Understanding Community Conditions to Improve Place-Based Rural Development Policies and Programs

By

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Executive Summary

Introduction

The rural development paradigm has evolved towards approaches that support locally developed strategies in recognition that rural communities are diverse (OECD, 2016b, p. 182, 2016a, p. 22). With this shift, the ability to accurately assess community conditions becomes ever more relevant for the administration of effective and equitable policies and programs, as governments support communities to make the most of their assets and opportunities.

The Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD) is the lead provincial agency responsible for land and resource management in B.C. As part of its mandate, the Ministry works to strengthen and diversify the economies of rural and Indigenous communities (Ministry of Forests Lands Natural Resource Operations and Rural Development, 2020). Within it, the Rural Policy and Programs Branch (RPP) is responsible for rural policies and programs that support economic diversification and that promote resilience in rural communities across the province. This work benefits from a deep understanding of rural communities' conditions including social, economic, geographical and environmental factors to help design policies and programs that target the main barriers to development in rural communities. It further requires the ability to communicate rural communities' conditions in a manner that is clear and accessible in order to support policy decisions that are beneficial to communities.

In 2016, RPP developed a composite indicator (CI) to rank communities based on their level of need for provincial support, which was named the Community Need Index (CNI). The CNI allowed RPP to boost application scores for communities with lower socio-economic development outcomes. Despite being a useful tool to help communities with lower economic capacity to access rural development funds, RPP recognized that the CNI could be improved to be more flexible and that it could account for factors beyond socioeconomic conditions such as geographical location, access to services, and environmental conditions in order to provide a more accurate understanding of community conditions. Due to these issues, in 2020 RPP set out to update the CNI. The updated tool was rebranded the Community Assessment Tool (CAT). The CAT represented a significant improvement in comparison to the CNI, increasing the number of indicators from 12 to 20, turning a static list into an interactive tool, and allowing users to see results for each indicator separately. Nonetheless, despite the clear improvements, the CAT still has significant gaps and methodological issues.

These perceived issues led to the commissioning of this project. The purpose of this project is to answer the following research question:

- How can RPP use georeferenced or community-level data to improve their understanding and ability to communicate rural community conditions in order to support better place-based policies and programs?

Supporting this overarching question are the following secondary questions:

- What variables are key to understanding rural communities' conditions and their ability to develop diverse and resilient economies?
- What relevant georeferenced or community-level data and indicators are available to support place-based rural development policies in B.C.?
- How have jurisdictions in Canada and elsewhere successfully developed tools to assess and communicate rural community conditions, and how could these be adapted to B.C.?

Methodology and Methods

The project employs a qualitative methodology rooted in a smart practices approach to investigate how RPP can use georeferenced and community-level data to support better place-based rural development policies and programs. The smart practices were gathered through a literature review and a jurisdictional scan.

The literature review investigated how the concepts of rural, rural development, rural development policy and place-based policy have been defined, as well as how these concepts have evolved and influenced policies through time. Then, it is applied to explore themes such as rural and community development indicators, sustainability indicators, community resilience and resilience indicators, place-based indicators. The literature review served the purpose of investigating smart practices in CI construction, while also being applied to collect initial information on available sources of georeferenced and community-level data and indicators in B.C. The project then sought additional information on community-level data sets from statistical agencies such as Statistics Canada and BC Stats, federal and provincial ministries and agencies, First Nations organizations, among others. The review considered organizations' websites and official documents. Information on available data sources is presented in a descriptive table that outlines key details of each data source, such as type of data, collection frequency, unit of analysis, etc.

The jurisdictional scan is used to assess how georeferenced and community-level data have been used to support place-based rural policies and programs across Canada and abroad. The scan focused primarily on initiatives developed in Canada at the federal and provincial levels but also considers international jurisdictions when experiences are believed to be relevant for RPP and their goals. It employed a qualitative document analysis that encompassed primary and secondary sources to gather information on each jurisdiction's initiatives. Documents such as government websites and reports, as well as peer-reviewed research on the initiatives, were reviewed.

Key Findings

The review of smart practices in CI construction demonstrated that the development of a sound theoretical framework is the building block of a quality CI. The theoretical framework defines the phenomenon being measured, identifies its dimensions and determines the types of indicators to be included. It is the theoretical framework that brings consistency and credibility to the variable selection process, as it provides a set of criteria to determine what variables should be included and how they should be organized. From there, the project presents smart practices on each of the choices required in the CI construction process, including the normalization, weighting and

aggregation processes. The review showed the complexity of this process and created a toolkit that RPP and future consultants can refer to when further updating the CAT or developing a new CI.

Next, the project sought to understand if and how CIs have been used to understand and communicate rural community conditions in jurisdictions across Canada and elsewhere. This jurisdictional scan found that CIs have been extensively used in a variety of forms and for different purposes. The review was organized around four lenses through which rural community conditions may be understood: rural development, local economic development (LED), community resilience and community well-being. These concepts present significant overlap and are not mutually exclusive but are different ways of interpreting local conditions. The scan found that measuring initiatives are extremely diverse. The variation exemplifies how there is no one way to measure community conditions. Even when the conceptual lens and the purpose are similar, CIs were found to be widely different in their choice of variables and construction methodology.

From a methodological standpoint, the most contentious choices in CI construction relate to weight selection and indicator aggregation. Regarding weight selection, initiatives tended to either use an equal weights approach or apply statistical methods to determine weights endogenously. Given that weights can drastically affect results and that priorities may vary significantly across communities, choosing a weighting scheme remains a complex choice that incurs significant trade-offs. Concerning the aggregation process, most of the reviewed initiatives used linear aggregation processes (i.e. weighted average) to turn the many indicator values into a single composite indicator score. The option for a linear aggregation process is probably due to its relative simplicity to calculate and communicate.

The jurisdictional scan also demonstrated that data availability is as important as the theoretical framework in determining variable selection. In an ideal world, a CI constructor would determine a theoretical framework and select the best variables to measure the phenomenon of interest. In reality, this choice is constrained by the availability of data at the community scale. This constraint is even more relevant when considering rural, small and First Nations communities. Therefore, the theoretical framework may work as an initial filter to determine what variables should be considered, but the final choice is dependent on data availability.

Following the jurisdictional scan, the project compiled an extensive set of community-level data sets and variables available in B.C. The research used the five capitals framework, which encompasses economic, human, social, environmental and cultural capitals, to help organize the variables. The review found 70 variables that may contribute to assessing community conditions distributed over more than 40 data sets from sources such as Statistics Canada, the Canada Revenue Agency, BC Stats, and various provincial ministries and agencies. Due to data quality and credibility concerns, the review kept a focus on government-produced, publicly available sources. Further research may want to investigate internal to government data sets that may be useful.

Despite finding a large set of relevant community-level variables, the review confirmed important data gaps for rural and First Nations communities that are mentioned in the literature. Many of the data sets only include incorporated municipalities, which excludes small unincorporated communities and First Nations reserves. The lack of data for these communities poses important challenges to the creation of a CI that accurately and comprehensively compares and ranks rural

communities in the province, as many communities may have to be excluded from the analysis. Another key issue refers to data timeliness. The various data sets listed in Section 5 follow different update timelines, which range from weekly updates to every 5 years, with some data sets having no set update frequency. This issue may lead the CI to compare communities based on outdated information, possibly leading to incorrect characterizations of local realities and misguided policy decisions. Despite these limitations, the information provided in this report will allow RPP to develop a more robust CI that helps improve their understanding and ability to communicate rural community conditions.

Recommendations

The recommendations presented in this project aim to improve how RPP understands and communicates community conditions to support place-based policies and programs. These recommendations have two main goals: i) improving RPP's ability to *assess* community conditions in rural B.C. and ii) raising RPP's ability to *communicate* community conditions. Recommendations are divided into these categories.

Assessing Community Conditions

The recommendations presented below aim to contribute to RPP's ability to assess and rank rural communities in B.C. based on their local conditions.

1. **Develop and communicate a clear theoretical framework for the CI -** RPP's existing CI does not have a clearly defined and documented theoretical framework, leading to questions regarding the structure of the tool, the choice of variables, how they are grouped, and the weights assigned to each of them. It is recommended that RPP create a document that describes the purpose and objectives of the tool, presents a theoretical lens that clearly defines the phenomenon being measured, and lists the criteria for variable inclusion and exclusion to help increase the quality and credibility of the tool.
2. **Use the variables and data sets presented in Section 5 as a starting point and add or remove variables as necessary -** The compilation presented in section 5 provides a good overview of the data available to measure community conditions in rural B.C. It is recommended that RPP use this list to select variables to include in the CI based on its theoretical framework.
3. **Consider data timeliness and coverage when selecting variables -** Where possible, RPP should use data that is updated frequently and covers the largest set of communities.
4. **Use the best practices for CI construction outlined in Section 3 to review and update the existing CI -** The steps outlined in Section 3 are a set of best practices in CI construction. RPP should consider following those steps to review the CAT and its construction process against best practices to determine where it requires revision and updating. Due to a lack of in-house expertise, RPP should consider contracting a statistics consultant to perform these tests.
5. **Improve the First Nations rural community CI -** RPP's existing CI for First Nation communities relies on a narrow set of variables due to data availability issues. Although data availability issues are significant, RPP should consider the variables presented in Section 5 to develop a deeper First Nations community CI.

6. **Consider restructuring the CAT around the 5 capitals framework -** The current CAT structure considers only two dimensions, namely: economic conditions, and social and infrastructure conditions. RPP is likely to benefit from a framework that allows for the consideration of a broader set of variables that influence economic performance and quality of life in rural communities.

COMMUNICATING COMMUNITY CONDITIONS

The recommendations provided below seek to ensure that the information presented through the CI is clear and contribute to improved government decision-making.

7. **Use the CI to bring attention to important issues -** CIs are great for bringing attention to specific issues or to start a discussion because they present simple and easily interpretable results. RPP should use the CI in discussions with other units, ministries and communities to help bring attention to rural specific challenges and opportunities.
8. **Avoid making decisions based solely on CI results -** Invariably, condensing a set of partial indicators into a single score results in loss of information. Thus, it is important to understand that CIs are an oversimplification of reality and should not be used in isolation to guide policy decisions. As such, RPP should always consider CI results along with disaggregated data, and expert and local knowledge.
9. **Recognize and communicate the limitations of the CI -** When using CI results, RPP should be upfront about the methodological choices and limitations of the tool. Being clear on what the tool can and cannot do will help avoid its use for unsuitable purposes.
10. **Work with other ministries to increase awareness of rural community conditions -** RPP should use the CI to help other units and ministries develop a better understanding of rural realities. Increased knowledge is an important first step in ensuring that policies account for rural issues. RPP could provide other ministries with rural data and knowledge or even allow access to the tool so ministries can develop their own analyses.
11. **Consider creating a public-facing version of the CI -** RPP should consider developing a public-facing CI to support rural communities' development efforts and increase transparency in rural policymaking and funding decisions. Access to structured data may help communities understand their challenges, opportunities and how they compare with other communities across the province.

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1.0 Introduction

1.1 Defining the Problem

In the early 1980s, a deep economic recession marked the beginning of a new era for rural communities in British Columbia (B.C.). Rural communities that relied on natural resource exploitation had to restructure to adapt to an increasingly globalized economy. Competition from low-cost global competitors, changes in consumer demand and the lumber trade dispute with the United States, associated with rural policy changes at the provincial and federal levels impacted rural areas of the province (Markey et al., 2008a, p. 414). Natural resource industry closures and layoffs caused many rural communities in the province to start shrinking for the first time in decades (Halseth, 2009, p. 255). During this period, governments in Canada and abroad started to move away from the top-down rural policies that characterized the 1950s and 1960s towards more bottom-up approaches that focused on attracting small and medium-sized firms (OECD, 2016, p. 86). More generally, however, the B.C. government policy response was of withdrawal in social and economic terms, which resulted in a decrease in service provision across rural areas and a diminished role in supporting regional development programs (Markey et al., 2008a, p. 415).

Almost 40 years later, rural restructuring is still a reality, with many communities being affected by closures and curtailments in the forestry sector. As structural conditions, such as climate change and globalization, contribute to this continued restructuring process, communities will need support from the provincial government to develop more diverse and resilient economies. Nonetheless, a return to top-down, undifferentiated rural development policies is unlikely to work due to the increasing complexity and diversity of rural communities. As a result, higher levels of government have increasingly accepted the need for policy approaches that recognize that rural communities are diverse and support locally developed strategies (OECD, 2016a, p. 86). With this shift, the ability to accurately assess community conditions becomes more relevant to administering effective and equitable policies and programs, as governments take a supportive role to help communities to overcome barriers to development and take advantage of competitive advantages.

Understanding local conditions is a complex task, as communities face a variety of challenges and opportunities that affect their ability to develop and prosper. The multidimensional nature of development processes ensures that no one indicator is capable of accurately describing local realities. As such, multiple indicators are required. This, however, creates new issues related to the capacity to prioritize and interpret a larger set of indicators. What variables are most important? What is the relative importance of each variable in determining community outcomes? How should communities be compared on the basis of a chosen set of variables? These are complex questions that are made even more difficult by data restrictions, since not all factors that influence the development process are directly measurable or collected at the community-level. There are also time lags in local data availability. The importance and complexity involved in assessing conditions in B.C.'s rural communities are what motivates this project.

1.2 Project Client

The Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD) is the lead provincial agency responsible for land and resource management in B.C. As part of its mandate, the Ministry works to strengthen and diversify the economies of rural and Indigenous communities (Ministry of Forests Lands Natural Resource Operations and Rural Development, 2020).

The Rural Policy and Programs Branch (RPP) is the area of FLNRORD responsible for developing rural development policies and administering rural programs, such as the Rural Dividend Program (RDP), the Community Support Grants (CSG) and the Forest Employment Program (FEP). Further, RPP is the lead on several inter-agency initiatives that aim to support rural communities, especially those affected by forest mill closures and curtailments. To administer programs and develop rural development policies that support economic diversification and resilience in rural communities across the province, RPP requires a deep understanding of rural communities' conditions that considers social, economic, geographical and environmental factors. Further, it needs the ability to communicate rural communities' conditions in a manner that is clear and accessible to support policy decisions that are beneficial to communities.

RPP is the client for the project and is represented by its program manager, Matthew Scott-Moncrieff.

1.3 Project Objectives and Research Questions

This project sought to determine how the Rural Policy and Program's Branch (RPP) could use community-level data to understand and communicate rural community conditions to improve place-based policies and programs. The project reviewed the literature to understand the conceptualization of rural, rural development and place-based policies; investigated tools that are available for understanding and communicating local conditions, with a specific focus on composite indicators (CI); reviewed how jurisdictions in Canada and elsewhere have developed tools to assess and communicate rural community conditions and determined how these experiences may help RPP; and investigated what relevant georeferenced or community-level data and indicators are available to support place-based rural development policies in B.C.

The objective of this project is to contribute to RPP's ability to assess, rank and communicate rural communities' conditions to support decisions that lead to better rural development outcomes. To achieve this objective, the project reviews the literature to understand the conceptualization of rural, rural development and place-based policies; investigates tools that are available for understanding and communicating local conditions, with a specific focus on composite indicators (CI); reviews how jurisdictions in Canada and elsewhere have developed tools to assess and communicate rural community conditions and determined how these experiences may help RPP; and assesses what relevant georeferenced or community-level data and indicators are available to support place-based rural development policies in B.C.

Through these tasks, the project seeks to answer the following primary question:

- How can RPP use georeferenced or community-level data to improve their understanding and ability in order to communicate rural community conditions to support better place-based policies and programs?

Supporting this overarching question, the project will answer these secondary questions:

- What variables are key to understanding rural communities' conditions and their ability to develop diverse and resilient economies?
- What relevant georeferenced or community-level data and indicators are available to support place-based rural development policies in B.C.?
- How have jurisdictions in Canada and elsewhere successfully developed tools to assess and communicate rural community conditions, and how could these be adapted to B.C.?

The deliverables of the project include a list of smart practices for building a CI, a jurisdictional scan of tools to measure and communicate rural conditions through different lenses, a list of available data sets that can be used to measure local conditions and a list of practical recommendations on how to better use community-level data to assess and communicate community conditions and improve place-based rural development policies and programs in B.C.

1.4 Background

In 2015, the Rural Dividend Program was created to support rural communities in B.C. to diversify their economies beyond natural resources, as well as recognize their importance to the overall provincial economy. The RDP offers $25 million a year in grants to assist Indigenous and non-Indigenous rural communities with a population of up to 25,000. The program was built upon the principles of community economic development to help strengthen and provide stability to rural communities (Ministry of Forests Lands Natural Resource Operations and Rural Development, 2019, p. 2). As such, communities develop their projects based on their needs and priorities, and submit them to the program for funding. This allows communities the freedom to determine what opportunities they want to pursue. However, it also creates the risk that communities with lower capacity to develop quality applications do not receive support, as applications are ranked in a competitive process.

In 2016, RPP hired a consultant to develop a Community Need Index (CNI) to rank communities based on their level of need. Thus, allowing the branch to boost application scores for the communities considered to need the most support from the government. The CNI was built using data from Statistics Canada, Canada Revenue Agency, BC Stats and other B.C. ministries. It relied on two components to assess community need: vulnerability and recent performance. While vulnerability related to the structure of the local economy, such as the level of diversification and the history of population growth, recent performance included recent changes to economic, social and local government financial indicators. Despite being a useful tool to help communities with lower economic capacity access RDP funds, RPP recognized that the CNI could be improved to be more flexible and account for factors outside socioeconomic conditions such as geographical location, access to services, and environmental conditions to provide a more accurate understanding of community conditions.

Due to these issues, in 2020 RPP issued a contract to update the CNI. The goal of the contract was to improve the CNI by revising and adding new indicators, revising the index structure and, most importantly, turning a static list into a dynamic tool that would allow RPP to adjust the set of variables and weights used to rank communities, as well as see the disaggregated indicators. Making the CNI a dynamic tool was of critical importance, as it allows RPP to apply it to different programs and policy issues. The updated CNI was concluded on March 31, 2020, and rebranded as the Community

Assessment Tool (CAT). The new tool represented a significant improvement in comparison to the CNI, increasing the number of indicators from 12 to 20 and allowing users to see results for each indicator separately. Additionally, instead of the components of vulnerability and recent performance, the CAT has a structure based on economic and social conditions, as shown in Figure 1.

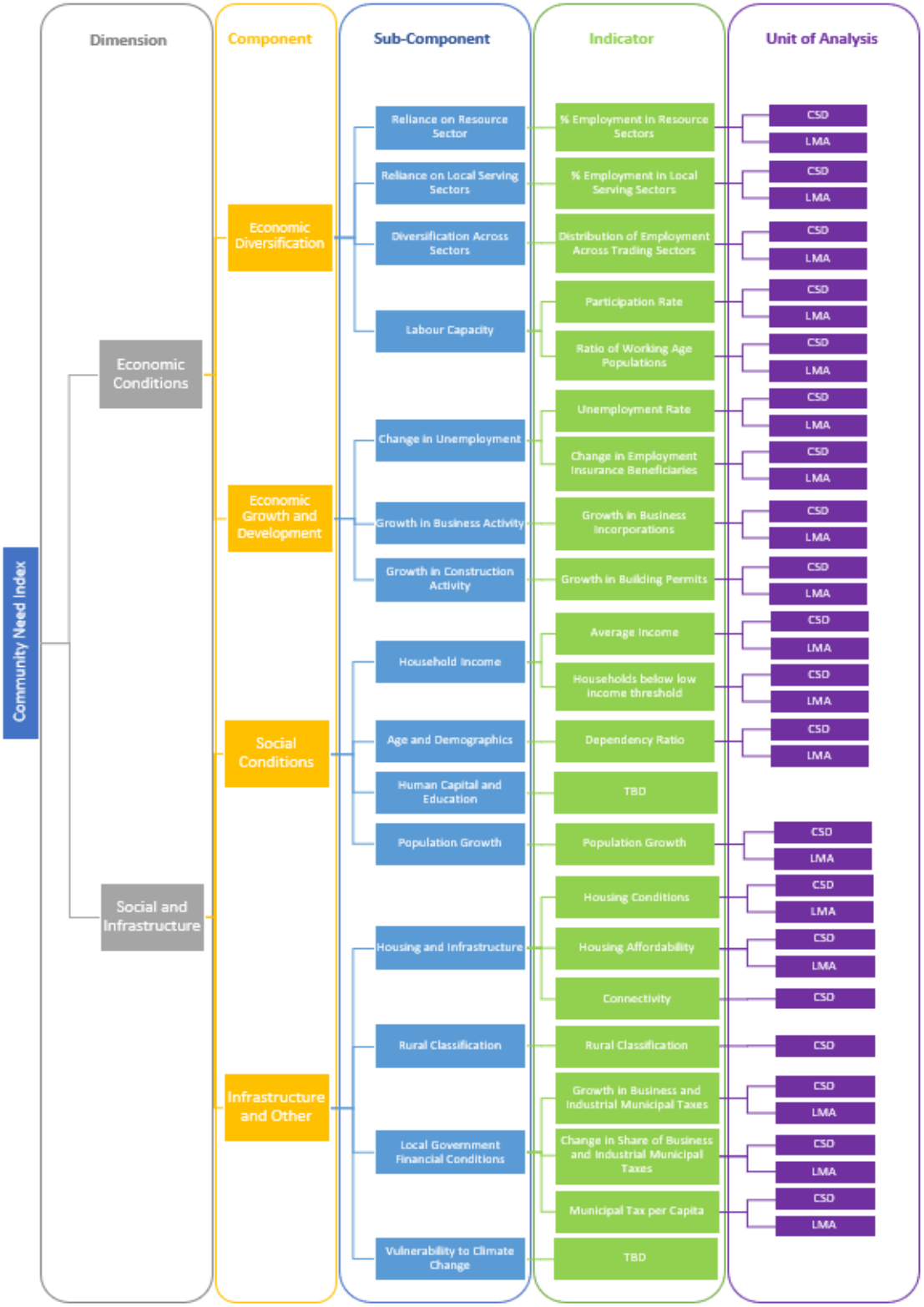
A unique feature of the CNI that has been kept in the CAT is the use of Local Market Areas (LMA) to measure community indicators. LMAs were created for the CNI using commuting data to define areas where communities shared and benefited from a common market. As such, the scores for most indicators in both the CNI and the CAT are a weighted average of the community and the LMA score. The rationale for this feature is that economic activity frequently crosses local political boundaries and the residents and businesses in one community have access to employment and business relationships in neighbouring communities.

Despite the clear improvements, the CAT still has significant gaps and methodological issues related to areas such as the indicator selection process, the structure of the tool, the treatment of missing data and the determination of weights. Furthermore, one of the most significant limitations of the tool is that it does not encompass First Nations communities, which are included in a separate, simplified ranking. The decision to not include First Nations communities resulted from data availability gaps, which made it impossible to reasonably compare First Nations and non-First Nations communities based on the set of indicators included in the CAT. Instead, First Nations communities are ranked based on three indicators: population size, remoteness and treaty stage. The assumption is that larger, urban First Nations with a signed treaty would have better local conditions than small, remote nations with no treaty. Aside from relying on this strong assumption, a key limitation of this approach is the inability to compare First Nations and non-First Nations communities.

These perceived issues led to the commissioning of this project. As a more accurate assessment of community conditions will help RPP improve the quality of its rural policies and programs, and may also help other areas of the provincial government better understand rural communities and their challenges.

Figure 1

Community Assessment Tool Framework



1.5 Organization of Report

The body of this report is comprised of five sections. Section 2 provides an overview of the literature. It presents the concepts of rural and rurality; rural development; rural development policy; and place-based policy. This section helps provide an understanding of how rural has been conceptualized and how that has affected rural development policies over time. The purpose of the section is to demonstrate how rural policy has evolved towards place-based approaches and how this evolution has required governments to develop a better understanding of local conditions. The key message is that if place-based rural development policy is to work, it needs to be built upon the knowledge of the unique assets and challenges, as well as the goals of rural communities.

Section 3 turns its focus to the tools that can be used to capture and communicate the complex reality of rural communities. Special focus is given to CI construction. This focus is justified because RPP has an interest in using CIs, such as the CNI and the CAT, to understand and rank communities, but also due to its complexity. As such, the section provides a brief overview of CIs and indicator dashboards, discussing their differences and the advantages and disadvantages of aggregating indicators. Then it outlines the key steps involved in developing a sound CI, describing the complex choices required at each step. Thus, the section aims to serve the twofold purpose of providing clear advice on sound CI construction but also cautioning readers to the risks of basing policy decisions on badly designed CIs.

Section 4 presents the results of a jurisdictional scan that investigated CIs focused on measuring rural community conditions in different regions of Canada and abroad. The section is divided into four different lenses that can be used to measure local conditions: rural development, local economic development, community resilience and community well-being. For each initiative, the section discusses its objectives, variables, methodology, and advantages and disadvantages. The collection of initiatives highlighted throughout the section does not aim to be exhaustive, but to demonstrate the various possibilities involved in CI construction and to provide inspiration for RPP.

Section 5 is dedicated to the review of available community-level data sets for rural B.C. The list of variables is organized using the five capitals framework, which includes economic, human, social, environmental and cultural capitals. The section aims to demonstrate what data is available for measuring local conditions but also highlights important data gaps present in B.C.

Section 6 concludes the report by summarizing key findings, providing recommendations to help RPP better assess and communicate rural community conditions, as well as outlining areas for future research.

1.6 Methodology

The project employs a qualitative approach to investigate how RPP can use georeferenced and community-level data to support better place-based rural development policies and programs. It uses a smart practices methodology to investigate ways in which data and indicators have been operationalized to support rural policies elsewhere. Smart practices - also known as best practices - are generally used to inform decision-making through identifying comparable initiatives and assessing their success or failure in addressing a specific problem, as well as determining their adaptability to a different context (Jennings Jr, 2007, p. 74). This makes smart practices a suitable methodology for this project.

1.7 Methods

This project relies on two qualitative methods: literature review, and jurisdictional scan. The literature review investigated how the concepts of rural, rural development, rural development policy and place-based policy have been defined, as well as how these concepts have evolved and influenced policies through time. The research used the University of Victoria's online library and Google Scholar to search for peer-reviewed research and grey literature related to the aforementioned concepts. Search terms included: rural, rural definition, rurality, rural British Columbia, rural Canada, rural development, rural economic development, rural policy, rural development policy, rural endogenous development, community development, local development, place-based policy, and place-based approach, among others.

The literature review also served the purpose of investigating smart practices on CI construction. For this investigation, search terms included: Indicator construction, indicator design, indicator development, index construction, index design, index development, composite indicator and others. The review demonstrated that the OECD's *Handbook on Constructing Composite Indicators: Methodology and User Guide* (Nardo et al., 2005) was a key reference in the CI literature. As a result, Section 3 of this report largely relied on this work to present smart practices in CI construction.

The jurisdictional scan was used to assess how georeferenced and community-level data have been compiled and used in order to support place-based rural policies and programs across Canada and abroad. The set of initiatives presented in this report is non-exhaustive and was selected to illustrate the different ways in which local conditions may be measured and communicated. Certain criteria were used to determine which initiatives would be included. First, a review was conducted to find initiatives to measure rural conditions in rural areas. The review focused on CIs, as the aggregation of indicators is key to allowing community comparability and ranking. Initiatives that present a panel of disaggregated indicators were not included. To find relevant initiatives, the scan started with a review of departments for rural affairs across Canada through an investigation of government websites and reports. Few initiatives were found through this process. As such, the University of Victoria's online library and Google Scholar were used to identify relevant initiatives through search terms such as: rural, rural economic, community development, community economic development, local economic development, rural sustainability, community sustainability, rural resilience, community resilience, local resilience, rural well-being, and others combined with the terms, indicators, index, and composite indicators.

When a substantial set of initiatives was uncovered, they were reviewed, and preference was given to CIs with an explicit rural community focus and large geographical coverage (i.e. including most of the

communities in the study area). Third, the review prioritized Canadian initiatives primarily, and initiatives from countries in similar stages of development secondarily. Nonetheless, when initiatives from developing countries brought a new methodological element, they were included in the review despite the difference in rural realities. Finally, initiatives were selected to cover different ways of assessing local conditions. These criteria were not used as hard rules in the selection process, but as principles to help guide the choice to include or exclude an initiative. Exceptions were made when an initiative did not meet all criteria but brought some aspects that could be of interest for RPP.

Initiatives that were reviewed but not covered in this section include: Rural Deprivation Index (Norfolk, England) (Burke & Jones, 2019); Rural Development Index (India) (Banakar & Patil, 2018); the Sustainable Community Design (Scotland) (Winther, 2017); Community Indicators Victoria (Australia) (Cox et al., 2010), Heritages and Patrimonies of the Peasantry (Mexico) (Pachón et al., 2017), Rurality Index (China) (Li et al., 2015), Canadian Index of Well-being (Smale & Holliday, 2020), State of the Basin Report (British Columbia) (Columbia Basin Rural Development Institute, 2017), and Subjective Well-being Report (British Columbia) (Columbia Basin Rural Development Institute, 2019).

In order to identify community-level data sets, this project used the data sets included in the CAT as a starting point. The CAT relies mostly on the Statistics Canada Census of Population but also use other federal and provincial datasets. From there, the CIs presented in Section 4, such as Statistics Canada's Community Wellbeing Index and Memorial University's Rural Economic Capacity Index, helped identify other data sets of interest. Finally, the review also used the Columbia Basin Rural Development Institute's *State of the Basin Report* (2017) - a collection of indicators that describes conditions in the Columbia Basin – to aid in identifying additional variables and datasets.

The inclusion of variables was guided by certain quality principles discussed in Section 3. Guided by these quality principles, the following data sources were considered: Statistics Canada, federal ministries and agencies, BC Stats, DataBC, various provincial ministries and agencies, as well as reputable non-governmental sources. Throughout the review, variables available at the community-level (e.g. census subdivision [CSD], municipality) were prioritized, but when those were not available, data at the regional-level was considered (e.g. regional district). Another key selection criterion related to data coverage. Given that RPP wants to not only understand local conditions but compare and rank communities, variables needed to have ample coverage of communities in the province. Thus, variables and indicators based on smaller or more localized surveys were not included in the review.

1.8 Data Analysis

The data collected in this project were organized and interpreted through a thematic analysis approach. Thematic analysis is a qualitative research method used for identifying, analyzing, organizing, describing and reporting themes found in the data (Vaismoradi et al., 2013, p. 400). This method is highly flexible, providing ample theoretical freedom and allowing the research to examine different perspectives and highlight similarities and differences in the data (Nowell et al., 2017, p. 2). This approach was used throughout the report to capture and organize smart practices in CI construction, organize and compare different approaches to understanding rural community conditions and organize available community-level data sets.

Through the jurisdictional scan of CIs, research papers and reports describing initiatives were saved and categorized using Mendeley. CI's were organized based on the phenomenon they aimed to measure (e.g. rural development, rural resilience). They were then either included or excluded from the report based on the criteria described in the methods section. The data availability review followed a different analytical process. To organize the review, data sets were organized using the five capitals framework presented in the literature review. The information on each potential data set was included in an Excel spreadsheet organized using the five capitals and their respective factors.

1.9 Project Limitations

1.9.1 LIMITATIONS

This study was limited by various factors. The identification of relevant georeferenced or community-level data relies largely on document and website research. It may be the case that certain relevant databases are not publicly available. Thus, what is reviewed and presented may not encompass the full set of available data. The smart practices methodology also has key limitations. The main one being related to the comparability and adaptability of practices across jurisdictions, context and time (Jennings Jr, 2007, p. 79). It may be hard to determine objectively if the practices reviewed in the jurisdictional scan were, in fact, successful and if they can reasonably help guide RPP's approach. To reduce this risk, the scan focuses primarily on other Canadian provinces, and secondarily on international jurisdictions with similar geographical, demographic and socioeconomic conditions. However, the jurisdictional scan of CIs was limited to what is publicly available, as jurisdictions were not contacted.

1.9.2 DELIMITATIONS

The project scope is limited to reviewing smart practices in CI construction, identifying data sources, investigating successful experiences in other jurisdictions, and using that information to provide recommendations on data use to support place-based rural development policy. In identifying factors that determine community conditions, the project does not engage directly with communities, rural organizations or rural residents. This project does not seek to develop a framework or a tool for assessing community conditions but provides recommendations to support these efforts.

2.0 Literature Review

This section provides an overview of the literature related to rural and rurality, rural development, rural development policies and place-based policies. Developing an improved understanding of rural community conditions to support policies that lead to the development of rural areas requires exploring these bodies of literature. How concepts such as rural and rural development are defined has important policy implications. They determine what communities are targeted by rural policy, what variables are considered in assessing community conditions, and, ultimately, what changes policies aim to bring to these communities. This section starts by discussing the concept of rural, and how it has been defined in the literature; from there it examines rural development, analyzing its concept and briefly discussing endogenous and exogenous approaches to development; next, it presents the evolution of rural development policy, describing how its objectives, focus and tools have changed over the years; finally, it reviews the literature on place-based policy, discussing its definition, advantages, and limitations.

2.1 Rural and Rurality

Although very commonly used in everyday discourse, rural is an ambiguous concept. The literature demonstrates that rural can be defined in a variety of ways, with some authors going as far as to argue against any attempt to define rural (Moseley, 2003, p. 2; Stoop, 2018, p. 9). With some authors positing that due to the diversity and inconsistency of rural areas any overarching definition would only lead to confusion, and others arguing that rural has no explanatory power and does not need to be defined (Stoop, 2018, pp. 9–10). However, many authors agree that defining rural is important for both research and policy, as it determines the targets of rural policy and allows for consistent analysis and comparison (Stoop, 2018, p. 11). In an extensive review of the literature, Stoop (2018, p. 13) uncovered a single method to systematically categorize the varying definitions of rural. This method organizes definitions in four broad categories: descriptive, socio-cultural, ‘rural as a locality’, and ‘rural as a social representation’.

Descriptive definitions rely on socio-spatial characteristics to define rural. In their simplest form, they define rural as everything that is not urban (Stoop, 2018, p. 14). This was a popular definition in what the Organisation for Economic Co-operation and Development (OECD) named the old paradigm of rural development policy (OECD, 2016b, p. 182). More recently, descriptive definitions use characteristics, such as population density, population size and distance to density or services to define rural (du Plessis et al., 2001, p. 4; Reimer & Bollman, 2010, p. 13; Stoop, 2018, p. 15). In contrast, socio-cultural definitions are concerned with the people, customs and traditions in rural societies (Stoop, 2018, p. 19). They assume that the varying socio-spatial characteristics of rural and urban areas result in differing behaviours, actions and ways of life. This category is connected to the concept of rural idyll (Stoop, 2018, p. 19), which idealizes rural life as simple, virtuous and happy as compared to urban life (Shucksmith, 2018, p. 163). The third category, ‘rural as locality’ identifies rural as the localities where rural structures are present (Stoop, 2018, p. 22). One such structure is a direct connection to agriculture or other primary industries (Ashley & Maxwell, 2002, p. 397; Huby et al., 2007, p. 5). Finally, the social representation category defines rural based on the experiences and interpretations of individuals who define themselves as rural, thus relying on people’s perceptions instead of scientific methods (Stoop, 2018, p. 23).

Despite this diversity, descriptive definitions are the most common in academic and policy discourse (Stoop, 2018, p. 14). This is probably because they are more easily operationalized and measured than the other categories. Nevertheless, even within this category, there is considerable variation in definitions. Most of them tend to rely on population density and distance to higher density areas as the two main characteristics of rural, which is justified because density and distance have important effects on economic and social policy (Reimer & Bollman, 2010, p. 13). While density is connected to agglomeration effects, distance affects transaction costs, and both are critical considerations for rural development (Reimer & Bollman, 2010, p. 13). However, even though there is some consensus on the relevance of these variables for defining rural, there is no agreement as to what population density and distance should be considered as the threshold that separates rural from urban. In the Canadian context, du Plessis et al. (2001, p. 6) presents six ways to define rural using different population sizes or densities, with each of them resulting in significantly different sizes and compositions of Canada's rural population. Given this lack of consensus, it has been argued that the definition of rural should be chosen based on the issue that is being addressed (du Plessis et al., 2001, p. 12; Moseley, 2003, p. 2; Stoop, 2018, p. 18).

Another important debate in the literature relates to the suitability of any single definition of rural. According to Sherry and Shortall (2019, p. 337), the urban-rural dichotomy has lost some of its relevance since the industrialization era, as spatial flows have changed, and boundaries have blurred. Consequently, relying on a single population density or size threshold to categorize communities as rural is unable to capture the differences in living conditions and quality of life between different rural communities (Sherry & Shortall, 2019, p. 337). More importantly then, is the concept of rurality, which understands rural as a spectrum and classifies communities by different degrees of rurality based on demographic characteristics (i.e. population density, size and growth), economic structure, accessibility, landscape, and other aspects (Li et al., 2015, p. 14). Recognizing the diversity within rural may provide a better understanding of local dynamics and result in policies that support rural development more effectively (Li et al., 2015, p. 13).

Currently, the B.C. Government has no standard definition of rural across its ministries. On one hand, this gives ministries the flexibility to pick a definition that is best suited to the issue under analysis, but it also makes it difficult to maintain a consistent approach to rural communities across government and may become an impediment for sectoral collaboration on rural issues. The Ministry of Forest, Lands, Natural Resource Operations and Rural Development (FLNRORD), which is the provincial ministry responsible for rural development policies, does not have an explicit ministry wide definition of rural. A de facto definition used in one of its programs classifies rural as municipalities, First Nations communities and unincorporated areas with 25,000 or fewer residents outside Metro Vancouver and the Capital Regional District (Ministry of Forests, Lands, Natural Resource Operations and Rural Development, 2019, p. 3). This is a fairly simple way to define rural communities, which relies mostly on population size but also considers location. The Rural Policy and Programs Branch (RPP) of FLNRORD has developed a rural classification system that categorizes communities in different levels of rurality based on population size and remoteness considerations. However, this classification is not officially approved, and still needs to be more widely adopted in the Ministry's rural development policies and programs.

This subsection has provided a brief review of the literature on the concepts of rural and rurality. In the context of this project, the key takeaways from this overview are:

- There are many ways to define rural and no consensus as to what definition is most appropriate. Defining rural is important because it directly affects what communities are targeted by rural development policies.
- Descriptive definitions of rural are the most common in the literature and the most appropriate for policy use. Population density and distance to density are two of the most commonly used variables, but other variables such as population size may also be used. Aside from choosing variables, determining a threshold value that divides rural from urban is difficult.
- The rural/urban dichotomy is becoming less useful, as there is significant variation within communities in each category. For policy purposes, using a rural definition based on levels of rurality may help understanding community conditions and lead to policies that account for the variability between rural communities.
- The B.C. government has no cross-ministry definition of rural, and the current definition used by RPP in its policies and programs is based on the rural/urban dichotomy and does not yet account for degrees of rurality.

2.2 Rural Development

One of the most popular definitions of rural development is "the process of improving the quality of life and economic wellbeing of people living in relatively isolated and sparsely populated areas" (Moseley as cited in Jean-Vasile et al., 2013, p. 61). This concept defines development as a process of improving quality of life and economic wellbeing, while rural is implicitly defined as a function of remoteness and population density. Yet, rural development may be conceptualized not only as a process but also as a phenomenon, a strategy and a discipline (Singh, 2009, p. 3). As a phenomenon, rural development is seen as the result of the interplay of economic, socio-cultural and institutional factors, while as a strategy it is designed to improve the economic performance and well-being of rural areas (Singh, 2009, p. 3). Finally, as a discipline, rural development can be understood as a multidisciplinary field that receives contributions from geography, economics, natural resource sciences, political science and other disciplines (Hobbes, 2010, p. 3).

Considering rural development as a process, Kim and Yang (2016, p. 115) argue that its various definitions tend to have three common factors. First, local people and the government are the two main agents of development. Second, its goal is to improve the quality of life of people in rural areas. Third, it focuses on economy, education, health, environment, culture and leisure as its main domains of analysis. Considering these common factors, they define rural development as "the process of improving the quality of life for people living in rural areas and achieving sustainable development in rural areas by solving challenges faced by local communities in various domains such as economy, education, health and environment, with the involvement of local people and government as the main agents of change" (Kim & Yang, 2016, p. 115). However, Harriss (1982, pp. 14–15) contends that as a process of change, rural development may occur without the participation of government. Additionally, Kim and Yang's definition does not account for the important role that local organizations and the private sector may play in the process of development. Despite that, their effort outlines some important aspects of rural development. The goal of rural development is broader than economic growth, considering other factors that influence quality of life; it generally requires the involvement of multiple agents, including both local people and outsiders; and it needs to be analyzed from a multidimensional perspective.

An important aspect of rural development relates to the study of the determinants of differential economic performance. That is, why some areas (i.e. regions, communities, etc.) achieve higher levels of development than others. The literature shows the existence of two theoretical approaches to explain economic development: exogenous development models, and endogenous development models (Chirwa & Odhiambo, 2018, p. 64; Terluin, 2003, pp. 331–332). Exogenous models hypothesize that development can only be explained by investment, population growth and technological progress, with the latter being the main determinant of productivity differences between areas (Chirwa & Odhiambo, 2018, p. 64). In a rural context, this means that development is determined externally and transplanted to rural areas (Terluin, 2003, p. 332) by modernizing and creating the local institutional conditions to attract private-sector investment (Krawchenko, 2016, p. 7). In that sense, exogenous development is perceived to be externally determined and to often disregard local values and interests (Terluin, 2003, p. 332). Exogenous models were highly influential in rural development policy until the end of the 1970s and focused on attracting manufacturing firms, subsidizing natural resource activities and supporting the labour market (see section 2.3 Rural Development Policy) (Krawchenko, 2016, p. 7; OECD, 2016a, p. 85; Terluin, 2003, p. 332).

In contrast, endogenous models hypothesize that development is produced locally, through the actions of local agents and communities, and grounded on territorial resources in a way that benefits the community and respects its values (Terluin, 2003, p. 332). In the endogenous development literature, many studies link economic development to territorial resources/capital (Agarwal et al., 2009, p. 309; Courtney & Moseley, 2008, p. 309; Salvia & Quaranta, 2017, p. 3; Sánchez-Zamora et al., 2014, p. 12; Zasada et al., 2015, p. 179). These studies generally argue that rural economic performance varies across communities as a function of the availability and deployment of five types of territorial capital: economic, human, social, cultural and environmental. The definition and relative importance of each type of capital in the development process varies between studies, but Table 1 synthesizes the main elements that comprise each of them. In this sense, Sánchez-Zamora et al. (2014, p. 12) posit that development in rural communities is a result of territorial dynamics, which are determined by the interplay of territorial resources, which are determined by the availability of the five capitals; territorial agents, comprised by the state, civil society, and private actors; and territorial construction, which refers to the existing institutional agreements. Successful rural territorial dynamics occur when the interaction of territorial resources, agents and construction improve the ability of a community to maintain its rural population, increase their quality of life and advance environmental sustainability (Sánchez-Zamora et al., 2014, p. 12).

Table 1

Main Elements Comprising the Five Territorial Capitals

Types of Capital	Elements
Economic	Productivity, employment, investment, enterprise, innovation (Agarwal et al., 2009; Sánchez-Zamora et al., 2014), economic structure (Agarwal et al., 2009; Courtney & Moseley, 2008; Sánchez-Zamora et al., 2014), infrastructure and telecommunications (Courtney & Moseley, 2008; Sánchez-Zamora et al., 2014).
Human	Education, skills, entrepreneurship (Agarwal et al., 2009; Courtney & Moseley, 2008; Sánchez-Zamora et al., 2014), demographic structure (Agarwal et al., 2009;

	Sánchez-Zamora et al., 2014; Zasada et al., 2015), migration, access to services, quality of life (Agarwal et al., 2009; Sánchez-Zamora et al., 2014).
Social	Trust, shared norms (Agarwal et al., 2009; Courtney & Moseley, 2008), cooperation (Sánchez-Zamora et al., 2014), public-private partnerships and networks, voluntary sector (Agarwal et al., 2009; Courtney & Moseley, 2008; Sánchez-Zamora et al., 2014).
Cultural	Degree of commercialization of heritage, environment and identity, the existence of heritage sites (Agarwal et al., 2009; Sánchez-Zamora et al., 2014), civic engagement (Agarwal et al., 2009; Courtney & Moseley, 2008; Sánchez-Zamora et al., 2014), place identity and sense of place (Courtney & Moseley, 2008).
Environmental	Natural resource endowment, location, peripherality and remoteness (Agarwal et al., 2009; Courtney & Moseley, 2008; Sánchez-Zamora et al., 2014), cost of environmental maintenance, landscapes (Agarwal et al., 2009; Sánchez-Zamora et al., 2014).

Despite the apparent dichotomy between exogenous and endogenous models, part of the literature suggests that rural development is determined by the interaction between endogenous territorial dynamics and global forces (Terluin, 2003, p. 327). As such, rural agents are involved in both local and external networks and may use both to mobilize resources. The relevance of each network varies between communities and the control over the development process results from the interaction of internal and external forces (Terluin, 2003, p. 333). Thus, rural development is a complex process that may involve both internal and external forces, and there is no clear consensus as to what the key determinants of development processes in rural communities are.

This subsection reviewed key concepts in the rural development literature that are directly relevant to this project's objectives. The key takeaways are:

- Rural development is a complex concept that relates not only to economic growth but to broader socio-economic and well-being improvements for rural residents. Thus, measures of rural community conditions cannot rely strictly on economic indicators if they are to support policies that advance rural development.
- Within the rural development literature, two theoretical approaches attempt to explain the development process: exogenous development models and endogenous development models. Although exogenous models have fallen out of favour, exogenous factors are still relevant to the rural development process.
- Endogenous development models associate development outcomes with the availability and deployment of five types of capital: economic, human, social, cultural and environmental. The five capitals framework may be a starting point to assess rural community conditions.

2.3 Rural Development Policy

Until the 1950s, governments did not explicitly distinguish between rural and urban areas when designing and implementing policies (Breen, 2017, p. 13; OECD, 2016a, p. 85). Rural development policy gained prominence in developed countries after they had reached an advanced level of development and transitioned to mostly urban economies and societies (OECD, 2016a, p. 85). In Canada, with no clear

rural policy until after World War II, rural development was largely determined by natural resource availability and exploitation (Markey et al., 2008a, p. 413).

In its first 20 years, rural development was based on top-down policies that aimed to modernize rural areas by developing transportation infrastructures, such as highways and airports; attracting large businesses to rural areas; and supporting resource extraction (Halseth, 2009, p. 253). In British Columbia (B.C.), W.A.C. Bennett's Social Credit Party, which came into power in 1952, extensively implemented a series of investments throughout the rural areas of the province, such as the construction of a highway network, hydro-power plants and railways (Breen, 2017, p. 13). Through these initiatives, the government was able to take advantage of B.C.'s natural resource abundance to implement a model of industrial resource development dependent on natural resource extraction that successfully expanded the province's economy (Breen, 2017, p. 14; Halseth, 2009, p. 254). Although there were attempts at the Federal level to support rural economic diversification during this period, rural B.C. remained largely reliant on natural resources (Breen, 2017, p. 14; Halseth, 2009, p. 254). Despite this dependence, B.C.'s rural regions grew and prospered until the early 1980s, supported by good stable jobs in new industries, as the province became an international supplier of raw materials to industrial nations (Halseth, 2009, p. 255).

In the 1970s rural development started to shift from top-down integrated approaches towards sector-based approaches (Breen, 2017, p. 14). This change, in conjunction with a deep economic recession in the early 1980s, marked the beginning of a new era for rural communities in B.C. (Markey et al., 2008a, p. 415). Rural communities started to decline as they attempted to adapt to a more globalized economy. Competition from low-cost global competitors, changes in consumer demand and the lumber trade dispute with the United States, compounded with rural policy changes at the provincial and federal levels impacted rural areas of the province (Markey et al., 2008b, p. 414). Natural resource industry closures and layoffs caused many rural communities to start shrinking for the first time since the 1930s, a trend that has continued in many rural communities (Halseth, 2009, p. 255). Throughout the 1980s and beyond, governments in Canada and abroad started to move away from the top-down rural policies that characterized the 1950s and 1960s towards more bottom-up approaches that focused on attracting small and medium-sized firms (OECD, 2016a, p. 86). More generally, however, the B.C. government policy response was of withdrawal in social and economic terms, which meant a reduced commitment to providing services across the province and the assumption of a secondary role in supporting regional programs (Markey et al., 2008a, p. 415). This shift resulted in the downloading of responsibilities to lower levels of government, which left rural communities isolated in their quest to develop and increased the competitiveness between rural communities (Breen, 2017, p. 14).

In the 2000s, the context of globalization, improved connectivity, changing trade patterns and the rise of non-natural resource activities in rural areas pushed governments to focus increasingly on place-based, community-driven approaches to rural policy that recognize that communities are distinct and require different approaches to development (OECD, 2016a, p. 86). This approach stems from a broad recognition that successful rural development policies cannot focus only on exploiting natural resources or recruiting large businesses to rural areas but instead must identify and develop communities' competitive advantages (Drabenstott, 2009, p. 2). The OECD played a key role in disseminating and supporting this policy approach to rural development when it launched the New Rural Development Paradigm in 2006. It suggested "moving away from compensatory policies such as subsidies, towards a more strategic approach that takes into account local assets and relies on investment for improving the

competitiveness of rural areas (OECD, 2016a, p. 87)". Ideally, under the NRP, local stakeholders would identify a local development strategy to be implemented with support from national and subnational governments to increase local competitiveness. In 2016, the OECD updated the NRP under the name of Rural Policy 3.0. This update maintains its support for place-based approaches but puts a stronger emphasis on improving the well-being of rural communities, with local competitiveness becoming a condition to achieve well-being as opposed to the end-goal of rural development policy (OECD, 2016b, p. 184). Table 2 outlines the paradigm shifts in rural development policy.

Table 2

The Evolution of Rural Development Policy

	Old Paradigm	**New Rural Paradigm (2006)**	**Rural Policy 3.0 (2017)**
Objectives	Equalization	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 the type of rural area
Tools	Subsidies for firms	Investments in qualified firms and communities	Integrated rural development approach – spectrum of support to public sector, firms and third sector
Key actors & stakeholders	Farm organizations 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 organizations 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, 2016b, p. 182)

The integrated approach described in Rural Policy 3.0 is connected to mixed exogenous/endogenous development approaches. Mixed exogenous/endogenous approaches recognize the importance of both local (endogenous) and external (exogenous) factors on the development performance of rural communities and, as such, point to integrated approaches that involve the co-construction of development strategies by a local network with the support of higher levels of government (Terluin, 2003, p. 342). This type of policy approach, characterized by the integration of multiple policy domains, has gained popularity in the last 20 years and is supported by OECD's Rural Policy 3.0.

This subsection described the evolution of rural development policy, from the post-war era to current days. In the context of this project, key lessons are summarized below:

- The policy approach to rural development has evolved from top-down policies aimed at modernizing rural areas and supporting resource extraction to a bottom-up approach that downloaded responsibilities to the local level, and more recently to a more collaborative place-based approach that builds on unique local assets to improve the competitiveness and well-being of local communities.
- The failures of both top-down and bottom-up approaches suggest a need for integrated approaches that involve different levels of government, community organizations and the private sector in the rural development process. A better understanding of community conditions can help support collaboration, as well as allow the provincial government to develop policies that build on local assets or target local barriers to development

2.4 Place-based Policy

With a strong consensus in the rural development literature that top-down place-neutral policies have generally been inefficient in producing development (Markey, 2010, p. 3; Olfert & Partridge, 2010, pp. 150–151; Salvia & Quaranta, 2017, pp. 1–2), place-based approaches have gained prominence. Policies built on a place-based framework acknowledge that rural communities are diverse, have unique strengths and challenges and, as such, require different strategies to develop (Naldi et al., 2015, p. 92; Olfert & Partridge, 2010, p. 150; Sánchez-Zamora et al., 2014, p. 12). In this sense, place is a holistic concept that is defined by the interconnections between the people, institutions, assets, economic activities, culture and practices that occur in a certain space (Markey et al., 2015, p. 876). Although place does not have causal power, it affects processes and influences outcomes in a contingent manner. For instance, while education and income are positively related in all places, the strength of this relationship varies between communities depending on the interplay of factors that create a place (Sherry & Shortall, 2019, p. 337).

Place-based rural development can be understood as "a holistic and targeted intervention that seeks to reveal, utilize and enhance the unique natural, physical, and/or human capacity endowments present within a particular location for the development of the in-situ community" (Markey et al., 2015, p. 878). Thus, it aims to improve local competitiveness and well-being through the development and improvement of unique local assets (Olfert & Partridge, 2010, p. 149; Salvia & Quaranta, 2017, p. 2) and drawing upon residents' sense of place (Olfert & Partridge, 2010, p. 149). Place-based rural development policies have been used in a variety of ways: to support product development, add value and gain market share in natural resource and tourism activities, to develop place images, and promote local customs through foods, crafts, and festivals (Ryser & Halseth, 2010, p. 522), as well as to develop local infrastructure, support governance reform, business incentives and others (Olfert & Partridge, 2010, p. 149).

Place-based policy differs from people-based or sector-based policies in that it focuses on supporting a geographical area and not specific individuals or economic sectors. While people- and sector-based policies can be offered in a spatially neutral way, place-based policies must account for local particularities (Olfert & Partridge, 2010, p. 149). Sector-based policies may target sectors that are primarily rural, such as agriculture and forestry, or specific geographical locations (i.e. B.C.'s Interior Forest Sector Renewal Initiative), but they do not account for local specificities and, even when they are successful in supporting a sector, they may have unintended consequences that negatively impact rural communities (Olfert & Partridge, 2010, pp. 150–151). Similarly, people-based policies (e.g. workforce training) may also target specific locations. However, these should not be confused with place-based rural

development policies, because they are not rooted in local conditions and are not evaluated against their impact on the community or region.

Given the heterogeneity of rural areas, the advantages of place-based rural development policies relative to 'one-size-fits-all' approaches are clear. First, place-based approaches recognize local differences and help places identify, develop and capitalize on their unique assets, allowing them to develop products and services in which they have competitive advantages (Salvia & Quaranta, 2017, p. 2). Second, by accounting for local conditions, interests and goals, place-based approaches have a better chance of benefitting from local knowledge and attaining local buy-in (Markey, 2010, p. 3). Third, due to the complex nature of rural development, an approach that integrates economic, social, environmental, cultural and political dynamics under a cohesive place-sensitive framework is more likely to achieve rural development than approaches that treat these dynamics separately (Markey, 2010, p. 3).

On the other hand, place-based approaches also have important limitations. it is argued that place-based approaches may be wasteful and even counterproductive. In the absence of spatial frictions, place-based policies would be unnecessary, as firms and individuals would freely relocate to more dynamic areas until outcomes were equalized across space (Partridge & Rickman, 2008, p. 133). Under this assumption, place-based policies would slow these necessary adjustments. Nevertheless, studies have shown that spatial frictions exist, as labour markets are slow to adjust and indicators, such as poverty rate, household income and others, have remained different across space (Partridge & Rickman, 2008, p. 131). Aside from not considering relocation costs related to transportation, housing and labour market opportunities (Olfert & Partridge, 2010, p. 150), this argument against place-based policies does not account for the significance of the social and cultural ties that are relevant for people's well-being and identity, and constrain their ability to relocate (Markey, 2010, p. 4).

Furthermore, despite a consensus towards place-based rural development, many governments have found challenges in implementing policies that effectively incorporate the socioeconomic and environmental diversity of rural areas in their objectives and measures (Sherry & Shortall, 2019, p. 338). Markey, Halseth and Manson (2008b, p. 338), argue that many local economic development planning processes suffer due to a 'lack of attention' to the context of place, which leads to plans that are misdirected or unviable. The difficulty of incorporating diversity in rural policy leads many current rural policies to rely on a lens of disparity, in which rural communities are depicted as in need of 'catching-up' to their urban counterparts. A disparity framework results in policies built on an oversimplified representation of rural communities' conditions that does not allow for diverse strategies or goals (Sherry & Shortall, 2019, p. 338). In contrast, policies built on a diversity framework account for community diversity and understand that differences between communities may continue to exist because their goals and strategies are also diverse goals (Sherry & Shortall, 2019, p. 338). However, top-down policies built on a disparity framework are easier to implement than place-based policies, which explains their continued use, despite a general understanding that they tend to be less effective in promoting rural development (Krawchenko, 2016, p. 6; Markey et al., 2015, pp. 876–878; OECD, 2016a, p. 70; Olfert & Partridge, 2010, pp. 150–151; Sánchez-Zamora et al., 2014, p. 12).

Another limitation of place-based approaches is a reliance on local capacity to identify, develop and implement strategies that take advantage of local assets. Often, communities lack the understanding of their socio-economic conditions and their best options for development, which compromises their ability

to identify opportunities (Simms et al., 2014, p. 351). Generally, higher capacity communities will have more success in identifying, developing and implementing strategies than lower-capacity communities. In this sense, Olfert and Partridge (2010, p. 153) argue that place-based rural development initiatives require a certain level of local capacity to succeed, and this capacity is determined by local agglomeration economies, workforce quality, and innovation. Thus, place-based approaches risk exacerbating disparities between leading and lagging communities, as leading communities have more capacity to benefit from these policies (Salvia & Quaranta, 2017, p. 2). A necessary condition to ensure - or at least reduce the chance – that provincial place-based rural development policies leave lagging communities behind is having a good understanding of community conditions. This would allow the provincial government to identify communities that require more support, assist them in developing their development strategies, while also helping the province to design policies that consider the local context of rural communities.

This subsection explored the concept

of place in the context of rural policy, outlining the definition of place-based policy, as well as its advantages and limitations. The key takeaways from this subsection are summarized below:

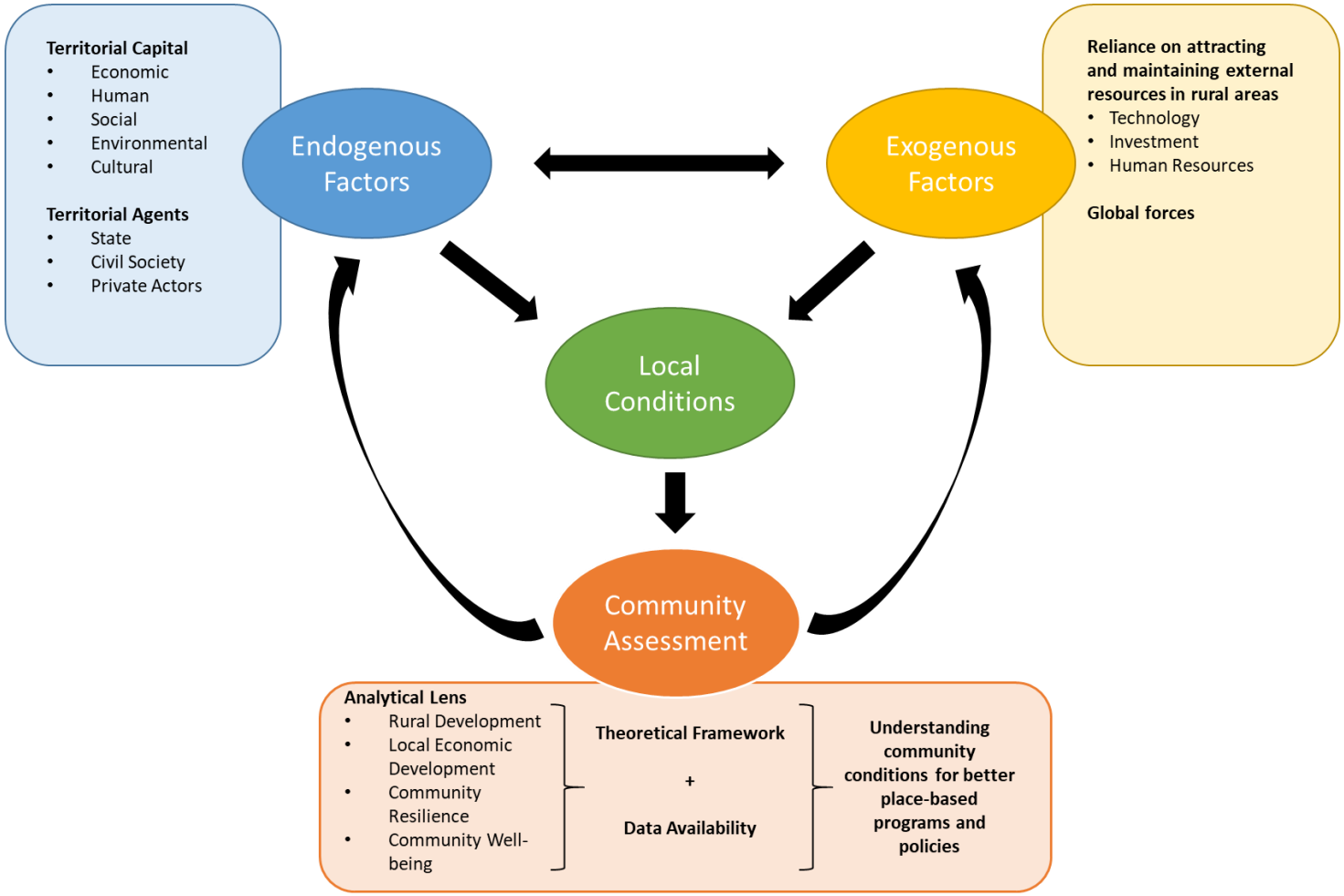
- Place is an important concept for rural development as, although it may not have causal power, it affects development outcomes in a contingent manner. As such, understanding community conditions is a way to begin to understand place, which would help develop better rural development policies.
- Place-based policies have important advantages over sector-based or other place-neutral policies in supporting rural development. However, they are harder to implement, may increase the gap between high and low capacity communities, and may be wasteful if certain conditions are not present. Gaining a good understanding of community conditions may help offset these limitations by providing knowledge to help support place-based policymaking, recognizing communities that need additional support to identify and exploit their unique assets, and ensuring that community-driven strategies are supported by local conditions.

2.5 Conceptual Framework

Based on the preceding literature review, the following conceptual framework has guided comparative analysis of rural indicators. The conceptual framework is based on an understanding that both endogenous and exogenous factors affect local conditions. Here, endogenous factors are understood to be determined by the availability and interplay of territorial capital, and their deployment by territorial agents, while exogenous factors are external resources and forces that affects the community (e.g. global demand). The framework is guided by a view of rural development policy that is grounded in the importance of place-based policies – that is that communities are often the best place to understand community needs and to deliver local services. At the same time, the policies and programs of upper level governments structure opportunities and can have place-based outcomes regardless of whether they are intentionally targeted to place. In this respect, an understanding of community conditions is essential for the delivery of effective rural policies, programs and services. In turn, the assessment of community conditions is determined by the choice of analytical lens - which guides the construction of a theoretical framework – while also being constrained by data availability. The quality of the community assessment influences the policies, programs and services offered by upper levels of government and their effectiveness in supporting rural communities.

Figure 2

Conceptual Framework



3.0 Measuring Rural Community Conditions

As described in Section 2, the rural development paradigm has shifted from uniform top-down policies to integrated approaches that leverage local assets. In the new paradigm, the role of higher levels of government moves towards supporting communities and regions in identifying, developing and implementing strategies rooted in local competitive advantages to improve community well-being (OECD, 2016b, p. 182). However, providing appropriate support to local agents depends on the availability of information to assess the opportunities and barriers they face. This challenge may be reduced through a better understanding of community conditions. Understanding communities' socioeconomic, environmental, and infrastructural conditions would allow the provincial government to identify local challenges, assess community projects and strategies, and guide sector-based policies (i.e. health, education) to incorporate considerations of their impacts in rural communities. In this regard, Reimer and Bollman (2019, p. 11) posit that although opportunities and challenges will vary across rural communities, timely, detailed information about local conditions will always help support effective responses to these challenges and opportunities.

Composite indicators (CI) and indicator dashboards are some of the tools that may be used to understand and communicate community conditions. These tools may be useful in decision making because they allow policymakers in the community and in higher levels of government to identify trends and develop strategies that build on local conditions. For example, good information on rural communities may help the government understand how forest sector closures will affect different communities, given a variety of factors, such as the level of economic diversification, the unemployment rate in the area, the capacity of the local labour force, etc. This sort of information may be used to design responses that target the most pressing needs of each affected community. Yet, this sort of place-based response requires not only access to detailed, community-level data but also the analytical capacity to identify the most important types of information to support decisions about rural places and people (Reimer & Bollman, 2019, p. 11). This section briefly discusses the challenges related to the use of rural community-level data; outlines the advantages and disadvantages of using CIs and dashboards as tools for analyzing and communicating local conditions; and, presents the key steps to developing a sound CI.

3.1 Rural Community Data Challenges

There are important complications associated with the use of rural community data. Rural communities are smaller and tend to be more remote than their urban counterparts, which creates challenges to data collection and dissemination processes. The low population density and remoteness of many rural areas increase the costs involved in data collection. Data collection costs relate both to the cost of accessing communities, as well as canvassing households or individuals within communities. Dissemination is also more difficult, as small population sizes in rural communities may result in data being filtered, modified or suppressed due to confidentiality concerns (Reimer & Bollman, 2019, p. 9). Furthermore, Reimer and Bollman (2019, p. 9) argue that groups (e.g. Indigenous and Mennonites) that may be suspicious of data collection processes -often due to a history of government abuse - are more commonly located in rural areas. As a result, these rural populations may be underrepresented in official statistics. Due to these challenges, rural community data is frequently improperly aggregated, or even excluded, from many studies and surveys (Reimer & Bollman, 2019, p. 9).

Analyzing Statistics Canada data suppression rules for the 2016 Census of Population helps to illustrate the challenges related to the use of small community data. Statistics Canada suppresses census data due to issues of confidentiality - where the identity or characteristics of respondents may be identified - and data quality, to avoid disseminating data below a quality threshold (Statistics Canada, 2017, p. 39). Issues of confidentiality are more prevalent in lower levels of geography, especially those with low population counts. Consequently, Statistics Canada removes all characteristic data for geographic areas with a total population smaller than 40 inhabitants, except for six-character postal code areas where the threshold is 100 (Statistics Canada, 2017, p. 40).

Looking at the 2016 Census data at the census subdivision level (CSD), which is generally equivalent to a municipality or First Nation reserve, British Columbia has a total of 737 CSDs. Out of these, 533 have a population of over 40 inhabitants, while 204 have smaller populations. Although in population terms these CSDs represent a minimal share of the province, they represent almost 28% of all CSDs. Out of this share, 85 CSDs are uninhabited, leaving 119 communities – or 16% of all CSDs - for which all data characteristics are suppressed due to confidentiality issues. These are overwhelmingly First Nations communities (98%). For data quality reasons, Statistics Canada suppresses census data when the global non-response rate (GNR) - which includes total (household) and partial (questions) non-response - is equal or greater than 50% for a given geographical area (Statistics Canada, 2017, p. 40). In the 2016 census, suppression due to quality issues was a minor concern, with less than 1% of CSDs in B.C. with over 40 inhabitants reaching the GNR threshold (Statistics Canada, 2017, pp. 42–43).

Data suppression does not apply only to geographical areas, but also to subsections of data. Considering Statistics Canada's Labour Force Survey (LFS), confidentiality rules determine that subsections of data with a sample of fewer than 1,500 individuals must be suppressed (Statistics Canada, 2020, Table 7.4). As such, for rural areas with smaller populations, sector-specific labour data may be unavailable due to data suppression. This practice, which is justified and necessary to preserve confidentiality, may affect the ability to understand labour market trends in rural areas. This brief exploration helps demonstrate some of the data challenges faced by initiatives that seek to understand rural community conditions. Challenges that are increasingly significant for small and First Nations communities.

Mediating the challenges related to the deficit of rural data availability will require a series of strategies. The *State of Rural Canada III: Bridging rural data gaps* report (Canadian Rural Revitalization Foundation, 2019, p. 7) presents important recommendations for reducing data gaps in rural areas, such as:

- creating a better understanding of the importance of data in rural areas by communicating success stories of data collection and use in rural places;
- ensuring consistent quantitative and qualitative data is collected and used by different actors;
- providing support for rural communities to develop the capacity to use existing data and collect their own data; and
- increasing the disaggregation of national and provincial data to allow users to identify how trends affect rural and remote communities.

Implementing these recommendations would significantly improve the province's and communities' ability to understand local conditions. Notwithstanding these limitations, it appears that the available rural data is often underused to inform policy decisions that affect rural communities. That may be because the

utility of the data hinges on the capacity of local and provincial agents to analyze it to identify trends, anticipate problems, find solutions and design development strategies that account for local conditions. This challenge is increased by the multidimensional nature of the factors that influence community conditions because it is difficult to determine what variables are important, how they are connected and how they might affect outcomes. Thus, this section discusses key considerations for the development of tools that can help analyze and communicate multidimensional phenomena.

3.2 Tools for Assessing and Communicating Community Conditions

Composite indicators and indicator dashboards are two different sets of tools that can be used to better understand and communicate community conditions. A CI synthesizes the measurement of a multidimensional concept into a single score through the compilation of individual indicators selected based on an underlying framework (Booysen, 2002, p. 118; Nardo et al., 2005, p. 8; Zhou et al., 2010, p. 170). In contrast, an indicator dashboard is an information delivery system that organizes key indicators to present complex information at a glance (Mitchell & Ryder, 2013, pp. 73–74). The key difference between these approaches is the process of aggregation – while CIs aggregate indicators into a single value, dashboards present various indicators in their disaggregated form. CI supporters believe that the aggregation process creates important advantages while detractors posit that the steps involved in CI construction require arbitrary choices that significantly influence results, thus supporting a dashboard approach (see Composite Indicators Advantages and Disadvantages) (Saltelli, 2007, p. 68).

Table 3

Composite Indicators Advantages and Disadvantages

Advantages of composite indicators	Disadvantages of composite indicators
• They capture reality in a simplified manner that can garner the attention of the public and policymakers (Nardo et al., 2005, p. 8; Saltelli, 2007, p. 68); • They are easier to interpret than various separate indicators (Moreira & Crespo, 2016, p. 142; Nardo et al., 2005, p. 8); • They facilitate comparisons between units (i.e. communities) and across time (Moreira & Crespo, 2016, p. 142; Nardo et al., 2005, p. 8).	• If poorly constructed, CIs may send misleading policy messages or result in simplistic policy conclusions (Nardo et al., 2005, p. 8; Saltelli, 2007, p. 69); • The construction process may be the target of disagreement or political challenge (Nardo et al., 2005, p. 8; Saltelli, 2007, p. 69); • They may be unable to provide more information than a single well-chosen indicator (Moreira & Crespo, 2016, p. 141); • They may increase the amount of data required in the analysis (Kovacevic, 2010, p. 36; Saltelli, 2007, p. 69).

Given these advantages and disadvantages, CIs should be carefully constructed to ensure that their benefits outweigh their costs. In rural policy, the main advantage of using a CI over a dashboard approach relates to the ease of comparing and ranking communities. It is much easier to compare a single score than a series of indicators. Saltelli (2007, p. 68) argues that the usefulness of CIs lies in their ability to draw political attention to a topic and, as such, their creation is driven by a need for advocacy. In this

sense, when used to support policy decisions, CIs should be considered along with its disaggregated indicators (Kovacevic, 2010, p. 36).

3.3 Composite Indicator Construction

This subsection briefly discusses the necessary steps in CI construction. The *Handbook on Constructing Composite Indicators: Methodology and User Guide* (Nardo et al., 2005) - a key reference in the literature – lists a series of 10 steps in CI construction. This work seeks to create a common guideline to support CI development and increase the soundness and transparency of the process (Greco et al., 2019, p. 63). Based on the handbook, the following eight steps are covered in this section:

1. Developing a theoretical framework
2. Selecting variables
3. Checking data structure
4. Dealing with missing data
5. Normalizing indicators
6. Weighing indicators
7. Aggregating indicators
8. Validating the composite indicator

The goal of this discussion is to present certain quality guidelines to help ensure that the tools created to synthesize, interpret and communicate rural community conditions present accurate information that supports good policy decisions.

3.3.1. Developing a Theoretical Framework

The first step in creating a CI or dashboard is to develop a sound theoretical framework (Booysen, 2002, p. 118; Nardo et al., 2005, p. 12). A theoretical framework defines the phenomenon that will be measured, identifies its dimensions, and determines the type of indicators to be included (Burchi & De Muro, 2016, p. 121). In policy areas where multidimensional concepts still do not have a clear theoretical and empirical underpinning, the need for a clear theoretical framework is even stronger (Nardo et al., 2005, pp. 12–13). The variation in the concepts of rurality and rural development discussed in the previous section underlines the need for a clear definition of what is being measured because the meaning given to a concept can drastically change how a CI is built and the results it achieves (Booysen, 2002, p. 118). From a practical standpoint, at the end of this step, CI developers should have a clearly defined concept of what is being measured rooted on a strong theoretical framework; a set of sub-groups that represent the different dimensions of the multi-dimensional concept being measured (i.e. economic, social, environmental, etc.); and selection criteria for the indicators included in each sub-group (Nardo et al., 2005, pp. 12–13).

3.3.2. Selecting Variables

The success of a measurement tool largely depends on the quality of its underlying variables (Nardo et al., 2005, p. 13). The variable selection process is based on a combination of theory, empirical analysis, availability and intuitive appeal, as well as political and policy considerations, since these tools are generally designed to inform the debate on a specific issue of interest (Booysen, 2002, p. 119). As such, the impossibility of selecting indicators in a purely objective manner is widely accepted (Booysen, 2002, p. 122; Kovacevic, 2010, p. 5). Nevertheless, certain quality considerations should guide the variable selection process. Nardo et al. (2005, pp. 32–35) suggest that the following dimensions be considered:

- Relevance: the degree to which the indicator is relevant for the objective of the tool. That is, does the variable help understand the phenomenon defined in the theoretical framework?
- Accuracy: the degree to which the indicator correctly measures the phenomenon it is intended to measure.
- Timeliness: the time gap between an event and the availability of the indicator that describes it.
- Accessibility: the ease with which users can locate and access the indicator in its source.
- Interpretability: the level of difficulty to properly interpret, analyze and use the indicator.
- Coherence: the degree to which data is consistent and logically connected. It requires maintaining consistency in conceptualization, terminology and methodology.

To these quality dimensions, Kovacevic (2010, p. 5) adds non-redundancy, which means that there should be no data duplication or, in a broader sense, that indicators that measure the same variable should not be included in the model. While Booysen (2002, p. 122) posits that database width - the size and comprehensiveness of the sample – should also be considered in the selection process to ensure statistically significant results.

Aside from data quality considerations, variable selection requires a difficult balance between complexity and simplification (Booysen, 2002, p. 121). Ensuring that the information included in a CI or dashboard is easily communicable and of interest to a range of stakeholders requires using a manageable number of consistent and unambiguous indicators (Blanke & Walzer, 2013, p. 538; Kovacevic, 2010, p. 5). Accordingly, it is necessary to avoid adding too many variables and components, while refraining from omitting relevant variables and oversimplifying the model (Booysen, 2002, pp. 121–122). Although there is no easy way to determine an ideal selection of indicators, including stakeholders in the selection process, as well as using statistical tools to test variables may help to determine what the key variables are (Blanke & Walzer, 2013, p. 538).

Also relevant is the distinction between input, output and outcome variables. The literature on CIs tends to agree that different types of variables should not be mixed (Booysen, 2002, p. 120; Burchi & De Muro, 2016, p. 126), as variables should match the purpose of the intended tool (Nardo et al., 2005, p. 14). That is, if the tool's purpose is to measure ends, it should only include outcome variables and, when these are not available, output variables as proxies. In contrast, if it is created to measure means, then input variables are a better choice. For example, rural development grants received measures an input, while growth in business incorporations measures an output and income per capita measures an outcome. Organizing variables in input, output and outcome categories is not always straightforward, because the output of a process may be the input to a different process. Despite this difficulty, it is recommended that CI developers attempt to follow this division (Booysen, 2002, p. 120; Burchi & De Muro, 2016, p. 126; Nardo et al., 2005, p. 14). When measuring development or well-being there are at least two key advantages in focusing on outcomes: (1) measuring outcomes gives communities the flexibility to determine how they want to achieve the desired outcomes (Kovacevic, 2010, p. 6); (2) it does not rely on the - often strong - assumption that there is a direct relationship between inputs and outcomes (Burchi & De Muro, 2016, pp. 129–130).

A different categorization distinguishes between stock and flow variables. Stock variables are a snapshot of an existing quantity that may have been accumulated in the past (i.e. education level), while flow variables are measured over a determined interval of time (i.e. unemployment rate) (Kovacevic, 2010, p. 6). Although it is not necessarily a problem to mix stock and flow variables if there is theoretical

reasoning behind it, stock variables can make a CI less responsive to policy changes and external impacts (Burchi & De Muro, 2016, pp. 133–134). Since stocks are accumulated over time, they are less sensitive to short-term shocks. For instance, while a community's population size (stock) is unlikely to change drastically due to the COVID-19 pandemic, the unemployment rate (flow) will probably capture significant changes. Thus, if the goal of the CI is to capture short-term impacts, it should only include flow variables.

At the end of this step, the CI developer should have analyzed the quality of available indicators, evaluated their strengths and weaknesses and develop a table summarizing data characteristics, such as source, availability, type, etc. (Nardo et al., 2005, p. 14).

3.3.3. Checking the Data Structure

Nardo et al. (2005, p. 14) suggest performing some preliminary statistical tests before continuing with the CI construction. These tests aim to uncover the relationship between the selected indicators, which is especially important for CIs, where poor variable selection may lead to confusing or misleading indices. Understanding the relationship between variables will help guide the next steps of CI construction. Multivariate analysis techniques, such as principal components analysis (PCA), factor analysis (FA), or Cronbach coefficient alpha (c-alpha) can be applied to gain insight into the data structure (Nardo et al., 2005, p. 14). While PCA and FA transform "correlated variables into a new set of uncorrelated variables using a covariance matrix or its standardized form – the correlation matrix" to determine the association between variables and how they change in relation to one another, c-alpha does that by estimating the internal consistency of the variables included in the model (Nardo et al., 2005, p. 14). Describing these techniques in detail is outside the scope of this project – the point here is to outline the importance of understanding how variables connect to and influence one another, and assessing how these interactions can affect the overall model.

3.3.4. Dealing with Missing Data

When working with various community-level indicators, some of the indicators will likely have missing data for certain communities. When these situations arise, one must determine how to deal with the missing data. Three courses of action may be taken: ignoring missing data, case deletion and data imputation (Farrugia, 2007, p. 14; Nardo et al., 2005, p. 17). The first and simplest option is to ignore missing observations and calculate the CI using only the available indicators for each community. However, Farrugia (2007, p. 14) cautions that this process may reduce comparability between communities and affect the credibility of the CI. The comparability issue relates to the fact that community scores are determined by different sets of indicators weighted differently, while the credibility issue arises from the user's need to verify data availability for the community of interest to interpret results.

The second approach for dealing with missing data is called case deletion. Case deletion refers to the process of deleting all cases with missing values from the analysis (Jakobsen et al., 2017, p. 3). By removing communities with missing data, one can ensure that the CI results for the communities included are derived from the same set of indicators, ensuring comparability. However, case deletion has important drawbacks for CI construction. First, removing communities from the CI could reduce its comprehensiveness and utility for policy use. Second, if the missing data are not missing completely at random (MCAR), case deletion may create biases in the analysis (Nardo et al., 2005, p. 17). For instance,

if missing data is correlated to community size, then case deletion would result in the CI covering only larger communities. As such, a rule of thumb is that case deletion should only be used if data are missing at random and the proportion of missing data for a variable is below 5% of the sample size (Jakobsen et al., 2017, p. 3; Nardo et al., 2005, p. 17).

If missing data risks the representativeness or the statistical significance of the data, data imputation techniques may be considered (Booysen, 2002, p. 122). Missing data can be corrected by single or multiple imputation (Nardo et al., 2005, p. 17). Single imputation substitutes missing data by values estimated by a predetermined rule (Jakobsen et al., 2017, p. 3). There are many forms of single imputation, some of which may be applied to the analysis of communities. Nardo et al. (2005, p. 52) present the following imputation methods:

- Hot deck imputation: replaces missing values with data drawn from a similar community. This could be based on population size, location, economic structure, etc.
- Cold deck imputation: replaces missing values with data from an external source, such as a previous version of the same survey or from a different survey.
- Mean, median or mode imputation: replaces missing values with the mean, median or mode for the relevant indicator.
- Regression imputation: replaces missing values with a value estimated through a regression on a highly correlated indicator.
- Expectation maximization imputation: replaces missing values through an iterative estimation process.

Unlike case deletion, single imputation methods do not depend on missing data being MCAR but instead rely on the specific assumptions of the imputation technique, which are often unrealistic and may lead to biases (Jakobsen et al., 2017, p. 3). For instance, a hot deck imputation that assumes communities of comparable populations sizes have similar demographic structures may lead to distortions in the CI. In contrast, their main advantage is simplicity and ease of understanding (Nardo et al., 2005, p. 53).

Finally, multiple imputation is a "simulation-based statistical technique for handling missing data" (Jakobsen et al., 2017, p. 4). The data is imputed multiple times using a random sample of plausible values to create multiple complete datasets, analysis is performed on each dataset to estimate the parameters of interest, then results from each analysis are aggregated into a single imputation result (Jakobsen et al., 2017, p. 4; Nardo et al., 2005, p. 55). Single regression analysis, monotonic imputation and the Markov chain Monte Carlo are examples of multiple imputation methods (Jakobsen et al., 2017, p. 5). Due to their complexity and the scope of this project, these methods will not be discussed here, but it should be noted that the main advantage of multiple imputation methods is that they account for the additional uncertainty created by the missing data (Nardo et al., 2005, p. 58). Regardless of the chosen method, data imputation should always be used parsimoniously because although they may reduce bias and create a "complete" dataset, even the most sophisticated methods rely on strong assumptions that may not hold (Nardo et al., 2005, p. 17).

3.3.5. NORMALIZING INDICATORS

Given that the indicators that comprise a CI seldom use the same scales and measurement units, data normalization is generally required to make them comparable. Using unscaled indicators is not desirable,

as they cannot be meaningfully compared or aggregated (Booysen, 2002, p. 123). Nardo et al. (2005, p. 20) describe various normalization methods, which are presented in Table 3 below:

Table 4

Normalization Methods for CIs

Method	Description	Pros	Cons	Equation
Ranking	Ranks communities from first to last based on results in each indicator.	• Simplest normalization method. • Not affected by outliers. • Easy to track relative performance over time.	• Performance in absolute terms cannot be evaluated. • Ordinal scale.	$I_{qc}^{t} = Rank(x_{qc}^{t})$ [1]
Standardization (z-scores)	Converts indicators to a scale with mean zero and standard deviation of one.	• Cardinal scale. • Extreme values have a greater effect on the index result.	• Range of results for each indicator may vary	$I_{qc}^{t} = \frac{x_{qc}^{t} - x_{qc=\bar{c}}^{t}}{\sigma_{qc=\bar{c}}^{t}}$ [2]
Re-scaling	Normalizes indicators to have an identical range, generally between 0 and 1.	• Cardinal scale. • Identical ranges for all indicators.	• Scale can be distorted by outliers.	$I_{qc}^{t} = \frac{x_{qc}^{t} - \min_{c}(x_{q}^{t_0})}{\max_{c}(x_{q}^{t_0}) - \min_{c}(x_{q}^{t_0})}$
Distance to a reference	Measures indicators as the relative position to a reference point (i.e. best performing community)	• Cardinal scale. • Shows how far a community is from a certain level of performance.	• Based on extreme values, which could be unreliable.	$I_{qc}^{t} = \frac{x_{qc}^{t}}{x_{qc=\bar{c}}^{t_0}}$ [3]
Categorical scale	Creates categories (often based on percentiles) and gives communities in each category the same score.	• Cardinal scale. • Simple and unaffected by outliers.	• Excludes large amounts of information. • May distort data when the variation in the original data is small.	$I_{qc}^{t} = \begin{cases} 25 \; if \; x_{qc}^{t} \in \{p^{25th}\} \, perc \\ \dots \\ 100 \; if \; x_{qc}^{t} \in \{p^{100th} - p^{75th}\} \, perc \end{cases}$

[1] Where, x_{qc}^{t} is the score for indicator q for community c at time t, and I_{qc}^{t} is the normalized value of the indicator.

[2] Where, $x_{qc=\bar{c}}^{t}$ is the average score for indicator q, and $\sigma_{qc=\bar{c}}^{t}$ is the standard deviation of indicator q.

[3] Where, $x_{qc=\bar{c}}^{t_0}$ is the indicator value for the reference country at the initial period.

Indicators above or below the mean	Indicators above, below and around the mean receive scores of +1,-1 and 0, respectively.	• Cardinal scale. • Simple and unaffected by outliers.	• Excludes large amounts of information. • The threshold level is arbitrary.	$I_{qc}^{t} = \begin{cases} 1 & \text{if } w > (1+p) \\ 0 & \text{if } (1-p) \le w \le (1+p) \\ -1 & \text{if } w < (1+p) \end{cases}$ where $w = x_{qc}^{t} \Big/ x_{qc=\bar{c}}^{t_0}$

The choice of normalization process can significantly impact CI results, and choosing an appropriate method is a complex task that needs to consider the structure of the data and the objectives of the particular CI (Nardo et al., 2005, p. 19). Further, Booysen (2002, p. 126) argues that the normalization process needs to balance the width of the range and the spread of the CI score, such that scores are not so close that communities cannot be distinguished from each other or so widely spread that comparable communities do not receive similar scores.

3.3.6. WEIGHING INDICATORS

There is little consensus on how to choose a weighting scheme, making it one of the hardest steps in CI construction (Greco et al., 2019, p. 64). They are contentious because weights are value judgements that can directly impact the results of a CI (Booysen, 2002, pp. 127–128; Nardo et al., 2005, p. 21). The subjectivity involved in this decision may put into question the credibility of a CI. As an attempt to reduce subjectivity, various approaches have been used to determine weights. These approaches can be grouped into three categories: equal weighting, participatory approaches and statistical approaches.

Equal weighting (EW) is the most commonly used approach in CI development (Greco et al., 2019, p. 66; Nardo et al., 2005, p. 21). It implies either distributing weights uniformly across indicators or distributing weights uniformly across dimensions (Greco et al., 2019, p. 66). In the second case, if dimensions include varying numbers of indicators, each indicator would have different weights. which might result in an unbalanced CI structure (Nardo et al., 2005, p. 21). There are a variety of arguments to support the use of equal weights, such as objectivity, simplicity, lack of theoretical justification for a different weighting scheme, and lack of agreement between decision-makers (Greco et al., 2019, p. 66). In this sense, some authors argue that due to the subjectivity of choosing weights, EW should be the standard and the burden of proof placed on differential weighting approaches (Booysen, 2002, pp. 127–128).

However, Greco et al. (2019, p. 66) point out that EW is often not adequately justified. They suggest that EW may result in significant oversimplification costs when it is used instead of alternative approaches rooted in a solid theoretical framework. Furthermore, they argue that the objectivity of EW may be disputed, stating that it is as subjective as other arbitrary weighting schemes. Finally, certain aspects of the data structure may result in implicit weighting that causes indicators to have different weights. First, if two or more indicators are highly correlated, they may be measuring the same underlying variable, which would mean the variable was being double-counted. In which case, its weight in the overall CI would be equal to the sum of the weights given to each indicator (Nardo et al., 2005, p. 21). Second, different ranges of variation between indicators may result in those indicators with higher variability to have an added implicit weight relative to others (Kovacevic, 2010, p. 34). Both issues may be fixed by assigning lower weights to the relevant indicators.

In contrast, participatory approaches rely on consultations with a range of stakeholders - such as experts, policymakers, analysts and citizens - to determine the weighting scheme (Booysen, 2002, p. 126; Nardo et al., 2005, p. 22). Budget allocation and the analytic hierarchy process (AHP) are participatory approaches that may be used in the weighting process (Nardo et al., 2005, p. 22). In the budget allocation approach, stakeholders are given a certain amount of points to allocate over a set of indicators based on their importance. The AHP, in contrast, uses rotating pairwise comparisons of indicators to determine their relative importance. These methods may be theoretically ideal for determining weights when they involve the full range of stakeholders in open debate, but they also have limitations. Participatory methods require a certain degree of consensus among stakeholders regarding policy direction and objectives, otherwise, the process may result in an endless debate

(Greco et al., 2019, p. 67). Additionally, these approaches are best-suited to CIs that have a small number of indicators (i.e. less than 10), as they can become overwhelming to participants when too many indicators are involved (Nardo et al., 2005, p. 22). Finally, AHP may result in intransitive relations, where option A is preferred to option B, and option B is preferred to option C, but option C is preferred to A. However, there are tools to identify and help the decision maker deal with these inconsistencies (Forman & Gass, 2001, pp. 476–477)

Finally, statistical approaches attempt to increase objectivity by using the data itself to derive indicator weights (Booysen, 2002, p. 127). Principal component analysis, factor analysis and data envelopment analysis, are some of the tools that can be used to determine weights endogenously (Nardo et al., 2005, pp. 21–22). Each of these represents diverse methodological approaches that rely on a different set of assumptions. Aside from the added complexity, and the methodological limitations of each statistical approach, their main criticism is of a philosophical nature, relating to the difference between what is and what ought to be (Greco et al., 2019, p. 69). By relying on the statistical relation between indicators to determine weights, this approach focus on what the data demonstrates to be the most important indicators (what is), which may not reflect what is most important for policymakers and citizens (what ought to be).

This brief review demonstrates that there is no single best approach that can be universally employed. As such, the choice of weighting scheme must be based on the purpose of the CI, the theoretical framework in which it is built, and the availability of data and knowledge.

3.3.7. AGGREGATING INDICATORS

Following the weighting process, indicators need to be aggregated into a single composite score. A useful way to categorize aggregation methods is separating compensatory and non-compensatory approaches (Greco et al., 2019, p. 75). The key difference between the two is that compensatory approaches allow poor performance in one indicator to be offset by good performance in another. Linear and geometric aggregation methods are examples of compensatory approaches, while the non-compensatory multi-criteria approach (MCA) is an example of a non-compensatory approach.

Linear aggregation is the most popular method in CI construction (Greco et al., 2019, p. 75; Nardo et al., 2005, p. 75; Paruolo et al., 2013, p. 610). Linear aggregation creates a single CI score through the summation of normalized and weighted indicators (Nardo et al., 2005, p. 75). When all indicators are given equal weight, this aggregation process is simply the average value of all indicators. Despite its simplicity, this additive approach has important methodological repercussions. First, it assumes preference independence, which according to Nardo et al. (2005, p. 75) implies that the trade-off ratio between two variables is independent of the values of all other variables in the model. This assumption may not hold as synergies and conflicts between variables tend to exist. Second, it assumes full compensability between indicators, which means that poor performance in one indicator can be perfectly compensated by good performance in another. For many phenomena, full compensability is also a very strong assumption (Nardo et al., 2005, p. 79). In rural development, full compensability could mean, for example, that low access to services or high environmental degradation may be fully compensated by a low unemployment rate or a high household income.

In contrast, geometric aggregation only allows for partial compensability (Nardo et al., 2005, p. 22). It is a multiplicative process where indicators are exponentiated by their weights and multiplied together to achieve a CI score. As such, it offers inferior compensability for indicators with lower values, thus creating diminishing returns, as opposed to the constant trade-off assumed in linear aggregation (Greco et al., 2019, p. 76). For instance, a community with high poverty rates would be unable to fully

compensate for poor performance in this indicator by improving performance in other indicators. Similarly, diminishing returns means that an improvement in a low-performing indicator has a much stronger impact on the CI's overall score than a similar improvement in a high performing indicator (Nardo et al., 2005, p. 79). Given these advantages, well-established CIs, such as the Human Development Index (HDI), have moved from linear to geometric aggregation (Greco et al., 2019, p. 79).

However, a key problem that affects both linear and geometric aggregation is the fact that, when compensability is allowed, weights become a measure of the trade-off rate between pairs of indicators, instead of a measure of the importance of an indicator to the overall CI (Greco et al., 2019, p. 69). In other words, although weights are generally conceived as a measure of importance, they represent the amount a community would have to increase one indicator to compensate for a decline in another. As such, non-compensatory approaches should be employed if one wishes for weights to function as a measure of importance (Nardo et al., 2005, p. 22). By not allowing for any compensability, in MCA weights become strictly a measure of how much an indicator score should contribute to the overall result of the CI. MCA aggregates scores in two steps: " (1) pair-wise comparison of units according to the whole set of indicators and (2) ranking of units in a partial, or complete pre-order" (Munda & Nardo, 2009, p. 1516). This method has important advantages over compensatory approaches, such as the freedom from the preference independence assumption, the ability to combine qualitative and quantitative data, and the fact that it does not require indicators to be normalized. However, its drawbacks include the loss of information on preference intensity (it uses only ordinal information), as well as higher calculation cost and complexity (Nardo et al., 2005, p. 79). Nevertheless, there is also a cost to simplification that should be considered when using linear aggregation methods (Paruolo et al., 2013, p. 631).

3.3.8. VALIDATING THE COMPOSITE INDICATOR

The last step in CI construction is to test, adjust and validate the index. As shown in this section, CI results are dependent on a series of choices with no single best answer. The processes of indicator selection, normalization, weighting and aggregation bear direct influence on CI results, and poor or incompatible choices may lead to meaningless results (Greco et al., 2019, p. 80). Often, despite weighting and aggregation processes being made explicit, their implications are not fully understood or assessed by developers (Paruolo et al., 2013, p. 631). The validation step helps developers understand the implication of their choices on final results and reduces the chances of producing meaningless results (Booysen, 2002, p. 129; Greco et al., 2019, p. 81).

Common procedures in the validation process are uncertainty and sensitivity analysis. Greco et al. (2019, p. 81) describe uncertainty analysis (UA) as the changes that are observed in CI results stemming from potentially different choices in the construction process. Ideally, UA should assess all potential sources of uncertainty. Some key steps in the process are (Nardo et al., 2005, p. 24):

- Including and excluding indicators
- Using alternative data imputation methods
- Using alternative normalization methods
- Using different weighting schemes
- Using different aggregation methods

Through these steps, the overall index value, the difference in values between two communities of interest and the average shift in the rank of each community should be captured and monitored (Greco et al., 2019, p. 82). In contrast, sensitivity analysis (SA) studies how much of the variance in the CI

result can be attributed to each source of uncertainty (Farrugia, 2007, p. 23). A sensitivity index is computed to show the amount of uncertainty that would be reduced if a source of uncertainty was removed from the CI (Nardo et al., 2005, p. 24). Another validation approach is to calculate the correlation between the CI and a measurable variable that is linked to the phenomenon of interest (Nardo et al., 2005, p. 24). For instance, it could be argued that there is a link between rural development and population growth. As such, a high correlation between a CI that measures rural community development and population growth could suggest a well-built CI.

Applying these techniques can improve the robustness of the CI and help demonstrate its usefulness. However, robustness is not a validation of a sensible index, but simply a way to assess the fit of the model and to understand the impacts of certain choices on the observed results. Instead, the sensibility of a CI is determined by the quality of the theoretical framework that underlies its construction (Greco et al., 2019, p. 84).

3.4. Conclusion

This section briefly discussed the challenges associated with the use of rural data, especially for small and remote communities. Then, it outlined the advantages and disadvantages of using CIs as tools for measuring multidimensional phenomena. The difficult choice between aggregating indicators to create a CI and simply using a series of disaggregated indicators requires careful consideration. It appears that the key advantages of CIs lie in their ability to easily communicate and draw attention to multidimensional phenomena, while also facilitating comparisons. Due to RPP's goals, which include comparing and ranking communities, it appears that a CI is the best approach. While a dashboard of disaggregated indicators provides more information than a CI, it makes ranking communities based on their overall conditions difficult because one would have to compare various separate indicators and implicitly make choices regarding their relative weights.

Yet, if poorly constructed, the apparent simplicity with which CIs measure complex phenomena may misinform users and lead to bad policy decisions. Greco et al. (2019, p. 80) use the example of the Shanghai Ranking - a widely criticized measure of the top 500 universities in the world - to demonstrate how even a poorly constructed CI can still attract significant attention and influence policy decisions. For this reason, this section focused on briefly discussing each of the key steps in CI construction. This was not meant to be a comprehensive exploration, but to bring attention to the complex choices involved in CI construction and their potential implications to results. Therefore, the key takeaway from this section is the understanding that to provide useful policy guidance, the complex decisions involved in constructing a CI must be rooted in a carefully developed theoretical framework. Otherwise, the CI may create an illusion of knowledge and lead to poor policies that are ineffective or even harmful to rural communities.

4.0 A Jurisdictional Scan of Composite Indicators

Many initiatives have attempted to understand and communicate local conditions in a rural context through diverse theoretical frameworks and methodological approaches. Regarding theoretical frameworks, this section will review measuring initiatives that have used the lenses of rural development, local economic development (LED), community resilience and community well-being to assess local conditions. While the concept of rural development has been discussed in Section 1, it is important to briefly define the other three concepts.

LED is a concept that does not have one unanimously accepted definition (Pavel & Moldovan, 2019, p. 2). LED definitions are diverse as they may focus on different aspects of the concept, such as economic growth, structural change and communalization (Krawchenko, 2016, p. 14). However, a common theme among these definitions is a focus on the endogenous nature of development (Krawchenko, 2016, p. 7; Pavel & Moldovan, 2019, p. 2), where the community leads the process of finding solutions to their local problems to build long-term capacity and achieve development that integrates economic, social and environmental goals (Markey et al., 2008a, p. 341). In contrast, community resilience is concerned with the capacity of a territory (e.g. community, district, region) to prepare, resist (short-term) and adapt (long-term) to changes or shocks (Breen, 2017, p. 18; Sánchez-Zamora et al., 2014, p. 12). The concept of community resilience is rooted in a social-ecological systems approach (Salvia & Quaranta, 2017, p. 3) that recognizes the connection between socio-economic and environmental systems, leading to stronger consideration of environmental factors in the development process (Breen, 2017, p. 20). Finally, community well-being is another multidimensional concept built on the understanding that economic development should be viewed as part of a broader development goal that includes social and environmental conditions (OECD, 2016b, p. 184). Well-being focuses on people and not on the economy, as there might be important differences between the economic performance of a territory and the well-being experiences of its inhabitants (Durand, 2015, p. 6). However, the focus on people does not mean communities are left out of the analysis, instead, they are evaluated based on the quality of life they provide to its residents (Stiglitz et al., 2009, p. 134).

The multidimensionality of the concepts of rural development, LED, community resilience and community well-being makes their quantification difficult, as there is no single indicator that can accurately measure them. As a result, CIs have been extensively used in their measurement due to their ability to aggregate and summarize information from a variety of indicators. Thus, most of the initiatives presented in this section are CIs, which does not mean that the use of CIs is required. Although they have the advantage of facilitating the comparison and ranking of communities, disaggregated indicators may also be used to assess local conditions.

This section presents a brief overview of initiatives, discussing their purpose, structure and variables, key methodological aspects (e.g. normalization, weighting and aggregation), limitations and key consideration regarding their ability to help guide RPP's efforts to understand community conditions. The initiatives included in the section are listed in Table 4. They come from Canada and seven other countries, which have diverse rural realities and overall stages of development. As a result, the choice of indicators varies significantly not only due to the contextual nature of these measurement efforts but also due to their goals and the availability of data in each country. For these reasons, and given the purpose of the section, the overview of each initiative focuses on their structure and methodological choices and not on their findings, as these tend to be location-specific.

Table 5

Initiatives Measuring Local Conditions

Framework	Index/Study	Location	Purpose	Unit of Analysis	Dimensions
Rural Development	Rural Economic Capacity Index	Newfoundland & Labrador	Provide communities with information on socioeconomic conditions to support policy decisions and regional collaboration	Community	Demography, Economic Structure, Income, Service Level, Spatial Location, Governance
	Rural Development Index	Vietnam	Comprehensively evaluate the level of development in rural areas and draw lessons for improving rural well-being.	Region	Economy, Health & Welfare, Education, Environment, Culture & Leisure
	Rural Development Index	Poland / Slovakia	Measure the level of rural development and quality of life through a multidimensional lens.	District	Economic, Social, Environmental, Demographics, Administration, Infrastructure
Local Economic Development	Local Economic Development Index	Romania	Explore the connection between the LED index and a set of exogenous factors.	Commune (Rural Community)	Economic (Market Indicators)
	Indicators to Inform Local Economic Development	England	Identify indicators to measure 11 factors considered relevant to LED.	Local Authority District	Location, Physical, Infrastructural, Human Resource, Finance & Capital, Knowledge & Technology, Industrial Structure, Business Culture, Community Identity, Quality of Life
Community Resilience	Indicators of Resilience for Rural Communities	New Zealand	Understand resilience in a rural context and develop a measure that could be incorporated in the policymaking process	Community	Economic, Environmental, Social, Institutional, Cultural
	Territorial Resilience Index	Spain	Identify characteristics associated with resilience in rural areas to help guide the design of policies that support adaptation efforts.	County	Index: Economic, Demography Descriptive Indicators: Economic, Social, Human, Natural
	Factors of Resiliency for Forest Communities in Transition	British Columbia	Present a framework to assess community resilience in B.C.'s forest reliant communities	Community	Economic Diversity, Financial Resources, Natural Resources, Local Control Over Enterprise, Planning, Smart Design, Policy Control, Good Governance, Human Capital, Attitude, Community Attractiveness, Information, Geography, Health
Community Well-Being	Community Well-Being Index	Canada	Measure of well-being for Indigenous and non-Indigenous communities across Canada	Community	Income, Labour Force, Education, Housing
	Community Accounts Composite Well-Being Score	Newfoundland & Labrador	Measure well-being in communities to allow users to understand the factors that affect progress in communities.	Community	Not structured around dimensions. Includes indicators on population, migration, income, employment, poverty, education, subjective well-being.

4.1. Measuring Rural Development

4.1.1. The Rural Economic Capacity Index (Newfoundland & Labrador)

The Rural Economic Capacity Index (RECI) is an initiative of the Memorial University in Newfoundland and Labrador. RECI was developed to address two issues faced by rural communities in that province: (1) the lack of information about local socioeconomic conditions to help communities assess their best options for development and (2) the difficulty of collaborating regionally to avoid the pressures for aggregation due to demographic decline (Simms et al., 2014, p. 351). As such, RECI was built to provide communities with a set of socioeconomic and demographic information aggregated in a way that is easy for local leaders to understand and apply to policy decisions. Additionally, it allows users to see the metrics at different levels of aggregation to see how conditions may change if regions work collaboratively (Simms et al., 2014, pp. 351–352). The information from RECI is publicly available at http://reci.ucs.mun.ca/index.php.

Structure

The RECI was built around 8 components considered relevant to community economic capacity, namely (Simms et al., 2014, pp. 354–357):

- Demography: recognizes that age structure, workforce size, education level and participation rates influence community viability and productivity.
- Economic Structure: relates to the stability of the economy, workforce utilization, entrepreneurial potential and proximity to larger markets.
- Income: a measure of workforce utilization.
- Service Level: access to basic services as measured by distance to certain facility types.
- Spatial Location: incorporates distance factors that impact local economies.
- Governance: a measure of the viability of not-for-profit organizations and community councils
- Labour Supply: workforce characteristics
- Labour Demand

Components contain a set of individual indicators based on 25 specific data series, mostly drawn from Community Accounts, a ‘comprehensive Internet-accessible public database for communities that provides a wide range of social, economic, and health data at the community level’ developed by the Government of Newfoundland and Labrador (Simms et al., 2014, pp. 354–355). Due to data availability issues and the focus of the initiative on community economic viability, RECI uses a narrow definition of economic well-being, which excludes broader variables that may be important for well-being, such as life expectancy, education levels, access to leisure, etc. (Simms et al., 2014, p. 352). Table 5 (Simms et al., 2014, pp. 355–357) lists the variables included in the index.

Table 6

RECI Variables and Description

Component	Variable	Description
Demography	Age Structure	Measures the relative sizes of different age groups in the labour force against demographic growth models
	Participation Rate	Measures the percentage of eligible people who are in the workforce
	High School Completion	Measures the percentage of the workforce that has a high school diploma and is associated with labour market quality
	Total Population	The size of a community represents labour market capacity as well as the ability of the labour market to support local services.
	Working Age Population	Represents the percentage of the population between the ages of 16 and 65 years.
	Education Level	A measure of the degree of homogeneity between workers who did not complete high school, completed high school, finished college/trade school, earned a bachelor's degree, and those with graduate degrees.
	Non-University but Postsecondary	This refers to the percentage of the workforce that has a college or trades diploma.
Economic Structure	Percentage Primary Versus Secondary Industries	Measures overexposure to resource availability and market volatility.
	Self-Employment Ratio	Measures local creativity and internal growth - entrepreneurship can be an important factor when assessing the viability of smaller rural communities.
	Employment Insurance Ratio	Refers to the percentage of earnings in a community derived from employment insurance
	Distance to Retail Center	Based on road distance and proximity to retail centers – measures remoteness
	Three Largest Employers' Share	Assesses the reliance of communities on its three largest employers.
Income	Market Income	Refers to the percentage of a community's income that is derived from market sources.
	Transfer Payment Income	Based on the percentage of a community's income that is derived from government transfer payments.
Service Level	Distance to Post Office	As the population declines to a predetermined threshold, the postal service is generally discontinued within a community. The proximity to a post office is viewed as a competitive advantage for a community.
	Distance to High School	Proximity to a high school is considered a competitive advantage.
	Distance to Hospital	Proximity to a hospital not only provides access to health care but recent studies indicate that hospitals also generate significant spinoffs to a local economy.
Spatial Location	Distance to Urban Center	Measures access to the province's largest urban centers as well as all the amenities and opportunities associated with the centers.
	Distance to Trans Canada Highway	Measures access to the province's primary transportation network and the opportunities that are associated with it.
	Distance to Tourist Destination	Measures proximity to provincially listed tourist destinations. Nearness to a tourist destination identifies a potential to capitalize on spin-offs generated by tourists visiting the region.
Governance	Grants Received	The score is calculated from the value of grants that a municipality applied for and received from other levels of government.
	Elected Officials Turnover	A composite score that assesses whether a municipality participated in the most recent election and, if yes, what was the voter turnout.
	Part of Multi-community Organization	Sum of the number of multi-community organizations that a municipality participates in.
	Volunteer Organizations	A measure of how proactive a community is in attracting volunteers from the existing workforce.

Methodology

The RECI uses a fuzzy function to scale each indicator to a +1, -1 interval, where -1 represents the lowest raw score and +1 the highest raw score (Simms et al., 2014, p. 355). The fuzzy function returns larger values for extreme values as compared to a linear transformation. Simms et al. (2014, p. 357) explain the choice of a fuzzy function because 'values close to the average are not as different as extreme values and should be considered as comparable'. As such, the normalization method gives stronger rewards/penalties to exceptional results in comparison to results closer to the average. The function used in RECI is shown below:

$$f(x)\begin{cases} 1\ for\ x = Max \\ \left(\frac{x}{Max}\right) for\ Max > x > 0 \\ \left(\left(\frac{(x-Min)}{(-Min)}\right) - 1\right)^{4} for\ 0 \geq x > Min \\ -1\ for\ x = Min \end{cases}$$

where x is a score for any input variable and 0 represents the mean value for the variable. As with various rescaling methods, this fuzzy transformation can be distorted by outliers.

In the RECI, variables are weighted equally (Simms et al., 2014, p. 352), however 'individual and composite scores are based on the concept of comparative advantage, and if a region scores a plus on a majority of the inputs, it will have a comparative advantage over its neighbours with lower scores (Simms et al., 2014, p. 357). As such, a score of +0.10 means a community is 10% better than the average, which indicates a small competitive advantage in the given variable. To achieve a single composite score for a community, RECI aggregates results using a linear aggregation method, which with equal weights is simply the average score of all variables.

Limitations

- The RECI website does not present a detailed methodology. This does not allow users to fully understand how results were achieved or identify possible limitations.
- The use of equal weights to aggregate variables may not be a realistic assumption.
- The study does not describe how missing data was dealt with.
- There is no discussion of statistical analysis to understand the data structure and support the choice of variables.

Key Considerations

- The RECI has a relatively straightforward construction, thus making results easy to interpret and communicate.
- RECI's results are available online and can be visualized using different units of analysis.

4.1.2. THE RURAL DEVELOPMENT INDEX (VIETNAM)

The Rural Development Index (RDI) was developed to 'analyze the current status and process of Vietnam's rural development to draw lessons for improving the quality of rural life and achieving

[4] This formula, as presented in the source paper, appears to yield results lower than -1, which would be counterintuitive and outside the proposed range. The formula $\left(\left(\frac{(x-Min)}{x}\right) - 1\right)$ appears to yield the expected results.

sustainable rural development in Vietnam (Kim & Yang, 2016, p. 118). Its purpose was to comprehensively evaluate the level of development in the rural areas of Vietnam's 63 regions (Kim & Yang, 2016, p. 130).

Structure

The RDI is comprised of the following five domains: economy, education, health and welfare, environment, and culture and leisure (Kim & Yang, 2016, p. 118). Kim and Young (2016, p. 118) argue that these domains were chosen based on previous indices and account for the 'most common characteristics of rural residents' lives in their entirety. Each of these domains is composed of a result and a cause index, that allows a cause and a result index to be calculated separately for each domain. This follows the idea presented in Section 2, that different types of indicators (i.e. input, output, outcome) should not be mixed in the same composite indicator (CI). Table 6 (Kim & Yang, 2016, pp. 124–130) shows the structure of the RDI and the variables included in the Result and Cause indices.

Table 7

Structure of the Rural Development Index

Domain	Variables	
	Result	**Cause**
Economy	Average Annual Farm Income	Agricultural Production
		Agricultural Distribution
		Agricultural Infrastructure
		Agricultural Infrastructure for Distribution
	Average Annual Non-Farm Income	Industry Development
Health & Welfare	Life Expectancy at Birth	Medical Facilities
		Medical Manpower
		Medical Insurance
		Disease Prevention
Education	Literacy Rate of Population Aged 15 and older & School Net Enrollment Rate	Educational Facilities
		Educational Manpower
		Crusade Against Illiteracy
Environment	Residential Area Per Person	State Budget for Housing
	Proportion of Permanent Housing	
	Proportion Households Using Clean Water	State Budget for Drinking Water Systems
	Proportion Households Using Sanitary Toilet	State Budget for Improving Sanitary Conditions
	Proportion of Households Using a National Electricity Network	State Budget for Expanding Electricity Networks
	Rate of Forest Area	State Budget for Afforestation
	Quality of Soil	Chemical Fertilizer Use
		Herbicide Use
		Pesticide Used
	Quality of Air	Air Pollution Prevention Facility
	Quality of Water	Wastewater Generation per Person
		Sewer System Supply Rate
Culture & Leisure	Average Annual Expenditure for Culture and Leisure per Household	Availability of Cultural Facilities
		Availability of Tourism Facilities
		Availability of Sports Facilities

Methodology

The RDI applies three different normalization procedures depending on the variable type to re-scale indicators to a 0-1 range (Kim & Yang, 2016, pp. 119–120). If the indicator is already in a 0-1 range, then the raw indicator is used, otherwise, a min-max normalization is applied. The min-max normalization is shown below:

$$I_{qc}^{t} = \frac{x_{qc}^{t} - \min_{c}(x_{q}^{t_0})}{\max_{c}(x_{q}^{t_0}) - \min_{c}(x_{q}^{t_0})}$$

Finally, when minimum and maximum values are unknown, the authors assume a normal distribution and use the standard deviation to estimate these values, using the following equations:

$$\hat{X}_{max} = \bar{X} + 3\sigma_X$$

$$\hat{X}_{min} = \bar{X} - 3\sigma_X$$

where $\bar{X}$ is the mean value of indicator X and σ_X is the standard deviation of X.

Once indicators are normalized, they are aggregated into cause and result indices using equal weights and a linear aggregation process (Kim & Yang, 2016, p. 121). As such, the cause and result indices equal the average score of the five domains for a given region.

Limitations

- The study does not provide a clear rationale for the weighting scheme and aggregation process, and does not discuss the limitations of these choices.
- The cause index could not be operationalized in the study due to data availability issues. As such, it is more a theoretical exercise than an actual index.
- The selection of indicators is not useful for the BC context due to differences in economic and social context between jurisdictions.

Key Considerations

- The structure of the RDI, divided into cause and result indicators is innovative and follows CI construction best practices. It would allow policymakers to assess the current stage of rural development (result index) and quantify the efforts to reduce barriers to community development (cause index).

4.1.3. RURAL DEVELOPMENT INDEX (POLAND/SLOVAKIA)

The Rural Development Index (RDI) was created to measure the level of rural development and quality of life in Poland and Slovakia through a multidimensional lens (Michalek & Zarnekow, 2012, p. 1). Michalek and Zarkenow (2012, p. 2) argue that the RDI can be used to analyze the main determinants of rural development and measure the impact of rural development programs at different regional levels. The index was applied to rural regions at NUTS-4 level, which is equivalent to the district level.

Structure

The RDI assumes that the level of development and the quality of life in a rural community are equivalent and that quality of life is correlated with migration levels. It is thus built on the premise that areas with a better quality of life (or a higher level of development), will experience net in-

migration, while less well-performing areas will experience net out-migration (Michalek & Zarnekow, 2012, p. 6). Unlike the other CIs presented in this section, the RDI does not pre-select the 'most important' variables based on a theoretical framework or expert knowledge, instead, it considers all partial indicators available at NUTS-4 level that measure different aspects of rural development (Michalek & Zarnekow, 2012, p. 14). As a result, it includes 991 variables for Poland and 340 variables for Slovakia in the following domains: economic, social, environment, demographics, administration, and infrastructure.

Methodology

The overall methodological approach to estimate the RDI is described by the following steps (Michalek & Zarnekow, 2012, p. 13):

1. Selecting relevant rural development domains to be considered in the model;
2. Defining variables describing each domain;
3. Translating variables into meaningful units of measurement (e.g. per capita, per km2, etc.);
4. Converting variables into district-specific factors (Principal Component Analysis) and then reducing dimensionality (Factor Analysis);
5. Deriving weights for each component using an econometrically estimated migration function; and
6. Computing the RDI for each district.

Once domains are selected and variables defined given the availability of statistical data, missing data were treated through linear interpolation where less than 10% of data was missing, and the expectation-maximization method (EM) where data for a whole year was missing (Michalek & Zarnekow, 2012, p. 16). To reduce the dimensionality (i.e. the number of variables) of the index, the authors use principal component analysis (PCA) and factor analysis (FA) to create a smaller number of components that explain most of the variation in the data (Michalek & Zarnekow, 2012, p. 10). Michalek and Zarnekow (2012, p. 10) explain that the optimal number of components is determined endogenously through an iterative method to achieve the best fit of the estimated migration model.

Following this process, weights are estimated using a panel regression model with gross migration flows between rural areas as a dependent variable (Michalek & Zarnekow, 2012, p. 11). Michalek and Zarnekow (2012, p. 11) explain that the model postulates that migration flow between regions depends on the differences in observable conditions in different regions and the transaction costs of moving between regions. Thus, weights become a measure of importance assigned by society (migrants and non-migrants) to a set of characteristics that represent the quality of life in origin and destination regions (Michalek & Zarnekow, 2012, p. 9).

Finally, components are aggregated through a linear aggregation process using the endogenously estimated weights and the components created through PCA and FA to achieve a synthetic RDI score.

Limitations

- The construction of the RDI is complex, making it harder to replicate and communicate. The use of PCA and FA reduces dimensionality but creates components that aggregate a set of variables, making their interpretation less intuitive.
- The RDI is built on the assumption that migration flows are the best measure of rural development or rural quality of life. Although this assumption appears plausible (people tend to move to areas that offer a better quality of life), it is unclear if it would hold in all contexts.

Key Considerations

- The methodological approach used in the RDI construction reduces the subjectivity involved in the variable selection and weighting process by including all available variables in the selected domains and allowing endogenous processes to determine their importance.
- The RDI uses a large amount of data that encompasses the key domains of the rural development process.

4.2. Measuring Local Economic Development

4.2.1. Local Economic Development Index (Romania)

The Local Economic Development Index was developed to identify key exogenous factors that influence development (Pavel & Moldovan, 2019, p. 2). The focus of the study was to create an LED index and use regression models to explore its connection with the following exogenous factors: location, connection with national and European road infrastructure, and access to infrastructure development grants. The index was applied to a sample of 398 communes in Northwest Romania (Pavel & Moldovan, 2019, p. 5).

Structure

Given the purpose of the study, the LED index was created to serve as the dependent variable to which the previously mentioned exogenous variables were tested against. The index uses a set of 10 outcome/market indicators to measure LED using data from official sources in the 2007-2014 period (Pavel & Moldovan, 2019, p. 6). Table 7 (Pavel & Moldovan, 2019, p. 6) lists the variables used in the LED index.

Table 8

LED Index Variables and Description

Variable	Description
Turnover (per capita)	Turnover at the level of the commune divided by the size of the population
Turnover (per employee)	Turnover at the level of the commune divided by the average number of employees
Average number of employees (per 1000 inhabitants)	Total number of employees at the level of the commune divided by the size of the population and multiplied by 1000
Number of employees/elderly (retired) population	The number of employees divided by the number of the elderly (retired) population (over 64 years)
Budgetary revenue from personal/company income taxes (per capita)	The total value of the budgetary revenue from personal/company income tax breakdowns at the level of the commune, divided by the size of the population
Budgetary revenue from local taxes (per capita)	Total budgetary revenue from local taxes at the level of the commune divided by the population size
Active business density	The number of enterprises divided by the size of the population and multiplied by 1000
Entrepreneurial capacity	The number of newly created enterprises for every 1000 people; calculated based on the total number of newly created enterprises divided by the size of the population and multiplied by 1000
Social assistance expenses (per capita)	The total social assistance expenditures at the level of the commune divided by the size of the population. It also doubles as a proxy for the poverty level.
Number of dwellings completed during the year (per 1000 inhabitants)	The total number of dwellings completed during the year divided by the size of the population and multiplied by 1000

Methodology

The 10 indicators comprising the LED Index were normalized on a 0 to 1 scale, then weighted using PCA and linearly aggregated as the sum of scores for each indicator (Pavel & Moldovan, 2019, pp. 7–10). As such, each commune received a score out of 10. The use of PCA is an interesting alternative to assigning equal weights, as it uses the data itself to determine how important each variable is to the overall variability of the model. In the LED index, Pavel and Moldovan (2019, p. 7) used the factor loadings of the first extracted component (the component that explains the most variation in the data) to assign weights to each variable.

Limitations

- The index relies on a small set of strictly economic variables to measure LED.
- The authors do not mention what percentage of the variation is explained by the first component of the PCA analysis, as such it is impossible to determine if that is an adequate method for selecting the index weights.

Key Considerations

- The use of PCA as a weighting method may be an interesting option to avoid the subjectivity involved in weight selection. However, it should be used with care, as the correlation between variables may not represent the true relationship between the variables and the phenomenon being measured (Saisana & Tarantola, 2002, p. 54).

4.2.2. INDICATORS TO INFORM LOCAL ECONOMIC DEVELOPMENT (ENGLAND)

The purpose of this study was to identify indicators to measure 11 factors that were considered relevant to LED and thus help inform local economic planning (Wong, 2002, p. 1834). Once a set of indicators was identified, the study applied regression analyses to understand the connection between the indicators and two measures of economic performance, namely employment rate in high productivity sectors and a property-market indicator (planning application per thousand residents) (Wong, 2002, pp. 1854–1855). The unit of analysis for the study is the local authority district (LAD), which are the basic political and administrative units where social and political activities take place, and funding is allocated for social and economic development (Wong, 2002, p. 1844). In total, 366 LADs were considered in the analysis.

Structure

Starting from the 11 factors considered relevant for LED, the author identified 60 potential indicators to measured them, but only 29 were retained due to their statistical properties and the reliability of their data sources (Wong, 2002, p. 1837). Table 8 (Wong, 2002, pp. 1838–1839) presents the 11 factors and their corresponding indicators.

Table 9

LED Factors and Indicators

Factor	Indicator
Location	Accessibility to main airports in England, weighted by the passenger-carrying capacity to overseas destinations
	Accessibility to the eight largest business service centres by car
	Railway journey time to London index
Physical	Factory floor space per 1000 economically active persons

	Office floorspace per 1000 economically active persons
	Hectares of derelict land
	Urban land per 1000 economically active persons
Infrastructural	Car-owning households used public transport to work
	Average distance of one-way car trips in weekday
	Average journey length per car on a weekday
Human Resource	Economic activity rate
	Supply-side overqualification index
	Workforce in high-skill socioeconomic groups
	Long-term youth unemployment rate
Finance and Capital	Accessibility to venture capital firms
Knowledge and Technology	Location quotient of high-technology employment, including both manufacturing and service employment
	Accessibility to quality science and engineering research in higher education institutes
Industrial Structure	Location quotient of information-based business service employment
	Structural component of shift-share analysis
Business Culture	Death rate of small firms
	Vitality rate of small firms
Community Identity	Index of commuting independence (core resident workers as a ratio of inward and outward commuters)
Quality of Life	Home contents insurance premium (proxy for crime rate)
	Index of earnings
	Average house price
	Percentage of local area designated as Area of Outstanding Natural Beauty
	Standardized mortality rate
	Percentage of secondary school students with 5 or more GCSE passes
	Council tax rate

Methodology

To analyze the connection between these indicators and economic performance, Wong (2002, p. 1834) applied multivariate analysis techniques in two stages. First, PCA was applied to examine the relationship among the LED indicators and to summarize them into a set of five components that explain 70.3% of the total variation in the model (Wong, 2002, p. 1845). These five components were named Big City Syndrome, Buoyant Suburbia, Desirable Living Environment, Local Services Centre and Small Business Culture, and were used to highlight different spatial patterns across England (Wong, 2002, pp. 1857–1858). Second, multiple regression models were applied to explore the strength between different indicators and performance variables to understand how much they contribute to local economic performance (Wong, 2002, p. 1834).

Unlike the other initiatives in this section, here the author does not attempt to achieve a single synthetic score for each district. Instead, districts receive five scores based on the components extracted from the indicators and listed above. Each component represents a set of the indicators presented in Table 4. For example, the Big City Syndrome component summarizes the following indicators: accessibility to main airports, use of public transportation by car-owned households, average distance of car trips during weekdays, supply-side overqualification index, accessibility to quality science and engineering research in higher education institutions, location quotient of information-based businesses, index of commuting interdependence, home contents insurance

premium, and index of earnings. In contrast, the Small Business Culture component represents the death rate and the vitality rate of small firms.

Limitations

- The study does not attempt to create a synthetic score, which makes comparisons between communities more difficult.
- The analysis occurs at the district level, and more importantly, it does not have a specific focus on rural districts, as such urban areas in each district may dominate the analysis.

Key Considerations

- The study provides a good theoretical justification for the choice of factors that affect LED. However, given that the study was published in 2002, the choice of indicators does not reflect key considerations that have evolved in the last two decades, such as the importance of internet connectivity for rural community development.

4.3. Measuring Community Resilience

4.3.1. Indicators of Resilience for Rural Communities (New Zealand)

The purpose of this research was to understand what resilience means in a rural context and develop a measure of community resilience that could be incorporated in the policymaking process (Kaye-Blake et al., 2019, p. 162). The study analyzed indicator data from a set of variables correlated to resilience and compared the results from these indicators with resilience ratings collected through workshops with rural community residents (Kaye-Blake et al., 2019, p. 162). Workshop participants in four rural communities provided qualitative information about factors that affect their community's resilience, as well as ratings on their community's level of resilience (Kaye-Blake et al., 2019, p. 166). As a result, researchers were able to compare and understand the relationship between residents' perceptions of resilience and their measure of resilience based on statistical data.

Structure

The resilience framework developed in this study follows the 5 capitals framework presented in Section 1 of this study. It includes social, institutional, economic, environmental and cultural dimensions, as well as the external factors that affect community resilience (Kaye-Blake et al., 2019, p. 165). Figure 2 (Kaye-Blake et al., 2019, p. 165) graphically represents the framework, while Table 9 (Kaye-Blake et al., 2019, p. 168) lists the variables included in each dimension.

Figure 3

Resilience Framework

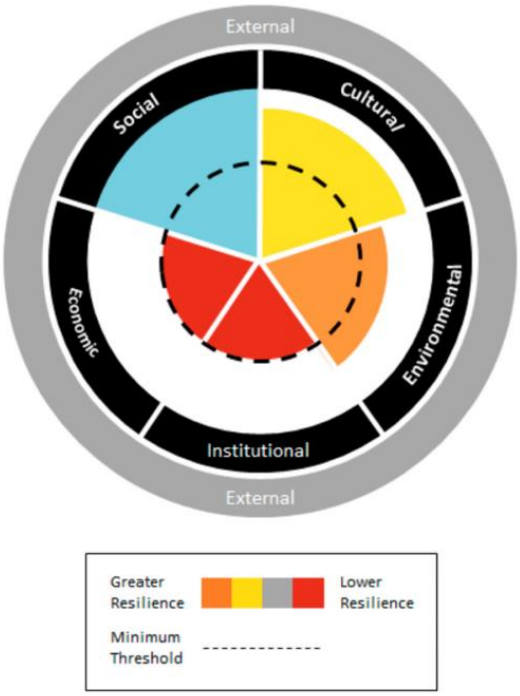


Table 10

Resilience for Rural Communities Dimensions and Variables

Dimension	Variable
Economic	Income
	Employment level
	Diversity of Income Streams
	Diversity of Occupations
Environmental	Fresh Water Quality
	Soil Erosion
	Biodiversity
	Air Quality
Social	Population Change
	Education Level
	Dependency Ratio
	Volunteering
	Phone Access
	Internet Access
Institutional	Self-rated Health
	Court Convictions
	% Local Voting
	State Owned Housing
Cultural	Maori Affiliated
	te reo (Maori Language) Speaking
	Born Overseas
	Religious Affiliation

Methodology

The resilience indicators were aggregated to form a CI. The raw values for each indicator were normalized through a categorical process where communities were given a score between 1 and 5, based on certain performance thresholds for each indicator (Kaye-Blake et al., 2019, p. 169). Once all indicators were in a 1-5 range, scores were linearly aggregated using equal weights for each dimension, as such CI scores were equal to the mean score across the five dimensions. In contrast, the resilience perception ratings were a score out of 10, given by workshop participants when considering community resilience holistically (Kaye-Blake et al., 2019, p. 169).

Limitations

- The qualitative component - assessed through community workshops – is likely to have significantly increased time and cost commitments. These additional costs would be prohibitive for an initiative that aims to cover all communities in the province.
- The CI has a simple construction that does not justify the choice of equal weights or the linear aggregation process.
- Normalizing scores through categorization results in loss of information on the magnitude of differences, because all communities within a category receive the same score, regardless of being close to the lower or the higher bound of the category.

Key Considerations

- The use of both 'objective' measures of resilience based on statistical data and individuals' perception of resilience is innovative and allows researchers to understand how well residents' perceptions align with information derived from their resilience framework.
- Researchers found that self-reported ratings are mostly influenced by economic and institutional dimensions, but the overall self-report ratings generally matched resilience estimations based on official indicators (Kaye-Blake et al., 2019, p. 161).

4.3.2. TERRITORIAL RESILIENCE INDEX (SPAIN)

The Territorial Resilience Index (TRI) was developed to identify characteristics associated with resilience in different rural areas of Andalusia, Spain. It aims to provide information to guide the design of policies that support adaptation efforts in rural areas, with a focus on territorial recovery capacity following the 2008 economic crisis (Sánchez-Zamora & Gallardo-Cobos, 2019, p. 3). The unit of analysis used in the study is the county-level, and the TRI was calculated for 52 rural Andalusian counties, accounting for 80% of the territory and 698 municipalities (Sánchez-Zamora & Gallardo-Cobos, 2019, p. 5).

Structure

The study used employment, income and population as the variables to measure resilient behaviour. The percentage increase in the employment rate, the percentage increase in net income per capita, and the percentage increase in the population during the period between 2012/2013-2016 are used as indicators to assess resilient behaviour (Sánchez-Zamora & Gallardo-Cobos, 2019, p. 9). Sánchez-Zamora and Gallardo-Cobos (2019, p. 9) argue that a territory is considered resilient if it has been able to perform well in these three indicators during the analyzed period. Thus, these indicators are combined to create the TRI.

Once the TRI is calculated for each territory, the authors used a set of 30 indicators to identify characteristics that were relevant to determine territorial performance following the crisis (Sánchez-Zamora & Gallardo-Cobos, 2019, p. 10). The indicators were selected based on the literature, collected from available statistical data published by official bodies and categorized under four

territorial capitals: economic, social, human and natural (Sánchez-Zamora & Gallardo-Cobos, 2019, p. 6). Table 10 (Sánchez-Zamora & Gallardo-Cobos, 2019, p. 7) presents the list of indicators.

Table 11

Descriptive Indicators of Rural Territories

Capital	Variable	Indicator
Economic	Employment	Employed-to-active population ratio (100-unemployment rate) (%)
	Income	Level of income weighted by the total county population (€/pers)
	Innovation and investment	Investment in the creation of new businesses (€/pers)
	Economic structure	Based on the inverse of the Herfindahl-Hirschman Index (HHI) (dimensionless)
	Economic dynamism	Total number of new business and professional activities weighted by population (dimensionless)
	Agricultural sector	Number of new business and professional activities corresponding to agriculture, livestock farming, and fishing weighted by population (dimensionless)
	Industrial sector	Number of new business and professional activities corresponding to industrial activities weighted by population (dimensionless)
	Construction industry	Number of new business and professional activities corresponding to construction weighted by population (dimensionless)
	Service sector	Number of new business and professional activities corresponding to the service sector weighted by population (dimensionless)
Social	Investment	Percentage of expenditure per capita versus income per capita (%)
	Taxation	Current budget surplus or deficit (€)
	Participation	Average percentage of votes in general, regional, and local elections per total voters (%)
	Partnership	Percentage of private members and businesses on the board of directors of Rural Development Groups (%)
	Associations	Number of sector and business associations, cooperatives and civic associations in the overall structure of Rural Development Group (%)
	Cooperatives	Number of cooperatives per thousand total population (dimensionless)
Human	Demographic	Total population in county (pers)
	Density	Population per square kilometre (pers /km2)
	Generational replacement	Percentage of total population under 20 (%)
	Ageing	Percentage of total population over 64 (%)
	Population attraction	Weight of foreign-born population versus total population (%)
	Education and training	Percentage of the population with university education (%)
	Access to basic services	Number of education and primary healthcare centres per thousand total population (dimensionless)
	Connectivity	Number of ADSL per thousand inhabitants (dimensionless)
Natural	Remoteness	Distance from provincial capital (NUTS 3) (Km.)
	Isolation	Altitude above sea-level (m)
	Climate change	Based on the inverse value of total CO2 emissions (1/CO2 emissions) (1/Mt CO2 equivalent)
	Biodiversity	Percentage of surface-area designated as Special Area of Conservation (SAC) and Special Protection Area (SPA) versus total surface-area (%)
	Nature	Percentage of surface-area covered by natural vegetation and forests versus total surface-area (%)
	Invulnerability	Percentage of surface-area with erosion levels classified as low or medium (%)

	Availability of resources	Percentage of region covered by reservoirs, marshland, salt flats, aquaculture, and rivers, streams and other wet lands versus total surface-area (%)

The study uses these indicators to first create four clusters of rural territories and then compare territorial characteristics with the TRI to identify how they impact territorial resilience.

Methodology

The TRI was created using Data Envelopment Analysis (DEA) – a statistical method that determines weights endogenously to maximize the efficiency of each territory (Sánchez-Zamora & Gallardo-Cobos, 2019, pp. 8–9). This method has the advantage of avoiding selecting weights arbitrarily or relying on expert opinion, but it has the disadvantage of creating specific weights for each territory, which may decrease the index comparability. Since the three indicators included in the TRI used the same units (percentages) no normalization procedures were required.

Following the creation of the TRI, FA was applied to the 30 indicators characterizing rural territories to reduce the indicators to 10 factors (Sánchez-Zamora & Gallardo-Cobos, 2019, p. 10). The factors were then correlated to the TRI using correlation analysis to identify which indicators were contributing to territorial recovery following the crisis.

Limitations

- The TRI equates resilient behaviour to growth in three variables - employment, income and population. However, a community may perform well in these indicators not due to their resilience, but because of other external factors. As such, results may be misleading.
- The use of DEA has the advantage of using the data itself to determine weights. However, DEA only provides relative community rankings and it gives different weights to each territory (i.e. the weighting scheme that gives the territory the best relative performance), which decreases comparability between territories.

Key Considerations

- The 30 indicators used to describe rural territories are a good benchmark that could be adapted to B.C. The indicators were selected based on a clear conceptual framework and on reliability and applicability criteria (Sánchez-Zamora & Gallardo-Cobos, 2019, p. 15).

4.3.3. FACTORS OF RESILIENCY FOR FOREST COMMUNITIES IN TRANSITION (BRITISH COLUMBIA)

Unlike the previously described initiatives, this study does not set out to measure local conditions, but instead, presents a framework that may be used to assess community resilience in B.C.'s forest reliant communities. The study identifies 15 factors that contribute to resilience in both Indigenous and non-Indigenous communities and then presents a set of sample indicators that may be used to measure community resilience (Joseph & Krishnaswamy, 2010, p. 129). With that, Joseph and Krishnaswamy (2010, p. 129) aim to guide community leaders, as well as decision-makers at the provincial and federal levels, on how to assess community resilience.

Structure

Drawing from the literature on community resilience, Joseph and Krishnaswamy (2010, p. 130) find 15 resilience factors that contribute to successful community transitions. Guided by these factors and accounting for indicator quality considerations, such as their interpretability, relevancy, comparability, and consistency, the authors selected a set of relevant indicators to measure community

resilience in the rural B.C. context (Joseph & Krishnaswamy, 2010, pp. 138–140). The set of resilience factors and their corresponding indicators are presented in Table 11 (Joseph & Krishnaswamy, 2010, p. 139).

Table 12

Community Resilience Factors and Indicators

Resilience Factor	Example Indicators
Economic Diversity	Diversity index
	Forest vulnerability index
	Social capital infrastructure
	Number of people working by industry
Financial Resources	Employment rate
	Median household income
	Percentage of population by age group receiving income assistance
	Sponsorship of local events, scholarships, etc., by local businesses
Natural Resources	Perceived quality of natural environment
	Proportion of timber harvest area successfully regenerated
Local Control Over Enterprise	Presence of community forests
	Rates of entrepreneurship
	Number of new business licences
Planning	Completion of community economic development plan
	Stakeholder satisfaction with level of involvement
	Existence of genuine stakeholder involvement in planning
Smart Design	Stakeholder satisfaction with economic transition plans
Policy Control	Local representative in provincial or federal government
	Community perception of leadership quality
	Existence of genuine stakeholder involvement in planning
	Stakeholder satisfaction with economic transition plans
Good Governance	Perception among business community of ample separation of political leadership from enterprise
	Level of stakeholder support for transition programs
Human Capital	Qualified professional labour force as a percentage of total labour force
	Percentage of people achieving minimum grade 12 education
	Education enrolment rate
Social Capital	Perceived level of racism
	Distribution of individual total returns by income class
	Membership in organizations
Attitude	Perceptions of ability to adapt, confidence, etc.
Community Attractiveness	Crime rates
	General practitioners per 1000 population
	Perceived satisfaction with services (Walter
	Municipal business taxes compared to provincial average
Information	Demographics of citizenry
	Number of computers connected to Internet per capita
Geography	Proximity to large urban centre
Health	Cancer rate
	Low infant birth weight rate per 1000 live births in last year
	Teenage birth rate
	Hospital beds per 1000 people

Although the authors attempted to distinguish each factor, they recognize that there is a significant overlap between them due to their inherent interrelatedness (Joseph & Krishnaswamy, 2010, p. 130).

Additionally, they recommend that the choice of indicators be adapted by the users to fit the community's specific context (Joseph & Krishnaswamy, 2010, p. 140).

Methodology

The description of a methodology on how to operationalize the suggested indicators or how to aggregate them into a CI is outside the scope of the study, as it only presents an overall framework for measuring resilience.

Limitations

- The study does not operationalize their proposed framework. It appears that some of the suggested indicators would be hard to operationalize, at least at a province-wide scale.

Key Considerations

- The selection of factors and indicators is rooted in the literature and designed for the specific context of B.C.'s forest reliant communities. As such, it may be a useful guide for RPP's efforts to measure rural community conditions.

4.4. Measuring Well-Being

4.4.1. COMMUNITY WELL-BEING INDEX (CANADA)

The Community Well-Being Index (CWB) is a measure of well-being for Indigenous and non-Indigenous communities across Canada developed by Indigenous Services Canada (ISC) using data from the Statistics Canada Census of Population (Penney et al., 2012, p. 2). The CWB was based on the Human Development Index (HDI), which defines well-being in terms of educational attainment, income and life expectancy. Given that community-level life expectancy estimates would be unreliable due to the small population size, the CWB removed that indicator and included indicators related to housing and labour force – key areas of concern in Indigenous communities (Penney et al., 2012, p. 3).

Structure

The CWB consists of the following components: education, labour force activity, income and housing (Indigenous Services Canada, 2019, p. n.p.). Table 12 (Penney et al., 2012, pp. 3–4) shows the indicators included in each component.

Table 13

CWB Components and Indicators

Component	Indicator	Description
Income	Income Score	Log of Income per Capita normalized by a min-max normalization process and multiplied by 100
Education	High School Attainment	Proportion of population aged 20 years and over that has obtained at least a high school certificate
	University Attainment	Proportion of population aged 25 years and over that has obtained at least a university bachelor's degree
Housing	Housing Quantity	Proportion of the population living in dwellings that contain no more than one person per room
	Housing Quality	Proportion of the population living in dwellings that are not in need of major repairs
Labour Force Activity	Participation	Proportion of the population, aged 20-65, that was involved in the labour force in the week prior to Census Day

	Employment	Percentage of labour force participants, aged 20-65, that was employed in the week prior to Census Day

These components are not intended to represent all dimensions of well-being but focus on areas where information is readily available at a community-level through the census, as to allow the comparison of Indigenous and non-Indigenous communities across Canada over many decades (Indigenous Services Canada, 2019, p. n.p.).

Methodology

ISC does not present a detailed description of the CWB methodology in its website, as such this description relies on reports published by Aboriginal Affairs and Northern Development Canada (the organization previously responsible for Indigenous affairs in Canada), which may be outdated.

Given that all indicators are expressed as proportions in a 0-100 range, the CWB does not require any additional normalization procedures. Regarding weighting, in the Housing and Labour Force Activity components, indicators are given equal weights, while in the Education component high school attainment represents two-thirds of the score and university attainment the remaining one-third (Penney et al., 2012, pp. 3–4). Once scores are calculated for each component, they are aggregated giving equal weights to each component (O'Sullivan & McHardy, 2004, p. 1). The aggregation process is not described in the documents, but it is assumed that it uses a linear aggregation process, the most common method in CIs.

Limitations

- The CWB is only available for communities of at least 65 residents that are not an incompletely enumerated reserve and whose global non-response rate did not exceed 25% (Penney et al., 2012, p. 4). As such, many of B.C.'s Indigenous communities are excluded from the index.
- As previously mentioned, due to data availability, the CWB uses a very narrow concept of well-being. The Office of the Auditor General in an audit recommended that the CWB be included in a broader dashboard including other indicators, such as health and language, to provide a more holistic assessment of community well-being (Indigenous Services Canada, 2019, p. n.p.).
- While using census data increases the coverage of the CWB, it only allows the index to be updated every 5 years. This is not ideal to inform policy decisions.

Key Considerations

- CWB's construction is simple and easy to communicate.
- The CWB was created for the Canadian context and considering data limitations for Indigenous communities. The issues with the CWB construction will probably affect any efforts by RPP to measure conditions in B.C.'s Indigenous communities.

4.4.2. COMMUNITY ACCOUNTS COMPOSITE WELL-BEING SCORE (NEWFOUNDLAND AND LABRADOR)

Community Accounts is an initiative of the Government of Newfoundland and Labrador and the Labrador Statistics Agency to provide publicly available data at the community, regional and provincial levels. The system allows users to generate data on key social and economic indicators organized by geography or topic, and the well-being account provides information to help users understand the factors that influence the progress and status of a community or region (Government of

Newfoundland and Labrador, n.d., Profile section, para. 3-4). The composite well-being index is available at https://nl.communityaccounts.ca/.

Structure

The well-being composite score is derived from a set of 16 indicators. The set includes both quantitative and qualitative indicators from various sources, including Statistics Canada, Canada Customs and Revenue Agency, and provincial ministries. The composite well-being score is comprised of the following indicators:

- population change (5-year rate);
- migration rate (migrants in last 5 years);
- average couple family income;
- personal income per capita;
- economic self-reliance ratio;
- employment rate;
- change in employment;
- proportion of population with high school diploma or higher;
- proportion of population with bachelor's degree or higher;
- employment insurance prevalence;
- income support benefits prevalence;
- median age of death;
- low income prevalence (all family types);
- proportion of population reporting excellent or very good self-assessed health;
- proportion of population reporting very strong or strong sense of belonging to the community;
- proportion of population reporting being very satisfied or satisfied with life in general.

Methodology

The composite well-being indicator has a very simple construction. For each community, the indicator score is calculated by taking the number of indicators that score in the bottom 25% for all communities, and subtracting it from the number that score in the top 25% for all communities. The resulting number is turned into a percentage of the range -16 (all indicators in the bottom 25%) and 16 (all indicators in the top 25%) by adding 16 to the community score and dividing it by 32 to achieve a zero-based scale (Government of Newfoundland and Labrador, n.d.-b, Calculation Details section). For example, if a community scores two indicators in the bottom 25% and 11 in the top 25%, it would receive a score of 9 (11–2=9). From there, 16 is added to the score, totalling 25, which is then divided by 32 to achieve a total score of 78% (25/32). Thus, the index uses a categorical scale to normalize results and an equal weighting scheme.

When data for an indicator is missing for a community, the index uses offsets to create a complete indicator collection. An offset is larger geography that contains the community of interest. For instance, when data is missing for a community, the index will use the data from the regional district in which that community is located (Government of Newfoundland and Labrador, n.d.-b, Understanding the Use of Offsets in Well-Being section).

Limitations

- The use of categorical scaling results in significant loss of information, because all indicators within a category are given identical results. That means that the index is insensitive to different levels of performance within a category. For example, a community with 5 indicator scores in the 99th percentile will receive the same score as a community with 5 scores in the 76th percentile, because they are both in the top 25% category.
- The thresholds at the top and bottom 25% may be perceived as arbitrary and may have significant impact on the rankings.
- The use of equal weights without clear justification may also be considered arbitrary.

Key Considerations

- The simple construction of the index makes it easy to interpret and communicate.
- The use of offsets is a simple and effective way of dealing with missing data. It is easily explained and justifiable, and if the selected offset is relatively small compared to the community size, it is unlikely to significantly distort results.

4.5. Conclusion

This section reviewed a series of initiatives that were developed to measure local conditions through different lenses. The list presented here is non-exhaustive but demonstrates the variety of efforts to measure rural development, local economic development, community resilience and community well-being. The initiatives in each of these categories are significantly different from one another, but, even when using the same lens, they are extremely varied in their indicator selection and methodological structure. While some indices use only a handful of indicators, others include over 900 indicators. And while some are built using simple methodological structures to normalize, weight and aggregate indicators, others rely on complex statistical methods. Finally, while some present a narrower economic focus, others include environmental, cultural, and qualitative factors.

A common theme among all these initiatives is that they are attempts to capture multi-dimensional phenomena that are hard to define and even harder to measure. Since these phenomena cannot be measured directly, initiatives resort to identifying measurable proxies to represent their manifestation. As proxies rely on assumptions about the relationship between the measurable indicator and the variable of interest, if the assumed relationship is incorrect, the measurement will be inaccurate (Yumagulova et al., 2019, p. 44). Additionally, due to data limitation issues, which are especially prevalent in rural, remote and Indigenous communities, indicators often need to be selected based on data availability, resulting in important aspects of rural conditions being excluded from consideration. As such, the reviewed initiatives encompass a range of variables to capture a complex reality that is context-dependent, while being constrained by data availability issues and hard methodological choices. Thus, while a perfect set of variables or an ideal methodology does not exist, and any efforts will need to be adapted to account for the unique rural B.C. context, the initiatives presented here demonstrate the amplitude of community measuring initiatives, which may help guide RPP's choices in developing tools to measure and communicate rural community conditions in B.C.

Due to the selection criteria, particularly the focus on CIs that cover many communities, a common problem among the indicators presented is that the variable selection process tends to be uniform and top-down. That is, all communities are measured by a predetermined set of variables regardless of their different realities, cultural background and goals. There appears to be a difficult trade-off between comparability and flexibility. Since the need for externally consistent measures still exists, it

is important to be conscious that any undifferentiated ranking system imposes a common set of goals on communities that may be radically different. This relates to a discussion briefly presented in Section 2, about building rural policy on a disparity lens, which means depicting rural communities as lagging areas that need to catch-up to their urban counterparts (Sherry & Shortall, 2019, p. 338). Thus, externally determined measures that rank communities against an undifferentiated set of criteria must be applied carefully and with the understanding that communities may have diverse goals. This is especially important when considering First Nation communities.

The key takeaways from this exploration of measurement initiatives are presented below:

- **The variation in the selection of indicators and the methodological choices to summarize them demonstrate that there is no one way to measure rural community conditions.** Even when the conceptual lens and the purpose are similar, measuring initiatives can be widely different. Considering the Rural Development Indices from Vietnam and Poland/Slovakia, although they both aim to measure the level of rural development in their select countries, they take completely different methodological approaches.
- **There is as much variation within each category as between them**. However, some patterns may be observed. The LED measuring initiatives included in this section tend to have a narrower focus on economic variables, while the measures of resilience and rural development generally encompass more explicit environmental concerns. In this sense, **initiatives in the rural development and resilience categories generally structured their CIs around some variation of the five capitals framework** discussed in Section 2.0, which includes economic, human, social, cultural and environmental dimensions.
- **From a methodological standpoint, initiatives tend to use either equal weights or rely on statistical methods to determine weights endogenously**. This is probably an effort to avoid criticism related to the subjectivity of weight selection, although the use of equal weights is as subjective as any other scheme. **In contrast, the aggregation process is much more consistent across initiatives, with linear aggregation processes (i.e. weighted average) being by far the most prevalen**t.
- A common theme across initiatives is that **indicator selection is influenced as much by data availability and quality considerations as by their theoretical framework**. The theoretical framework appears to work as a filter to help with the selection indicators from a set of available data from official sources.
- **The use of qualitative data was not common among reviewed initiatives**, with the Indicators of Resilience for Rural Communities from New Zealand being the only initiative that attempted to compare perceptions of resilience with CI results derived from official data. This is likely a result of the cost of collecting qualitative data, since while this initiative encompassed only four communities, most of the other initiatives included dozens or even hundreds of communities.
- **The initiatives shown in this section have varying degrees of complexity**, which is an important choice in CI construction. This choice influences various aspects of the construction process, from the number of indicators included in the model to the methodology used to normalize, weight and aggregate results. Adding complexity tends to improve accuracy but reduce interpretability. This is a key decision because it requires a balance between accurately measuring local conditions and easily interpreting and communicating results.

5.0 The Availability of Community-level Data in B.C.

The availability of quality data at the community level is a key consideration for initiatives attempting to understand local conditions. As briefly discussed in Section 3, there are significant data gaps in rural B.C., especially when considering small and First Nations communities. This section sets out to investigate what community-level variables are available that would contribute to understanding the conditions of rural communities in B.C. The work presented here builds upon the Community Need Index (CNI) and its subsequent version, the Community Assessment Tool (CAT) to identify variables and datasets of interest. These tools rely mostly on the Statistics Canada Census of Population but also use other federal and provincial datasets. Additionally, the composite indicators (CI) presented in Section 4, such as Statistics Canada's Community Wellbeing Index and Memorial University's Rural Economic Capacity Index, helped identify other variables of interest. Finally, the review also used the Columbia Basin Rural Development Institute's *State of the Basin Report* (2017) to aide in identifying potential variables and datasets.

The inclusion of variables was guided by quality principles suggested in the literature. These principles were discussed in Section 3 and are briefly listed below for reference (Booysen, 2002, p. 122; Kovacevic, 2010, p. 5; Nardo et al., 2005, pp. 32–35):

- Relevance – Degree of relevance to the objective of the tool;
- Accuracy – Correctly measuring the phenomenon it is intended to measure;
- Timeliness – Time gap between an event and data availability;
- Accessibility – Ease of access to original data;
- Interpretability – Ease of interpretation, analysis and usage;
- Coherence – Methodologically, conceptually and terminologically consistent;
- Comprehensiveness – Relating to population coverage or sample size.

Guided by the previous efforts mentioned above and considering these quality principles, the following data sources were considered: Statistics Canada, federal ministries and agencies, BC Stats, DataBC, various provincial ministries and agencies, as well as reputable non-governmental sources. Throughout the review, variables available at the community-level (e.g. census subdivision [CSD], municipality) were prioritized, but when those were not available, data at the regional-level was considered (e.g. regional district). Another key selection criterion related to data coverage. Given that RPP wants to not only understand local conditions but compare and rank communities, variables needed to have ample coverage of communities in the province. Thus, variables and indicators based on smaller or more localized surveys were not included in the review.

A recurrent issue regarding data coverage was the lack of available data for First Nations communities in B.C. This is a known limitation that has been discussed in detail in the OECD report *Linking Indigenous Communities with Regional Development* (OECD, 2020, pp. 104–122). The main source of community-level data for First Nations is the census of the population, which includes demographic data on most First Nations communities, but lacks data on their economies, businesses and entrepreneurial activity (OECD, 2020, p. 104).

5.1. The Five Capitals Framework

This review uses the five capitals framework to organize the variables of interest. This framework links local performance to the availability, deployment and interplay of economic, human, social, cultural and environmental capitals (Courtney & Moseley, 2008, pp. 308–309). The choice of the five capitals framework is justified for three main reasons. First, many studies in the rural development

literature, especially those focused on the endogenous determinants of development, use this framework to understand local performance (see Agarwal et al., 2009; Courtney & Moseley, 2008; Salvia & Quaranta, 2017; Sánchez-Zamora et al., 2014; Sánchez-Zamora & Gallardo-Cobos, 2019; Zasada et al., 2015). Second, the five capitals framework is a popular method of organizing CIs. Three of the CIs presented in Section 4 use a variation of this framework to structure their indices, more than any other structure. Finally, the broadness of the framework allowed for the inclusion of a large set of variables that may be relevant for different analyses and policy goals. For example, it allows RPP to consider only economic variables or use a broader analysis depending on policy objectives. Nevertheless, although variables are organized in terms of capitals in this section, one can easily reorganize variables in a different structure to fit their objectives and the structure of the phenomenon being measured.

As with most categorization efforts, the separation between categories is not always clear, with certain variables potentially fitting in more than one type of capital. In such cases, the variables were included in the capital considered to be most appropriate, but a reclassification may be considered following statistical analysis to understand the data structure and the relationship between variables. In any case, the key contribution of this review is not related to the categorization of variables, but the creation of an extensive list of data sets and variables that can be employed to better understand local conditions, as well as the identification of important data gaps.

In total, 70 variables were identified, categorized under the five capitals and further subdivided into factors that comprise each capital. The factors included in each capital largely follow what was found in the literature and presented in Section 2. In some cases, the review did not uncover any available variables at the community-level for certain factors. In those cases, the factor was kept and, where possible, potential variables and indicators were proposed. This is helpful because it contributes to the identification of data gaps, which were particularly relevant in the Social and Environmental capitals. In the former, this occurred due to the difficulty of measuring the more intangible aspects that determine the existence of social capital, while the latter is affected by the difficulty of finding relevant environmental data at the local level.

The remainder of this section is dedicated to describing each capital, the factors that comprise it, and the available variables to measure each of them. Throughout this section, tables will present the data source, update frequency, data coverage and rationale for inclusion for each variable. A more detailed table of variables and indicators is available in Appendix A.

5.2. Economic Capital

Economic capital relates to the economic resources that are available and mobilized to generate profit in a community or region (Agarwal et al., 2009, p. 310; Sørensen, 2018, p. 80). It is a somewhat vague concept that is comprised of a variety of factors that are considered to influence processes of change in rural areas (Agarwal et al., 2009, p. 310; Sánchez-Zamora et al., 2014, p. 13). These factors include (Agarwal et al., 2009; Courtney & Moseley, 2008; Sánchez-Zamora et al., 2014):

- Productivity
- Employment
- Investment
- Economic Climate
- Innovation
- Economic Structure
- Infrastructure

- Local Governance

The literature generally indicates that the availability of economic capital influences economic performance in rural areas (Agarwal et al., 2009, p. 310; Courtney & Moseley, 2008, p. 310; Sørensen, 2018, p. 80). Below, each factor is discussed briefly, and Table 13 presents additional detail on each variable.

Productivity

A broadly accepted definition of productivity is the value of output produced by a certain unit of labour and/or capital (Carayannis & Grigoroudis, 2014, p. 205). GDP per unit of labour (e.g. hours worked) is a common measure of productivity. In Canada, Statistics Canada measures labour productivity as the ratio of value-added and hours worked. However, this data is only available at the national and provincial levels. A possible proxy for productivity is GDP per capita, but that is also not available at the sub-provincial level. Thus, income measures are proposed as proxies for local productivity, based on the rationale that higher productivity results in higher income levels. This proxy has limitations, because wages are influenced by other factors unrelated to productivity, such as the labour supply. Additionally, individuals may reside in a community and commute to work in another area, which could distort income numbers. Despite these limitations, income is generally a good measure of productivity, as per capita income is directly correlated with value-added per hour worked (OECD, 2001, p. 12).

Employment

Employment is a key factor in economic performance. The unemployment rate is determined by the interaction of supply and demand in the labour market, while the participation rate is affected by demography, as well as labour market conditions (Agarwal et al., 2009, p. 312). Economically well-performing areas tend to have higher labour market demand, which leads to lower unemployment rates and higher participation rates. The unemployment and participation rates are available at the community-level through the census. Further, the number of employment insurance beneficiaries, measured at the regional district (RD) level monthly, is also available. Changes in employment insurance numbers may serve as a proxy for employment levels.

Investment

Investment in infrastructure, as well as the availability of financial capital and private investment of firms and households are important determinants of local performance (Courtney & Moseley, 2008, p. 311). Investment data at the community or regional scale proved difficult to find, with the BC Major Project Inventory the only relevant dataset found. The inventory is a list of large infrastructure investments (over $15 million) across the province and could be used to measure community investment per capita. The minimum dollar value of $15 million introduces an urban bias in the inventory, as small communities are less likely to have projects above this threshold. In communities with low population, smaller projects may generate significant economic activity, but they are not included in the inventory. Other data that may be of interest is the distribution of venture capital funds to small businesses through BC's Venture Capital Program, but it is not publicly available.

Economic Climate

Economic climate refers to the dynamism of the economy in a community. It is related to an economic environment that is favourable to the creation, establishment and development of new businesses (Agarwal et al., 2009, p. 317). This factor includes variables related to business density,

business creation and failures, as well as housing market indicators. These variables measure market activity for both businesses and households.

Innovation

Innovation is believed to be strongly correlated with productivity and competitiveness (Carayannis & Grigoroudis, 2014, p. 201). The development of innovative technologies and methods may lead to economies of scale, access to new markets and the creation of new products. Carayannis and Grigoroudis (2014, p. 201) argue that innovation is hard to measure directly due to its qualitative aspects. For this reason, most studies use the drivers and outcomes of innovation as proxy measures. In the rural B.C. context, the availability of human resources educated in science, technology, engineering, and mathematics is proposed as a proxy measure for innovation. Employment in high technology sectors is another potential proxy for innovation, but that would require additional analysis to determine what industries to include and estimate employment levels for communities, as detailed industry employment data is only available at the regional level. Finally, patent applications are also commonly used measures of innovation, but patent data is not available at a community or regional level.

Economic Structure

Economic structure refers to the productive capabilities of a community, which determine the economic activities that take place in that geographical area (Constantine, 2017, p. 2). An economic structure that produces high value-added products is likely to generate more wealth for its participants. Another aspect of economic structures relates to the level of diversification, where more diversified economies are associated with lower volatility and higher resilience (Joya, 2015, p. 39). Census data on employment divided by North American Industry Classification System (NAICS) codes allow for the calculation of market concentration on certain sectors, such as natural resources, as well as the estimation of economic diversification. Additionally, employment in high value-added industries could be a good measure of the quality of the economic structure of a community but estimating that may be challenging given the level of aggregation of NAICS codes.

Infrastructure

Infrastructure refers to the built systems that allow communities to function and develop through access to essential goods and services (Breen, 2017, p. 7). It encompasses human-made structures, such as houses, roads, telecommunication systems, water and sewage systems, and others (Zasada et al., 2015, p. 180). Infrastructure is an essential determinant of economic performance and quality of life, as it affects economic productivity, access to markets and services, health, safety and others (Breen, 2017, p. 8). Available variables to help measure the quality of infrastructure at a community are related to housing (e.g. housing quality), telecommunications (e.g. broadband access) and transportation infrastructure (e.g. road quality and distance to international airports). Other relevant variables that were not available include the availability of cellphone service, level of accessibility to the community (e.g. highway, ferry, forest service road), and water systems (e.g. access to clean water and sewage).

Local Government Finances

This factor is concerned with the quality of local government finances as measured by their financial positions, accumulated debt and tax structure. The quality of local finances is a relevant factor for four reasons. First, it is a measure of local governments' ability to respond to shocks that may require them

to increase spending or investment. Second, it may serve as a proxy for the quality and sustainability of local governance, as municipalities that are excessively indebted and/or posting large financial deficits may be forced to reduce service provision and investment in the future. Third, taxes per capita or household may be a proxy for community wealth, as higher economic activity and house values will likely lead to increased tax collection. Finally, lower tax rates may help attract businesses and residents to a community.

Table 14

Economic Capital Factors, Variables and Indicators

Factor	Variable	Sample Indicator	Source	Unit of Analysis	Coverage	Update Frequency	Rationale
Productivity	Income	Income per Capita (average/median)	Statistics Canada - Census of the Population	CSD	Most CSDs with at least 200 respondents	5 years	A measure of community economic wealth - may be used as a proxy for productivity.
		Household Income	Statistics Canada - Census of the Population	CSD	Most CSDs with at least 200 respondents	5 years	A measure of community economic wealth - may be used as a proxy for productivity.
			Annual Income Estimates for Census Families and Individuals (T1 Family File)[5]	CSD	Unknown	Annual	
		Proportion of Market Income	Statistics Canada - Census of the Population	CSD	Most CSDs with at least 200 respondents	5 years	A measure of economic dependency on government transfers.
		Proportion of Transfer Payment Income	Statistics Canada - Census of the Population	CSD	Most CSDs with at least 200 respondents	5 years	A measure of economic dependency on government transfers.
Employment	Labour Participation	Participation Rate	Statistics Canada - Census of the Population	CSD	CSDs with population larger than 40	5 years	Measures the proportion of the population participating in the labour market. Communities with higher participation rates tend to be more economically dynamic.
			Statistics Canada - Labour Force Survey	Economic Region	All Economic Regions	Monthly	
	Unemployment	Unemployment Rate	Statistics Canada - Census of the Population	CSD	CSDs with population larger than 40	5 years	Measures labour market health. High unemployment rates are associated with low economic activity, lower incomes and well-being.
			Statistics Canada - Labour Force Survey	Economic Region	All Economic Regions	Monthly	
	Employment Insurance	Growth in Employment Insurance Beneficiaries	Statistics Canada - Employment Insurance Statistics	RD/Census Metropolitan Areas/Census Agglomerations	All RDs and CMAs. CAs are aggregated	Monthly	EI recipients is an indicator of economic opportunities. An increase in EI beneficiaries may be associated with an economic downturn.
Investment	Major Projects	Value of Major Infrastructure Projects in Community (total/per capita)	BC Major Project Inventory	Municipality	All municipalities - Not all major projects are included.	Quarterly	The major project inventory provides an indicator of investment in infrastructure. Large investments in infrastructure generate economic activity and may lead to new development opportunities.

[5] Data is available for order.

Economic Climate	Business Density	Business with employees per capita	BC Stats	CSD	392 CSDs	Annual	Higher business density may be associated with higher economic activity, leading to higher wages and lower unemployment.
	Indigenous Businesses	Indigenous Businesses per capita (Indigenous population)	BC Data Catalogue – BC Ministry of Jobs, Economic Development and Competitiveness	CSD	Unknown	Unknown (Last modified 08/2020)	
	Business Creation	Business Incorporations (growth/per capita)	BC Stats	RD / Municipality	All RDs and municipalities. Unincorporated areas are aggregated.	Annual	Measures the creation of new businesses - indicates the quality of the business climate. Economically dynamic communities are likely to attract new businesses.
	Business Failures	Business Bankruptcies (Growth)	BC Stats	Economic Region	All Economic Regions	Quarterly	Measures closures of existing businesses - indicates the quality of the business climate.
	Housing Market	Housing Starts (Growth/Per capita)	BC Stats	RD / Municipality	138 Municipalities. Other areas are aggregated.	Annual (Discontinued after 2019)	Housing starts and building permits are well-accepted indicators of economic performance. They are influenced by consumer expectations and interest rates. They tend to pick up at the beginning of a business cycle, and taper at the initial signs of economic slowdown. (2017 State of Columbia Basin)
		Annual FMV Property Tax per capita / Average Annual FMV Property Tax	BC Data Catalogue - Ministry of Finance	RD / Municipality	29 RDs/239 Municipalities	Weekly	Measures housing market activity considering both the number and the value of transactions. Indicator of economic performance and stability.
		Median House Value	BC Assessment	CSD	Unknown	Unknown	Higher housing prices may be associated with economic prosperity, population growth and community attractiveness. However, it may also lead to housing affordability issues.
Innovation	Human resources	Graduates in mathematics, computer and information sciences; physical and life sciences and technologies; and architecture, engineering and related technologies (per 1,000 population, aged 15 and above)	Statistics Canada - Census of the Population	CSD	CSDs with population larger than 40	5 years	Innovation is considered an important factor for economic development and resilience. The ability to innovate allows communities to find new economic activities and solutions to adverse shocks.
Economic Structure	Diversification	Herfindahl-Hirschman Index	Statistics Canada - Census of the Population	CSD	CSDs with population larger than 40	5 years	Measures how diversified the economy is. More diversified economies are less vulnerable to economic downturns.
			Statistics Canada - Labour Force Survey	Economic Region	All Economic Regions	Monthly	
	Resource Sector Dependence	Proportion of Work Force Employed in Natural Resource Sector	Statistics Canada - Census of the Population	CSD	CSDs with population larger than 40	5 years	Measures the level of dependence on the resource sector. Commodities are generally more vulnerable to economic fluctuations.
			Statistics Canada - Labour Force Survey	Economic Region	All Economic Regions	Monthly	

Infrastructure	Housing	Housing Suitability	Statistics Canada - Census of the Population	CSD	CSDs with population larger than 40	5 years	A measure of overcrowding. Housing suitability impacts well-being and may also work as a proxy for housing and rent affordability.
		Housing Conditions	Statistics Canada - Census of the Population	CSD	CSDs with population larger than 40	5 years	A measure of housing quality. Good housing is important for well-being, health and safety.
	Telecommunications	Broadband Access	Statistics Canada - National Broadband Data	Pseudo-Household Demographic Distribution	Unknown - Pseudo-Household polygons would need to be converted to communities	Unknown	Broadband access is relevant for accessing information and services, attracting and retaining businesses and residents. Areas with good broadband access are likely to have an advantage over areas that do not.
	Transportation	Annual Highway Closures Affecting Access to Community	BC Data Catalogue - Ministry of Transportation and Infrastructure	Incident	All areas covered by DriveBC road conditions reports	Annual	Access to good transportation infrastructure is relevant for attracting businesses, accessing services and markets, among others.
		Distance to nearest international airport	BC Data Catalogue - GeoBC	CSD	All international airports	Occasional	Proximity to an international airport influences tourism and other economic opportunities accessible to the community.
Local Government Finances	Surplus	Accumulated Surplus (Financial Position) per Capita	BC Ministry of Finance	Municipality	162 Municipalities	Annual	Higher budget surpluses demonstrate more capacity to absorb shocks and maintain services and operations.
	Debt	Debt-Revenue Ratio	BC Ministry of Finance	Municipality	162 Municipalities	Annual	The debt revenue ratio is an indicator of the financial condition of municipalities.
	Taxes	Municipal Taxes per Capita	BC Ministry of Finance	Municipality	162 Municipalities	Annual	Higher taxes per capita may be an indicator of higher tax rates but may also indicate a higher level of economic activity. It also means that municipalities have more capacity to offer services to their residents.
		Total Taxes and Charges on a Representative House	BC Ministry of Finance	Municipality	162 Municipalities	Annual	This may work as a proxy indicator of community wealth. Controlling for tax rates, wealthier communities will have higher total taxes and charges on a representative household.
		Average Tax Rate	BC Ministry of Finance	Municipality	162 Municipalities	Annual	Lower tax rates may increase a municipality's attractiveness to businesses and citizens.

5.3. Human Capital

Human capital refers to the accumulated knowledge, skills and qualifications of individuals in a community, especially concerning the production and exchange processes (Agarwal et al., 2009, p. 310). Higher levels of human capital are perceived to lead to higher productivity and influence processes of change and development in rural areas (Sánchez-Zamora et al., 2014, p. 13; Sørensen, 2018, p. 80). The key factors that comprise human capital identified in the rural literature are (Agarwal et al., 2009; Courtney & Moseley, 2008; Sánchez-Zamora et al., 2014; Zasada et al., 2015):

- Education
- Skills
- Entrepreneurship
- Demographic Structure
- Migration
- Access to Services
- Quality of Life

Each factor is briefly described below, while Table 14 presents a list of available variables.

Education

Education relates to levels of educational attainment and access to post-secondary institutions (Agarwal et al., 2009, p. 310). Education is a determinant factor for economic growth, as more educated workforces are better prepared to adapt to and take advantage of economic changes (Columbia Basin Rural Development Institute, 2017, p. 17). Available community-level variables related to education include educational attainment, quality of early education and access to post-secondary institutions. An important data gap is a lack of reliable educational quality data at the high school and post-secondary levels. The Fraser Institute periodically publishes high school rankings for B.C. schools, but there are significant methodological issues that affect the credibility of such rankings. They are only partially based on test results and use indicators that favour independent, single-gender schools (Raptis, 2012, p. 197). Similarly, university rankings are available but are created by private parties, such as Times Higher Education and Maclean's. As such, due to the lack of widely accepted educational quality data, it is not included in this compilation.

Skills

Skills refer to abilities that are valued in the workforce and that are not necessarily connected to formal education. These could include abilities and knowledge that are gained through experience or informal education. Due to the difficulty of measuring these skills, this factor is limited to the measurement of trade skills, as measured by the attainment of trade certificates and diplomas in the workforce.

Entrepreneurship

Higher levels of entrepreneurship in rural areas are considered to be associated with economic diversification, improved economic performance and higher quality of life (Sá et al., 2019, p. 698). Entrepreneurship is closely related to and has some overlap with the concepts of innovation and the economic climate, which were both included as determinant factors of economic capital endowment. Entrepreneurship can be understood as a factor that leads to more innovation and a better economic climate. However, it is not easily measurable, as it relates to various aspects ranging from risk acceptance, to access to capital and knowledge, and skills. Here, entrepreneurship is measured simply

by the prevalence of self-employment in the labour force. This is due to data availability issues and the fact that many factors relevant to entrepreneurship (e.g. business creation, patent applications) are included elsewhere. The prevalence of self-employment is an imperfect proxy for entrepreneurship, as it may also indicate a lack of employment opportunity and reliance on precarious employment. As such, it may need to be analyzed in combination with other indicators (e.g. unemployment rate, income per capita) to determine if a high prevalence of self-employment is indicative of high levels of entrepreneurship or not.

Demographics

Demographics are concerned with population characteristics such as size, age, growth/decline and composition. Demographic characteristics affect community plans, needs and performance. For example, a community experiencing high population growth needs to plan for additional demand for services (e.g. schools, sports facilities), while a community with an ageing population needs to prepare to have a smaller labour force and higher demand for health services. Demographic data is widely available at the community-level but relies overwhelmingly on census data that is updated only every five years. BC Stats publishes annual population estimates, but these are only available for municipalities and RDs, and only account for population size but not their characteristics. Under this factor are included variables related to population size, density, change, and age composition. Here, data related to gender, Indigenous identity, and other aspects may be included, but further analysis of the directionality of the data would be required (e.g. how can these characteristics be integrated into a CI?). Finally, there are challenges in accounting for the intersectionality in demographic data, as different characteristics compound and lead to results that are different than the simple sum of its parts. For example, an elder, rural resident will feel the impacts of being elderly and a rural resident, but they will also face challenges that neither an urban elder nor a young rural resident would.

Migration

In this context, migration relates to the movement of people to and from different rural communities in the province. It considers international and internal (inter- and intra-provincial) migration flows. Well performing communities – those that offer good economic opportunities and high quality of life – tend to experience net migration, which increases the size (and often the quality) of the labour force, and leads to higher demand for consumer and public services, thus creating a prosperous cycle (Terluin, 2003, p. 331). In contrast, areas facing out-migration may experience decreased demand, a diminishing labour force and difficulty maintaining basic services and infrastructure. The stock of migrants in a community is tracked at the community-level by Statistics Canada Census of Population, while net migration numbers are measure by BC Stats annually.

Access to Services

Access to services relates to the availability of services essential to sustaining well-being and economic activity in a community. These include health services, care facilities for elders and children, employment information and advice, among others. The lack of services may affect a community's ability to attract and retain residents, as services are a key foundation for economic activity and opportunities (Markey et al., 2008a, p. 415). Variables found to measure access to services are the distance to essential services such as hospitals, care facilities, ServiceBC and WorkBC centres, as well as access to child care facilities and physicians in the community.

Quality of Life

Quality of life is a broad concept associated with the general well-being of individuals in a community, considering not only their living conditions but also their perceptions regarding their lives (Shucksmith et al., 2009, p. 1276). As such, it is comprised of a variety of factors both objective and subjective. The variables included under this factor are life expectancy, inequality, poverty, affordability and life satisfaction. Due to its broad definition, the variables considered here inevitably overlap with other factors in the framework. For example, inequality and poverty could be included under the Economic Structure factor, while housing conditions and suitability, included under Infrastructure, could be listed here. Further, important aspects of quality of life were not available, especially more detailed measures of subjective well-being, such as happiness, optimism, and contact with family and friends.

Table 15

Human Capital Factors, Variables and Indicators

Factors	Variable	Sample Indicator	Source	Unit of Analysis	Coverage	Update Frequency	Rationale
Education	Educational Attainment	Percentage of the population with high school diploma	Statistics Canada - Census of the Population	CSD	CSDs with population larger than 40	5 years	Education plays an important role in labour force productivity. High school graduation is correlated with higher income, lower unemployment rates, lower criminality, and other desirable outcomes.
		High School Graduation Rate	BC Ministry of Education	School District	All school districts	Yearly (Last published in 2014/15)	
		Percentage of the population with university education (Bachelor or above)	Statistics Canada - Census of the Population	CSD	CSDs with population larger than 40	5 years	Similar to high school completion, university education is correlated with better social and economic outcomes.
	Early Development	Proportion of Children Vulnerable on One or More Scales in the Early Development Instrument	Human Early Learning Partnership (UBC)	School District	Al School Districts (except SD87-Stikine)	Approximately every 3 years	EDI data are a long-term indicator of children's early developmental health and well-being. Early development is correlated with adult productivity.
	Access to Post-Secondary Education	Distance to Nearest Post-Secondary Institution	BC Data Catalogue - Ministry of Advanced Education, Skills and Training	CSD	Unknown	Unknown (last update 06-2020)	Proximity to post-secondary institutions may influence youth retention, as well as the quality of the labour force.
Skills	Trade Skills	Percentage of the labour force with trades certificates or diplomas	Statistics Canada - Census of the Population	CSD	CSDs with population larger than 40	5 years	Trade skills are an important indicator of the quality of the labour force. Higher skilled labour forces tend to be more productive.
Entrepreneurship	Class of Worker	Percentage of the labour force that is self-employed	Statistics Canada - Census of the Population	CSD	CSDs with population larger than 40	5 years	Self-employment is used as a proxy for entrepreneurship. It is believed that entrepreneurship is correlated with higher economic performance. However, self-employment may also be a sign of a lack of employment opportunities.
Demographics	Population Size	Population Size	Statistics Canada - Census of the Population	CSD	CSDs with population larger than 40	5 years	Population size is a commonly used criterion to determine rurality. Smaller populations have important economic drawbacks such as smaller workforce, smaller market for products, fewer economies of scale, less diverse economic structure and others.
		Population Size (Estimates)	BC Stats	Municipalities / RD	All RDs and municipalities. Unincorporated areas are aggregated.	Annual	
	Population Change	Population Change Since Previous Census	Statistics Canada - Census of the Population	CSD	CSDs with population larger than 40	5 years	Measures population growth or decline. Well-performing communities tend to attract residents,

		Average Annual Population Change in Last 3 Years (Estimates)	BC Stats	Municipalities / RD	All RDs and municipalities. Unincorporated areas are aggregated.	Annual	while low-performing communities tend to have difficulty attracting and retaining residents.
	Population Density	Population Density	Statistics Canada - Census of the Population	CSD	CSDs with population larger than 40	5 years	Population density is a commonly used criterion to determine rurality. Rural communities tend to be less densely populated, which increases the costs of providing services and doing business, as distances between households are relatively larger.
	Population Ageing and Replacement	Proportion of Working Age Population (15-64)	Statistics Canada - Census of the Population	CSD	CSDs with population larger than 40	5 years	Measures the ratio of the working-age population and the total population. A high proportion of working-age population may be associated with better economic performance and capacity to maintain essential services. It is similar to the dependency ratio but accounts for all working-age population and not only individuals that are part of the labour force.
		Dependency Ratio	Statistics Canada - Census of the Population	CSD	CSDs with population larger than 40	5 years	Measures the ratio of the non-economically active population and the total population. As dependency increases with the ageing population, communities may be challenged to maintain supports and services that rely on contributions from the workforce.
		Percentage of total population under 20	Statistics Canada - Census of the Population	CSD	CSDs with population larger than 40	5 years	A measure of generational replacement. A larger population of young individuals may lead to a larger workforce if the community can retain its residents. It is also an important metric for the need for schools and other children-related services.
		Percentage of total population over 64	Statistics Canada - Census of the Population	CSD	CSDs with population larger than 40	5 years	A measure of population ageing. Relatively older populations result in a smaller workforce, higher need for services and a larger dependent population.
		Labour Force Replacement Ratio	Statistics Canada - Census of the Population	CSD	CSDs with population larger than 40	5 years	Measures the community's ability to replace retiring workers with young individuals entering the workforce. A low replacement rate may negatively impact future economic performance.
Migration	International Immigration	Proportion of Immigrants in total population in private households	Statistics Canada - Census of the Population	CSD	CSDs with population larger than 40	5 years	Historical measure of immigrant attraction and retention.
		Proportion of Recent International Immigrants (2011-2016) for the population in private households	Statistics Canada - Census of the Population	CSD	CSDs with population larger than 40	5 years	A measure of international immigrant attraction and retention in recent years.
	Internal Immigration	Proportion of Recent Internal Immigrants (2011-2016) for the population in private households	Statistics Canada - Census of the Population	CSD	CSDs with population larger than 40	5 years	A measure of internal immigrant attraction in recent years. Areas that offer better quality of life or economic opportunities tend to attract residents.

	Net Migration	Net Migrants per Capita	BC Data Catalogue - BC Stats	RD	All RDs	Annual	A measure of overall population attraction. Areas that offer a better quality of life or economic opportunities tend to attract residents, while stagnant areas tend to lose residents.
Access to Services	Distance to Services	Distance to Nearest Hospital	BC Data Catalogue - Ministry of Health	CSD	All CSDs	Unknown	A measure of access to various essential services that affect population attraction and retention and overall well-being.
		Distance to Nearest Residential Care Facility	BC Data Catalogue - Ministry of Health	CSD	Unknown	Biweekly	
		Distance to Nearest Service BC Office	BC Data Catalogue - Ministry of Citizens Services	CSD	Unknown	Unknown (last update 05-2020)	
		Distance to Nearest WorkBC Centre	BC Data Catalogue - Ministry of Social Development and Poverty Reduction	CSD	Unknown	Unknown (last update 12-2019)	
	Access to Child Care	Child Care Facilities per Capita	BC Data Catalogue - Ministry of Children and Family Development	CSD	Unknown	Daily	Access to child care is important for women empowerment and participation in the labour market, which influences community overall social and economic performance.
	Physicians	Physicians per capita	BC Data Catalogue - Ministry of Jobs, Economic Development and Competitiveness	CSD	Unknown	5 years	Physicians per capita is an indicator of access to health care services in the community.
Quality of Life	Life Expectancy	Life Expectancy at Birth	BC Stats	LHA / Community Health Service Area (CHSA)	Most CSHAs	Annual	Life expectancy at birth measures a series of factors that influence mortality such as access to health care, appropriate nutrition, crime rates and others. It is an important indicator of well-being.
	Inequality	Income Distribution	Statistics Canada - Census of the Population	CSD	Most CSDs with at least 200 respondents	5 years	Income distribution is an indicator of economic equity. High income inequality is associated with undesirable outcomes, such as lower life satisfaction and criminality.
			Annual Income Estimates for Census Families and Individuals (T1 Family File)	CSD	Unknown	Annual	
	Poverty	Prevalence of low income based on the Low-income	Statistics Canada - Census of the Population	CSD	Most CSDs with at least 200 respondents	5 years	Low income is a good proxy to measure poverty, which affects an individual's health, education and economic outcomes.

		measure, after tax (LIM-AT) (%)	Annual Income Estimates for Census Families and Individuals (T1 Family File)	CSD?	Unknown	Annual	
		Prevalence of low income based on the Low-income cut-offs, after tax (LICO-AT) (%)	Statistics Canada - Census of the Population	CSD	Most CSDs with at least 200 respondents	5 years	
	Affordability	Proportion of households pending 30% or more of income on shelter costs in relation to total households	Statistics Canada - Census of the Population	CSD	Most CSDs with at least 200 respondents	5 years	Housing affordability is critical for well-being. When too much is spent on housing, access to food, goods and services may be impacted.
	Life Satisfaction	Percentage of population that reports being satisfied or very satisfied with their life	Statistics Canada - Canadian Community Health Survey	Health Regions	All Health Regions	Occasional (Last data 2017/2018)	Subjective well-being measures capture aspects of an individual's life that cannot be understood from statistical data. It helps determine the quality of life of individuals in a community.
	Perceived Health	Percentage of population that reports very good or excellent self-assessed health	Statistics Canada - Canadian Community Health Survey	Health Regions	All Health Regions	Occasional (Last data 2017/2018)	Self-assessed health impacts the overall quality of life. Additionally, individuals suffering from deprivation are more likely to have worse health outcomes.

5.4. Social Capital

Social capital relates to the ties that hold a society together, namely the connections and networks between individuals and the resulting reciprocity created by them (Agarwal et al., 2009, p. 310; Permingeat & Vanneste, 2019, p. 2). Permingeat and Vanneste (2019, p. 2) point to Bourdieu and Putnam as two key contributors to the social capital literature. While both generally agree on what comprises social capital, Bourdieu focuses on its benefits to individuals through personal connections, trust and self-interest. In contrast, Putnam is concerned with the benefits that higher social capital brings to the common good. Social capital is often confused with human capital, but they represent different aspects of society. While social capital relates to the societal networks working towards a common goal, human capital represents the collection of traits and skills that a society applies to achieve its goal (Permingeat & Vanneste, 2019, p. 3). In itself, social capital is not sufficient to support high economic performance, but it is a necessary component for economic development, as it supports other forms of capital and increases community competitiveness and innovation potential (Agarwal et al., 2009, p. 311). Important factors of social capital mentioned in the literature include (Agarwal et al., 2009; Courtney & Moseley, 2008; Sánchez-Zamora et al., 2014):

- Trust
- Social Cohesion
- Public-private Partnerships/Networks
- Civic Engagement

Each factor is detailed below, and variables, potential indicators and data sources are presented in Table 15.

Trust

Trust refers to both feelings of trust among individuals (i.e. interpersonal trust) and trust in institutions and organizations (i.e. institutional trust) (Kwon, 2019, p. 20). Kwon (2019, pp. 33–39) argues that trust has been found to positively affect economic and social development through channels such as increasing life satisfaction and subjective well-being; expanding cooperation between agents; reducing transaction costs; and improving the implementation of policies and the rule of law. Due to its subjectivity, it is difficult to directly measure trust. Available proxy community-level variables are related to criminality and charitable donations. Qualitative measures, such as subjective trust in neighbours, community and the government would be helpful to better assess the level of trust but were unavailable at the community-level.

Social Cohesion

Although an amorphous concept, most definitions of social cohesion present a strong connection with the concept of trust (Kwon, 2019, p. 34). It is related to the existence of a shared identity built on common values, norms, symbols, etc., which enables individuals to trust one another (Cheong et al., 2007, p. 39; Larsen, 2014, p. 2). As a result of this close connection between trust and social cohesion, the same variables considered to measure trust could have been used here. Additionally, “sense of belonging”, included under cultural capital as a measure of place identity, could also have been used as a proxy for social cohesion. Due to this overlap and the subjective nature of social cohesion, no community-level variables were found to measure this factor. As such, it is left as a placeholder.

Public-private Partnerships/Networks

Public-private partnerships and networks relate to the connection and the level of cooperation between organizations in these sectors. There is evidence that stronger connections between public and private organizations are a key factor that influences local economic performance (Agarwal et al., 2009, p. 311). In a study to measure regional resilience in rural Spain, Sánchez-Zamora and Gallardo-Cobos (2019, p. 7) used the percentage of business members on the board of directors of rural development groups to measure the strength of the public-private partnership. Unfortunately, this review was unable to find a similar proxy variable in the B.C. context, leaving this factor as a placeholder.

Civic Engagement

Civic engagement relates to individuals' participation in civic life to address issues of public concern and improve local conditions in the short and long term (Adler & Goggin, 2005, p. 241). Civic engagement may materialize through activities such as volunteering, donating to charitable causes, voting, protesting and others. Available variables that can help measure civic engagement are voter turnout and the strength of the volunteer sector in the community (e.g. charity organizations per capita). Voter turnout is a measure of the health and quality of democratic processes, while the vibrancy of the volunteer sector is thought to be correlated with higher levels of trust and community involvement (Bekkers, 2012, p. 242). Charitable donations - a variable included under Trust - could also have been included here.

Table 16

Social Capital Factors, Variables and Indicators

Factors	Variable	Sample Indicator	Source	Unit of Analysis	Coverage	Update Frequency	Rationale
Trust	Crime	Crime Rate per 100,000	Statistics Canada - Uniform Crime Reporting Survey	RD / Policing Jurisdictions	180 out 232 Policing Jurisdictions	Annual	High crime rates influence perceptions of safety and trust.
		Crime Severity Index	Statistics Canada - Uniform Crime Reporting Survey	Policing Jurisdictions	180 out 232 Policing Jurisdictions	Annual	The crime severity index considers both the volume and seriousness of crimes. Similar to the crime rate, a high index may be associated with low perceptions of safety and trust.
	Charitable Donations	Ratio of Charitable Donors and Total Tax filers	Statistics Canada - Income and Financial Data of Individuals, Preliminary T1 Family File	Census Agglomeration	All CAs	Annual	Charitable donations assist in improving community well-being through various channels and is also an indicator of social responsibility.
Civic Engagement	Voter Turnout	Proportion of Registered Voters Participating in Last Provincial Elections	BC Data Catalogue - Elections BC	Provincial Electoral Districts	87 Electoral Districts	Occasional	Voter turnout is an indicator of the health of a democracy and is considered a measure of citizen engagement in community life.
		Voter Turnout in Local Elections	Civic Info BC	Municipalities	154 Municipalities	Occasional (Last collection 2018)	
	Voluntary Sector	Charity Organizations per Capita	Canada Revenue Agency	Municipality	Unknown	Unknown	The number of charities and not-for-profits per capita is an indicator of community engagement.

5.5. Environmental Capital

Environmental capital, also known as natural capital, relates to the stock of natural resources, renewable and non-renewable, and the ecosystem services they provide (Ratner, 2020, p. 12). These resources may provide a community with direct-use benefits (e.g. natural resource exploitation), unpriced benefits from ecosystem services (e.g. carbon sinks), and non-material benefits (e.g. aesthetic value, recreation) (Crowe, 2008, p. 831). The sustainable exploitation of natural resources can increase other forms of capital without depleting environmental capital stocks, thus leading to higher levels of local development and well-being. In contrast, when exploitation degrades or depletes natural resources, wealth creation may be offset by the loss of environmental capital (Ratner, 2020, p. 12). Key factors associated with environmental capital identified in the literature are (Agarwal et al., 2009; Courtney & Moseley, 2008; Sánchez-Zamora et al., 2014):

- Natural Resource Endowment
- Natural Assets
- Location
- Pollution
- Climate Change

Each factor is detailed below, and variables, potential indicators and data sources are presented in Table 16.

Natural Resource Endowment

Natural resource endowment refers to the availability of resources that can be exploited and traded, either in their raw form or through value-added products. These natural resources are related to sectors such as forestry, mining, oil and gas and even agriculture, through the availability of fertile lands. An important distinction is between natural resource abundance and dependence. While abundance relates to the availability of natural resources, dependence refers to the extent to which a community depends on the commercialization of these resources to maintain its livelihood (Gylfason, 2011, p. 4). Although an excessive dependence on natural resources is seen as a source of vulnerability (Halseth & Ryser, 2018, p. 39), the availability of natural resources may be seen as a unique asset and an opportunity for development. Although communities generally do not own these resources as they are crown controlled, they may still benefit from their exploitation through job and wealth creation. Due to the difficulty in finding measures of resource endowment, under this factor are included variables related to the location of major mines, the location of forestry tenures (tree farm licences) and the availability of farmable land. Variables that measure the availability of petroleum and gas reserves, would also be relevant but were unavailable.

Natural Assets

In this context, natural assets relate to non-material benefits - such as aesthetic pleasing landscapes, fauna and flora - that may improve quality of life, provide recreation opportunities, and attract tourism to a community. Crowe (2008, p. 833) posits that areas such as forests, coasts and lakes are attractive to vacationers and potential residents, allowing communities near these ecosystems to develop identities that support endogenous development. Available variables relevant to this factor include the availability or ease of access to national parks, conservation areas and biodiversity.

Location

This factor is associated with the concepts of remoteness and peripherality. Although not clearly defined, these concepts are generally thought to relate to distance and level of accessibility to a set of services (Department of Health, 2001, p. 4). Proximity to population agglomerations and service centres are important factors in determining what socioeconomic opportunities are available to communities (Alasia et al., 2017, pp. 4–5). Remoteness reduces access to services and specialized labour force while increasing shipping costs (Crowe, 2008, p. 831). Variables considered to be good measures of community location are Statistics Canada's Index of Remoteness and RPP's internally developed Rural Classification.

Environmental Degradation

Environmental degradation relates to the depletion or pollution of resources, such as the air, soil and water. Degradation leads to a reduction in the overall stock of environmental capital, thus reducing the potential to pursue development opportunities associated with natural resources, such as tourism and recreation. Available variables to measure environmental degradation at a community-level are scarce. Here, variables related to air quality and waste generation are included as possible metrics. If available, variables that measure soil erosion, water pollution, deforestation and others could be included to provide a more accurate representation of environmental degradation.

Climate Change

This factor is mostly concerned with a community's level of vulnerability to the anticipated effects of climate change, such as variations in weather patterns, sea-level rise, loss of biodiversity and others. Two key variables are considered under this factor, mitigation and adaptation. Mitigation refers to efforts to reduce greenhouse gas (GHG) emissions, while adaptation is concerned with reducing the negative impacts of climate change. Regarding mitigation, data on GHG emissions is available at the regional district level and may be used as a measure of mitigation efforts. In terms of adaptation, no clear measure is readily available, but the existence of a hazard, risk and vulnerability analysis or emergency preparedness plan may be used as proxy variables, if available.

Table 17

Environmental Capital Factors, Variables and Indicators

Factor	Variable	Sample Indicator	Source	Unit of Analysis	Coverage	Update Frequency	Rationale
Natural Resource Endowment	Mineral Endowment	Major Mine in Community Boundary	BC Data Catalogue - BC Ministry of Energy, Mines and Petroleum Resources	Mining Region / Community	Unknown	Unknown	The existence of a major mine in a community is an important natural resource endowment that may affect economic opportunities.
	Forestry Tenures	Proximity to Forestry Tenure areas	BC Data Catalogue - BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development	Tree Farm Licences	Unknown	Unknown (Last modified 06/2020)	The existence of forestry tenures around a community suggests potential economic opportunities related to the forestry sector.
	Food Production	Hectares of Farmed Land	Statistics Canada - Census of Agriculture	Census Consolidated Subdivision	132 CCSs	5 years	Measures the community's food production potential, as well as the viability of agricultural activity in the area.
Natural Assets	Parks	Distance to Nearest National Park	BC Data Catalogue - GeoBC	CSD	7 parks	Unknown	Proximity to national parks, NWAs and MBSs may be a good measure of the attractiveness of the natural environment of a community.
	Natural Wildlife Areas	NWA in the community	Environment and Climate Change Canada	CSD	6 NWA	Unknown	
	Migratory Bird Sanctuaries	MBS in the community	Environment and Climate Change Canada	CSD	7 MBS	Unknown	
	Endangered Flora	Proportion of Species considered Extirpated, Endangered, Threatened (red) or Special Concern (blue) in the region	BC Ministry of Environment and Climate Change	Regional District	All RDs	Unknown	This may be a proxy for the quality of habitat management practices in a region. Areas with a high proportion of endangered species in relation to all resident species may be mismanaging their natural resource endowment.
Location	Remoteness	Distance to nearest urban centre (Rural Classification)	Rural Policy and Programs branch (internal)	Community	All communities	Occasional	Geographic proximity to service centres and population centres is an important determinant of socio-economic outcomes.
		Index of Remoteness	Statistics Canada - Index of Remoteness	CSD	All CSDs	Occasional	
Environmental Degradation	Air Quality	Average PM2.5 Concentration	BC Ministry of Environment and Climate Change	Measuring Stations		Daily	Air pollution is associated with negative health and environmental impacts.
	Waste Generation	Waste Generation per Capita	BC Data Catalogue - Ministry of Environment	RD	27 RDs	Unknown (Last available data 2017)	Lower waster generation per capita may be associate with more sustainable practices.
Climate Change	Mitigation	Change in GHG Emissions per capita	BC Ministry of Environment and Climate Change	RD	22 RDs	Annual	Changes in GHG emissions may be related to efforts to employ cleaner technologies but may also result from a decrease in economic activity.

5.6. Cultural Capital

Cultural capital has been defined in a variety of ways. As with social capital, Pierre Bourdieu's contributions have helped shape the concept and the study of cultural capital (Beel & Wallace, 2018, p. 699; Throsby, 1999, p. 4; Tubadji & Nijkamp, 2016, p. 1). Bourdieu divided the concept of cultural capital into three groups: embodied, referring to dispositions acquired through time; objectified, relating to the transformation of cultural capital into cultural goods, such as books or paintings; and institutionalized, when embodied cultural capital receives institutional recognition (e.g. educational credential) (Beel & Wallace, 2018, p. 699; Throsby, 1999, p. 4). Building on this conceptualization, Throsby (1999, p. 7) defines cultural capital as the stock of cultural value embodied in an asset or assets available to a society, which in turn may generate a flow of goods or services. In this case, cultural value as a concept is different but associated with economic value and refers to how society values a cultural item. Cultural capital is comprised of both tangible (e.g. buildings, locations, artifacts) and intangible assets (e.g. ideas, traditions, beliefs). Like other forms of capital, cultural capital encompasses various factors, such as (Agarwal et al., 2009; Courtney & Moseley, 2008; Sánchez-Zamora et al., 2014):

- Cultural Sites
- Degree of Commercialization of Heritage, Environment and Identity
- Place Identity

These factors may play an important role in the economic performance of a community, as the historical and cultural identity, as well as its cultural assets, may be developed and exploited for commercial gain (Agarwal et al., 2009, p. 311). Each factor is briefly described below, while additional detail on their correspondent variables, indicators and data sources is presented in Table 17.

Cultural Sites

Cultural sites relate to the tangible stock of cultural capital. The existence of locations and buildings that either have high cultural value (e.g. unique sites, heritage sites) or house items and artifacts of high cultural value (e.g. art galleries, public libraries) to the community is an important source of cultural capital. The commercial potential of some of these sites may generate opportunities for investment and income production, especially through tourism (Gould & Burtenshaw, 2014). Aside from economic gains, the availability of cultural sites may contribute to the attraction, retention, and well-being of residents by providing leisure opportunities or by strengthening the community's sense of place. Variables related to the availability of museums, art galleries, unique sites, public libraries, heritage conservation sites, UNESCO world heritage sites, and other civic facilities are included in this factor.

Degree of Commercialization of Heritage, Environment and Identity

The degree of commercialization of heritage, environment and identity refers to the extent to which a community economically exploits its available cultural capital stock, which is characterized by its heritage and identity, as well as its environmental assets. Although the existence of environmental assets is considered under environmental capital, how it is developed and commercialized is considered part of cultural capital, as a community's culture may affect the form and the extent to which an asset is exploited. This factor is closely linked with the tourism industry, as tourism is likely the most common method of commercialization of heritage, environment and identity. Available variables found to measure this factor are seasonal residents, availability of ski resorts, golf courses,

tourism centres, and festivals and events. The size of a community's tourism sector could also be included in this factor, but this data is not readily available.

Place Identity

As a concept, place identity is hard to define, with at least three different sets of conceptualizations: place identity as an extension of self-identity; place identity as linked to certain elements that typify an area (e.g. tall buildings); and place identity in terms of an emotional connection to a place (Bernardo & Palma-Oliveira, 2013, p. 37). In this last perspective, place identity relates to the feelings, meanings, memories, interpretations and experiences related to a spatial location (Qazimi, 2014, p. 307). Place identity is relevant as it creates connections between residents of a community, as well as between residents and place. Place identity may help improve residents' well-being, contribute to population attraction and retention and others. As a subjective concept, place identity is not easily measured. A possible proxy variable for place identity is the sense of belonging to a community, which is measured by Statistics Canada through a survey at the health region level.

Table 18

Cultural Capital Factors, Variables and Indicators

Factor	Variable	Sample Indicator	Source	Unit of Analysis	Coverage	Update Frequency	Rationale
Cultural Sites	Historic Sites	Number of Historic Sites in the Community	Hello BC	CSD	Unknown	Unknown	Civic (e.g. arts, culture and recreation) facilities are an important part of a vibrant and culturally rich community. The presence of these facilities in a community is a good indicator of cultural capital.
	Museums	Number of Museums in the Community	Hello BC	CSD	Unknown	Unknown	
	Unique Sites	Number of Unique Sites in the Community	Hello BC	CSD	Unknown	Unknown	
	Art Galleries	Number of Art Galleries in the Community	Hello BC	CSD	Unknown	Unknown	
	Indigenous Culture	Number of Indigenous Cultural Facilities and Businesses in the Community	Hello BC	CSD	Unknown	Unknown	
	Civic Facilities	Number of Civic Facilities in the Community	BC Data Catalogue - GeoBC	CSD	Unknown	Updated Monthly	
	Public Library	Access to Library in the Community	BC Ministry of Education	CSD	Unknown	Unknown	The existence of libraries in a community is an important measure of cultural capital. Libraries provide access to culture and serve as meeting places for various civic and cultural activities.
	UNESCO World Heritage Sites	Number of Heritage Sites in the Community	UNESCO	CSD	Unknown	Unknown	Represent sites of significance for human heritage. The existence of a World Heritage site in a community is a unique cultural asset.
	Heritage Conservation Areas	HCA in the community	BC Data Catalogue - FLNRORD	CSD	Unknown	Unknown	HCAs are associated with historically significant areas, which may contribute to a community's cultural capital.
Degree of Commercialization of Heritage, Environment and Identity	Seasonal Residents	Proportion of Households not Occupied by Usual residents	Statistics Canada - Census of the Population	CSD	CSDs with population larger than 40	5 years	This aims to measure second homeownership as a proxy for the level of commercialization of local assets, as individuals tend to have second homes in areas with natural or cultural attractions. However, low usual resident occupancy may also mean houses are abandoned.
	Ski Resorts	Access to Ski Resort in the Community	Hello BC/BC Data Catalogue - GeoBC	CSD	Unknown	Updated Monthly	The existence of these facilities in a community and the amount of tourism activity measure the extent

	Golf Courses	Number of Golf Courses in the Community	BC Data Catalogue - GeoBC	CSD	Unknown	Updated Monthly	to which the community is taking advantage of its culture, environment and identity as a source of economic development.
	Recreation Sites and Trails	Number of Recreation Sites and/or Recreation Trails in the Community	BC Data Catalogue - BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development	CSD	Unknown	Unknown (Last modified 06/2020)	
	BC Tourism Centre	Access to BC Tourism Centre in the Community	BC Data Catalogue - Ministry of Tourism, Arts and Culture	CSD	Unknown	Unknown	
		Annual Visitors per Capita	Destination BC	Tourism Centre	Municipalities with a Tourism Centre	Monthly	
	Festival and Events	Number of Festival and Events in the Community	BC Data Catalogue - Destination BC	CSD	Unknown	Unknown	Festival and events are a way to commercialize the local culture and attract tourism.
Place Identity	Sense of Belonging	Percentage of population that reports very or somewhat strong sense of belonging to community	Statistics Canada - Canadian Community Health Survey	Health Regions	All Health Regions	Occasional (Last data 2017/2018)	Measures identity and connection to place. Higher levels of place identity may be related to higher social cohesion.

5.7. Conclusion

This review presented an extensive list of variables that are considered important determinants of community performance and residents' well-being in rural areas. However, it does not claim to be exhaustive. It is expected that other relevant data sets will be found, especially those that are not publicly available but may be accessible within government. This initiative focused on publicly available data, as the use of publicly accessible data contributes to the credibility of a CI. Nonetheless, when public data is not available for important variables, internal data should be used to create a more comprehensive picture of community conditions in rural B.C.

This review found a total of 70 variables distributed across the five capitals. These variables are not evenly distributed throughout the framework, as shown in Table 18.

Table 19

Number of Available Variables by Capital

	Economic Capital	**Human Capital**	**Social Capital**	**Environmental Capital**	**Cultural Capital**
Number of Factors	8	7	2	5	3
Number of Variables	19	20	4	11	16

Not surprisingly, human and economic capital have the most variables available. That is because they are concerned with more tangible factors, which are easier to measure. In contrast, the intangible nature of social capital makes it hard to measure. Many of the social capital factors would be better measured by qualitative variables, which are not as readily available at the community-level nor consistently replicated across places. Additionally, social capital significantly overlaps with both cultural and human capital. For example, access to civic facilities (e.g. libraries, museums, recreation centres) may measure social capital as much as cultural capital, given that aside from providing access to culture, they serve as a gathering place for the community. As such, variables that could have been included under social capital were placed elsewhere. Environmental capital is also hard to measure, but because few data sets are available at the community-level.

Aside from demonstrating what data is available, this section also outlined data gaps. Many factors that may play an important role in determining socioeconomic conditions in rural communities are currently not measurable due to a lack of available data. For the reasons presented above, these gaps are more prevalent in the social and environmental capitals, with no variables available to measure various factors. For instance, considering social capital, trust and civic engagement had only partially satisfactory variables, while social cohesion and public-private partnerships/networks could not be measured. A similar issue occurs with environmental capital, where factors related to climate change, pollution and natural resource endowment are only partially measurable given the limited availability of data.

There are also significant differences in the types of variables accessible for each capital. While economic, human and social capitals are comprised mostly of quantitative variables, environmental

and cultural capitals rely more on geographical variables that need to be converted into a quantitative scale (e.g. distance to a facility or asset, or the number of facilities within a community's boundaries). Furthermore, few qualitative variables are available in a consistent format for most rural communities in the province. This is an important barrier for measuring some of the less tangible aspects that affect a community's stock of capital, specifically in relation to cultural and social capital.

The timeliness of the data is another important consideration. The update frequency of different data sets ranges from days to up to intervals of five years. Also, some data sets do not have an established update frequency. This occurs either because they are one-off efforts or because data collection is triggered by specific events (e.g. voter turnout data is collected only when elections happen). However, as has been the pattern, the timeliness of the data also differs between capitals. The update frequency for many of the environmental and cultural capital variables is unknown, but this may not be a significant issue because they are comprised mostly of geographical variables. As variables are related to the distance or availability of physical assets or facilities - parks, museums, heritage sites, etc. - they are less likely to drastically change in the short-term. In contrast, the economic and human capitals present a stronger reliance on census data, which is only updated every five years. Where data quality and availability allow, it is recommended that data from provincial sources be used because they tend to be updated annually.

A parallel issue to data availability and timeliness relates to the geographical coverage of the data sets. Due to the intended data usage, the review included only variables that are available for a large set of communities or regions in the province. Nonetheless, it appears that Indigenous communities, unincorporated areas, and small communities (e.g. communities with less than 200 residents) are often not covered in key data sets. Fully understanding the significance of data coverage issues will require further analysis, since the geographical coverage of some of the data sets are still unknown. Despite that, the lack of socioeconomic data on rural communities, and especially rural Indigenous communities, is a known issue that will need to be considered in any effort to rank or categorize communities based on their local conditions.

The collection of variables presented throughout this section uncovered significant data sets that can help RPP better understand local conditions. It is not expected that all variables be included in a model or CI. Data sets should be collected and assessed for their quality and relevance to the phenomenon being measured (e.g. community resilience, economic development, well-being). Variables that do not meet certain quality criteria should be excluded. Next, statistical testing should be applied to test the relationship between variables. Certain variables will likely present a significant overlap. Redundant indicators (e.g. those with a correlation higher than a certain threshold) may be excluded from the analysis, as their inclusion would create unnecessary complexity and potential issues with double counting. This process will lead to a final set of variables that will allow RPP to develop a clearer understanding of community conditions in rural B.C.

6.0 Recommendations and Conclusion

6.1. Key Findings

This project sought to determine how the Rural Policy and Program's Branch (RPP) could use community-level data to understand and communicate rural community conditions to improve place-based policies and programs. The project reviewed the literature to understand the conceptualization of rural, rural development and place-based policies; investigated tools that are available for understanding and communicating local conditions, with a specific focus on composite indicators (CI); reviewed how jurisdictions in Canada and elsewhere have developed tools to assess and communicate rural community conditions and determined how these experiences may help RPP; and examined what relevant georeferenced or community-level data and indicators are available to support place-based rural development policies in B.C.

RPP has been using CIs since 2016 to assist in funding decisions, which justified the focus of this project on this type of tool. The Community Need Index (CNI) used data from Statistics Canada, the Canada Revenue Agency, BC Stats and other B.C. ministries organized around two components - vulnerability and recent performance – to rank communities. The CNI had issues related to its strict focus on economic and social indicators, data availability and lack of transparency. As a result, in 2020 RPP hired a consultant to review and update the CNI. The new tool – rebranded the Community Assessment Tool (CAT) – includes more indicators, has a more comprehensive structure that includes geographical and infrastructure considerations. Additionally, the CAT improves overall flexibility and transparency. While the CNI was a static ranking of communities, the CAT is an interactive tool that allows users to select variables, weights and see disaggregated results. These improvements significantly increased RPP's ability to assess and analyze different factors that determine local conditions. Nonetheless, the CAT still has important limitations related to its methodological construction that justified this project.

Developing a CI that captures the key aspects of a multidimensional reality and turns them into a single score that allows communities to be ranked is a complex endeavour. It is a process that involves a series of difficult and subjective choices, such as what indicators to include; what normalization procedure to use; how to structure, weight and aggregate the selected indicators; and how to validate its results. Given that RPP's goal with the CAT is to objectively measure and compare rural community conditions, the choices required to develop a CI need to be based on practices that reduce the subjectivity involved in the construction process. Otherwise, the scores and ranks become a reflection of its constructors' biases and may lead to misguided policy decisions. Thus, the first concern of this research was to develop a clear understanding of the challenges and the best practices in CI construction.

The project briefly discusses the advantages and disadvantages of using CIs to measure multidimensional phenomena, before turning to the description of best practices in the CI construction process. A key takeaway from this exploration of best practices is that the development of a sound theoretical framework is the building block of a quality CI. The theoretical framework defines the phenomenon being measured, identifies its dimensions and determines the types of indicators to be included. It is the theoretical framework that brings consistency and credibility to

the variable selection process, as it provides a set of criteria to determine what variables should be included and how they should be organized. From there, the section discusses each of the choices required in the construction process, presenting options and best-practices for each of them. The overall goal of this process was to create a toolkit that RPP and future consultants can refer to when further updating the CAT or developing a new CI.

Next, the project sought to understand if and how CIs have been used to understand and communicate rural community conditions in jurisdictions across Canada and elsewhere. This jurisdictional scan found that CIs have been extensively used in a variety of forms and for different purposes. The review was organized around four lenses through which rural community conditions may be understood: rural development, local economic development (LED), community resilience and community well-being. These concepts present significant overlap and are not mutually exclusive, but they are different ways of interpreting local conditions. The choice of a lens may affect how a CI is structured and what variables are considered. The section presents a sample of experiences under each of these lenses. The goal was to present options that could help RPP in constructing and improving their tools.

The scan demonstrated that there is an abundance of initiatives that measure rural community conditions and that these initiatives are extremely diverse. The variation exemplifies how there is no one way to measure community conditions. Even when the conceptual lens and the purpose are similar, measuring initiatives can be widely different. However, some patterns may be observed in different categories. LED initiatives tend to have a narrower focus on economic variables, while resilience and rural development CIs generally have a broader view, including environmental and cultural variables. Another commonality was the use of some version of the five capitals framework, which generally includes economic, human, social, cultural and environmental capitals. Many studies argue that rural economic performance is connected to the availability and deployment of these capitals in a community.

From a methodological standpoint, the most contentious choices in CI construction relate to weight selection and indicator aggregation. Regarding weight selection, initiatives tended to either use an equal weights approach or apply statistical methods to determine weights endogenously. The equal weights approach is popular for its simplicity and it is generally used to avoid the subjectivity of assigning importance to different variables. The main critique of this approach is that assigning equal weights is as arbitrary as any other scheme. In contrast, statistical methods use the data itself to determine weights. Although this process is perceived to be more objective, it significantly increases complexity and may reduce the communicability of a CI. Given that weights can drastically affect results and that priorities may vary significantly across communities, choosing a weighting scheme remains a complex choice that incurs significant trade-offs.

Concerning the aggregation process, most initiatives reviewed used linear aggregation processes (i.e. weighted average) to turn the many indicator values into a single composite indicator score. The option for a linear aggregation process is probably due to its relative simplicity to calculate and communicate. The key issue with linear aggregation, which is discussed in detail in Section 3, is that it assumes full compensability between indicators. Full-compensability means that bad performance in a variable can always be compensated by strong performance elsewhere. That is a strong assumption, as it is unlikely that many variables can be compensated for. For example, it is

not plausible that a community can compensate for a high climate change vulnerability by increasing population growth or decreasing unemployment. Furthermore, the linearity of the aggregation process means that returns are constant for all variables. That means that increasing an indicator that is already high, results in the same benefit as improving a low performing indicator. This assumption also does not hold for many variables, with various studies showing that the marginal utility of income diminishes as they increase, for example. Thus, although simple and popular, linear aggregation processes have important drawbacks.

The jurisdictional scan also demonstrated that data availability is as important as the theoretical framework in determining variable selection. In an ideal world, a CI constructor would determine a theoretical framework and select the best variables to measure the phenomenon of interest. In reality, this choice is constrained by the availability of data at the community scale. This constraint is even more relevant when considering rural, small and Indigenous communities. Therefore, the theoretical framework may work as an initial filter to determine what variables should be considered, but the final choice is dependent on data availability. This might be especially important when considering qualitative data. The review showed that few initiatives incorporate qualitative data, which might be a result of its lack of availability, probably resulting from high collection costs.

Following the jurisdictional scan, the project compiled an extensive set of community-level data sets and variables available in B.C. The research used the five capitals framework to help organize the variables. The five capitals framework was selected for three mains reasons. First, because it is well accepted and widely used in the rural development literature, where the availability of these capitals is often considered to be determinants of endogenous development. Second, because the jurisdictional scan demonstrated that many CIs are organized around these capitals. Third, the framework is broad and encompasses a variety of factors that may be perceived to influence local conditions in rural communities. As such, it allowed for the inclusion of a large set of variables that may be relevant for different policy analyses and goals. This choice, however, does not require that RPP use this framework, although it may benefit from it. At this point, it was used as a tool to help guide and organize the various data sets uncovered during the review.

The review found 70 variables that may contribute to assessing community conditions distributed over more than 40 data sets from sources such as Statistics Canada, the Canada Revenue Agency, BC Stats, and various provincial ministries and agencies. Due to data quality and credibility concerns, the review kept a focus on government-produced, publicly available sources. Further research may want to investigate internal to government data sets that may be useful. Despite finding a large set of relevant community-level variables, the review confirmed important data gaps for rural and First Nations communities that are mentioned in the literature. Many of the data sets only include incorporated municipalities, which excludes small unincorporated communities and Indigenous reserves. The lack of data for these communities poses important challenges to the creation of a CI that accurately and comprehensively compares and ranks rural communities in the province, as many communities may have to be excluded from the analysis. Another key issue refers to data timeliness. The various data sets listed in Section 5 follow different update timelines, which range from weekly updates to every 5 years, with some data sets having no set update

frequency. This issue may lead the CI to compare communities based on outdated information, possibly leading to incorrect characterizations of local realities and misguided policy decisions.

Considering the five types of capital, the research showed that data availability differs significantly between them. Economic and Human capitals, which broadly encompass more tangible aspects of a community, have the best data availability. Most of the factors considered to constitute these capitals are well represented in data sets, with few exceptions. In contrast, social capital – concerned with the connections and networks between members of a community – proved to be the most difficult to measure. That results largely from the intangible nature of these networks of trust and reciprocity. Cultural capital presents a similar issue since culture is also predominantly intangible. Consequently, the stock of cultural capital would be largely measured through proxies related to the availability of cultural facilities. Improving the availability of province-wide community-level qualitative data could help improve the ability to measure these capitals. Environmental capital also presents notable data gaps, but because few data sets with variables measuring the quality of the natural environment are available at the community-level. Despite these limitations, the list compiled in this research will allow RPP to develop a more robust CI than what currently exists.

6.2. Recommendations

The recommendations presented in this section build on the project's findings and aim to improve how RPP understands and communicates community conditions to support place-based policies and programs. These recommendations have two main goals: improving RPP's ability to assess community conditions in rural B.C. and raising RPP's ability to communicate community conditions. As such, they are organized around these goals.

The recommendations presented here are not in order of priority. They are listed in a sequential order considering the construction of a CI, with the initial recommendations relating to improvements to the foundations of the CI and progressing towards its usage as an information and communication tool.

6.2.1. Assessing Community Conditions

The recommendations presented below aim to contribute to RPP's ability to assess and rank rural communities in B.C. based on their local conditions.

1. **Develop and communicate a clear theoretical framework for the CI**

RPP's existing CI, the CAT, was developed to assess and rank communities to support funding decisions, but it does not have a clearly defined and documented theoretical framework. As a result, it is hard to understand through which lens it is attempting to assess local conditions, which leads to questions regarding the structure of the tool, the choice of variables, how they are grouped, and the weights assigned to each of them. It is recommended that RPP create a document that describes the purpose and objectives of the tool, presents a theoretical lens that clearly defines the phenomenon being measured, and lists the criteria for variable inclusion and exclusion to help increase the quality and credibility of the tool. Additionally, this clarity will help ensure that the CI is used for

its intended purposes only, thus helping avoid inappropriate use that may lead to misguided policies.

2. **Use the variables and data sets presented in Section 5 as a starting point and add or remove variables as necessary**

The compilation presented in section 5 provides a good overview of the data available to measure community conditions in rural B.C. It is recommended that RPP use this list to access data, test their quality and relevance, and select variables to include in the CI based on its theoretical framework. This compilation could serve as a living document, where new data sets are included as they become available, thus presenting an extensive list of data that can be used as the tool evolves.

3. **Consider data timeliness and coverage when selecting variables**

Where possible, RPP should use data that is updated frequently and covers the largest set of communities. As demonstrated in Section 5, data timeliness can vary widely between data sets. When more than one data set is available to measure the same variable, or when two variables from different data sets are highly correlated, RPP should include the variable that is updated most frequently. Unless there are significant data quality or coverage issues. Similarly, RPP should prioritize data sets that have the largest coverage, especially those that include First Nations communities.

4. **Use the best practices for CI construction outlined in Section 3 to review and update the existing CI**

The steps outlined in Section 3 are a set of best practices in CI construction. RPP should consider following those steps to review the CAT and its construction process against best practices to determine where it requires revision and updating. Examples of tests that may lead to improvements include:

- Performing multivariate analysis to understand the structure of the data;
- Testing different normalization methods;
- Testing endogenous weighting methods;
- Testing different aggregation methods, such as geometric and non-compensatory aggregation;
- Using different data imputation methods to deal with missing data.

Performing these tests will contribute to the quality and credibility of the tool by providing a more solid justification for the choices taken in the construction process. Due to a lack of in-house expertise, RPP should consider contracting a statistics consultant to perform these tests.

5. **Improve the First Nations rural community CI**

RPP's existing CI for First Nation communities relies on a narrow set of variables due to data availability issues, considering only population size, location and treaty stage to rank communities. Although data availability issues are significant, other variables are available - at least for the more populated reserves - such as education and demographic data collected through the census.

Additionally, georeferenced variables, such as the distance to certain assets, facilities or services (e.g. distance to nearest higher education institution) apply to First Nations communities as easily as for municipalities. Thus, RPP should consider the variables presented in Section 5 to develop a deeper First Nations community CI.

6. **Consider restructuring the CAT around the 5 capitals framework**

The current CAT structure considers only two dimensions, namely: economic conditions, and social and infrastructure conditions. This leaves out important factors that are believed to affect community conditions, especially those related to human, social, environmental and cultural capital. Ultimately, the structure of the CI and the inclusion of specific variables will depend on its theoretical framework. However, RPP is likely to benefit from a framework that allows for the consideration of a broader set of variables that influence economic performance and quality of life in rural communities. The five capitals framework appears well suited for this, as it encompasses a large range of factors that may affect rural conditions. Furthermore, including more variables in a flexible tool such as the CAT, would allow RPP to create different analyses. For example, considering only economic capital or any subgroup of the five capitals, depending on the goal of the analysis.

6.2.2. COMMUNICATING COMMUNITY CONDITIONS

One of the main advantages of CIs relates to their ability to simplify a complex reality making it easier to communicate. By transforming a series of partial indicators into a single score, a CI allows users to easily understand an issue and compare different units (e.g. communities, countries). However, this simplification comes with a cost, the loss of some of the information contained in the partial indicators and, sometimes, the oversimplification of complex issues. The recommendations provided below seek to ensure that the information presented through the CI is clear and contribute to improved policy decisions.

7. **Use the CI to bring attention to important issues**

CIs are great for bringing attention to specific issues or to start a discussion because they are simple and easily interpretable. Consider, for instance, the attention given to CIs in the mainstream media, where CIs that rank universities and high schools, for example, are often discussed. They attract interest to complex issues by creating rankings that can be understood by non-specialists. The CAT can serve a similar purpose, by allowing RPP to attract attention to local and regional rural issues. It may be used in discussions with other units and ministries to help bring attention to rural specific challenges and opportunities.

8. **Avoid making decisions based solely on CI results**

Paradoxically, a key drawback of CIs also relates to their simplicity. The same simplicity that allows them to attract attention to issues, may lead to misguided decisions. Invariably, condensing a set of partial indicators into a single score results in loss of information. Thus, it is important to understand that CIs are an oversimplification of reality and should not be used in isolation to guide policy decisions. As such, RPP should always consider CI results along with disaggregated data, and expert and local knowledge.

9. **Recognize and communicate the limitations of the CI**

When using CI results, RPP should be upfront about the methodological choices and limitations of the tool. Being clear on what the tool can and cannot do will help avoid its use for unsuitable purposes. RPP should consider creating a brief document that details the objectives of the tool, its methodology, its appropriate uses and known limitations.

10. **Work with other ministries to increase awareness of rural community conditions**

Many provincial policies are designed without a clear understanding of how they will impact different types of rural communities, or even how they will affect rural communities differently than their urban counterparts. This can be attributable, at least in part, to a lack of consideration of rural specific challenges and opportunities. RPP should use the CI to help other units and ministries develop a better understanding of rural realities. Increased knowledge is an important first step in ensuring that policies account for rural issues. RPP could provide other ministries with rural data and knowledge or even allow access to the tool so ministries can develop their own analyses. Additionally, RPP should consider working with other ministries to access internal data sets that can be incorporated into the CI to improve its quality. Through these actions, RPP can contribute to raising the profile of rural within government, while also improving its understanding of rural community conditions.

11. **Consider creating a public-facing version of the CI**

Access to data may help communities understand their challenges, opportunities and how they compare with other communities across the province. Additional information may help communities develop partnerships and build on each other strengths. An example of such public-facing CI is Newfoundland and Labrador's Community Accounts website (available at https://www.communityaccounts.ca/), which presents disaggregated community-level indicators, as well as the community composite well-being score described in Section 4. Publishing CI results has inherent risks, such as disagreements associated with its methodology, but it is an important step to increase transparency. Thus, RPP should consider developing a public-facing CI to support rural communities' development efforts and increase transparency in rural policymaking and funding decisions.

6.3. Next Steps

The research and recommendations presented in this report aim to help RPP improve their understanding and ability to communicate conditions in rural communities. In turn, this is expected to contribute to the improvement of provincial policies that affect rural communities, especially those that follow a place-based approach.

A key issue that is not directly addressed in the recommendations regards the diversity of community goals and the difficulty in accounting for them in a CI. Due to its focus on comparability, CIs require that all communities be assessed based on the same set of variables. By assessing and ranking communities based on a single set of variables, a CI imposes certain criteria that may not accurately reflect local priorities. For example, by including population growth as an indicator population growth of local performance, a CI assumes that this is a desirable goal for all

communities, which might not be realistic. This issue is even more significant when considering First Nations communities, as CIs force communities with different cultural backgrounds into an externally determined understanding of performance or development that may not align with local values and priorities. Future research could investigate ways to improve our understanding of First Nations communities by balancing the need for standardization and comparability with respect for different goals and worldviews.

Capturing a complex phenomenon in a way that is simple enough to be easily communicable but sophisticated enough to provide quality information is an extremely hard task. Since 2016, RPP has been working to understand local conditions in rural areas and use this knowledge to help guide policy and program decisions to provide effective support to the rural communities that need it most. This project is an effort to continue advancing this knowledge.

References

Adler, R. P., & Goggin, J. (2005). What Do We Mean By "Civic Engagement"? *Journal of Transformative Education*, *3*(3), 236–253. https://doi.org/10.1177/1541344605276792

Agarwal, S., Rahman, S., & Errington, A. (2009). Measuring the determinants of relative economic performance of rural areas. *Journal of Rural Studies*, *25*(3), 309–321. https://doi.org/10.1016/j.jrurstud.2009.02.003

Alasia, A., Bédard, F., Bélanger, J., Guimond, E., Penney, C., & Canada, S. (2017). Measuring remoteness and accessibility - A set of indices for Canadian communities. In *Statistics Canada – Catalogue no. 18-001-X* (Issue 18). http://www.statcan.gc.ca/pub/18-001-x/18-001-x2017002-eng.htm%0Ahttp://www.statcan.gc.ca/pub/18-001-x/18-001-x2017002-eng.pdf%0Ahttps://trid.trb.org/view/1470512

Ashley, C., & Maxwell, S. (2002). Rethinking rural development. *Forests Trees and Livelihoods*, *12*(3), 155–161. https://doi.org/10.1080/14728028.2002.9752420

Banakar, V., & Patil, D. S. V. (2018). A Conceptual Model of Rural Development Index. *International Journal of Rural Development, Environment and Health Research*, *2*(4), 29–38. https://doi.org/10.22161/ijreh.2.4.4

Beel, D., & Wallace, C. (2018). Gathering together: social capital, cultural capital and the value of cultural heritage in a digital age. *Social and Cultural Geography*, *21*(5), 697–717. https://doi.org/10.1080/14649365.2018.1500632

Bekkers, R. (2012). Trust and Volunteering: Selection or Causation? Evidence From a 4 Year Panel Study. *Political Behavior*, *34*(2), 225–247. https://doi.org/10.1007/s

Bernardo, F., & Palma-Oliveira, J. (2013). Place identity, place attachment and the scale of place: The impact of place salience. *Psyecology*, *4*(2), 167–193. https://doi.org/10.1080/21711976.2013.10773867

Blanke, A. S., & Walzer, N. (2013). Measuring community development: what have we learned? *Community Development*, *44*(5), 534–550. https://doi.org/10.1080/15575330.2013.852595

Booysen, F. (2002). An overview and evaluation of composite indices of development. *Social Indicators Research*, *59*(2), 115–151. https://doi.org/10.1023/A:1016275505152

Breen, S.-P. (2017). *From Staples Theory to New Regionalism: managing drinking water for regional resilience in rural British Columbia*. Simon Fraser University, Burnaby, Canada.

Burchi, F., & De Muro, P. (2016). Measuring human development in a high-income country: A conceptual framework for well-being indicators. *Forum for Social Economics*, *45*(2–3), 120–138. https://doi.org/10.1080/07360932.2014.995196

Burke, A., & Jones, A. (2019). The development of an index of rural deprivation: A case study of Norfolk, England. *Social Science and Medicine*, *227*(January 2018), 93–103. https://doi.org/10.1016/j.socscimed.2018.09.019

Canadian Rural Revitalization Foundation. (2019). *State of Rural Canada III: Bridging Rural Data Gaps*. http://sorc.crrf.ca/sorc3/#:~:text=The Canadian Rural Revitalization Foundation,St John's%2C Newfoundland and Labrador.

Carayannis, E., & Grigoroudis, E. (2014). Linking innovation, productivity, and competitiveness: Implications for policy and practice. *Journal of Technology Transfer*, *39*(2), 199–218. https://doi.org/10.1007/s10961-012-9295-2

Cheong, P. H., Edwards, R., Goulbourne, H., & Solomos, J. (2007). Immigration, social cohesion and social capital: A critical review. *Critical Social Policy*, *27*(1), 24–49. https://doi.org/10.1177/0261018307072206

Chirwa, T. G., & Odhiambo, N. M. (2018). Exogenous and endogenous growth models: A critical review. *Comparative Economic Research*, *21*(4), 63–84. https://doi.org/10.2478/cer-2018-0027

Columbia Basin Rural Development Institute. (2017). *2017 State of the Basin - Full Report*. http://datacat.cbrdi.ca/sites/default/files/attachments/2017SOTB_FullReport.pdf

Columbia Basin Rural Development Institute. (2019). *2019 State of the Basin Subjective Well-being Report*. http://www.cbrdi.ca/sites/default/files/Documents/PDF/2019SubjectiveWellbeingReport_FINAL_Apr2020a.pdf

Constantine, C. (2017). Economic structures, institutions and economic performance. *Journal of Economic Structures*, *6*(1), 1–18. https://doi.org/10.1186/s40008-017-0063-1

Courtney, P., & Moseley, M. (2008). Determinants of local economic performance: Experience from rural England. *Local Economy*, *23*(4), 305–318. https://doi.org/10.1080/02690940802408029

Cox, D., Frere, M., West, S., & Wiseman, J. (2010). Developing and using local community wellbeing indicators: Learning from the experience of Community Indicators Victoria. *Australian Journal of Social Issues*, *45*(1), 71–88. https://doi.org/10.1002/j.1839-4655.2010.tb00164.x

Crowe, J. (2008). The role of natural capital on the pursuit and implementation of economic development. *Sociological Perspectives*, *51*(4), 827–851. https://doi.org/10.1525/sop.2008.51.4.827

Department of Health. (2001). Measuring Remoteness: Accessibility/Remoteness Index of Australia (ARIA) Revised Edition. *Occasional Papers*, *14*, 1–75. http://www.sti.health.gov.au/internet/main/publishing.nsf/Content/health-historicpubs-hfsocc-ocpanew14a.htm Accessed February 14, 2020

Drabenstott, M. (2009). *Revitalizing Rural British Columbia: Some Lessons from Rural America*. https://www.bcruralcentre.org/wp-content/uploads/2016/10/Drabenstott-Revitalizing-Rural-BC-Some-Lessons-from-Rural-America.pdf

du Plessis, V., Beshiri, R., Bollman, R. D., & Clemenson, H. (2001). Rural and Small Town Canada Analysis Bulletin. *Rural and Small Town Canada Analysis Bulletin*, *3*(3), 1–17. https://doi.org/21-006-XIE

Durand, M. (2015). The OECD better life initiative: How's life? And the measurement of well-being. *Review of Income and Wealth*, *61*(1), 4–17. https://doi.org/10.1111/roiw.12156

Farrugia, N. (2007). *Conceptual Issues in Constructing Composite Indices* (No. 2; Occasional Papers on Islands and Small States). https://core.ac.uk/download/pdf/187769075.pdf

Forman, E., & Gass, S. (2001). The Analytic Hierarchy Process: An Exposition. *Operational Research*, *49*(4), 469–486.

Gould, P., & Burtenshaw, P. (2014). Heritage Sites: Economic Incentives, Impacts, and Commercialization. In C. Smith (Ed.), *Encyclopedia of Global Archaeology* (pp. 3326–3331). Springer New York. https://doi.org/10.1007/978-1-4419-0465-2_508

Government of Newfoundland and Labrador. (n.d.-a). *About the Project*. Community Accounts. Retrieved September 4, 2020, from https://nl.communityaccounts.ca/about_us.asp

Government of Newfoundland and Labrador. (n.d.-b). *Well-Being and Indicators Overview Page*. Community Accounts. Retrieved September 4, 2020, from https://nl.communityaccounts.ca//indicators.asp?_=vb7En4WVgaauzXZmVQ__

Greco, S., Ishizaka, A., Tasiou, M., & Torrisi, G. (2019). On the Methodological Framework of Composite Indices: A Review of the Issues of Weighting, Aggregation, and Robustness. *Social Indicators Research*, *141*(1), 61–94. https://doi.org/10.1007/s11205-017-1832-9

Gylfason, T. (2011). Natural Resource Endowment: A Mixed Blessing? In *CESifo Working Paper* (No. 3353; Category 9: Resource and Environment Economics).

Halseth, G. (2009). Understanding and Transforming a Staples-based Economy: Place-based development in Northern British Columbia, Canada. In G. Halseth, S. Markey, & D. Bruce (Eds.), *The Next Rural Economies: Constructing Rural Place in Global Economies* (pp. 251–262). CABI Press. https://doi.org/10.1079/9781845935818.0251

Halseth, G., & Ryser, L. (2018). *Towards a Political Economy of Resource-dependent Regions*. Routledge.

Harriss, J. (1982). *Rural development: Theories of Peasant Economy and Agrarian Change*. Hutchinson.

Hobbes, M. (2010). *Figuring Rural Development : Concepts and Cases of Land Use, Sustainability and Integrative Indicators*. Leiden University Press. https://doi.org/10.1007/978-3-540-46586-7_1

Huby, M., Owen, A., & Cinderby, S. (2007). Reconciling socio-economic and environmental data in a GIS context: An example from rural England. *Applied Geography*, *27*(1), 1–13. https://doi.org/10.1016/j.apgeog.2006.10.001

Indigenous Services Canada. (2019). *About the Community Well-Being index*. https://www.sac-isc.gc.ca/eng/1421245446858/1557321415997

Jakobsen, J. C., Gluud, C., Wetterslev, J., & Winkel, P. (2017). When and how should multiple imputation be used for handling missing data in randomised clinical trials - A practical guide with flowcharts. *BMC Medical Research Methodology*, *17*(1), 1–11. https://doi.org/10.1186/s12874-017-0442-1

Jean-Vasile, A., Turek Rahoveanu, A., Subic, J., & Dusmanescu, D. (2013). Sustainable technologies, policies, and constraints in the green economy. In *Sustainable Technologies, Policies, and Constraints in the Green Economy: Vol. i*. https://doi.org/10.4018/978-1-4666-4098-6

Jennings Jr, E. (2007). Best practices in public administration: how do we know them? How can we

use them? *Administratie SI Management Public*, *9*, 73.

Jeremic, V., Radojicic, Z., & Dobrota, M. (2016). Emerging trends in the development and application of composite indicators. In *Emerging Trends in the Development and Application of Composite Indicators: Vol. i*. https://doi.org/10.4018/978-1-5225-0714-7

Joseph, C., & Krishnaswamy, A. (2010). Factors of resiliency for forest communities in transition in British Columbia. *Management*, *10*(3), 127–144.

Joya, O. (2015). Growth and volatility in resource-rich countries: Does diversification help? *Structural Change and Economic Dynamics*, *35*, 38–55. https://doi.org/10.1016/j.strueco.2015.10.001

Kaye-Blake, W., Stirrat, K., Smith, M., & Fielke, S. (2019). Testing indicators of resilience for rural communities. *Rural Society*, *28*(2), 161–179. https://doi.org/10.1080/10371656.2019.1658285

Kim, T., & Yang, S. (2016). Construction of the Rural Development Index: The Case of Vietnam. *Journal of Rural Development / Nongchon-Gyeongje*, *39*(2016), 113–142. https://doi.org/10.22004/ag.econ.251931

Kovacevic, M. (2010). Review of HDI Critiques and Potential Improvements. *Human Development Reports UNDP*, 1–44.

Krawchenko, T. A. (2016). Questioning Neoendogeneity: Cases of Community Economic Development Practice from Atlantic Canada. *Canadian Journal of Nonprofit and Social Economy Research*, *7*(2), 5–18. https://doi.org/10.22230/cjnser.2016v7n2a202

Kwon, O. (2019). Social trust: its concepts, determinants, roles, and raising ways. In *Social Trust and Economic Development*. https://doi.org/10.4337/9781784719609.00008

Larsen, C. A. (2014). *Social cohesion: Definition, measurement and developments*. https://www.un.org/esa/socdev/egms/docs//2014/LarsenDevelopmentinsocialcohesion.pdf

Li, Y., Long, H., & Liu, Y. (2015). Spatio-temporal pattern of China's rural development: A rurality index perspective. *Journal of Rural Studies*, *38*, 12–26. https://doi.org/10.1016/j.jrurstud.2015.01.004

Markey, S. (2010). Primer on place-based development. In *Canadian regional development: A critical review of theory, practice, and potentials* (Issue November). http://cdnregdev.ruralresilience.ca/wp-content/uploads/2013/03/primerplacebaseddevelopment-markey.pdf

Markey, S., Breen, S. P., Vodden, K., & Daniels, J. (2015). Evidence of Place: Becoming a Region in Rural Canada. *International Journal of Urban and Regional Research*, *39*(5), 874–891. https://doi.org/10.1111/1468-2427.12298

Markey, S., Halseth, G., & Manson, D. (2008a). Challenging the inevitability of rural decline: Advancing the policy of place in northern British Columbia. *Journal of Rural Studies*, *24*(4), 409–421. https://doi.org/10.1016/j.jrurstud.2008.03.012

Markey, S., Halseth, G., & Manson, D. (2008b). Closing the implementation gap: A framework for incorporating the context of place in economic development planning. *Local Environment*, *13*(4), 337–351. https://doi.org/10.1080/13549830701803315

Michalek, J., & Zarnekow, N. (2012). Application of the Rural Development Index to Analysis of Rural Regions in Poland and Slovakia. *Social Indicators Research*, *105*(1), 1–37. https://doi.org/10.1007/s11205-010-9765-6

Ministry of Forests Lands Natural Resource Operations and Rural Development. (2019). *BC Rural Dividend Program Guide*. https://www2.gov.bc.ca/assets/gov/employment-business-and-economic-development/economic-development/plan-and-measure/rural-communities/bcrdp-guide_6thround_may2019_final.pdf

Ministry of Forests Lands Natural Resource Operations and Rural Development. (2020). *2020/21 - 2022/23 Service Plan*. https://www2.gov.bc.ca/assets/gov/government/ministries-organizations/ministries/forests-lands-natural-resource-operations-rural-development/flnr_sp_2020.pdf

Mitchell, J. J., & Ryder, A. J. (2013). The Globalization of Career Services. *New Directions for Student Services*, *2013*(142), 71–81. https://doi.org/10.1002/ss

Moseley, M. J. (2003). Rural Development: Making it Local. In *Rural Development : Principles and Practice* (pp. 1–16). SAGE Publications Ltd. https://doi.org/http://dx.doi.org/10.4135/9781446216439.n1

Munda, G., & Nardo, M. (2009). Noncompensatory/nonlinear composite indicators for ranking countries: A defensible setting. *Applied Economics*, *41*(12), 1513–1523. https://doi.org/10.1080/00036840601019364

Naldi, L., Nilsson, P., Westlund, H., & Wixe, S. (2015). What is smart rural development? *Journal of Rural Studies*, *40*, 90–101. https://doi.org/10.1016/j.jrurstud.2015.06.006

Nardo, M., Saisana, M., Saltelli, A., Tarantola, S., Hoffman, A., & Giovannini, E. (2005). Handbook on Constructing Composite Indicators: Methodology and User Guide. In *OECD Statistics Working Papers* (No. 3). https://doi.org/https://dx.doi.org/10.1787/533411815016

Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic Analysis: Striving to Meet the Trustworthiness Criteria. *International Journal of Qualitative Methods*, *16*(1), 1–13. https://doi.org/10.1177/1609406917733847

O'Sullivan, E., & McHardy, M. (2004). *The Community Well-Being (CWB) Index: Disparity in Well-Being Between First Nations and Other Canadian Communities Over Time*. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.497.6477&rep=rep1&type=pdf

OECD. (2001). *Measuring Productivity - Measurement of Aggregate and Industry-level Productivity Growth*. https://doi.org/10.1787/9789264194519-en

OECD. (2016a). *A New Rural Development Paradigm for the 21st Century: A Toolkit for Developing Countries*. OECD Publishing. https://doi.org/http://dx.doi.org/10.1787/9789264252271-en

OECD. (2016b). *OECD Regional Outlook 2016: Productive Regions for Inclusive Societies*. OECD Publishing. https://doi.org/http://dx.doi.org/10.1787/9789264260245-en

OECD. (2020). *Linking Indigenous Communities with Regional Development*. OECD Publishing. https://doi.org/https://doi.org/10.1787/fa0f60c6-en

Olfert, M. R., & Partridge, M. D. (2010). Best Practices in Twenty-First-Century Rural

Development and Policy. *Growth and Change*, *41*(2), 147–164.

Pachón, F. A., Bokelmann, W., & Ramirez, C. A. (2017). Heritage and patrimony of the peasantry framework and rural development indicators in rural communities in Mexico. *Revista de Economia e Sociologia Rural*, *55*(2), 199–226. https://doi.org/10.1590/1234-56781806-94790550201

Partridge, M. D., & Rickman, D. S. (2008). Place-based policy and rural poverty: Insights from the urban spatial mismatch literature. *Cambridge Journal of Regions, Economy and Society*, *1*, 131–156. https://doi.org/10.1093/cjres/rsm005

Paruolo, P., Saisana, M., & Saltelli, A. (2013). Ratings and rankings: voodoo or science ? *Journal of the Royal Statistical Society*, *176*(3), 609–634.

Pavel, A., & Moldovan, O. (2019). Determining local economic development in the rural areas of Romania. Exploring the role of exogenous factors. *Sustainability (Switzerland)*, *11*(2). https://doi.org/10.3390/su11010282

Penney, C., O'Sullivan, E., & Senécal, S. (2012). *The Community Well-Being Index (CWB): Examining Well-Being in Inuit Communities, 1981- 2006*. https://assembly.nu.ca/library/Edocs/2012/000818-e.pdf

Permingeat, M., & Vanneste, D. (2019). Social capital in rural development projects in Europe - Three LEADER cases in Wallonia analysed. *Belgeo*, *1*, 0–19. https://doi.org/10.4000/belgeo.34979

Qazimi, S. (2014). Sense of place and place identity. *European Journal of Social Sciences*, *1*(1), 306–310.

Raptis, H. (2012). Ending the reign of the Fraser Institute's school rankings. *Canadian Journal of Education*, *35*(1), 187–201.

Ratner, S. E. (2020). *Wealth Creation: A New Framework for Rural Economic and Community Development*. Routledge.

Reimer, B., & Bollman, R. D. (2010). Understanding Rural Canada: Implications for Rural Development Policy and Rural Planning Policy. In D. J. A. Douglas (Ed.), *Rural Planning and Development in Canada* (pp. 10–52). Nelson Education Ltd.

Ryser, L., & Halseth, G. (2010). Rural economic development: A review of the literature from industrialized economies. *Geography Compass*, *4*(6), 510–531. https://doi.org/10.1111/j.1749-8198.2010.00321.x

Sá, E., Casais, B., & Silva, J. (2019). Local development through rural entrepreneurship, from the Triple Helix perspective: The case of a peripheral region in northern Portugal. *International Journal of Entrepreneurial Behaviour and Research*, *25*(4), 698–716. https://doi.org/10.1108/IJEBR-03-2018-0172

Saisana, M., & Tarantola, S. (2002). State-of-the-art Report on Current Methodologies and Practices for Composite Indicator Development. *Joint Research Centre. Italy: European Commission*, *July*, 1–72. https://doi.org/10.13140/RG.2.1.1505.1762

Saltelli, A. (2007). Composite Indicators between Analysis and Advocacy. *Social Indicators Research*, *81*(1), 65–77. https://doi.org/10.1007/s11205-006-0024-9

Salvia, R., & Quaranta, G. (2017). Place-based rural development and resilience: A lesson from a small community. *Sustainability (Switzerland)*, *9*(6). https://doi.org/10.3390/su9060889

Sánchez-Zamora, P., & Gallardo-Cobos, R. (2019). Diversity, disparity and territorial resilience in the context of the economic crisis: An analysis of rural areas in Southern Spain. *Sustainability (Switzerland)*, *11*(6). https://doi.org/10.3390/su11061743

Sánchez-Zamora, P., Gallardo-Cobos, R., & Ceña-Delgado, F. (2014). Rural areas face the economic crisis: Analyzing the determinants of successful territorial dynamics. *Journal of Rural Studies*, *35*(2014), 11–25. https://doi.org/10.1016/j.jrurstud.2014.03.007

Sherry, E., & Shortall, S. (2019). Methodological fallacies and perceptions of rural disparity: How rural proofing addresses real versus abstract needs. *Journal of Rural Studies*, *68*(December 2018), 336–343. https://doi.org/10.1016/j.jrurstud.2018.12.005

Shucksmith, M. (2018). Re-imagining the rural: From rural idyll to Good Countryside. *Journal of Rural Studies*, *59*, 163–172. https://doi.org/10.1016/j.jrurstud.2016.07.019

Shucksmith, M., Cameron, S., Merridew, T., & Pichler, F. (2009). Urban-rural differences in quality of life across the European union. *Regional Studies*, *43*(10), 1275–1289. https://doi.org/10.1080/00343400802378750

Simms, A., Freshwater, D., & Ward, J. (2014). The Rural Economic Capacity Index (RECI): A Benchmarking Tool to Support Community-Based Economic Development. *Economic Development Quarterly*, *28*(4), 351–363. https://doi.org/10.1177/0891242413512672

Singh, K. (2009). *Rural Development: Principles, Policies, and Management*. SAGE Publications India Pvt Ltd. https://doi.org/10.2307/2071523

Smale, B., & Holliday, C. (2020). *A Profile of Wellbeing in Rural Ontario: A Report by the Canadian Index of Wellbeing prepared for the Rural Ontario Institute*. https://www.ruralontarioinstitute.ca/uploads/userfiles/files/RuralOntarioReport-CIW-ACCESSIBLE_FINAL.pdf

Sørensen, J. F. L. (2018). The importance of place-based, internal resources for the population development in small rural communities. *Journal of Rural Studies*, *59*, 78–87. https://doi.org/10.1016/j.jrurstud.2018.01.011

Statistics Canada. (2017). *Guide to the Census of Population, 2016 - Census of Population Reference Product* (Issue 98). https://www12.statcan.gc.ca/census-recensement/2016/ref/98-304/98-304-x2016001-eng.pdf

Statistics Canada. (2020). *Guide to the Labour Force Survey*. https://www150.statcan.gc.ca/n1/pub/71-543-g/71-543-g2020001-eng.htm

Stiglitz, J., Sen, A., & Fitoussi, J.-P. (2009). *Report of the Commission on the Measurement of Economic Performance and Social Progress*. https://www.researchgate.net/publication/258260767_Report_of_the_Commission_on_the_Measurement_of_Economic_Performance_and_Social_Progress_CMEPSP

Stoop, N. (2018). *Understanding Rural: A Comparison of Academic, Political and Lay Discourses of Rural* [The University of Guelph]. https://atrium.lib.uoguelph.ca/xmlui/bitstream/handle/10214/14220/Stoop_Neil_201808_Msc.pdf?sequence=5&isAllowed=y

Terluin, I. J. (2003). Differences in economic development in rural regions of advanced countries: An overview and critical analysis of theories. *Journal of Rural Studies*, *19*(3), 327–344. https://doi.org/10.1016/S0743-0167(02)00071-2

Throsby, D. (1999). Cultural Capital. *Journal of Cultural Economics*, *23*(1), 3–12. http://www.jstor.com/stable/41810682

Tubadji, A., & Nijkamp, P. (2016). Impact of intangible cultural capital on regional economic development: A study on culture-based development in Greece. *Journal of Regional Analysis and Policy*, *46*(1), 1–21.

Vaismoradi, M., Turunen, H., & Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nursing and Health Sciences*, *15*(3), 398–405. https://doi.org/10.1111/nhs.12048

Winther, A. M. (2017). Community sustainability: a holistic approach to measuring the sustainability of rural communities in Scotland. *International Journal of Sustainable Development and World Ecology*, *24*(4), 338–351. https://doi.org/10.1080/13504509.2016.1224987

Wong, C. (2002). Developing Indicators to Inform Local Economic Development in England. *Urban Studies*, *39*(10), 1833–1863. https://doi.org/10.1080/0042098022000002 98

Yumagulova, L., Sperry, K., & Stone, J. (2019). *Rural Community Resilience: Definitions, Case Studies and Measurement Tools*.

Zasada, I., Reutter, M., Piorr, A., Lefebvre, M., & Paloma, S. G. Y. (2015). Between capital investments and capacity building-Development and application of a conceptual framework towards a place-based rural development policy. *Land Use Policy*, *46*, 178–188. https://doi.org/10.1016/j.landusepol.2014.11.023

Zhou, P., Ang, B. W., & Zhou, D. Q. (2010). Weighting and aggregation in composite indicator construction: A multiplicative optimization approach. *Social Indicators Research*, *96*(1), 169–181. https://doi.org/10.1007/s11205-009-9472-3

Appendix A Complete List of Variables and Data Sets

Capital	Dimension	Variable	Sample Indicator	Unit of Analysis	Coverage	Update Frequency	Source	Indicator Type	Input / Output / Outcome	Flow / Stock	Direction	Rationale	Notes	Links
Economic	Productivity	Income	Income per Capita (average/median)	CSD	Most CSDs with at least 200 respondents	5 years	Statistics Canada - Census of the Population	Quantitative	Output	Flow	+	Measure of community economic wealth - may be used as a proxy for productivity.		
			Household Income	CSD	Most CSDs with at least 200 respondents	5 years	Statistics Canada - Census of the Population	Quantitative	Output	Flow	+	Measure of community economic wealth - may be used as a proxy for productivity.		
				CSD	Unknown	Annual	Statistics Canada - Annual Income Estimates for Census Families and Individuals (T1 Family File)	Quantitative	Output	Flow	+		May need to be ordered at the CSD level	https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=4105
			Proportion of Market Income	CSD	Most CSDs with at least 200 respondents	5 years	Statistics Canada - Census of the Population	Quantitative	Output	Flow	+	Measure of economic dependency on government transfers.		
			Proportion of Transfer Payment Income	CSD	Most CSDs with at least 200 respondents	5 years	Statistics Canada - Census of the Population	Quantitative	Output	Flow	-	Measure of economic dependency on government transfers.		
		GDP	GDP per Capita	Province	Not available at subprovincial level.	NA	NA	Quantitative	Output	Flow	+	Measure of economic output corrected by population size - may be used as a proxy for productivity.	Not available at community or RD level	
		Labour Productivity	Chained Dollars per Hour	Province	Not available at subprovincial level.	NA	NA	Quantitative	Output	Flow	+	Measure of labour productivity. Productivity is directly associated with economic development and wealth.	Not available at community or RD level	https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610048001
	Employment	Employment	Participation Rate	CSD	CSDs with population larger than 40	5 years	Statistics Canada - Census of the Population	Quantitative	Output	Flow	+	Measures the proportion of the population participating in the labour market. Communities with higher participation rates tend to be more economically dynamic.		

				Economic Region	All Economic Regions	Monthly	Statistics Canada - Labour Force Survey				+			https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410029301
			Unemployment Rate	CSD	CSDs with population larger than 40	5 years	Statistics Canada - Census of the Population	Quantitative	Output	Flow	-	Measures labour market health. High unemployment rates are associated with low economic activity, lower incomes and well-being.		
				Economic Region	All Economic Regions	Monthly	Statistics Canada - Labour Force Survey				-			https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410029301
			Growth in Employment Insurance Beneficiaries	RD/Census Metropolitan Areas/Census Agglomerations	All RDs and CMAs. CAs are aggregatated	Monthly	Statistics Canada - Employment Insurance Statistics	Quantitative	Output	Flow	-	EI recipients is an indicator of economic opportunities. An increase in EI beneficiaries may be associated with an economic downturn.		https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=1410032301 https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=1410013701
	Investment	Major Projects	Value of Major Infrastructure Projects (total/per capita)	Municipality	All municipalities - Not all major projects are included.	Quarterly	BC Major Project Inventory	Quantitative/Geographical	Output	Stock	+	The major projects inventory provides an indicator of investment in infrastructure. Large investments in infrastructure generate economic activity and may lead to new development opportunities.		https://www2.gov.bc.ca/gov/content/employment-business/economic-development/industry/bc-major-projects-inventory
		Access to Venture Capital	Venture capital dollars per capita	NA	NA	NA	NA	Quantitative	Input	Flow	+	Lack of access to capital is an important barrier for growth for small businesses in rural areas.		
	Economic Climate	Business Density	Business with employees per capita	CSD	392 CSDs	Yearly	BC Stats	Quantitative	Output	Stock	+	Higher business density may be associated with higher economic activity, leading to higher wages and lower unemployment.	Business Locations by Census Subdivision (municipalities and non-incorporated areas) (XLSX)	https://www2.gov.bc.ca/gov/content/data/statistics/business-industry-trade/number-of-businesses-and-employmen

														t-by-industry
		Indigenous Businesses	Indigenous Businesses per capita (Indigenous population)	CSD	Unknown	Unknown (Last modified 08/2020)	BC Data Catalogue - Ministry of Jobs, Economic Development and Competitiveness	Quantitative	Output	Stock	+			https://catalogue.data.gov.bc.ca/dataset/bc-indigenous-business-listings
		Business Creation	Business Incorporations (growth/per capita)	RD/Municipalities	All RDs and municipalities. Unincorporated areas are aggregated.	Yearly	BC Stats	Quantitative	Output	Flow	+	Measures the creation of new businesses - indicates the quality of the business climate. Economically dynamic communities are likely to attract new businesses.		https://www2.gov.bc.ca/gov/content/data/statistics/economy/business-formations-failures
		Business Failures	Business Bankruptcies (Growth)	Economic Region	All Economic Regions	Quarterly	BC Stats	Quantitative	Output	Flow	-	Measures closures of existing businesses - indicates the quality of the business climate.		https://www2.gov.bc.ca/gov/content/data/statistics/economy/business-formations-failures
		Housing Market	Housing Starts (Growth/Per capita)	RD/Municipalities	138 communities. Other areas are aggregated.	Yearly (Discontinued after 2019)	BC Stats	Quantitative	Output	Flow	+	Housing starts and building permits are well-accepted indicators of economic performance. They are influenced by consumer expectations and interest rates. They tend to pick up at the beginning of a business cycle, and taper at the initial signs of economic slowdown. (2017 State of Columbia Basin)		https://www2.gov.bc.ca/gov/content/data/statistics/economy/building-permits-housing-starts-sales
			Annual FMV Property Tax per capita?/Average Annual FMV Property Tax	RD/Municipality	29 RDs/239 Municipalities	Weekly	BC Data Catalogue - Ministry of Finance	Quantitative	Output	Flow	+	Measures housing market activity considering both the number and value of transactions. Indicator of economic performance and stability.	Some municipalities are split between rural and urban	https://catalogue.data.gov.bc.ca/dataset/property-transfer-tax-data-2019

			Median House Value	CSD	Unknown	Unknown	BC Assessment	Quantitative	Output	Stock	+	Higher housing prices may be associated with economic prosperity, population growth and community attractiveness. However, it may also lead housing affordability issues.	Purchasing custom data may be required	
	Innovation	Human resources	Graduates in mathematics, computer and information sciences; physical and life sciences and technologies; and architecture, engineering and related technologies (per 1,000 population, aged 15 and above)	CSD	CSDs with population larger than 40	5 years	Statistics Canada - Census of the Population	Quantitative	Input	Stock	+	Innovation is considered an important factor for economic development and resilience. The ability to innovate allows communities to find new economic activities and solutions to adverse shocks.		https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/dt-td/Rp-eng.cfm?TABID=2&LANG=E&APATH=3&DETAIL=0&DIM=0&FL=A&FREE=0&GC=01&GK=1&GRP=1&PID=110634&PRID=10&PTYPE=109445&S=0&SHOWALL=0&SUB=0&Temporal=2017&THEME=123&VID=0&VNAMEE=&VNAMEF=
		Patents	Patent Applications per capita	NA	NA	NA	NA	Quantitative	Output	Flow	+	Patent applications are a good proxy for innovation.		

		Employment	Employment in high-tech services (% of total workforce)	NA	NA	NA	NA	Quantitative	Input	Stock	+	High technology sectors tend to be more innovative than most other economic sectors. High employment in technological advanced sectors measures local innovative potential.		
	Economic Structure	Diversification	Herfindahl-Hirschman Index	CSD	CSDs with population larger than 40	5 years	Statistics Canada - Census of the Population	Quantitative	Output	Stock	+	Measures how diversified the economy is. More diversified economies are less vulnerable to economic downturns.	Calculated using employment numbers by NAICS for community	
				Economic Region	All Economic Regions	Monthly	Statistics Canada - Labour Force Survey				+			https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=1410009101
		Resource Sector Dependence	Proportion of Work Force Employed in Natural Resource Sector	CSD	CSDs with population larger than 40	5 years	Statistics Canada - Census of the Population	Quantitative	Output	Stock	-	Measures the level of dependence on the resource sector. Commodities are generally more vulnerable to economic fluctuations.	Calculated using employment numbers by NAICS for community	
				Economic Region	All Economic Regions	Monthly	Statistics Canada - Labour Force Survey				-			https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=1410009101
		High Productivity Industries	Percentage of Work Force Employed in High Value Added Industries	NA	NA	NA	NA	Quantitative	Output	Stock	+	High value-added industries produce differentiated products that are less vulnerable to global competition than commodities. Further, they tend to generate higher wages, potentially leading to better economic outcomes.		
	Infrastructure	Housing	Housing Suitability	CSD	CSDs with population larger than 40	5 years	Statistics Canada - Census of the Population	Quantitative	Output	Stock	-	Measure of overcrowding. Housing suitability impacts well-being and may also work as a proxy for housing and rent affordability.		

			Housing Conditions	CSD	CSDs with population larger than 40	5 years	Statistics Canada - Census of the Population	Quantitative	Output	Stock	-	Measure of housing quality. Good housing is important for well-being, health and safety.		Proportion of dwellings that require major repairs in relation to total dwellings
		Telecommunications	Broadband Access	Pseudo-Household Demographic Distribution	Unknown - Pseudo-Household polygons would need to be converted to communities	Unknown	Statistics Canada - National Broadband Data	Geographical	Output	Stock	+	Broadband access is relevant for accessing information and services, attracting and retaining businesses and residents. Areas with good broadband access are likely to have an advantage over areas that do not.		https://open.canada.ca/data/en/dataset/00a331db-121b-445d-b119-35dbbe3eedd9
			Cellphone Service	NA	NA	NA	NA	Quantitative	Output	Stock	+	Cellphone service facilitates access to information and services and it may also increase local productivity.		
		Transportation	Annual Highway Closures Affecting Access to Community	Incident	All published DriveBC road conditions reports	Annual	BC Data Catalogue - Ministry of Transportation and Infrastructure	Geographical	Output	Flow	-	Access to good transportation infrastructure is relevant for attracting businesses, accessing services and markets, among others.		https://catalogue.data.gov.bc.ca/dataset/historical-drivebc-events
			Level of Accessibility to Community	NA	NA	NA	NA	Geographical	Output	Stock			For example, ferry access only, dirt road access, single highway access, multiple highway access, etc.	
			Distance to nearest international airport	CSD	All international airports	Occasional	BC Data Catalogue - GeoBC	Geographical	Input	Stock	-	Proximity to an international airport influences tourism and other economic opportunities accessible to community.		https://catalogue.data.gov.bc.ca/dataset/bc-airports
		Water Systems	Percentage of population with access to Clean Water	NA	NA	NA	NA	Quantitative	Output	Stock	+	Access to clean water is believed to be correlated to better health outcomes, population attraction and retention.		
	Local Government Finances	Surplus	Accumulated Surplus (Financial Position) per Capita	Municipality	162 Municipalities	Annual	BC Ministry of Finance	Quantitative	Input	Flow	+	Higher budget surpluses demonstrate more capacity to absorb shocks and maintain		Schedule 304: https://www2.gov.bc.ca/gov/content/governm

												services and operations.		ents/local-governments/facts-framework/statistics/statistics
		Debt	Debt-Revenue Ratio	Municipality	162 Municipalities	Annual	BC Ministry of Finance	Quantitative	Input	Flow	-	The debt revenue ratio is an indicator of the financial condition of municipalities.		Calculated from schedules 603 and 401: https://www2.gov.bc.ca/gov/content/governments/local-governments/facts-framework/statistics/statistics
		Taxes	Municipal Taxes per Capita	Municipality	162 Municipalities	Annual	BC Ministry of Finance	Quantitative	Input	Flow	+	Higher taxes per capita may be an indicator of higher tax rates but may also indicate a higher level of economic activity. It also means that municipalities have more capacity to offer services to its residents.		Schedule 707: https://www2.gov.bc.ca/gov/content/governments/local-governments/facts-framework/statistics/tax-rates-tax-burden
			Total Taxes and Charges on a Representative House	Municipality	162 Municipalities	Annual	BC Ministry of Finance	Quantitative	Input	Flow	+	This is an indicator of community wealth. Wealthier communities will have a higher total taxes and charges on a representative household.		Schedule 704: https://www2.gov.bc.ca/gov/content/governments/local-governments/facts-framework/statistics/tax-rates-tax-burden
			Average Tax Rate	Municipality	162 Municipalities	Annual	BC Ministry of Finance	Quantitative	Input	Flow	-	Lower tax rates may increase a municipality's attractiveness to businesses and citizens.		Schedule 707: https://www2.gov.bc.ca/gov/content/governments/local-governments/facts-framework/statistics/tax-rates-tax-burden

Human	Education	Educational Attainment	Percentage of the population with high school diploma	CSD	CSDs with population larger than 40	5 years	Statistics Canada - Census of the Population	Quantitative	Output	Stock	+	Education plays an important role in labour force productivity. High school graduation is correlated with higher income, lower unemployment rates, lower criminality, and other desirable outcomes.		
			High School Graduation Rate	School District	All school districts	Yearly (Last published in 2014/15)	BC Ministry of Education	Quantitative	Output	Flow	+	Education plays an important role in labour force productivity. High school graduation is correlated with higher income, lower unemployment rates, lower criminality, and other desirable outcomes.		https://www2.gov.bc.ca/gov/content/education-training/k-12/administration/program-management/reporting-on-k-12/district-reports
			Percentage of the population with university education (Bachelor or above)	CSD	CSDs with population larger than 40	5 years	Statistics Canada - Census of the Population	Quantitative	Output	Stock	+	Education plays an important role in labour force productivity. Similarly to high school completion, university education is correlated with better social and economic outcomes.		
		Early Development	Proportion of Children Vulnerable on One or More Scales in the Early Development Instrument	School District	Al School Districts (except SD87-Stikine)	Approximately every 3 years	Human Early Learning Partnership (UBC)	Quantitative	Outcome	Flow	-	EDI data are a long-term indicator of children's early developmental health and well-being. Early development is correlated with adult productivity.		http://earlylearning.ubc.ca/maps/edi/
		Access to Post-Secondary Education	Distance to Nearest Post-Secondary Institution	CSD	Unknown	Unknown (last update 06-2020)	BC Data Catalogue - Ministry of Advanced Education, Skills and Training	Geographical	Input	Stock	-	Proximity to post-secondary institutions influences youth retention as well as the quality of the labour force.		
	Skills	Trade Skills	Percentage of the population with trades certificates or diplomas	CSD	CSDs with population larger than 40	5 years	Statistics Canada - Census of the Population	Quantitative	Output	Stock	+	Trade skills are an important indicator of the quality of the labour force. Higher skilled labour forces tend to be more productive.		

	Entrepreneurship	Class of Worker	Percentage of the labour force that is self-employed	CSD	CSDs with population larger than 40	5 years	Statistics Canada - Census of the Population	Quantitative	Output	Flow	+	Self-employment is used as a proxy for entrepreneurship. It is believed that entrepreneurship is correlated with higher economic performance. However, self-employment may also be a sign of lack of employment opportunities.		
	Demographics	Population Size	Population Size	CSD	CSDs with population larger than 40	5 years	Statistics Canada - Census of the Population	Quantitative	Input	Stock	+	Population size is a commonly used criteria to determine rurality. Smaller populations have important economic drawbacks such as smaller workforce, smaller market for products, less economies of scale, less diverse economic structure and others.		
			Population Size (Estimates)	Municipalities/RD	All RDs and municipalities. Unincorporated areas are aggregated.	Yearly	BC Stats	Quantitative	Input	Stock	+			https://www2.gov.bc.ca/gov/content/data/statistics/people-population-community/population/population-estimates
		Population Change	Population Change Since Previous Census	CSD	CSDs with population larger than 40	5 years	Statistics Canada - Census of the Population	Quantitative	Output	Flow	+	Measures population growth or decline. Well-performing communities tend to attract residents, while low-performing communities tend to have difficulty attracting and retaining residents.		
			Average Annual Population Change in Last 3 Years (Estimates)	Municipalities/RD	All RDs and municipalities. Unincorporated areas are aggregated.	Yearly	BC Stats	Quantitative	Output	Flow	+			https://www2.gov.bc.ca/gov/content/data/statistics/people-population-community/population/population-estimates

		Population Density	Population Density	CSD	CSDs with population larger than 40	5 years	Statistics Canada - Census of the Population	Quantitative	Input	Stock	+	Population density is a commonly used criteria to determine rurality. Rural communities tend to be less densely populated, which increases costs of providing services and doing business, as distances between households are relatively larger.		
		Population Ageing and Replacement	Proportion of Working Age Population (15-64)	CSD	CSDs with population larger than 40	5 years	Statistics Canada - Census of the Population	Quantitative	Input	Stock	+	Measures the ratio of the working age population and the total population. A high proportion of working age population may be associated with better economic performance and capacity to maintain essential services. It is similar to the dependency ratio, but accounts for all working age population and not only individuals that are part of the labour force.		
			Dependency Ratio	CSD	CSDs with population larger than 40	5 years	Statistics Canada - Census of the Population	Quantitative	Input	Stock	-	Measures the ratio of the non-economically active population and the total population. As dependency increases with the aging population, communities may be challenged to maintain supports and services that rely on contributions from the workforce.		
			Percentage of total population under 20	CSD	CSDs with population larger than 40	5 years	Statistics Canada - Census of the Population	Quantitative	Input	Stock	+	Measure of generational replacement. A larger population of young individuals may lead to a larger workforce if the community is able to retain its residents. It is also an important metric for the need for schools and other children-related services.		

			Percentage of total population over 64	CSD	CSDs with population larger than 40	5 years	Statistics Canada - Census of the Population	Quantitative	Input	Stock	-	Measure of population ageing. Relatively older populations result in a smaller work force, higher need for services and a larger dependent population.		
			Labour Force Replacement Ratio	CSD	CSDs with population larger than 40	6 years	Statistics Canada - Census of the Population	Quantitative	Input	Stock	+	Measures community's ability to replace retiring workers with young individuals entering the workforce. A low replacement rate may negatively impact future economic performance.	Ratio of population aged 0-14 and population aged 50-64.	
	Migration	International Inmigration	Proportion of Immigrants in total population in private households	CSD	CSDs with population larger than 40	5 years	Statistics Canada - Census of the Population	Quantitative	Output	Stock	+	Historical measure of immigrant attraction and retention.		
			Proportion of Recent International Inmigrants (2011-2016) for the population in private households	CSD	CSDs with population larger than 40	5 years	Statistics Canada - Census of the Population	Quantitative	Output	Stock	+	Measure of international immigrant attraction and retention in recent years.		
		Internal Inmigration	Proportion of Recent Internal Inmigrants (2011-2016) for the population in private households	CSD	CSDs with population larger than 40	5 years	Statistics Canada - Census of the Population	Quantitative	Output	Stock	+	Measure of internal immigrant attraction in recent years. Areas that offer better quality of life or economic opportunities tend to attract residents.		
		Net Migration	Net Migrants per Capita	RD	All RDs	Annual	BC Data Catalogue - BC Stats	Quantitative	Output	Flow	+	Measure of overall population attraction. Areas that offer better quality of life or economic opportunities tend to attract residents, while stagnant areas tend to lose residents.		https://catalogue.data.gov.bc.ca/dataset/migration-by-development-region-and-regional-district/resource/726e54aa-f403-42d2-90b1-72c9a8c8e84f
	Access to Services	Distance to Services	Distance to Nearest Hospital	CSD	All CSDs	Unknown	BC Data Catalogue - Ministry of Health	Geographical	Input	Stock	-	Measure of access to various essential services that affect population attraction and retention and overall well-being.		https://catalogue.data.gov.bc.ca/dataset/bc-health-care-facilities-hospital

			Distance to Nearest Residential Care Facility	CSD	Unknown	Biweekly	BC Data Catalogue - Ministry of Health	Geographical	Input	Stock	-			https://catalogue.data.gov.bc.ca/dataset/residential-care-facilities
			Distance to Nearest Service BC Office	CSD	Unknown	Unknown (last update 05-2020)	BC Data Catalogue - Ministry of Citizens Services	Geographical	Input	Stock	-			https://catalogue.data.gov.bc.ca/dataset/service-bc-office-locations
			Distance to Nearest WorkBC Centre	CSD	Unknown	Unknown (last update 12-2019)	BC Data Catalogue - Ministry of Social Development and Poverty Reduction	Geographical	Input	Stock	-			https://catalogue.data.gov.bc.ca/dataset/workbc-centres
		Access to Child Care	Child Care Facilities per Capita	CSD	Unknown	Updated Daily	BC Data Catalogue - Ministry of Children and Family Development	Geographical	Input	Stock	+	Access to child care is important for women empowerment and participation in the labour market, which influences community overall social and economic performance.		https://catalogue.data.gov.bc.ca/dataset/child-care-map-data
		Physicians	Physicians per capita	CSD	Unknown	5 years	BC Data Catalogue - Ministry of Jobs, Economic Development and Competitiveness	Geographical	Input	Stock	+	Physicians per capita is an indicator of access to health care services in the community.		https://catalogue.data.gov.bc.ca/dataset/physicians-for-each-census-subdivision
	Quality of Life	Life Expectancy	Life Expectancy at Birth	LHA/Community Health Service Area (CHSA)	Most CSHAs	Yearly	BC Stats	Quantitative	Outcome	Stock	+	Life expectancy at birth measures a series of factors that influence mortality such as access to health care, appropriate nutrition, crime rates and others. It is an important indicator of well-being.		https://www2.gov.bc.ca/gov/content/data/statistics/people-population-community/population/vital-statistics
		Inequality	Income Distribution Measure (e.g. Gini Coefficient)	CSD	Most CSDs with at least 200 respondents	5 years	Statistics Canada - Census of the Population	Quantitative	Output	Flow	-	Income distribution is an indicator of economic equity. High income inequality is associated with undesirable outcomes, such as lower life satisfaction and criminality.		Calculated based on distribution of household or individual income in the community

				CSD/RD	Unknown	Annual	Statistics Canada - Annual Income Estimates for Census Families and Individuals (T1 Family File)	Quantitative	Output	Flow	-	Income distribution is an indicator of economic equity. High income inequality is associated with undesirable outcomes, such as lower life satisfaction and criminality.	May need to be ordered at the CSD level	https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=4105
		Poverty	Prevalence of low income based on the Low-income measure, after tax (LIM-AT) (%)	CSD	Most CSDs with at least 200 respondents	5 years	Statistics Canada - Census of the Population	Quantitative	Output	Flow	-	Low income is a good proxy to measure poverty, which affects individual's health, education and economic outcomes.		
				CSD/RD	Unknown	Annual	Statistics Canada - Annual Income Estimates for Census Families and Individuals (T1 Family File)	Quantitative	Output	Flow	-	Low income is a good proxy to measure poverty, which affects individual's health, education and economic outcomes.	May need to be ordered at the CSD level	https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=4105
			Prevalence of low income based on the Low-income cut-offs, after tax (LICO-AT) (%)	CSD	Most CSDs with at least 200 respondents	5 years	Statistics Canada - Census of the Population	Quantitative	Output	Flow	-	Low income is a good proxy to measure poverty, which affects individual's health, education and economic outcomes.		
		Affordability	Proportion of households spending 30% or more of income on shelter costs in relation to total households	CSD	Most CSDs with at least 200 respondents	5 years	Statistics Canada - Census of the Population	Quantitative	Output	Stock	-	Housing affordability is critical for well-being. When too much is spent on housing, access to food, goods and services may be impacted.		
		Living Wages	Gap between minimum wage and living wage	Community	Few communities have an estimated living wage	Occasional	Living Wage Canada	Quantitative	Output	Stock	-	The living wage is a measure of the cost of living in a community. The gap between the living wage and the minimum wage is a measure of the hardships faced by the lowest earners.		http://livingwagecanada.ca/index.php/living-wage-communities/british-columbia/
		Life Satisfaction	Percentage of population that reports being satisfied or very satisfied with their life	Health Regions	All Health Regions	Occasional (Last data 2017/2018)	Statistics Canada - Canadian Community Health Survey	Qualitative	Outcome	Flow	+	Subjective well-being measures capture aspects of an individual's life that cannot be understood from statistical data. It helps determine the quality of life of		https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=1310011301

												individuals in a community.		
		Perceived Health	Percentage of population that reports very good or excellent self-assessed health	Health Regions	All Health Regions	Occasional (Last data 2017/2018)	Statistics Canada - Canadian Community Health Survey	Qualitative	Outcome	Flow	+	Self-assessed health impacts overall quality of life. Additionally, individuals suffering from deprivation are more likely to have worse health outcomes.		https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=1310011301
Social	Trust	Crime	Crime Rate per 100,000	RD/Policing Jurisdictions	180 out 232 Policing Jurisdictions	Annual	Statistics Canada - Uniform Crime Reporting Survey	Quantitative	Outcome	Flow	-	High crime rates influence perceptions of safety and are associated with higher poverty areas.		https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=3510018401 https://www2.gov.bc.ca/gov/content/justice/criminal-justice/policing-in-bc/publications-statistics-legislation/crime-police-resource-statistics
			Crime Severity Index	Policing Jurisdictions	180 out 232 Policing Jurisdictions	Annual	Statistics Canada - Uniform Crime Reporting Survey	Quantitative	Outcome	Flow	-	High crime rates influence perceptions of safety and are associated with higher poverty areas.	The Crime Severity Index is not available for police services or detachments with populations of less than 1000, and data for populations of less than 5000 should be used with caution.	https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=3510006301
		Charitable Donations	Ratio of Charitable Donors and Total Taxfilers	Census Agglomeration	All CAs	Yearly	Statistics Canada - Income and Financial Data of Individuals, Preliminary T1 Family File	Quantitative	Input	Flow	+	Charitable donations assist in improving community well-being through various channels and is also an indicator of social responsibility.		https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=1110000301

		Subjective Trust	Proportion of residents that declare a high level of trust in neighbours/community	NA	NA	NA	NA	Qualitative	Outcome	Flow	+	Perception of trust is important for well-being, social cohesion and business activity.		
		Trust in Local Government	Proportion of residents that declare a high level of trust in local government	NA	NA	NA	NA	Qualitative	Outcome	Flow	+	Subjective trust is an important determinant of the quality of civic life in a community. Low levels of trust may directly impact economic activity and individual well-being.		
	Social Cohesion	Shared Norms		NA	NA	NA	NA	NA	NA	NA	NA	Areas where residents agree on a shared set of norms are likely to have higher social cohesion, which leads to increased business activity and well-being.		
	Public-private Partnerships/ Networks	Business participation in Rural Development Groups	Percentage of business members on the board of directors of rural development groups	NA	NA	NA	NA	Quantitative	Outcome	Stock	+	Public-private partnerships and networks measure the level of connection between these sectors. Higher cohesion is thought to lead to better socioeconomic results.		
	Civic Engagement	Voter Turnout	Proportion of Registered Voters Participating in Last Provincial Elections	Provincial Electoral Districts	87 Electoral Districts	Occasional	BC Data Catalogue - Elections BC	Quantitative	Output	Flow	+	Voter turnout is an indicator of the health of a democracy, and can be seen as a measure of citizen engagement in community life.		https://catalogue.data.gov.bc.ca/dataset/provincial-voter-participation-by-age-group
			Voter Turnout in Local Elections	Municipalities	154 Municipalities	Occasional (Last collection 2018)	Civic Info BC	Quantitative	Output	Flow	+	Voter turnout is an indicator of the health of a democracy, and can be seen as a measure of citizen engagement in community life.		https://www.civicinfo.bc.ca/election
		Voluntary Sector	Not-for-Profits per capita	NA	NA	NA	NA	Quantitative	Input	Stock	+	The number of not-for-profits per capita is an indicator of community involvement.		
			Charity Organizations per Capita	Municipality	Unknown	Unknown	Canada Revenue Agency	Quantitative	Input	Stock	+	The number of charities per capita is an indicator of community involvement.		https://apps.cra-arc.gc.ca/ebci/hacc/srch/pub/bscSrch?dsrdPg=1

														0&q.stts=0007&q.ordrClmn=NAME&q.ordrRnk=ASC
Environmental	Natural Resource Endowment	Mineral Endowment	Major Mine in Community Boundary	Mining Region/Community	Unknown	Unknown	BC Data Catalogue - Ministry of Energy, Mines and Petroleum Resources	Geographical	Input	Stock	+	Existence of a major mine in a community is an important natural resource endowment that may affect economic opportunities.		https://catalogue.data.gov.bc.ca/dataset/permitted-mine-areas-major-mine#edc-pow
		Forestry Tenures	Proximity to Forestry Tenure areas	Tree Farm Licences	Unknown	Unknown (Last modified 06/2020)	BC Data Catalogue - Ministry of Forests, Lands, Natural Resource Operations and Rural Development	Geographical	Input	Stock	+	The existence of forestry tenures around a community suggests potential economic opportunities related to the forestry sector.		https://catalogue.data.gov.bc.ca/dataset/fadm-tree-farm-license-current-view-tfl-
		Food Production	Hectares of Farmed Land	Census Consolidated Subdivision	132 CCSs	5 years	Statistics Canada - Census of Agriculture	Quantitative	Input	Stock	+	Measures community's food production potential, as well as the viability of agricultural activity in the area.		https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3210040601
		Petroleum and Natural Gas Endowment		NA	NA	NA	NA	NA	NA	NA	NA	Access to oil and natural gas can be an important driver of economic development in a community.		
	Natural Assets	Parks	Distance to Nearest National Park	CSD	7 parks	Unknown	BC Data Catalogue - GeoBC	Geographical	Input	Stock	-	Proximity to national parks, NWAs and MBSs may be a good measure of the attractiveness of the natural environment of a community.		https://catalogue.data.gov.bc.ca/dataset/national-parks-of-canada-within-british-columbia
		Natural Wildlife Areas	NWA in the community	CSD	6 NWA	Unknown	Environment and Climate Change Canada	Geographical	Input	Stock				https://www.canada.ca/en/environment-climate-change/services/national-wildlife-areas/locations.html#_NWA_BC
		Migratory Bird Sanctuaries	MBS in the community	CSD	7 MBS	Unknown	Environment and Climate Change Canada	Geographical	Input	Stock				https://www.canada.ca/en/environment-climate-change/serv

														ices/migratory-bird-sanctuaries/locations.html#bc
		Endangered Flora	Proportion of Species considered Extirpated, Endangered, Threatened (red) or Special Concern (blue) in the region	Regional District	All RDs	Unknown	BC Ministry of Environment and Climate Change	Quantitative	Input	Stock	-	This may be a proxy for the quality of habitat management practices in a region. Areas with a high proportion of endangered species in relation to all resident species may be mismanaging their natural resource endowment.		http://a100.gov.bc.ca/pub/eswp/
	Location	Remoteness	Distance to nearest urban centre (Rural Classification)	Community	All communities	Occasional	RPP	Geographical	Input	Stock	-	Geographic proximity to service centres and population centres is an important determinant of socio-economic outcomes.	Calculated by RPP depending on the definition of urban centre	
			Index of Remoteness	CSD	All CSDs	Occasional	Statistics Canada - Index of Remoteness	Geographical	Input	Stock	-	Geographic proximity to service centres and population centres is an important determinant of socio-economic outcomes.		https://www150.statcan.gc.ca/n1/pub/17-26-0001/172600012020001-eng.htm
	Environmental Degradation	Air Quality	Average PM2.5 Concentration	Measuring Stations	Unknown	Daily	BC Ministry of Environment and Climate Change	Quantitative	Output/Outcome	Flow	-	Air pollution is associated with negative health and environment impacts.		https://envistaweb.env.gov.bc.ca/
		Waste Generation	Waste Generation per Capita	RD	27 RDs	Unknown (Last available data 2017)	BC Data Catalogue - Ministry of Environment	Quantitative	Output	Flow	-	Lower waster generation per capita may be associate with more sustainable practices.	Higher waste generation may be also associated with higher incomes. Indicator may have to be corrected by income level.	https://catalogue.data.gov.bc.ca/dataset/bc-municipal-solid-waste-disposal-rates
	Climate Change	GHG Emissions	Change in GHG Emissions per capita	RD	22 RDs	Annual	BC Ministry of Environment and Climate Change	Quantitative	Output	Flow	-	Changes in GHG emissions may be related to efforts to employ cleaner technologies, but may also result from a decrease in economic activity.		https://www2.gov.bc.ca/gov/content/environment/climate-change/data/industrial-facility-ghg
		Emergency Preparedness	Existing Emergency Preparedness Plan	NA	NA	NA	NA	Quantitative	Input	Stock	+	Demonstrates how prepared a community is to adapt to the adverse effects of climate change.		

Cultural	Cultural Sites	Historic Sites	Number of Historic Sites in the Community	CSD	Unknown	Unknown	Hello BC	Geographical	Input	Stock	+	Civic (e.g. arts, culture and recreation) facilities are an important part of a vibrant and culturally rich community. The presence of these facilities in a community is a good indicator of cultural capital.		
		Museums	Number of Museums in the Community	CSD	Unknown	Unknown	Hello BC	Geographical	Input	Stock	+			https://www.hellobc.com/listings/?experiences=museums-heritage-sites&view=map
		Unique Sites	Number of Unique Sites in the Community	CSD	Unknown	Unknown	Hello BC	Geographical	Input	Stock	+			
		Art Galleries	Number of Art Galleries in the Community	CSD	Unknown	Unknown	Hello BC	Geographical	Input	Stock	+			https://www.hellobc.com/listings/?experiences=art-galleries&view=map
		Indigenous Culture	Number of Indigenous Cultural Facilities and Businesses in the Community	CSD	Unknown	Unknown	Hello BC	Geographical	Input	Stock	+			https://www.hellobc.com/listings/?experiences=indigenous-culture&view=map
		Civic Facilities	Number of Civic Facilities in the Community	CSD	Unknown	Updated Monthly	BC Data Catalogue - GeoBC	Geographical	Input	Stock	+			https://catalogue.data.gov.bc.ca/dataset/civic-facilities
		Public Library	Access to Library in the Community	CSD	Unknown	Unknown	BC Ministry of Education	Geographical	Input	Stock	+	The existence of libraries in a community is an important measure of cultural capital. Libraries provide access to culture and serve as meeting places for various civic and cultural activities.		https://catalogue.data.gov.bc.ca/dataset/bc-public-libraries-systems-branches-and-locations/resource/ed17f111-fb39-46b3-89aa-5375592fbb01

		Unesco World Heritage Sites	Number of Heritage Sites in the Community	CSD	Unknown	Unknown	Unesco	Geographical	Input	Stock	+	Represent sites of significance for human heritage. The existence of a World Heritage site in a community is a unique cultural asset.		https://www2.gov.bc.ca/gov/content/governments/celebrating-british-columbia/historic-places/find-a-historic-place
		Heritage Conservation Areas	HCA in the community	CSD	Unknown	Unknown	BC Data Catalogue - Ministry of Forests, Lands, Natural Resource Operations and Rural Development	Geographical	Input	Stock	+	HCA are associated with historically significant areas, which may contribute to a community's cultural capital.		https://catalogue.data.gov.bc.ca/dataset/heritage-conservation-areas-of-bc
	Degree of Commercialization of Heritage, Environment and Identity	Seasonal Residents	Proportion of Households not Occupied by Usual residents	CSD	CSDs with population larger than 40	5 years	Statistics Canada - Census of the Population	Quantitative	Output	Stock	+	This aims to measure second home ownership as a proxy for the level of commercialization of local assets, as individuals tend to have second homes in areas with natural or cultural attractions. However, low usual resident occupancy may also mean houses are abandoned.		
		Ski Resort	Access to Ski Resort in the Community	CSD	Unknown	Updated Monthly	Hello BC/BC Data Catalogue - GeoBC	Geographical	Input	Stock	+	The existence of these facilities in a community and the amount of tourism activity measure the extent to which the community is taking advantage of its culture, environment and identity as a source of economic development.		https://www.hellobc.com/things-to-do/ski-snowboard/bc-ski-map/ https://catalogue.data.gov.bc.ca/dataset/ski-resorts
		Golf Courses	Number of Golf Courses in the Community	CSD	Unknown	Updated Monthly	BC Data Catalogue - GeoBC	Geographical	Input	Stock	+			https://catalogue.data.gov.bc.ca/dataset/golf-courses
		Recreation Sites and Trails	Number of Recreation Sites and/or Recreation Trails in the Community	CSD	Unknown	Unknown (Last modified 06/2020)	BC Data Catalogue - Ministry of Forests, Lands, Natural Resource Operations and Rural Development	Geographical	Input	Stock	+			https://catalogue.data.gov.bc.ca/dataset/recreation-sites-and-trails

		BC Tourism Centre	Access to BC Tourism Centre in the Community	CSD	Unknown	Unknown	BC Data Catalogue - Ministry of Tourism, Arts and Culture	Geographical	Input	Stock	+			https://catalogue.data.gov.bc.ca/dataset/bc-tourism-centres
			Annual Visitors per Capita	Tourism Centre	Municipalities with a Tourism Centre	Monthly	Destination BC	Quantitative	Output	Flow	+			https://www.networkstats.tourismbc.com/ReportDefinition.aspx
		Festival and Events	Number of Festival and Events in the Community	CSD	Unknown	Unknown	BC Data Catalogue - Destination BC	Geographical	Input	Stock	+	Festival and events are a way to commercialize the local culture and attract tourism.		https://catalogue.data.gov.bc.ca/dataset/hellobc-festivals-and-events-listing
	Place Identity	Sense of Belonging	Percentage of population that reports very or somewhat strong sense of belonging to community	Health Regions	All Health Regions	Occasional (Last data 2017/2018)	Statistics Canada - Canadian Community Health Survey	Qualitative	Outcome	Flow	+	Measures identity and connection to place. Higher levels of place identity may be related to higher social cohesion.		https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=1310011301