# 5. Sensitivity Analysis

The Sensitivity Analysis (SA) for this study is based on the Scenario 1 model focusing on the event when a country stopped exporting one of the key food items due to diplomatic or diseases, etc. The analysis will evaluate how the new import ratios of distribution between alternative import source can affect the final total GHG emissions.

The group decided SA to focus on beef as it has the highest GHG emission among the meats. Currently, the three (3) sources of import for beef are Brazil, Australia and New Zealand. Both Brazil and Australia have the highest GHG emission per kg. Hence, the analysis will be conducted based on two (2) use cases :

Use Case 1 - Assumed Brazil is unable to export their beef to Singapore.

Use Case 2 – Assumed Australia is unable to export their beef to Singapore.

Therewith, the source for chilled beef and frozen beef will be between New Zealand and remaining source.

Below are the steps to prepare relevant data for the SA :

* **Adjusted Annual GHG Emission per Capita** will be derived based on six (6) different sets of import ratio (0:1, 0.2:0.8, 0.4:0.6, 0.6:0.4, 0.8:0.2, 1:0) from the remaining country source.
* **Residual** will be the differences between the **adjusted Annual GHG Emission per Capita** and the **optimised Annual GHG Emission per Capita**.

Graphical user interface, application

Description automatically generated

**Figure 5.1** Sensitivity analysis for use cases when Brazil or Australia stopped exporting their beef.

Use Case 1

As shown in the **Figure 5.1**, regardless of ratios, the overall **adjusted Annual GHG Emission per Capita** for the **Use Case 1** is lower than the **optimised** **Annual GHG Emission per Capita**. The highest residual is -4.89 which indicate lower GHG emission per capita without consuming Brazilian’s beef.

The maximum and minimum for **Use Case 1** is generally within the range of 0.3 kg CO2 eq. The lowest adjusted Annual GHG Emission per Capita is when sourcing the Brazilian’s portion 100% from New Zealand.

Use Case 2

The maximum and minimum for **Use Case 2** is generally within the range of 2.6 kg CO2 eq. The differences are mainly contributed by importing higher proportion of Brazilian chilled meat which has the highest total GHG per source for beef, that is 38.38 total kg CO2 eq. Therefore, in the event when Australian beef is unavailable, New Zealand is the best replacement option of Australia’s import portion to keep the adjusted **Annual GHG Emission per Capita** same if not lower than the optimised Annual GHG Emission per Capita.