Development of a Carbon-Mapping Framework for the International Distribution of Fresh Fruit

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“Climate change has evolved from being just another environmental problem to potentially the greatest threat facing our civilization”

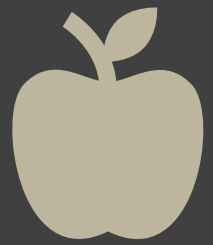
-Prof. Alan McKinnon, 2018

- United Nations (UN) created a set of 17 global goals
- Act as global blueprint to achieve better future for all
- Goal 13 : "Take urgent action to combat climate change and its impacts."
- Goal 9 : "Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation."

(Source: United Nations, 2020)

FRESH FRUIT DISTRIBUTION

Southern and northern hemisphere production seasons are complimentary.



Southern hemisphere exported 9,4 million tons of fruit to northern hemisphere in 2018 valued at $14,4 billion.

(Southern Hemisphere Association of Fresh Fruit Exporters, 2019)

Carbon intensive process- large shipment distances across multiple modes

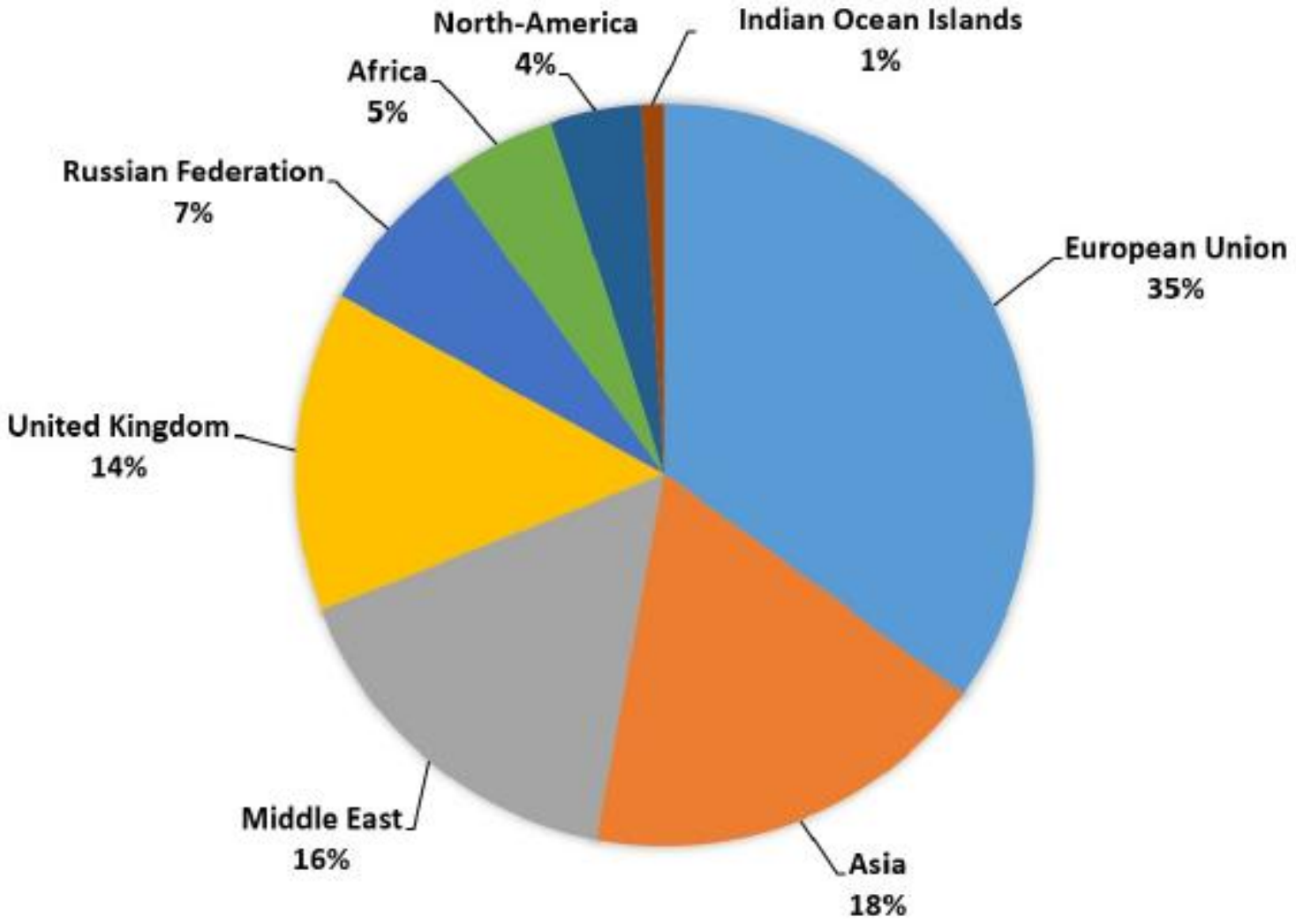
SIZE OF ISSUE

- Rizet, Browne, Cornelis, and Leonardi (2012) assessed the carbon footprint of different supply chains for various goods
- Scope of study is for logistics operations from the farm gate to the point of consumption
- Results:
  - Taking road, maritime transport as well as refrigeration into account from the farm gate up until retailer
  - Distributing apples from New Zealand to Ile de France retailer resulted in approximately 950 gCO_{2e}/kg apples.

Global distribution of fresh fruit is a major emitter!

SOUTH AFRICAN (SA) FRUIT EXPORT

- Biggest exporter of fresh fruit by volume in the southern hemisphere and second largest citrus exporter in the world (Fresh Produce Export Forum, 2020)
- Total volume across all fruit types: 2 605 008 tonnes valued at R36,4 billion ($2,3 billion) (Fresh Produce Export Forum, 2020)
- SA exports 60% of its fresh produce to 110 countries worldwide (SA Fruit Journal, 2020)



(Source: Department of Agriculture Forestry and Fisheries, 2018)

GLOBAL TREND

Majority of current frameworks/protocols focus on mapping emissions associated with a business entity and its assets or an entire country

- Leads to ambiguity- who takes responsibility for what emissions
- Companies simply outsource carbon intensive activities to other organisations to reduce emissions
- Large number of emissions in world are not accounted for such as maritime transport
- Complex and confusing process- not a true representation of emissions

Global shift towards measuring SC or product emissions

- Measure the emissions associated with a SC- map the activities, irrespective of ownership of assets
- Ensures that all processes are accounted for when determining emissions
- Easier to determine and interpret
- Can state what the carbon footprint of product is

WHERE DO WE GO FROM HERE?

Need	Determine what we currently emit (status quo) before embarking on reduction initiatives. Transform a complex problem to an understandable one.
Use	Use this as baseline to determine alternative transport scenarios and reduce emissions.
Create	Create a standardized framework to simplify carbon-mapping process of fresh fruit distribution.

HOW WILL A FRAMEWORK HELP?

01

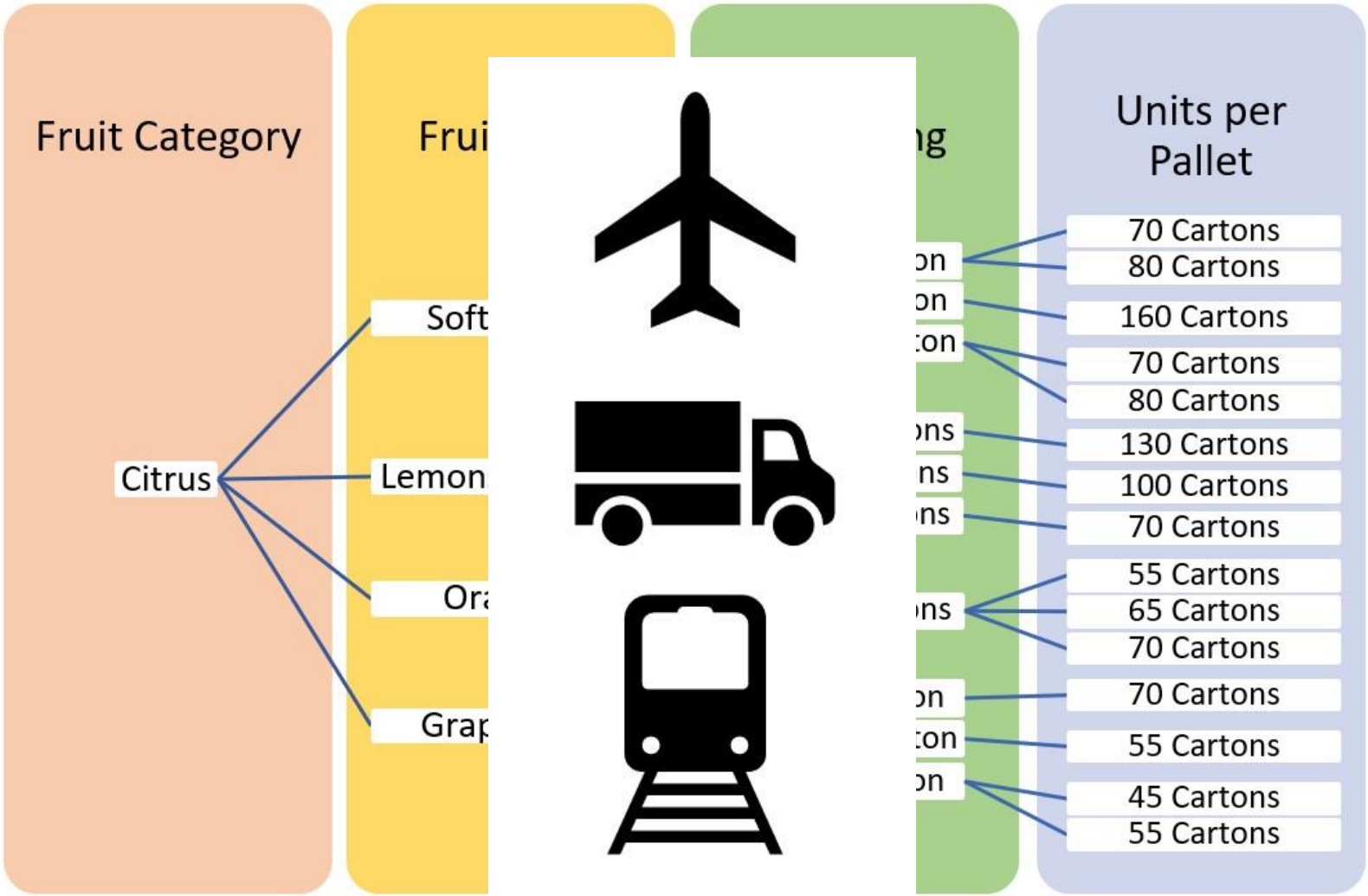
Simplify and standardize emission calculation process

02

Identify areas for improvement or reduction by providing overview of SC

03

Establish carbon footprint due to the distribution of product- will affect client's purchase choice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FRAMEWORK CREATION

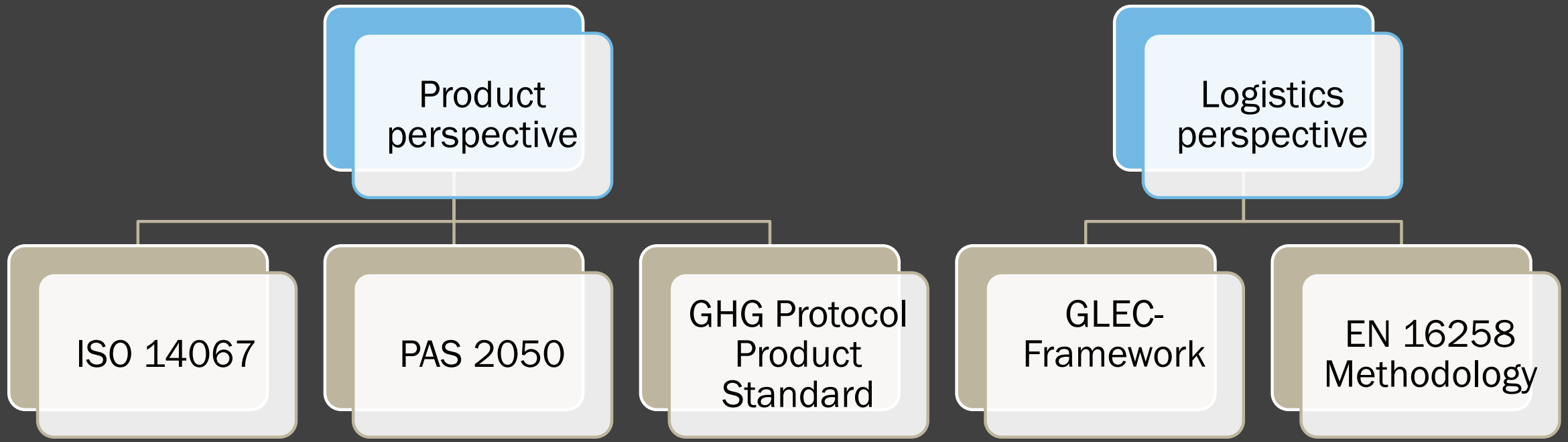
1. Literature Review- examine existing carbon-mapping frameworks and body of knowledge

2. Determine generic SC activities and SC for each fruit type

3. Establish emission factors for each activity in generic SC

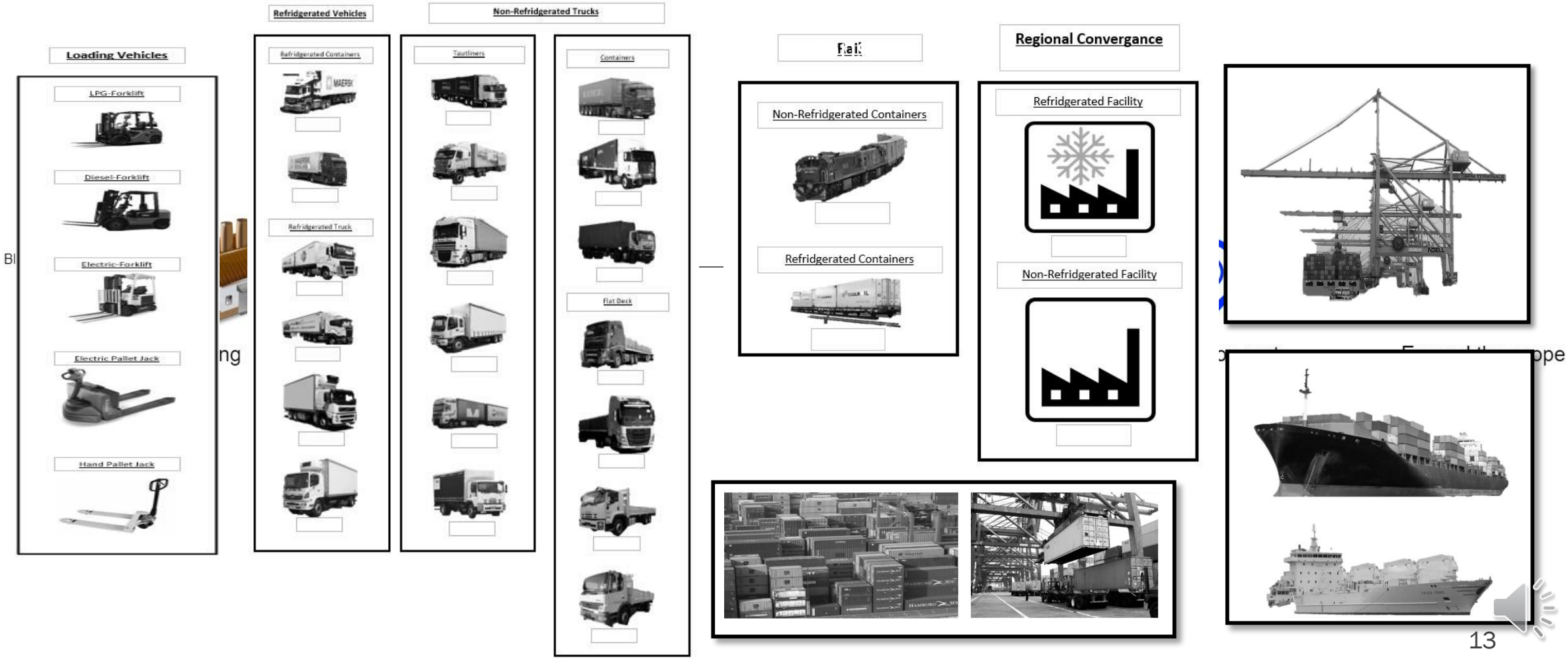
4. Develop framework

BASIS OF FRAMEWORK:



HOW WILL THE FRAMEWORK WORK?

Step 2: Collect data about the activities



CONCLUSION: WHERE AM I GOING NEXT?

Complete the Literature Review

Determine Generic activities in a fresh fruit SC for each fruit type and validate by means of interview(s)

Determine emission factors for identified activities and validate

Create the framework and develop in software.

Apply the framework to several different fruit SC in order to validate

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