

# Trade Statistics

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```
library(data.table)
library(ggplot2)
library(gridExtra)
library(readxl)
library(viridis)
library(hrbrthemes)

readRDS("/home/pawan/trade/totaltrade/total_exportsusd.rds")->usd
readRDS("/home/pawan/trade/totaltrade/total_exportsqty.rds")->qty
readRDS("/home/pawan/trade/totaltrade/total_importsusd.rds")->musd
readRDS("/home/pawan/trade/totaltrade/total_importsqty.rds")->mqty
as.data.table(read_excel("/home/pawan/trade/totaltrade/two-digit.xlsx"))->twodigit

my_theme <- theme_bw(base_size = 16) + ## Start with theme_bw and increase base size
  theme(text = element_text(family = "serif", color = "#333333"), ## Set font family and color
        plot.title = element_text(size = 20, face = "bold",
                                   hjust = 0.5, margin = margin(10, 0, 10, 0)), ## Center and margin
        axis.title = element_text(size = 18),
        axis.text = element_text(size = 14),
        legend.position = "bottom",
        legend.title = element_blank(), ## Remove legend title
        panel.grid.major = element_line(color = "#EEEEEE"), ## Lighter grid lines
        panel.border = element_blank(), ## Remove panel border
        axis.line = element_line(color = "#333333"), ## Add axis lines
        axis.text.x = element_text(angle = 90, vjust = 0.5, hjust=1),
        strip.background = element_rect(fill = "#F2F2F2", color = NA) ## Style facet strips
  )

## Export Data Cleaning
usd[,HSCode4 := substr(HSCode, 1, 4)]
```

```

usd[,HSCode6 := substr(HSCode, 1, 6)]
usd[,HSCode2 := substr(HSCode, 1, 2)]
qty[,HSCode2 := substr(HSCode, 1, 2)]
qty[,HSCode4 := substr(HSCode, 1, 4)]
qty[,HSCode6 := substr(HSCode, 1, 6)]

as.numeric(twodigit$HSCode2)->twodigit$HSCode2
as.numeric(qty$HSCode2)->qty$HSCode2

merge(qty,twodigit,by=c("HSCode2"),all.x=TRUE)->qty

as.numeric(gsub(",", "", qty$Export))->qty$Export
ifelse(is.na(qty$Export), 0, qty$Export)->qty$Export

as.numeric(gsub(",", "", usd$Export))->usd$Export
ifelse(is.na(usd$Export), 0, usd$Export)->usd$Export

qty[,.(Export_Qty = sum(Export)),.(Year)]->exportqty
usd[,.(Export_USD = sum(Export)),.(Year)]->exportusd

qty[,.(Qty = sum(Export)),.(Year, HSCode2)]->hscode2
hscode2[,.(Qty = sum(Qty)),.(HSCode2)]->a
##a[, Share := round(Qty*100/(sum(a$Qty)),2)][order(Share)]

## Import Data Cleaning
musd[,HSCode4 := substr(HSCode, 1, 4)]
musd[,HSCode6 := substr(HSCode, 1, 6)]
musd[,HSCode2 := substr(HSCode, 1, 2)]
mqty[,HSCode2 := substr(HSCode, 1, 2)]
mqty[,HSCode4 := substr(HSCode, 1, 4)]
mqty[,HSCode6 := substr(HSCode, 1, 6)]

as.numeric(gsub(",", "", mqty$Import))->mqty$Import
ifelse(is.na(mqty$Import), 0, mqty$Import)->mqty$Import

as.numeric(gsub(",", "", musd$Import))->musd$Import
ifelse(is.na(musd$Import), 0, musd$Import)->musd$Import

mqty[,.(Import_Qty = sum(Import)),.(Year)]->importqty
musd[,.(Import_USD = sum(Import)),.(Year)]->importusd

mqty[,.(Qty = sum(Import)),.(Year, HSCode2)]->hscode21

```

```

hscode21[,.(Qty = sum(Qty)),.(HSCode2)]->b
##b[, Share := round(Qty*100/(sum(b$Qty)),2)][order(Share)]

## Net Trade Tarde Balance
merge(exportqty, importqty, by = "Year")->trade
merge(trade, exportusd, by = "Year")->trade
merge(trade, importusd, by = "Year")->trade

trade[, Trade_Balance := (Export_USD - Import_USD)]

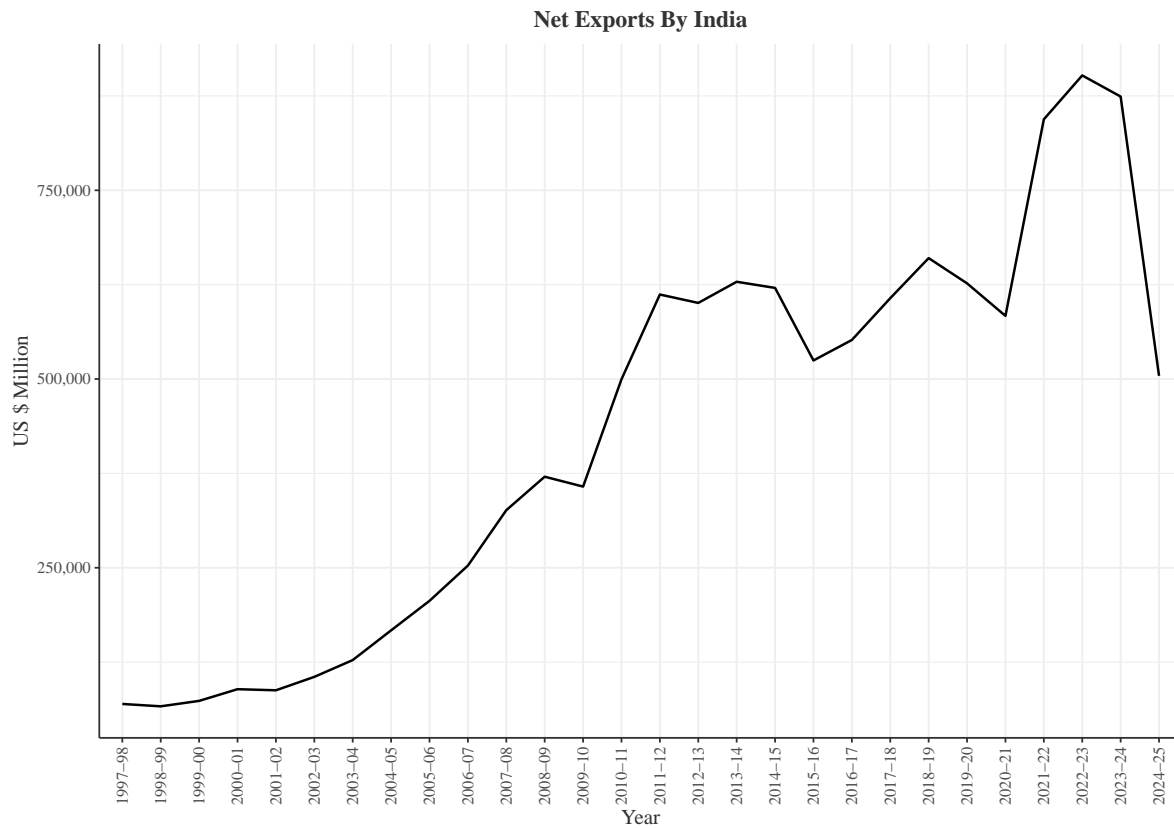
```

## Trade Statistics

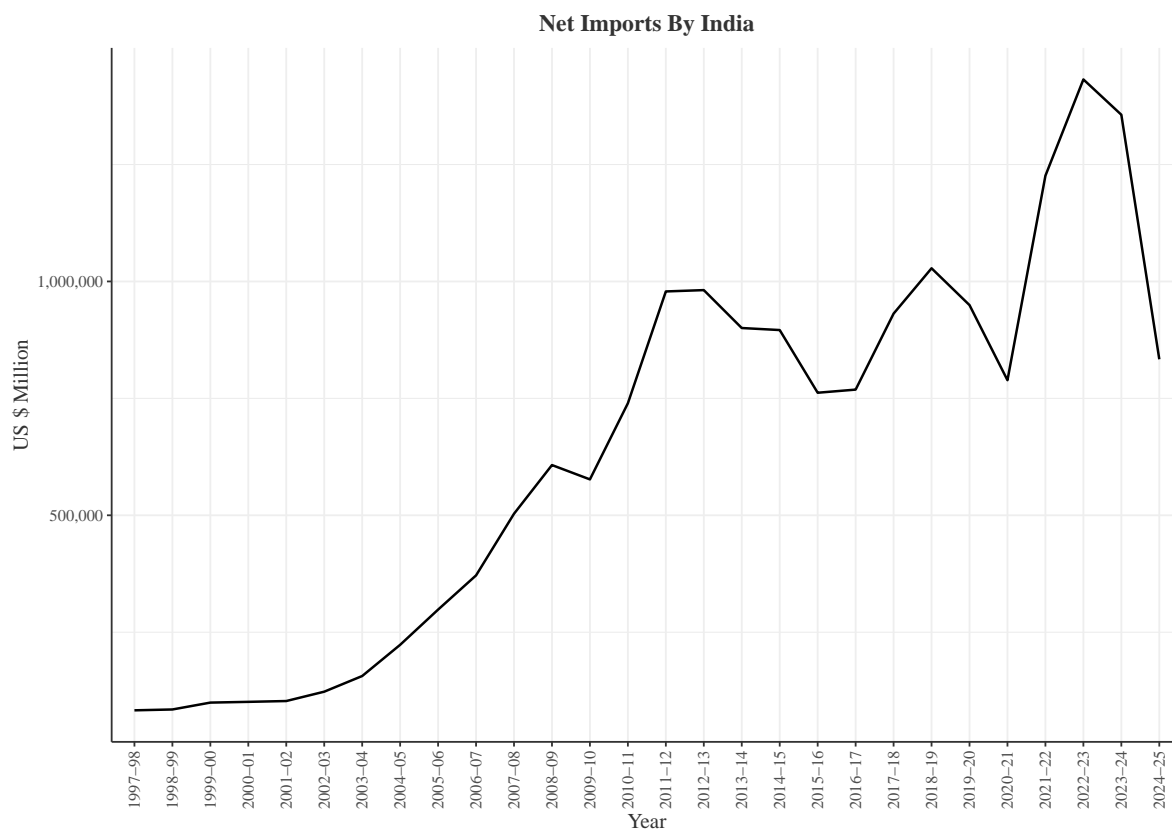
```

ggplot(trade, aes(x = Year, y = Export_USD, group = 1)) +
  geom_line(linewidth = 1) +
  my_theme +
  scale_y_continuous(labels = scales::comma) +
  labs(y = "US $ Million") +
  ggtitle("Net Exports By India")->p1
p1

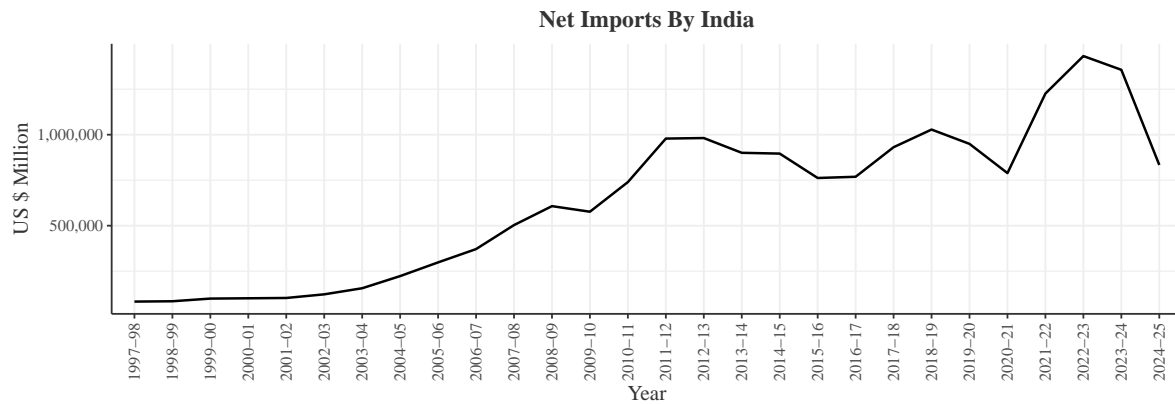
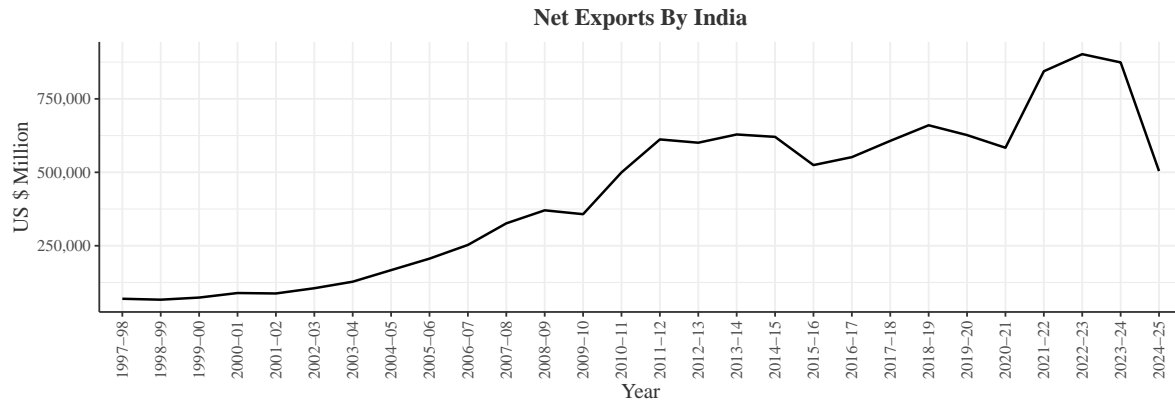
```



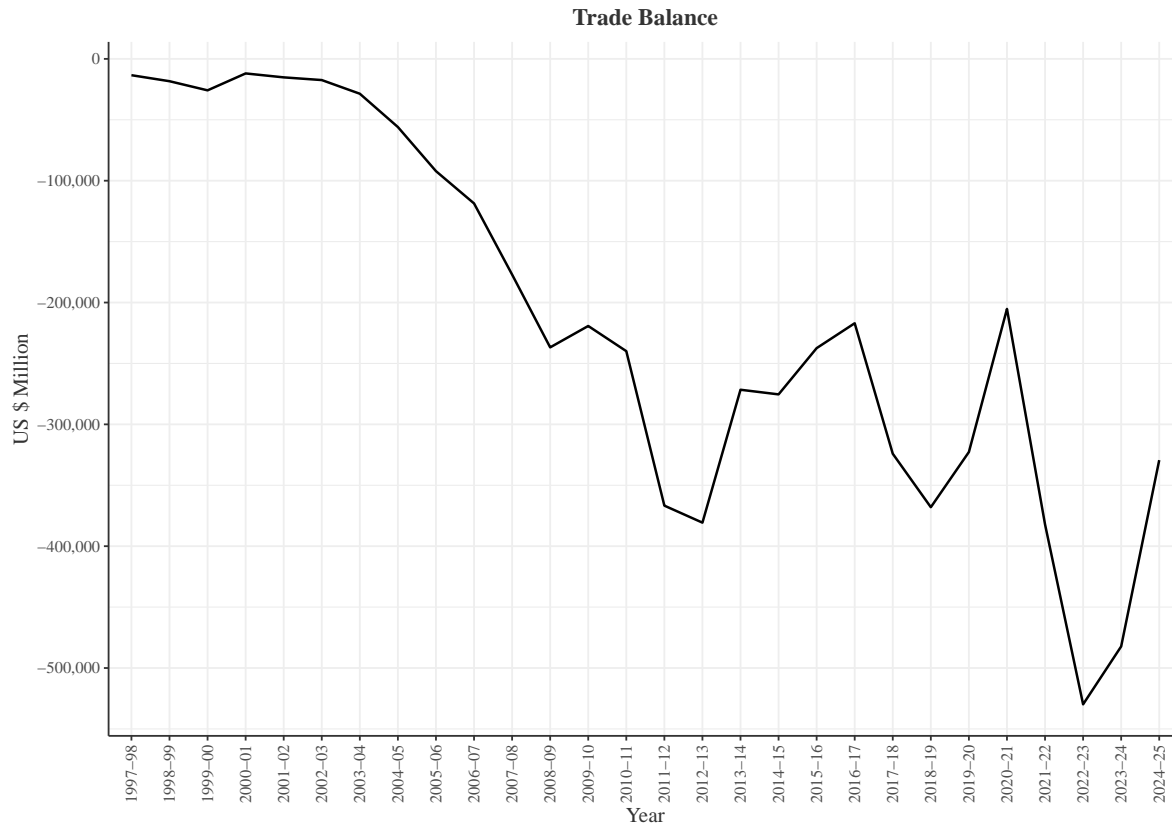
```
ggplot(trade, aes(x = Year, y = Import_USD, group = 1)) +
  geom_line(linewidth = 1) +
  my_theme +
  scale_y_continuous(labels = scales::comma) +
  labs(y = "US $ Million") +
  ggtitle("Net Imports By India")->p2
p2
```



```
grid.arrange(p1, p2)
```



```
# Trade Balance
ggplot(trade, aes(x = Year, y = Trade_Balance, group = 1)) +
  geom_line(linewidth = 1) +
  my_theme +
  scale_y_continuous(labels = scales::comma) +
  labs(y = "US $ Million") +
  ggtitle("Trade Balance")
```



## Cereals Export

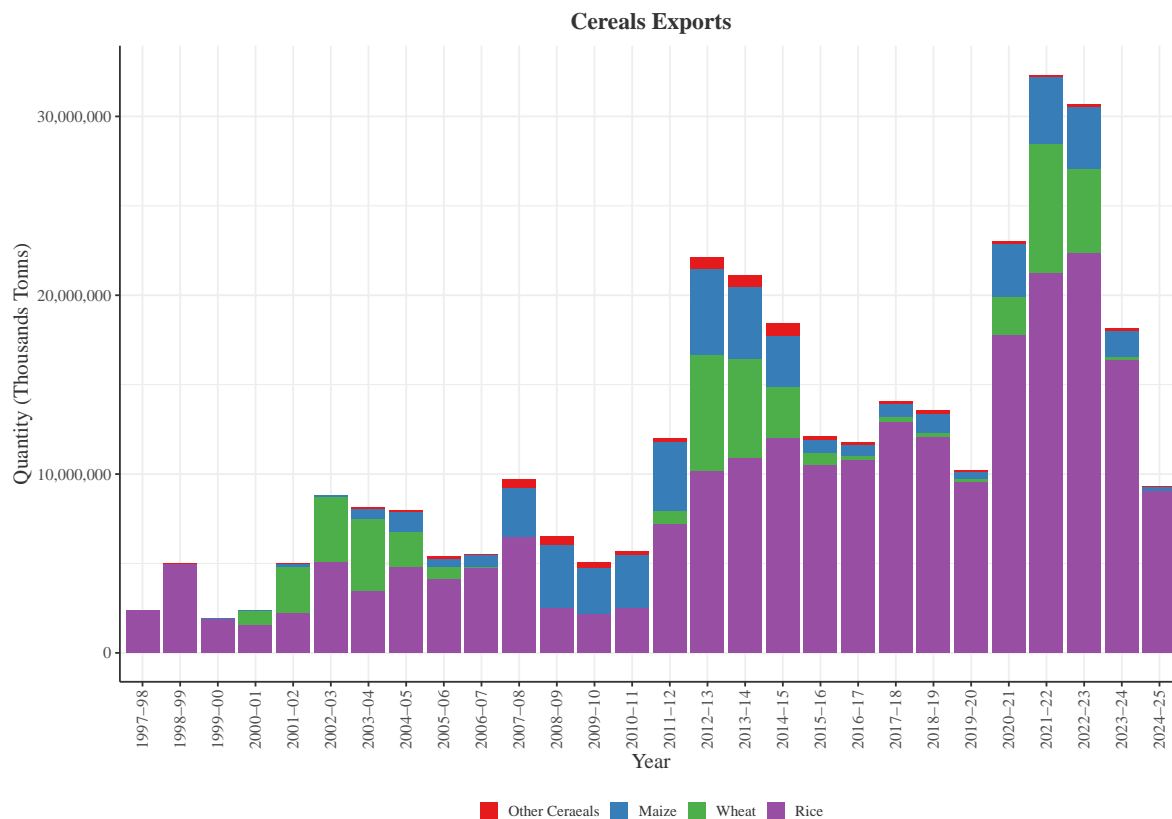
```

qty[HSCode2 == "10"]->t0
ifelse(t0$HSCode4 == "1006", "Rice",
ifelse(t0$HSCode4 == "1001", "Wheat",
ifelse(t0$HSCode4 == "1005", "Maize", "Other Ceraeals")))->t0$Commodity4
t0[,.(Qty = sum(Export)),.(Year, Commodity4)]->t0

factor(t0$Commodity4, levels = c("Other Ceraeals", "Maize",
                                "Wheat", "Rice"))->t0$Commodity4
ggplot(t0, aes(x = Year, y = Qty)) +
  geom_bar(aes(fill = Commodity4), stat = "identity") +
  my_theme +
  scale_fill_brewer(palette = "Set1") +
  scale_y_continuous(labels = scales::comma) +

```

```
labs(y = "Quantity (Thousands Tonns)") +
ggtitle("Cereals Exports")
```

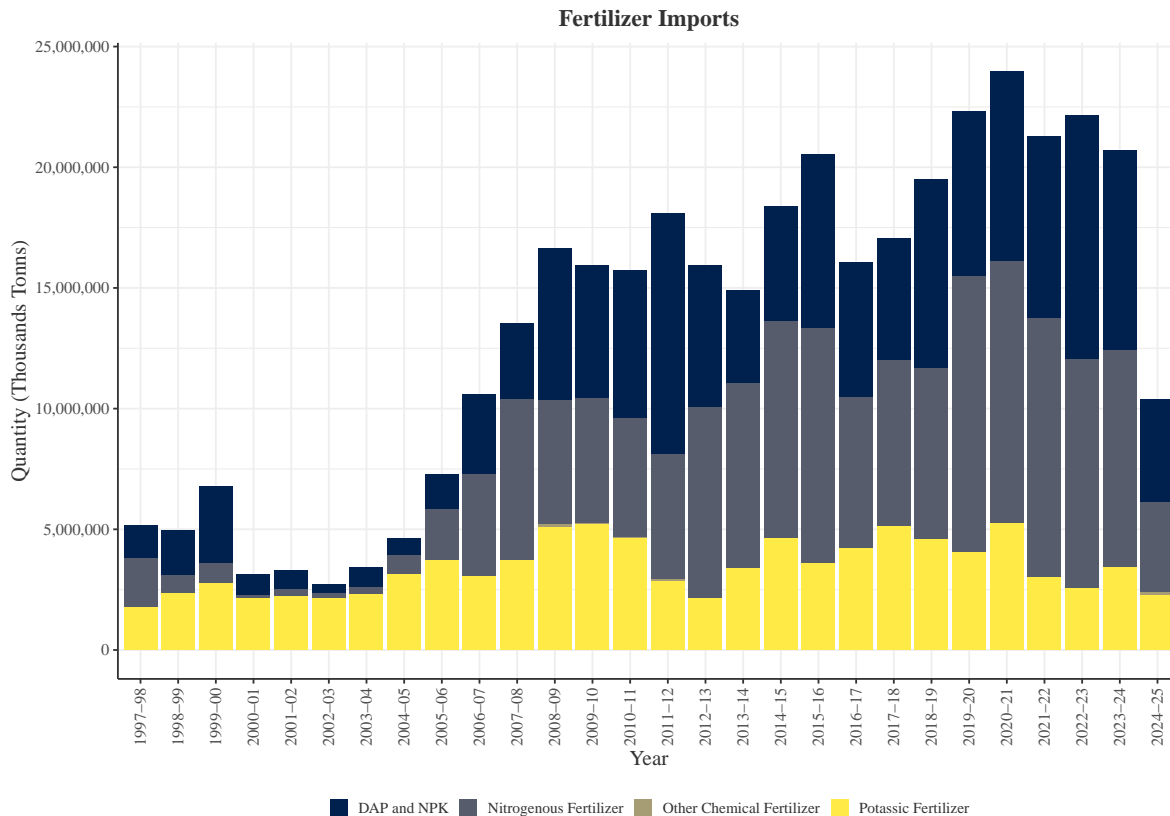


## Fertilizer Import

```
mqty[HSCode2 == "31"]->f
ifelse(f$HSCode4 == "3102", "Nitrogenous Fertilizer",
ifelse(f$HSCode4 == "3104", "Potassic Fertilizer",
ifelse(f$HSCode4 == "3105", "DAP and NPK", "Other Chemical Fertilizer")))->f$Commodity4
f[,.(Qty = sum(Import)),.(Year, Commodity4)]->f
ggplot(f, aes(x = Year, y = Qty)) +
  geom_bar(aes(fill = Commodity4), stat = "identity") +
  scale_fill_viridis(discrete = T, option = "E") +
  theme_ipsum() +
  my_theme +
```

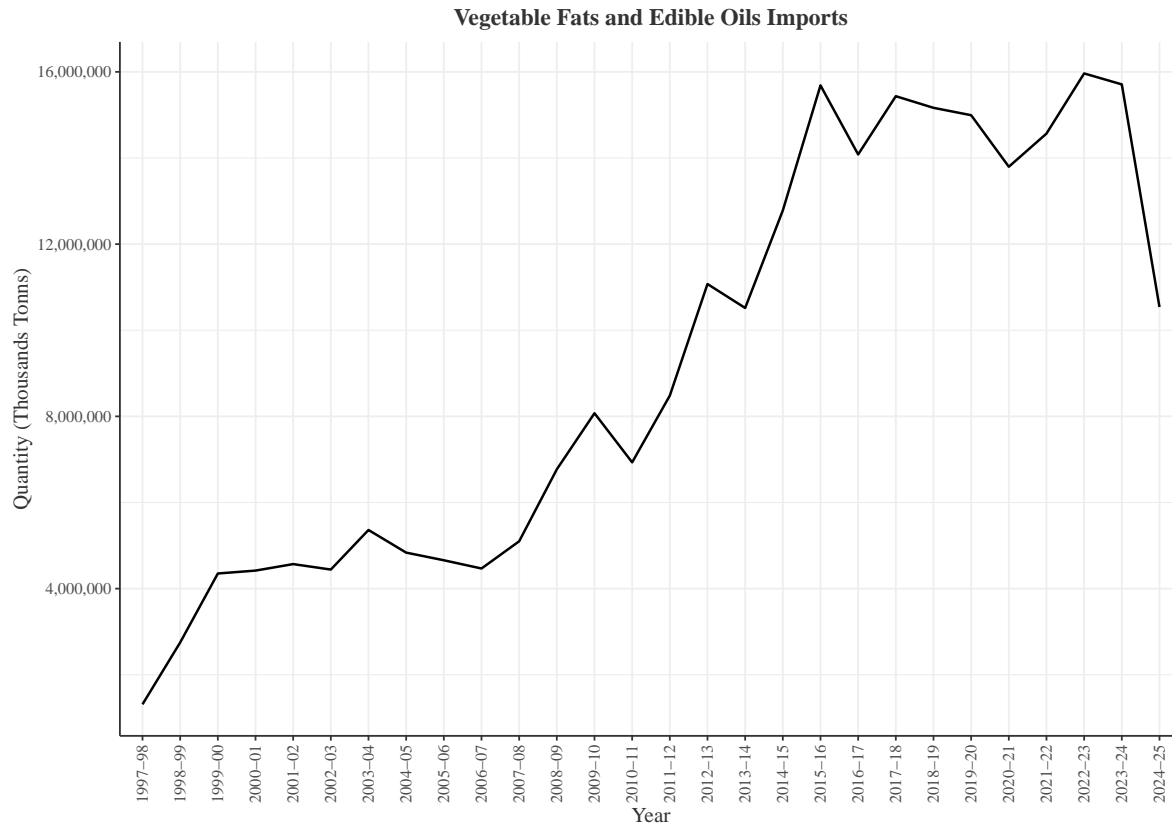


```
scale_y_continuous(labels = scales::comma) +
labs(y = "Quantity (Thousands Tonns)") +
ggtitle("Fertilizer Imports")
```



## Fats and Oil Import

```
mqty[HSCode2 == "15"]->h1
h1[,.(Qty = sum(Import)),.(Year)]->h1
ggplot(h1, aes(x = Year, y = Qty, group = 1)) +
  geom_line(linewidth = 1) +
  my_theme +
  scale_fill_brewer(palette = "Set2") +
  scale_y_continuous(labels = scales::comma) +
  labs(y = "Quantity (Thousands Tonns)") +
  ggtitle("Vegetable Fats and Edible Oils Imports")
```



## Petroleum Import

```
mqty[HSCode2 == "27"]->h2
ifelse(h2$HSCode4 == "2701", "Coal",
ifelse(h2$HSCode4 == "2709", "Petroleum Oils",
ifelse(h2$HSCode4 == "2711", "Petroleum Gases", "Other Petroleum")))->h2$Commodity4
h2[,.(Qty = sum(Import)),.(Year, Commodity4)]->h2
ggplot(h2, aes(x = Year, y = Qty)) +
  geom_bar(aes(fill = Commodity4), stat = "identity") +
  my_theme +
  scale_fill_brewer(palette = "Set2") +
  scale_y_continuous(labels = scales::comma) +
  labs(y = "Quantity (Thousands Tonns)") +
  ggtitle("Petroleum Imports")
```

