

Assignment-part2

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4/27/2018

Data Clean

```
library(stringr)
suppressMessages(library(tidyverse))
library(dplyr)
library(ggplot2)
library(readxl)
```

```
## Warning: package 'readxl' was built under R version 3.4.4
```

```
veg.1 <- read_xlsx("veg1.xlsx")
```

```
## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F1192 / R1192C6: got 'ARIZONA'
```

```
## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F1193 / R1193C6: got 'ARIZONA'
```

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## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F1194 / R1194C6: got 'ARIZONA'
```

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## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F1195 / R1195C6: got 'ARIZONA'
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## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F1196 / R1196C6: got 'ARIZONA'
```

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## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F1197 / R1197C6: got 'ARIZONA'
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```
## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F1198 / R1198C6: got 'ARIZONA'
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```
## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F1199 / R1199C6: got 'ARIZONA'
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## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F1200 / R1200C6: got 'ARIZONA'
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## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F1201 / R1201C6: got 'ARIZONA'
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## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F1202 / R1202C6: got 'ARIZONA'
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```
## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F1203 / R1203C6: got 'ARIZONA'
```

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## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F1204 / R1204C6: got 'ARIZONA'
```

```
## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F1205 / R1205C6: got 'ARIZONA'
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```
## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F19492 / R19492C6: got 'TEXAS'

## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F19493 / R19493C6: got 'TEXAS'

## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F19494 / R19494C6: got 'TEXAS'

## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F19495 / R19495C6: got 'TEXAS'

## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F19496 / R19496C6: got 'TEXAS'

## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F19497 / R19497C6: got 'TEXAS'

## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F19498 / R19498C6: got 'TEXAS'

## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F19499 / R19499C6: got 'TEXAS'

## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F19500 / R19500C6: got 'TEXAS'

## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F19501 / R19501C6: got 'TEXAS'

## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F19502 / R19502C6: got 'TEXAS'

## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F19503 / R19503C6: got 'TEXAS'

## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F19504 / R19504C6: got 'TEXAS'

## Warning in read_fun(path = path, sheet_i = sheet, limits = limits, shim =
## shim, : Expecting logical in F19505 / R19505C6: got 'TEXAS'

a <- apply(veg.1, 2, n_distinct)
c <- names(a[a>1])

veg2 <- select(veg.1, c)
apply(veg2, 2, n_distinct)
```

```
##           Year      Geo Level      State ANSI      Region
##           13          2          2          6
##      Commodity      Data Item      Domain Domain Category
##           5          54          13          240
##           Value
##           1271
```

```
veg.3 <- dplyr::rename(veg2,
                        Geo = `Geo Level`,
                        State = `State ANSI`,
                        Data = `Data Item`,
                        Category = `Domain Category`)
```

```
cnames.3 <- colnames(veg.3)
cnames.3
```

```
## [1] "Year"      "Geo"      "State"    "Region"   "Commodity" "Data"
## [7] "Domain"    "Category" "Value"
```

```
unique(veg.3[, "Commodity"])
```

```
## # A tibble: 5 x 1
##   Commodity
##   <chr>
## 1 BROCCOLI
## 2 CAULIFLOWER
## 3 VEGETABLE TOTALS
## 4 VEGETABLES, OTHER
## 5 BRUSSELS SPROUTS
```

```
unique(veg.3[, "Data"]) %>% print(n=60)
```

```
## # A tibble: 54 x 1
##   Data
##   <chr>
## 1 BROCCOLI - APPLICATIONS, MEASURED IN LB
## 2 BROCCOLI - APPLICATIONS, MEASURED IN LB / ACRE / APPLICATION, 10TH PER~
## 3 BROCCOLI - APPLICATIONS, MEASURED IN LB / ACRE / APPLICATION, 90TH PER~
## 4 BROCCOLI - APPLICATIONS, MEASURED IN LB / ACRE / APPLICATION, AVG
## 5 BROCCOLI - APPLICATIONS, MEASURED IN LB / ACRE / APPLICATION, CV PCT
## 6 BROCCOLI - APPLICATIONS, MEASURED IN LB / ACRE / APPLICATION, MEDIAN
## 7 BROCCOLI - APPLICATIONS, MEASURED IN LB / ACRE / YEAR, 10TH PERCENTILE
## 8 BROCCOLI - APPLICATIONS, MEASURED IN LB / ACRE / YEAR, 90TH PERCENTILE
## 9 BROCCOLI - APPLICATIONS, MEASURED IN LB / ACRE / YEAR, AVG
## 10 BROCCOLI - APPLICATIONS, MEASURED IN LB / ACRE / YEAR, CV PCT
## 11 BROCCOLI - APPLICATIONS, MEASURED IN LB / ACRE / YEAR, MEDIAN
## 12 BROCCOLI - APPLICATIONS, MEASURED IN NUMBER, 10TH PERCENTILE
## 13 BROCCOLI - APPLICATIONS, MEASURED IN NUMBER, 90TH PERCENTILE
## 14 BROCCOLI - APPLICATIONS, MEASURED IN NUMBER, AVG
## 15 BROCCOLI - APPLICATIONS, MEASURED IN NUMBER, CV PCT
## 16 BROCCOLI - APPLICATIONS, MEASURED IN NUMBER, MEDIAN
## 17 BROCCOLI - TREATED, MEASURED IN PCT OF AREA PLANTED, 10TH PERCENTILE
## 18 BROCCOLI - TREATED, MEASURED IN PCT OF AREA PLANTED, 90TH PERCENTILE
## 19 BROCCOLI - TREATED, MEASURED IN PCT OF AREA PLANTED, AVG
## 20 BROCCOLI - TREATED, MEASURED IN PCT OF AREA PLANTED, CV PCT
## 21 BROCCOLI - TREATED, MEASURED IN PCT OF AREA PLANTED, MEDIAN
## 22 CAULIFLOWER - APPLICATIONS, MEASURED IN LB
## 23 CAULIFLOWER - APPLICATIONS, MEASURED IN LB / ACRE / APPLICATION, AVG
## 24 CAULIFLOWER - APPLICATIONS, MEASURED IN LB / ACRE / YEAR, AVG
## 25 CAULIFLOWER - APPLICATIONS, MEASURED IN NUMBER, AVG
## 26 CAULIFLOWER - TREATED, MEASURED IN PCT OF AREA PLANTED, AVG
## 27 VEGETABLE TOTALS, (EXCL POTATOES), INCL STRAWBERRIES, IN THE OPEN - PE~
## 28 VEGETABLE TOTALS, (EXCL POTATOES), INCL STRAWBERRIES, IN THE OPEN - PE~
## 29 VEGETABLES, OTHER, (COMBINED, EXCL POTATOES), HONEY BEE POLLINATION - ~
## 30 VEGETABLES, OTHER, (COMBINED, EXCL POTATOES), HONEY BEE POLLINATION - ~
## 31 VEGETABLES, OTHER, (COMBINED, EXCL POTATOES), HONEY BEE POLLINATION - ~
## 32 VEGETABLES, OTHER, (COMBINED, EXCL POTATOES), HONEY BEE POLLINATION - ~
## 33 VEGETABLES, OTHER, (COMBINED, EXCL POTATOES), HONEY BEE POLLINATION - ~
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```
## 34 CAULIFLOWER - APPLICATIONS, MEASURED IN LB / ACRE / APPLICATION, 10TH ~
## 35 CAULIFLOWER - APPLICATIONS, MEASURED IN LB / ACRE / APPLICATION, 90TH ~
## 36 CAULIFLOWER - APPLICATIONS, MEASURED IN LB / ACRE / APPLICATION, CV PCT
## 37 CAULIFLOWER - APPLICATIONS, MEASURED IN LB / ACRE / APPLICATION, MEDIAN
## 38 CAULIFLOWER - APPLICATIONS, MEASURED IN LB / ACRE / YEAR, 10TH PERCENT~
## 39 CAULIFLOWER - APPLICATIONS, MEASURED IN LB / ACRE / YEAR, 90TH PERCENT~
## 40 CAULIFLOWER - APPLICATIONS, MEASURED IN LB / ACRE / YEAR, CV PCT
## 41 CAULIFLOWER - APPLICATIONS, MEASURED IN LB / ACRE / YEAR, MEDIAN
## 42 CAULIFLOWER - APPLICATIONS, MEASURED IN NUMBER, 10TH PERCENTILE
## 43 CAULIFLOWER - APPLICATIONS, MEASURED IN NUMBER, 90TH PERCENTILE
## 44 CAULIFLOWER - APPLICATIONS, MEASURED IN NUMBER, CV PCT
## 45 CAULIFLOWER - APPLICATIONS, MEASURED IN NUMBER, MEDIAN
## 46 CAULIFLOWER - TREATED, MEASURED IN PCT OF AREA PLANTED, 10TH PERCENTILE
## 47 CAULIFLOWER - TREATED, MEASURED IN PCT OF AREA PLANTED, 90TH PERCENTILE
## 48 CAULIFLOWER - TREATED, MEASURED IN PCT OF AREA PLANTED, CV PCT
## 49 CAULIFLOWER - TREATED, MEASURED IN PCT OF AREA PLANTED, MEDIAN
## 50 BRUSSELS SPROUTS - APPLICATIONS, MEASURED IN LB
## 51 BRUSSELS SPROUTS - APPLICATIONS, MEASURED IN LB / ACRE / APPLICATION, ~
## 52 BRUSSELS SPROUTS - APPLICATIONS, MEASURED IN LB / ACRE / YEAR, AVG
## 53 BRUSSELS SPROUTS - APPLICATIONS, MEASURED IN NUMBER, AVG
## 54 BRUSSELS SPROUTS - TREATED, MEASURED IN PCT OF AREA PLANTED, AVG
```

```
unique(veg.3[, "Domain"])
```

```
## # A tibble: 13 x 1
##   Domain
##   <chr>
## 1 CHEMICAL, FUNGICIDE
## 2 CHEMICAL, HERBICIDE
## 3 CHEMICAL, INSECTICIDE
## 4 CHEMICAL, OTHER
## 5 RESTRICTED USE CHEMICAL, HERBICIDE
## 6 RESTRICTED USE CHEMICAL, INSECTICIDE
## 7 RESTRICTED USE CHEMICAL, OTHER
## 8 PRACTICE, AVOIDANCE
## 9 PRACTICE, MONITORING
## 10 PRACTICE, PREVENTION
## 11 PRACTICE, SUPPRESSION
## 12 TOTAL
## 13 FERTILIZER
```

```
unique(veg.3[, "Category"])
```

```
## # A tibble: 240 x 1
##   Category
##   <chr>
## 1 CHEMICAL, FUNGICIDE: (AMETOCTRADIN = 119210)
## 2 CHEMICAL, FUNGICIDE: (AZOXYSTROBIN = 128810)
## 3 CHEMICAL, FUNGICIDE: (BACILLUS SUBTILIS=6479)
## 4 CHEMICAL, FUNGICIDE: (BOSCALID = 128008)
## 5 CHEMICAL, FUNGICIDE: (CHLOROTHALONIL = 81901)
## 6 CHEMICAL, FUNGICIDE: (CONIOTHYRIUM MINITAN = 28836)
## 7 CHEMICAL, FUNGICIDE: (COPPER HYDROXIDE = 23401)
## 8 CHEMICAL, FUNGICIDE: (COPPER OCTANOATE=23306)
## 9 CHEMICAL, FUNGICIDE: (COPPER OXIDE=25601)
```

```
## 10 CHEMICAL, FUNGICIDE: (CYPRODINIL=288202)
## # ... with 230 more rows

unique(veg.3[, "Value"])

## # A tibble: 1,271 x 1
##   Value
##   <chr>
## 1 (D)
## 2 4700
## 3 (NA)
## 4 500
## 5 2900
## 6 100
## 7 1400
## 8 6500
## 9 600
## 10 700
## # ... with 1,261 more rows

veg.3 <- veg.3 %>%
  separate(Category, into = c("Label", "Chemical"), sep=",") %>%
  separate(Data, into=c("Vegetable", "Class Desc"), sep=" - ") %>%
  separate(`Class Desc`, into=c("Class", "Production Practice", "Unit"), sep=",") %>%
  separate(`Production Practice`, into=c("Production Practice", "Utilization Practice", "Statistic Category"), sep=",") %>%
  separate(Domain, into=c("Domain", "Type"), sep=", ")

## Warning: Expected 2 pieces. Additional pieces discarded in 1170 rows [77,
## 199, 331, 463, 597, 700, 788, 874, 960, 1048, 1087, 1099, 1106, 1113, 1121,
## 1127, 1128, 1136, 1148, 1155, ...].

## Warning: Expected 2 pieces. Missing pieces filled with `NA` in 879 rows
## [1181, 1182, 1183, 1184, 1185, 1186, 1187, 1188, 1189, 1190, 3884, 3885,
## 3886, 3887, 3888, 3889, 3890, 3891, 3892, 3893, ...].

## Warning: Expected 3 pieces. Missing pieces filled with `NA` in 10064
## rows [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19,
## 20, ...].

## Warning: Expected 3 pieces. Missing pieces filled with `NA` in 14940
## rows [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19,
## 20, ...].

## Warning: Expected 2 pieces. Missing pieces filled with `NA` in 879 rows
## [1181, 1182, 1183, 1184, 1185, 1186, 1187, 1188, 1189, 1190, 3884, 3885,
## 3886, 3887, 3888, 3889, 3890, 3891, 3892, 3893, ...].

veg.3 <- veg.3 %>%
  separate(Chemical, into=c("DuplicateType", "Active Ingredient or Action Taken"), sep=": ") %>%
  separate(`Active Ingredient or Action Taken`, into=c("Temp1", "Active ingredient or Action Taken", "Temp2"), sep=",") %>%
  separate(`Active ingredient or Action Taken`, into=c("Active ingredient or Action Taken", "EPA Pesticide Use Category"), sep=",") %>%
  separate(Geo, into=c("Area", "Temp3"), sep=" : ") %>%
  select(-Vegetable, -Label, -DuplicateType, -Temp1, -Temp2, -Temp3)

## Warning: Expected 2 pieces. Missing pieces filled with `NA` in 8185 rows
## [28, 41, 77, 90, 94, 199, 331, 463, 548, 561, 597, 610, 614, 660, 668, 700,
## 713, 721, 788, 874, ...].

## Warning: Expected 2 pieces. Missing pieces filled with `NA` in 13825 rows
```

```
## [1191, 1192, 1193, 1194, 1195, 1196, 1197, 1198, 1199, 1200, 1201, 1202,
## 1203, 1204, 1205, 1206, 1207, 1208, 1209, 1210, ...].
```

Restricted use chemical

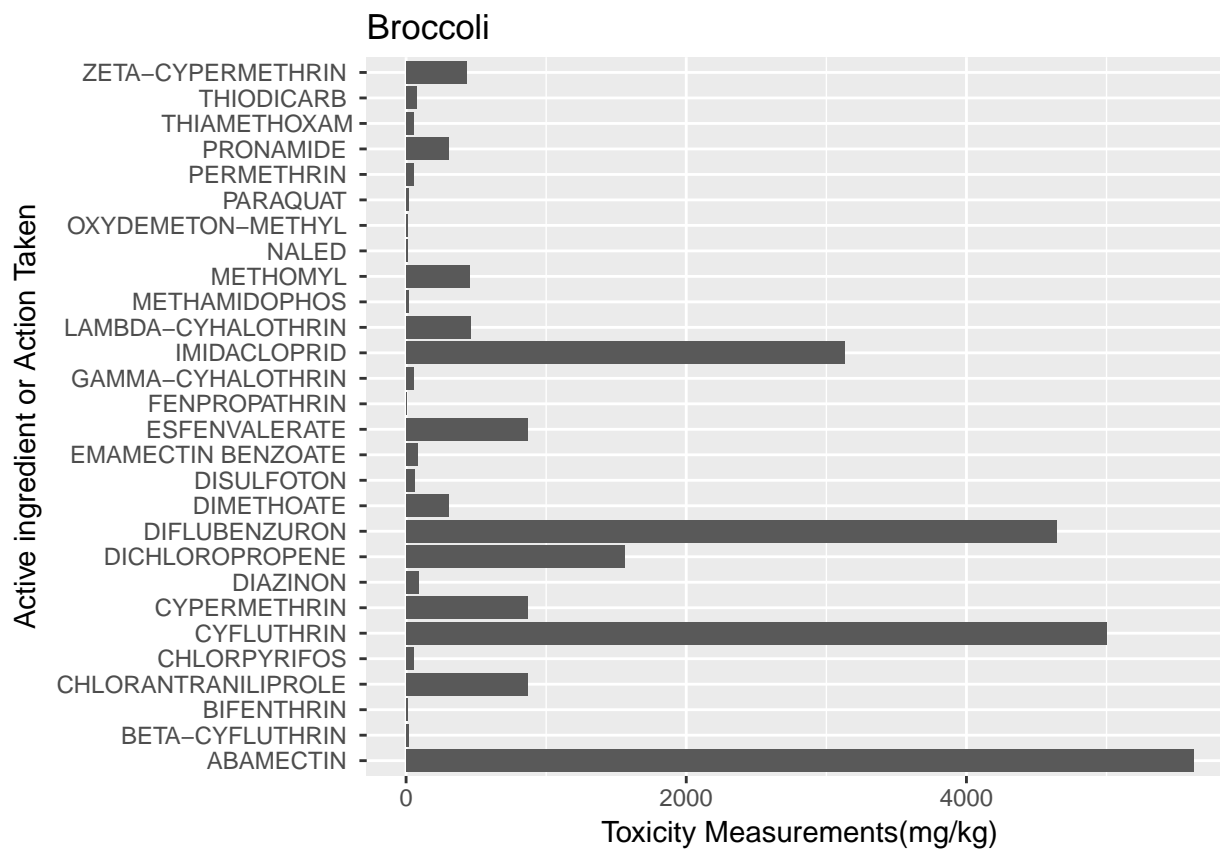
```
veg4 <- veg.3 %>%
  filter(Domain=="RESTRICTED USE CHEMICAL") %>%
  select(Commodity, Domain:`EPA Pesticide Chemical Code`) %>%
  unique()
```

toxicity

```
toxicity <- tibble(
  `Toxicity Measurements(mg/kg)` =
    c(20, 5620, 20, 11,
      869, 54, 5000, 82,
      869, 3129, 458, 450,
      14, 12, 50, 50,
      430, 1563, 86, 380,
      54, 5000, 3129, 458,
      450, 144, 12, 50,
      50, 430, 1563, 86,
      300, 60, 1.9, 72.1,
      82, 869, 150, 300,
      4640, 56, 16, 73,
      1.9, 56, 73, 121
    )
)
veg4 <- veg4 %>%
  bind_cols(toxicity)

broccoli<-filter(veg4,Commodity=="BROCCOLI")
cauliflower<-filter(veg4,Commodity=="CAULIFLOWER")

graph1<-ggplot(data=broccoli,mapping=aes(x=`Active ingredient or Action Taken`,
                                           y=`Toxicity Measurements(mg/kg)`))+labs(title = "Broccoli")+
  geom_bar(stat = "identity")+coord_flip()
plot(graph1)
```



```
graph2<-ggplot(data=cauliflower,mapping=aes(x=`Active ingredient or Action Taken`,
                                             y=`Toxicity Measurements(mg/kg)`))+labs(title = "Cauliflower")+
  geom_bar(stat = "identity")+coord_flip()
plot(graph2)
```