# Palm Oil Case Study

## Learning Outcomes

* Describe key features of the global market for palm oil
* Use the UN ComTrade database to identify important trading patterns in palm oil
* Use R to retrieve and analyze select palm oil trade data from ComTrade
* Estimate palm oil prices and transportation costs for select trading partners
* Determine if prices and transportation cost conform to the spatial law-of-one price

## Exercise 1

Read <https://greenpalm.org/about-palm-oil/what-is-palm-oil/what-is-palm-oil-used-for>

Answer the following TRUE/FALSE questions.

1. Australia has an ideal climate for growing palm trees.
2. Palm oil has two harvesting periods, each lasting about six weeks.
3. About 50% of all supermarket products contain palm oil.
4. Palm oil is the base for dozens of different food ingredients such as stearic acid.
5. Indonesia and Malaysia together account for about one third of global palm oil production.
6. Expanding palm tree plantations is causing large losses in global biodiversity.
7. 90 percent of the world’s palm oil produers belong to the Roundtable on Sustainable Palm Oil

# Focus on Rotterdam

Rotterdam is a major port city in the Netherlands. Prior to 2004 Rotterdam was the world’s busiest port. The Wikipedia entry for Rotterdam indicates that the petrochemical industry is especially important in ROtterdam. In 2018 almost 30,000 vessels arrived at Rotterdam.

We see from [Index Mundi](https://www.indexmundi.com/agriculture/?commodity=palm-oil&graph=imports) that the EU-27 is the world’s third largest importer of palm oil behind India and China. We are interested to know what fraction of these European imports arrive at the Port of Rotterdam.

We can estimate receipts of palm oil at Rotterdam by using the UN ComTrade database to identify imports of palm oil by the Netherlands. Lets consider imports from the world as a whole and from the top palm oil exporters, which include Indonesia, Malaysia, Columbia and Guatemala.

# Types of Palm Oil

We will mostly focus on crude palm oil (CPO). Palm olein is a liquid refined form of palm oil used in cooking and baking. Stearin is a hard refined form of palm oil for food applications. To use the ComTrade database we need to know the harmonized system (HS) commodity code. The four-digit HS code for palm oil is 1511: “Palm oil and its fractions, whether or not refined, but not chemically modified.”. We wil use a pair of six digit codes:

* 151110: “Crude palm oil”
* 151190: “Palm oil or fractions simply refined”

# UN ComTrade Database

Read about the UN ComTrade database [here](https://unstats.un.org/unsd/tradekb/knowledgebase/50075/what-is-un-comtrade):

Answer the following TRUE/FaLSE questions.

1. The data within the UN ComTrade database is collected via UN surveys.
2. The UN ComTrade database contains over 40 billion records.

To use the database you need to know the country and commodity codes. The country code is in column A of a [UN Country Code Excel File](https://unstats.un.org/unsd/tradekb/Knowledgebase/50377/Comtrade-Country-Code-and-Name). The commodity code can be looked up [here](https://comtrade.un.org/db/mr/rfCommoditiesList.aspx)

# Manual Query of UN ComTrade

Take a guess: which country exports more crude palm oil (CPO) to Canada: Malaysia or the USA? To determine if you answered correctly access the [UN ComTrade](https://comtrade.un.org/data/) database and manually generate data for 2019 and 2020. Include Canadian imports from the world as a whole to serve as a benchmark.

# Using R to Query UN ComTrade

The UN has written a get.ComTrade function in R to enable users to extract data using R. The queries are limited in size unless you have premium access, You can view the function in the section titled “A user-defined function to extract data from the UN Comtrade API” by clicking [here](https://comtrade.un.org/data/Doc/api/ex/r). This is a complex function and you are not responsible for knowing how it works.

This function has been saved to “ComTrade\_Function.R”. Ensure that this file resides in your working directory so that it is available for use.

Need the following country codes:

* Netherlands 528 (reporter)
* Columbia 170 (partner)
* Guatemala 320 (partner)
* Indonesia 360 (partner)
* Malaysia 458 (partner)
* World 0 (partner)

In addition, to

* 151110: “Crude palm oil”
* 151190: “Palm oil or fractions simply refined”

we will work with

* 382600: “Biodiesel”

# Parameters for get.ComTrade function

The get.ComTrade function takes a large number of parameters. If you do not supply a particular parameter value then R will use the default value. The parameters we will use are as follows

* r ==> country code for reporting country (i.e., r=“528” for Netherlands)
* p ==> country codes for partner countries (e.g.,p=“170” for Colombia )
* ps ==> year (e.g., ps=“2020” for the year 2020)
* rg ==> type (e.g., rg=1 for imports)
* cc ==> commodity (e.g., cc=“151110” for crude palm oil)
* fmt ==> data save format (e.g., fmt=“csv” for comma separated values)

In our case the function will look as follows:

get.Comtrade(r=“528”, p=“0, 170, 320, 360, 458”, ps=“2020”, rg=1, cc=“151110”, fmt=“csv”)

After we retrieve the data we want it the form of a standard R dataframe. The following code gives the desired results:

setwd("C:/Users/Jim/Dropbox/Git/Markdown501/Palm Oil")  
source("ComTrade\_Function.R")  
dt <- get.Comtrade(r="528", p="0, 170, 320, 360, 458", ps="2020",   
 rg=1, cc="151110", fmt="csv")  
dtdf <- as.data.frame(do.call(rbind, dt))