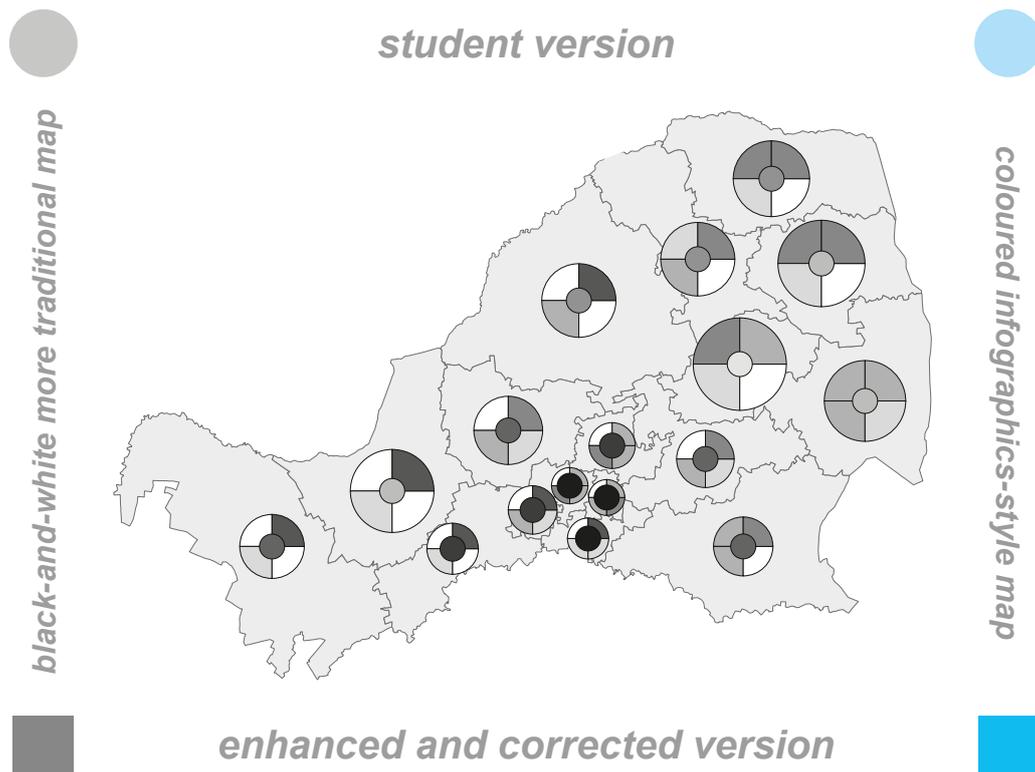


Teaching Multivariate Thematic Map Making

The example of socio-economic maps for Northern South Africa

Gertrud Schaab, Sybil Adams & Serena Coetzee



2020

URI: <http://hdl.handle.net/2263/75571>

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The maps' origin

In August 2017, University of Pretoria (UP) students of the Bachelor in Science Honours (BScHons) in Geoinformatics had the opportunity to participate in a two-week block course in thematic cartography (student workload: 15 credits, i.e. 150 notional hours). The offer meant a special opportunity for students to learn theoretical details and to gain hands-on training. By asking every student to come up with their own map depictions, we aimed at raising interest in thematic map making for revealing geographic patterns, as well as at demonstrating the creativity involved in map making.

The students had to elaborate two thematic maps based on the same but individually assigned statistical data: a black-and-white map following cartographic principles and rules, and a coloured map deploying infographics design elements. The objective was for students to present two contrasting maps for printing on an A4 sheet, considering the typical characteristics of the respective visualization medium. The statistical data covered socio-economic variables from the 2011 Census for the 17 district municipalities of the four most northern provinces of South Africa (North West, Gauteng, Limpopo, Mpumalanga). The seven participants opted for seven different map topics. Both maps had to be accompanied by appropriate text as an integral part of the map product and overall layout. All maps were created and designed using vector graphics software.

Due to the limited time period spent by the lecturer in South Africa, further guidance in skilful thematic map making was provided to the students by correcting and polishing their final map versions. The revised maps acted as final feedback and learning opportunity.

Purpose of the map collection

For each of the seven topics, four maps are now available: a black-and-white and a coloured student version, as well as an enhanced version of each, revised by a well-trained cartographer.

The collection of 28 maps offers a unique teaching aid to make students understand the power of thematic maps to reveal geographic patterns and relations. By discussing the maps, they can also be used indirectly to teach students how to create convincing maps. In particular, the effects of the chosen cartographic representation method can be demonstrated and that diversity of visualization options matters when telling a story with a map. Moreover, by juxtaposing the student versions with those corrected by cartographically experienced map makers, the impacts of correctly applied cartographic principles can be revealed. Therefore, the map collection can also serve as a teaching tool for conveying potential misinterpretations by map readers as a consequence of flaws in the map making process.

With the recently experienced increased recognition or even popularity of thematic mapping, this set of maps can help to draw students' attention to complex maps by getting them intrigued about a map's ability to make hidden information visible and about maps as visual means for telling a story. In this context, attractive design helps.

Note that the accompanying text on the revised maps was generally corrected only for obvious mistakes. Further and more detailed information on the teaching approach and the maps are provided in two scientific papers.

Scientific publications

Schaab, G., S. Adams & S. Coetzee (2020): Conveying map finesse: thematic map making essentials for today's university students. *Journal of Geography in Higher Education*, <https://doi.org/10.1080/03098265.2020.1850656>.

Schaab, G., S. Adams & S. Coetzee (2021): Drawing attention via diversity in thematic map design, as demonstrated by student maps of Northern South Africa. *International Journal of Cartography*, <https://doi.org/10.1080/23729333.2020.1839207>.

Acknowledgement

Thanks to the UP students of the BScHons Geoinformatics programme who participated in the Thematic Cartography course in August 2017 for their willingness to widely share the maps. We are grateful for Prof. Dr. Gertrud Schaab's two visits to the Department of Geography, Geoinformatics and Meteorology, supported by the University of Pretoria's Visiting Professor Programme.

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Maps on socio-economic topics in Northern South Africa

1) on the topic, Communication Access:

- The Status of Communication Access in Northern South Africa in 2011
(black-and-white more traditional map, student version)..... 6
- The Status of Communication Access in Northern South Africa in 2011
(black-and-white more traditional map, enhanced and corrected version) 7
- The Age of the Cell Phone in Northern South Africa
(coloured infographics-style map, student version)..... 8
- The Age of the Cell Phone in Northern South Africa
(coloured infographics-style map, enhanced and corrected version)..... 9

2) on the topic, Highest Education Level:

- Highest Educational Level in the Northern Municipalities of South Africa 2011
(black-and-white more traditional map, student version)..... 10
- Highest Educational Level in the Northern Municipalities of South Africa 2011
(black-and-white more traditional map, enhanced and corrected version) 11
- Climbing the Education Ladder. Highest Educational Level Reported in the Northern
Municipalities of South Africa 2011 (coloured infographics-style map, student version).... 12
- Climbing the Education Ladder. Highest Educational Level Reported in the Northern
Municipalities of South Africa 2011 (coloured infographics-style map,
enhanced and corrected version) 13

3) on the topic, Languages:

- Native Languages in the Northern Municipalities of South Africa
(black-and-white more traditional map, student version)..... 14
- Native Languages in the Northern Municipalities of South Africa
(black-and-white more traditional map, enhanced and corrected version) 15
- The Spread of Languages of the Limpopo Province across Northern South Africa
(coloured infographics-style map, student version)..... 16
- The Spread of Languages of the Limpopo Province across Northern South Africa
(coloured infographics-style map, enhanced and corrected version)..... 17

4) on the topic, Water Source:

- Main Sources of Water in the Water-Scarce Region of Northern South Africa (black-and-white more traditional map, student version)..... 18
- Main Sources of Water in the Water-Scarce Region of Northern South Africa (black-and-white more traditional map, enhanced and corrected version) 19
- Water: A Source of Life. Use of the Regional Water Scheme and Other Major Water Sources in the Northern Municipalities of South Africa (coloured infographics-style map, student version)..... 20
- Water: A Source of Life. Use of the Regional Water Scheme and Other Major Water Sources in the Northern Municipalities of South Africa (coloured infographics-style map, enhanced and corrected version)..... 21

5) on the topic, Population Groups:

- Population Groups in the Northern Provinces of South Africa (black-and-white more traditional map, student version)..... 22
- Population Groups in the Northern Provinces of South Africa (black-and-white more traditional map, enhanced and corrected version) 23
- Population Groups in the Limpopo, North West, Gauteng and Mpumalanga Provinces (coloured infographics-style map, student version)..... 24
- Population Groups in the Limpopo, North West, Gauteng and Mpumalanga Provinces (coloured infographics-style map, enhanced and corrected version)..... 25

6) on the topic, Cooking Fuel:

- Cooking Fuel Use in the Northern Provinces of South Africa in 2011 (black-and-white more traditional map, student version)..... 26
- Cooking Fuel Use in the Northern Provinces of South Africa in 2011 (black-and-white more traditional map, enhanced and corrected version) 27
- Main Fuel Used for Cooking in the Northern Provinces of South Africa (coloured infographics-style map, student version)..... 28
- Main Fuel Used for Cooking in the Northern Provinces of South Africa (coloured infographics-style map, enhanced and corrected version)..... 29

7) on the topic, Refuse Removal:

- Refuse Disposal Methods in the Northern Municipalities of South Africa (black-and-white more traditional map, student version)..... 30
- Refuse Disposal Methods in the Northern Municipalities of South Africa (black-and-white more traditional map, enhanced and corrected version) 31
- Refuse Disposal in Northern South Africa (coloured infographics-style map, student version)..... 32
- Refuse Disposal in Northern South Africa (coloured infographics-style map, enhanced and corrected version)..... 33

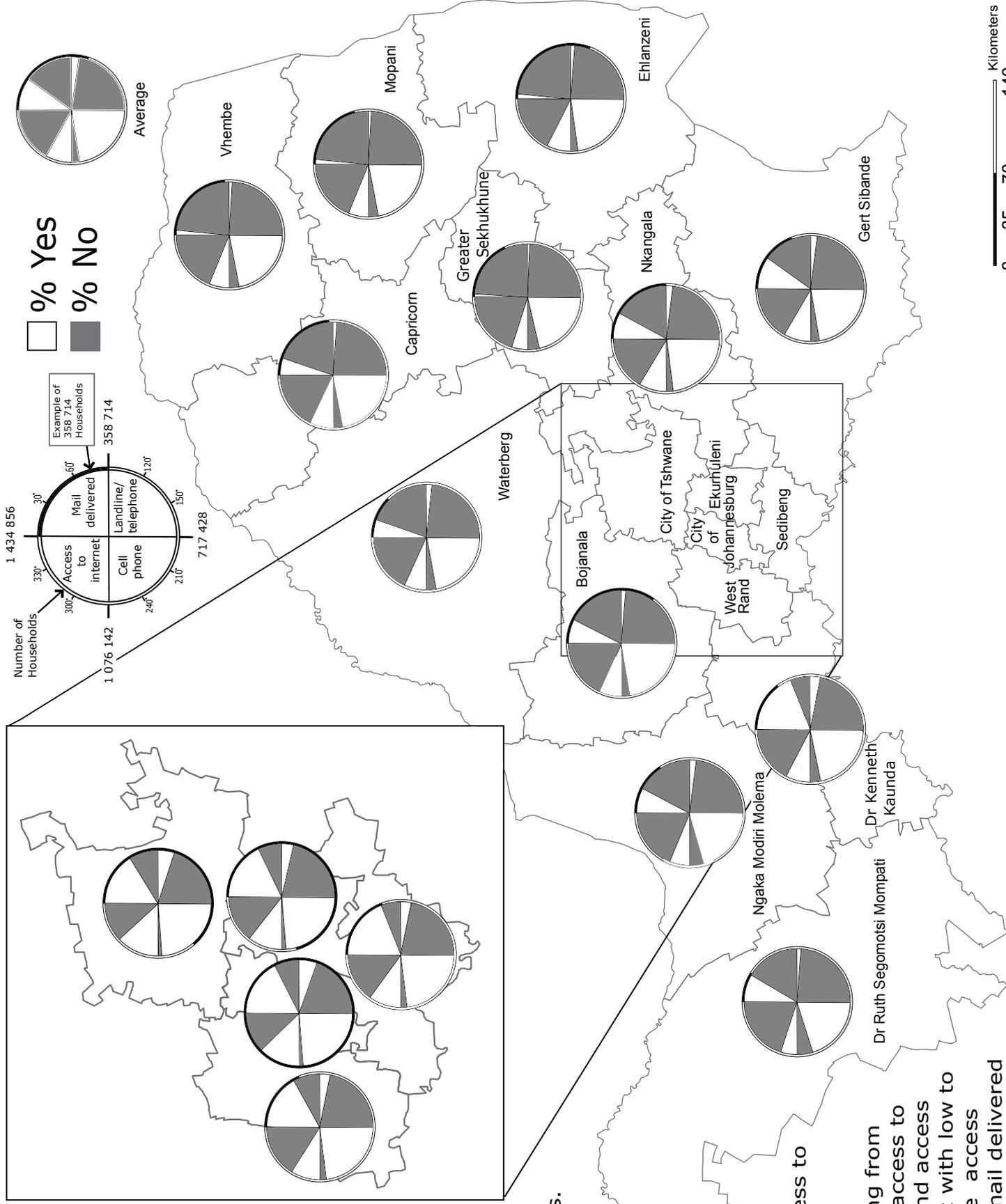
A glimpse into the status of communication access in Northern South-Africa

Northern South Africa's status of communication to access is a very rich and diverse occurrence.

This map highlights this phenomena. Northern South-Africa consist out of Gauteng, North West, Limpopo and Mpumalanga. Each symbol has 4 quadrants representing the 4 categories (mail delivered at their residence, access to a landline/telephone, access to the internet and access to a cell phone) in a yes versus no percentage. The outer circle represents the amount of households.

Half of the of households receive their mail at their residence, with very few having access to a landline/telephone. Half of the households have access to the internet and the majority has access to a cell phone.

A trend is seen when going from north-east with very low access to landline, mail delivered and access to internet, to south-west with low to sometimes above average access to a landline/telephone, mail delivered and access to the internet

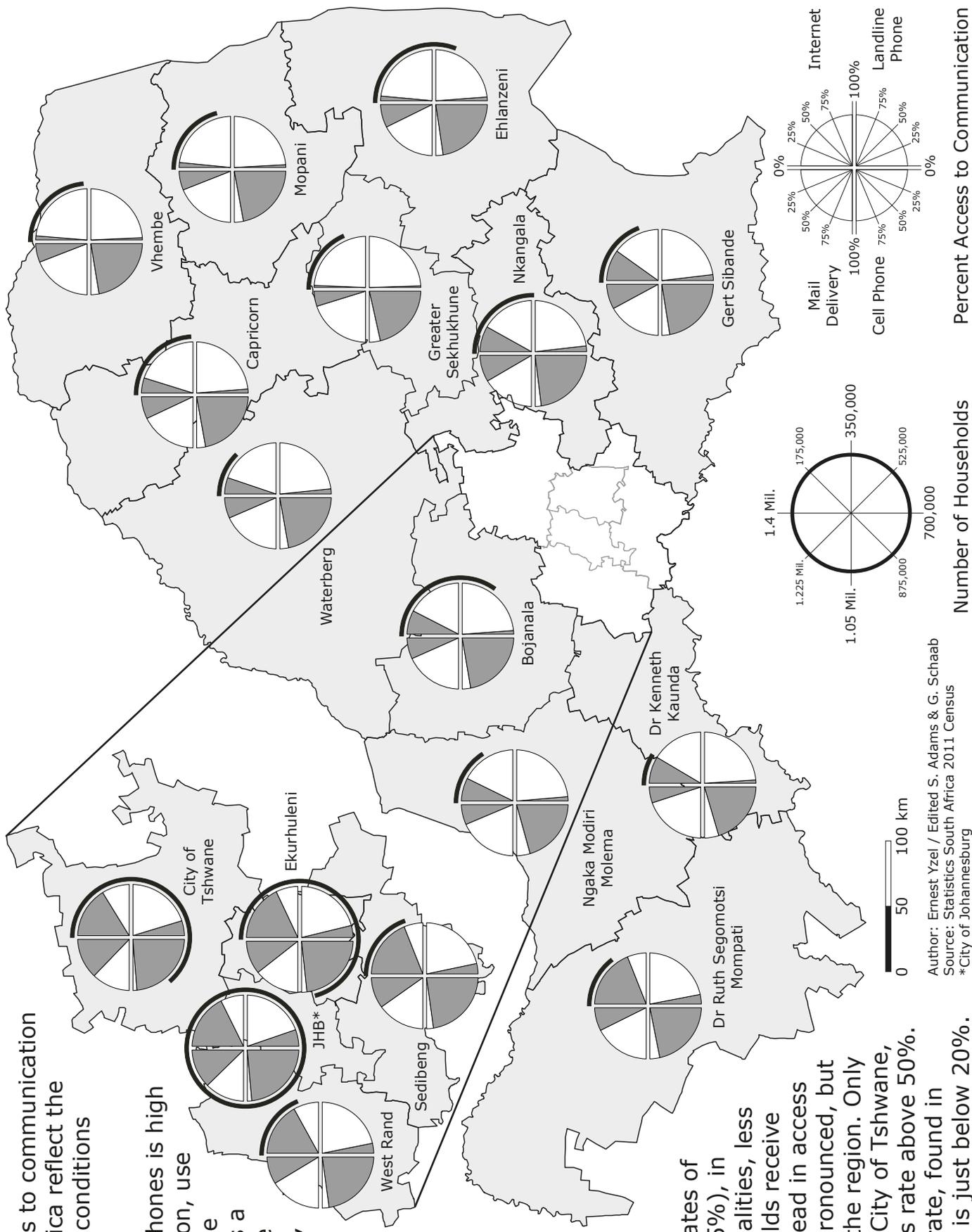


The Status of Communication Access in Northern South Africa in 2011

The patterns of access to communication in northern South Africa reflect the diverse lifestyles and conditions across the region.

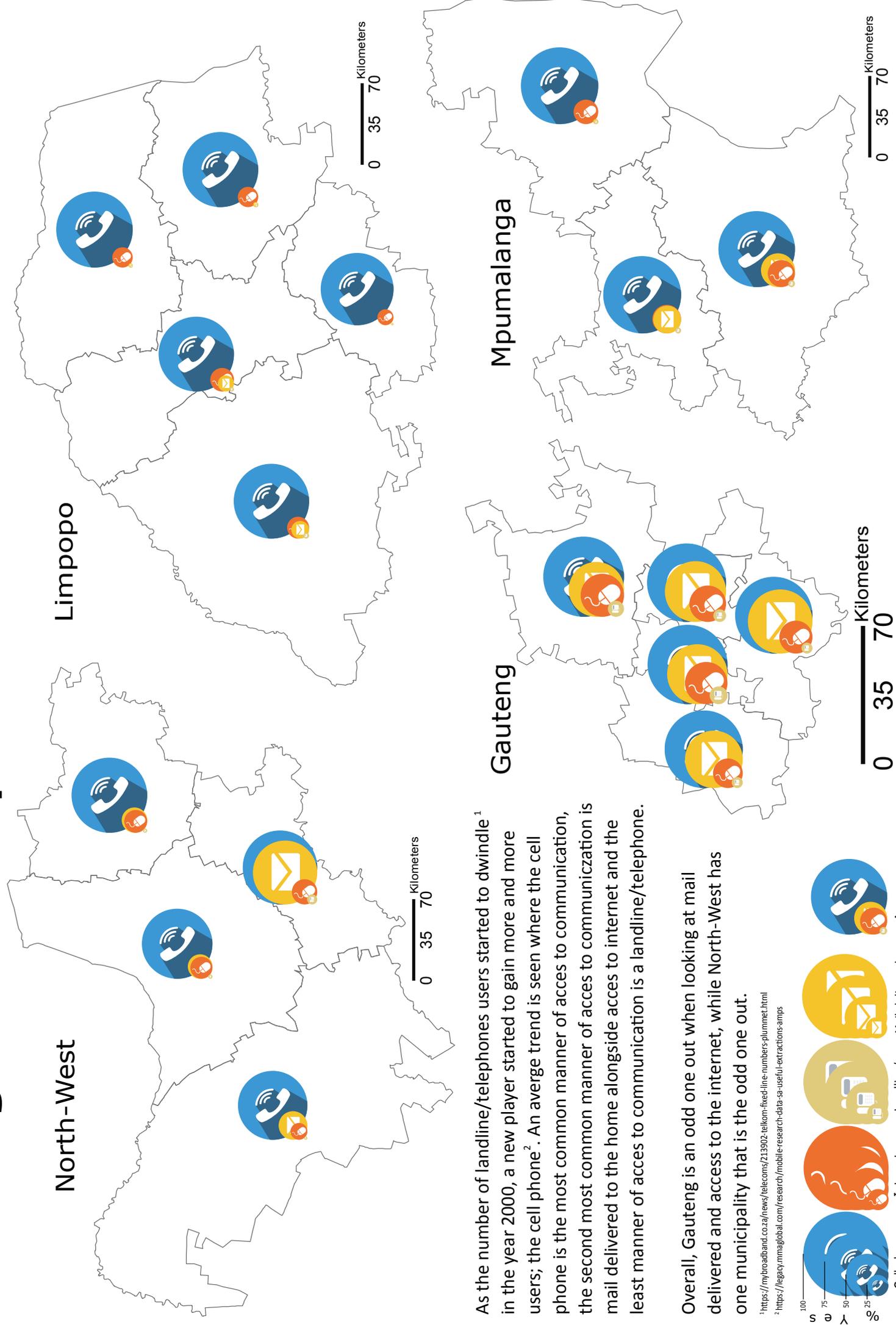
While access to cell phones is high across the entire region, use of landlines is low. The Gauteng province has a noticeable higher rate of access to landlines, likely related to the higher population and population density of the area.

Access to the internet and to mail delivery varies greatly across the region. While the municipalities of Gauteng, as well as one municipality in North West province, have relatively high rates of mail delivery (over 65%), in several other municipalities, less than 10% of households receive mail delivery. The spread in access to internet is not as pronounced, but relatively low across the region. Only one municipality, the City of Tshwane, has an internet access rate above 50%. However, the lowest rate, found in Greater Sekhukhune, is just below 20%.



Author: Ernest Yzel / Edited S. Adams & G. Schaab
 Source: Statistics South Africa 2011 Census
 *City of Johannesburg

The age of the cell phone in Northern South Africa



As the number of landline/telephones users started to dwindle¹ in the year 2000, a new player started to gain more and more users; the cell phone². An average trend is seen where the cell phone is the most common manner of access to communication is the second most common manner of access to communication is mail delivered to the home alongside access to internet and the least manner of access to communication is a landline/telephone.

Overall, Gauteng is an odd one out when looking at mail delivered and access to the internet, while North-West has one municipality that is the odd one out.

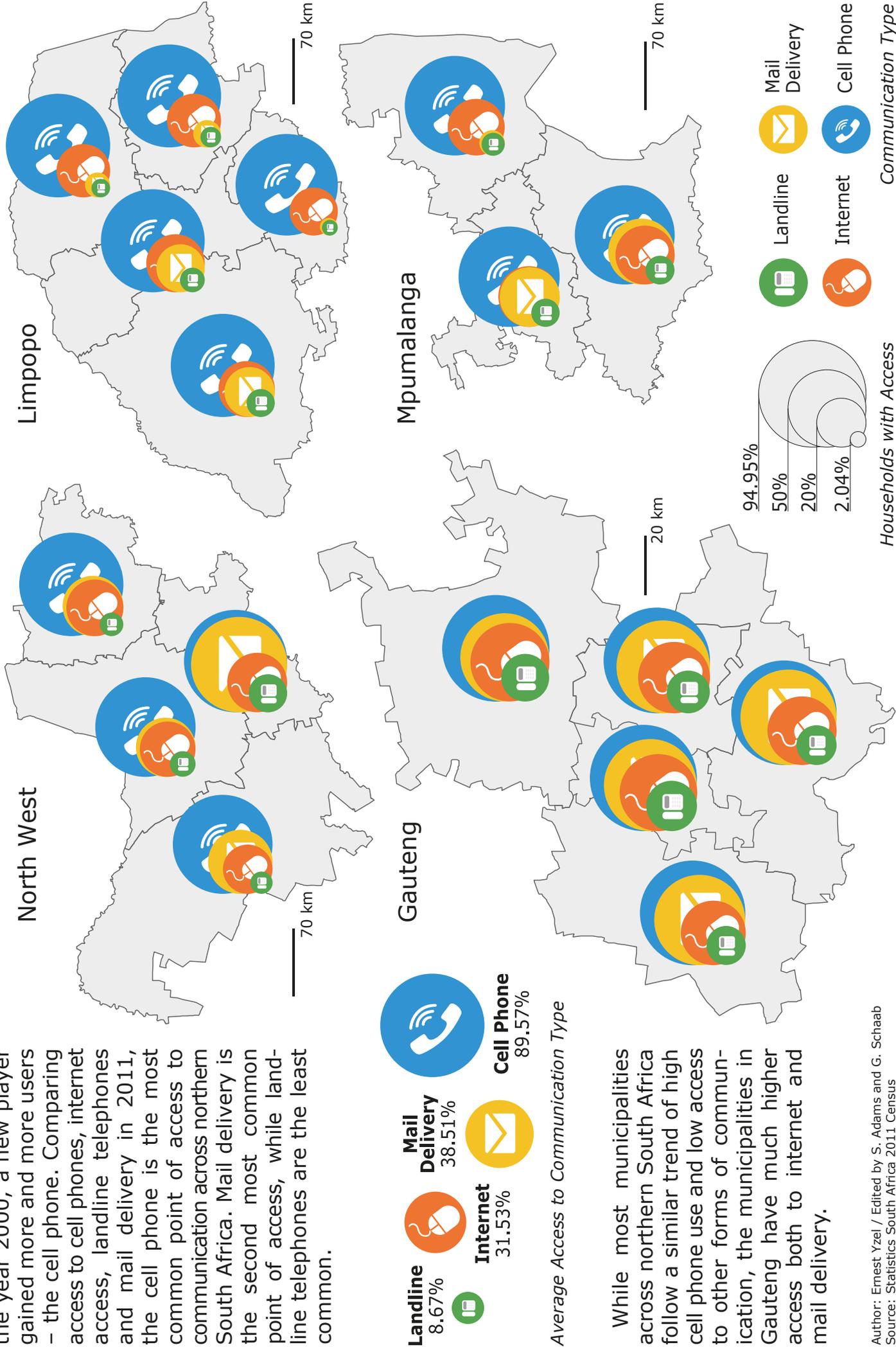
¹ <https://mybroadband.co.za/news/telecoms/213902/telkom-fixed-line-numbers-plummet.html>
² <https://legacy.mmajournal.com/research/mobile-research-data-sa-useful-extractions-amps>

100
75
50
25
0

- Cell phone
- Internet
- Landline/telephone
- Mail delivered
- Average

The Age of the Cell Phone in Northern South Africa

As the number of landline users started to dwindle in the year 2000, a new player gained more and more users – the cell phone. Comparing access to cell phones, internet access, landline telephones and mail delivery in 2011, the cell phone is the most common point of access to communication across northern South Africa. Mail delivery is the second most common point of access, while landline telephones are the least common.



While most municipalities across northern South Africa follow a similar trend of high cell phone use and low access to other forms of communication, the municipalities in Gauteng have much higher access both to internet and mail delivery.

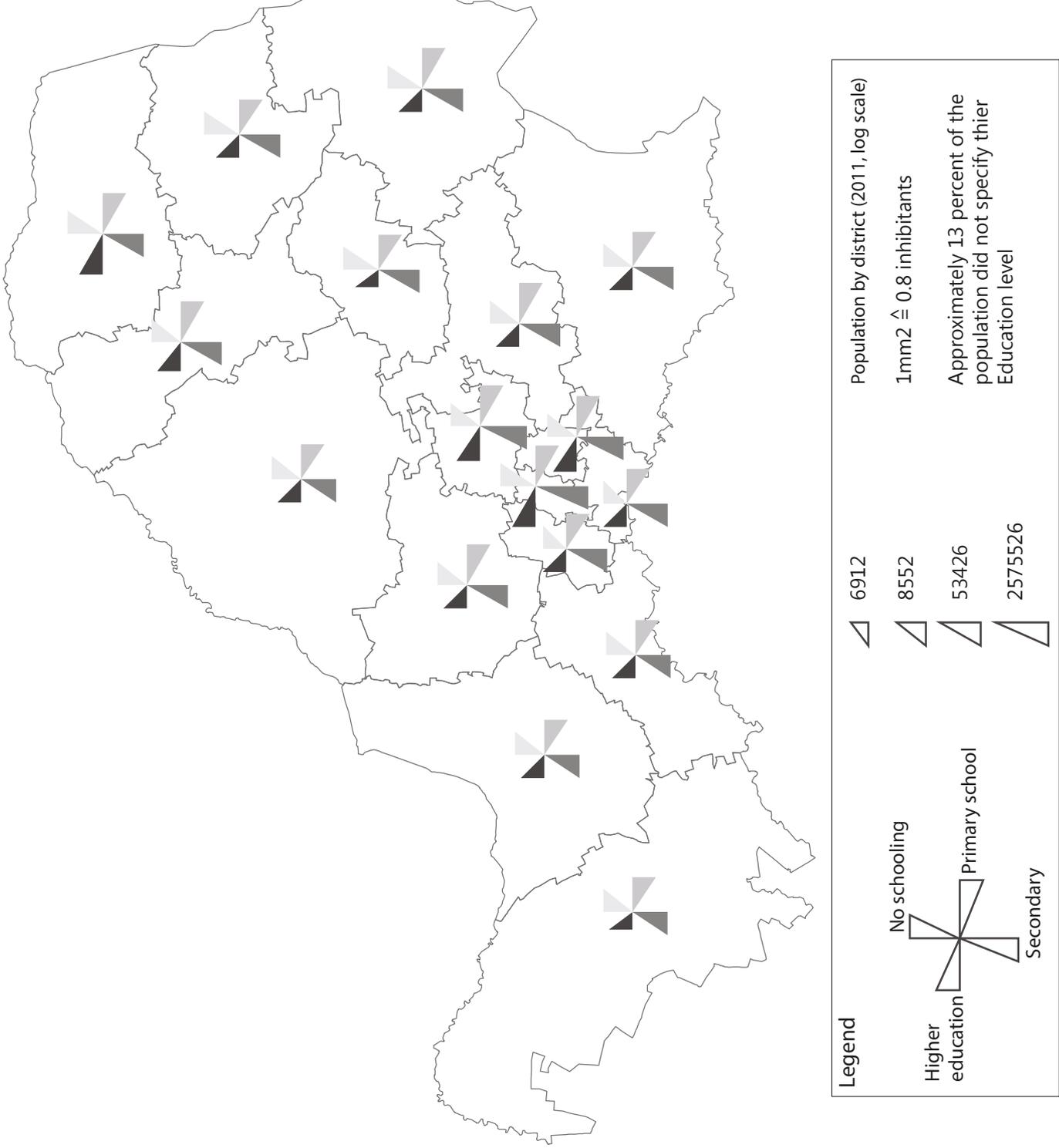
Highest education levels in selected South African Districts

Education has always been the backbone of a nation. It is a gateway for students to realize their full potential and contribute to the development of a nation. However, over the past decade, the unfortunate reality is that the income gap has widened between South African families and educational outcomes are one of the key areas influenced by family incomes.

Taking note of high dropout rate in primary and secondary schools, the Government has ordered the Department of Education officials to reverse the trend or face the music. Notably, in the Northern parts of South Africa, in around 17 districts, statistics reveal that 12 995 967 people had secondary school leaving qualification. Of all the people that had secondary school leaving qualifications, only 1 231 986 managed to make it through tertiary – showing an alarming rate of 91 % of learners either dropping out of the system altogether or remaining stuck with secondary school leaving qualifications

This pattern is visible across every district in this part of the country, where the drop-out rate even reaches as high as 96% in Dr Ruth Segomotsi Mompati district. Also, in the year 2011, statistics showed that over 6.2 million learners from these districts combined, finished primary school. Speaking in Parliament today, the Minister for basic education Angie Motshekga said she was rather surprised by the findings, as records for the last 10 years show that enrolments in primary and secondary school has been increasing at an average of 10 to 15 percent in these districts. Her records also show an increase in the number of primary and secondary schools over the years, despite the backlogs.

However, while enrolment and school facilities are increasing, some children remain out of school and there are still many cases of drop-outs. The Minister has issued a stern warning to all the Department of Education officials working in this region and has instructed them to find out reasons behind these high dropout rates in schools and improve them accordingly by making effective plans.



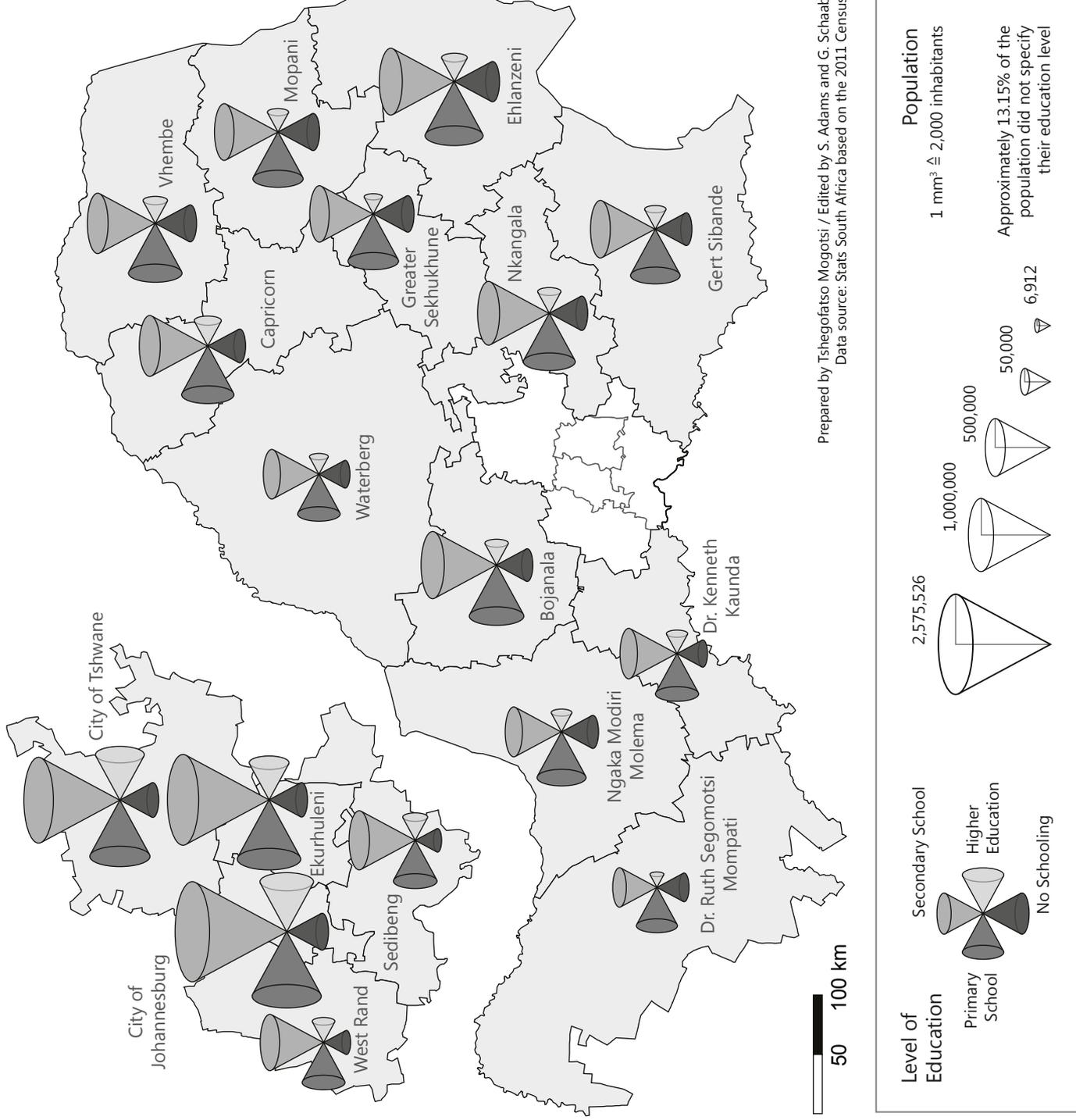
Highest Educational Level in the Northern Municipalities of South Africa 2011

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Climbing the education ladder

(Averages)

Higher education = 4 %

Secondary level = 48 %

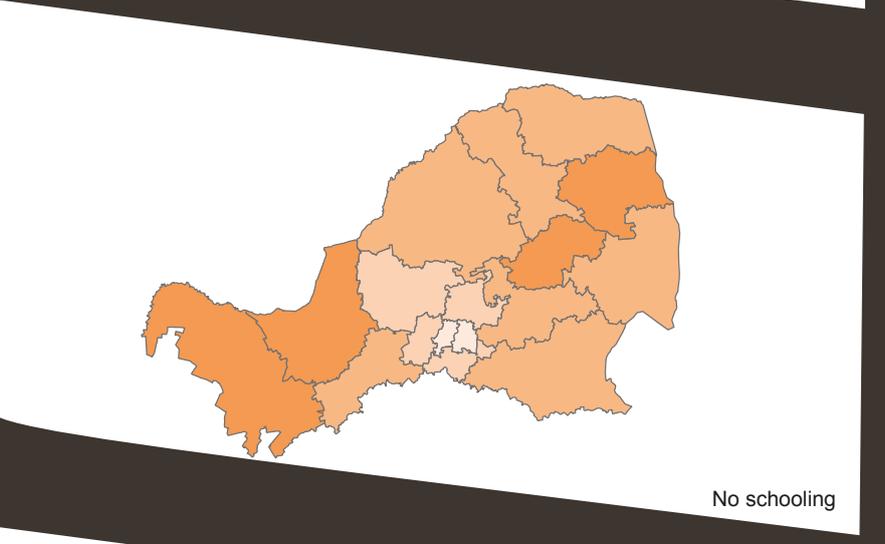
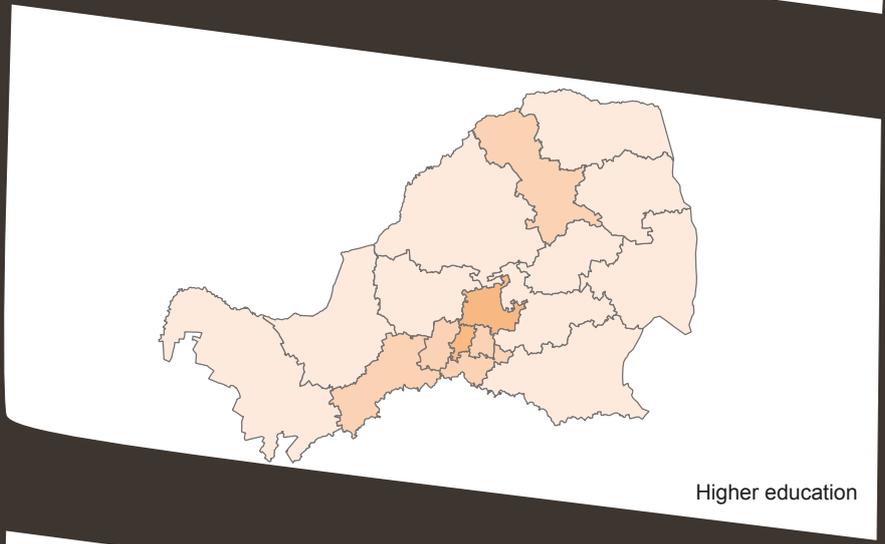
Primary level = 27%

No schooling = 8 %

0 150km

Legend
Education level per district municipality

- 60 - 53 %
- 52 - 48 %
- 47 - 39 %
- 38 - 31 %
- 30 - 25 %
- 24 - 14 %
- 13 - 11 %
- 10 - 7%
- 6 - 4%
- 3- 1%



Climbing the Education Ladder

Highest Educational Level Reported in the Northern Municipalities of South Africa 2011



Higher education:
3.62%

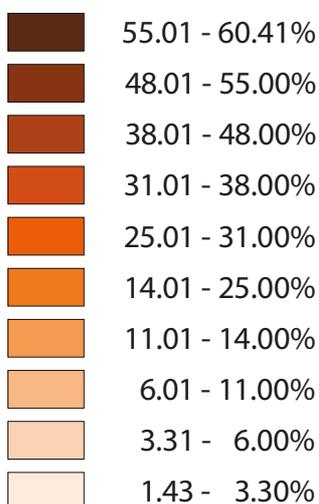
Secondary School:
48.42%

Primary School:
27.35%

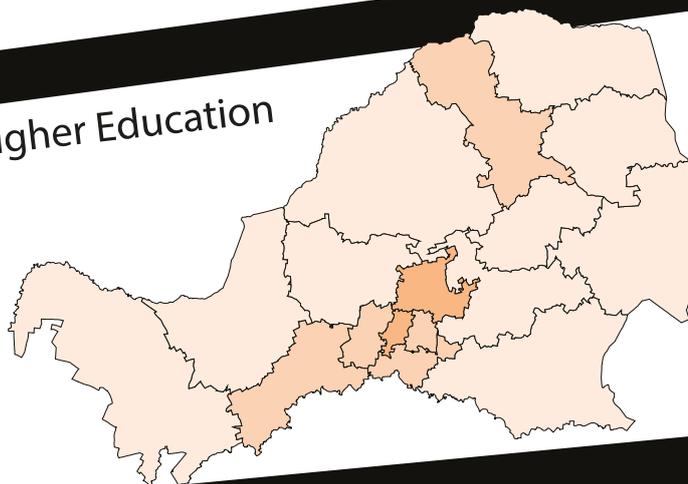
No Schooling:
7.74%



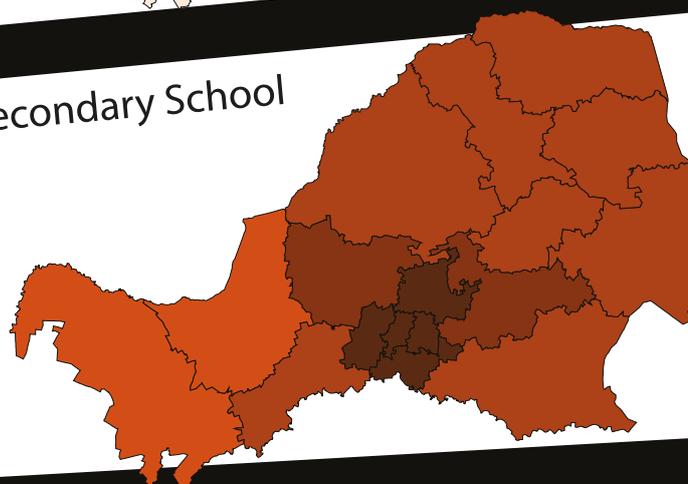
Percent of Individuals at Educational Level



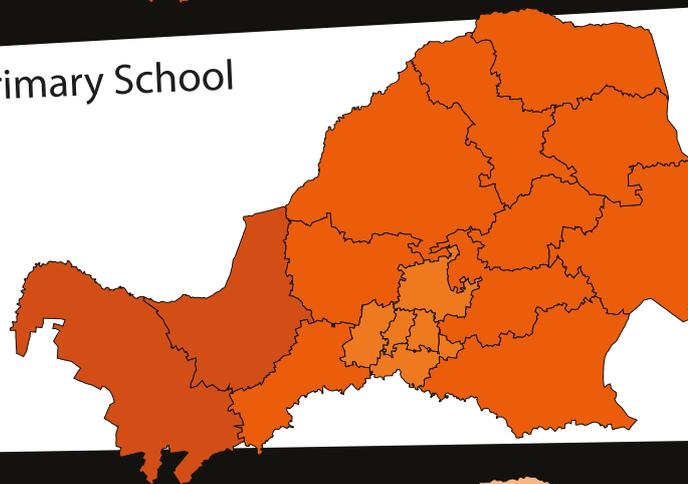
Higher Education



Secondary School



Primary School

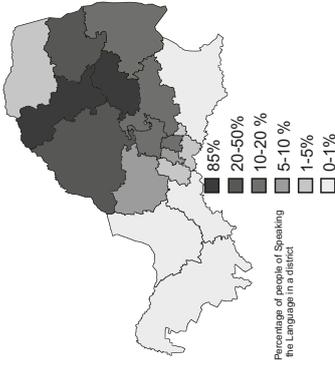


No Schooling

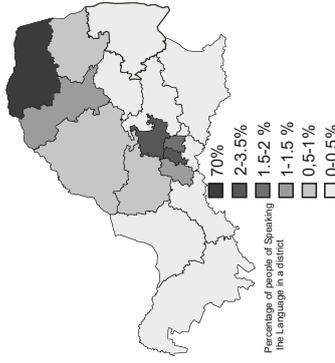


0 100 km

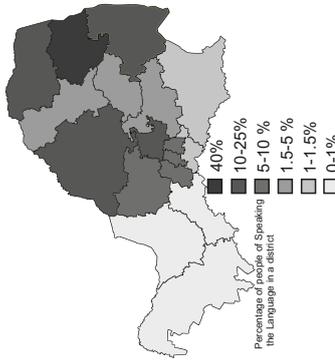
SEPEDI



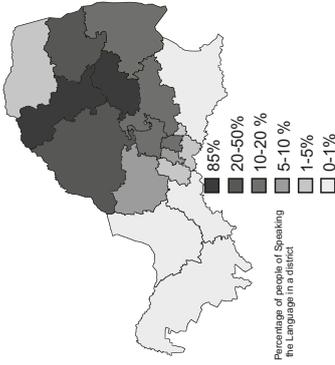
TSHIVENDA



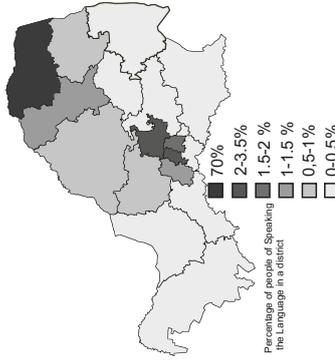
XITSONGA



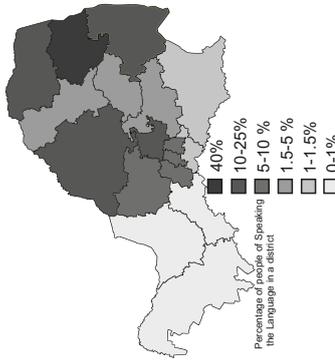
ENGLISH



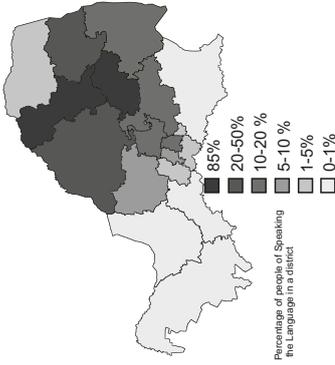
AFRIKAANS



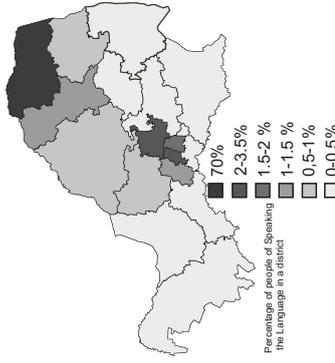
ISINDEBELE



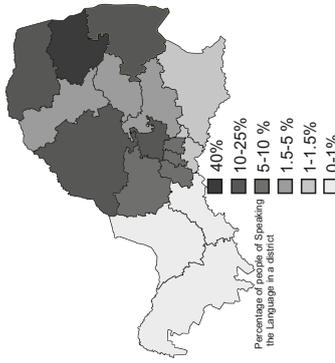
SESOTHO



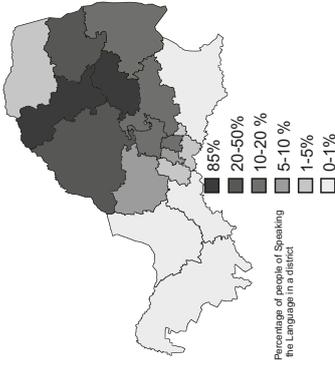
SETSWANA



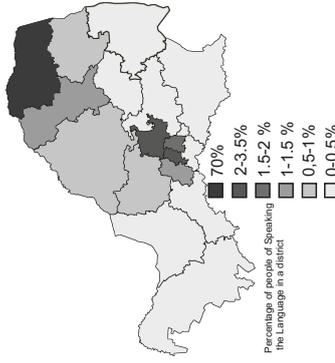
OTHER



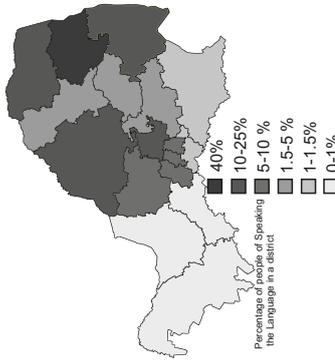
ISIXHOSA



ISIZULU



SESWATI



Language Distribution in South Africa

By Roselinah Mohlasedi

South Africa has eleven official languages: **Afrikaans, English, isiNdebele, Sepedi, Sesotho, Swazi, Tsonga, Setswana, Tshivenda, IsiXhosa and Isizulu.**

Due to historical dimensions in South Africa most of the languages in South Africa were only spoken by in their place of origin with exemption of the Gauteng region. However post 1994 with the shift of the political landscape in South Africa, people are free to move around the country for various reasons resulting with most people being able to speak more than one language.

English is currently being used as the medium of communication even at institutions of learning with a few of institutions still using both English and Afrikaans. The interesting part is that the 2010 statistics point out the fact that English and Afrikaans do not have dominance over the other native languages despite their status as a medium of

communication.

As indicated by the maps most of the languages are dominantly spoken around their place of origin and around the City of Johannesburg, City of Tswane and Erkhuruleni district (Gauteng). The reason for the distribution around the Gauteng is mainly because, this is the Economic hub of South Africa and people move from the rural areas to this urban area in search for employment. As indicated by the data which only covers 17 districts, most languages are spreading throughout South Africa. It is important to note that our data does not cover the whole of South Africa so the results are not inconclusive. There are other languages which are spoken in South Africa but are not classified as official languages. Some of the other languages originated in South Africa and others are from some other parts of Africa introduced to South Africa by foreign people.

Native Languages in the Northern Municipalities of South Africa

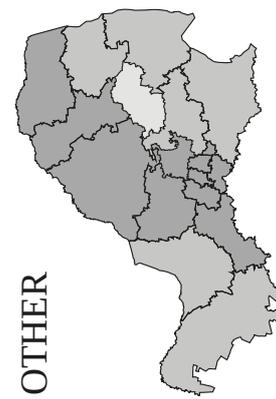
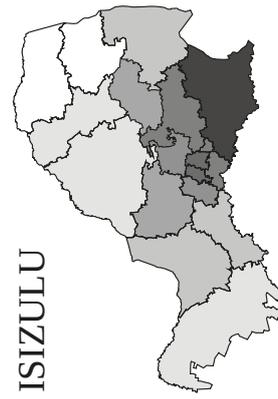
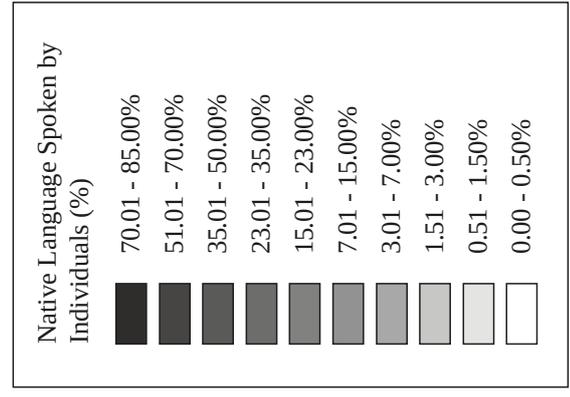
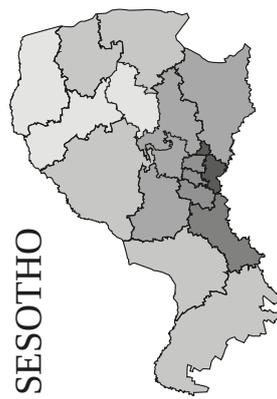
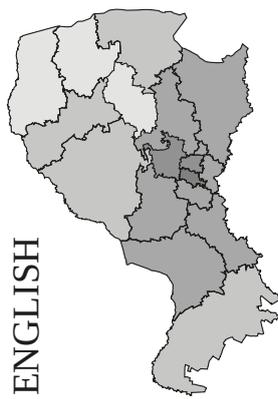
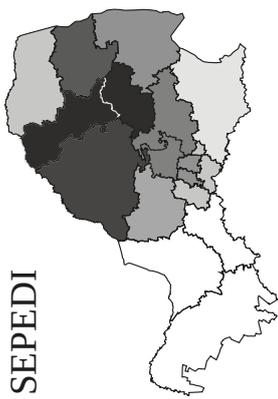
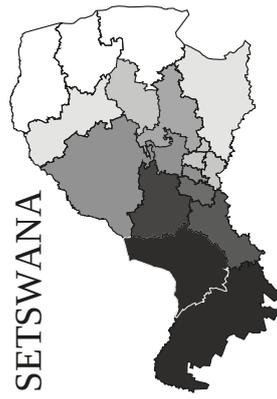
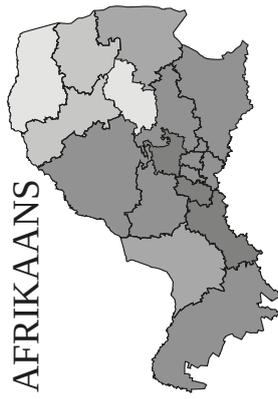
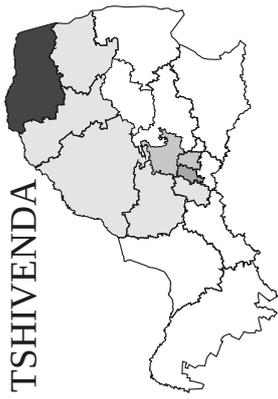
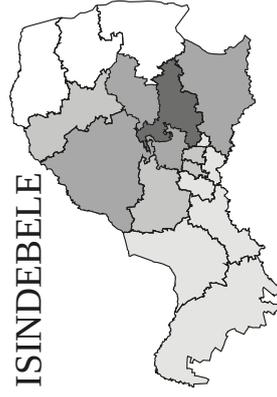
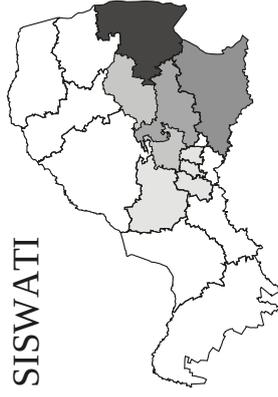
As indicated by the maps, most of the languages are dominantly spoken around their place of origin, but also within the City of Johannesburg, City of Tshwane and the Ekurhuleni district, all in Gauteng. The reason for this distribution is mainly because it is the economic hub of South Africa, and people move from the rural areas to this urban area in search of employment.

As indicated by this dataset, covering seventeen municipalities in South Africa, most of the native languages have spread out beyond their place of origin.

Other languages are also spoken in South Africa beyond those presented here, either originating within the country, or brought in by foreigners.

South Africa has eleven official languages: Sepedi, Tshivenda, Xitsonga, English, Afrikaans, SiSwati, Sesotho, Setswana, IsiNdebele, IsiXhosa and IsiZulu. Due to historical dimensions in South Africa, most of the languages were only spoken in their place of origin, with the exception of the Gauteng region. However, post 1994, with the shift of the political landscape in South Africa, people were more free to move around the country for various reasons, enabling most people to speak more than one language.

English is currently used as the main medium of communication, even at institutions of learning, with a few institutions using both English and Afrikaans. It is notable that English and Afrikaans do not have dominance over the other native languages, despite their status as a main medium of communication.



Prepared by Roselinah Mohlasedi /
 Edited by S. Adams and G. Schaab
 Data Source: Statistics South Africa
 Census 2011 Community Profiles

LIMPOPO LANGUAGES FROM LIMPOPO

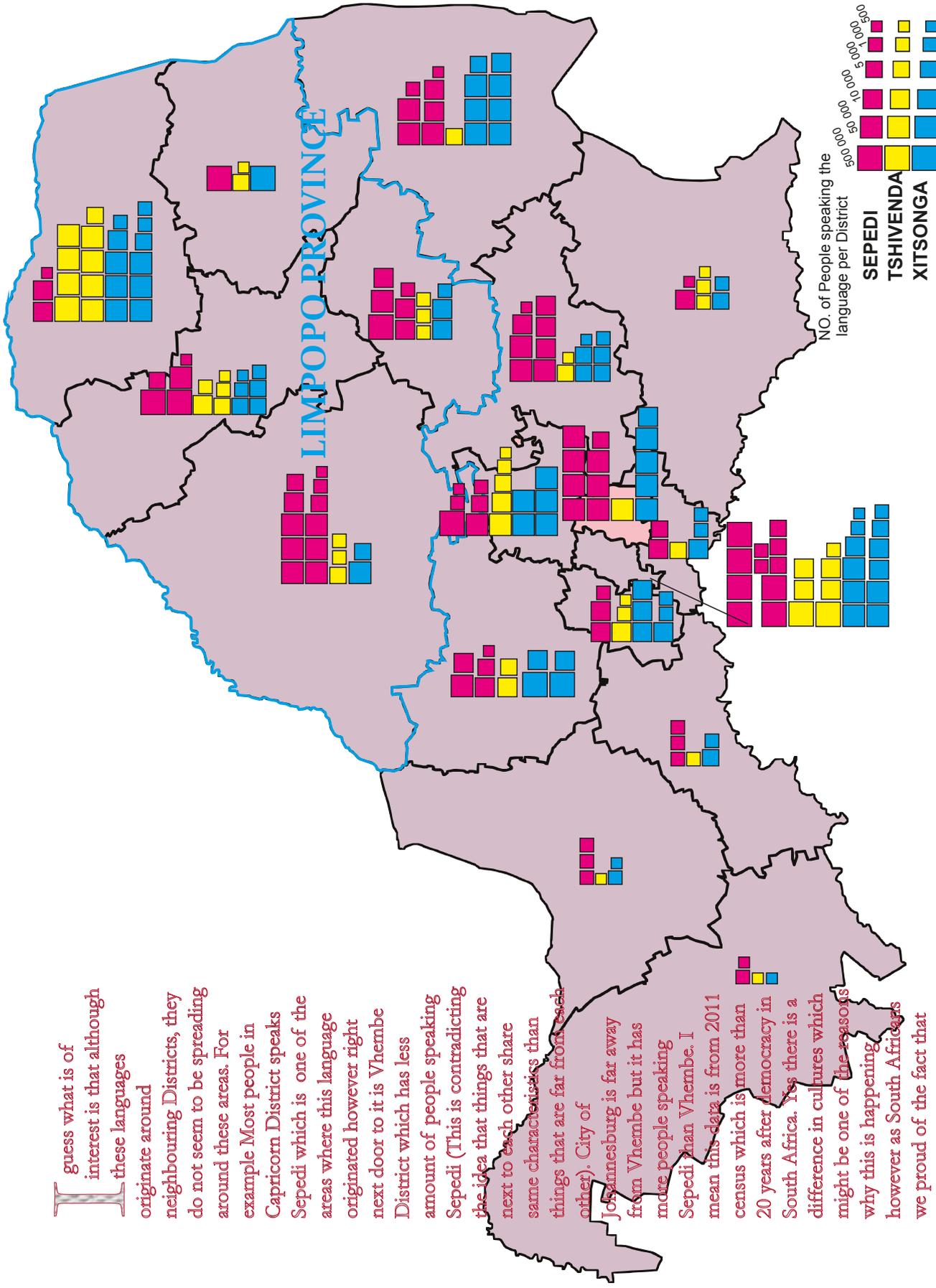
BY ROSELINAH MOHLASEDI

Limpopo is a province situated north in the map. Three of the official languages have their origins in this province (Sepedi, Tshivenda and Xitsonga).

As indicated by the Infographic these languages have spread throughout South Africa. These languages are predominantly used in Limpopo province because that is where they have their origins and Gauteng province because of it being an economic hub for South Africa. The three languages are spoken dominantly around the Gauteng region which also shows a trend of Limpopo not have many opportunities for people to better their lives. This is also supported by the Census which indicated that Limpopo has high levels of poverty.

SEPEDI, TSHIVENDA, XITSONGA

I guess what is of interest is that although these languages originate around neighbouring Districts, they do not seem to be spreading around these areas. For example Most people in Capricorn District speaks Sepedi which is one of the areas where this language originated however right next door to it is Vhembe District which has less amount of people speaking Sepedi (This is contradicting the idea that things that are next to each other share same characteristics than things that are far from each other). City of Johannesburg is far away from Vhembe but it has more people speaking Sepedi than Vhembe. I mean this data is from 2011 census which is more than 20 years after democracy in South Africa. Yes there is a difference in cultures which might be one of the reasons why this is happening however as South Africans we proud of the fact that we are a very diverse country and we try to embrace it every single day.



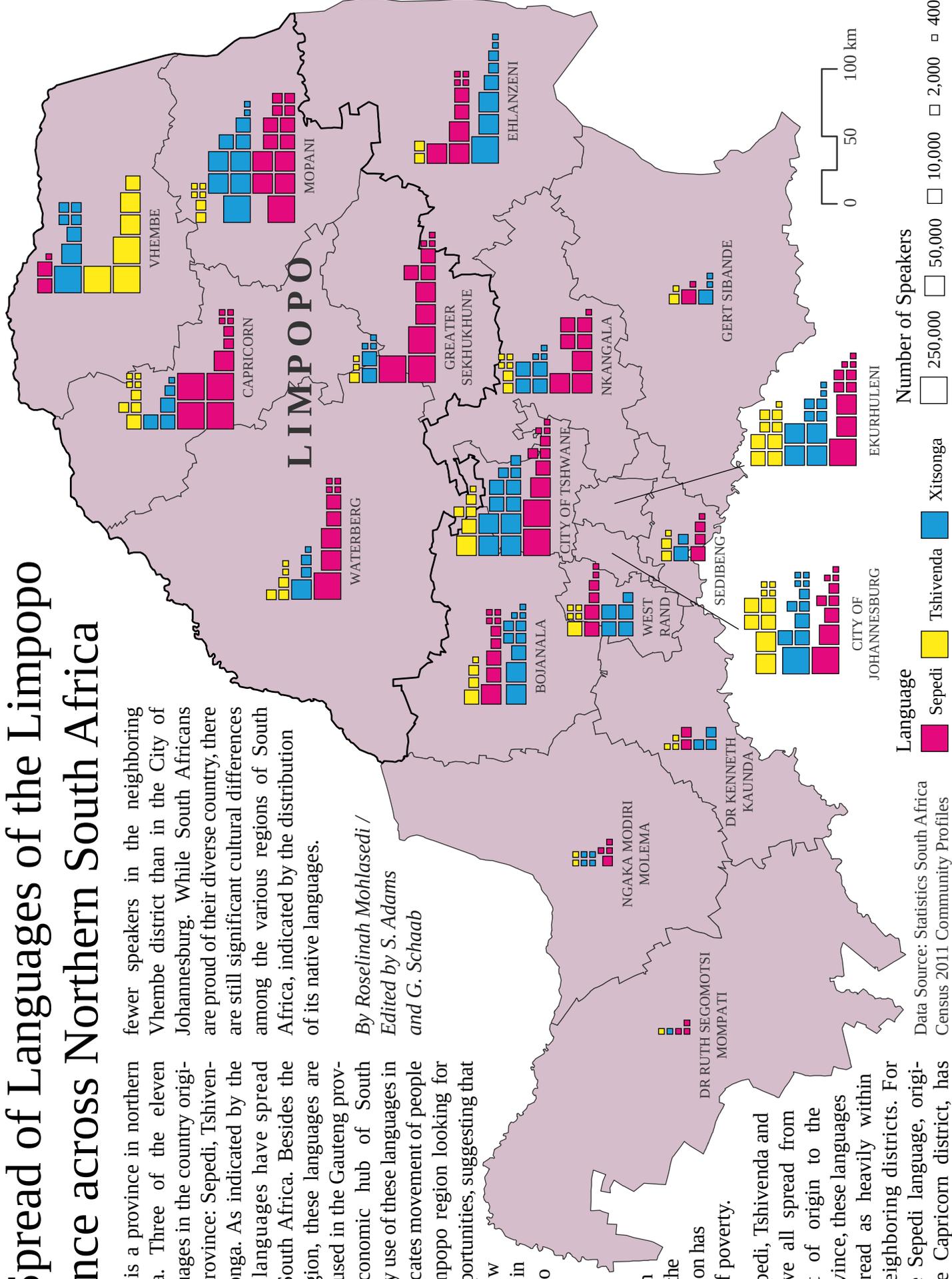
The Spread of Languages of the Limpopo Province across Northern South Africa

Limpopo is a province in northern South Africa. Three of the eleven official languages in the country originate in this province: Sepedi, Tshivenda and Xitsonga. As indicated by the map, these languages have spread throughout South Africa. Besides the Limpopo region, these languages are also heavily used in the Gauteng province, the economic hub of South Africa. Heavy use of these languages in Gauteng indicates movement of people from the Limpopo region looking for economic opportunities, suggesting that there are few opportunities in the Limpopo region. This is supported by the 2011 Census, which indicated that the Limpopo region has high levels of poverty.

While Sepedi, Tshivenda and Xitsonga have all spread from their district of origin to the Gauteng Province, these languages have not spread as heavily within their own neighboring districts. For example, the Sepedi language, originating in the Capricorn district, has

fewer speakers in the neighboring Vhembe district than in the City of Johannesburg. While South Africans are proud of their diverse country, there are still significant cultural differences among the various regions of South Africa, indicated by the distribution of its native languages.

By Roselinah Mohlasedi /
 Edited by S. Adams
 and G. Schaab



Data Source: Statistics South Africa
 Census 2011 Community Profiles

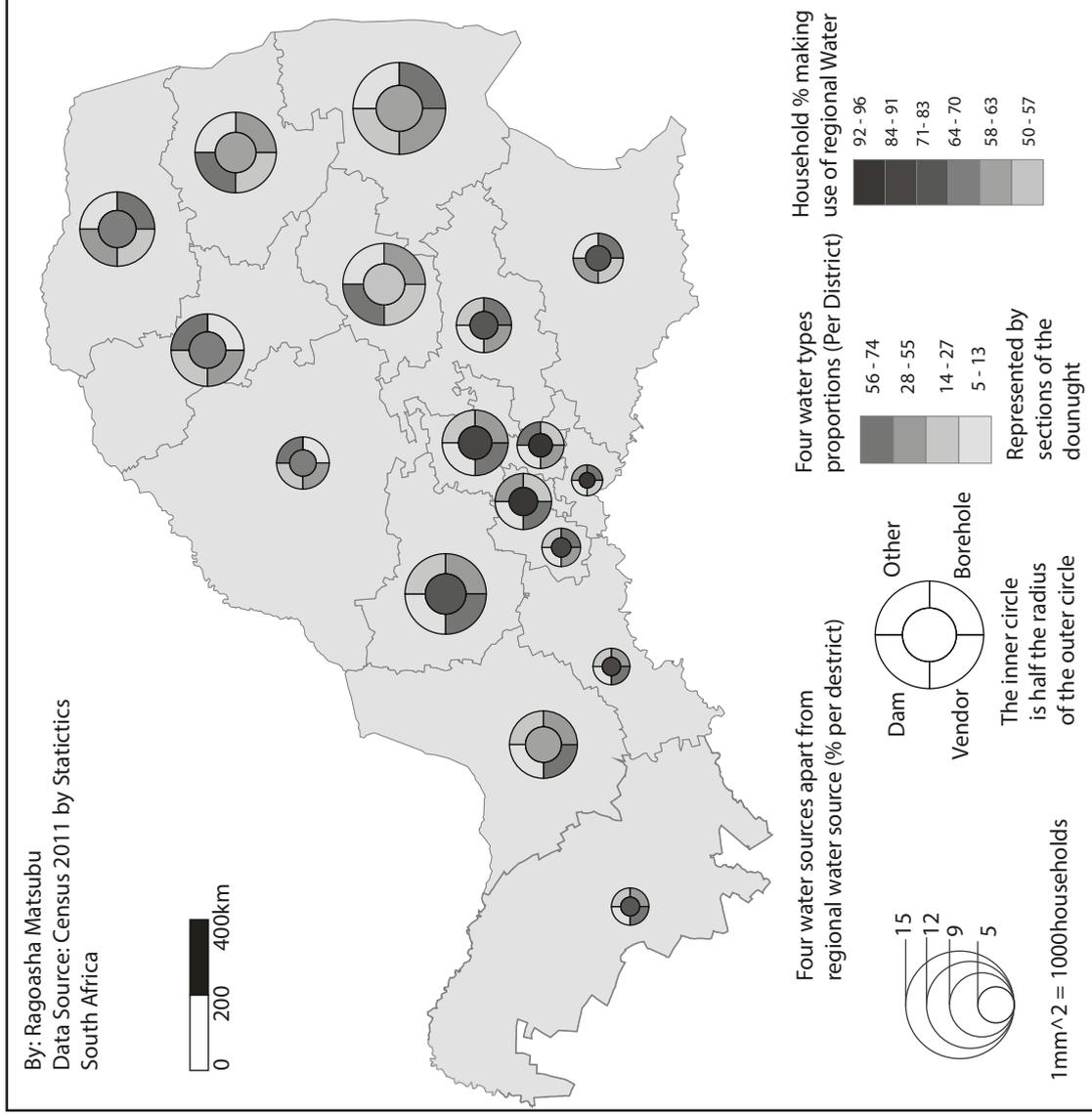
Water Source Outlook in the Major Strained Regions of South Africa.

The Department of Water Affairs (DWA) has embarked on a journey to revitalise water supply programmes in South Africa by investing billions of Rands into water supply projects in order to meet the Millennium Development Goal of halving the proportion of people without access to safe drinking water. As part of upgrading the sources of water supply in the country, the Southern African Development Community (SADC) has acknowledged the importance of regional water schemes as a primary source of water in the Republic. Following the recent reports on water scarcity in the country, particularly within the northern regions, speculations on the current statistics of sources of water supply in these regions has been of great interest to the Department of Water Affairs as part of the revitalization process.

In 2011, the majority of the households making use of the regional/local water schemes in the northern regions of the country were reported to be over 12 million which makes up to 82.37% out of all other sources of supply as recorded by the Statistics South Africa.

A comparative water source by province is as follows, from the five water sources presented by StatsSA, Limpopo and Mpumalanga majorly relies on dams/rivers/springs/ pools and/or stagnant water supply with 64.05% of households in Limpopo and 27.54% of the households in Mpumalanga making use of these water sources. This is due to the proximity that these provinces are in relation to Limpopo River. On the other hand, the majority of the households in the North-West Province, about 29.95% makes use of boreholes as their main water source. Gauteng Province on the other hand heavily relies on regional/local water scheme as a main source of water with about 56.69% of the households utilizing this source of supply.

It is quite interesting to see a negative correlation that exists from two water source categories i.e, where the proportion households making use of regional water scheme is high, the proportion of households making use of other four water sources is low, hence the smallest doughnut is filled with a darker colour.



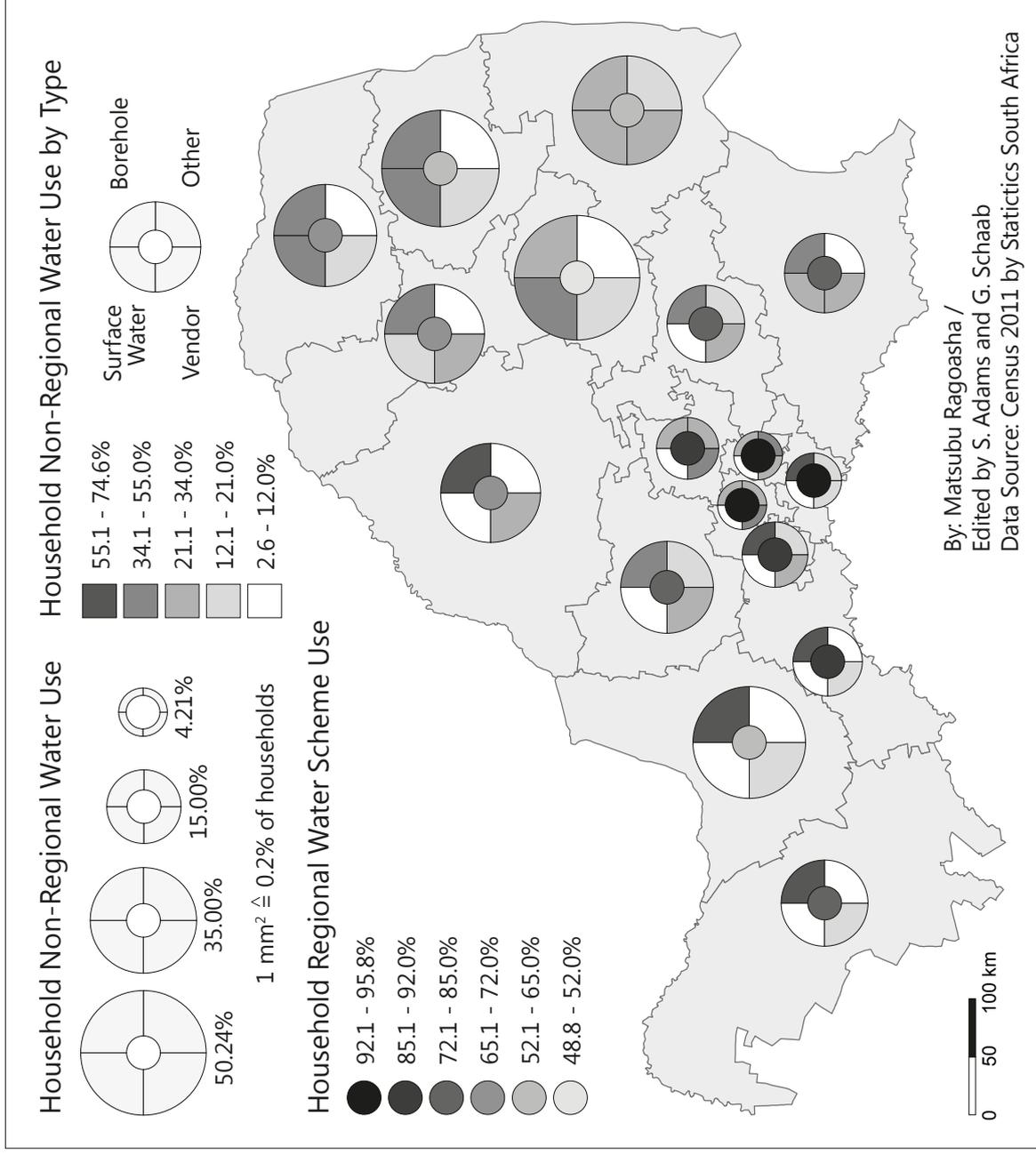
Main Sources of Water in the Water-Scarce Region of Northern South Africa

The Department of Water Affairs (DWA) has embarked on a journey to revitalise water supply programmes in South Africa by investing billions of Rands into water supply projects in order to meet the Millennium Development Goal of halving the proportion of people without access to safe drinking water. As part of upgrading the sources of water supply in the country, the Southern African Development Community (SADC) has acknowledged the importance of regional water schemes as a primary source of water in the Republic.

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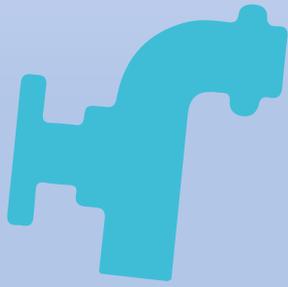
Many municipalities heavily rely on alternative water sources in addition to the regional or local water schemes. Households in the Limpopo provinces make the heaviest use of alternative sources, drawing 33.69% of water from other sources. About 11.68% of this comes from bodies of water (including dams, rivers, springs, pools and stagnant water). In Mpumalanga, 6.62% of households rely on bodies of water. The high use of bodies of water in Limpopo and Mpumalanga is likely due to the proximity of the Limpopo River.

Households in the North West instead heavily utilize boreholes and water vendors, which make up 20.4% of their water supply. The Gauteng Province, on the other hand, relies heavily on regional or local water schemes as a main source of water, with about 93.88% of the households utilizing this water source.



In 2011, the number of households in northern South Africa making use of the regional or local water scheme was reported to be about 6.15 million, which makes up 82.37% of all water sources in the region, as recorded by the Statistics South Africa (Stats SA). The next largest water source, boreholes, are utilized by 7.23%.

WATER, A SOURCE OF LIFE



5%



20%



40%

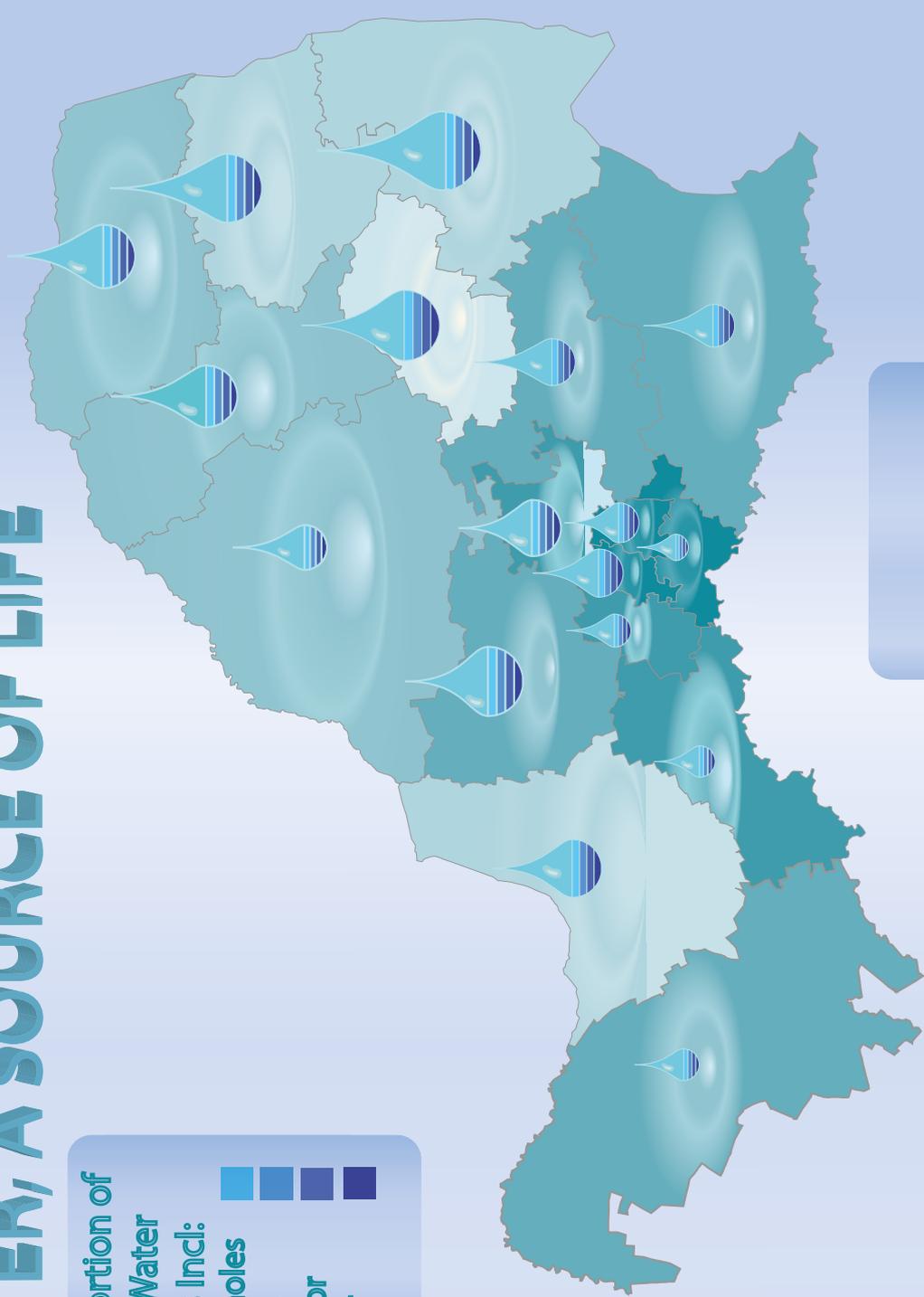


75%



Proportion of
Four Water
Types Incl:

- Boreholes
- Dams
- Vendor
- Other



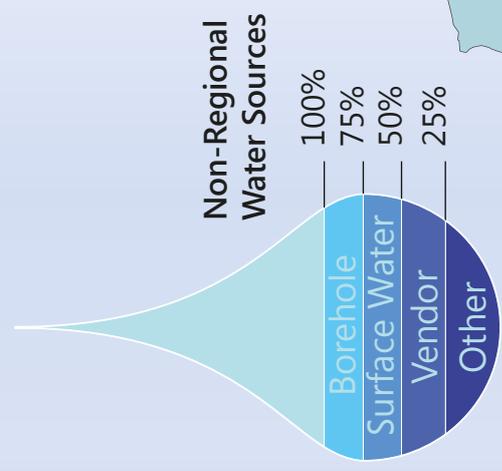
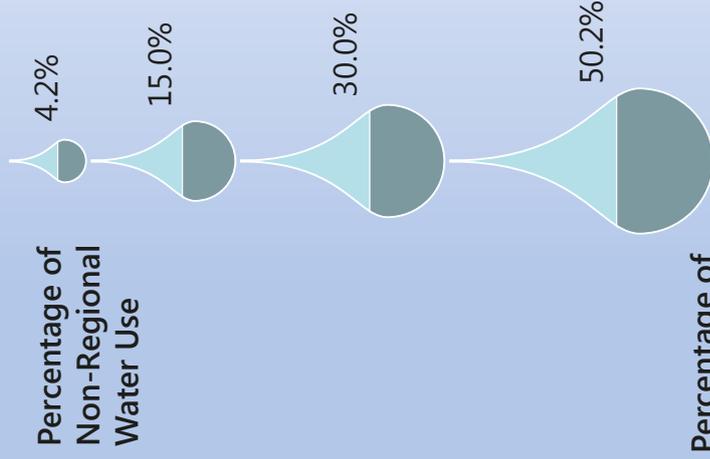
50 - 59%
58 - 63%
64 - 70%
71 - 83%
84 - 91%
92 - 96%

**Regional Water
Source is a Primary
Source of Water in
the Northern
Regions**



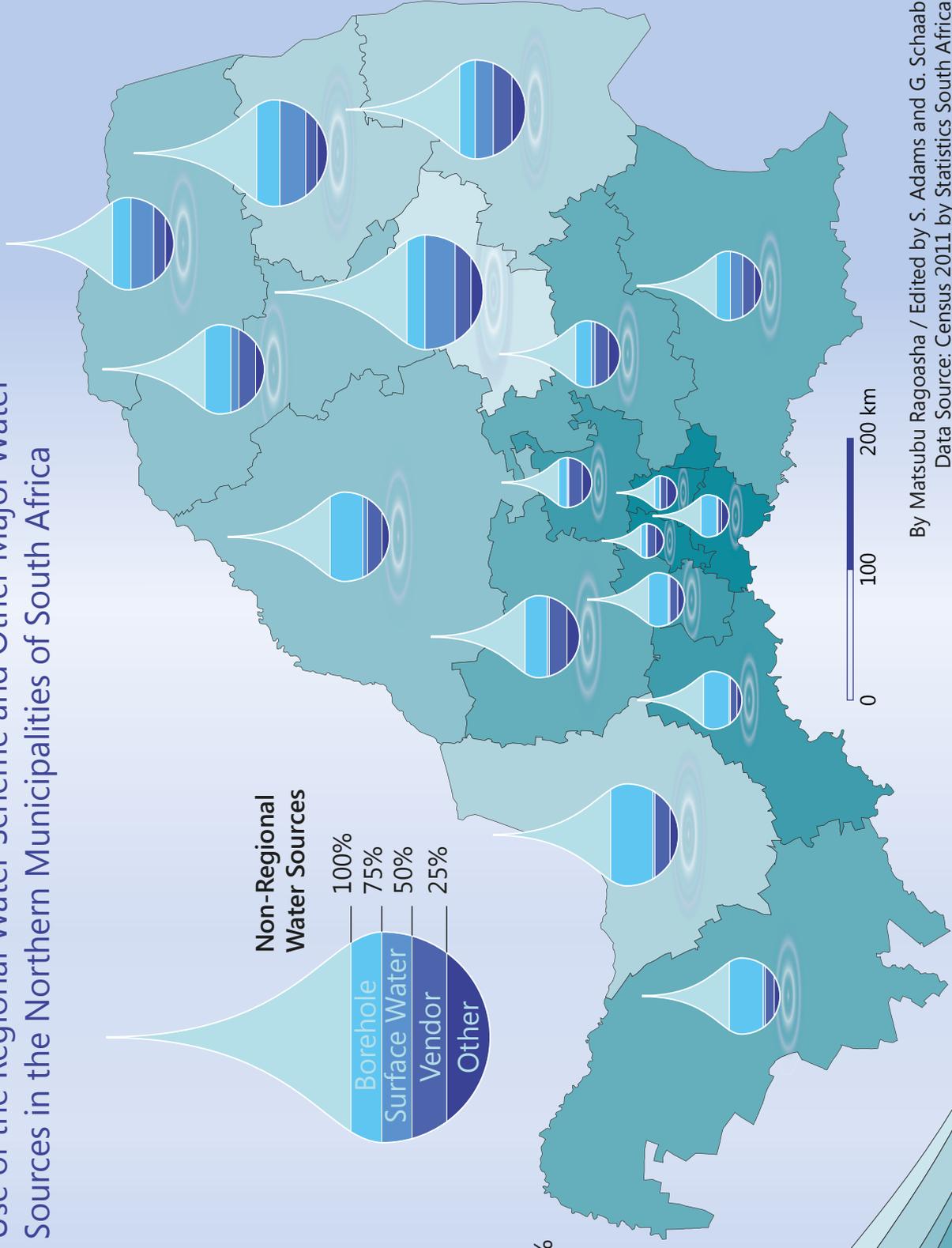
WATER: A SOURCE OF LIFE

Use of the Regional Water Scheme and Other Major Water Sources in the Northern Municipalities of South Africa



Percentage of Regional Water Scheme Use

- 48.8 - 52.0%
- 52.1 - 65.0%
- 65.1 - 72.0%
- 72.1 - 85.0%
- 85.1 - 92.0%
- 92.1 - 95.8%



By Matsubu Ragoasha / Edited by S. Adams and G. Schaab
Data Source: Census 2011 by Statistics South Africa

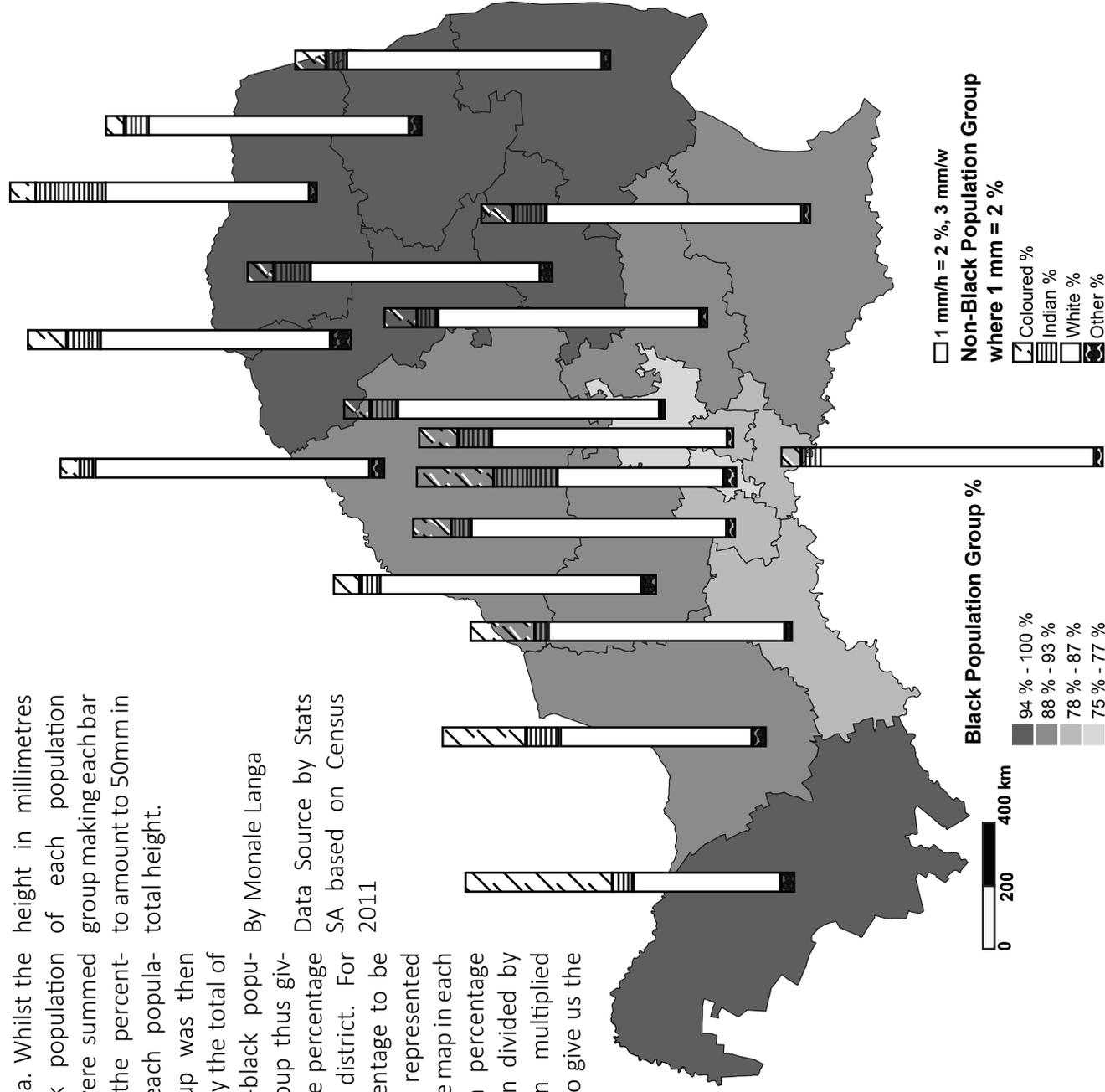
Population Groups

South Africa's history is one that has many angles and colours like the rainbow hence the phrase the rainbow nation. This article we focus on 4 of the warmest provinces situated in the northern part of the country including the Gauteng province being the smallest and most populated province in the South Africa. These provinces has the best safaris in the country making it a tourist paradise. The City of Tshwane is home to the government buildings such as the Union building and many historical infrastructure worth visiting to get a feel of the countries history. The Gauteng province include places such as Soweto where we have the apartheid and Voortrekker monuments, of our gold history from highest to lowest

in Pretoria. Whilst the non-black population groups were summed up and the percentage of each population group was then divided by the total of the non-black population group thus giving us the percentage in each district. For the percentage to be properly represented within the map in each district a percentage was taken divided by 100 then multiplied with 50 to give us the

By Monale Langa

Data Source by Stats SA based on Census 2011



Population Groups in the Northern Provinces of South Africa

South Africa's history is one that has many views and colours, like the rainbow, hence the phrase "The Rainbow Nation". This article focuses on four of the warmest provinces situated in the northern part of the country, including the Gauteng province, the smallest and most populated province in South Africa.

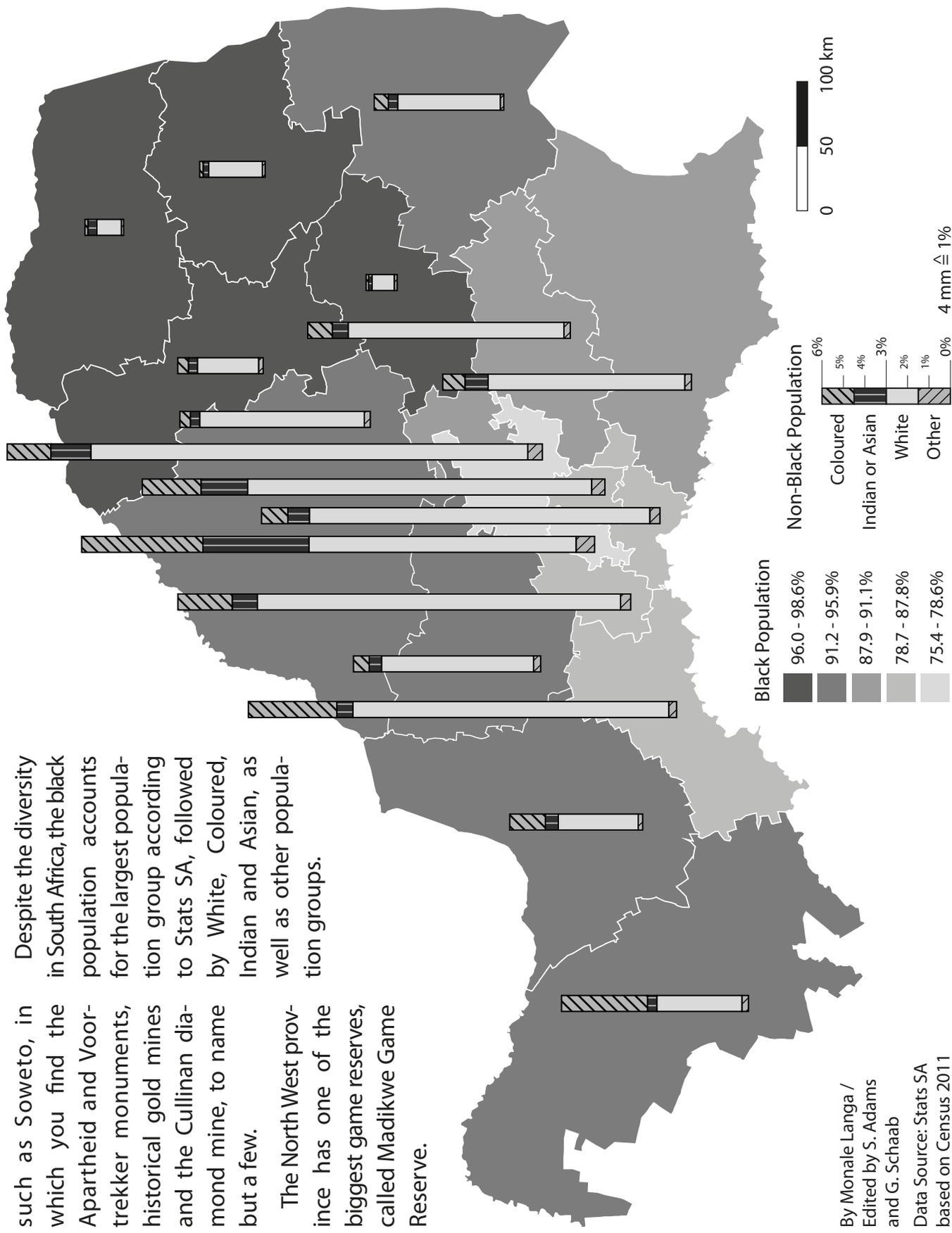
These provinces have the best safaris in the country, making them a tourist paradise. In the City of Tshwane, you will find many government buildings, such as the Union building, and many historical infrastructure worth visiting to get a feel of the country's history.

The Gauteng province includes places

such as Soweto, in which you find the Apartheid and Voortrekker monuments, historical gold mines and the Cullinan diamond mine, to name but a few.

The North West province has one of the biggest game reserves, called Madikwe Game Reserve.

Despite the diversity in South Africa, the black population accounts for the largest population group according to Stats SA, followed by White, Coloured, Indian and Asian, as well as other population groups.



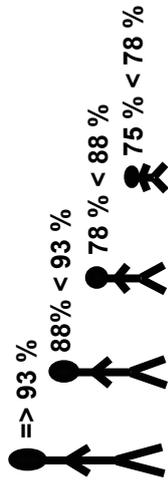
By Monale Langa /
 Edited by S. Adams
 and G. Schaab
 Data Source: Stats SA
 based on Census 2011

Population Groups of Limpopo, North West, Gauteng and Mpumalanga

Total % of the Population Groups



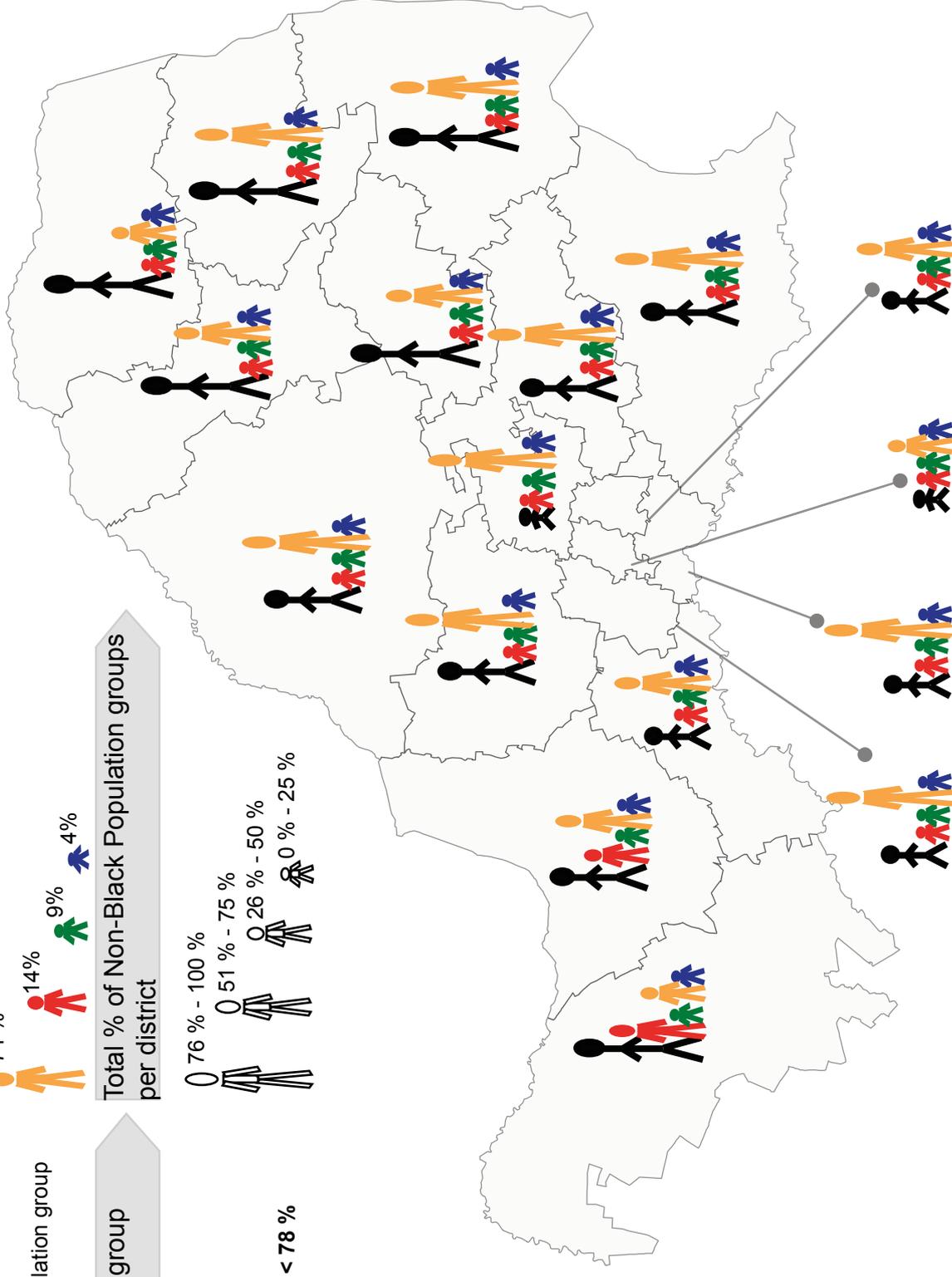
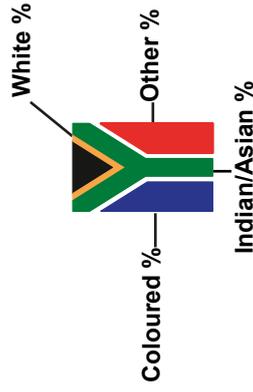
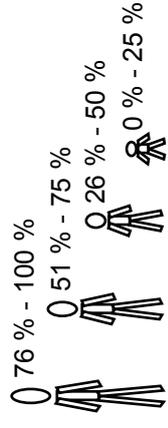
Total % of Black population group per district



Total % of Non-Black Population groups



Total % of Non-Black Population groups per district

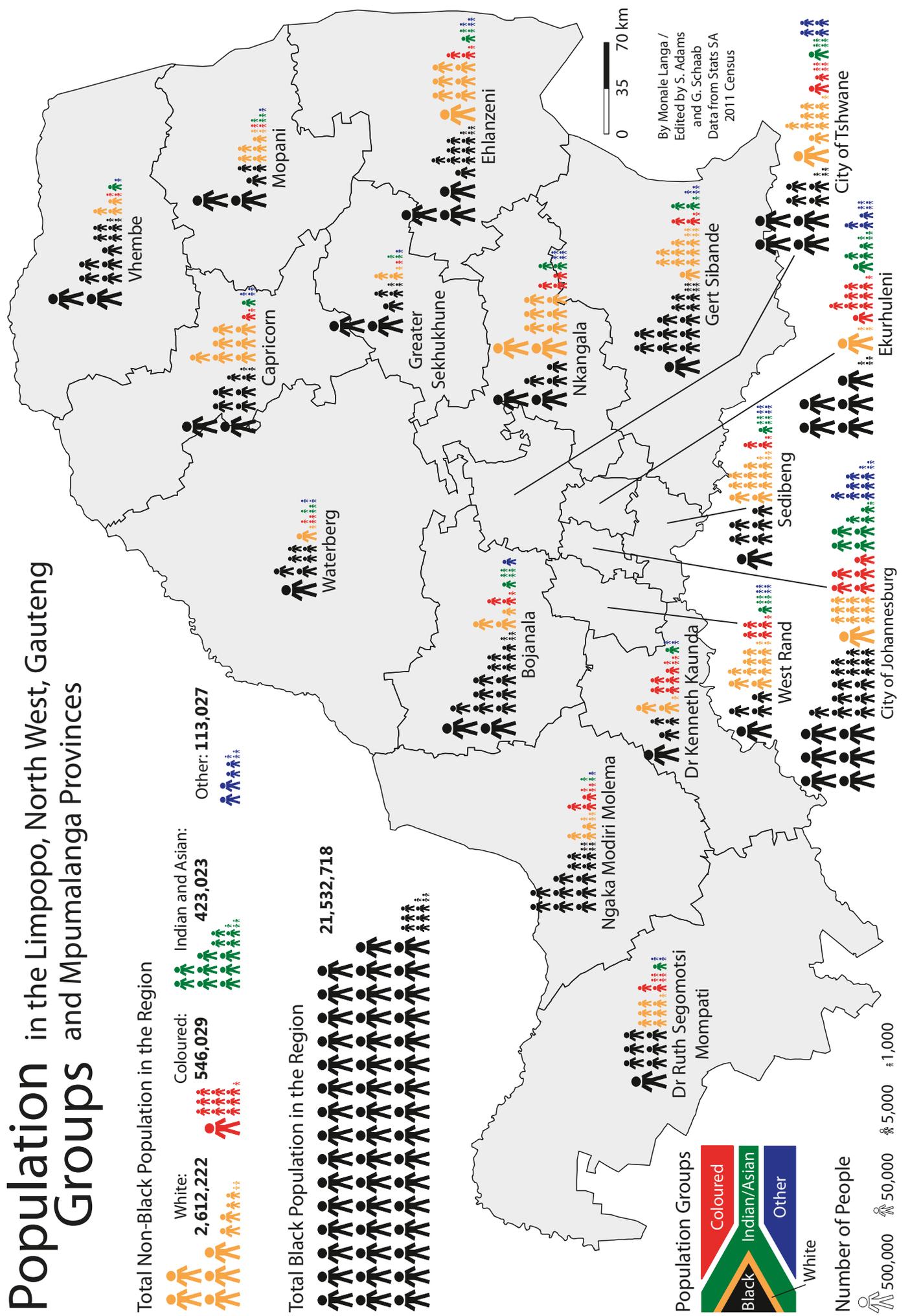
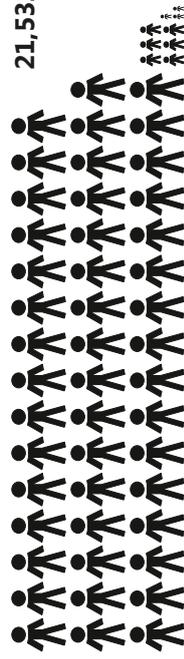


Population in the Limpopo, North West, Gauteng Groups and Mpumalanga Provinces

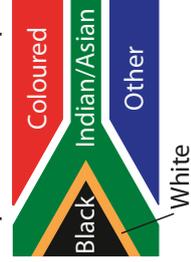
Total Non-Black Population in the Region



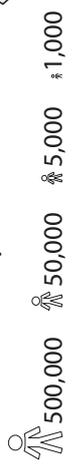
Total Black Population in the Region



Population Groups



Number of People



Fuel for Cooking per Household in the Four Northern Provinces of South Africa

Shown on the map is the different fuels for cooking per household in the four northern provinces of South Africa, being North West, Gauteng, Limpopo and Mpumalanga. The provinces are split into the relative municipalities. This is relevant as the main energy usage in South Africa is energy used for cooking, this is then followed by heating and lighting according to the Department of Environmental Affairs of the Republic of South Africa.

It is clear that in the Gauteng Province, a prevailing pattern of majority electricity use followed by paraffin, then wood and lastly other is seen across all municipalities. In other provinces the municipalities vary between each other within the same provinces. Another pattern seen in the two municipalities of Mopani and Vhembe in the Limpopo Province, these are the only two instances where a fuel other than electricity is used as the majority fuel for cooking, the main fuel in both municipalities is wood. It is also noted that in the Gert Sibande municipality in the Mpumalanga Province, 86% of the other fuel for cooking is made up of coal.

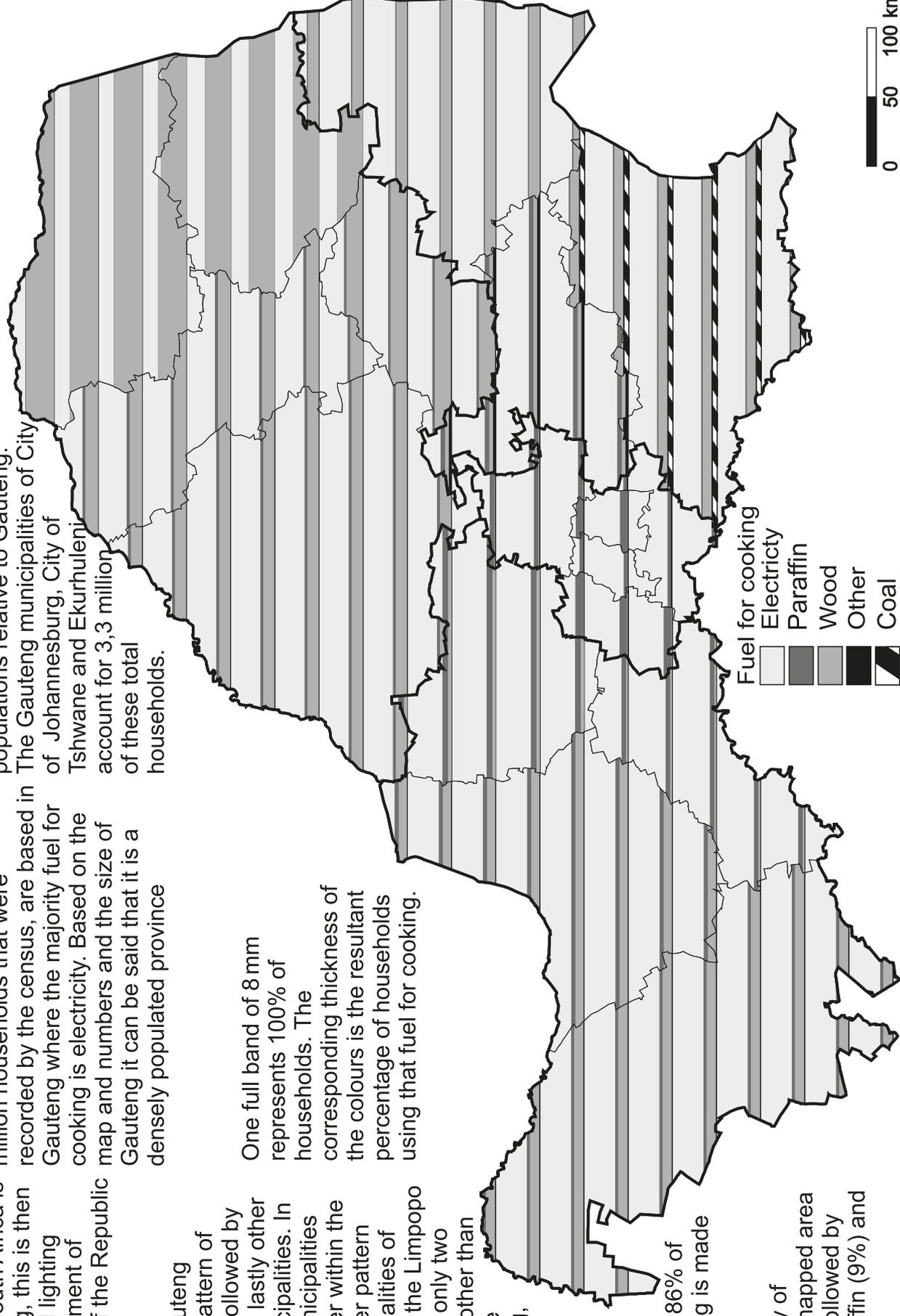
On average the majority of households within the mapped area use electricity (75%), followed by wood (13%), then Paraffin (9%) and lastly other (3%).

This is due to the fact that 3,88 million households of the total of 7,4 million households that were recorded by the census, are based in Gauteng where the majority fuel for cooking is electricity. Based on the map and numbers and the size of Gauteng it can be said that it is a densely populated province

One full band of 8 mm represents 100% of households. The corresponding thickness of the colours is the resultant percentage of households using that fuel for cooking.

compared to the other provinces which are quite large with less dense populations relative to Gauteng. The Gauteng municipalities of City of Johannesburg, City of Tshwane and Ekurhuleni account for 3,3 million of these total households.

The information present in this article are based on the Census 2011 dataset by Statistics South Africa. Due to this the values are guidelines as the dataset may have changed in the last 6 years. Prepared by Ryen Gast.



This map shows the distribution of fuel used for cooking by household in the four northern provinces of South Africa – North West, Gauteng, Limpopo and Mpumalanga. The municipalities within each province are also shown. The main usage of energy in South Africa is for cooking, followed by heating and lighting, according to the Department of Environmental Affairs of the Republic of South Africa.

substantially more than in any of the other municipalities.

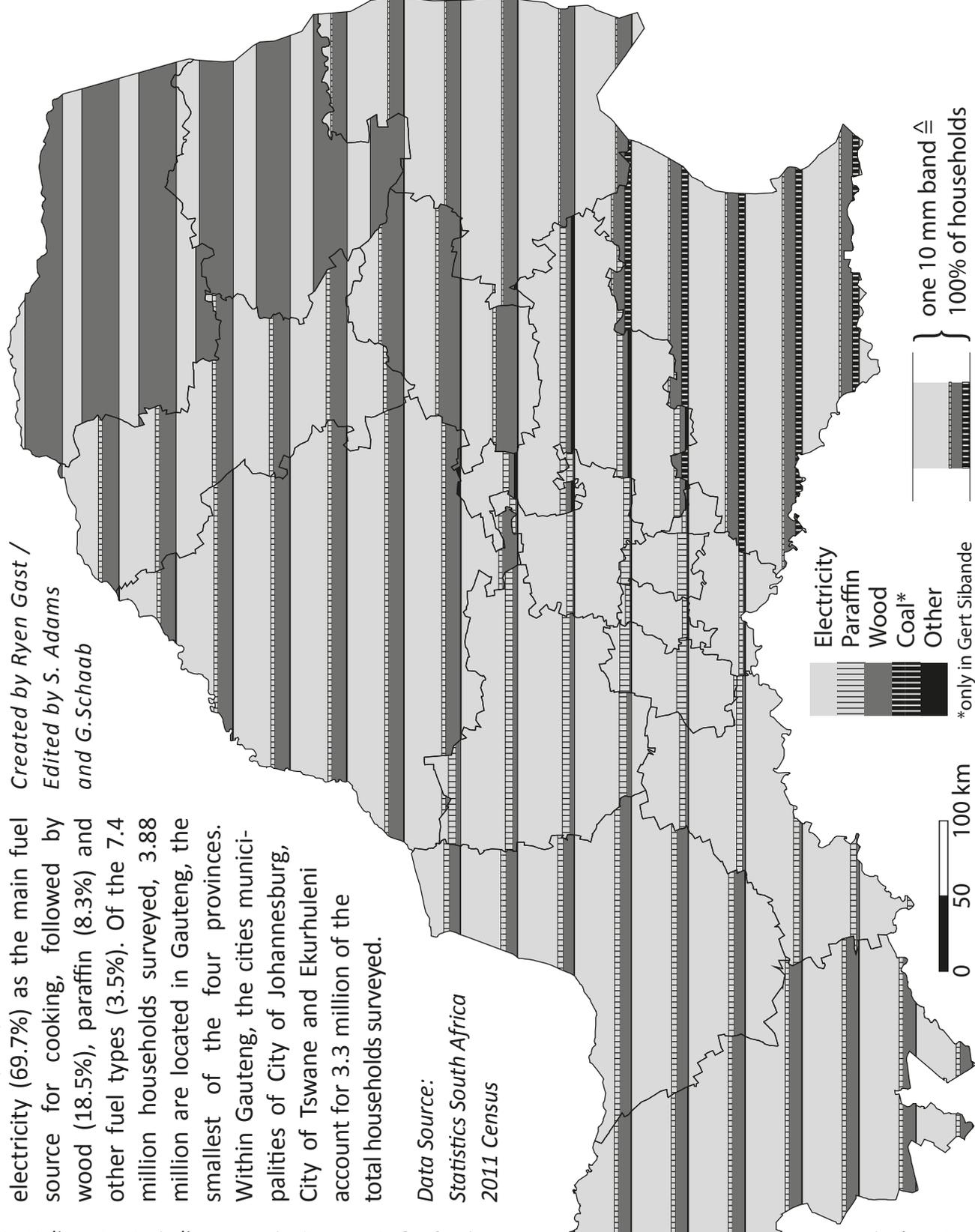
Averaging the mapped municipalities, the majority of households use electricity (69.7%) as the main fuel source for cooking, followed by wood (18.5%), paraffin (8.3%) and other fuel types (3.5%). Of the 7.4 million households surveyed, 3.88 million are located in Gauteng, the smallest of the four provinces. Within Gauteng, the cities municipalities of City of Johannesburg, City of Tswane and Ekurhuleni account for 3.3 million of the total households surveyed.

It is clear that in the Gauteng Province, electricity is the prevailing source of energy in all municipalities for cooking, followed by paraffin, wood and other sources. In the other three provinces, fuel source usage varies among the municipalities. In the municipalities Mopani and Vhembe, in the Limpopo Province, wood is the main fuel source used for cooking. In every other municipality, electricity is the main fuel source used.

It is also notable that in the Gert Sibande municipality in the Mpumalanga Province, 11% of the energy used for cooking is provided by coal,

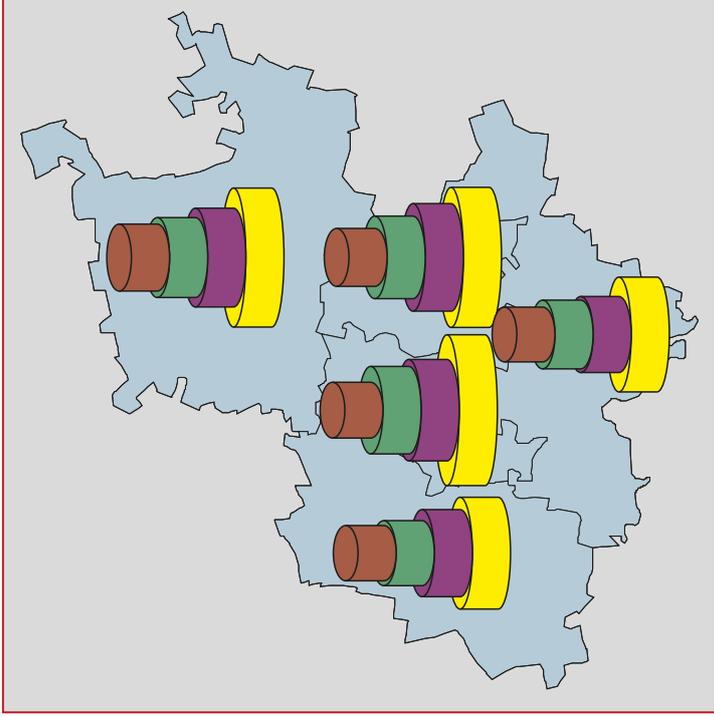
Cooking Fuel Use in the Northern Provinces of South Africa in 2011

Created by *Ryen Gast /*
 Edited by *S. Adams*
 and *G.Schaab*



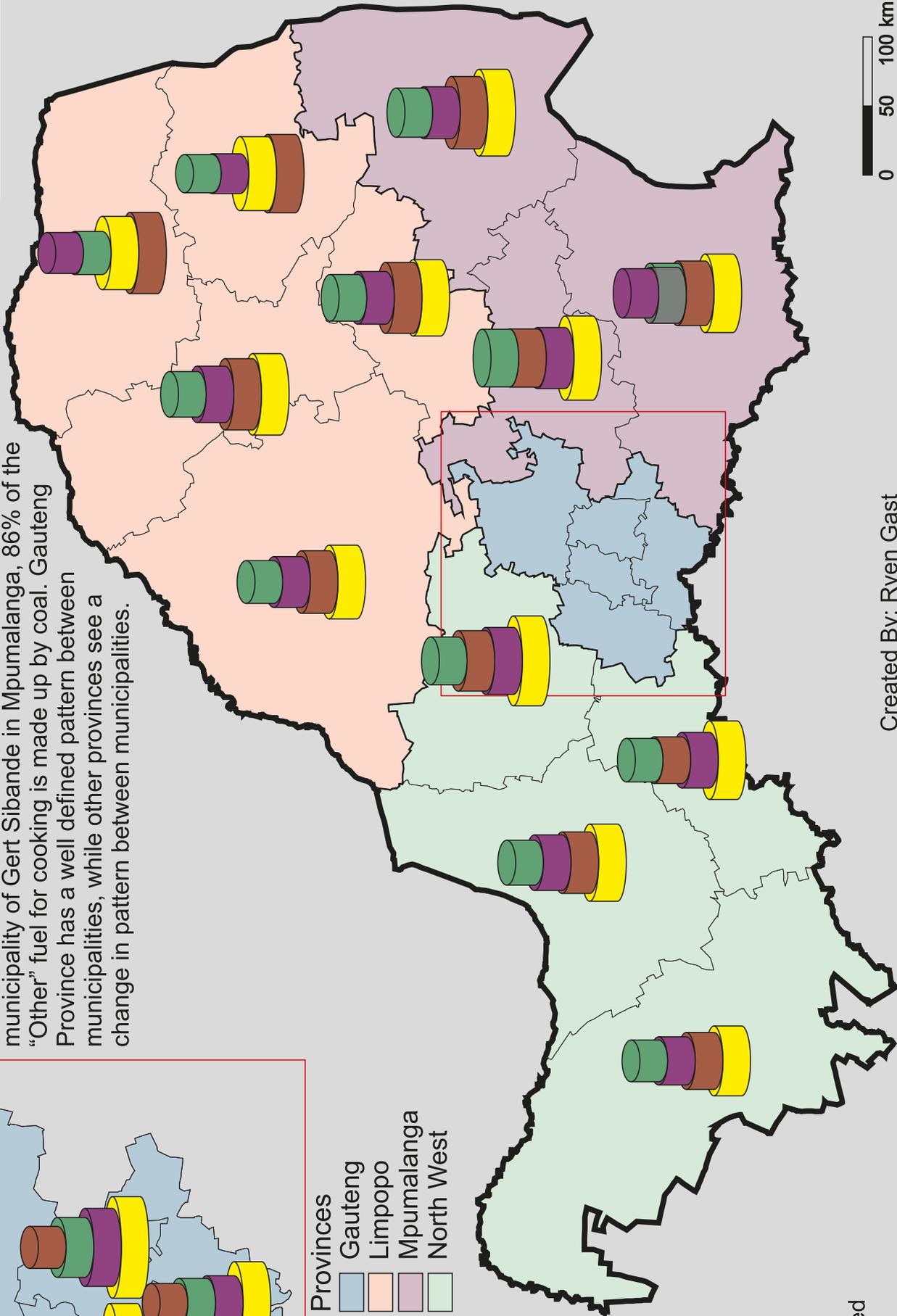
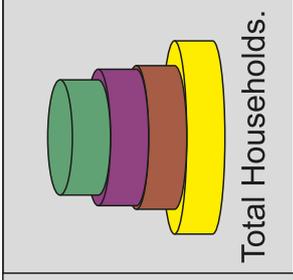
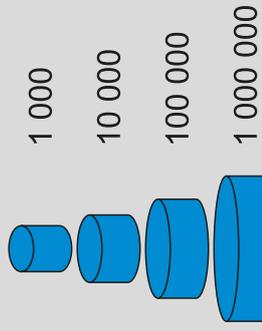
Infographic on Main Fuel For Cooking Per Household In Northern South

Electricity is the main fuel for cooking for all but two northern municipalities of South Africa, these two municipalities are Mopani and Vhembe, both in the Limpopo Province. It is also noted that in the municipality of Gert Sibande in Mpumalanga, 86% of the "Other" fuel for cooking is made up by coal. Gauteng Province has a well defined pattern between municipalities, while other provinces see a change in pattern between municipalities.



- Fuel for cooking**
- Coal
 - Other
 - Paraffin
 - Wood
 - Electricity

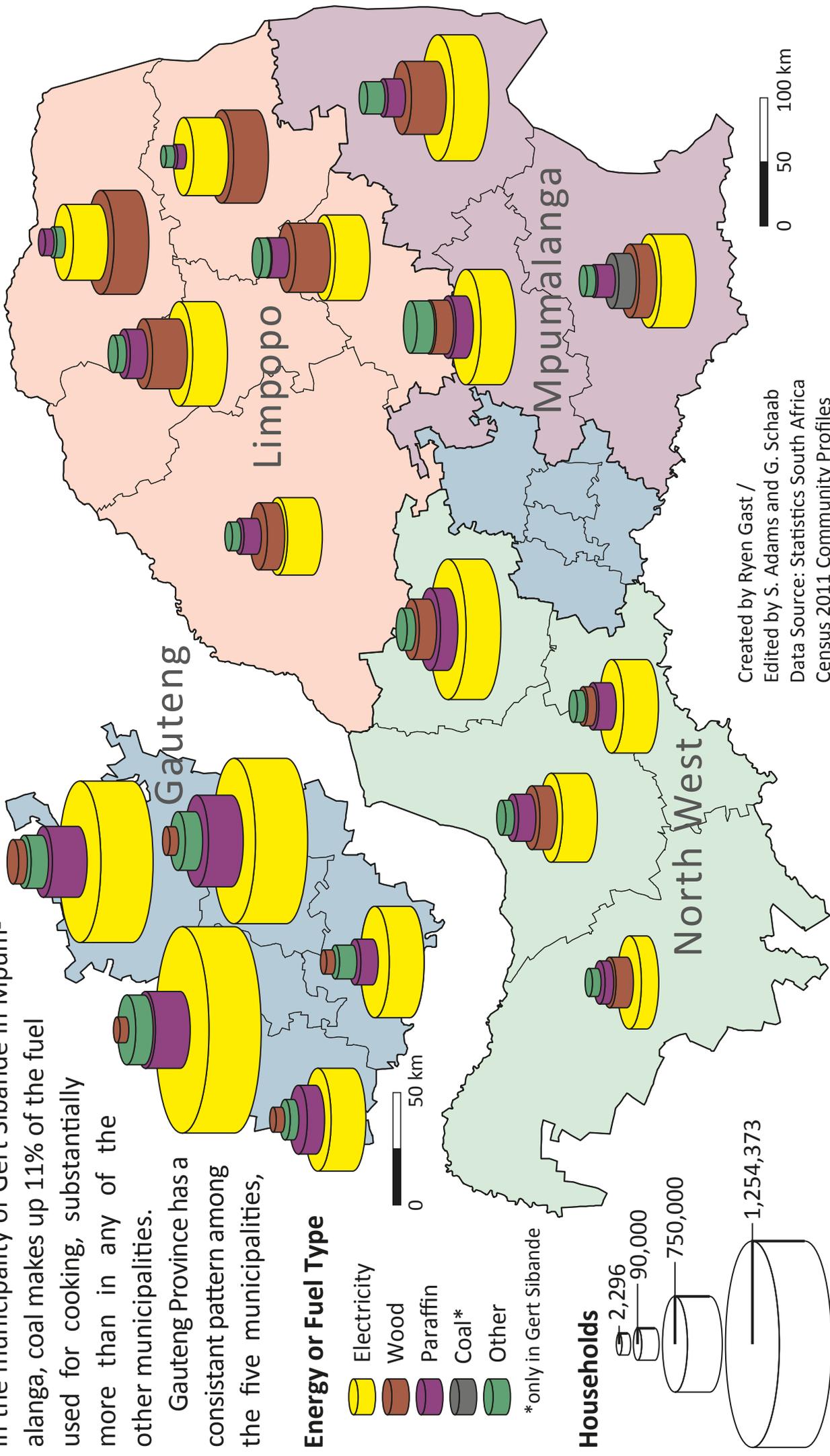
- Provinces**
- Gauteng
 - Limpopo
 - Mpumalanga
 - North West



Main Fuel Used for Cooking in the Northern Provinces of South Africa

Electricity is the main fuel used for cooking in all but two of the northern municipalities of South Africa – Mopani and Vhembe, both in the Limpopo Province. It is also notable that in the municipality of Gert Sibande in Mpumalanga, coal makes up 11% of the fuel used for cooking, substantially more than in any of the other municipalities.

Gauteng Province has a consistent pattern among the five municipalities,



Created by Ryen Gast /
 Edited by S. Adams and G. Schaab
 Data Source: Statistics South Africa
 Census 2011 Community Profiles

What we recycle?

The volume of refuse that is generated by households on a daily basis is on the increase. In order to ensure that households dispose of their refuse regularly, each municipality should provide a service to the tax-paying community to dispose of the refuse appropriately. How we recycle is just as important as to what we recycle. In order to minimize air pollution not everything can be incinerated and certain items prove a challenge to recycle effectively. Landfills are the most efficient form of disposing tons of refuse daily but contaminants from toxic waste pollutes the ground water and alternative strategies need to be developed to combat this concern. Government can only make informed decisions based on facts and statistics and in this regard Statistics South Africa embarked on including as part of the National 2011 Census, a count of the type of refuse disposal which is used by households. This census data is crucial in understanding what other challenges municipalities are faced with in their waste management policies. The map representation below aims to show the various disposal types which households are accustomed to. Only four provinces are represented in the map. They are the North West, Limpopo, Gauteng and Mpumalanga provinces. Each province is made up of wards and these are enumeration units. The percentage of households by type of refuse disposal used is graphically represented. The four types of disposal identified is refuse removed by the local authority or private company, where a refuse dump is used, where no refuse disposal exists, as well as a category of other types of refuse disposal. What is evident from the map is a distinct pattern that emerges which shows the four types of statistical data as a graphical representation of the information collected

South African National Census

2011 revisited

by Census 2011 officials. Its advantage is that readers now have a way of interpreting the meaning more readily as opposed to trying to make sense of lists of figures in tables. This is made possible by using area proportional symbols whereby the actual figures could be approximated according to the scaling factors shown. The percentages on the map relates to each variable or disposal type in relation to the total number of households for all 17 wards which makes up part of the the Census.

The area proportions were derived from the data below. Vitalstatistics: Type of disposal related to Households

Refuse removed by local authority or private company: Total Households: 4,822,008
Maximum: JHB (1,391,394)
Minimum: Greater Sekhukhune (23,213)

Refuse dump disposal: Total Households: 2,223,279
Maximum: Ehlanzeni (283,530)
Minimum: Sedibeng (22,835)

No refuse disposal: Total Households: 373,819
Maximum: Ehlanzeni (40,865)
Minimum: Sedibeng (5,287)

Other types of disposal: Total Households: 45,517
Maximum: Bojanala (5,878)
Minimum: Dr Kenneth Kaunda (1,243)

Vitalstatistics: Type of disposal in percentages

Refuse removed by local authority or private company: Total Households: 4,822,008
Maximum: JHB (28,86%)
Minimum: Greater Sekhukhune (0,48%)

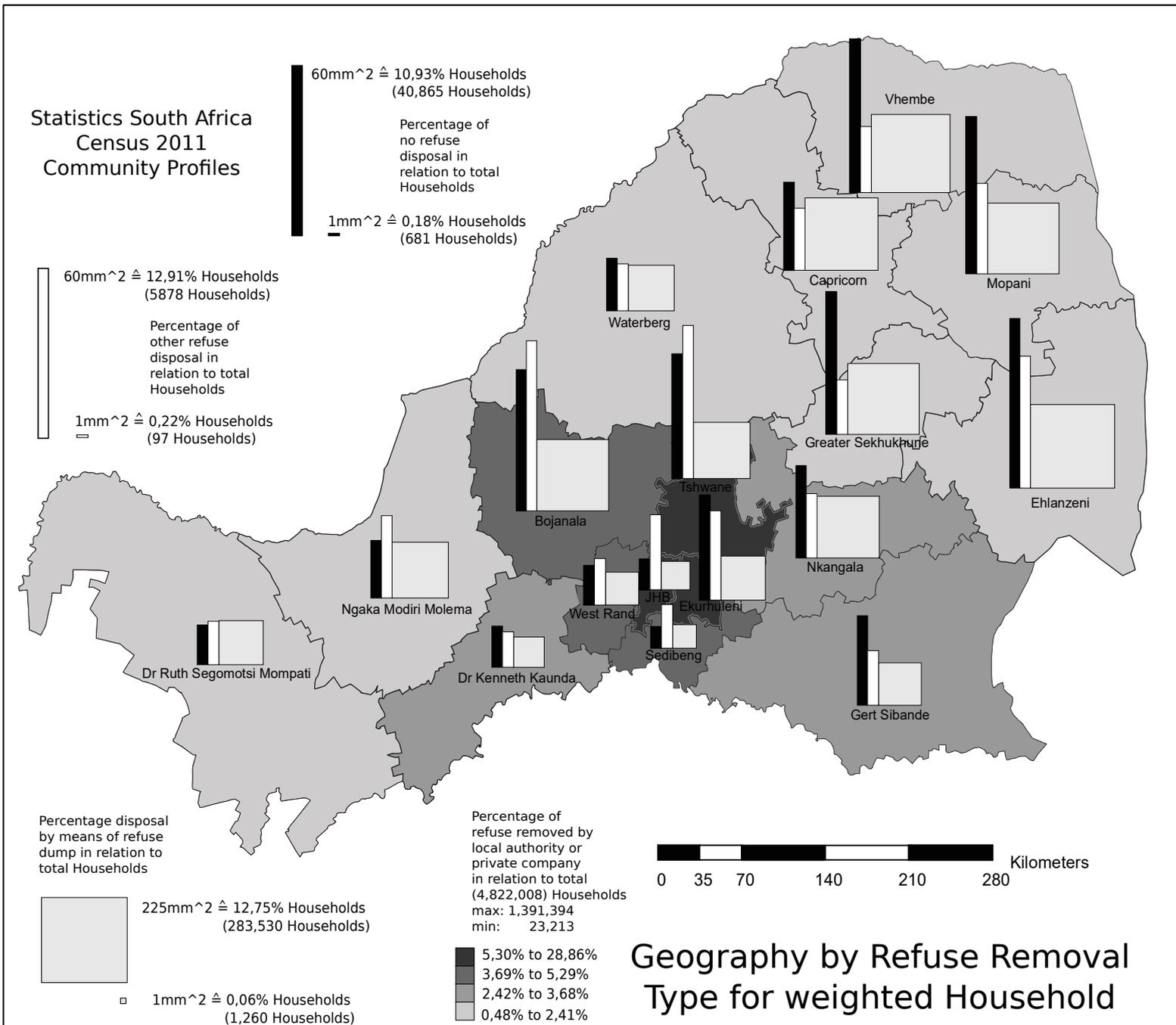
Refuse dump disposal: Total Households: 2,223,279
Maximum: Ehlanzeni (12,75%)
Minimum: Sedibeng (1,03%)

No refuse disposal: Total Households: 373,819
Maximum: Ehlanzeni (10,93%)
Minimum: Sedibeng (1,41%)

Other types of disposal: Total Households: 45,517
Maximum: Bojanala (12,91%)
Minimum: Dr Kenneth Kaunda (2,73%)

Statistics South Africa plays a major role in the country and the Census data of 2011 puts into perspective what may still need to be done in areas that do not have access to any refuse disposal services. It would be of interest to source the latest statistics pertaining to information on refuse disposal for the current 2017 year. This information when compared against the Census data of 2011 will determine the rate at which municipalities have taken steps to address the concerns.

For full Census 2011 data and comprehensive reports the Statistics SA website can be sourced at www.statssa.gov.za.



Refuse Disposal Methods in the Northern Municipalities of South Africa

The volume of refuse that is generated by households on a daily basis is on the increase. In order to ensure that households dispose of their refuse regularly, each municipality should provide a service to the tax-paying community to dispose of the refuse appropriately.

While many areas of northern South Africa can depend on a refuse removal service to remove trash from the household to be incinerated, many households must remove their trash to landfill dumps. The use of landfills is quite high in the region and provides a collective place for storing the communities refuse, but contaminants from toxic waste can pollute the ground water. Still other households have

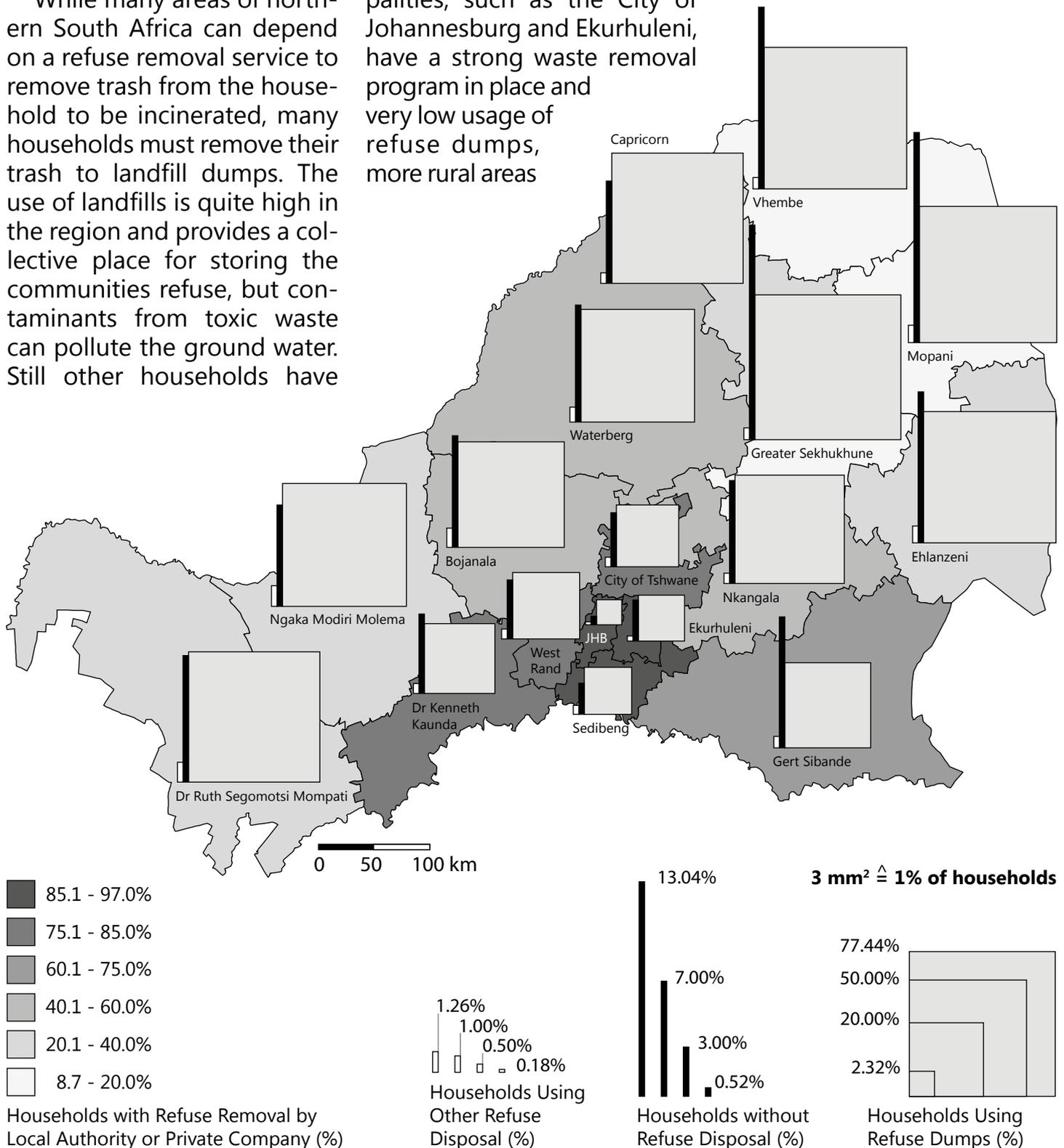
no reliable method for disposing of refuse and removing it from the household.

The census data presented below is crucial for understanding and informing about the challenges faced by each municipality regarding their waste management policies. While the more urban municipalities, such as the City of Johannesburg and Ekurhuleni, have a strong waste removal program in place and very low usage of refuse dumps, more rural areas

further removed from the population center must heavily rely on refuse dumps, or simply do without a refuse disposal method.

By Faizel Khan / Edited by S. Adams and G. Schaab

Data Source: Statistics South Africa Census 2011



QUICK REFERENCE

Bin Colour

Percentage of refuse removed by local authority or private company in relation to total
 max: 1,391,394
 min: 23,213



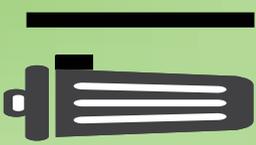
Bin Height

60mm $\hat{=}$ 10.93% Households (40,865 Households)
 Percentage of no refuse disposal in relation to total Households
 1mm $\hat{=}$ 0.18% Households (681 Households)



Bin Drum Handle

60mm $\hat{=}$ 12.91% Households (5878 Households)
 Percentage of other refuse disposal in relation to total Households
 1mm $\hat{=}$ 0.22% Households (97 Households)



Bin Lid Handle

Percentage disposal by means of refuse dump in relation to total Households
 100mm $\hat{=}$ 12.75% Households (283,530 Households)
 1mm $\hat{=}$ 0.06% Households (1,260 Households)

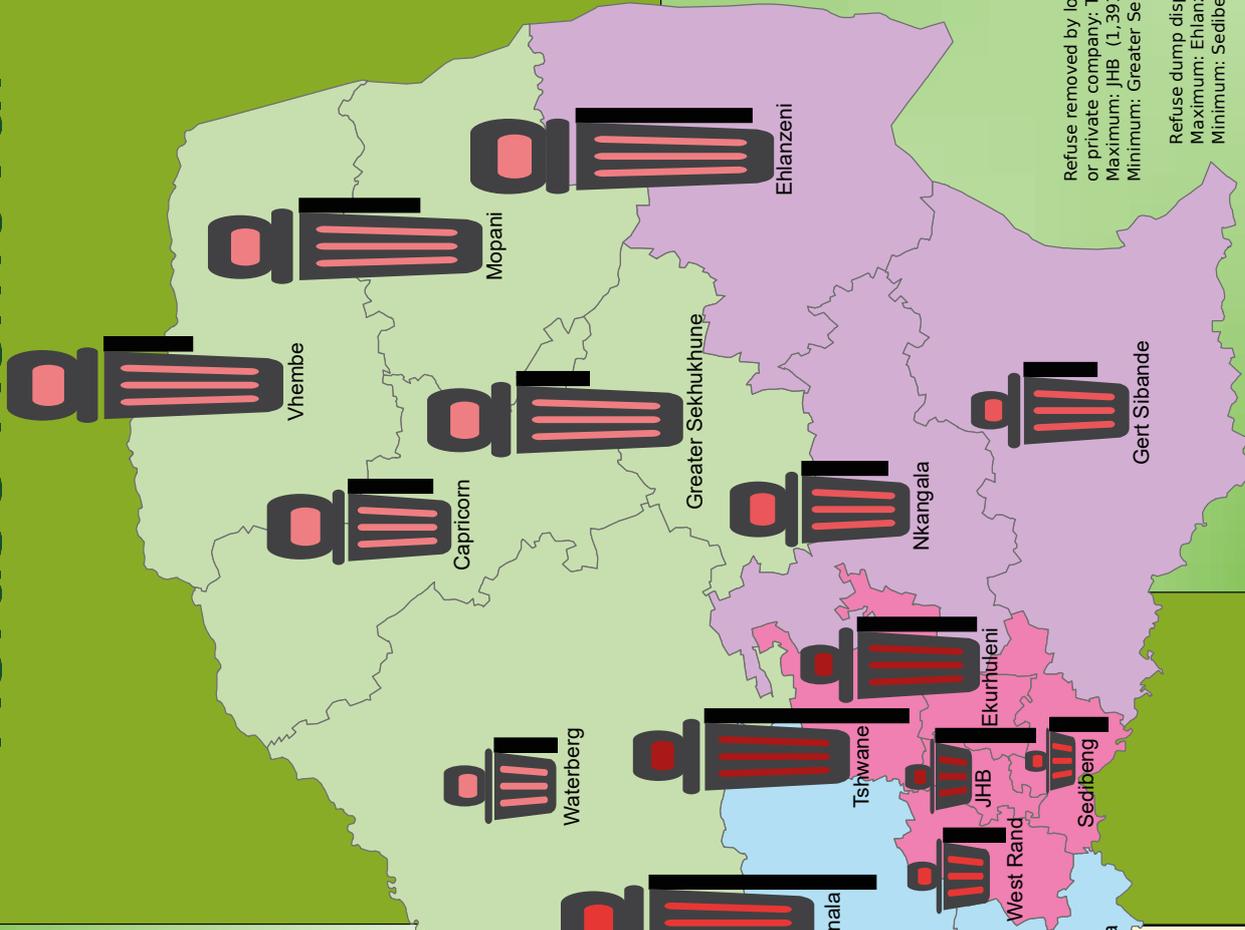


Maximum and Minimum counts related to total households (%) related to (17 Wards)

Refuse removed by local authority or private company: Total Households: 4,822,008
 Maximum: JHB (28.86%)
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 Maximum: Ehlanzeni (10.93%)
 Minimum: Sedibeng (1.41%)

Census 2011 Refuse Removal

Proportion of Households with access to refuse removal in percentages



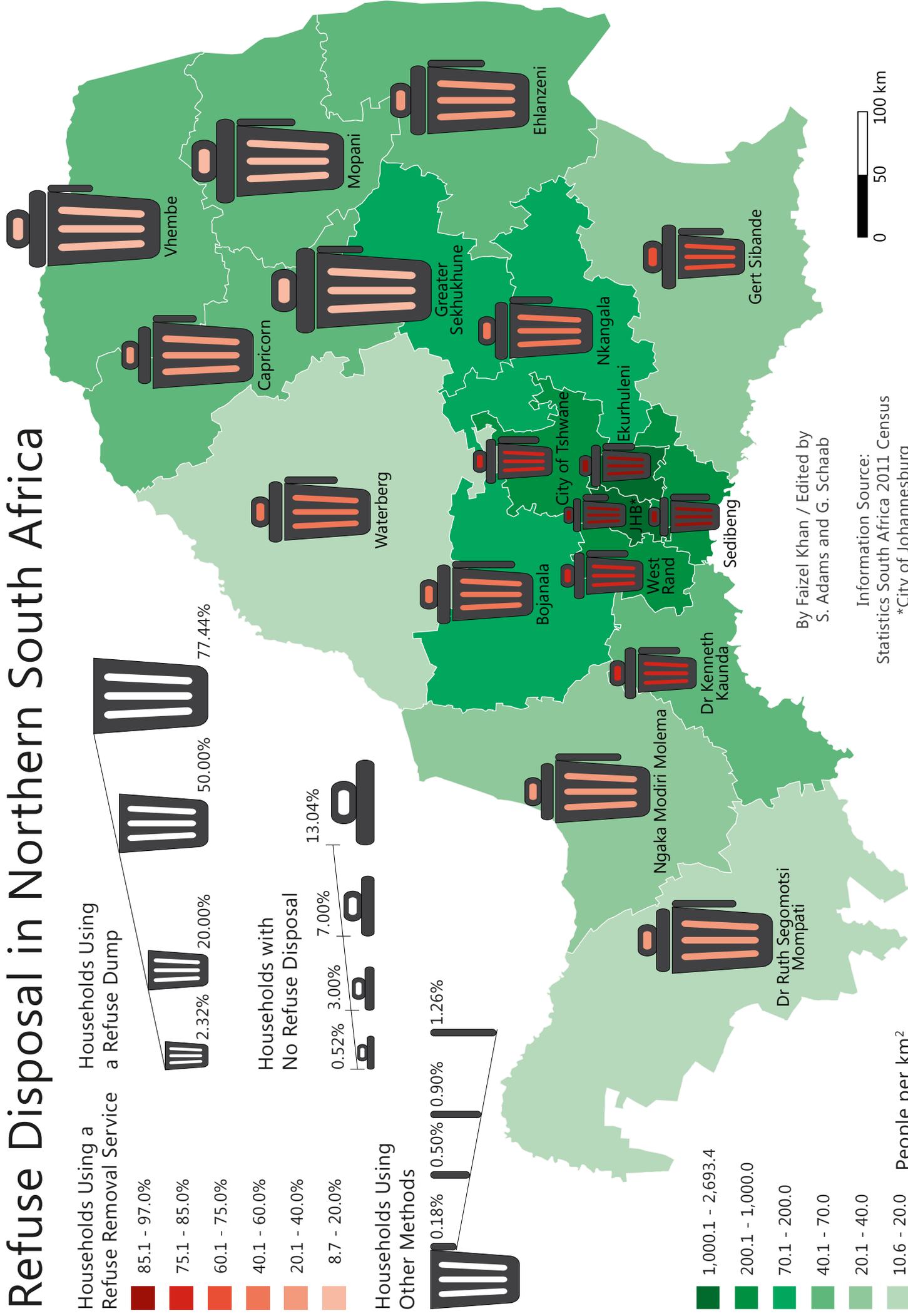
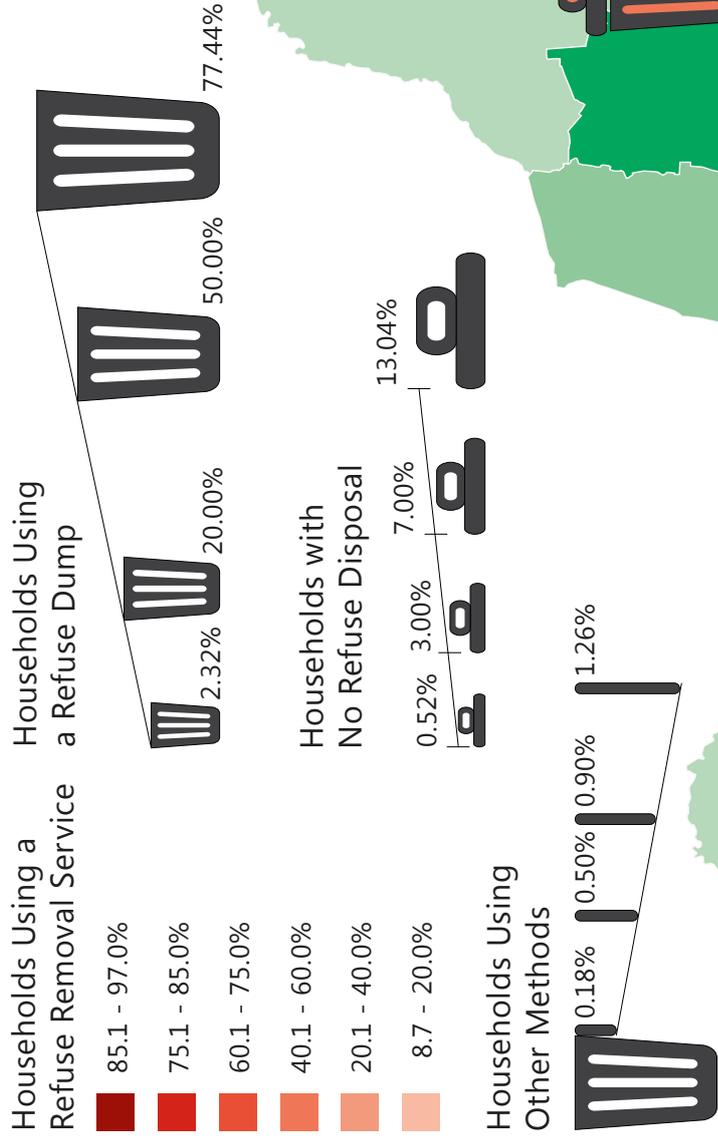
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Information Source: Statistics South Africa
www.stats.gov.za

Other types of disposal: Total Households: 45,517
 Maximum: Bojanala (12.91%)
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 Maximum: Bojanala (5,878)
 Minimum: Dr Kenneth Kaunda (1,243)

Refuse Disposal in Northern South Africa



By Faizel Khan / Edited by S. Adams and G. Schaab

Information Source:
 Statistics South Africa 2011 Census
 *City of Johannesburg

