilometres) or the price of distance (e.g. dollars to move a person, good, or service over a given number of kilometres). These measures change over time due to the growth or decline of population centres, changes in prices, changes in technologies, changes in infrastructure, etc. For the discussion of some issues, such as rural youth who move to the city to pursue further education, there are social, psychological, cultural, or familial advantages and disadvantages of making this move. Distance remains “a powerful shaper of human interaction, influence, and exchange” (Young, 2006, p. 262) but the dynamics of this influence are complex as the meaning (or “price”) of distance itself is different for different issues being discussed and for the changes over time for any given issue being discussed.

Rural policy analysis “is” the attention to the implications of density and distance-to-density for (almost) every policy proposal. In the specific case of development policy, the “rural” aspect of a development policy is the explicit consideration of density and distance-to-density in the design and the implementation of the policy. This approach implies that a rural lens or rural proofing needs to be applied to each development policy proposal.

The categorization of people, enterprises, or organizations into spatial geographic groups labelled “rural” does not define rurality. Density and distance-to-density define rurality. The classification of observations into spatial groups should consider two factors. First, the nature of the issue (e.g. day-care versus regional economic development) will determine the geographic grid (e.g. neighbourhood versus functional economic area) that is chosen to make the classification. Second, the nature of the issue will also drive the consideration of the appropriate level of the thresholds of density and distance-to-density when implementing the classification.

We conclude with the closing remark at the National Academies (2016) workshop regarding the desirability to determine “the extent to which place, size of population and distance constrain and permit economic activity, access to services, resilience to problems and so on.” (p. 127)

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