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A pilot study in the Waterberg district to develop a ward-level social progress index to improve measuring human development in South Africa

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Abstract

For town planners, prioritising human development, including education, health, income, and equity, is key for cultivating sustainable, thriving communities. In South Africa, persistent unemployment, poverty, and state dependency hinder development progress, making it vital to track human development levels to guide planning, investments, and targeted interventions across various levels of governance. A comprehensive index – the Social Progress Index (SPI) – has been developed that measures the well-being of a society, by observing social and environmental outcomes directly rather than the economic factors. In South Africa, the SPI is applied on provincial level, but this data set does not sufficiently capture the information required to assess quality of life at the sub-municipal level. This article reports on a pilot study conducted in the Waterberg district to assess the feasibility of developing a sub-municipal SPI in South Africa. The methodology is informed by the national SPI framework, which guided the index design and selection of outcome-based indicators/measures. Due to initial concerns about data availability, a case study approach is adopted to limit the scope and focus the data-collection process. Identifying suitable indicators and associated data items is a critical step, with data profiled for relevance, availability, and spatial disaggregation. Quantitative processing and analysis, including the use of ESRI's ArcGIS Pro software, play a central role in assembling and evaluating the indicators. Statistical analyses are used to calculate an overall SPI score which examines interrelationships and correlations among indicators to enable their integration into the index framework. The study demonstrates that constructing a sub-municipal SPI is feasible, with the resultant index offering value through both its composite score and the detailed insights provided by its individual indicators. When spatially applied, the index can help planners identify underperforming areas requiring targeted intervention and, when periodically updated, offers potential as a monitoring and evaluation tool for sub-municipal development outcomes.

Keywords: Human development, indicators, monitoring and evaluation, social progress, sustainable development goals, sub-municipal, wards, Waterberg pilot

'N LOODSSTUDIE IN DIE WATERBERG DISTRIK OM 'N WYKVLAK-SOSIALE PROGRESSIE-INDEKS TE ONTWIKKEL OM DIE METING VAN MENSLIKE ONTWIKKELING IN SUID-AFRIKA TE VERBETER

Vir stadsbeplanners is die prioritisering van menslike ontwikkeling, insluitend onderwys, gesondheid, inkomste en billikheid, die sleutel tot die kweek van volhoubare, florerende gemeenskappe. In Suid-Afrika belemmer volgehoue werkloosheid, armoede en staatsafhanklikheid hierdie ontwikkelingsvordering, wat dit noodsaaklik maak om vlakke van menslike ontwikkeling te monitor sodat beplanning, beleggings en geteikende intervensies op verskeie regeringsvlakke daarvolgens gerig kan word. 'n Omvattende indeks – die Sosiale Vooruitgangsindeks (SVI) – is ontwikkel om die welstand van 'n samelewing te meet deur sosiale en omgewingsuitkomste direk waar te neem eerder as ekonomiese faktore. In Suid-Afrika word die SVI tans op provinsiale vlak toegepas, maar hierdie datastel bevat onvoldoende inligting wat nodig is om die lewensgehalte op sub-munisipale vlak te bepaal. Hierdie artikel rapporteer oor 'n loodsstudie wat in die Waterberg-distrik uitgevoer is om die uitvoerbaarheid van 'n sub-munisipale SVI in Suid-Afrika te ondersoek. Die metodologie is gegrond op die nasionale SVI-raamwerk wat die ontwerp van die indeks en keuse van uitkomsgebaseerde aanwysers gelei het. As gevolg van aanvanklike bekommernisse oor databeskikbaarheid, is 'n gevallestudiebenadering gevolg om die omvang te beperk en dataversameling te fokus. Die identifisering van toepaslike aanwysers en gepaardgaande data-items is 'n kritieke stap, met data wat geprofileer is vir relevansie, beskikbaarheid en ruimtelike afbreekbaarheid. Kwantitatiewe verwerking en analise, insluitend die gebruik van ESRI se ArcGIS Pro-sagteware, speel 'n sentrale rol in die samestelling en evaluering van die aanwysers. Statistiese ontledings is gebruik om 'n algehele SVI-telling te bereken en onderlinge verwantskappe tussen aanwysers te ontleed. Die studie toon dat dit uitvoerbaar is om 'n wykvlak-SVI saam te stel, wat waarde bied deur middel van die saamgestelde telling en die insigte wat deur individuele aanwysers verskaf word. Wanneer dit ruimtelik toegepas word, kan die indeks

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beplanners help om onderpresterende gebiede te identifiseer en as moniterings- en evalueringsinstrument vir ontwikkeling dien.

THUTO EA TEKO SETEREKENG SA WATERBERG HO NTS'ETSAPELE SPI BOEMONG BA MASEPALA-POTLANA HO NTLAFATSA TEKANYO EA NTS'ETSOPELE EA BATHO AFRIKA BOROA

Bakeng sa baetsi ba meralo ea litoropo, ho etelletsa pele nts'etsopele ea batho – ho kenyeletsa thuto, bophelo bo botle, chelete e kenang le tekano – ke senotlolo sa ho aha sechaba se tsitsitseng le se atlehileng. Afrika Boroa, bothata bo sa feleng ba ho hloka mesebetsi, bofuma, le ho its'etleha ho feteletseng ho mmuso ho sitisa tsoelo-pele. Sena se totobatsa bohlokoa ba ho lekola le ho latela maemo a nts'etsopele ea batho ho tataisa meralo, matsete le ditsenogare tse reretsoeng boemong bo fapaneng ba puso. Index e ncha e felletseng – e tsejoang e le Social Progress Index (SPI) – e lekanya boiketlo ba sechaba ka ho shebana le liphello tsa sechaba le tsa tikoloho ka kotloloho, ho fapana le litekanyetso tsa moruo. Leha SPI e sebelisoa boemong ba liprofinse Afrika Boroa, datha e fumanehang ha e lekane ho hlahloba boleng ba bophelo boemong ba masepala-potlana, kapa lebatooa. Sengoliloeng sena se tlaleha ka boithuto ba teko bo entsoeng Seterekeng sa Waterberg ho hlahloba hore na ho ka khoneha ho nts'etsapele SPI e sebetsang boemong bona bo tlase. Mokhoa o sebelisitsoeng o thehiloe holima moralo oa naha oa SPI, o ileng oa tataisa moralo oa index le khetho ea matšoao a amang boleng ba bophelo. Ka lebaka la mathata a data, ho ile ha sebelisoa mokhoa oa boithuto ba mohlala ho fokotsa sebaka sa ts'ebetso le ho tsepamisa mohopolo pokellong ea lintlha. Data e ile ea hlophisoa ka tlhokomelo ho latela bohlokoa, ho fumaneha le karohano ea sebaka. Software ea ArcGIS Pro ea ESRI e sebelisitsoe haholo ho lekola le ho hlahisa matšoao ana. Tlhahlobo ea lipalo e ile ea thusa ho lekanya lintlha tse akaretsang tsa SPI le ho supa likamano pakeng tsa matšoao. Boithuto bo bontšitse hore SPI ea boemo ba masepala-potlana e ka etsoa, 'me e fana ka boleng bo boholo bakeng sa meralo ea sebaka le ho latela tsoelo-pele ea ntlafatso ha nako e ntse e ea.

1. INTRODUCTION

In the South African context, with its high levels of unemployment, poverty, and dependency on the state, the need for development is critical. Given the ever-increasing demands on limited financial resources, it becomes ever more essential to find measures to track development outcomes to target critical areas where intervention is required. While the responsibility for development spans all levels of government, it is most directly realised at the local municipal level. In this instance, development is shaped through the implementation of public projects guided by Spatial Development Frameworks (SDFs) that stem from Integrated Development Plans (IDPs), and are delivered in conjunction with national, sectoral, and other initiatives.

Measuring the outcomes of planning and investment is a complex, multi-agency endeavour, involving a broad array of stakeholders operating across diverse policy sectors (Mashiri *et al*., 2017: 146). To support decision-making, planners and stakeholders frequently rely on indicators to monitor changes in social conditions that can be linked to urban and regional planning efforts (Morford, 2007: 8). While a range of development indicators are used in South Africa, including the Human Development Index (HDI), the Gini coefficient, and the national poverty line, the spatial detail of these data sets varies significantly, often spanning national, provincial, and local municipal levels. Historically, development has been assessed primarily through economic metrics focused on material well-being. While such economic measures remain important, they are insufficient to fully capture societal progress. Since 2009, there has been growing international recognition of the limitations inherent in purely economic measures of development. Researchers and policymakers have increasingly advocated for the inclusion of non-economic indicators such as education, health, literacy, and civil freedoms as part of a more comprehensive assessment of societal well-being (Stiglitz, Sen & Fitoussi, 2009; Noll, 2014; Viera, 2017).

Responding to these concerns, the Social Progress Index (SPI) was developed in 2012 as a global, country-level index designed to measure development through social and environmental dimensions. Since its inception, the SPI has been applied across 170 countries (as of 2023), becoming one of the world's most extensive curated data sets on social progress (Social Progress Imperative, 2025). In South Africa, IQ Business adapted the SPI framework in 2018 to assess social progress at the provincial level (IQ Business, 2018). However, this data remains insufficient for understanding quality of life at more granular, sub-municipal, levels.

This discrepancy is especially relevant for mining communities that are often concentrated within specific wards such as those found in the Waterberg District Municipality. In South Africa, mining companies are mandated through Social and Labour Plans (SLPs) to invest in the development of communities directly affected by their operations. These investments aim to enhance quality of life and are expected to align with the socio-economic development priorities outlined in local municipalities' IDPs. SLP initiatives may include infrastructure development, skills training, and income-generating projects (Sibanye Stillwater, 2021).

During the COVID-19 pandemic, Anglo American recognised the importance of measuring the impact of its social investments to ensure that expenditure, particularly in doorstep communities, resulted in meaningful and sustainable outcomes. Because indexes in South Africa measure social progress only at the provincial level, commissioning a pilot study in the Waterberg District Municipality, where Anglo American has a significant operational presence, provided a valuable opportunity to test the feasibility of developing a SPI at a sub-municipal scale, in a context where such methods had not previously been applied. This article presents the pilot study findings, highlights the rationale for adopting a sub-municipal SPI framework, outlines the methodology applied in the case study, and provides a high-level overview of the results. The article concludes with

reflections on the lessons learned and the potential relevance of this approach for planning practice and development monitoring in South Africa. Given the considerable effort required to adapt and apply the SPI at ward level, this work is intended to contribute to broader discussions concerning inclusive, evidence-based development in South Africa, particularly in under-resourced contexts where such tools are often out of reach.

2. LITERATURE REVIEW

2.1 Defining social progress

According to Noll (2014: 6199), societal progress is a normative concept that refers to the advancement or change of major societal conditions in a direction deemed desirable, based on prevailing values and development goals. This concept is closely linked to human well-being, which the Organisation for Economic Co-operation and Development (OECD) (2017) describes as the improvement of quality of life, material conditions, and sustainability. The Social Progress Imperative (2023a) defines 'social progress' as a society's ability to meet the basic human development needs of its citizens, establish foundational elements that allow individuals and communities to enhance and sustain their quality of life, and create conditions for all individuals to realise their full potential. While the definitions of these concepts may vary to some degree, they all highlight the importance of enabling people to access the resources necessary for living healthy, fulfilling, and productive lives. On a global scale, aspects of social progress are often measured through frameworks such as the Sustainable Development Goals (SDGs), typically relying on official indicators. However, in cases where such indicators are lacking, measuring SDG performance becomes a challenge (Green, 2018a). This shortfall emphasises the need for supplementary methods to assess social progress and performance. Another challenge lies in measuring social progress at more localised levels, where detailed information is needed to better identify and support areas most in need of development.

2.2 The limitations of traditional measures to measure human development

Reliable metrics are needed to measure the levels of human development in society. Initially, Gross Domestic Product (GDP) was used as the primary indicator of human development (Brinkman & Brinkman, 2011). However, GDP fails to account for important factors such as the environment, social justice, and community satisfaction. As a result, more comprehensive metrics have been sought (Valderrama-Meiner, 2019; Stiglitz *et al.*, 2009). In the 1990s, the concept of human development gained prominence, particularly through the work of Amartya Sen, who introduced the 'capabilities approach'. This approach focused on enhancing people's freedoms, capabilities, and overall well-being (Sen, 1999: 18).

The 'human development approach' aimed to achieve several key goals, namely to treat people as the ends, not the means, of development; to shift attention from what people produce to what they can be or do, and to ensure that development policies improve people's quality of life, including their health, security, and overall flourishing (Foa *et al*., 2011: 2). However, human development is typically measured using the Human Development Index (HDI), which only accounts for income, health, and education levels (Foa *et al*., 2011: 2).

Amartya Sen (1999: 37), a Nobel economist, emphasised that freedom is "intrinsically important as the preeminent objective of development". He argued that development should focus not only on economic growth, but also on enhancing the lives people lead and the freedoms they enjoy. According to Sen, development should help individuals become "fuller social persons, exercising our own volitions (capacities for deliberate choice) and interacting with – and influencing – the world in which we live" (Perkins, Ozgurer, Lupton & Omidvar-Tehrani, 2021; Sen, 1999).

However, the HDI fails to capture people's overall well-being and empowerment, as it remains limited to a narrow set of indicators, excluding social aspects such as personal freedoms, shelter, and personal safety. A study by Wu, Fan and Pan (2014) found that the HDI alone may not adequately reflect development progress. Although the HDI is available at the local municipal level in South Africa, it is not calculated for sub-municipal areas (for example, wards). This limits its usefulness in providing detailed insights needed for more targeted planning and development.

2.3 The Social Progress Framework

The Social Progress Imperative, a U.S.-based non-profit organisation, was founded in 2012 with the goal to develop a more accurate measure of a country's development level, beyond what was available at the time, and to better understand its development priorities (Viera, 2017). The SPI is grounded in the work of Amartya Sen, Douglass North, and Joseph Stiglitz. Unlike traditional economic metrics, the SPI measures the well-being of a society, by focusing on social and environmental outcomes rather than purely economic factors (Rowan, 2022). Initially developed at the country level, the SPI encompasses a wide range of social and environmental performance components, aggregating them into a comprehensive framework. The index typically includes 53 indicators, which collectively provide a holistic view of social progress (Rowan, 2022).

Three fundamental questions lie at the core of the SPI, each addressing a key dimension of social progress:

1. Basic human needs – Does a country meet its citizens' most essential needs?

2. Foundations of well-being – Are the essential building blocks in place for individuals and communities to enhance and sustain their well-being?
3. Opportunity – Are there opportunities for all individuals to reach their full potential?

Taken together, these questions offer valuable insights into the level of social progress within a society.

The application of the index provides a detailed assessment of what life is really like for everyday people (Green, 2018b). In the context of town and regional planning, the index offers insight into specific components linked to key issues such as access to shelter, water, and sanitation – critical for informing decisions concerning infrastructure and facility provision. Broader dimensions group related components to offer a more aggregated view of the three core social aspects of human development, namely basic human needs (survival), foundations of well-being (quality of life), and opportunity (potential for progress). These dimensions and components can be used to track development progress within a specific area. At the foundation of the index are measurable indicators, which serve as the evidence base for assessing social progress.

The indicators used in the SPI are outcomes based rather than input based. Instead of considering the money invested in something such as healthcare, the SPI measures how healthy citizens are through several indicators. The use of social indicators, particularly those that reflect human development, is crucial to inform all levels of forward planning to ensure that appropriate actions are considered to support human development needs. In addition, the SPI is also aligned to the SDGs – it enables a way for policymakers to track and report on progress towards the SDGs (Social Progress Imperative, 2023a; IQ Business, 2018).

It measures societal well-being, using three dimensions, and under each dimension there are four components. Components such as dimensions are categories of outcomes, rather than specific outcomes themselves. Each component highlights separate aspects of the overall set of outcomes that make up a dimension. Dimensions include basic human needs (for example, nutrition, shelter, clean water), foundations of well-being (for example, access to knowledge and information, wellness, environmental quality), and opportunity (for example, personal rights and choice, inclusiveness, and access to advanced education). Each component describes a related but distinct aspect of what it means for society to guarantee opportunity among its population (Social Progress Imperative, 2023b). For example, the 'opportunity dimension' includes personal rights, access to higher education, personal freedom and choice, and inclusiveness. Personal rights and access to higher education describe different aspects of the extent to which individuals can pursue their own objectives to the best of their ability. Personal freedom and equity and inclusion describe different aspects of the extent of limits on individuals. Together these components offer a conceptually coherent way of capturing how societies can empower (or limit) an individual's autonomy, freedom, and ability to progress (Fehder & Stern, 2013). Each component contains indicators that reflect the component item. Critically, the indicator(s) for each component needs to be measurable. Figure 1 illustrates the framework dimensions and components under each.

Generally, there are two methods for index construction: input and output indices. Input indices refer more to the investment in activities that can lead to important outcomes, but outcome indices directly measure the outcome of investments (Stern, Wares & Orzell, 2015: 6). According to Fleurbaey and Blanchet (2013) when data related to input measures are incomplete or when there is no consensus on how inputs lead to outcomes, then an outcome -oriented index may be more appropriate (cited in Stern, Wares & Orzell, 2015). The SPI has been designed as an outcome index where interrelated elements are combined to produce a given level of social progress. The methodology allows measurement of each component and each dimension, yielding an overall score and ranking (Social Progress Imperative, 2023b). The three dimensions of the SPI, namely basic human needs, foundations of well-being, and opportunity, are all conceptually and statistically interrelated.

The calculated SPI ranges from 0 to 100, with 100 representing the highest level of social progress. At the most detailed level of analysis, the SPI is made up of individual indicators that are grouped into specific components. Each set of indicators measures a distinct but related aspect of social progress within its component. According to the Social Progress Imperative (2023b), these components represent the most comprehensive set of outcome categories currently available, based on both existing literature and accessible data. New applications such as the one in the Waterberg region offer valuable opportunities to test the framework in diverse contexts.

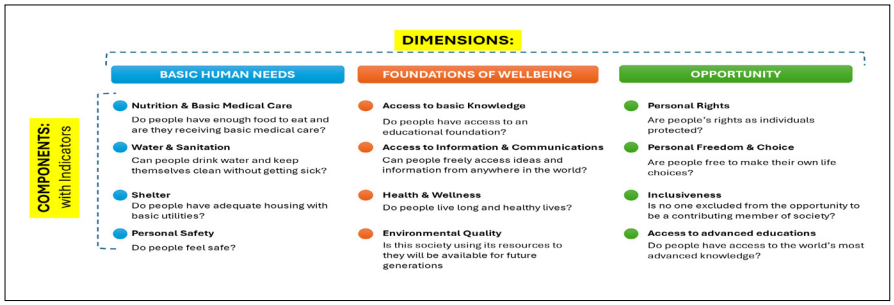

Figure 1: Social Progress Index Framework
Source: Social Progress Imperative, 2023a

2.4 Importance of social progress indicators for town and regional planners

Indices are important for town and regional planners for several reasons, as they aggregate and simplify complex data into single, clear figures. It offers a means to track development or lack thereof over time, to identify problem areas, and to be part of reporting processes (Wong, 2006). Legislation requires that monitoring and evaluation be implemented and that it complies with the requirements of the Spatial Planning and Land Use Management Act 16 of 2013 (SPLUMA). SPLUMA provides a guiding framework for spatial planning and land-use management in South Africa across different administrative levels with a strong emphasis on local municipal planning (USAID, 2017). A key monitoring and evaluation norm of SPLUMA is the ongoing collection and use of data as well as the use of indicators such as HDI, Gini coefficient, education levels, unemployment, and the poverty line to evaluate planning decisions and to determine if outcomes are being achieved (DALRRD, 2021: 30). Once an indicator is established, it can also serve as a benchmark, which planners can use to compare and track changes over time. An additional dimension of relevance is the link to the SDGs – South Africa has shown commitment to the SDGs localising them through the National Development Plan (NDP) (Ehiane, 2023). Local municipalities are inherently expected to implement the SDGs because they are in the centre of service delivery relevant to the functions of municipalities (Ngubane & Pillay, 2023: 4). However, data discovery and availability (especially at the sub-municipal level) is a limitation, especially for smaller constrained municipalities. This limitation reflects a broader challenge: the more localised and fine-grained the analysis becomes, the more difficult it is to access the necessary data. This is particularly critical for the SPI, which relies on detailed, place-based information. One of the key advantages of the SPI is that its components align with the SDGs, providing a useful mechanism for tracking and reporting progress toward these global targets. In addition, the index reflects overall human development, capturing conditions across society rather than focusing on specific population groups. The data captured should be available nationwide, making a sub-municipal SPI for South Africa feasible. To support meaningful comparison within municipalities, finer grained data is essential; municipal-level figures alone do not suffice. Planners consistently call for more detailed data, not less, and Statistics South Africa should resume the release of sub-municipal data, as it has done in the past.

3. CASE STUDY AREA – SOUTH AFRICAN APPLICATION

Anglo American sought a measurement tool that could more accurately capture the outcomes of SLPs and related investments, while helping identify vulnerable areas for future targeted support. Although originally developed to reflect countries, the SPI has also been applied to more localised spatial units such as census tracts in Orange County, USA (Social Progress Imperative, 2020).

The Waterberg district served as the pilot area for this SPI project, focusing on the ward-level subdivisions within local municipalities. Early in the project, team members raised concerns about the suitability of using wards as the primary spatial unit, noting that variations in ward size could lead to misinterpretation of results. In addition, wards are not static; demographic shifts can lead to changes in their boundaries over time. Despite these challenges and given the preference by Anglo American, wards were retained as the spatial framework for the project, as they align with other indices previously developed for Anglo American, such as the Economic Complexity Index (ECI) and the Community Economic Resilience Index (CERI), both of which used wards.

Given the more localised scale of analysis (at the ward level), a key consideration in the pilot was the availability of reputable, publicly accessible data. The Waterberg

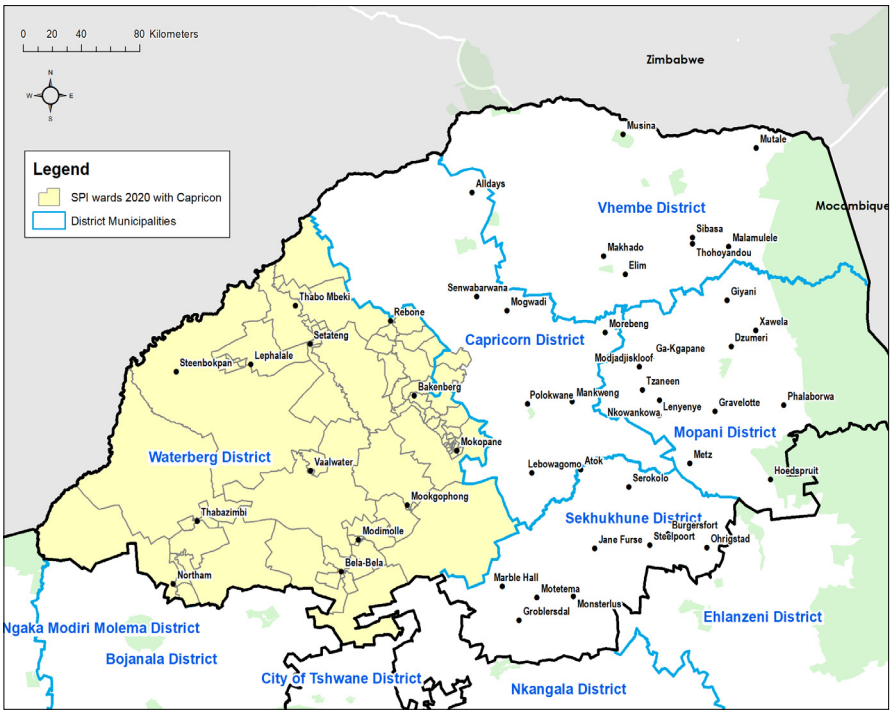

Figure 2: The Waterberg study area in the Limpopo province

Source: Maritz, 2024

district was selected by Anglo American as the pilot area based on two main factors, namely the presence of Anglo-American mining operations in the region and their desire to extent the data to cover the district, and the manageable spatial extent, which made data collection more feasible. The Waterberg SPI pilot covers 84 wards across six municipalities and evaluates two time periods, 2018 and 2021. This time frame corresponds with the first SPI being conducted in 2020 (using 2018 data serving as a baseline), followed by a repeat in 2023 (using 2021 data), allowing for a comparison across two periods. Figure 2 illustrates the extent of the study area consisting of wards for the Waterberg study area.

4. METHODOLOGY

4.1 Design process

To develop a sub-municipal SPI that measures development outcomes at the municipal ward level more accurately, the pilot study used the SPI framework outlined in Figure 1. The design process followed six key steps and involved two teams, namely the Social Progress Imperative (SPI) Team (international) and the Data Team (based in South Africa). Given their familiarity with the local data landscape. the Data Team was responsible for identifying and compiling indicator items based on the SPI framework, as well as sourcing the relevant data for each indicator. Meanwhile, the SPI Team evaluated the selected indicators to ensure that they accurately reflected the intended concepts. Given their global expertise, the SPI Team also took on the responsibility of calculating the index. The use of two teams was a distinctive feature of this project, given its constraints. However, future SPI projects may potentially involve a single team responsible for calculating the index. Figure 3 illustrates the key steps followed by the project team in deriving the index.

4.2 Data

Identifying, collecting, and processing suitable indicators posed the greatest risk to achieving the objective of developing a sub-municipal SPI. This challenge stemmed from the need for data to meet several strict criteria. Specifically, the data had to be publicly available or easily derived from public or other accessible sources, and originate from credible institutions such as government departments, public entities, or recognised non-governmental data custodians. The SPI was required to reflect two distinct time periods, namely 2018 (the baseline index) and 2021 (a follow-up index to allow for temporal comparison). To ensure consistency and comparability, all data items had to fully cover the pilot area and be available for both time periods, with the expectation that they would also be available for future updates. Importantly, the same set of indicator items was used for both 2018 and 2021. Collecting the data took up the most time during the overall design process. A key determinant was whether the data source is periodically updated and likely to be available in future, or whether a future indicator can be recreated. Not all data is available as published items on websites; some items had to be requested from the relevant institution, while a few were calculated spatially. The aim was to source indicator data from acknowledged sources focusing mainly on government departments that collect data annually. Government departments such as the Departments of Health (2023), and South African Social Security Agency (SASSA) (2023) were approached. Data was requested as their data items are not listed on web platforms. Data from departments such as the Department of Water and Sanitation (2023) and the Police Service were available on their web platforms. Where data was not available or simply too coarse, alternative sources were investigated. The Green Book (CSIR, 2019), GeoTerra Image (2022) and CellMapper (2022) are examples of non-government data sources.

4.3 Data processing and indicator selection

During the project, a data tracker (spreadsheet) was used to manage the assembly and creation of various indicators. For selecting the indicators in the index, a decision tree process is applied for each indicator considered (see Figure 4). It contains six questions that serve as a guide to help the data team decide whether to exclude or include an indicator. This process ensures that a relevant social or environmental indicator was selected, that it measures outcome, that it is reputable with sound method, as current as possible, and that it adequately covers the geographic region.

Processing and assembly of the data were done at wards level. Wards are a municipal geopolitical subdivision of municipalities and the geographic area used for the index. Consequently, all indicators had to

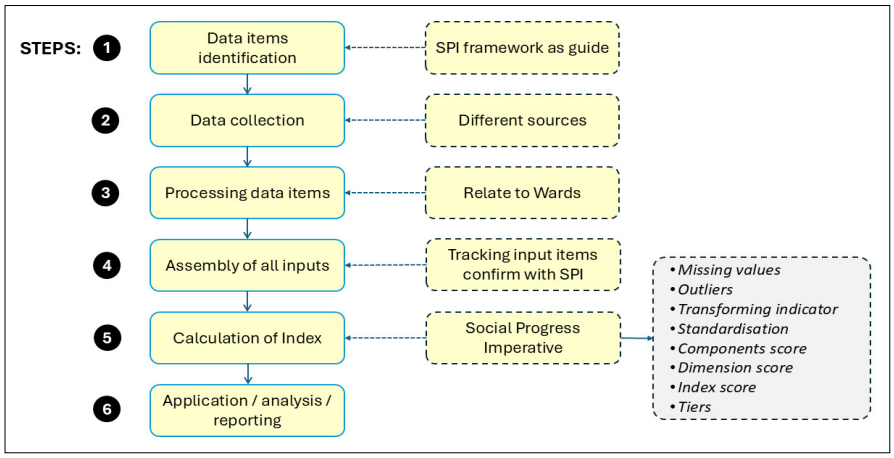

Figure 3: Steps followed in calculating SPI

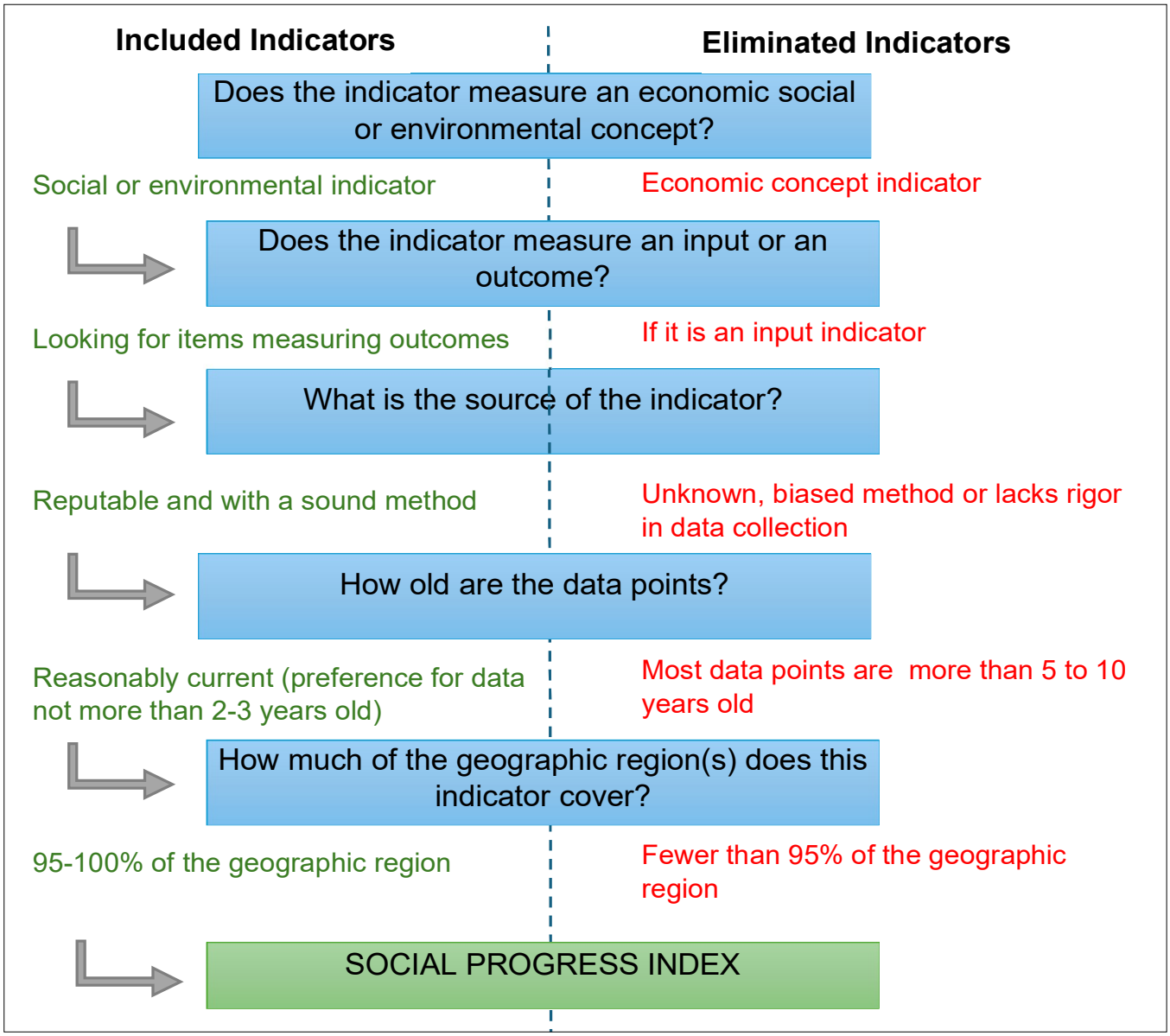

Figure 4: Decision Tree used to select suitable component indicators
Source: Social Progress Imperative, 2023b

be calculated for, or related to wards. Due to the localised scale, data was requested at the most granular level possible. For health data, it meant at the level of a health facility; for crime data, it meant at police station level, and for grant payments the payment points were sought. Several indicators had to be calculated where no data was available; for example, in the Inclusiveness Component both 'access to social services' and 'access to justice' indicators had to be calculated. For 'access to social services', geospatial accessibility to SASSA payment points had to be calculated and by applying departmental access norms, calculating the population within and beyond acceptable accessibility ranges could be calculated for each ward; the percentage of population beyond the acceptable norm would reflect the measure of access. Similarly, to reflect 'access to justice per ward', an accessibility calculation to police stations was calculated, and the results (reflecting the percentage population within the acceptable distance based on service norm) related to respective wards. These calculations were done using GIS software and the calculated results surface was overlaid with ward units to calculate the levels of access per ward. Information on Water and Sanitation indicators was available from the Department of Water Affairs' National Integrated Water Information System at settlement level, which could then be aggregated within wards to derive ward level indicators. It is preferable to have two or more indicators for each component, in order to avoid underrepresenting a component. The indicator items identified were discussed and confirmed with the SPI to ensure suitability. Several engagements by the project team with the SPI were undertaken to review and finalise indicator selection or development. All indicator data was assembled into a spreadsheet, which was used by the SPI to process and develop the various SPI scores for each ward. Table 1 lists the final selection of indicators for the Waterberg study area.

Table 1: Waterberg SPI indicator list 2018, 2021

Dimension	Component	Indicator name	Definition	Source
Basic human needs	Nutrition and basic medical care	Antenatal 1st visits before 20 weeks rate	Antenatal 1st visits before 20 weeks rate – percentage of all antenatal visits before 20 weeks	Department of Health
		Immunisation under 1 year coverage	Fully immunised relative to the population per ward under 1 year old	Department of Health
		Infant PCR test (HIV) positive as percentage of all tests done	Infant PCR test (HIV) positive as percentage of all tests done	Department of Health
	Water and sanitation	Access to Sanitation Infrastructure at the RDP level	Percentage of population with sanitation infrastructure at RDP level	Department of Water and Sanitation
		Access to water infrastructure at the RDP level	Percentage of population with water infrastructure at RDP level	Department of Water and Sanitation
		Using pit toilet without ventilation/no sanitation at all	Percentage of population using VIP and no sanitation	Department of Water and Sanitation
	Shelter	Satellite identification of informal housing	Percentage of structures classified as informal by satellite image algorithm	GeoTerraImage
		Malicious damage to property	Malicious damage to property cases per 1000 population	South African Police Service
	Personal safety	Attempted murder	Number of attempted murders per 1000 population	South African Police Service
		Common assault	Number of common assaults per 1000 population	South African Police Service
		Common robbery	Number of common robberies per 1000 population	South African Police Service
		Murder	Number of people murdered per 1000 population	South African Police Service
		Aggravating robbery	Robbery (that went violent) as a percentage of all people per wards	South African Police Service
Foundations of well-being	Access to basic knowledge	Grade 12/Matriculation pass rate in Physical Sciences	Average yearly performance in home language Grade 3	Department of Education
		Grade 12/Matriculation pass rate in Mathematical Literacy	Average yearly academic performance in Science Grade 9	Department of Education
		Grade 12/Matriculation pass rate in Life Sciences	Performance better than 50% on Social Science in Grade 9	Department of Education
		Matriculation pass of Mathematic Literacy with more than 40%	Matriculation pass of Mathematic Literacy with more than 40%	Department of Education
		Grade 12/Matriculation average pass rate across 5 selective subjects (Geography, Accounting, Agricultural Sciences, Business Studies, Economics)	Grade 12/Matriculation average pass rate across 5 selective subjects (Geography, Accounting, Agricultural Sciences, Business Studies, Economics)	Department of Education
	Access to Info and Comms	3G Coverage	Percentage of the population with access to 3G services per ward	CellMapper
		4G Coverage	Percentage of population with access to 4G services per ward	CellMapper
	Health and wellness	TB drug resistance rate 5 years old and over	Percentage of drug-resistant TB based on tests done	Limpopo Department of Health
		HIV positive mothers	Percentage of HIV-positive mothers who come for antenatal visits	Limpopo Department of Health
		HIV positive 5-14 years	Percentage positive based on tests done	Limpopo Department of Health
		% of TB DS started on treatment	Percentage of those identified as having drug-resistant TB on new treatment	Limpopo Department of Health
	Environmental quality	Particulate matter 2.5 mean annual exposure	The population-weighted exposure level to particulate matter PM2.5	NASA Earth Observation data from MERRA 2-
		% of population in medium- to high-risk area	The percentage of the population living in a medium-high flood risk area	Green Book Flood risk data
		% of population in very high-risk areas	The percentage of the population living in a very high-flood risk area	Green Book Flood risk data
Opportunity	Personal rights	Overall clinic rating	Overall clinic rating (including all components)	Limpopo Department of Health
		% score on the vital score	Rating on the vital components	Limpopo Department of Health
		% score on the non-negotiable vital scores	% non-negotiable rating – has to be 100% to pass	Limpopo Department of Health
		Voter turn out	% of registered voters turning out to vote	Electoral Commission
	Personal freedom and choice	Rape cases per year as a percentage of the population	Per 1000 population rate in ward	South African Police Service
		Total sexual offences	Per 1000 population rate in ward	South African Police Service
	Inclusiveness	Accessibility to social service	SASSA access within 5km distance range = Percentage population	Social Service Agency SA
		Access to justice (police stations)	Access to police station within 24km based on CSIR guidelines for provision of social services	South African Police Service
	Access to advanced education	Matriculation pass	Matriculation pass	Department of Education
		% of all learners who take pure maths as a subject	% of all learners who take pure maths as a subject	Department of Education
		% of all learners who take pure maths as a subject and pass	% of all learners who take pure maths as a subject and pass	Department of Education

Source: Maritz, Jele & Trichard, 2023

4.4 Creating the index

Once all indicator items were sourced and processed, the indicator information for each ward was entered into a spreadsheet table following the SPI framework structure of components and dimensions. Although the dimension and component categories of the framework are fixed, the nature of indicators within components can differ, due to the variability of data collected between countries and regions and at different scales. The sources available are considered, and trade-offs considered between the quality and precision of a social indicator along with the comprehensiveness of its coverage. All data items had to represent 2018 and 2021, as the intention was to compare the index for both years to determine what change had occurred. The process of creating the index for the Waterberg region underwent several core steps applied by the SPI team. All indicators in the spreadsheet were transformed to address missing values, address outliers, standardise values so they are comparable in scale. Principle component analysis was used to aggregate indicators into a component score, calculate dimension scores, and calculate the index score (Stern *et al*., 2024). These steps ensured the structural integrity of the index throughout the process and involved the following analysis methods. A brief overview of each step is provided below.

Step 1: Missing values – Although all effort is made to have a complete database set for all wards, some indicators can contain missing data. This was the case in the Waterberg area where, for a few healthcare indicators, data where only available for 2021 and not for 2018. The Social Imperative employed a model-based imputation process which uses the relationships between variables within the database (observed data) to predict and replace missing values. A regression imputation process is used to predict missing values, by using other data columns as predictors (Dong & Peng, 2013). Predictors are selected based on their correlation and relevance to the column with missing values.

Step 2: Outlier values (values that fall outside a percentile of all points) – After outliers are identified, a method such as windorisation is applied. This is a mean averaging method that involves replacing all the outliers with the largest value that is not considered an outlier (Myles-White, 2015).

Step 3: Transforming indicators – The indicators values compiled during the database assembly phase vary between percentages, score values, and rates. Some of these indicators need to be transformed in their direction so that the increase in the absolute value can increase the SPI. This is done by inverting values and multiplying by -1 (Social Progress Imperative, 2023b).

Step 4: Standardisation – The next steps involve calibration and scaling each indicator. Indicators are scaled from zero to 100, using benchmarks that are defined from theoretical boundaries drawn from indicator definitions or from reasonable limits above and below the maximum and minimum values, respectively. In the absence of a strong theoretical or practical boundary, the top and bottom benchmarks are set at one standard deviation above the maximum value and one standard deviation below the minimum value. Indicators, for which increasing values correspond to worse outcomes, are inverted before index calculations. When selecting indicators for each component of the SPI, Principal Component Analysis (PCA), Kaiser-Meyer-Olkin (KMO) test, and Cronbach's *alpha* are used to ensure that the chosen indicators are statistically sound, relevant, and contribute meaningfully to measuring social progress. Each method performs the following role in the selection process (Murillo, 2025; Pituch & Stevens, 2015):

- PCA helps identify the underlying structure of the data, by reducing dimensionality while retaining as much information as possible.
- The KMO test measures the adequacy of the data for factor analysis (such as PCA). It ensures that selected indicators are suitable for explaining underlying constructs.
- Cronbach's *alpha* measures internal consistency (reliability) – that is, how well a group of indicators measure the same concept.

These methods work together as follows in the construction of the SPI:

1. PCA is first applied to group indicators into meaningful components. Principal components explaining at least 70% of the total variance in the data were included.
2. KMO is checked to ensure that the data set is suitable for factor analysis. A KMO value ≥ 0.70 was preferred.
3. Cronbach's *alpha* is used to confirm that the indicators within each component are consistent and reliable. A value of above 0.7 is generally considered acceptable.
4. Iterative refinement: Indicators that do not perform well in PCA, KMO, or Cronbach's *alpha* are revised or removed.
5. Final validation: The final indicator set is tested to ensure that the dimensions and components make conceptual and statistical sense.

Step 5: Component score – The set of indicators are aggregated within each component, using a geometric mean that indicates the central tendency or typical value of a set of numbers by multiplying all the values and then taking the nth root, where "n" is the total number of indicators. This method is often preferred when indicators have different ranges or are multiplicative in nature. This helps control for bias in the data distribution (Social Progress Imperative, 2023a).

Step 6: Dimension score – Each dimension score is the arithmetic average of the four components that comprise the dimension. The formula for calculating the dimension score is below, where d=dimension and c=component.

$$Dimension_d = \frac{1}{4}\sum_c Component\ score_c$$

Step 7: Index score – The Overall SPI index score is calculated as the arithmetic average of the three dimensions. The formula is reflected below, where d= dimension

$$Social\ Progress\ Index\ Score = \frac{1}{3}\sum_d Dimension_d$$

Results through all steps are calculated for each of the 84 wards in the Waterberg region. The results are populated in a MS Excel spreadsheet to make further application easy. The results table consisted of the original inputs as well as the imputations for a few fields where data was lacking. The index section contained scores calculated for each component for 2018 and 2021. It also contained a dimension score as well as the overall SPI score. To spatialise the information, the results were related to the spatial wards data layer, which allows for thematic mapping within a GIS.

5. RESULTS AND DISCUSSION – WATERBERG REGION

The SPI results are presented at three levels: for the Waterberg pilot area, summarised by local municipality, and at the ward level. While a single year's data provides insight into social progress for that period, tracking SPI over multiple years offers more meaningful analysis. This section compares SPI scores from 2018 and 2021, highlighting the differences between these two periods.

5.1 Waterberg pilot area

At the highest level, the SPI results are presented for the Waterberg district. Figure 5 provides a graphical representation of changes in individual SPI scores in the Waterberg region between 2018 and 2021. The colours in the graph represent the grouping of components for each dimension, as shown in Figure 1. The results reveal a slight decline in the overall SPI score (-0.26) between 2018 and 2021. However, this decline may be misleading when examining the performance of individual components. It is, therefore, important to consider if change occurs from a low or high base. While some components improved, others deteriorated. Within the Basic Human Needs dimension, nutrition and basic medical care declined (-7.24), while shelter, water and sanitation, as well as personal safety all showed improvement. In the Foundations of Well-being dimension, access to basic knowledge and access to information significantly improved (+15.01), while health and wellness and environmental quality saw declines. The Opportunity dimension performed the worst, with all its components declining, particularly personal rights (-7.91) and inclusiveness (-8.83), which were most affected.

The district-level results can be used by the district municipality to track the performance of both individual components and dimensions. They can help identify areas that require further investigation, particularly to address deteriorating components. In addition, these results can inform district planning efforts such as the District Development Model (DDM), especially when coordinating investments across municipalities within the district. This is particularly important for aspects such as bulk infrastructure and social facilities, which are crucial for improving living conditions across the region.

5.2 Municipal area results

The results can be summarised to provide a local municipal perspective. This view is valuable for reflecting overall municipal social progress and identifying areas where sectoral improvements are needed. Figure 6 provides a graphical representation of changes in SPI and component scores for the Lephalale Local Municipality (serving as an example) between 2018 and 2021, highlighting the differences between the two periods. The results show a decline in the SPI score from 2018 to 2021 (-2.06). Most of the components have declined, with only three showing improvement. This highlights that relying on a single score can be misleading; analysing the performance of individual components offers deeper insights that can better inform planning decisions.

However, this municipal view does not pinpoint the specific areas of poor performance. The original goal of the project was to reflect social progress at the ward level to enable more effective spatial targeting. This approach is particularly useful when visualising SPI performance over two different time periods at the ward level, as shown for the Waterberg district in Figure 7. At this more detailed level, the results can be mapped by component as well as total score for each period, with changes over time also illustrated. However, caution is needed when using geopolitical subdivisions such

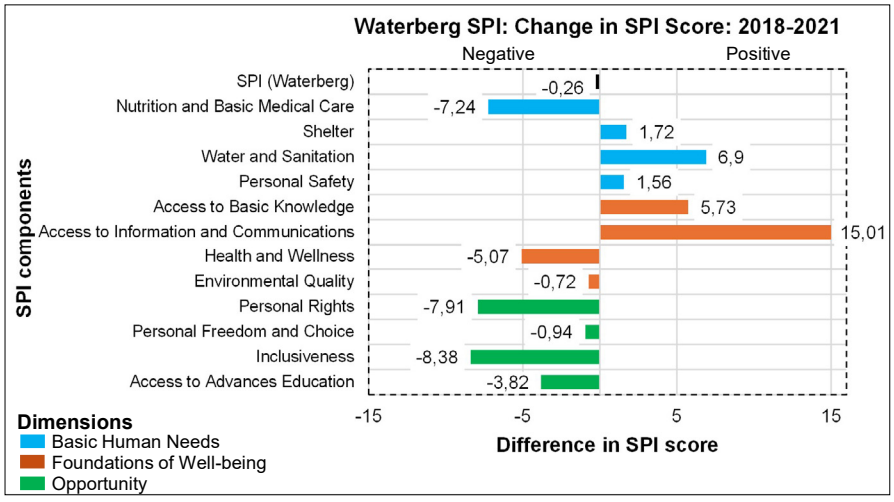

Figure 5: Change in SPI scores 2018-2021 for the Waterberg study area

Source: Social Progress Imperative, 2023b

as wards, as there is a risk of viewing them in isolation – supporting a 'my ward versus your ward' mentality. It is important to remember that aspects such as infrastructure and services often have a regional impact, not only a localised one.

5.3 Ward level

Ward level SPI results can assist local municipal planning processes, as it provides evidence-based information. It speaks to a range of issues such as housing (shelter), healthcare facilities (health and wellness; nutrition and basic medical care), and water and sanitation (water and sanitation infrastructure and services), among others. Together, all reflect the social condition within a municipality and as such can serve as an important instrument to measure human development. When undertaken periodically, it can inform plans, strategies, and policies. Given its spatial grain, it can be a useful resource to planners if it is periodically created to identify problem areas where future intervention is required. Drawing on current available data, it also serves to make optimal use of already captured data items by acknowledged data custodians.

The following results compare SPI scores to determine whether they have increased (improved) or declined (worsened). Figure 7 illustrates the overall change in SPI scores between 2018 and 2021, whereas Figures 8-10 display changes across individual dimensions during the same period. Colour ranges represent the magnitude of change based on manually defined categories to standardise the intervals across maps, with green indicating an increase (values greater than 0), while red indicates a decrease. Tables 2-4 present SPI scores for 2018 and 2021 across different dimensions, highlighting only the worst-performing wards based on 2021 values.[1]

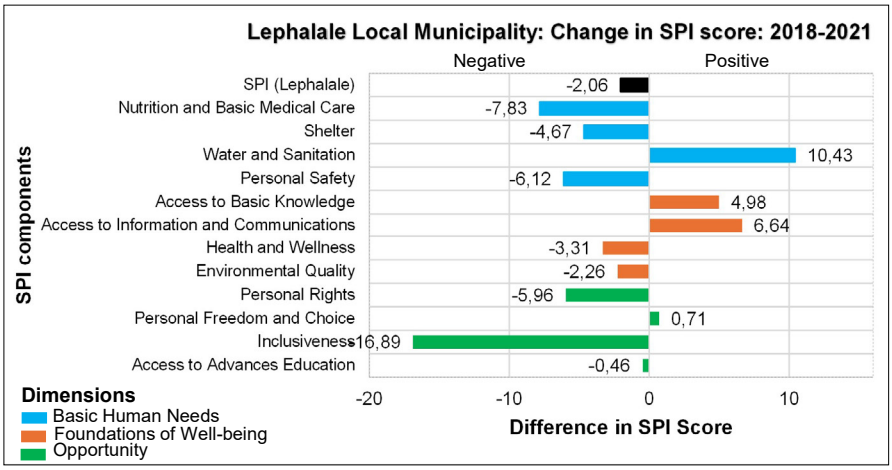

Figure 6: Change in SPI scores 2018-2021 for the Lephalale municipality
Source: Social Progress Imperative, 2023b

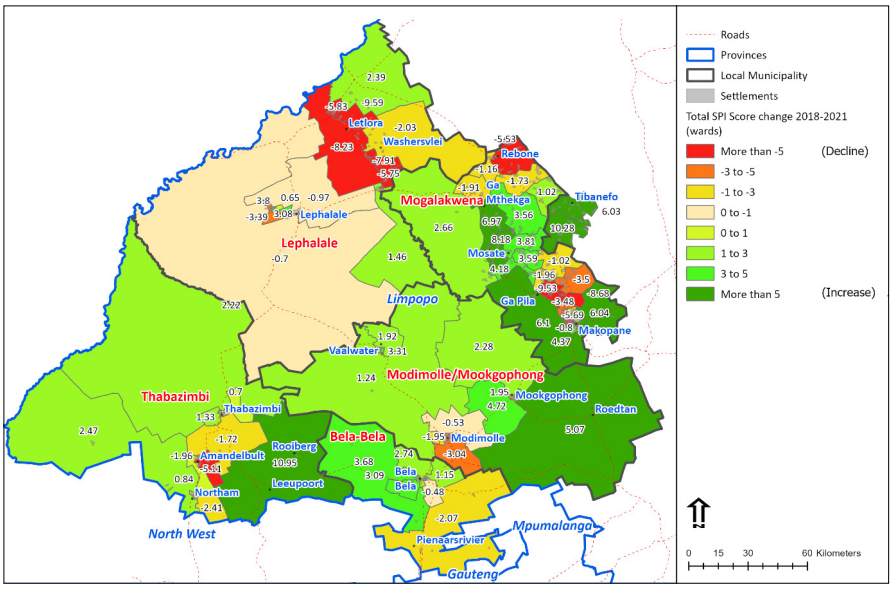

Figure 7: Change in ward-level SPI score comparing 2018 and 2021
Source: Maritz, 2025

By analysing the SPI scores across these dimensions and their individual components, policymakers and researchers can gain insights into a region's strengths and weaknesses, identify areas for improvement, and monitor progress toward broader social and environmental goals. To understand the factors driving growth or decline, it may be necessary to examine the individual components in more detail. The following maps provide spatial representations of the results, using the overall SPI score and performance by domain.

The SPI reflected in Tables 2-4, is measured on a scale from 0 to 100. A score of 100 represents the highest possible achievement across all indicators, reflecting maximum social progress, while a score of 0 indicates the lowest possible performance on all indicators. The levels of social progress corresponding to these scores are categorised as follows (Social Progress Imperative, 2023b):

- Very High: 100-86 points
- High: 85-76 points
- Medium-High: 75-66 points

1 A list of all 84 wards, including 2018, 2021, and change values in matrix format, with colour coding, is available from the author upon request.

- Medium-Low: 65-56 points
- Low: 55-46 points
- Very Low: 45-0 points

Comparing the overall SPI scores between 2018 and 2022 (in Figure 7), a few areas stand out as areas where the scores have declined (worsened). This includes wards in Amandelbult (-5.11), Modimolle (-3.04), western Lephalale town (-3.38), communities in the Letlora area (-8.23), Rebone (-5.52), and wards between Ga Pila and Mokopane (-5.13). Although useful to identify spatial areas in need of investigation, it does not reflect which dimensions were affected.

5.3.1 The Basic Human Needs dimension

Figure 8 reflects the change in the basic human needs dimension. Several settlement areas represent a decline, including settlements along the Lephalale river up to Tom Burke (up to -6.74), as well as areas to the north of Mogalakwena (-7.78) and north of the Anglo Platinum mine (-3.71). Wards near Mookgopong reflect a significant decline (up to -9.12). Other towns that also reflect a decline, albeit less, are Northam (-3.69) and Amandelbult (-2.05). The remainder of the area consists of conservation, commercial and game-farming areas which mostly reflect improvement in aspects related to basic human needs. To determine the worse affected components, the more detailed component scores are compared for the two periods. Table 2 indicates the eight worst affected wards in the study area with decline exceeding 5 points. It reflects the individual component scores for the periods 2018 and 2021. The areas marked in yellow indicate that Nutrition and Medical Care declined in all these wards significantly, while Personal Safety also declined, except for Mogalakwena wards 19 and 25 where the Housing Dimension deteriorated. Using these scores and the input indicators, the poor performing areas can be further investigated to determine the reasons for the decline.

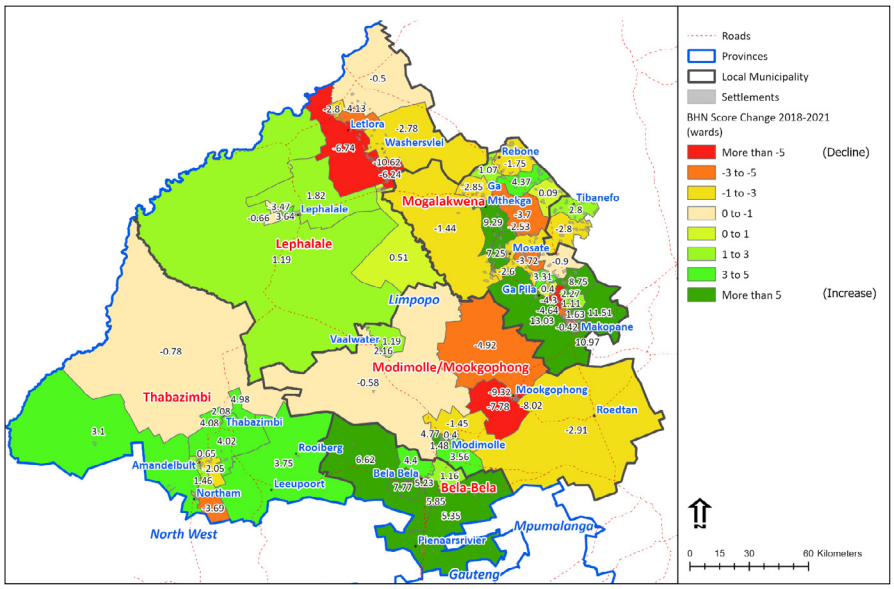

Figure 8: Change in Basic Human Needs dimension 2018-2021

Source: Maritz, 2025

Table 2: Scores for the Basic Human Needs dimension – worst performing wards 2018-2021

DIMENSION: Basic human needs								
COMPONENT	Nutrition and basic medical care		Water and sanitation		Housing		Personal safety	
Ward name and number	2018	2021	2018	2021	2018	2021	2018	2021
Lephalale (5)	58.86	34.70	85.59	97.68	88.85	83.73	84.67	74.91
Lephalale (7)	66.10	54.68	80.87	94.29	87.94	81.51	90.07	69.54
Lephalale (8)	58.86	34.70	85.37	98.56	87.14	80.10	88.65	64.16
Modimolle-Mookgopong (4)	76.71	45.08	68.82	75.14	70.49	71.64	72.55	64.64
Modimolle-Mookgopong (9)	75.20	47.55	56.04	59.43	63.20	66.23	63.27	53.37
Modimolle-Mookgopong (10)	77.72	41.37	75.89	82.82	67.77	70.06	61.71	51.57
Mogalakwena (19)	82.93	42.12	57.99	65.48	55.89	51.85	34.74	35.60
Mogalakwena (25)	78.71	54.58	55.84	64.24	46.09	41.89	33.74	33.51

Source: Social Progress Imperative, 2023b

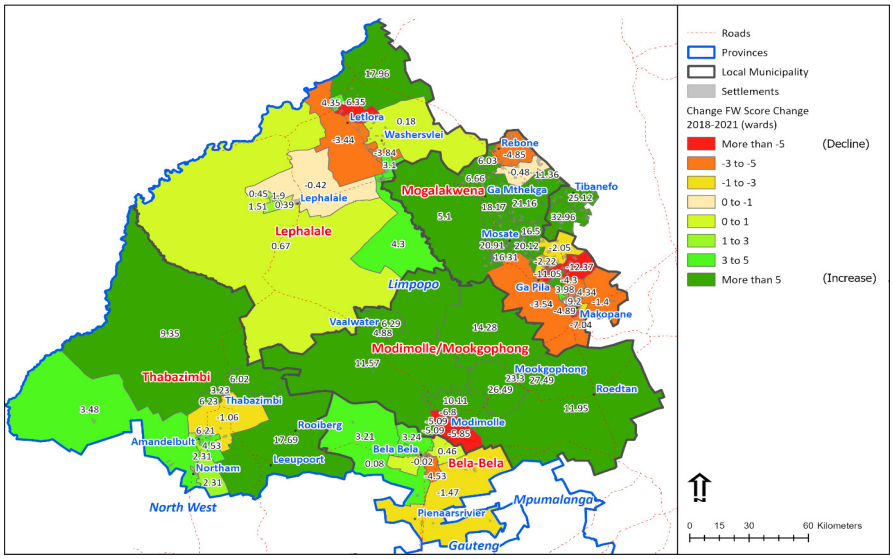

Figure 9: Change in Foundations of Well-being dimension 2018-2021

Source: Maritz, 2025

Table 3: Scores for the Foundation of Well-being dimension – Worst performing wards 2018-2021

DIMENSION: Foundations of Well-being								
COMPONENT	Access to basic knowledge		Access to information and communication		Health and wellness		Environmental quality	
Ward name and number	2018	2021	2018	2021	2018	2021	2018	2021
Lephalale (10)	55.96	30.67	10.00	10.00	17.83	19.16	14.80	13.37
Modimolle-Mookgophong (7)	65.09	64.03	100.00	100.00	45.94	23.86	11.39	11.14
Modimolle-Mookgophong (13)	51.53	46.65	100.00	100.00	45.94	23.86	11.39	11.14
Mogalakwena (17)	65.60	51.92	100.00	100.00	56.59	27.09	15.03	14.02
Mogalakwena (18)	65.04	50.92	100.00	100.00	62.82	28.46	15.03	14.02
Mogalakwena (25)	78.43	44.63	100.00	100.00	24.89	28.54	13.58	12.66
Mogalakwena (27)	70.47	64.09	100.00	100.00	56.76	27.28	13.58	12.66
Mogalakwena (29)	82.08	57.50	100.00	100.00	39.37	25.22	13.58	12.66
Mogalakwena (30)	41.32	31.19	100.00	100.00	39.37	25.22	13.58	12.66
Mogalakwena (31)	91.81	92.31	100.00	100.00	57.52	29.78	13.58	12.66

Source: Social Progress Imperative, 2023b

5.3.2 The Foundations of Well-being dimension

Figure 9 reflects the ward SPI results for the Foundations of Well-being dimension. Ten wards reflect a significant decline or worsening, including the Mogalakwena area (up to -12.37) with Modimolle (-5.85) and areas towards Tom Burke (northern Lephalale LM -6.35). Table 3 lists the ten worst performing wards. The most affected components are Access to Basic Knowledge and Health and Wellness.

5.3.3 The Opportunities dimension

Figure 10 (see page 165 of this article) maps the ward SPI results for the Opportunities dimension. This is the worst performing dimension, affecting not only the main settlement areas, but also large parts of the rural and farming wards. Table 4 (see page 165 of this article) lists the wards most affected by a decline in scores for this dimension. Personal rights are the most affected component with Inclusiveness and Access to advanced education also featuring in many wards.

The components score of the three dimensions further help identify areas experiencing a decline (worsening). Evaluating the individual components helps identify which aspects have led to the decline in dimension scores in the various locations. The spatialised version of the SPI can be used to support spatial analysis and serve as inputs to other spatial planning instruments such as SDFs and IDPs. When applied at a fine granularity, it can highlight problem clusters or regions. By considering the individual aspects, specific lagging areas can be identified. Several aspects can be related to infrastructure and social service provision. The index and its components could highlight areas of concern (where scores decline or remain low). However, it does not pinpoint the core problem in all cases; it guides the user to aspects that need to be investigated, in order to derive specific actions and interventions.

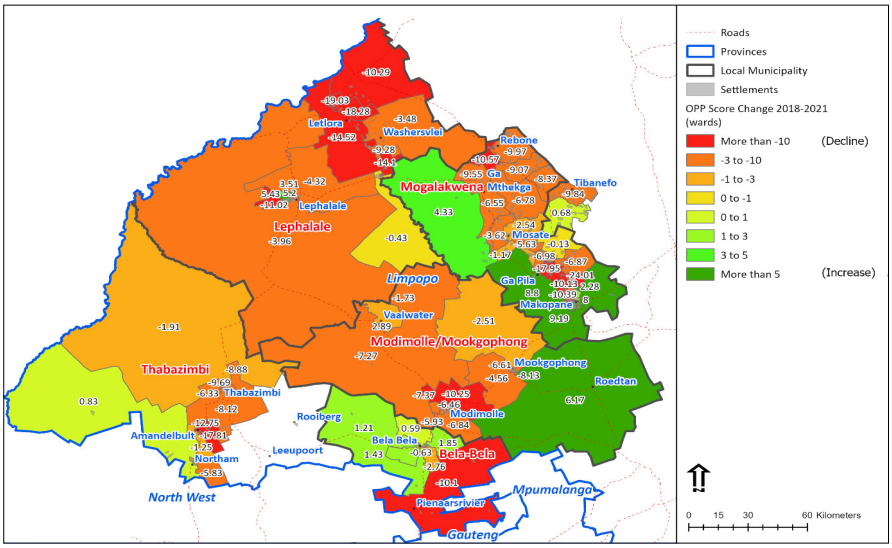

Figure 10: Change in Opportunities dimension 2018-2022

Source: Maritz, 2025

Table 4: Scores for the Opportunities dimension – Worst performing wards 2018-2021

DIMENSION: Opportunity								
COMPONENT	Personal rights		Personal freedom and choice		Inclusiveness		Access to advanced education	
Ward name and number	2018	2021	2018	2021	2018	2021	2018	2021
Bela-Bela (8)	35.15	31.05	85.23	86.62	43.43	8.55	56.03	53.22
Lephalale (3)	52.77	38.35	84.39	86.62	98.01	71.17	71.24	66.21
Lephalale (5)	71.38	57.54	73.78	76.44	91.04	44.63	36.00	35.51
Lephalale (7)	79.76	58.98	71.66	68.61	31.73	8.31	33.94	24.82
Lephalale (10)	74.67	58.14	81.76	66.23	99.82	83.18	57.54	33.10
Lephalale (11)	57.87	56.46	86.62	86.62	80.54	42.70	50.57	48.67
Lephalale (12)	67.10	56.28	85.40	72.63	100.00	39.76	29.47	37.17
Modimolle-Mookgophong (6)	76.14	38.08	72.22	77.40	72.31	76.18	33.05	21.04
Modimolle-Mookgophong (8)	76.02	35.35	70.72	73.30	100.00	100.00	49.03	36.97
Mogalakwena (3)	49.05	45.41	77.64	63.81	75.86	65.92	52.44	37.57
Mogalakwena (17)	74.03	61.19	22.67	22.67	69.41	15.17	64.15	59.42
Mogalakwena (19)	76.21	46.11	22.67	22.67	60.82	10.00	50.03	53.13
Mogalakwena (20)	64.41	47.16	38.05	34.00	70.80	10.00	56.32	42.37
Mogalakwena (21)	71.61	44.25	22.67	22.67	10.00	10.00	56.32	42.37
Mogalakwena (22)	79.08	47.23	22.67	22.67	10.00	10.00	62.03	52.33
Mogalakwena (23)	75.90	48.53	31.06	27.25	10.00	10.00	65.43	56.09
Mogalakwena (25)	69.45	46.94	22.67	22.67	80.82	79.88	75.20	28.88
Mogalakwena (30)	79.67	43.54	22.67	22.67	100.00	100.00	46.19	26.52
Thabazimbi (3)	65.64	47.33	44.51	22.67	99.81	90.11	75.80	74.64
Thabazimbi (11)	74.60	47.33	86.62	86.62	81.60	38.26	84.16	83.52

Source: Social Progress Imperative, 2023b

6. CONCLUSION AND RECOMMENDATIONS

Apart from a technical process to design and develop land use, town and regional planning is also a process to improve the health and well-being of people. This becomes more important in an ever-urbanising world, where more citizens reside in settlements, towns, and cities. Measuring human development has become a crucial aspect to track if planning interventions are achieving planning and human development objectives. Indexes and related indicators are crucial for town and regional planners because they provide measurable data that can guide decision-making and assess the effectiveness of planning strategies. The SPI offers planners and decision makers an alternative measure with which to measure human development and societal well-being across various social dimensions. It is already well established internationally, and its framework reflects a depth of dimensions and aspects. One key advantage of a spatially detailed SPI such as the Waterberg version is its applicability across different spatial units. It can provide a summarised view at the local municipal or district level, as illustrated by the Waterberg results, helping planners and policymakers identify underperforming social dimensions that may require attention in plans and budgets. It offers a framework that can measure the impacts of planning policy and implementation and can serve as a reporting tool regarding human development. The value of the SPI lies in its application within planning processes such as IDPs to ensure that areas most in need of intervention and investment are prioritised. As an evidence-based resource, the SPI strengthens decision-making and serves as valuable supporting information in engagements with communities and stakeholders involved in planning processes, including IDPs and SDFs.

As demonstrated in this pilot, it is now also possible to develop an SPI at a sub-municipal level. This, in turn, improves the ability to identify areas within a region where development

efforts are achieving results, where it is stagnant or worsening, and where interventions are required. The granularity of ward-level data further allows for targeted interventions in specific areas within a municipality or district that may need additional support. Although the index highlights components that require improvement, the underlying causes affecting each component should be investigated to ensure that the appropriate interventions are implemented. It is also possible that, depending on data availability and on-going research into social outcomes, indicators may change with each forthcoming version of the SPI. The concepts captured by each set of indicators, however, remains the same (Social Progress Imperative, 2023b). The following highlights several lessons learnt during the development of a sub-municipal SPI:

Data scale and availability challenges – Assigning data to the ward level required that certain input variables be available at the facility level. Potentially, this could present a problem, as such disaggregated data is often unavailable from the relevant departments or institutions, which typically report information at broader administrative levels.

Data sourcing from government departments – Although it may appear that data systems are in place and data sets are accessible, this is not always the case in practice. This can jeopardise the development of the index, particularly when a single source provides multiple critical input variables, as was the case with data from the Department of Health. National and provincial government departments are key providers of the data required for constructing the index. Therefore, their support and collaboration are essential. To mitigate potential data access issues and streamline the process, it is advisable to establish formal data-sharing agreements prior to initiating such an index project.

Availability and suitability of indicators – Not all indicator items are readily available or appropriate for use. In the Waterberg pilot study, several indicators had to be proposed and assessed for suitability. In addition, some indicators were derived through spatial data analysis and geospatial processing, further highlighting the need for technical expertise in data handling and interpretation.

Collaborative development process – The development of the Waterberg ward-level SPI was a collaborative undertaking. Participants contributed by identifying and assembling the necessary indicators, while the Social Progress Imperative processed the inputs and performed the index calculations. The Imperative also provided valuable guidance by proposing and evaluating potential indicators.

Documentation of indicator development – Given the diverse nature of indicators, it was necessary to document the sourcing and calculation method for each. This step is crucial for ensuring the replicability of the SPI in future projects and for maintaining transparency in the development process.

The following recommendations are drawn from the study:

Exploring alternative spatial units – Although wards were used as the spatial unit for the SPI, other units such as those from the CSIR Settlement Footprint layer could also be considered for future applications. None of the indicators used in the pilot were originally aligned to ward boundaries; all had to be spatially reprocessed. Using alternative or more granular spatial units may enhance the accuracy and relevance of the index.

Expanding and enhancing the data pool – In future iterations, additional or improved data items could be developed to enhance or replace some of the indicator items used in the Waterberg pilot.

Aligning with the SDGs – The SPI framework is aligned to the 17 SDGs, capturing some of the same development outcomes. As such, investment in an SPI can offer added value by supporting SDG reporting and helping policymakers align their strategies with global development goals.

Visualising results through mapping – Although a spreadsheet version of the SPI is useful, visualising the results through maps enhances their interpretability. Mapping allows users to spatially analyse results and assess them in relation to spatial data such as existing development projects and programmes implemented within a region.

The Waterberg pilot confirmed the feasibility of creating a sub-municipal SPI. The data-collection processes, and methodological framework developed through this application can be replicated in future projects. If expanded nationally, the SPI could become a valuable tool for measuring development outcomes, informing targeted interventions, and supporting SDG reporting across the country.

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