



## Tracking grain transport in South Africa

Agbiz Grain Mini-Symposium  
12 August 2015

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# The 30 minute take-away

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There are models and ongoing research initiatives that can provide intelligence regarding grain freight flows, logistics costs and road transport trends that could advise Agbiz Grain and its members in matters relating to lobbying and cross-cutting industry initiatives.

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We need buy-in from Agbiz Grain and its members.

*We... ?*

- Annual national freight flow modelling
- Annual logistics costs model

A green rounded rectangular button with the text "GAIN Group" in white, bold, sans-serif font.

**GAIN Group**

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- Detailed grain commodity production, consumption, storage and import/export data

**GAIN Group**

**SAGIS**

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*We... ?*

- Detailed agricultural supply and demand analyses

**GAIN Group**

**BFAP, UP**

**SAGIS**

# The 30 minute take-away

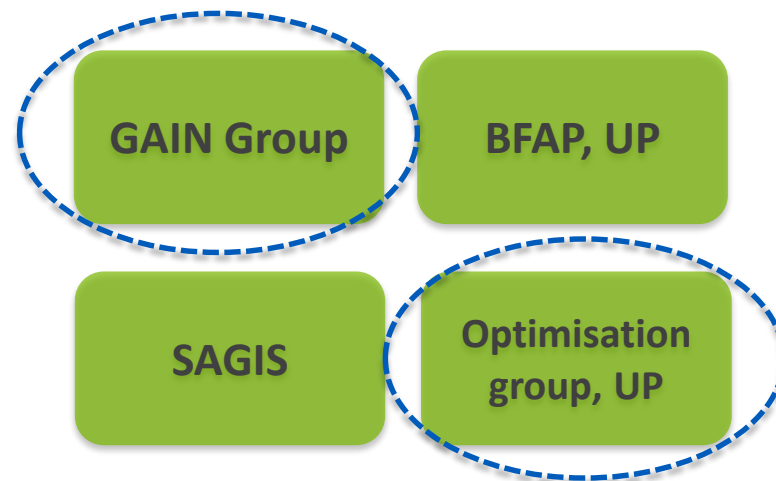
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*We... ?*

- Supply chain network analysis



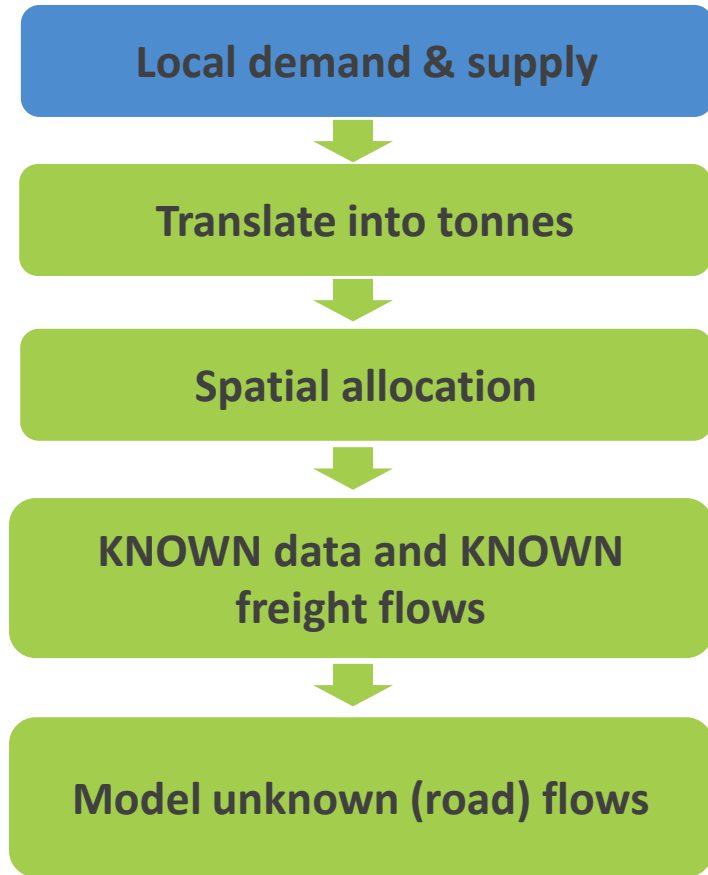
# On the menu

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- Behind the models
- Grain flows and logistics costs 2014
- The grain sector's Facebook page
- Future collaboration

# Freight Demand Model (GAIN Group)

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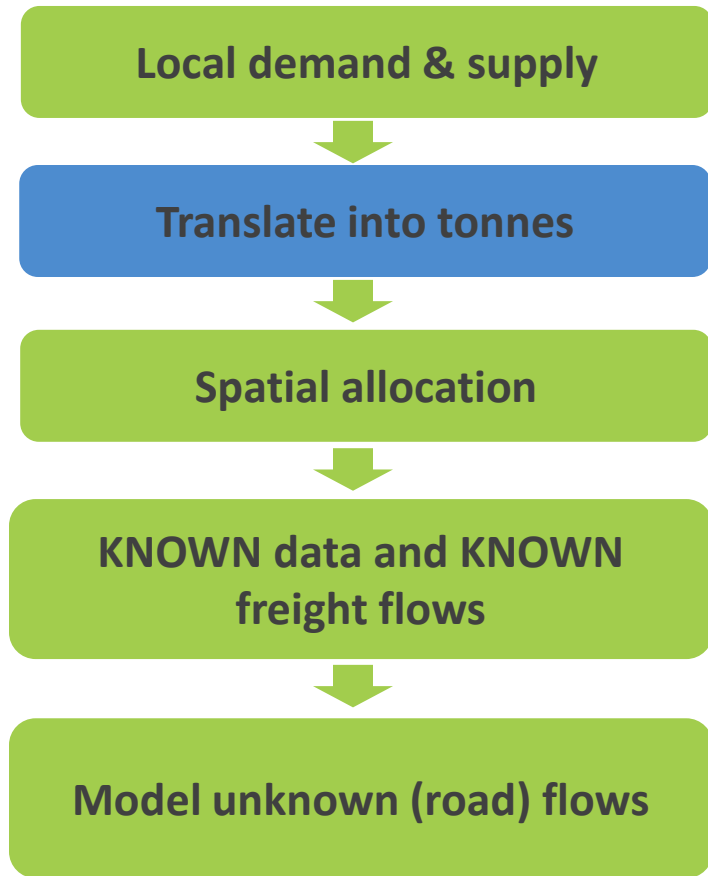


- The FDM predicts local demand & supply based on assumptions about the state of the economy over 30 years.
- These assumptions are based on international economic outlook, GDP growth, inflation, national capital spending, population growth, and various other forecasting factors.



# Freight Demand Model (GAIN Group)

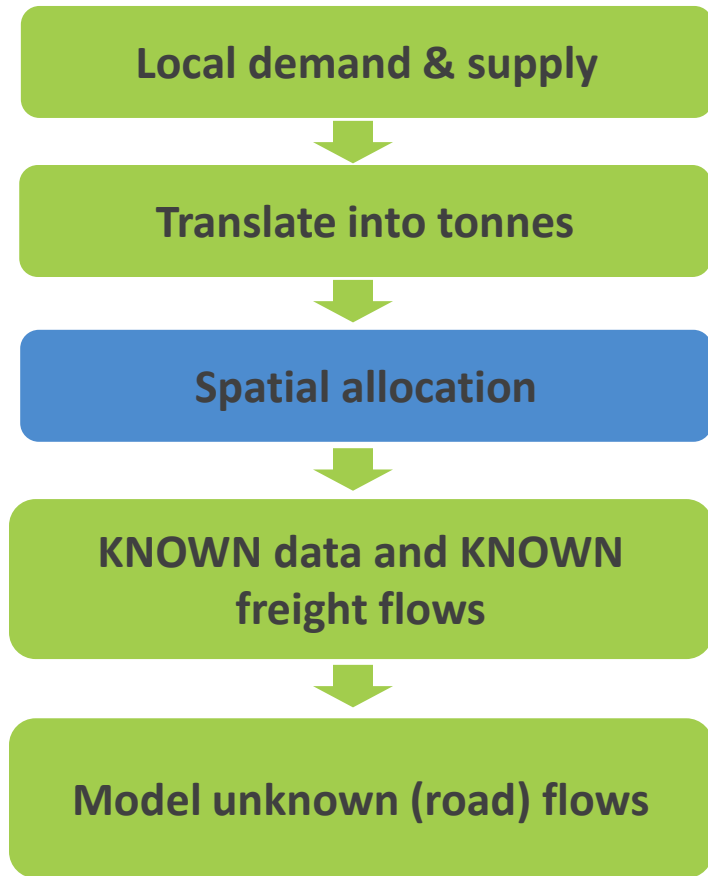
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- This macro-economic activity (currency) is then translated into production and consumption of goods (tonnes).

# Freight Demand Model (GAIN Group)

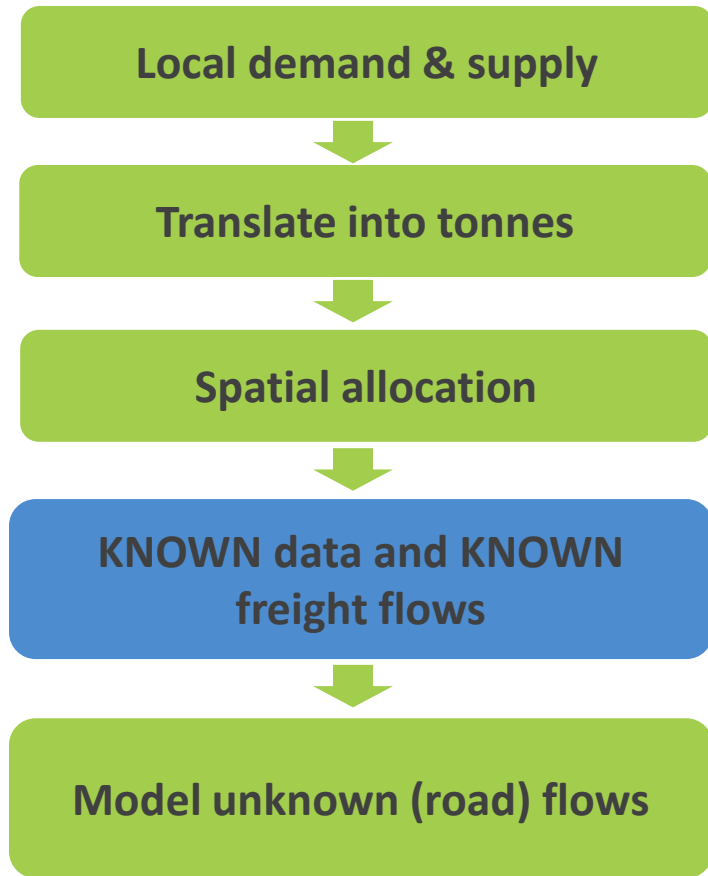
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- The production and consumption (supply and demand) of 83 commodity classes are then located spatially across the 365 districts of South Africa.

# Freight Demand Model (GAIN Group)

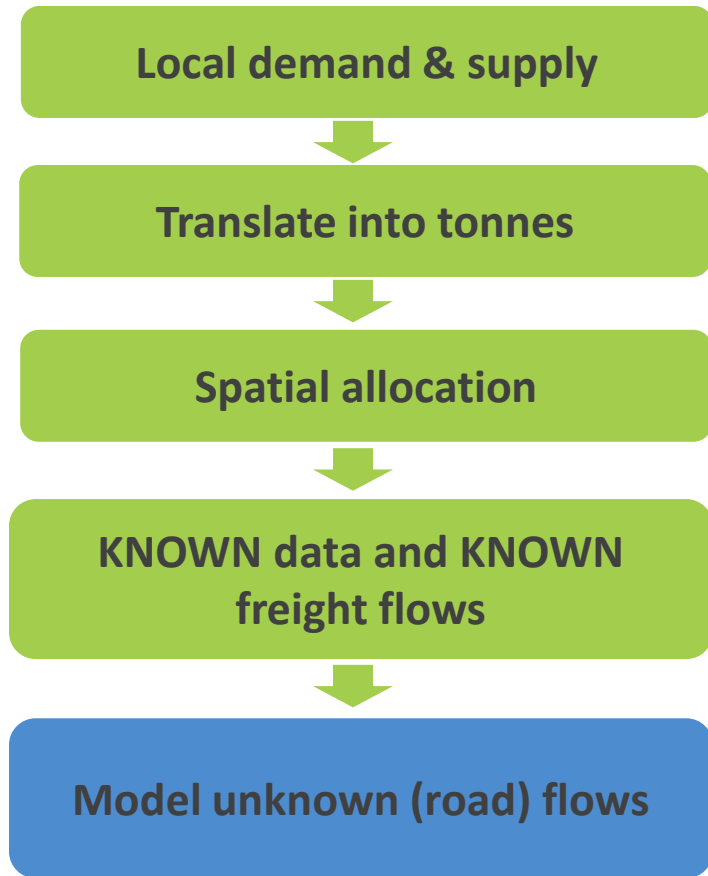
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- This is done by taking into account known flows, such as rail, pipeline, conveyor belt, bulk handled at ports as well a sampled container manifest data of what is in containers.
- Origins and destinations of commodities are mapped to determine freight flow movements.

# Freight Demand Model (GAIN Group)

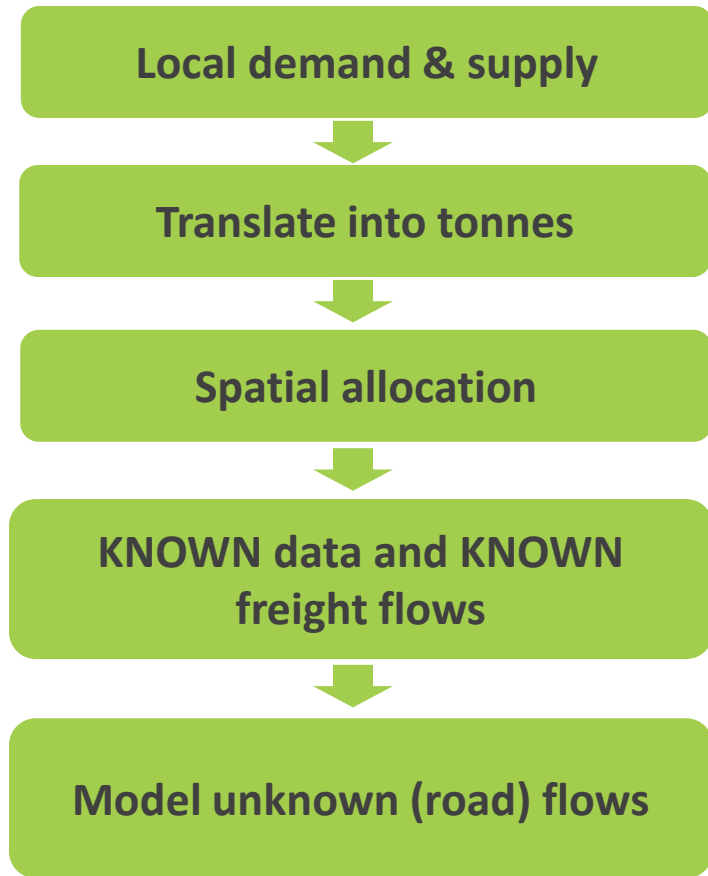
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- The remaining supply and demand is modelled as road flows using gravity modelling.
- This is all collated for a national view of freight.

# Freight Demand Model (GAIN Group)

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- A similar approach is followed for the forecasts.
- This entire process is updated annually.
- All forecasts are independently produced and modelled by the GAIN team in Stellenbosch.

# Known data sources

● TNPA: bulk, break bulk and liquid

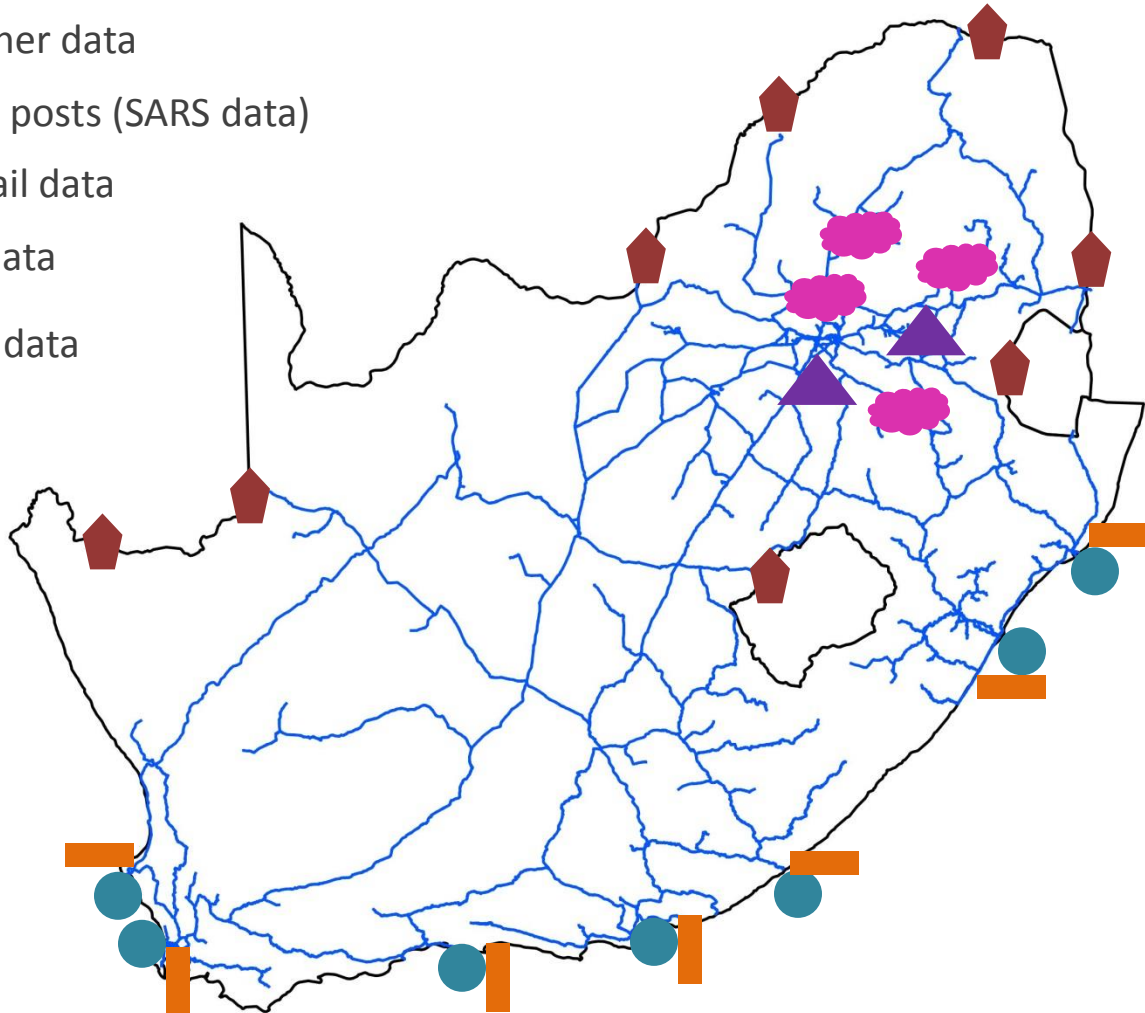
■ Container data

◆ Border posts (SARS data)

— TFR: Rail data

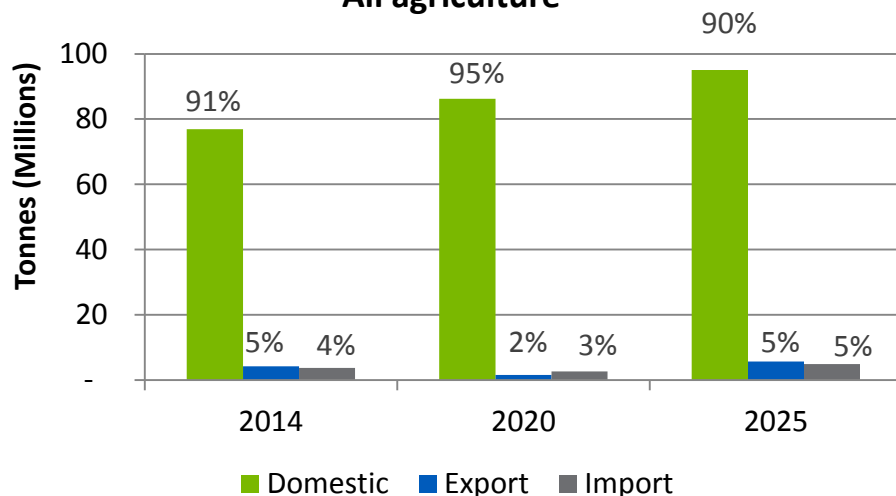
▲ Sasol data

● Eskom data



# Freight flows 2014, 2020 and 2025

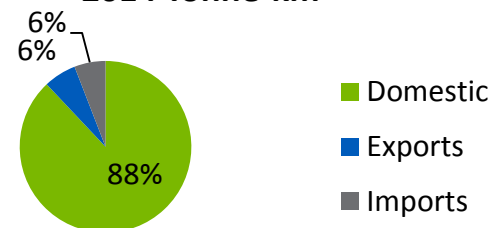
## All agriculture



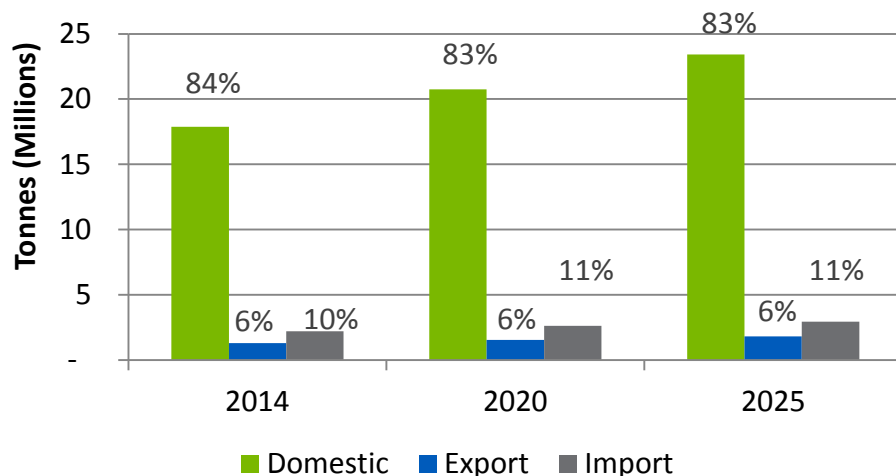
## Avg travelling distance (km)

Domestic	Export	Import
420	538	583

## 2014 Tonne-km



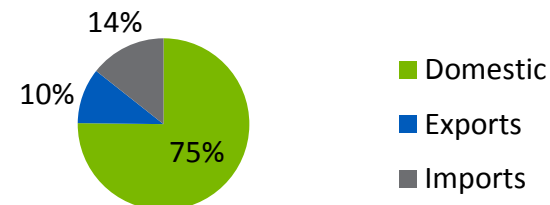
## Grains\*



## Avg travelling distance (km)

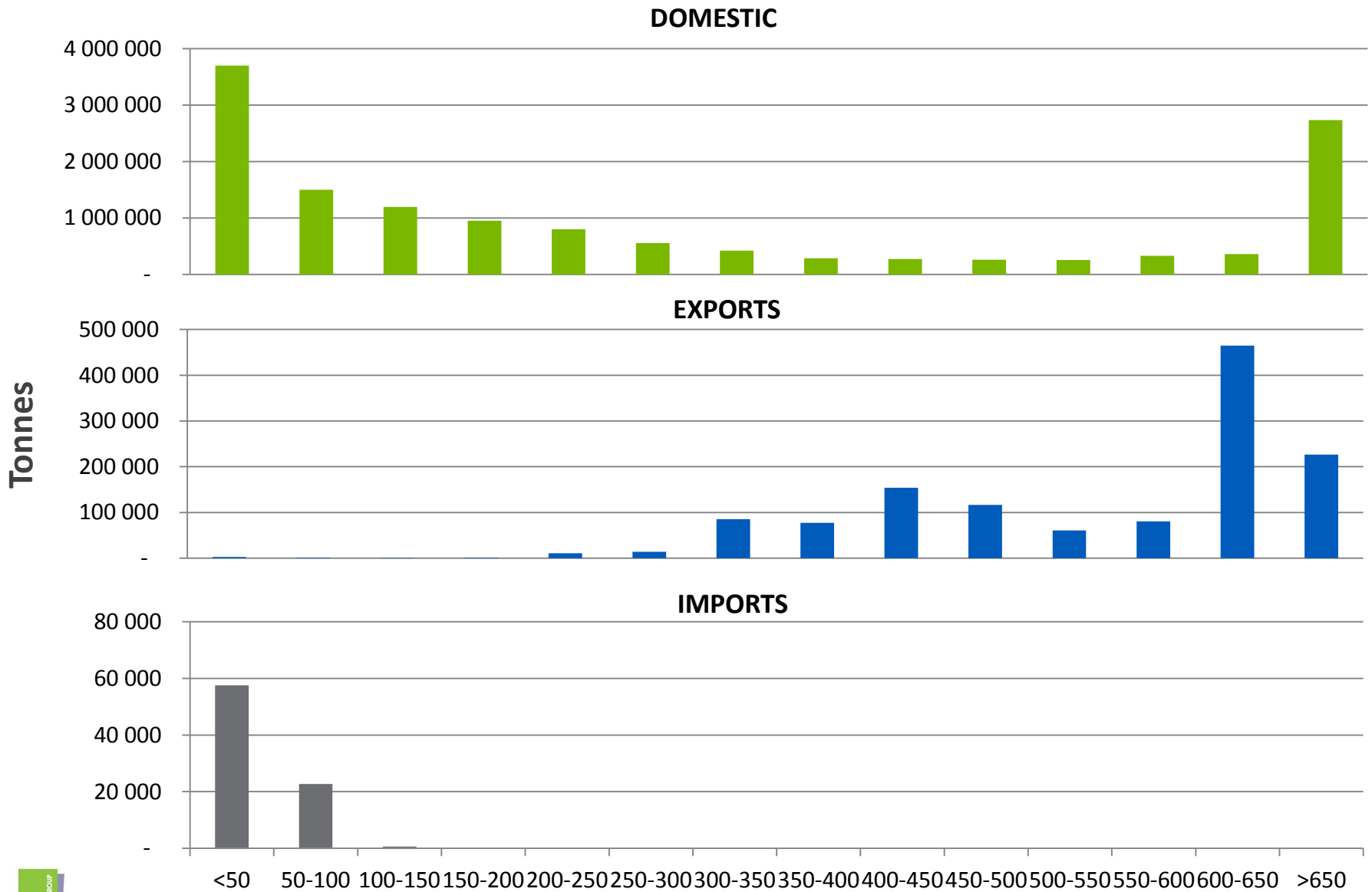
Domestic	Export	Import
315	600	583

## 2014 Tonne-km



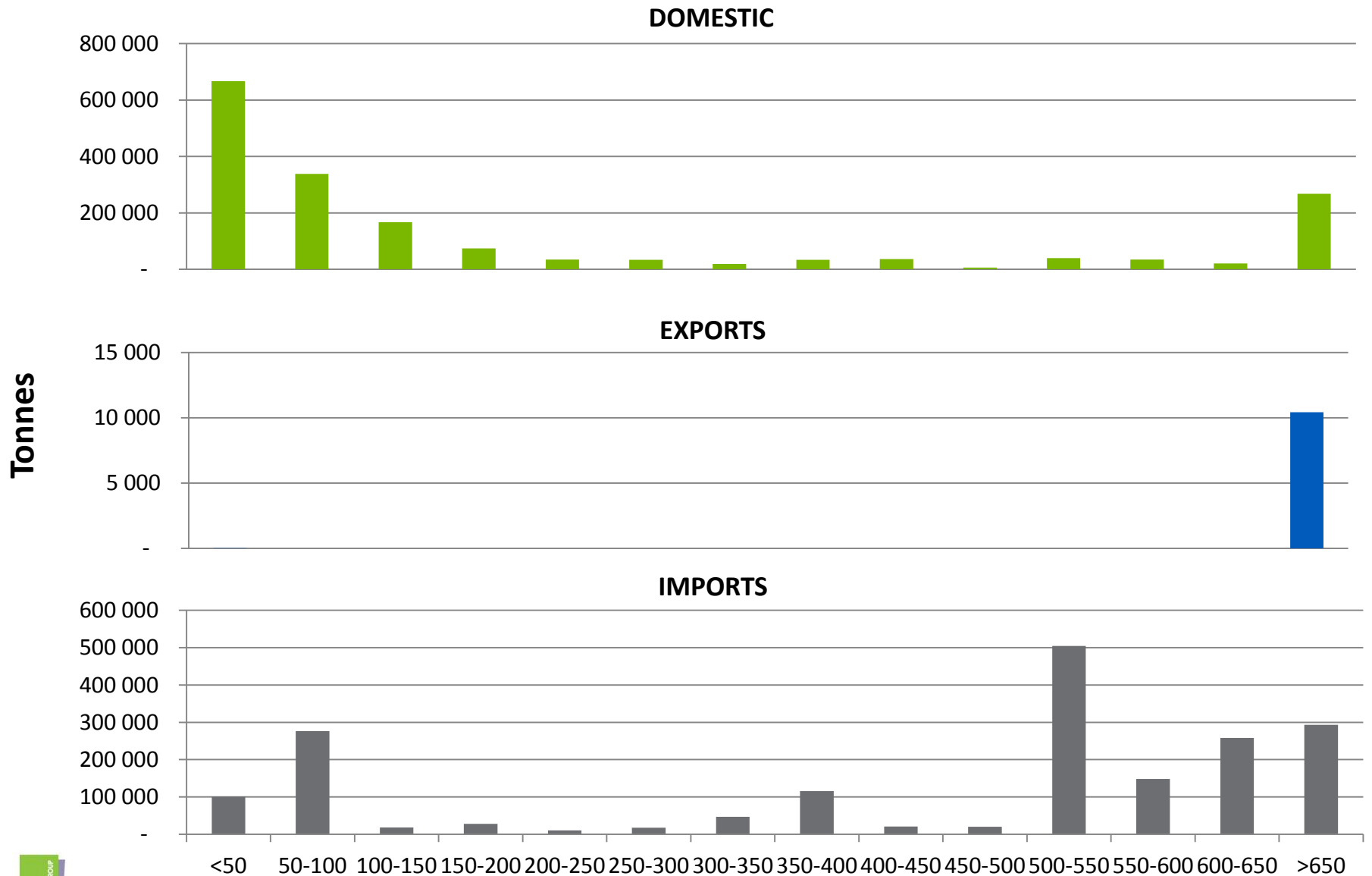
\*Maize, Wheat, Barley, Grain Sorghum, Sunflower Seeds, Soya Beans

# Maize transport distance distribution



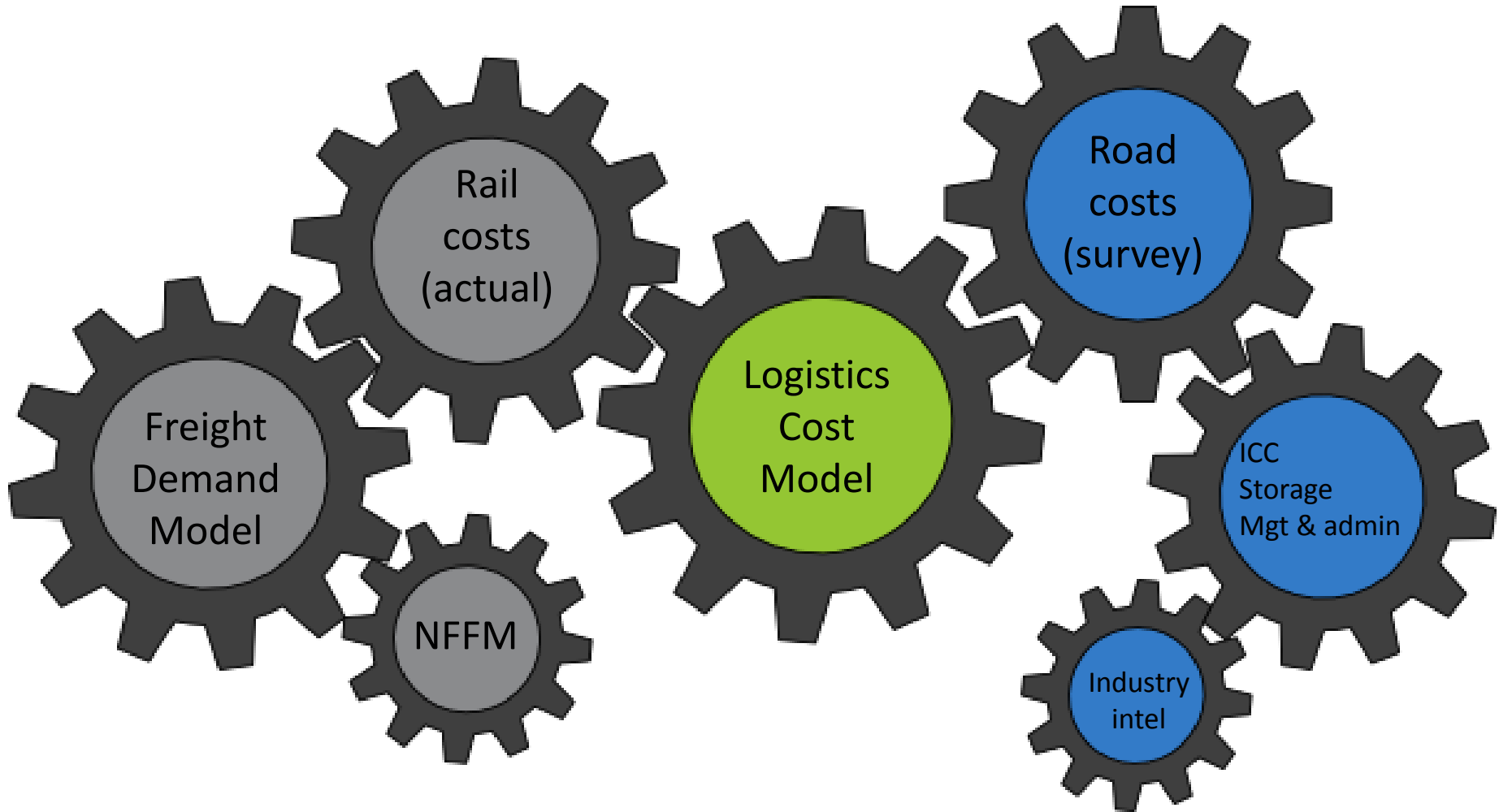


# Wheat transport distance distribution



# Logistics cost model (GAIN)

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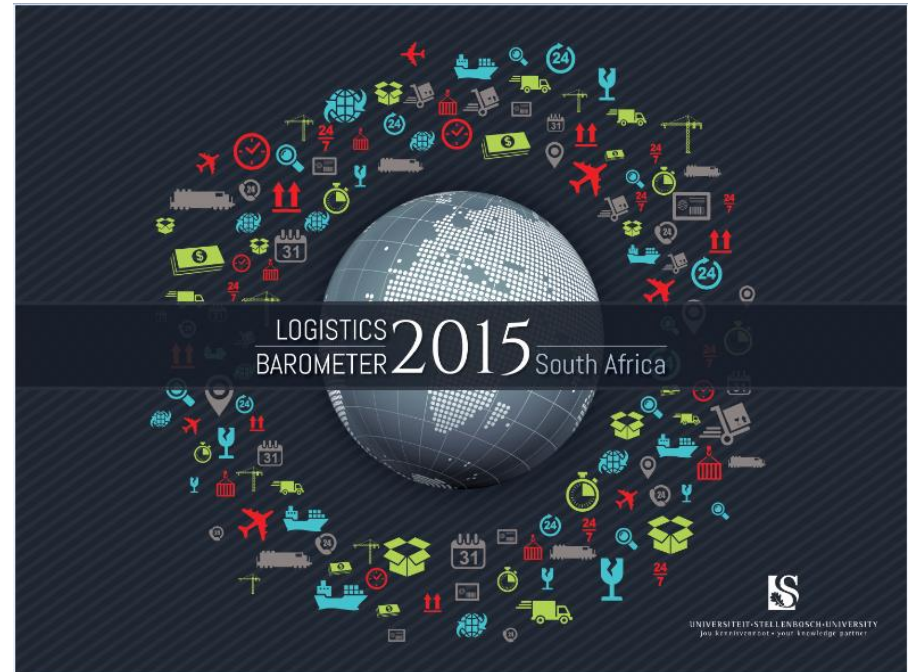


# Logistics cost model (GAIN)

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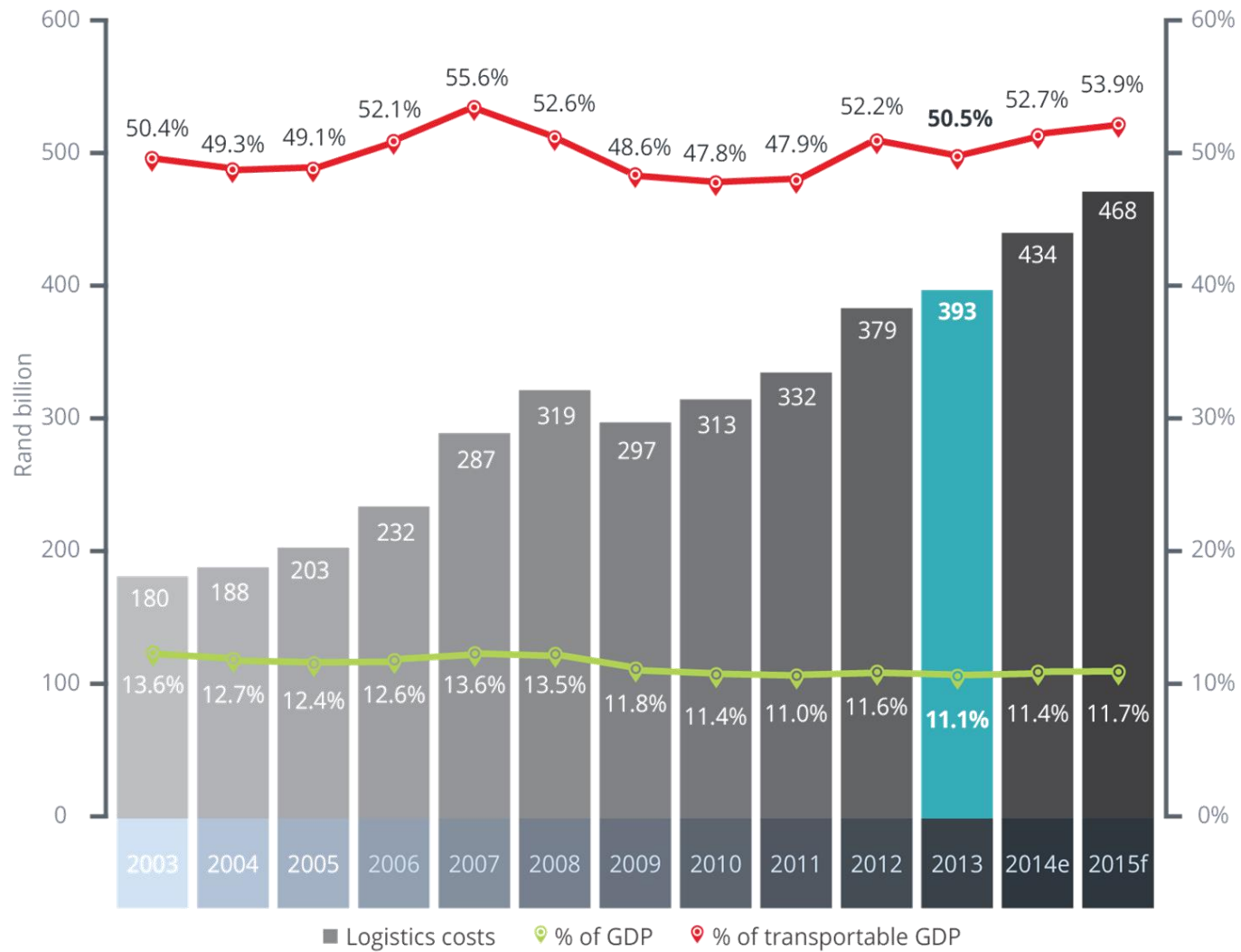


[www.csir.co.za/sol](http://www.csir.co.za/sol)

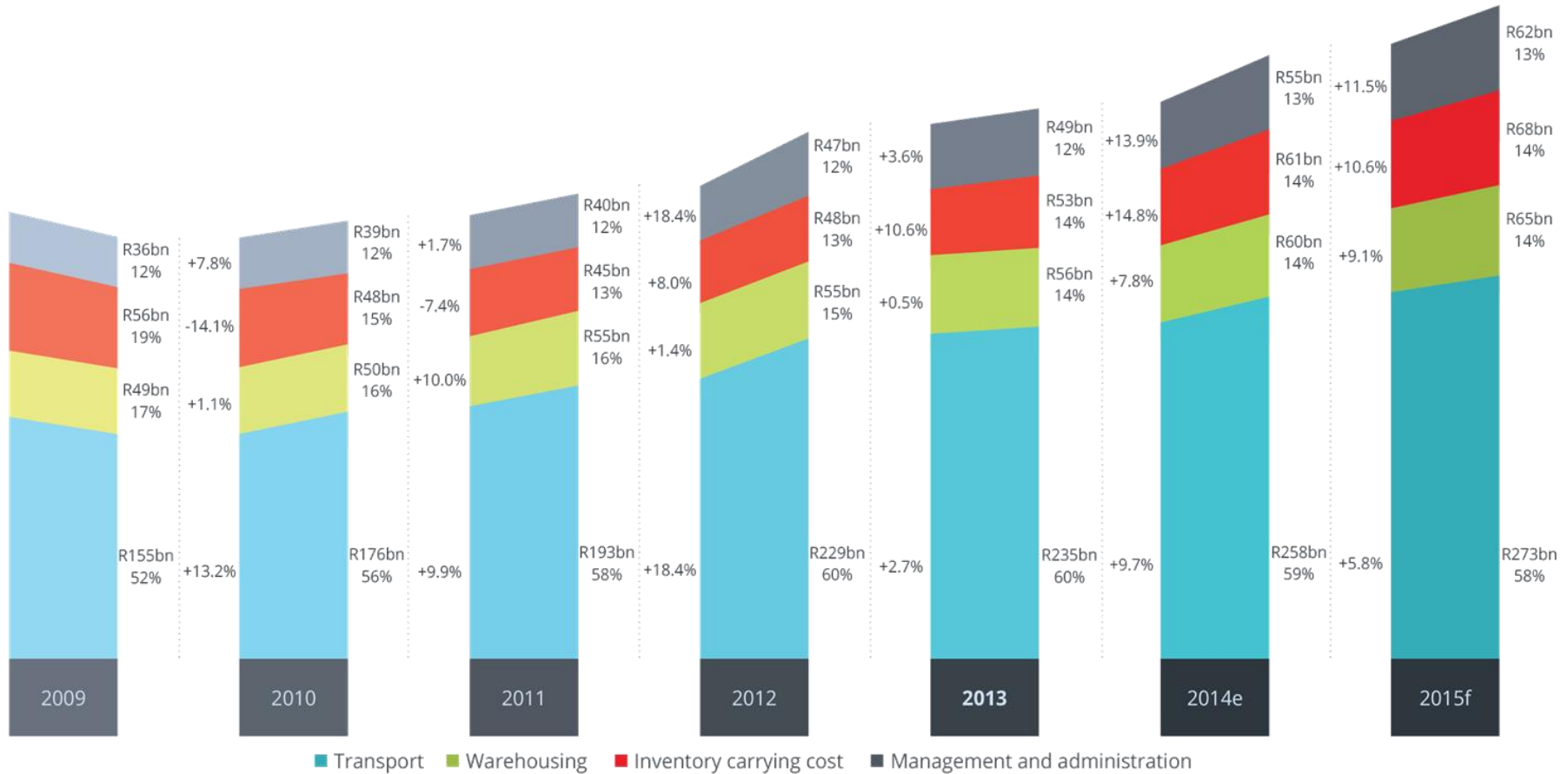


[www.sun.ac.za/logisticsbarometer](http://www.sun.ac.za/logisticsbarometer)

# Logistics cost model (GAIN)

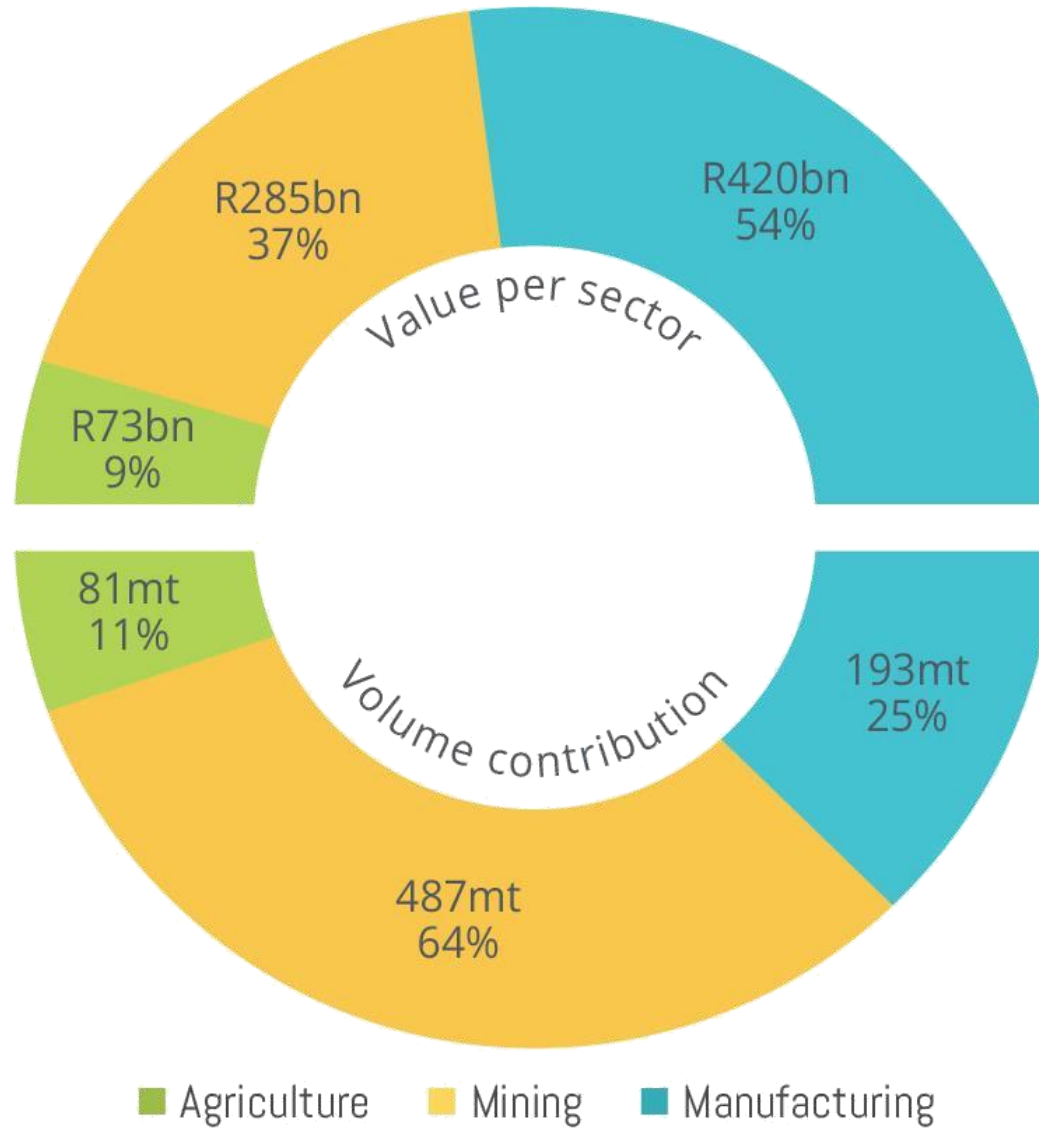


# Logistics cost model (GAIN)



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# Logistics cost model (GAIN)

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<b>2013</b>	<b>Volume (tonnes)</b>	<b>Transport intensity (tonne-km)</b>	<b>Logistics costs (Rand)</b>
Total economy	782 million	290 billion	393 billion
All agriculture	10.3%	11.7%	19.8%
<b>Grains*</b>	<b>2.3%</b>	<b>2.2%</b>	<b>2.8%</b>

## R 11 billion

Transport cost	Storage cost	Inventory carrying cost	Management and Admin cost
65%	14%	9%	12%

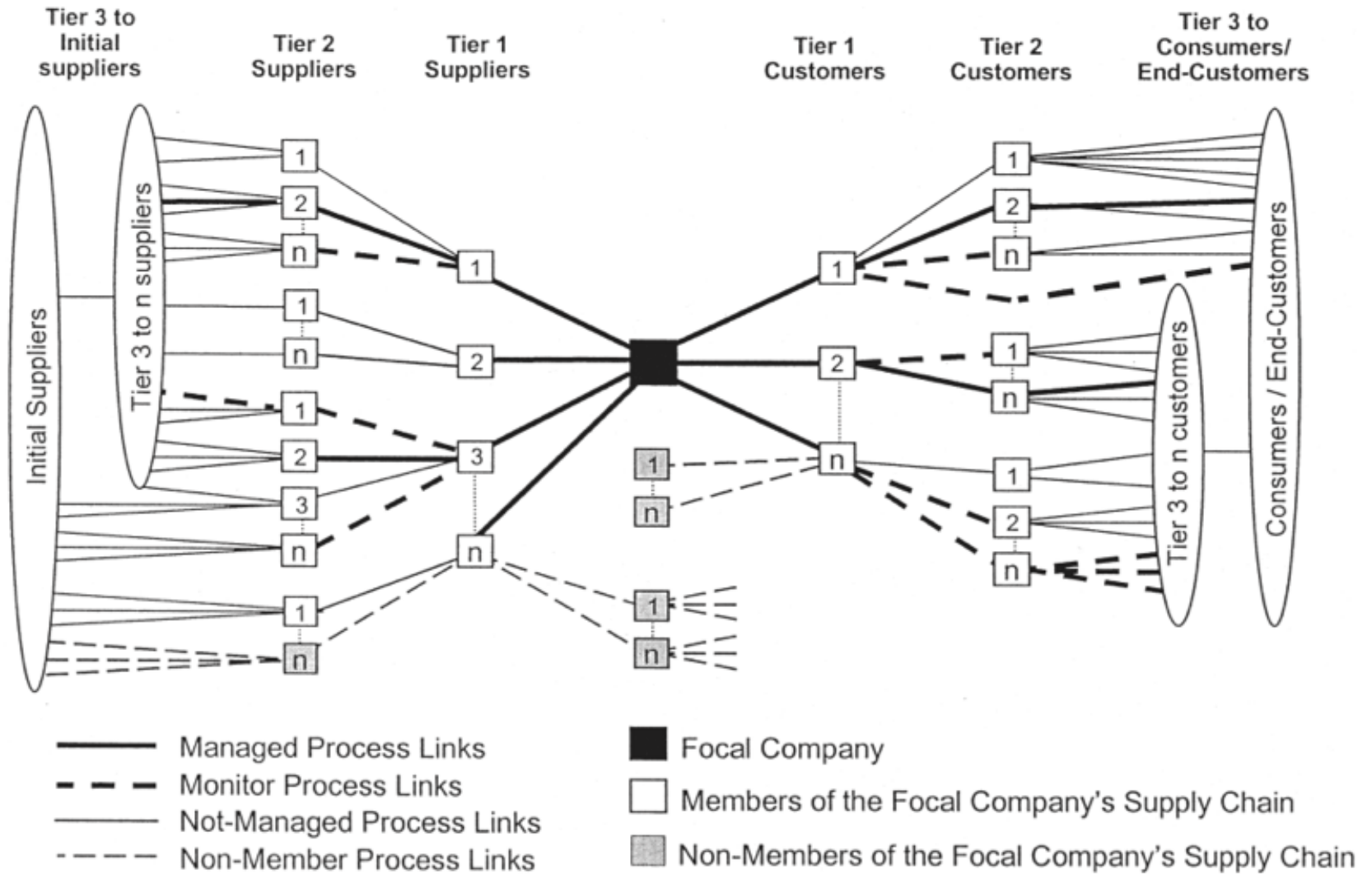
# Understanding behaviour

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# The grain sector's Facebook page



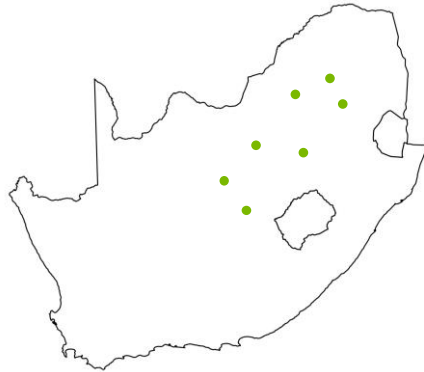
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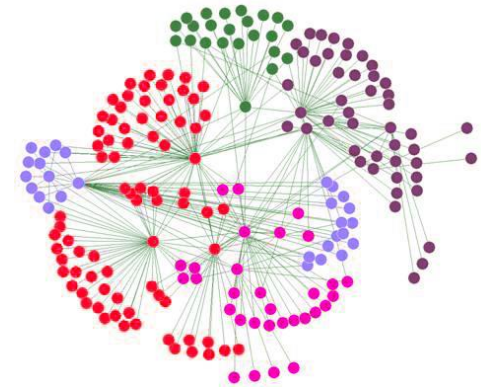
Commercial vehicle movements



Grain facilities



Grain network



16 000+ commercial vehicles  
Anonymous GPS logs  
Tracked over 5 years Jan 2010 – May 2014

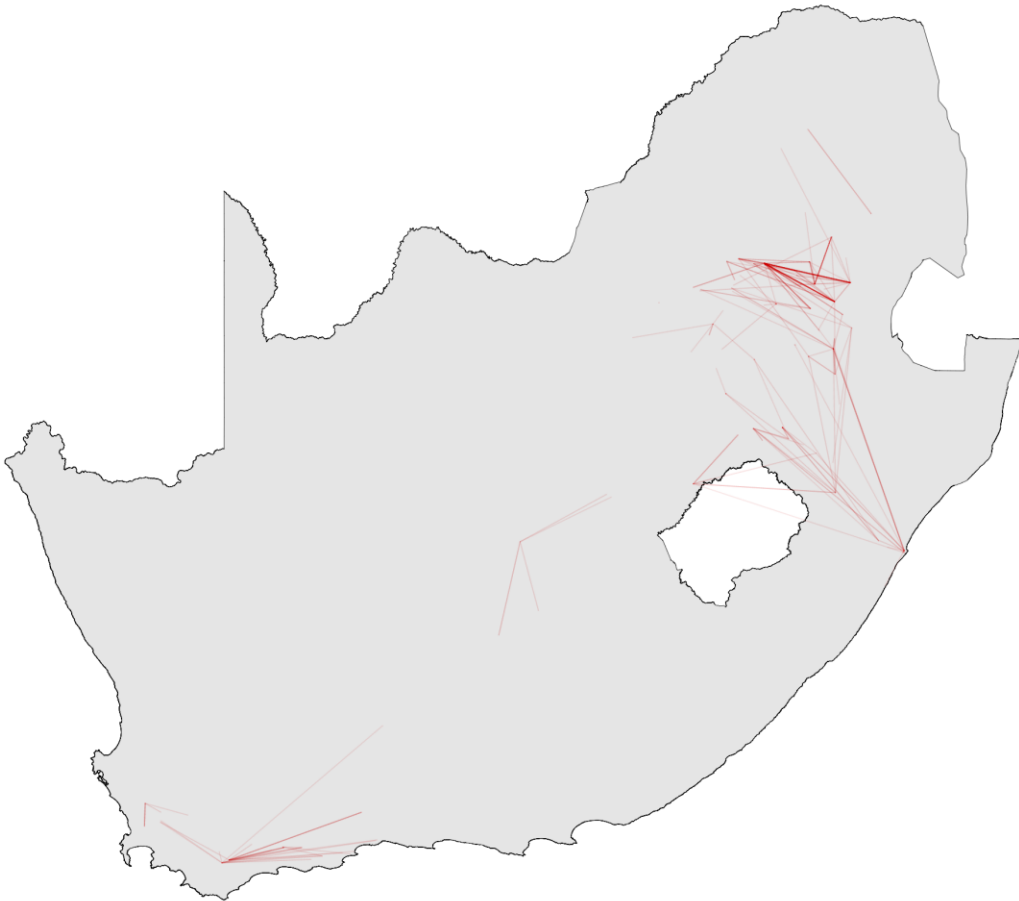
Sample of silos

Who is connected to whom through commercial vehicle movements?

# The grain sector's Facebook page

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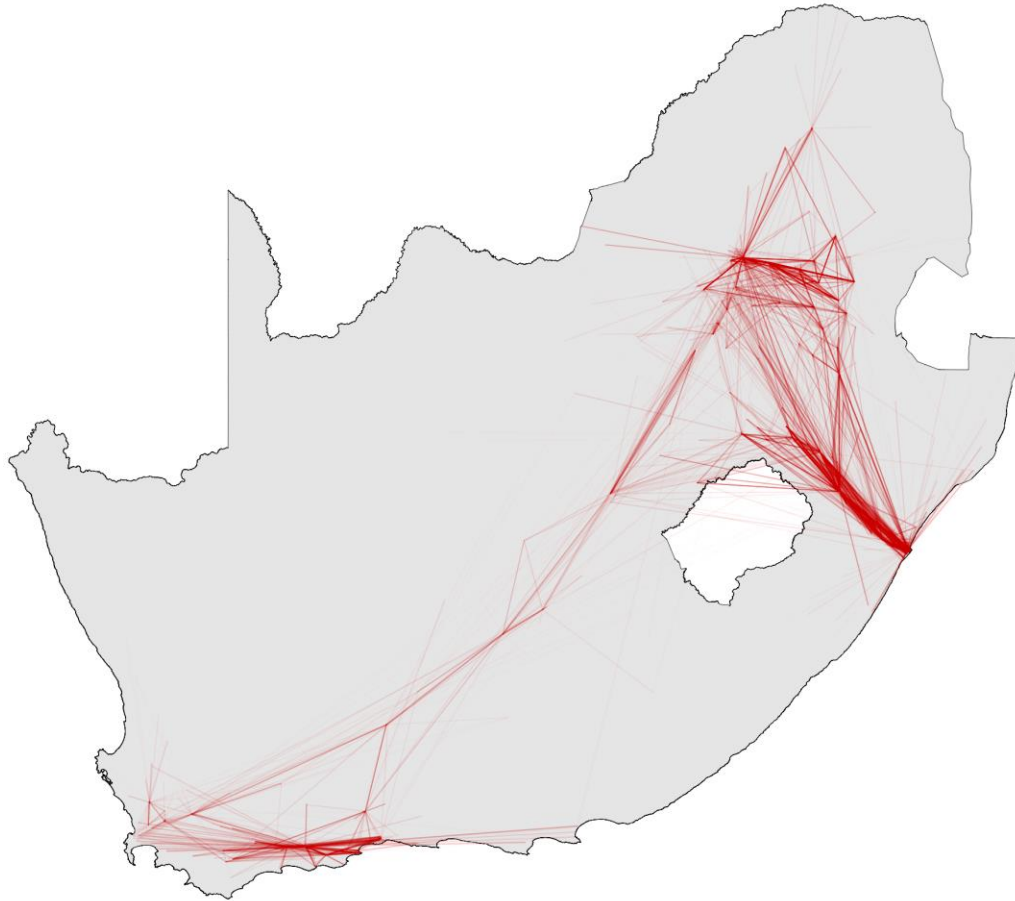
Tier 1 connections



# The grain sector's Facebook page

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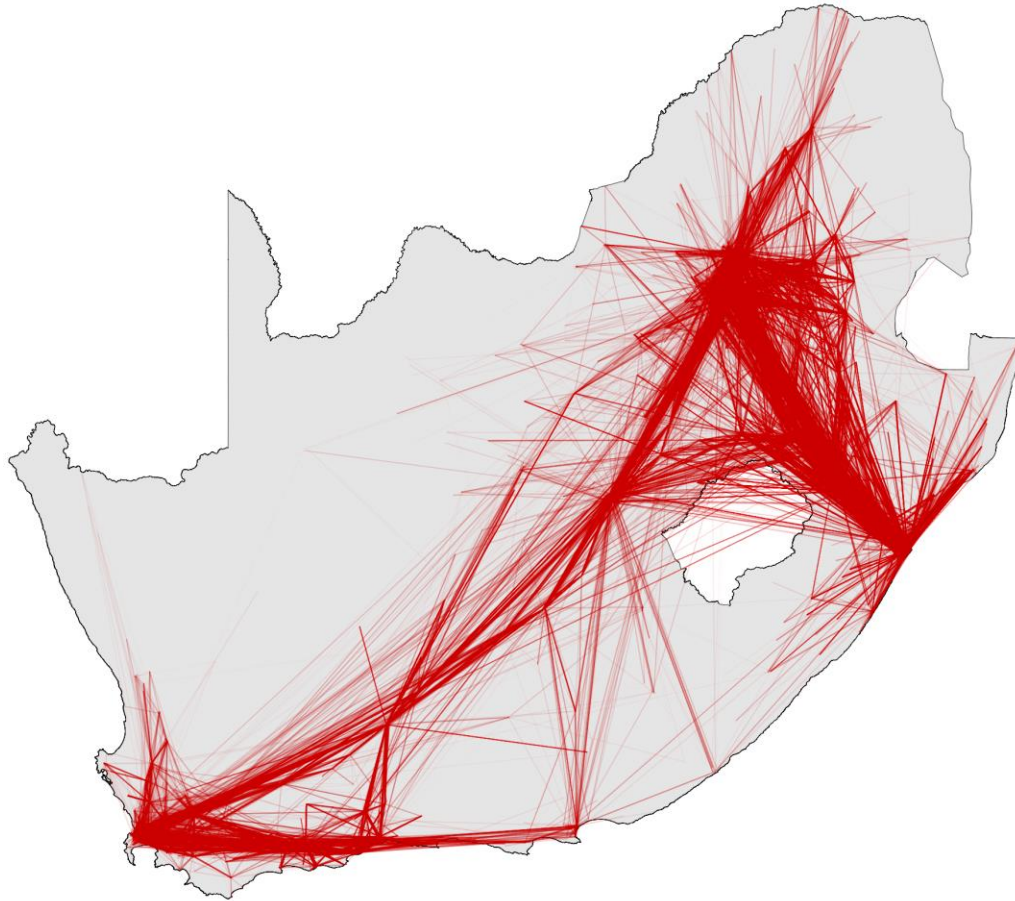
Tier 2 connections



# The grain sector's Facebook page

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Tier 3 connections



# The grain sector's Facebook page

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What can we learn from this?

- Synergistic connections
- Logistics communities
- Collaboration opportunities

*Current data gap: Large enough sample of grain vehicle GPS logs*

# Future collaboration

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1. Scope research that would directly impact Agbiz Grain members  
*(need input/suggestions from members)*
2. Determine level of industry participation  
*(data sharing, surveys)*
3. Develop funding model

... just do it! ...