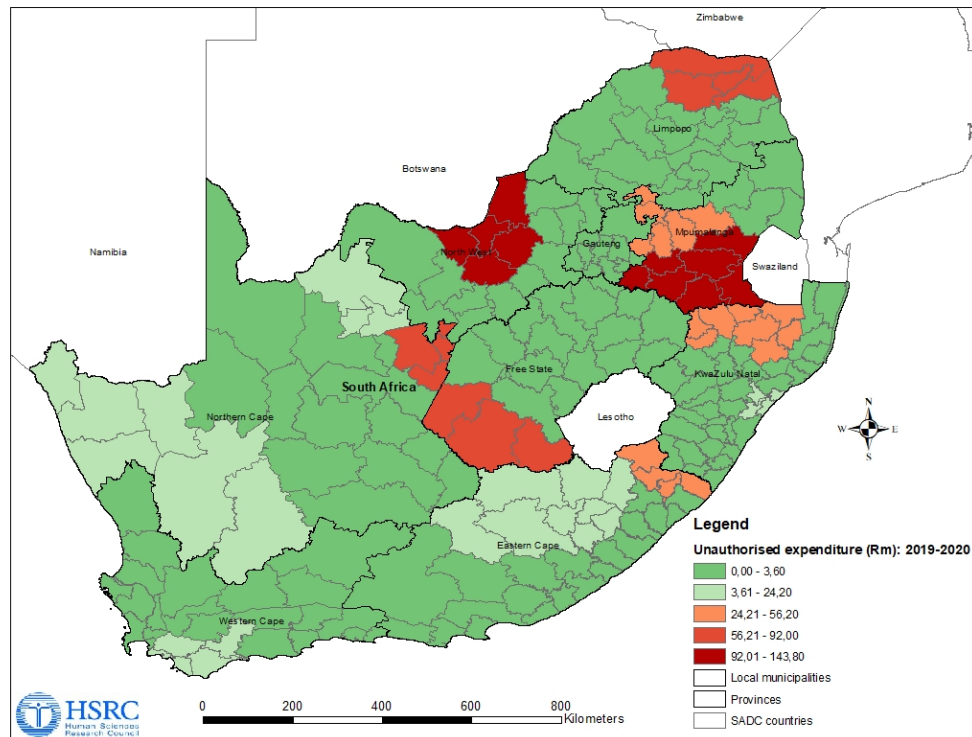


# Spatial characteristics of unauthorised municipal expenditure in South Africa

Unauthorised expenditure, ([read more](#)) as defined in section 1 of the Public Finance Management Act (PFMA), 1999 (Act No. 1 of 1999), is  
(a) overspending of a vote or a main division within a vote; or  
(b) expenditure that is made not in accordance with the purpose of a vote.

A vote is the total amount which is usually appropriated per department for use within a certain period, and is approved by parliament or a provincial legislature. This analysis presents a summary of *unauthorized expenditure* for provinces and their municipalities in South Africa for the 2015 to 2020 period, using hot spot analysis.

## Municipal unauthorised expenditure: 2019-2020



The purpose of this edition of Spatial Insights is to illustrate the use of the spatial statistics technique, hot spot analysis. Traditional choropleth mapping on the left, shows the municipalities with the highest *unauthorised expenditure* in the 2019-2020 Medium-term Expenditure Framework audit period. Overall, there was high *unauthorised expenditure* of R14.61 billion and 30% of municipalities ended the year with a deficit.

The municipalities mostly spending high amounts of unauthorized monies (between R92m-R144m) were in the southern parts of Mpumalanga and in the central parts of North-West.

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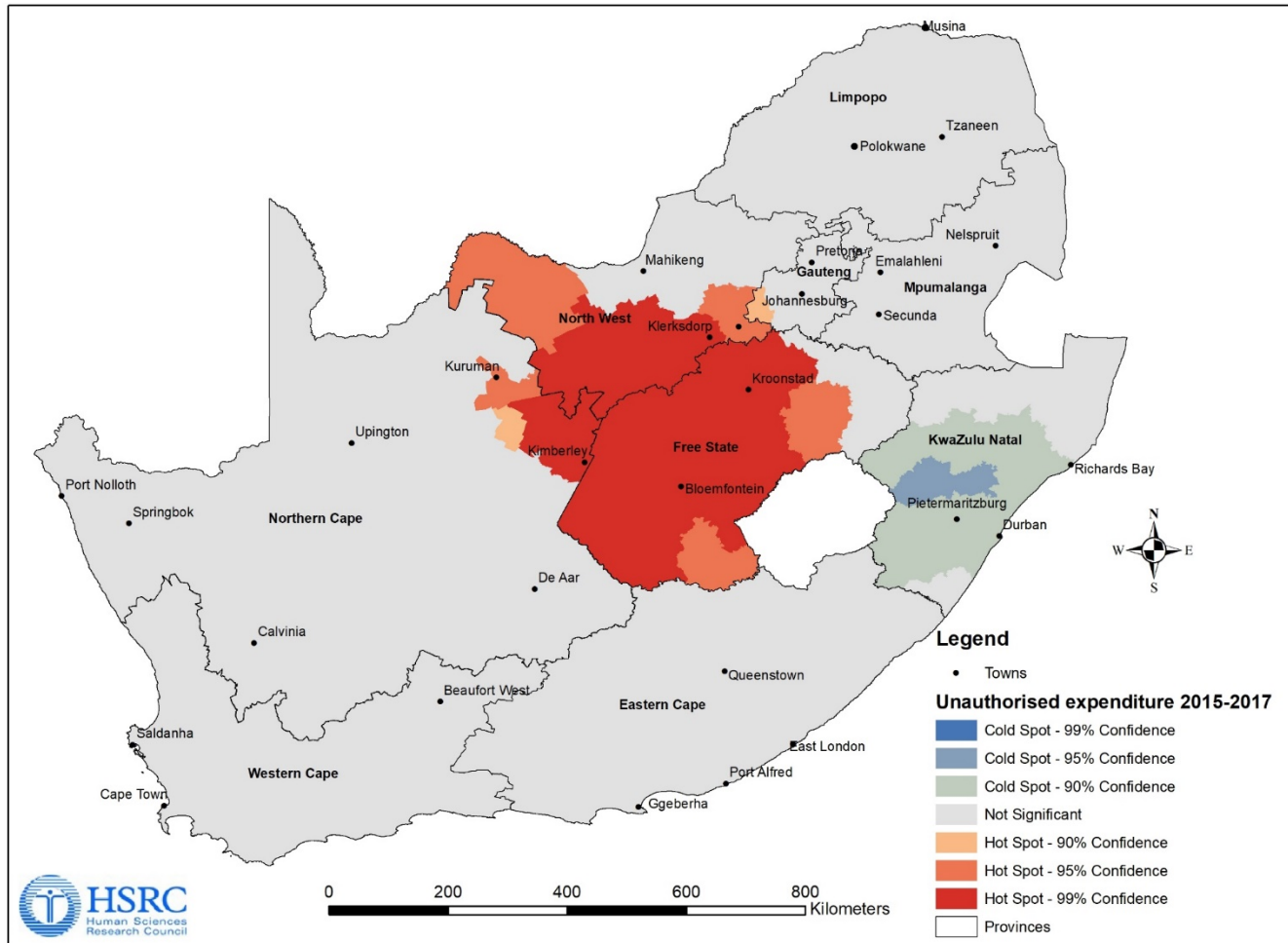
## Hot spot analysis

Thematic or choropleth maps illustrate spatial characteristics of qualitative or quantitative phenomena of all kinds, in this case *unauthorised expenditure*. In order to understand whether these patterns have any statistical significance, a hot spot analysis can be done.

This tool identifies statistically significant hot spots and cold spots using the Getis-Ord  $G_i^*$  statistic. Hot spots are spatial clusters of high values while cold spots refer to spatial clusters of low values. The statistical significance indicates whether or not the pattern is spatially random for each feature. Following the calculation, each feature in the database is assigned a z-score, p-value and confidence level. The confidence level ranges between 99% and 90% and for some features the clustering will not be statistically significant.

In order to undertake the hot spot analysis, the Conceptualization of Spatial Relationships has to be defined. In this case the Fixed Band option was used and it means that each feature is analysed within the context of the neighbouring features within the distance specified. Since no distance was indicated, it means that each feature will have at least 1 neighbour. More advanced ways of defining neighbours will be to create a Spatial Weight Matrix or conduct an Incremental Spatial Autocorrelation.

## Hot spot analysis: Unauthorised expenditure 2015-2017

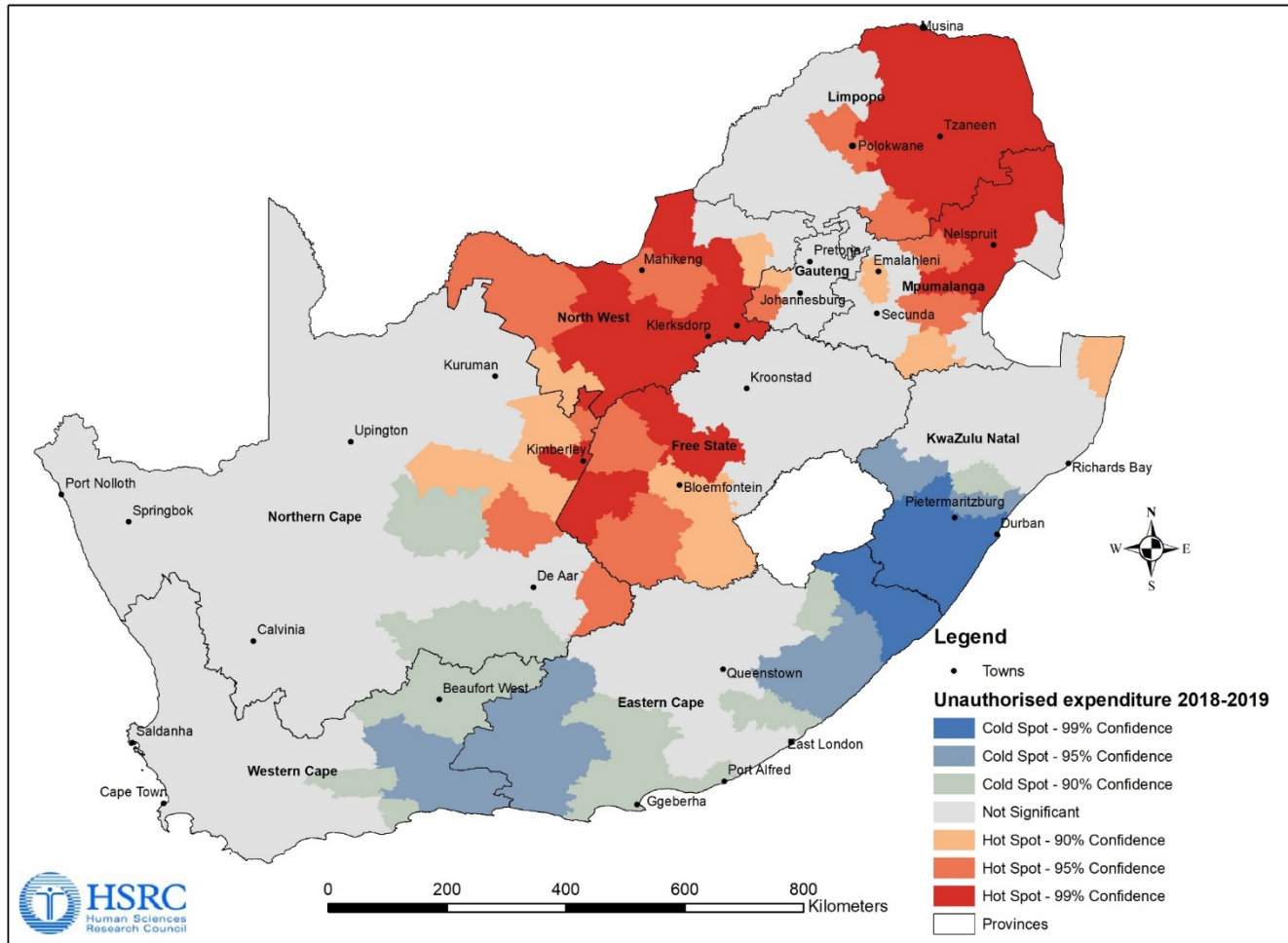


Between 2015 and 2017, statistically significant spatial clusters of high values (hot spots with 99% Confidence) of *unauthorised municipal expenditure* were found around the majority of municipalities in the Free State, in the south of the North-West, and a few in the north-eastern parts of the Northern Cape provinces. In total, 21 of the 213 audited municipalities were statistically significant hot spots. Statistically significant low values (cold spots with 95% Confidence) were found in the central parts of KwaZulu-Natal. For the remainder of the municipalities, the findings were not statistically significant.

**READ MORE** on the 2015-2017 audit outcomes

Data source: AGSA, 2015-2017

## Hot spot analysis: Unauthorised expenditure 2018-2019

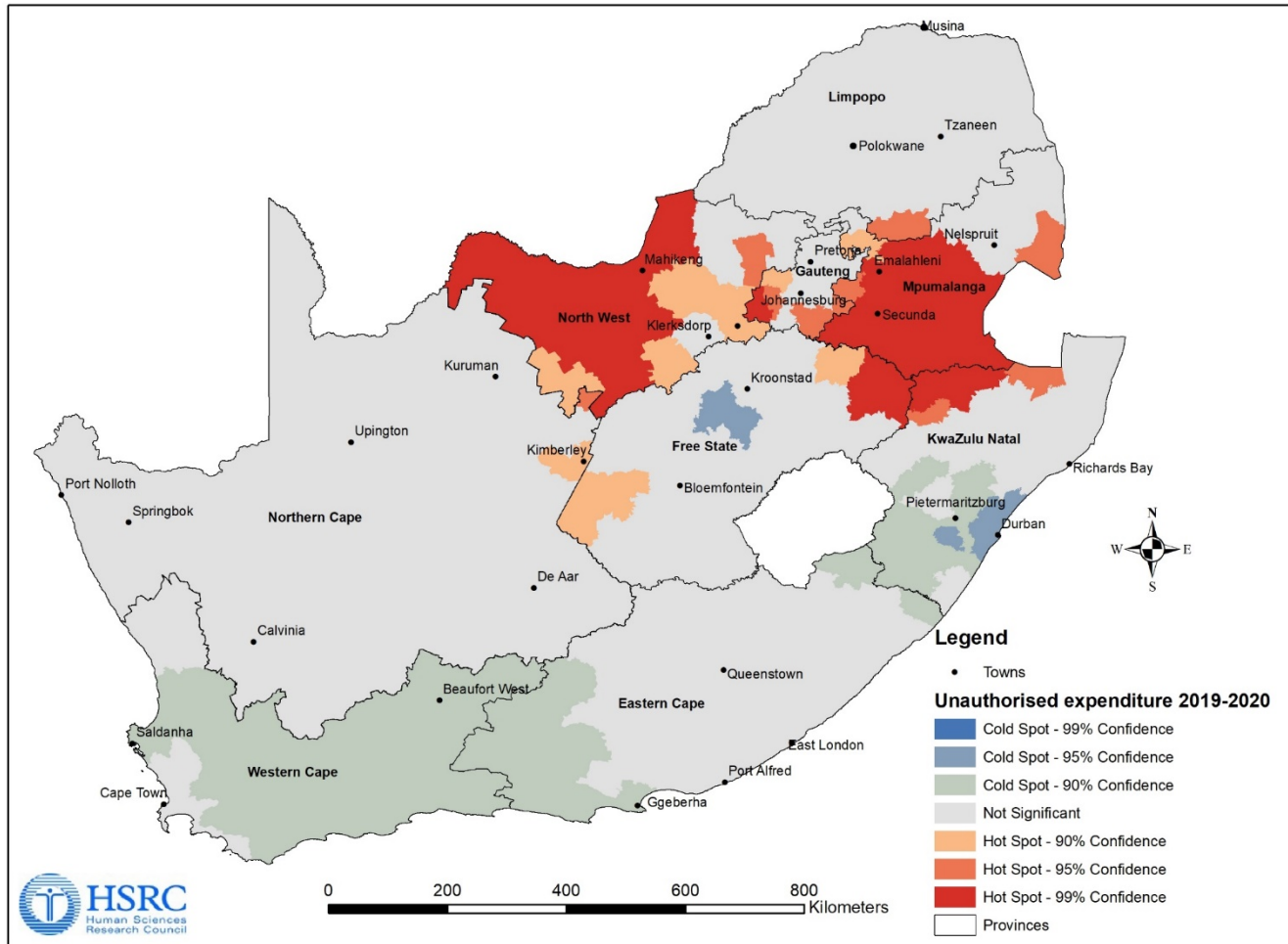


Between 2018 and 2019, statistically significant spatial clusters of high values (hot spots with 99% Confidence) relating to *unauthorised municipal expenditure* were found around municipalities in the east of Limpopo and Mpumalanga, almost all the municipalities in North-West, some to the south and south-west of the Free State, and a few to the north-eastern parts of the Northern Cape provinces (N=33). Statistically significant low values (cold spots with 99% Confidence) were found around municipalities in the south of KwaZulu-Natal, and some to the north-eastern parts of the Eastern Cape.

**READ MORE** on the 2018-2019 audit outcomes

Data source: AGSA, 2018-2019

## Hot spot analysis: Unauthorised expenditure 2019-2020



Between 2019 and 2020, statistically significant spatial clusters of high values (hot spots with 99% Confidence) relating to *unauthorised municipal expenditure* were found around most municipalities in North-West and Mpumalanga, with a few in Gauteng (N=23). Statistically significant low values (cold spots with 90% Confidence) were found in most of the Western Cape, and in the central and southern parts of KwaZulu-Natal.

**READ MORE on the 2019-2020 audit outcomes**

Data source: AGSA, 2019-2020



## Audit findings at a spatial glance

Traditional choropleth mapping, illustrates where municipalities with high *unauthorised expenditure* is located. Spatial statistics using a hot spot analysis, however, indicates that statistically significant hot spots extend beyond municipalities with high *unauthorised expenditure*. Such municipalities tend to cluster and in the latest year of analysis, was predominant in North-West, Limpopo and Mpumalanga. In total, 21 municipalities (out of the 213 audited) had statistically significant hot spots between 2015 and 2017, the figure increased to 33 between 2018 and 2019 and decreased to 23 between 2019 and 2020.

Conversely, statistical cold spot municipalities were mostly located in the Western Cape, Eastern Cape and southern parts of KwaZulu-Natal, while the concentration of *unauthorised expenditure* was not statistically significant in most of the municipalities in the country.

Source: AGSA, various years. *General report on the local government audit outcomes*. Pretoria.

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