INFORME ANALITICA DE DATOS TPAD-1

TPAD-1

12/2/2021

#INSTALAMOS LAS LIBRERIAS A UTILIZAR

```r
install.packages("hexbin")
```

```
## Installing package into '/home/rstudio-user/R/x86_64-pc-linux-gnu-library/4.0'
## (as 'lib' is unspecified)
```

```r
install.packages("readr")
```

```
## Installing package into '/home/rstudio-user/R/x86_64-pc-linux-gnu-library/4.0'
## (as 'lib' is unspecified)
```

```r
install.packages("ggplot2")
```

```
## Installing package into '/home/rstudio-user/R/x86_64-pc-linux-gnu-library/4.0'
## (as 'lib' is unspecified)
```

```r
install.packages("dplyr")
```

```
## Installing package into '/home/rstudio-user/R/x86_64-pc-linux-gnu-library/4.0'
## (as 'lib' is unspecified)
```

```r
install.packages("scatterplot3d",dependencies=T)
```

```
## Installing package into '/home/rstudio-user/R/x86_64-pc-linux-gnu-library/4.0'
## (as 'lib' is unspecified)
```

```r
install.packages("tidyverse")
```

```
## Installing package into '/home/rstudio-user/R/x86_64-pc-linux-gnu-library/4.0'
## (as 'lib' is unspecified)
```

#CARGAMOS LAS LIBRERIAS QUE VAMOS A UTILIZAR

```r
library(readr)
library(dplyr)
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
library(ggplot2)
library(hexbin)
library(scatterplot3d)
library(tidyverse)

## -- Attaching packages ------------------------------------- tidyverse 1.3.0 --

## v tibble  3.0.6      v stringr 1.4.0
## v tidyr   1.1.2      v forcats 0.5.1
## v purrr   0.3.4

## -- Conflicts ---------------------------------------- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

#OBTENEMOS EL ENLACE DE LA CARPETA EN LA QUE ESTAMOS TRABAJANDO

```
getwd()
```

```
## [1] "/cloud/project"
```

#BUSCAMOS LA RUTA DEL DATAFRAME

```
cafe_df<-read.csv("/cloud/project/R-MARKDOWN/cafesito/produccion.csv", header = TRUE, sep=",", dec=".")
```

#NOS INDICA EL TIPO O CLASE DE LA VARIABLE RENDIMIENTO

```
class(cafe_df$Rendimiento..ha.ton.)
```

```
## [1] "numeric"
```

#A CONTINUACION PODEMOS IDENTIFICAR LA ESTRUCTURA DEL DATAFRAME

```
str(cafe_df)
```

```
## 'data.frame':    266 obs. of  8 variables:
## $ Anio                  : int  2007 2007 2007 2007 2007 2007 2007 2007 2007 2007 ...
## $ Departamento          : chr  "ANTIOQUIA" "BOLIVAR" "BOYACA" "CALDAS" ...
## $ Producto              : chr  "CAFE" "CAFE" "CAFE" "CAFE" ...
## $ Area..ha.             : chr  "112,343.60" "502" "11,374.50" "78,393.65" ...
## $ Produccion..ton.      : chr  "120,500.80" "446" "9,683.10" "92,815.00" ...
## $ Rendimiento..ha.ton.  : num  1.07 0.89 0.85 1.18 0.93 0.79 0.96 0.57 0.71 0.78 ...
## $ Produccion.Nacional..ton.: num  14.54 0.05 1.17 11.2 0.26 ...
## $ Area.Nacional..ha.    : num  14.66 0.07 1.48 10.23 0.3 ...
```

#CONOCER LA DIMENSION DEL DATAFRAME

```
dim(cafe_df)
```

```
## [1] 266   8
```

#PODEMOS VER LA INFORMACION RESUMIDA DEL DATAFRAME DE LAS VARIABLES CUANTI-TATIVAS Y VALORES ESTADISTICOS

```
summary(cafe_df)
```

```
##       Anio      Departamento        Producto           Area..ha.
## Min.   :2007   Length:266         Length:266         Length:266
## 1st Qu.:2010   Class :character   Class :character   Class :character
## Median :2012   Mode  :character   Mode  :character   Mode  :character
## Mean   :2012
## 3rd Qu.:2015
```

```
## Max.   :2018
## Produccion..ton.   Rendimiento..ha.ton. Produccion.Nacional..ton.
## Length:266        Min.   :0.0000      Min.   : 0.0000
## Class :character   1st Qu.:0.7500      1st Qu.: 0.3525
## Mode  :character   Median :0.9400      Median : 2.7200
##                    Mean   :0.9364      Mean   : 4.5113
##                    3rd Qu.:1.1200      3rd Qu.: 7.1475
##                    Max.   :2.0000      Max.   :18.6700
## Area.Nacional..ha.
## Min.   : 0.000
## 1st Qu.: 0.390
## Median : 3.120
## Mean   : 4.511
## 3rd Qu.: 6.875
## Max.   :16.430
```

#INFORMACION CUANTITATIVA DEL DATAFRAME USANDO VARIAS VARIABLES

```
tapply(cafe_df$Rendimiento..ha.ton., cafe_df$Anio, summary)
```

```
## $`2007`
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##  0.4500  0.7900  0.9000  0.9505  1.1525  1.5300
##
## $`2008`
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##  0.4500  0.7775  0.9050  0.9827  1.2000  1.7900
##
## $`2009`
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##  0.3000  0.7600  0.9300  0.8814  1.1125  1.2100
##
## $`2010`
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##  0.0000  0.7050  0.9600  0.9061  1.1250  1.5200
##
## $`2011`
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##  0.4700  0.6100  0.9000  0.8543  1.0550  1.2000
##
## $`2012`
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##  0.0000  0.7450  0.8300  0.8587  0.9150  2.0000
##
## $`2013`
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##  0.6000  0.6000  0.7550  0.7595  0.8800  0.9900
##
## $`2014`
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##  0.6400  0.6500  0.8150  0.8223  0.9500  1.0600
##
## $`2015`
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   0.770   0.935   1.065   1.025   1.107   1.150
```

```
## 
## $`2016`
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max. 
##   0.790   0.960   1.120   1.064   1.150   1.190 
## 
## $`2017`
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max. 
##   0.660   0.845   1.090   1.068   1.290   1.500 
## 
## $`2018`
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max. 
##  0.6200  0.8575  1.1200  1.0795  1.3125  1.5200 
```

#ALGUNOS VALORES ESTADISTICOS

```
sum(cafe_df$Rendimiento..ha.ton.)
```

```
## [1] 249.09
```

```
prod(cafe_df$Area.Nacional..ha.)
```

```
## [1] 0
```

```
var(cafe_df$Rendimiento..ha.ton.)
```

```
## [1] 0.07135814
```

```
length(cafe_df$Area.Nacional..ha.)
```

```
## [1] 266
```

```
mean(cafe_df$Rendimiento..ha.ton.)
```

```
## [1] 0.9364286
```

```
max(cafe_df$Rendimiento..ha.ton.)
```

```
## [1] 2
```

```
min(cafe_df$Rendimiento..ha.ton.)
```

```
## [1] 0
```

```
sd(cafe_df$Rendimiento..ha.ton.)
```

```
## [1] 0.2671294
```

#RESTAR EL VALOR MAXIMO Y EL VALOR MINIMO DE LA VARIABLE RENDIMIENTO

```
max(cafe_df$Rendimiento..ha.ton.)-min(cafe_df$Rendimiento..ha.ton.)
```

```
## [1] 2
```

#NOMBRE DE LAS VARIABLES DEL DATAFRAME

```
names(cafe_df)
```

```
## [1] "Anio"                    "Departamento"
## [3] "Producto"                "Area..ha."
## [5] "Produccion..ton."        "Rendimiento..ha.ton."
## [7] "Produccion.Nacional..ton." "Area.Nacional..ha."
```

```
colnames(cafe_df)
```

```
## [1] "Anio"                    "Departamento"
## [3] "Producto"                "Area..ha."
## [5] "Produccion..ton."        "Rendimiento..ha.ton."
## [7] "Produccion.Nacional..ton." "Area.Nacional..ha."
```

#VER LAS PRIMERAS Y ULTIMAS 6 FILAS DEL DATAFRAME

`head(cafe_df)`

```
##   Anio Departamento Producto  Area..ha. Produccion..ton. Rendimiento..ha.ton.
## 1 2007    ANTIOQUIA     CAFE 112,343.60       120,500.80                 1.07
## 2 2007      BOLIVAR     CAFE        502              446                 0.89
## 3 2007       BOYACA     CAFE  11,374.50         9,683.10                 0.85
## 4 2007       CALDAS     CAFE  78,393.65        92,815.00                 1.18
## 5 2007      CAQUETA     CAFE   2,295.00         2,134.00                 0.93
## 6 2007     CASANARE     CAFE   2,605.00         2,048.40                 0.79
##   Produccion.Nacional..ton. Area.Nacional..ha.
## 1                     14.54              14.66
## 2                      0.05               0.07
## 3                      1.17               1.48
## 4                     11.20              10.23
## 5                      0.26               0.30
## 6                      0.25               0.34
```

`tail(cafe_df)`

```
##      Anio    Departamento Producto Area..ha. Produccion..ton.
## 261 2018        PUTUMAYO     CAFE    209.93            289.5
## 262 2018         QUINDIO     CAFE 16,374.73        17,739.03
## 263 2018       RISARALDA     CAFE 35,874.73        45,918.75
## 264 2018       SANTANDER     CAFE 42,269.07        55,918.71
## 265 2018          TOLIMA     CAFE 97,304.04        97,451.31
## 266 2018 VALLE DEL CAUCA     CAFE 48,305.31        49,667.88
##      Rendimiento..ha.ton. Produccion.Nacional..ton. Area.Nacional..ha.
## 261                 1.38                      0.03               0.03
## 262                 1.08                      2.07               2.21
## 263                 1.28                      5.37               4.83
## 264                 1.32                      6.53               5.69
## 265                 1.00                     11.39              13.11
## 266                 1.03                      5.80               6.51
```

#INSPECCIONAR DE FORMA DETALLADA EN EL DATAFRAME SELECCIONANDO SUS COLUMNAS Y FILAS

`cafe_df[3]`

```
##     Producto
## 1       CAFE
## 2       CAFE
## 3       CAFE
## 4       CAFE
## 5       CAFE
## 6       CAFE
## 7       CAFE
## 8       CAFE
## 9       CAFE
## 10      CAFE
```

```
## 11        CAFE
## 12        CAFE
## 13        CAFE
## 14        CAFE
## 15        CAFE
## 16        CAFE
## 17        CAFE
## 18        CAFE
## 19        CAFE
## 20        CAFE
## 21        CAFE
## 22        CAFE
## 23        CAFE
## 24        CAFE
## 25        CAFE
## 26        CAFE
## 27        CAFE
## 28        CAFE
## 29        CAFE
## 30        CAFE
## 31        CAFE
## 32        CAFE
## 33        CAFE
## 34        CAFE
## 35        CAFE
## 36        CAFE
## 37        CAFE
## 38        CAFE
## 39        CAFE
## 40        CAFE
## 41        CAFE
## 42        CAFE
## 43        CAFE
## 44        CAFE
## 45        CAFE
## 46        CAFE
## 47        CAFE
## 48        CAFE
## 49        CAFE
## 50        CAFE
## 51        CAFE
## 52        CAFE
## 53        CAFE
## 54        CAFE
## 55        CAFE
## 56        CAFE
## 57        CAFE
## 58        CAFE
## 59        CAFE
## 60        CAFE
## 61        CAFE
## 62        CAFE
## 63        CAFE
## 64        CAFE
```

```
## 65       CAFE
## 66       CAFE
## 67       CAFE
## 68       CAFE
## 69       CAFE
## 70       CAFE
## 71       CAFE
## 72       CAFE
## 73       CAFE
## 74       CAFE
## 75       CAFE
## 76       CAFE
## 77       CAFE
## 78       CAFE
## 79       CAFE
## 80       CAFE
## 81       CAFE
## 82       CAFE
## 83       CAFE
## 84       CAFE
## 85       CAFE
## 86       CAFE
## 87       CAFE
## 88       CAFE
## 89       CAFE
## 90       CAFE
## 91       CAFE
## 92       CAFE
## 93       CAFE
## 94       CAFE
## 95       CAFE
## 96       CAFE
## 97       CAFE
## 98       CAFE
## 99       CAFE
## 100      CAFE
## 101      CAFE
## 102      CAFE
## 103      CAFE
## 104      CAFE
## 105      CAFE
## 106      CAFE
## 107      CAFE
## 108      CAFE
## 109      CAFE
## 110      CAFE
## 111      CAFE
## 112      CAFE
## 113      CAFE
## 114      CAFE
## 115      CAFE
## 116      CAFE
## 117      CAFE
## 118      CAFE
```

```
## 119        CAFE
## 120        CAFE
## 121        CAFE
## 122        CAFE
## 123        CAFE
## 124        CAFE
## 125        CAFE
## 126        CAFE
## 127        CAFE
## 128        CAFE
## 129        CAFE
## 130        CAFE
## 131        CAFE
## 132        CAFE
## 133        CAFE
## 134        CAFE
## 135        CAFE
## 136        CAFE
## 137        CAFE
## 138        CAFE
## 139        CAFE
## 140        CAFE
## 141        CAFE
## 142        CAFE
## 143        CAFE
## 144        CAFE
## 145        CAFE
## 146        CAFE
## 147        CAFE
## 148        CAFE
## 149        CAFE
## 150        CAFE
## 151        CAFE
## 152        CAFE
## 153        CAFE
## 154        CAFE
## 155        CAFE
## 156        CAFE
## 157        CAFE
## 158        CAFE
## 159        CAFE
## 160        CAFE
## 161        CAFE
## 162        CAFE
## 163        CAFE
## 164        CAFE
## 165        CAFE
## 166        CAFE
## 167        CAFE
## 168        CAFE
## 169        CAFE
## 170        CAFE
## 171        CAFE
## 172        CAFE
```

```
## 173          CAFE
## 174          CAFE
## 175          CAFE
## 176          CAFE
## 177          CAFE
## 178          CAFE
## 179          CAFE
## 180          CAFE
## 181          CAFE
## 182          CAFE
## 183          CAFE
## 184          CAFE
## 185          CAFE
## 186          CAFE
## 187          CAFE
## 188          CAFE
## 189          CAFE
## 190          CAFE
## 191          CAFE
## 192          CAFE
## 193          CAFE
## 194          CAFE
## 195          CAFE
## 196          CAFE
## 197          CAFE
## 198          CAFE
## 199          CAFE
## 200          CAFE
## 201          CAFE
## 202          CAFE
## 203          CAFE
## 204          CAFE
## 205          CAFE
## 206          CAFE
## 207          CAFE
## 208          CAFE
## 209          CAFE
## 210          CAFE
## 211          CAFE
## 212          CAFE
## 213          CAFE
## 214          CAFE
## 215          CAFE
## 216          CAFE
## 217          CAFE
## 218          CAFE
## 219          CAFE
## 220          CAFE
## 221          CAFE
## 222          CAFE
## 223          CAFE
## 224          CAFE
## 225          CAFE
## 226          CAFE
```

```
## 227        CAFE
## 228        CAFE
## 229        CAFE
## 230        CAFE
## 231        CAFE
## 232        CAFE
## 233        CAFE
## 234        CAFE
## 235        CAFE
## 236        CAFE
## 237        CAFE
## 238        CAFE
## 239        CAFE
## 240        CAFE
## 241        CAFE
## 242        CAFE
## 243        CAFE
## 244        CAFE
## 245        CAFE
## 246        CAFE
## 247        CAFE
## 248        CAFE
## 249        CAFE
## 250        CAFE
## 251        CAFE
## 252        CAFE
## 253        CAFE
## 254        CAFE
## 255        CAFE
## 256        CAFE
## 257        CAFE
## 258        CAFE
## 259        CAFE
## 260        CAFE
## 261        CAFE
## 262        CAFE
## 263        CAFE
## 264        CAFE
## 265        CAFE
## 266        CAFE
```

```r
cafe_df[,4]
```

```
##   [1] "112,343.60" "502"        "11,374.50"  "78,393.65"  "2,295.00"
##   [6] "2,605.00"   "53,471.00"  "23,172.00"  "290"        "43,017.30"
##  [11] "89,661.56"  "4,785.00"   "17,506.00"  "2,048.00"   "24,458.50"
##  [16] "30,171.84"  "35"         "19,904.00"  "47,689.25"  "34,406.67"
##  [21] "91,679.10"  "76,667.80"  "114,694.00" "572"        "10,778.50"
##  [26] "74,897.00"  "2,735.00"   "2,149.00"   "56,208.00"  "23,198.00"
##  [31] "90"         "43,633.35"  "89,131.20"  "4,553.00"   "17,521.00"
##  [36] "2,146.00"   "25,582.00"  "30,171.84"  "31"         "19,571.00"
##  [41] "47,227.00"  "34,169.37"  "86,829.20"  "72,419.00"  "112,420.20"
##  [46] "770"        "10,672.50"  "73,083.00"  "2,332.00"   "1,904.00"
##  [51] "57,860.00"  "23,420.00"  "70"         "43,475.84"  "86,726.78"
##  [56] "4,488.00"   "17,036.00"  "2,216.00"   "26,467.20"  "33,552.58"
```

```
## [61] "23"         "19,052.00"  "45,428.00"  "37,985.90"  "88,667.00"
## [66] "67,001.30"  "111,602.71" "0"          "850"        "9,427.00"
## [71] "72,240.58"  "2,536.00"   "2,198.00"   "55,162.00"  "22,489.50"
## [76] "157.5"      "44,264.16"  "87,139.53"  "4,207.00"   "17,000.00"
## [81] "2,326.00"   "23,504.05"  "30,731.96"  "24"         "18,159.00"
## [86] "47,308.00"  "39,000.64"  "84,658.70"  "69,332.10"  "106,419.57"
## [91] "10"         "850"        "8,441.74"   "66,331.61"  "2,810.00"
## [96] "2,081.50"   "54,246.42"  "22,350.00"  "157.5"      "37,478.87"
## [101] "78,792.21" "4,100.00"   "16,577.00"  "2,578.00"   "24,263.80"
## [106] "21,520.45" "40"         "20,139.30"  "44,733.64"  "37,282.04"
## [111] "93,145.35" "68,038.40"  "112,221.14" "870"        "6,698.20"
## [116] "54,871.88" "2,882.50"   "2,322.00"   "56,825.00"  "22,911.00"
## [121] "70"        "37,175.06"  "0"          "79,809.34"  "5,143.00"
## [126] "17,686.00" "2,783.00"   "27,806.40"  "19,339.31"  "42"
## [131] "21,109.83" "45,588.03"  "33,947.15"  "90,904.48"  "69,456.71"
## [136] "109,755.50" "659.04"    "9,289.05"   "60,264.29"  "2,905.84"
## [141] "2,232.94"  "74,105.64"  "25,106.39"  "125.01"     "36,189.18"
## [146] "118,200.88" "5,750.70"  "17,016.72"  "2,483.43"   "32,136.51"
## [151] "25,332.45" "24.27"      "21,203.03"  "39,615.60"  "38,613.68"
## [156] "97,308.81" "53,481.02"  "110,115.86" "936.34"     "9,834.39"
## [161] "59,757.18" "3,074.92"   "2,599.43"   "77,068.46"  "26,138.58"
## [166] "136.88"    "33,623.54"  "128,273.15" "6,078.64"   "18,533.11"
## [171] "2,739.71"  "33,608.32"  "23,724.20"  "101.16"     "21,462.81"
## [176] "40,154.46" "40,733.20"  "100,832.91" "56,035.94"  "109,649.61"
## [181] "1,065.07"  "10,461.85"  "58,376.40"  "3,410.56"   "2,752.31"
## [186] "77,405.83" "25,948.50"  "137.47"     "34,101.49"  "130,452.40"
## [191] "5,631.53"  "17,996.31"  "2,922.21"   "33,490.93"  "22,940.64"
## [196] "128.65"    "21,491.21"  "41,732.03"  "42,679.11"  "103,368.73"
## [201] "54,938.79" "105,666.60" "1,065.97"   "10,181.80"  "56,022.04"
## [206] "3,392.22"  "2,671.04"   "78,421.95"  "25,530.59"  "134.96"
## [211] "33,214.17" "126,052.15" "5,531.20"   "17,745.80"  "2,924.89"
## [216] "32,750.16" "21,520.64"  "20,041.70"  "40,472.26"  "41,387.79"
## [221] "100,328.77" "52,648.25" "99,311.53"  "1,137.42"   "9,598.33"
## [226] "51,854.59" "3,408.69"   "2,436.63"   "80,289.56"  "25,158.80"
## [231] "125.67"    "30,894.16"  "122,575.76" "5,340.80"   "18,129.50"
## [236] "2,926.85"  "33,639.55"  "21,409.77"  "209.29"     "17,699.67"
## [241] "37,334.16" "42,327.26"  "96,018.89"  "51,470.86"  "98,038.15"
## [246] "1,182.13"  "9,653.45"   "50,762.22"  "3,485.24"   "2,360.55"
## [251] "82,085.54" "23,915.45"  "140.33"     "29,085.24"  "122,002.46"
## [256] "4,810.97"  "17,414.32"  "2,761.01"   "33,465.54"  "20,873.04"
## [261] "209.93"    "16,374.73"  "35,874.73"  "42,269.07"  "97,304.04"
## [266] "48,305.31"
```

```
cafe_df[,2]
```

```
##   [1] "ANTIOQUIA"         "BOLIVAR"      "BOYACA"
##   [4] "CALDAS"            "CAQUETA"      "CASANARE"
##   [7] "CAUCA"             "CESAR"        "CHOCO"
##  [10] "CUNDINAMARCA"      "HUILA"        "LA GUAJIRA"
##  [13] "MAGDALENA"         "META"         "NARIÑO"
##  [16] "NORTE DE SANTANDER" "PUTUMAYO"    "QUINDIO"
##  [19] "RISARALDA"         "SANTANDER"    "TOLIMA"
##  [22] "VALLE DEL CAUCA"   "ANTIOQUIA"    "BOLIVAR"
##  [25] "BOYACA"            "CALDAS"       "CAQUETA"
##  [28] "CASANARE"          "CAUCA"        "CESAR"
```

```
##  [31] "CHOCO"               "CUNDINAMARCA"       "HUILA"
##  [34] "LA GUAJIRA"          "MAGDALENA"          "META"
##  [37] "NARIÑO"              "NORTE DE SANTANDER" "PUTUMAYO"
##  [40] "QUINDIO"             "RISARALDA"          "SANTANDER"
##  [43] "TOLIMA"              "VALLE DEL CAUCA"    "ANTIOQUIA"
##  [46] "BOLIVAR"             "BOYACA"             "CALDAS"
##  [49] "CAQUETA"             "CASANARE"           "CAUCA"
##  [52] "CESAR"               "CHOCO"              "CUNDINAMARCA"
##  [55] "HUILA"               "LA GUAJIRA"         "MAGDALENA"
##  [58] "META"                "NARIÑO"             "NORTE DE SANTANDER"
##  [61] "PUTUMAYO"            "QUINDIO"            "RISARALDA"
##  [64] "SANTANDER"           "TOLIMA"             "VALLE DEL CAUCA"
##  [67] "ANTIOQUIA"           "ARAUCA"             "BOLIVAR"
##  [70] "BOYACA"              "CALDAS"             "CAQUETA"
##  [73] "CASANARE"            "CAUCA"              "CESAR"
##  [76] "CHOCO"               "CUNDINAMARCA"       "HUILA"
##  [79] "LA GUAJIRA"          "MAGDALENA"          "META"
##  [82] "NARIÑO"              "NORTE DE SANTANDER" "PUTUMAYO"
##  [85] "QUINDIO"             "RISARALDA"          "SANTANDER"
##  [88] "TOLIMA"              "VALLE DEL CAUCA"    "ANTIOQUIA"
##  [91] "ARAUCA"              "BOLIVAR"            "BOYACA"
##  [94] "CALDAS"              "CAQUETA"            "CASANARE"
##  [97] "CAUCA"               "CESAR"              "CHOCO"
## [100] "CUNDINAMARCA"        "HUILA"              "LA GUAJIRA"
## [103] "MAGDALENA"           "META"               "NARIÑO"
## [106] "NORTE DE SANTANDER"  "PUTUMAYO"           "QUINDIO"
## [109] "RISARALDA"           "SANTANDER"          "TOLIMA"
## [112] "VALLE DEL CAUCA"     "ANTIOQUIA"          "BOLIVAR"
## [115] "BOYACA"              "CALDAS"             "CAQUETA"
## [118] "CASANARE"            "CAUCA"              "CESAR"
## [121] "CHOCO"               "CUNDINAMARCA"       "GUAVIARE"
## [124] "HUILA"               "LA GUAJIRA"         "MAGDALENA"
## [127] "META"                "NARIÑO"             "NORTE DE SANTANDER"
## [130] "PUTUMAYO"            "QUINDIO"            "RISARALDA"
## [133] "SANTANDER"           "TOLIMA"             "VALLE DEL CAUCA"
## [136] "ANTIOQUIA"           "BOLIVAR"            "BOYACA"
## [139] "CALDAS"              "CAQUETA"            "CASANARE"
## [142] "CAUCA"               "CESAR"              "CHOCO"
## [145] "CUNDINAMARCA"        "HUILA"              "LA GUAJIRA"
## [148] "MAGDALENA"           "META"               "NARIÑO"
## [151] "NORTE DE SANTANDER"  "PUTUMAYO"           "QUINDIO"
## [154] "RISARALDA"           "SANTANDER"          "TOLIMA"
## [157] "VALLE DEL CAUCA"     "ANTIOQUIA"          "BOLIVAR"
## [160] "BOYACA"              "CALDAS"             "CAQUETA"
## [163] "CASANARE"            "CAUCA"              "CESAR"
## [166] "CHOCO"               "CUNDINAMARCA"       "HUILA"
## [169] "LA GUAJIRA"          "MAGDALENA"          "META"
## [172] "NARIÑO"              "NORTE DE SANTANDER" "PUTUMAYO"
## [175] "QUINDIO"             "RISARALDA"          "SANTANDER"
## [178] "TOLIMA"              "VALLE DEL CAUCA"    "ANTIOQUIA"
## [181] "BOLIVAR"             "BOYACA"             "CALDAS"
## [184] "CAQUETA"             "CASANARE"           "CAUCA"
## [187] "CESAR"               "CHOCO"              "CUNDINAMARCA"
## [190] "HUILA"               "LA GUAJIRA"         "MAGDALENA"
```

```
## [193] "META"              "NARIÑO"              "NORTE DE SANTANDER"
## [196] "PUTUMAYO"           "QUINDIO"             "RISARALDA"
## [199] "SANTANDER"          "TOLIMA"              "VALLE DEL CAUCA"
## [202] "ANTIOQUIA"          "BOLIVAR"             "BOYACA"
## [205] "CALDAS"             "CAQUETA"             "CASANARE"
## [208] "CAUCA"              "CESAR"               "CHOCO"
## [211] "CUNDINAMARCA"       "HUILA"               "LA GUAJIRA"
## [214] "MAGDALENA"          "META"                "NARIÑO"
## [217] "NORTE DE SANTANDER" "QUINDIO"             "RISARALDA"
## [220] "SANTANDER"          "TOLIMA"              "VALLE DEL CAUCA"
## [223] "ANTIOQUIA"          "BOLIVAR"             "BOYACA"
## [226] "CALDAS"             "CAQUETA"             "CASANARE"
## [229] "CAUCA"              "CESAR"               "CHOCO"
## [232] "CUNDINAMARCA"       "HUILA"               "LA GUAJIRA"
## [235] "MAGDALENA"          "META"                "NARIÑO"
## [238] "NORTE DE SANTANDER" "PUTUMAYO"            "QUINDIO"
## [241] "RISARALDA"          "SANTANDER"           "TOLIMA"
## [244] "VALLE DEL CAUCA"    "ANTIOQUIA"           "BOLIVAR"
## [247] "BOYACA"             "CALDAS"              "CAQUETA"
## [250] "CASANARE"           "CAUCA"               "CESAR"
## [253] "CHOCO"              "CUNDINAMARCA"        "HUILA"
## [256] "LA GUAJIRA"         "MAGDALENA"           "META"
## [259] "NARIÑO"             "NORTE DE SANTANDER"  "PUTUMAYO"
## [262] "QUINDIO"            "RISARALDA"           "SANTANDER"
## [265] "TOLIMA"             "VALLE DEL CAUCA"
```

```r
cafe_df[2,]
```

```
##   Anio Departamento Producto Area..ha. Produccion..ton. Rendimiento..ha.ton.
## 2 2007      BOLIVAR     CAFE       502              446                 0.89
##   Produccion.Nacional..ton. Area.Nacional..ha.
## 2                      0.05               0.07
```

```r
cafe_df[100,]
```

```
##     Anio Departamento Producto Area..ha. Produccion..ton. Rendimiento..ha.ton.
## 100 2011 CUNDINAMARCA     CAFE 37,478.87        32,780.35                 0.87
##     Produccion.Nacional..ton. Area.Nacional..ha.
## 100                      5.12               5.26
```

#CON LA FUNCION TABLE LISTAMOS LAS FILAS DE LA VARIABLE SELECCIONADA

```r
table(cafe_df$Produccion..ton.)
```

```
##
##           0   1,089.74   1,128.32   1,338.56   1,388.13   1,617.20   1,629.25
##           2          1          1          1          1          1          1
##    1,650.41   1,656.96   1,672.60   1,688.60   1,718.25   1,747.51   1,933.00
##           1          1          1          1          1          1          1
##    1,950.84  10,200.84  10,221.69  10,826.24 101,201.88 102,147.00 102,403.24
##           1          1          1          1          1          1          1
## 103,703.00 104,336.56 104,609.42 105,563.88 105,976.19     105.93  11,035.85
##           1          1          1          1          1          1          1
##   11,937.90 111,452.91 112,322.38 113,505.20 115,267.98 115,874.98 119,970.68
##           1          1          1          1          1          1          1
##          12  12,012.98  12,214.54  12,332.00  12,770.00 120,365.77 120,500.80
##           1          1          1          1          1          1          1
```

```
## 121,253.38        124.67        125.42 129,052.51  13,276.08  13,278.50  13,301.60
##          1             1             1          1          1          1          1
##  13,412.80  13,593.24  13,593.25  13,600.00  13,841.45 131,316.47 133,787.95
##          1             1             1          1          1          1          1
## 135,971.20 136,161.86  14,005.00  14,017.00  14,096.05  14,943.62        140
##          1             1             1          1          1          1          1
## 140,398.62 141,898.91 145,154.42 145,168.10  15,050.27  15,108.55  15,185.79
##          1             1             1          1          1          1          1
##     158.2     158.85  16,628.14  16,691.31  16,935.63      16.87     160.62
##          1             1             1          1          1          1          1
##  17,031.09  17,739.03  18,030.13  18,792.05     181.42  19,590.10  19,994.35
##          1             1             1          1          1          1          1
##   2,023.50   2,048.40   2,079.70   2,133.10   2,134.00   2,188.92   2,221.90
##          1             1             1          1          1          1          1
##   2,328.90   2,332.00   2,340.40   2,393.00   2,446.38   2,469.00   2,503.81
##          1             1             1          1          1          1          1
##   2,528.40   2,533.75   2,564.86   2,626.73   2,638.88   2,902.50   2,958.70
##          1             1             1          1          1          1          1
##   2,990.91  20,267.64  20,599.27  20,814.11      205.9  21,065.00  21,985.00
##          1             1             1          1          1          1          1
##  22,089.82  22,111.65  22,240.81  22,518.42  22,649.03  23,271.89  23,409.44
##          1             1             1          1          1          1          1
##  23,471.69  23,669.00  23,791.30  24,073.95  24,594.10  24,694.56  24,993.74
##          1             1             1          1          1          1          1
##  25,118.55  25,426.00  26,311.61       26.7  27,094.16  27,487.71  28,077.94
##          1             1             1          2          1          1          1
##  28,606.96     282.18      289.5  29,016.75  29,469.52      292.6   3,206.35
##          1             1             1          1          1          1          1
##   3,322.42   3,434.30   3,447.31   3,516.80   3,749.27   3,861.63   3,877.62
##          1             1             1          1          1          1          1
##   3,923.80  30,227.02  30,786.41  31,165.15  31,262.50  31,413.34  31,770.05
##          1             1             1          1          1          1          1
##  32,321.56  32,580.24  32,780.35  33,729.14  33,943.39         34  34,512.79
##          1             1             1          1          1          1          1
##  35,004.18  35,679.42       35.6  36,607.56  36,989.43  37,020.90  37,118.07
##          1             1             1          1          1          1          1
##  37,214.80  39,073.92     395.07   4,013.11   4,317.50   4,387.19   4,981.59
##          1             1             1          1          1          1          1
##  41,645.39  42,719.53  42,948.40        446  45,113.00  45,918.75       45.8
##          1             1             1          1          1          1          1
##  46,779.71  47,215.69  47,221.00  47,304.16  47,357.02  47,512.36  48,073.00
##          1             1             1          1          1          1          1
##      48.4  49,042.31  49,667.88  49,799.28   5,108.33   5,280.40   5,591.05
##          1             1             1          1          1          1          1
##   5,643.39  50,588.14  51,348.00  51,687.80        510  53,288.42  53,648.00
##          1             1             1          1          2          1          1
##  54,115.96  54,908.68  55,918.71  56,303.92  57,067.08  57,583.56  58,634.19
##          1             1             1          1          1          1          1
##   6,364.41  60,079.00     606.93  61,190.55  62,711.08  62,869.38  63,365.76
##          1             1             1          1          1          1          1
##  65,475.63  65,666.43      652.5  66,661.14  67,231.37         68  68,668.20
##          1             1             1          1          1          1          1
##  68,670.96  69,496.65  69,618.24   7,083.07   7,638.99   7,780.34        711
##          1             1             1          1          1          1          1
```

```
##  72,091.00  72,842.55      734.91      748.97       76.04  77,215.36  78,254.77
##          1          1           1           1           1          1          1
##  78,805.87      78.75    8,567.97  81,668.22  83,626.44  85,027.49  85,150.66
##          1          1           1           1           1          1          1
##  85,212.64  86,453.62  86,884.00  87,642.49  88,633.10   9,501.54   9,547.30
##          1          1           1           1           1          1          1
##   9,583.80   9,683.10  91,621.30  92,815.00  94,230.20  94,556.71  95,957.90
##          1          1           1           1           1          1          1
##  97,451.31  97,922.49          98
##          1          1           2
```

```
table(cafe_df$Rendimiento..ha.ton.)
```

```
##
##    0  0.3 0.38 0.45 0.47 0.49 0.51 0.52 0.55 0.57 0.59  0.6 0.62 0.63 0.64 0.65
##    2    1    1    2    1    1    1    1    1    4    2   10    7    1    1    7
## 0.66 0.67 0.69  0.7 0.71 0.72 0.74 0.75 0.76 0.77 0.78 0.79  0.8 0.81 0.82 0.83
##    5    2    5    1    2    2    2    6    2    4    2    5    8    3    4    1
## 0.84 0.85 0.86 0.87 0.88 0.89  0.9 0.91 0.92 0.93 0.94 0.95 0.96 0.97 0.98 0.99
##    1    7    4    2    2    6    2    5    2    3    3    2    5    5    3    5
##    1 1.01 1.02 1.03 1.04 1.05 1.06 1.07 1.08 1.09  1.1 1.11 1.12 1.13 1.14 1.15
##    5    2    2    2    2    4    5    3    5    5    5    4    5    3    4    9
## 1.16 1.17 1.18 1.19  1.2 1.21 1.22 1.23 1.24 1.25 1.26 1.27 1.28 1.29  1.3 1.32
##    3    3    2    4    2    2    2    1    2    1    1    1    2    1    2    2
## 1.33 1.35 1.37 1.38  1.4 1.41 1.44 1.45 1.47  1.5 1.52 1.53 1.79    2
##    1    2    1    1    1    1    1    1    1    1    2    1    1    1
```

#PODEMOS VER LA UTILIDAD E INFORMACION DE LA FUNCION

```
help (subset)
```

#CON LA FUNCION SUBSET PODEMOS SELECCIONAR POR VARIABLES EN NUESTRO DATAFRAME

```
subset(cafe_df, subset = Departamento == 'HUILA')
```

```
##     Anio Departamento Producto  Area..ha. Produccion..ton. Rendimiento..ha.ton.
## 11  2007        HUILA     CAFE  89,661.56       129,052.51                 1.44
## 33  2008        HUILA     CAFE  89,131.20       131,316.47                 1.47
## 55  2009        HUILA     CAFE  86,726.78       104,609.42                 1.21
## 78  2010        HUILA     CAFE  87,139.53       104,336.56                 1.20
## 101 2011        HUILA     CAFE  78,792.21        85,150.66                 1.08
## 124 2012        HUILA     CAFE  79,809.34        85,212.64                 1.07
## 146 2013        HUILA     CAFE 118,200.88       115,874.98                 0.98
## 168 2014        HUILA     CAFE 128,273.15       135,971.20                 1.06
## 190 2015        HUILA     CAFE 130,452.40       145,168.10                 1.11
## 212 2016        HUILA     CAFE 126,052.15       145,154.42                 1.15
## 233 2017        HUILA     CAFE 122,575.76       133,787.95                 1.09
## 255 2018        HUILA     CAFE 122,002.46       136,161.86                 1.12
##     Produccion.Nacional..ton. Area.Nacional..ha.
## 11                      15.57              11.70
## 33                      15.85              11.75
## 55                      14.76              11.49
## 78                      13.39              11.71
## 101                     13.30              11.06
## 124                     13.60              11.23
## 146                     17.77              15.31
```

```
## 168                        18.67                16.12
## 190                        17.07                16.28
## 212                        17.00                16.21
## 233                        15.71                16.27
## 255                        15.91                16.43
```

```r
subset(cafe_df, subset = Departamento == 'META')
```

```
##     Anio Departamento Producto Area..ha. Produccion..ton. Rendimiento..ha.ton.
## 14  2007         META     CAFE  2,048.00         1,617.20                 0.79
## 36  2008         META     CAFE  2,146.00         1,656.96                 0.77
## 58  2009         META     CAFE  2,216.00         1,672.60                 0.75
## 81  2010         META     CAFE  2,326.00         2,221.90                 0.96
## 104 2011         META     CAFE  2,578.00         2,533.75                 0.98
## 127 2012         META     CAFE  2,783.00         2,133.10                 0.77
## 149 2013         META     CAFE  2,483.43         1,650.41                 0.66
## 171 2014         META     CAFE  2,739.71         1,950.84                 0.71
## 193 2015         META     CAFE  2,922.21         3,206.35                 1.10
## 215 2016         META     CAFE  2,924.89         3,322.42                 1.14
## 236 2017         META     CAFE  2,926.85         4,013.11                 1.37
## 258 2018         META     CAFE  2,761.01         3,877.62                 1.40
##     Produccion.Nacional..ton. Area.Nacional..ha.
## 14                       0.20               0.27
## 36                       0.20               0.28
## 58                       0.24               0.29
## 81                       0.29               0.31
## 104                      0.40               0.36
## 127                      0.34               0.39
## 149                      0.25               0.32
## 171                      0.27               0.34
## 193                      0.38               0.36
## 215                      0.39               0.38
## 236                      0.47               0.39
## 258                      0.45               0.37
```

```r
subset(cafe_df, subset = Anio == '2009')
```

```
##    Anio       Departamento Producto   Area..ha. Produccion..ton.
## 45 2009         ANTIOQUIA     CAFE  112,420.20       103,703.00
## 46 2009           BOLIVAR     CAFE         770            292.6
## 47 2009            BOYACA     CAFE   10,672.50         8,567.97
## 48 2009            CALDAS     CAFE   73,083.00        81,668.22
## 49 2009           CAQUETA     CAFE    2,332.00         2,332.00
## 50 2009          CASANARE     CAFE    1,904.00         2,079.70
## 51 2009             CAUCA     CAFE   57,860.00        47,221.00
## 52 2009             CESAR     CAFE   23,420.00        12,770.00
## 53 2009             CHOCO     CAFE          70            78.75
## 54 2009       CUNDINAMARCA     CAFE   43,475.84        37,118.07
## 55 2009             HUILA     CAFE   86,726.78       104,609.42
## 56 2009         LA GUAJIRA     CAFE    4,488.00         2,340.40
## 57 2009         MAGDALENA     CAFE   17,036.00        13,412.80
## 58 2009              META     CAFE    2,216.00         1,672.60
## 59 2009            NARIÑO     CAFE   26,467.20        27,487.71
## 60 2009 NORTE DE SANTANDER     CAFE   33,552.58        10,221.69
## 61 2009          PUTUMAYO     CAFE          23            26.7
```

```
## 62 2009              QUINDIO    CAFE  19,052.00        21,985.00
## 63 2009             RISARALDA   CAFE  45,428.00        53,648.00
## 64 2009             SANTANDER   CAFE  37,985.90        26,311.61
## 65 2009                TOLIMA   CAFE  88,667.00        88,633.10
## 66 2009      VALLE DEL CAUCA    CAFE  67,001.30        62,711.08
##    Rendimiento..ha.ton. Produccion.Nacional..ton. Area.Nacional..ha.
## 45                 0.92                     14.63              14.90
## 46                 0.38                      0.04               0.10
## 47                 0.80                      1.21               1.41
## 48                 1.12                     11.52               9.68
## 49                 1.00                      0.33               0.31
## 50                 1.09                      0.29               0.25
## 51                 0.82                      6.66               7.67
## 52                 0.55                      1.80               3.10
## 53                 1.13                      0.01               0.01
## 54                 0.85                      5.24               5.76
## 55                 1.21                     14.76              11.49
## 56                 0.52                      0.33               0.59
## 57                 0.79                      1.89               2.26
## 58                 0.75                      0.24               0.29
## 59                 1.04                      3.88               3.51
## 60                 0.30                      1.44               4.45
## 61                 1.16                      0.00               0.00
## 62                 1.15                      3.10               2.52
## 63                 1.18                      7.57               6.02
## 64                 0.69                      3.71               5.03
## 65                 1.00                     12.50              11.75
## 66                 0.94                      8.85               8.88
```

```r
subset(cafe_df, subset = Anio == '2012')
```

```
##        Anio       Departamento Producto   Area..ha. Produccion..ton.
## 113 2012            ANTIOQUIA    CAFE 112,221.14        91,621.30
## 114 2012              BOLIVAR    CAFE        870           652.5
## 115 2012               BOYACA    CAFE   6,698.20         4,981.59
## 116 2012               CALDAS    CAFE  54,871.88        54,115.96
## 117 2012              CAQUETA    CAFE   2,882.50         2,446.38
## 118 2012             CASANARE    CAFE   2,322.00         1,718.25
## 119 2012                CAUCA    CAFE  56,825.00        50,588.14
## 120 2012                CESAR    CAFE  22,911.00        19,994.35
## 121 2012                CHOCO    CAFE         70             140
## 122 2012         CUNDINAMARCA    CAFE  37,175.06        30,786.41
## 123 2012             GUAVIARE    CAFE          0               0
## 124 2012                HUILA    CAFE  79,809.34        85,212.64
## 125 2012           LA GUAJIRA    CAFE   5,143.00         3,434.30
## 126 2012            MAGDALENA    CAFE  17,686.00        14,096.05
## 127 2012                 META    CAFE   2,783.00         2,133.10
## 128 2012               NARIÑO    CAFE  27,806.40        28,077.94
## 129 2012    NORTE DE SANTANDER   CAFE  19,339.31        12,214.54
## 130 2012             PUTUMAYO    CAFE         42            48.4
## 131 2012              QUINDIO    CAFE  21,109.83        18,030.13
## 132 2012             RISARALDA   CAFE  45,588.03        36,989.43
## 133 2012             SANTANDER   CAFE  33,947.15        23,271.89
## 134 2012                TOLIMA   CAFE  90,904.48        85,027.49
## 135 2012      VALLE DEL CAUCA    CAFE  69,456.71        61,190.55
```

```
##     Rendimiento..ha.ton. Produccion.Nacional..ton. Area.Nacional..ha.
## 113                 0.82                     14.62               15.80
## 114                 0.75                      0.10                0.12
## 115                 0.74                      0.79                0.94
## 116                 0.99                      8.63                7.72
## 117                 0.85                      0.39                0.41
## 118                 0.74                      0.27                0.33
## 119                 0.89                      8.07                8.00
## 120                 0.87                      3.19                3.22
## 121                 2.00                      0.02                0.01
## 122                 0.83                      4.91                5.23
## 123                 0.00                      0.00                0.00
## 124                 1.07                     13.60               11.23
## 125                 0.67                      0.55                0.72
## 126                 0.80                      2.25                2.49
## 127                 0.77                      0.34                0.39
## 128                 1.01                      4.48                3.91
## 129                 0.63                      1.95                2.72
## 130                 1.15                      0.01                0.01
## 131                 0.85                      2.88                2.97
## 132                 0.81                      5.90                6.42
## 133                 0.69                      3.71                4.78
## 134                 0.94                     13.57               12.80
## 135                 0.88                      9.76                9.78
```

```r
subset(cafe_df, subset=Anio == '2009',
       select=c('Rendimiento..ha.ton.', 'Produccion.Nacional..ton.'))
```

```
##    Rendimiento..ha.ton. Produccion.Nacional..ton.
## 45                 0.92                     14.63
## 46                 0.38                      0.04
## 47                 0.80                      1.21
## 48                 1.12                     11.52
## 49                 1.00                      0.33
## 50                 1.09                      0.29
## 51                 0.82                      6.66
## 52                 0.55                      1.80
## 53                 1.13                      0.01
## 54                 0.85                      5.24
## 55                 1.21                     14.76
## 56                 0.52                      0.33
## 57                 0.79                      1.89
## 58                 0.75                      0.24
## 59                 1.04                      3.88
## 60                 0.30                      1.44
## 61                 1.16                      0.00
## 62                 1.15                      3.10
## 63                 1.18                      7.57
## 64                 0.69                      3.71
## 65                 1.00                     12.50
## 66                 0.94                      8.85
```

```r
subset(cafe_df, subset=Departamento == 'CUNDINAMARCA',
       select=c('Rendimiento..ha.ton.', 'Produccion.Nacional..ton.'))
```

```
##     Rendimiento..ha.ton. Produccion.Nacional..ton.
## 10                  0.78                       4.07
## 32                  1.79                       9.44
## 54                  0.85                       5.24
## 77                  0.84                       4.78
## 100                 0.87                       5.12
## 122                 0.83                       4.91
## 145                 0.69                       3.83
## 167                 0.75                       3.45
## 189                 0.91                       3.66
## 211                 0.95                       3.68
## 232                 1.10                       3.99
## 254                 1.12                       3.81
```

```
subset(cafe_df, subset=Departamento == 'CUNDINAMARCA' & Anio <= '2012',
       select=c( 'Produccion.Nacional..ton.', 'Area.Nacional..ha.', 'Rendimiento..ha.ton.'))
```

```
##     Produccion.Nacional..ton. Area.Nacional..ha. Rendimiento..ha.ton.
## 10                       4.07               5.61                 0.78
## 32                       9.44               5.75                 1.79
## 54                       5.24               5.76                 0.85
## 77                       4.78               5.95                 0.84
## 100                      5.12               5.26                 0.87
## 122                      4.91               5.23                 0.83
```

#PONEMOS LA INSTRUCCION EN UNA VARIABLE Y LO GRAFICAMOS

```
Grupo_Antioquia<-subset(cafe_df, subset=Departamento == 'ANTIOQUIA' & Anio <= '2012',
                        select=c( 'Produccion.Nacional..ton.', 'Area.Nacional..ha.', 'Rendimiento..ha.t
Grupo_Antioquia
```

```
##     Produccion.Nacional..ton. Area.Nacional..ha. Rendimiento..ha.ton.
## 1                       14.54              14.66                 1.07
## 23                      13.70              15.13                 0.99
## 45                      14.63              14.90                 0.92
## 67                      15.56              14.99                 1.09
## 90                      18.00              14.94                 1.08
## 113                     14.62              15.80                 0.82
```

```
plot(Grupo_Antioquia)
```
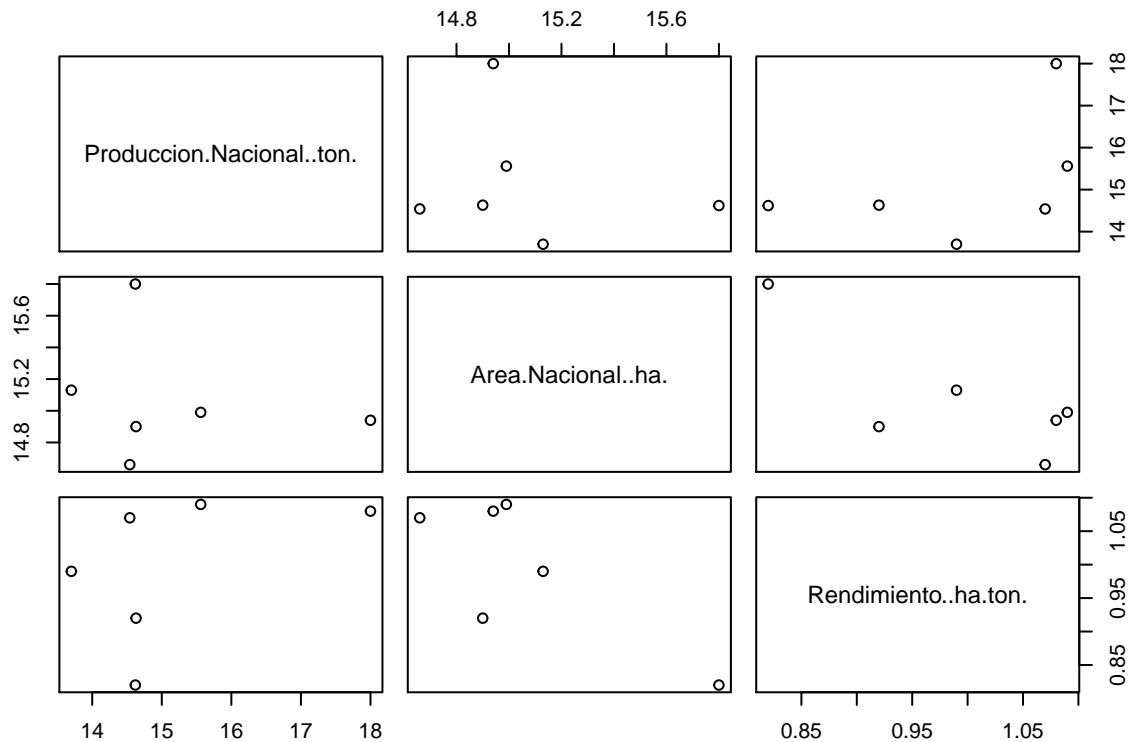
#PODEMOS VER SI EXISTEN DATOS NULOS EN EL DATAFRAME

```
is.na(cafe_df)
```

```
##         Anio Departamento Producto Area..ha. Produccion..ton.
##   [1,] FALSE        FALSE    FALSE     FALSE            FALSE
##   [2,] FALSE        FALSE    FALSE     FALSE            FALSE
##   [3,] FALSE        FALSE    FALSE     FALSE            FALSE
##   [4,] FALSE        FALSE    FALSE     FALSE            FALSE
##   [5,] FALSE        FALSE    FALSE     FALSE            FALSE
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## [166,]            FALSE                   FALSE            FALSE
## [167,]            FALSE                   FALSE            FALSE
## [168,]            FALSE                   FALSE            FALSE
## [169,]            FALSE                   FALSE            FALSE
## [170,]            FALSE                   FALSE            FALSE
## [171,]            FALSE                   FALSE            FALSE
## [172,]            FALSE                   FALSE            FALSE
## [173,]            FALSE                   FALSE            FALSE
## [174,]            FALSE                   FALSE            FALSE
## [175,]            FALSE                   FALSE            FALSE
## [176,]            FALSE                   FALSE            FALSE
## [177,]            FALSE                   FALSE            FALSE
## [178,]            FALSE                   FALSE            FALSE
## [179,]            FALSE                   FALSE            FALSE
## [180,]            FALSE                   FALSE            FALSE
## [181,]            FALSE                   FALSE            FALSE
## [182,]            FALSE                   FALSE            FALSE
## [183,]            FALSE                   FALSE            FALSE
## [184,]            FALSE                   FALSE            FALSE
## [185,]            FALSE                   FALSE            FALSE
## [186,]            FALSE                   FALSE            FALSE
## [187,]            FALSE                   FALSE            FALSE
## [188,]            FALSE                   FALSE            FALSE
## [189,]            FALSE                   FALSE            FALSE
## [190,]            FALSE                   FALSE            FALSE
## [191,]            FALSE                   FALSE            FALSE
```

```
## [192,]                FALSE                FALSE       FALSE
## [193,]                FALSE                FALSE       FALSE
## [194,]                FALSE                FALSE       FALSE
## [195,]                FALSE                FALSE       FALSE
## [196,]                FALSE                FALSE       FALSE
## [197,]                FALSE                FALSE       FALSE
## [198,]                FALSE                FALSE       FALSE
## [199,]                FALSE                FALSE       FALSE
## [200,]                FALSE                FALSE       FALSE
## [201,]                FALSE                FALSE       FALSE
## [202,]                FALSE                FALSE       FALSE
## [203,]                FALSE                FALSE       FALSE
## [204,]                FALSE                FALSE       FALSE
## [205,]                FALSE                FALSE       FALSE
## [206,]                FALSE                FALSE       FALSE
## [207,]                FALSE                FALSE       FALSE
## [208,]                FALSE                FALSE       FALSE
## [209,]                FALSE                FALSE       FALSE
## [210,]                FALSE                FALSE       FALSE
## [211,]                FALSE                FALSE       FALSE
## [212,]                FALSE                FALSE       FALSE
## [213,]                FALSE                FALSE       FALSE
## [214,]                FALSE                FALSE       FALSE
## [215,]                FALSE                FALSE       FALSE
## [216,]                FALSE                FALSE       FALSE
## [217,]                FALSE                FALSE       FALSE
## [218,]                FALSE                FALSE       FALSE
## [219,]                FALSE                FALSE       FALSE
## [220,]                FALSE                FALSE       FALSE
## [221,]                FALSE                FALSE       FALSE
## [222,]                FALSE                FALSE       FALSE
## [223,]                FALSE                FALSE       FALSE
## [224,]                FALSE                FALSE       FALSE
## [225,]                FALSE                FALSE       FALSE
## [226,]                FALSE                FALSE       FALSE
## [227,]                FALSE                FALSE       FALSE
## [228,]                FALSE                FALSE       FALSE
## [229,]                FALSE                FALSE       FALSE
## [230,]                FALSE                FALSE       FALSE
## [231,]                FALSE                FALSE       FALSE
## [232,]                FALSE                FALSE       FALSE
## [233,]                FALSE                FALSE       FALSE
## [234,]                FALSE                FALSE       FALSE
## [235,]                FALSE                FALSE       FALSE
## [236,]                FALSE                FALSE       FALSE
## [237,]                FALSE                FALSE       FALSE
## [238,]                FALSE                FALSE       FALSE
## [239,]                FALSE                FALSE       FALSE
## [240,]                FALSE                FALSE       FALSE
## [241,]                FALSE                FALSE       FALSE
## [242,]                FALSE                FALSE       FALSE
## [243,]                FALSE                FALSE       FALSE
## [244,]                FALSE                FALSE       FALSE
## [245,]                FALSE                FALSE       FALSE
```

```
## [246,]                FALSE              FALSE            FALSE
## [247,]                FALSE              FALSE            FALSE
## [248,]                FALSE              FALSE            FALSE
## [249,]                FALSE              FALSE            FALSE
## [250,]                FALSE              FALSE            FALSE
## [251,]                FALSE              FALSE            FALSE
## [252,]                FALSE              FALSE            FALSE
## [253,]                FALSE              FALSE            FALSE
## [254,]                FALSE              FALSE            FALSE
## [255,]                FALSE              FALSE            FALSE
## [256,]                FALSE              FALSE            FALSE
## [257,]                FALSE              FALSE            FALSE
## [258,]                FALSE              FALSE            FALSE
## [259,]                FALSE              FALSE            FALSE
## [260,]                FALSE              FALSE            FALSE
## [261,]                FALSE              FALSE            FALSE
## [262,]                FALSE              FALSE            FALSE
## [263,]                FALSE              FALSE            FALSE
## [264,]                FALSE              FALSE            FALSE
## [265,]                FALSE              FALSE            FALSE
## [266,]                FALSE              FALSE            FALSE
```

`is.na(cafe_df$Area..ha.)`

```
##   [1] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [13] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [25] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [37] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [49] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [61] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [73] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [85] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [97] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [109] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [121] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [133] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [145] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [157] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [169] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [181] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [193] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [205] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [217] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [229] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [241] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [253] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [265] FALSE FALSE
```

`is.na(cafe_df$Rendimiento..ha.ton.)`

```
##   [1] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [13] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [25] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [37] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [49] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
```

```
##  [61] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [73] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [85] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
##  [97] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [109] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [121] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [133] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [145] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [157] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [169] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [181] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [193] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [205] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [217] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [229] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [241] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [253] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [265] FALSE FALSE
```

#NOS MUESTRA LA SUMA DE LOS VALORES NULOS EN EL DATAFRAME

```
rowSums(is.na(cafe_df))
```

```
##   [1] 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
##  [38] 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
##  [75] 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
## [112] 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
## [149] 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
## [186] 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
## [223] 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
## [260] 0 0 0 0 0 0
```

#NOS MUESTRA LA SUMA TOTAL DE TODOS LOS VALORES NULOS

```
sum(rowSums(is.na(cafe_df)))
```

```
## [1] 0
```

#VISUALIZAMOS HISTOGRAMAS POR VARIABLE

```
plot(cafe_df$Rendimiento..ha.ton.)
```
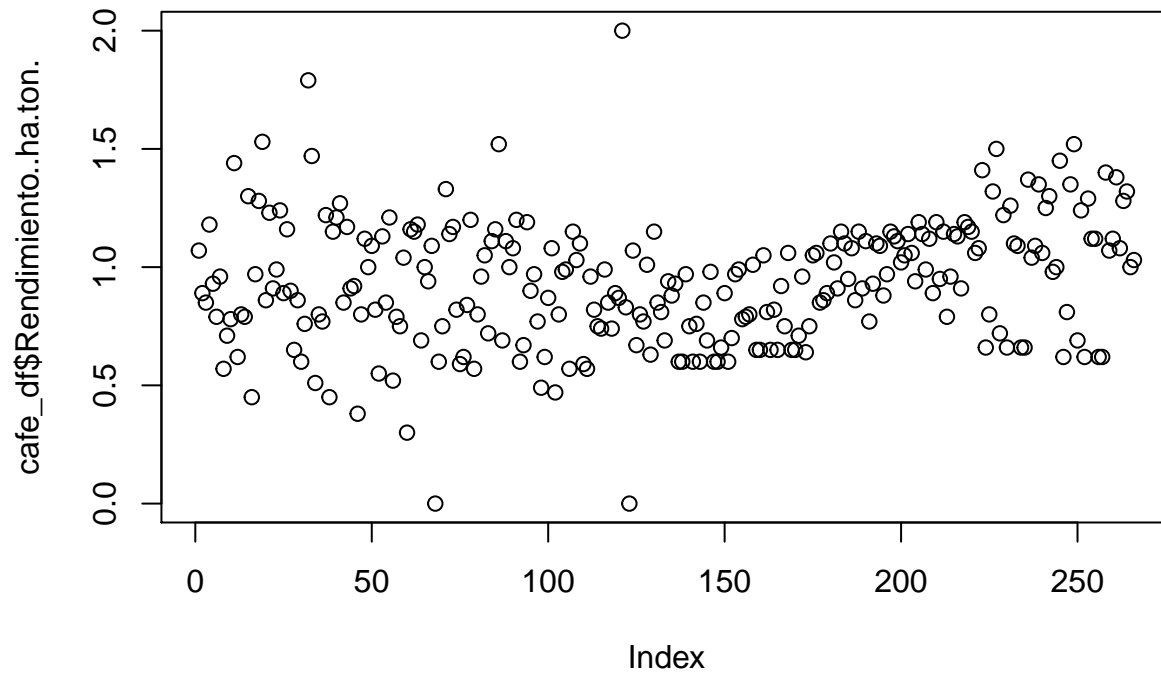
#GRAFICAMOS LA VARIABLE Y SELECCIONAMOS ALGUNOS DETALLES

```
plot(cafe_df$Rendimiento..ha.ton., main ="Gráfico Dispersion",
     sub ="CANTIDAD",
     type ="p", # p indica puntos de dispersion
     col ="red",
     xlab ="cantidad",
     ylab = "Rendimiento (ha/ton)")
```
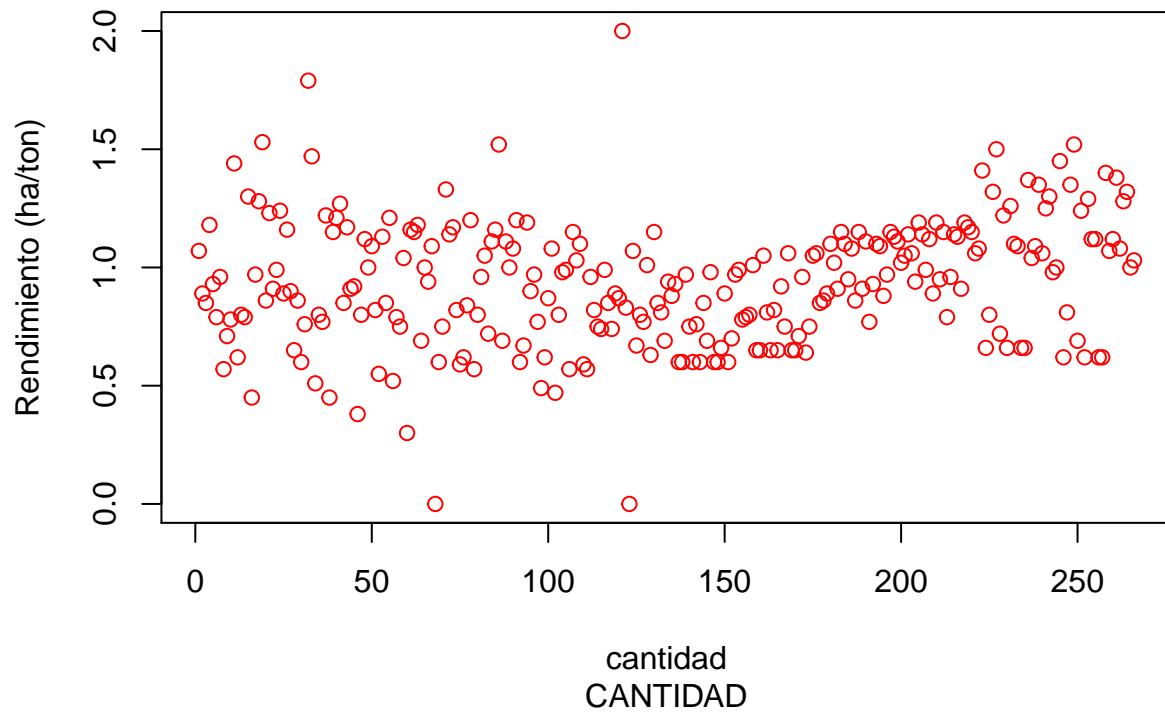
Gráfico Dispersion


```
plot(cafe_df$Rendimiento..ha.ton., main ="Gráfico Dispersion",
     sub ="Indices",
     type ="b", # b indica lineas uniendo los puntos de dispersion
     col ="red",
     xlab ="cantidad",
     ylab = "Rendimiento (ha/ton)")
```

Gráfico Dispersion
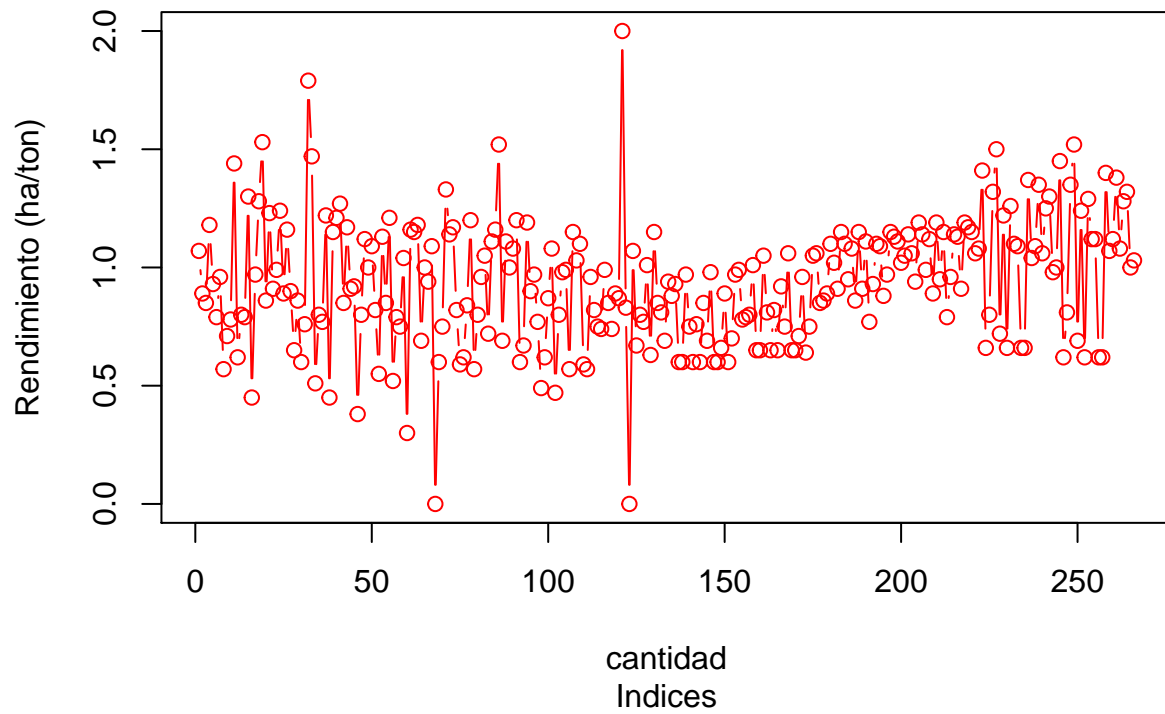
cantidad
Indices

```
plot(cafe_df$Rendimiento..ha.ton., main ="Gráfico Dispersion",
     sub ="Indices",
     type ="o", # b indica lineas sobreindicadas sobre los puntos de dispersion
     col ="blue",
     xlab ="cantidad",
     ylab = "Rendimiento (ha/ton)")
```
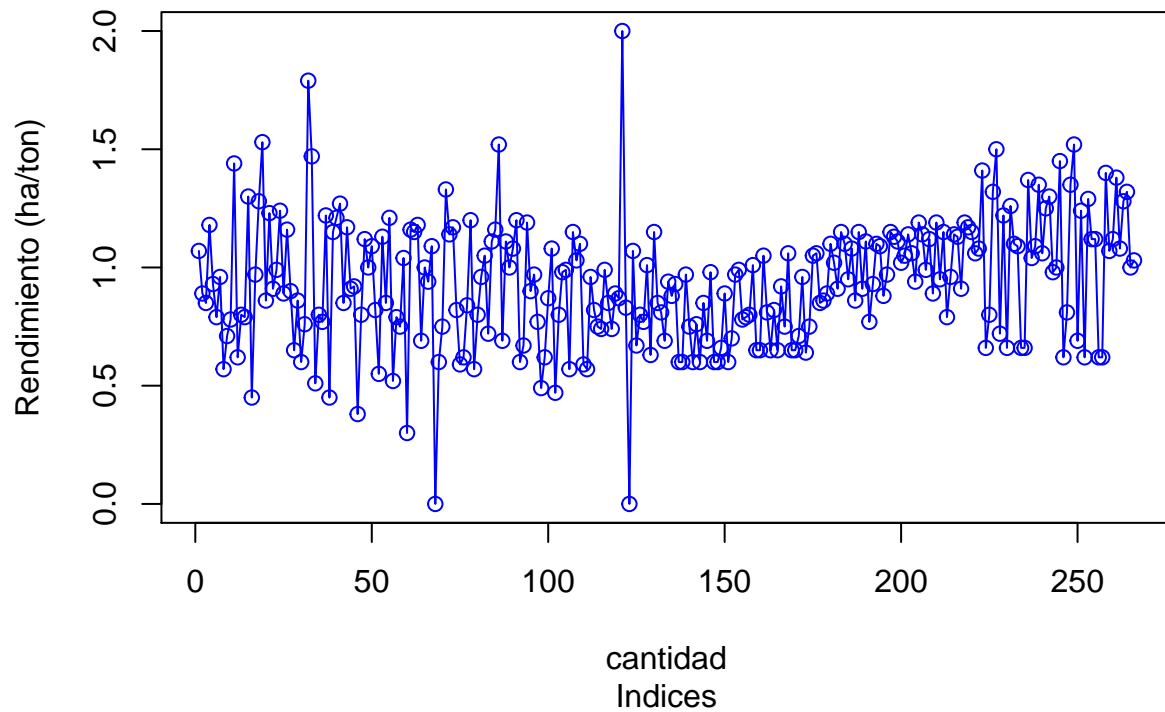
Gráfico Dispersion


```
plot(cafe_df$Rendimiento..ha.ton., main ="Gráfico Dispersion",
     sub ="Indices",
     type ="h", # b indica lineas tipo histograma sobre los puntos de dispersion
     col ="blue",
     xlab ="cantidad",
     ylab = "Rendimiento (ha/ton)")
```
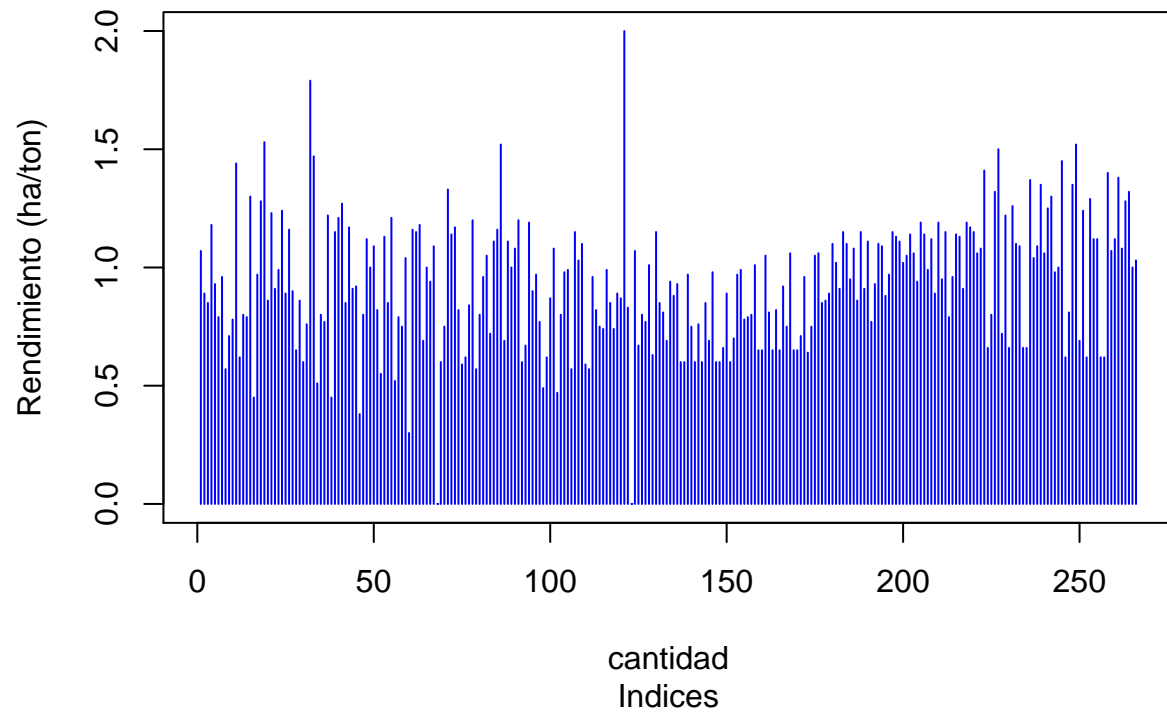
Gráfico Dispersion


```
plot(cafe_df$Rendimiento..ha.ton., main ="Gráfico Dispersion",
     sub ="Indices",
     type ="s", # s funcion escalera (horizontal a vertical)
     col ="blue",
     xlab ="cantidad",
     ylab = "Rendimiento (ha/ton)")
```
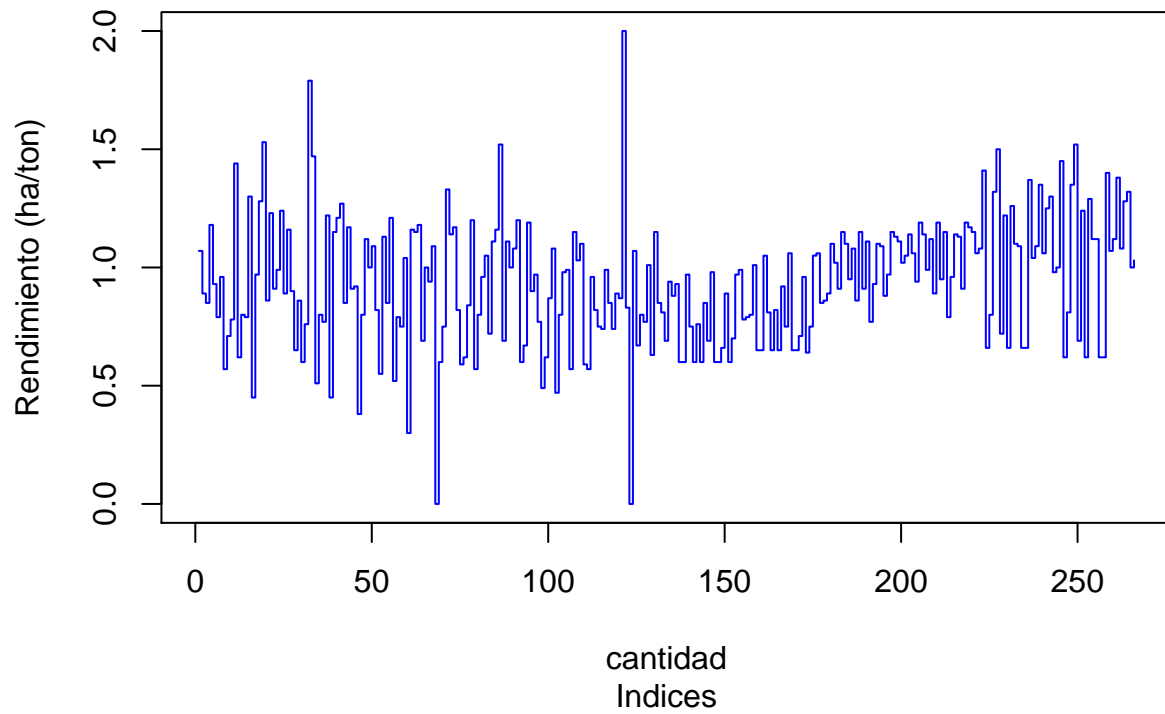
Gráfico Dispersion


```
plot(cafe_df$Rendimiento..ha.ton., main ="Gráfico Dispersion",
     sub ="Indices",
     type ="l", # l indica lineas
     col ="blue",
     xlab ="cantidad",
     ylab = "Rendimiento (ha/ton)")
```

Gráfico Dispersion

cantidad
Indices
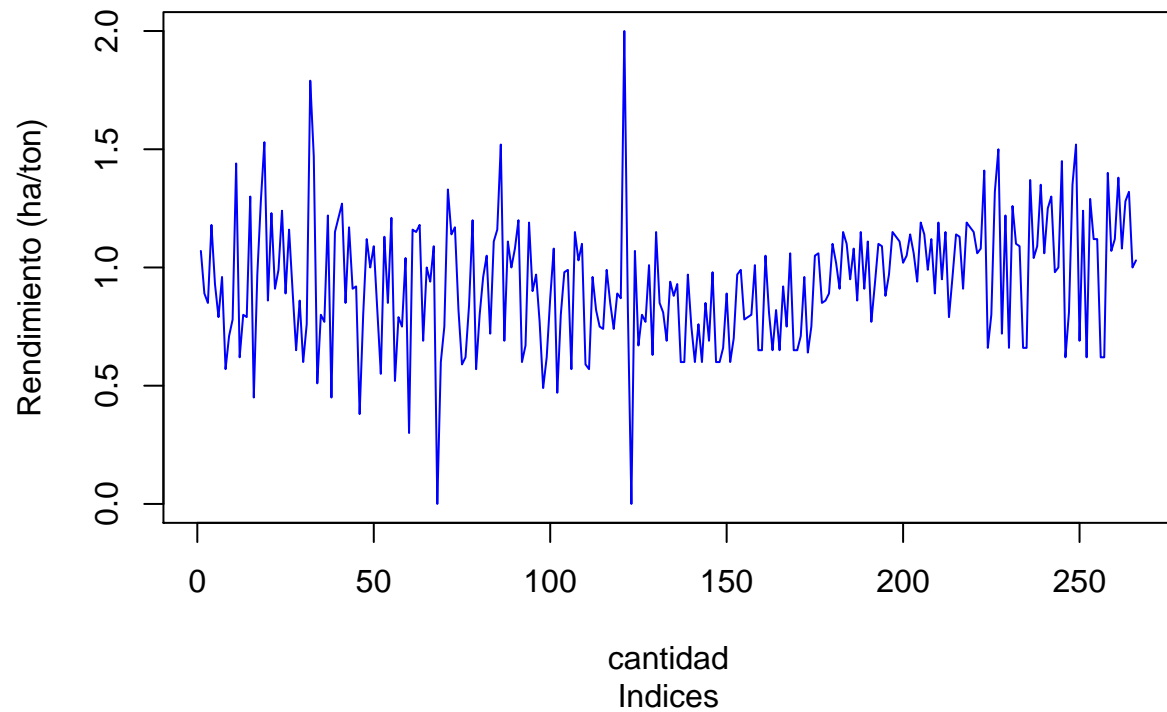
#GRAFICAS POR VARIABLES

```
plot(x = cafe_df$Area..ha.,  y = cafe_df$Rendimiento..ha.ton.)
```

Warning in xy.coords(x, y, xlabel, ylabel, log): NAs introduced by coercion
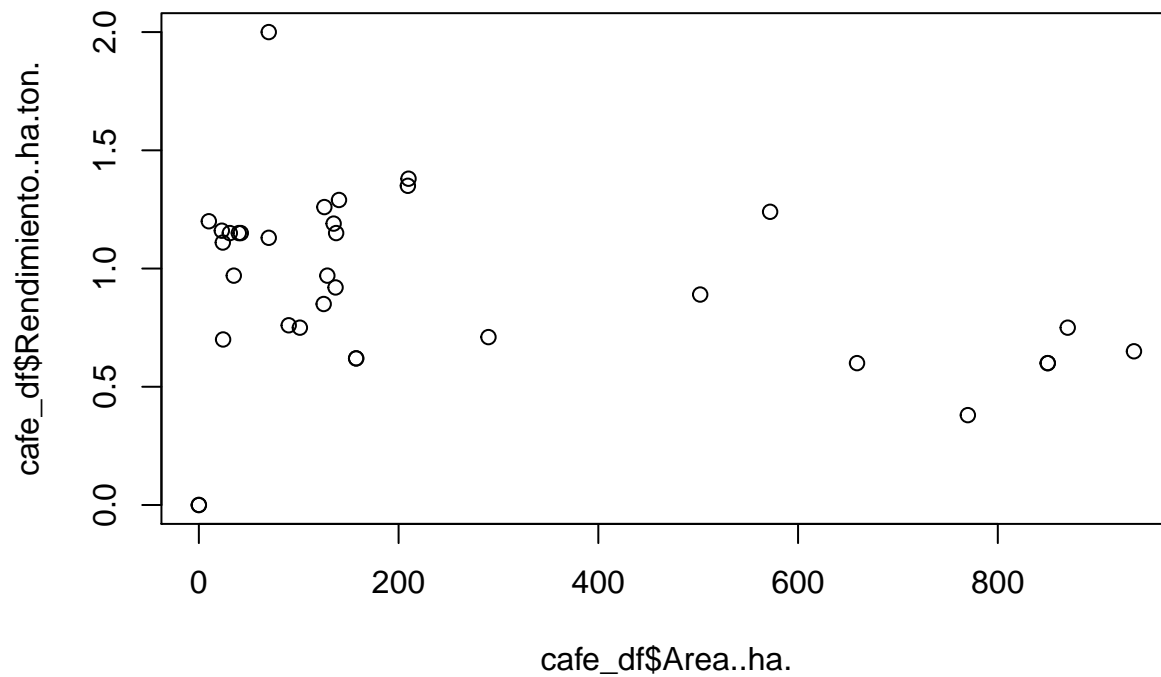

```
plot(x = cafe_df$Area..ha.,  y = cafe_df$Area.Nacional..ha.)
```
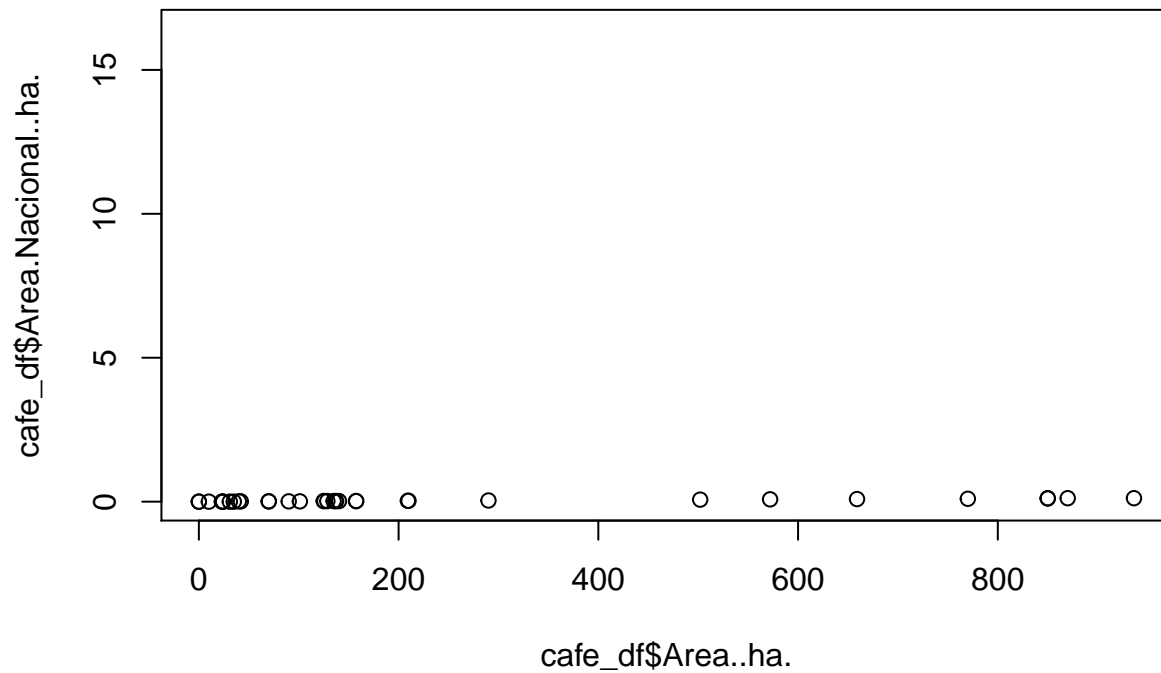
```
plot(x = cafe_df$Anio,  y = cafe_df$Rendimiento..ha.ton.)
```
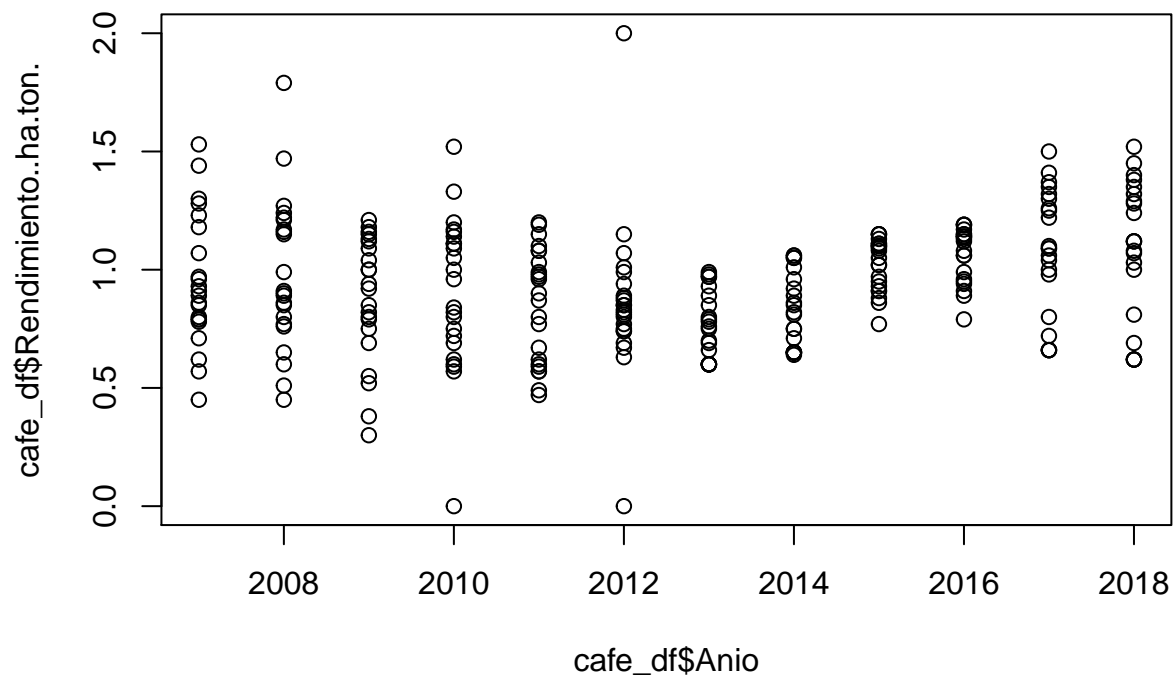


```
plot(x = cafe_df$Anio,  y = cafe_df$Produccion..ton.)
```
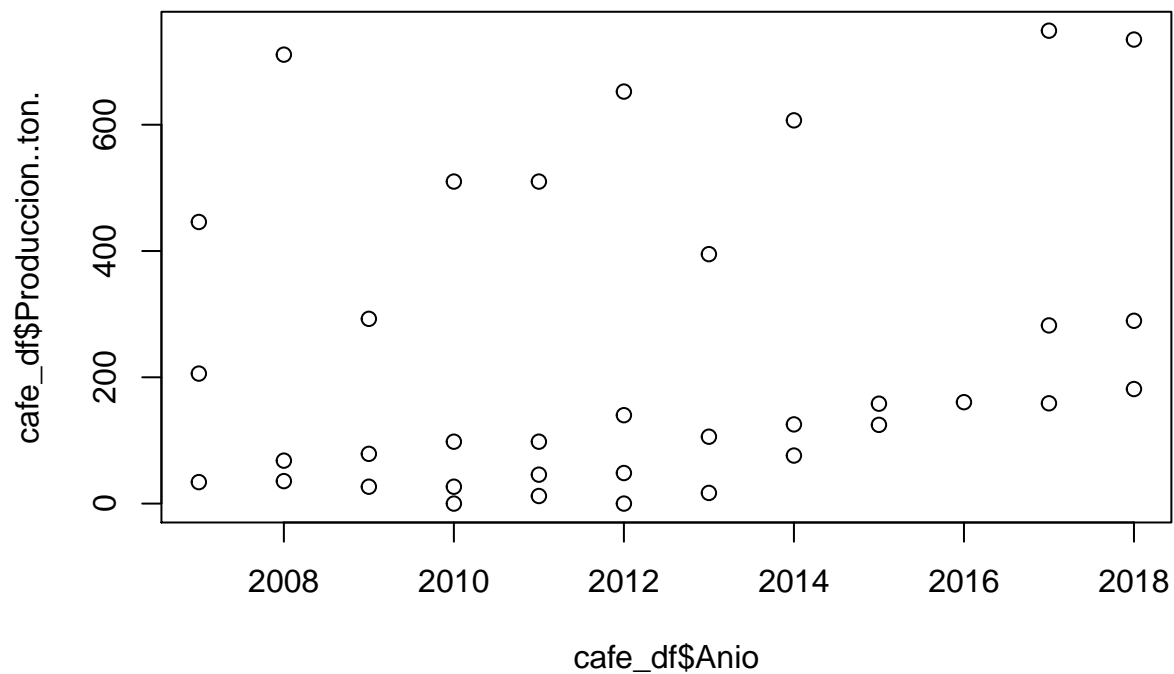
```
plot(x = cafe_df$Area..ha.,  y = cafe_df$Produccion.Nacional..ton.)
```

```
## Warning in xy.coords(x, y, xlabel, ylabel, log): NAs introduced by coercion
```
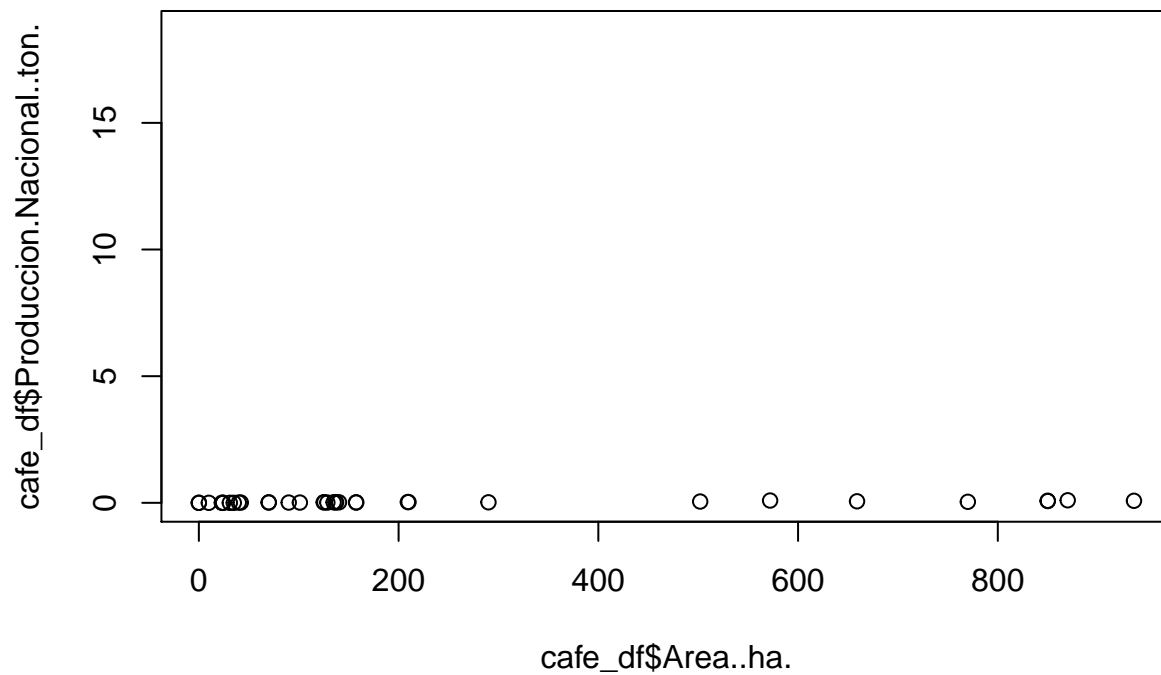


```
plot(cafe_df$Area..ha.)
```

```
## Warning in xy.coords(x, y, xlabel, ylabel, log): NAs introduced by coercion
```
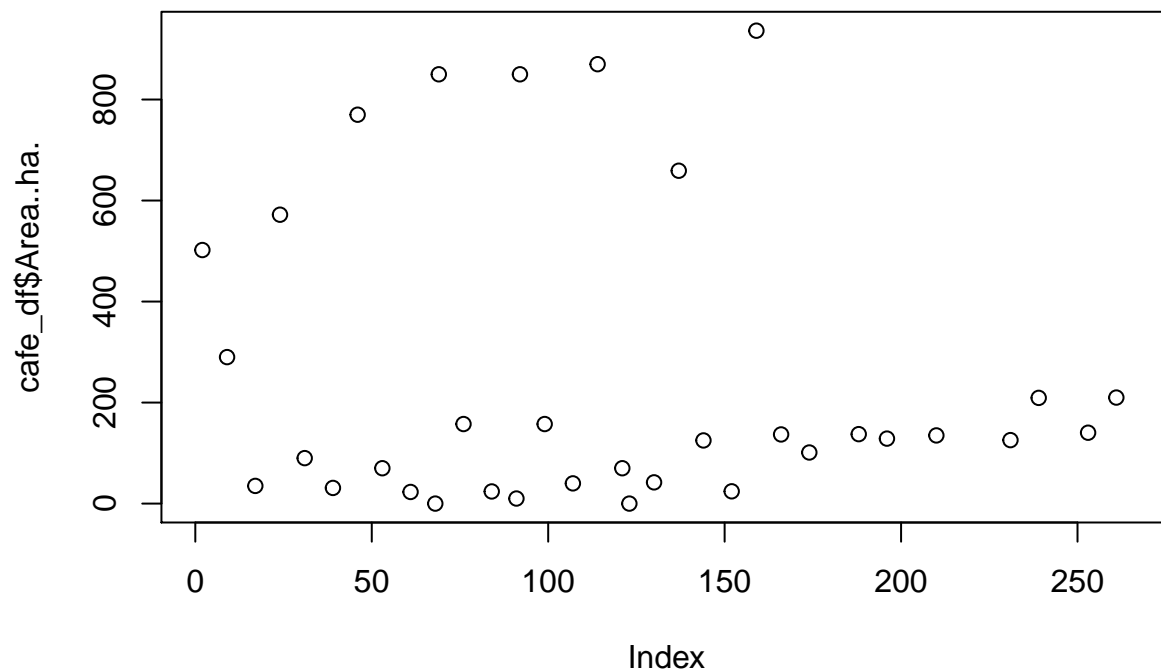
#REPRESENTA LA FRECUENCIA DE LOS DATOS EN UN HISTOGRAMA

```
hist(cafe_df$Rendimiento..ha.ton., main ="Histograma",
     sub ="Rendimiento (ha/ton)",
     col ="red",
     xlab ="Cantidad (miles) ",
     ylab = "Frecuencia")
```
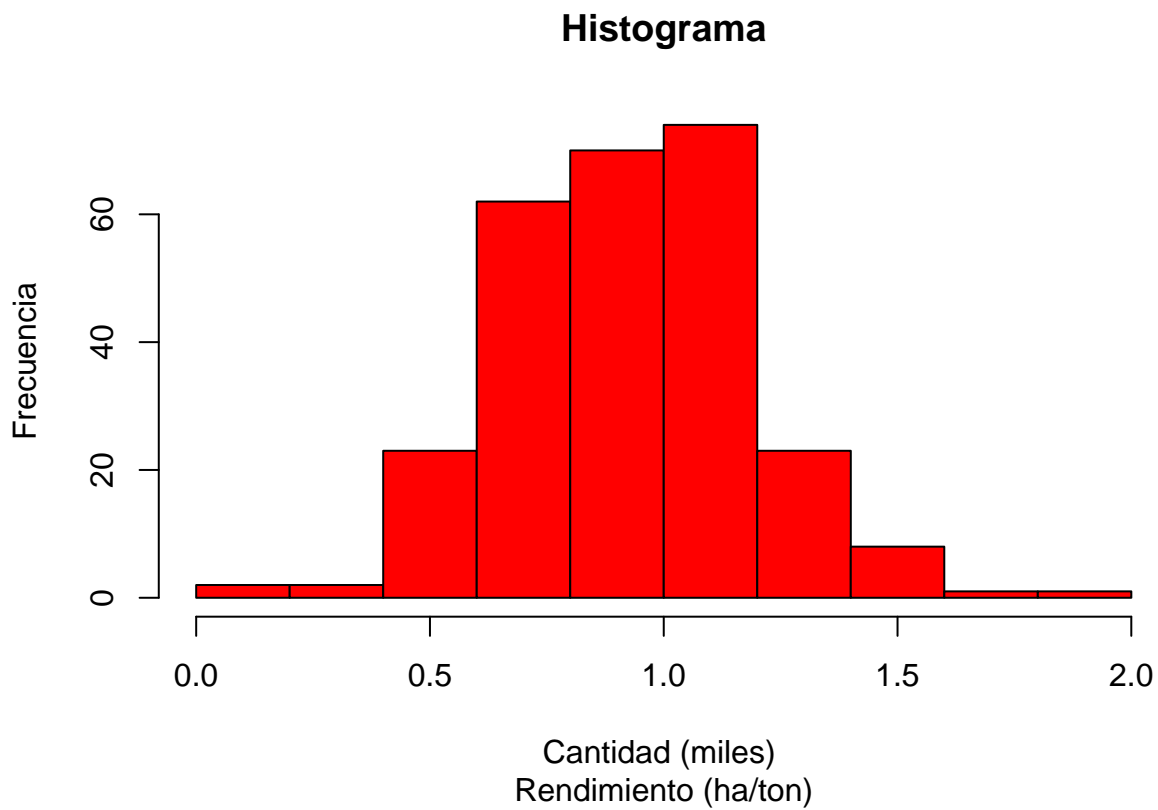
Histograma

#DIAGRAMA DE BARRAS DE LA COLUMNA RENDIMIENTO

```
barplot(table(cafe_df$Rendimiento..ha.ton.))
```
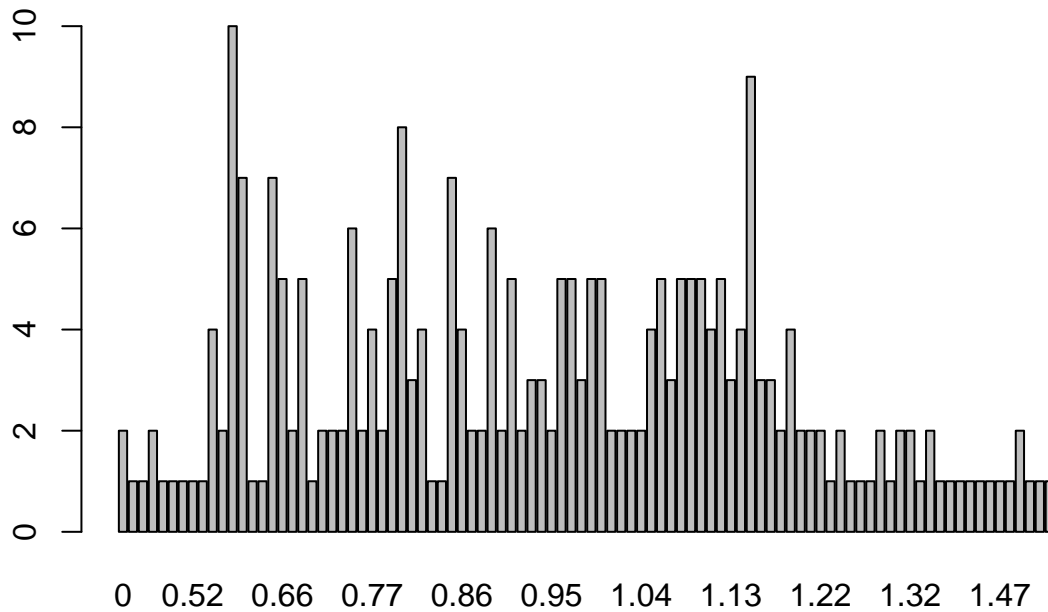

#PARA VER COMO SE DISTRUBUYEN LOS DATOS PODEMOS USAR LA FUNCION DENSITY, LA DENSIDAD ES UNA VERSION SUAVIZASA DEL HISTOGRAMA, NOS PERMITE OBSERVAR SI LOS DATOS SE COMPORTAN COMO UNA DISTRIBUCION NORMAL

```
plot(density(cafe_df$Rendimiento..ha.ton.), main="Densidad para el Rendimiento (ha/ton)")
```

Densidad para el Rendimiento (ha/ton)
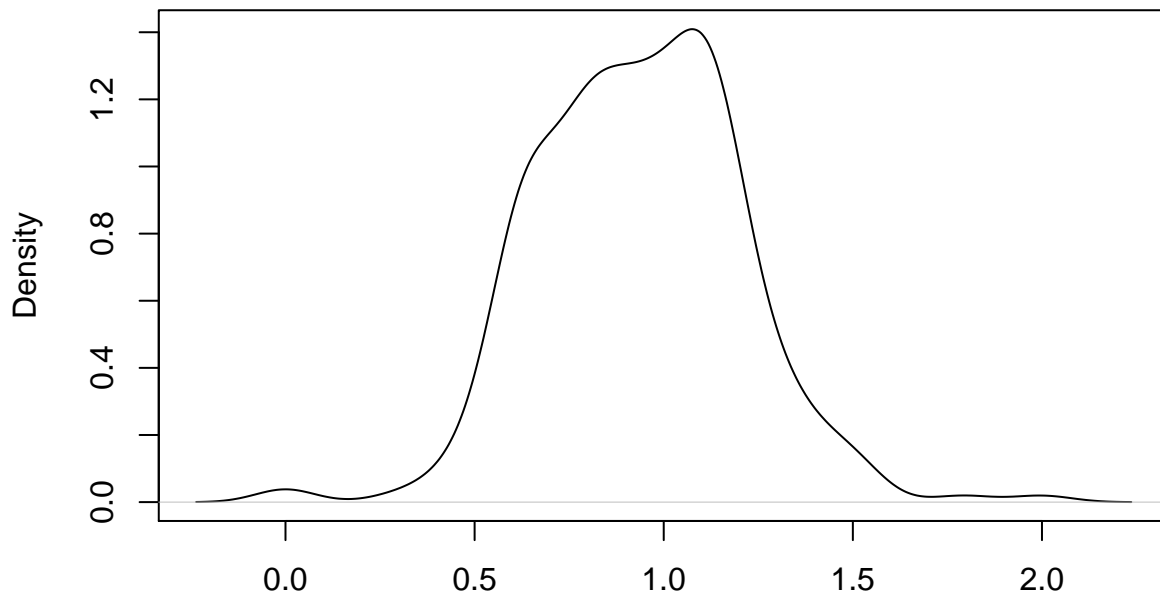
N = 266   Bandwidth = 0.0787

```
plot(density(cafe_df$Produccion.Nacional..ton.), main="Densidad para la produccion Nacional (ton)")
```

Densidad para la produccion Nacional (ton)
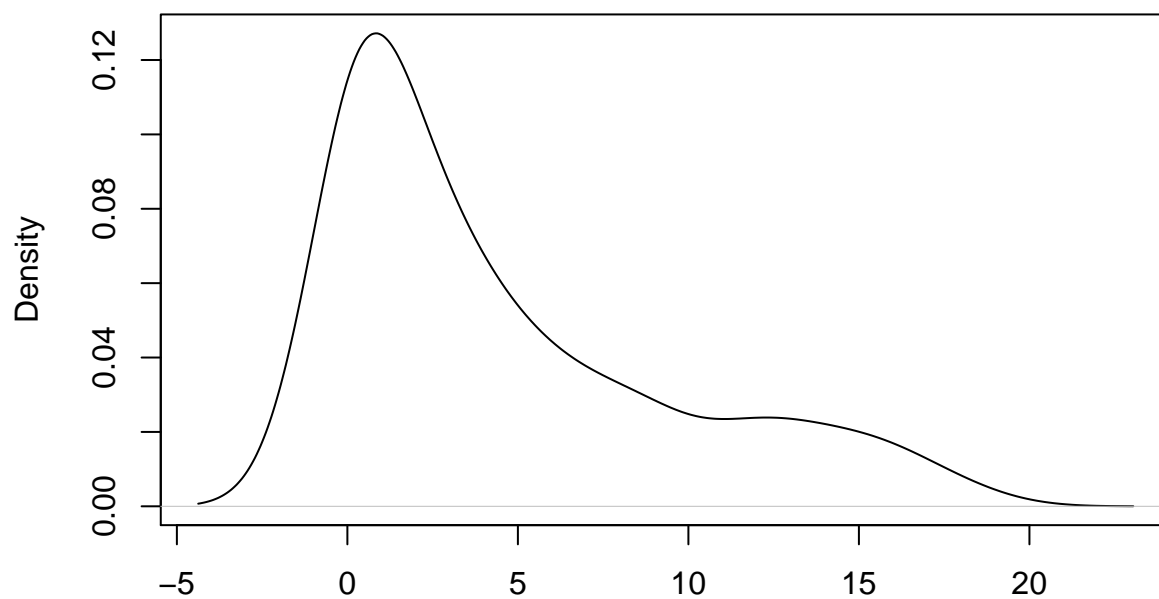
N = 266   Bandwidth = 1.459

```
plot(density(cafe_df$Area.Nacional..ha.), main="Densidad para el Area Nacional (ha)")
```

Densidad para el Area Nacional (ha)
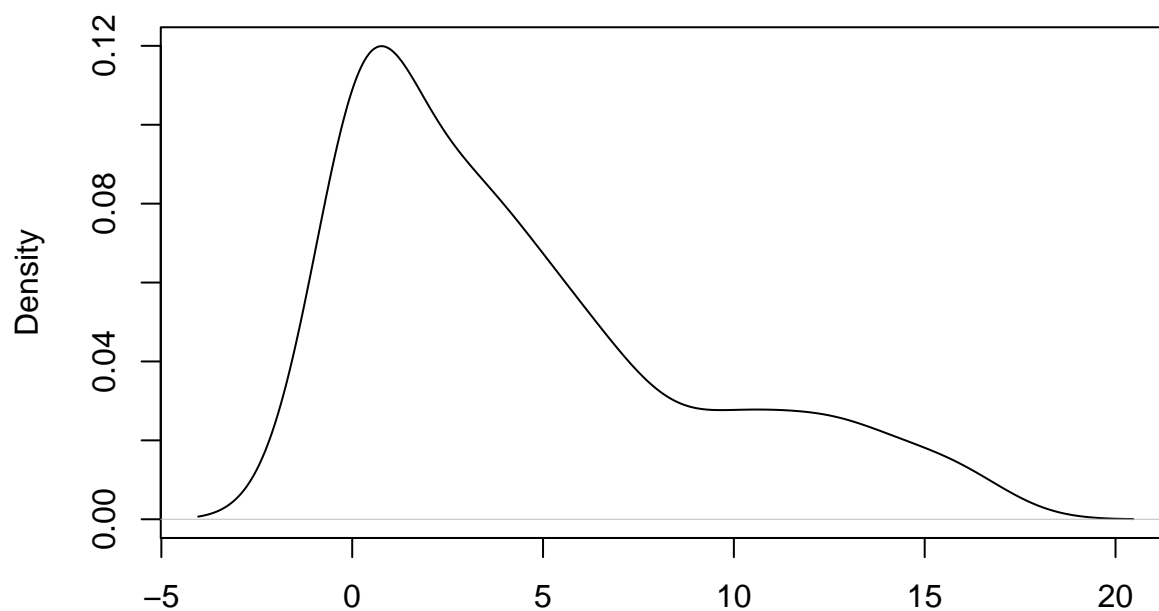
N = 266   Bandwidth = 1.345

```
#HACEMOS UN GRAFICO DE PASTEL
pie(table(cafe_df$Departamento[1:10]))
```
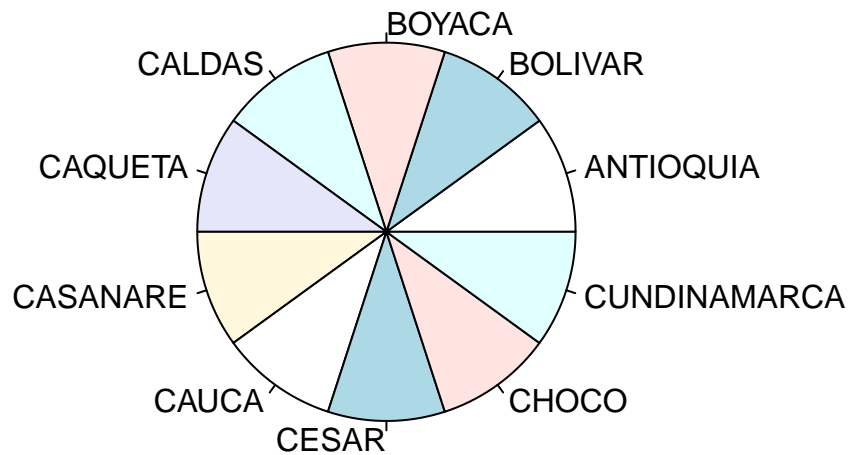
```
pie(table(cafe_df$Rendimiento..ha.ton.[1:10]))
```
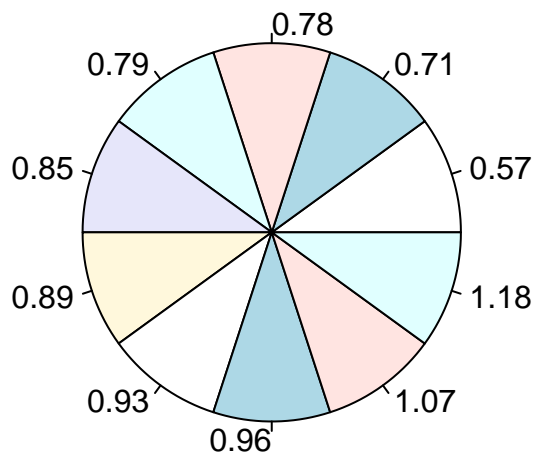

#LOS BOXPLOTS O DIAGRAMAS DE CAJA SE CONTRIBUYEN A PARTIR DE LOS PERCENTILES. #SE CONSTRUYE UN RECTANGULO USANDO ENTRE EL PRIMER Y EL TERCER CUARTIL. #LA ALTURA DEL RECTANGULO ES EL RANGO INTERCUARTIL. #LA MEDIANA ES UNA LINEA QUE DIVIDE EL RECTANGULO- #LOS VALORES MAS EXTREMOS QUE EL LARGO DE LOS BRAZOS SON CONSIDERADOS ATIPICOS #EL BOXPLOT NOS ENTREGA INFORMACION SOBRE LA SIMETRIA DE LA DISTRIBUCION DE LOS DATOS, SI LA MEDIANA NO ESTA EN EL CENTRO DEL RECTANGULO LA DISTRIBUCION NO ES SIMETRICRA. #SON UTILES PARA VER LA PRESENCIA DE VALORES ATIPICOS O OUTLERS

```
boxplot(cafe_df$Rendimiento..ha.ton.,ylab="Rendimiento (ha/ton)")
```
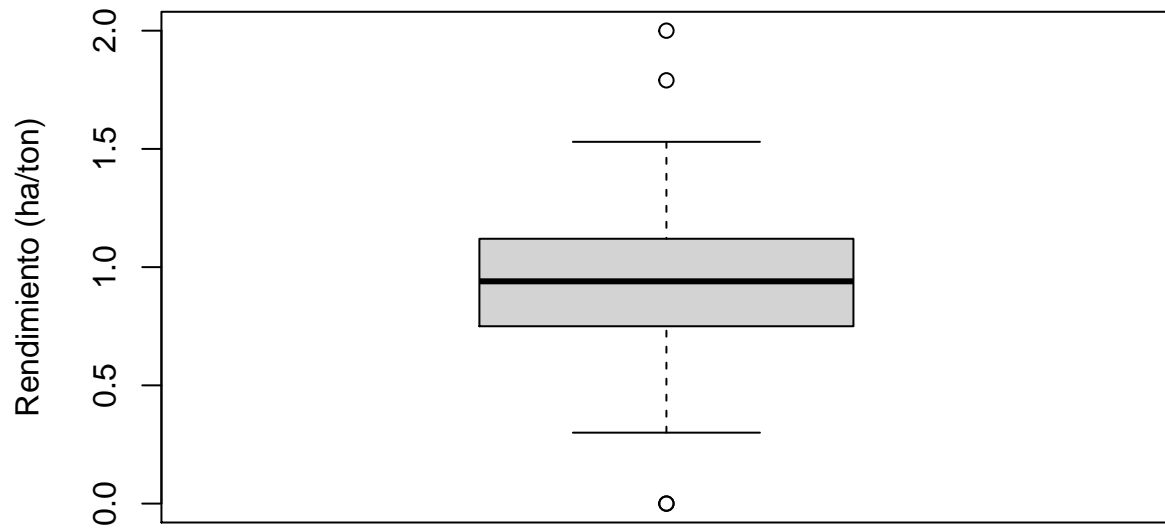
```
boxplot(cafe_df$Produccion.Nacional..ton.,ylab="Produccion Nacional (ton)")
```
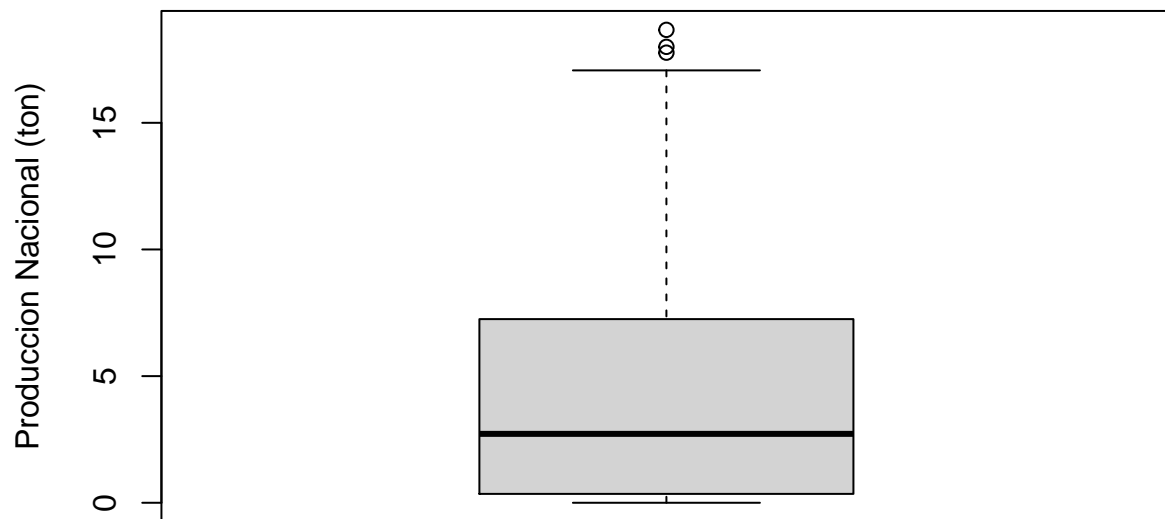

#SELECCIONAR POR RANGOS

```
boxplot(x=cafe_df$Rendimiento..ha.ton.[1:10],main="Rendimiento (ha/ton)")
```

Rendimiento (ha/ton)
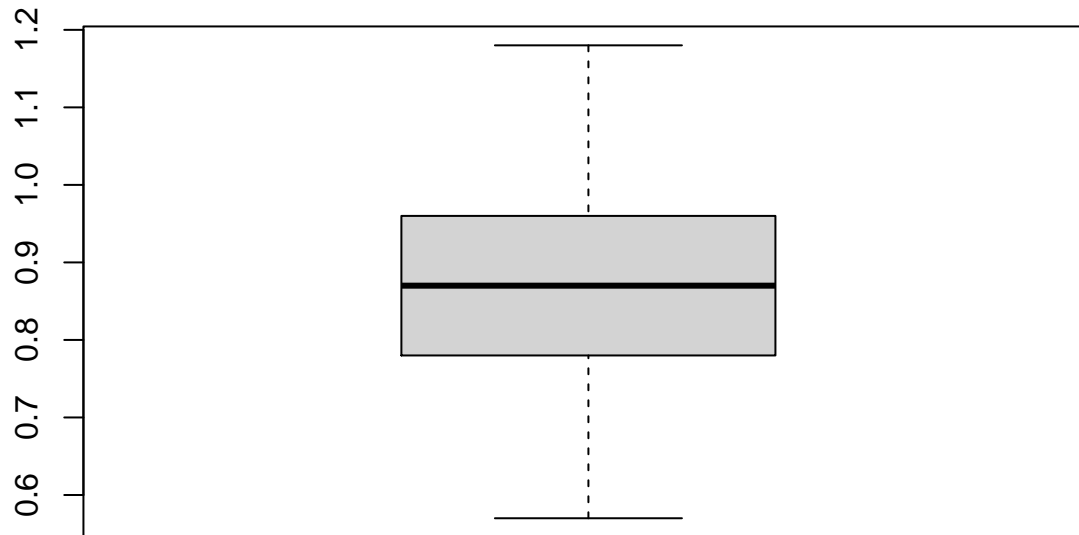
#CON LA FUNCION HEXBIN SE PUEDE MEJORAR LA PRESENTACION Y LECTURA DE LOS GRAFICOS. #SE CREA EL OBJETO BIN CON LA RELACION DE DOS VARIABLES

```
bin1<-hexbin(cafe_df$Produccion..ton.,cafe_df$Rendimiento..ha.ton., xbins=10)
```

```
## Warning in xy.coords(x, y, xl, yl): NAs introduced by coercion
```

```
plot(bin1)
```
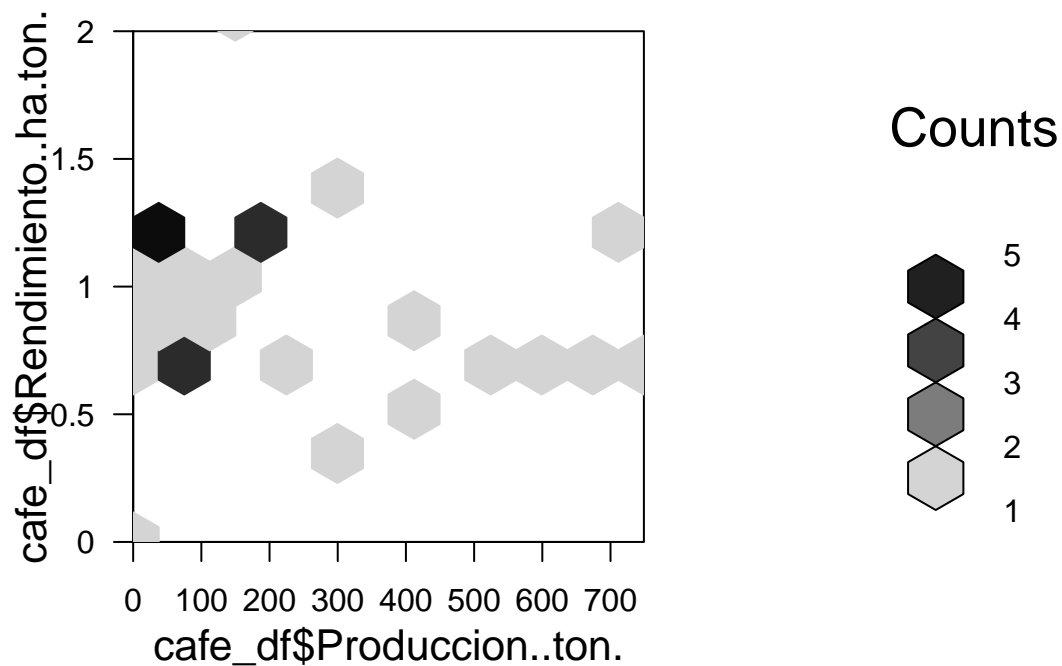


```
bin2<-hexbin(cafe_df$Area.Nacional..ha.,cafe_df$Rendimiento..ha.ton., xbins=10)
```

```
plot(bin2)
```
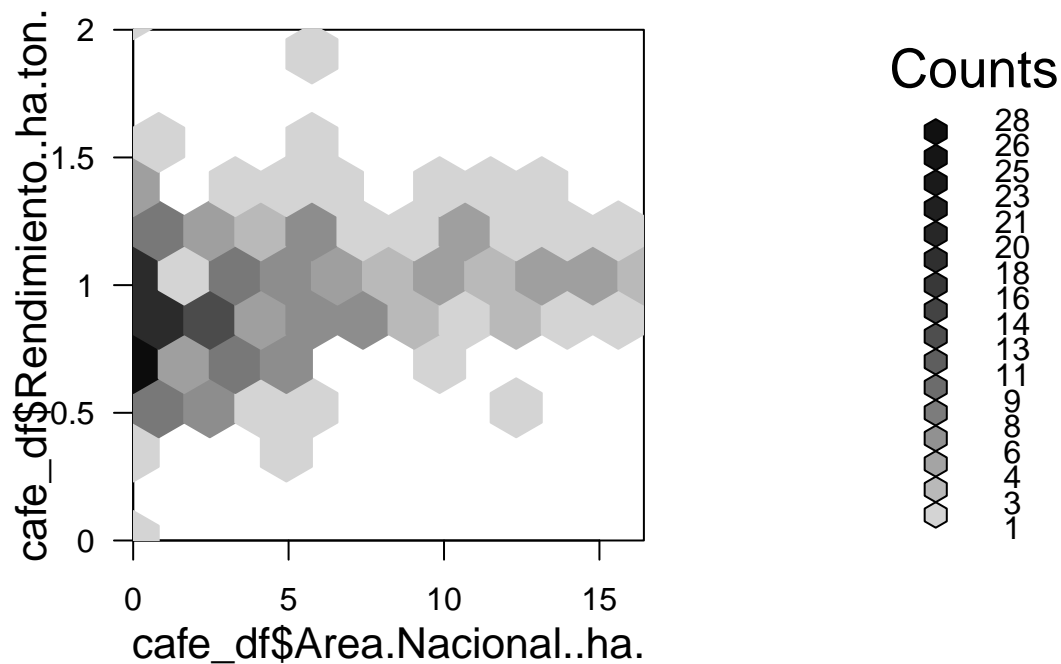
#HALLAMOS LA CORRELACION ENTRE LAS VARIABLES POR CORRELACION DE PEARSON-
#INDICAMOS LAS VARIABLES CON VALORES DESCARTANDO LOS VALORES NULOS QUE
EXISTAN

```
cor(cafe_df$Area.Nacional..ha.,cafe_df$Rendimiento..ha.ton., use="complete.obs")
```

[1] 0.2806767

#PARA CALCULAR LA MODA SELECCIONANDO LAS VARIABLES EN EL DATAFRAME "cafe_df"

```
moda=function(var){
        frec.var<-table(var)
        valor=which(frec.var==max(frec.var)) #Elemento con el valor
        names(valor)}

which.max(cafe_df$Rendimiento..ha.ton.)
```

[1] 121

#SEGUIMOS ESTUDIANDO EL COMPORTAMIENTO O DISTRIBUCION DE LOS DATOS O LA INFOR-
MACION CON GRAFICOS DE DISPERSION. #GRAFICO DE DISPERSION DEL COMPORTAMIENTO
DE LA PRODUCCION VS RENDIMIENTO, PERMITE ENTENDER O DESCUBRIR PATRONES EN
LOS DATOS

```
qplot(Produccion..ton., Rendimiento..ha.ton., data = cafe_df,
      main ="Grafico de Dispersion",
      col = "Red",
      xlab ="Produccion (miles ton)",
      ylab = "Rendimiento (ha/ton)")
```

Grafico de Dispersion
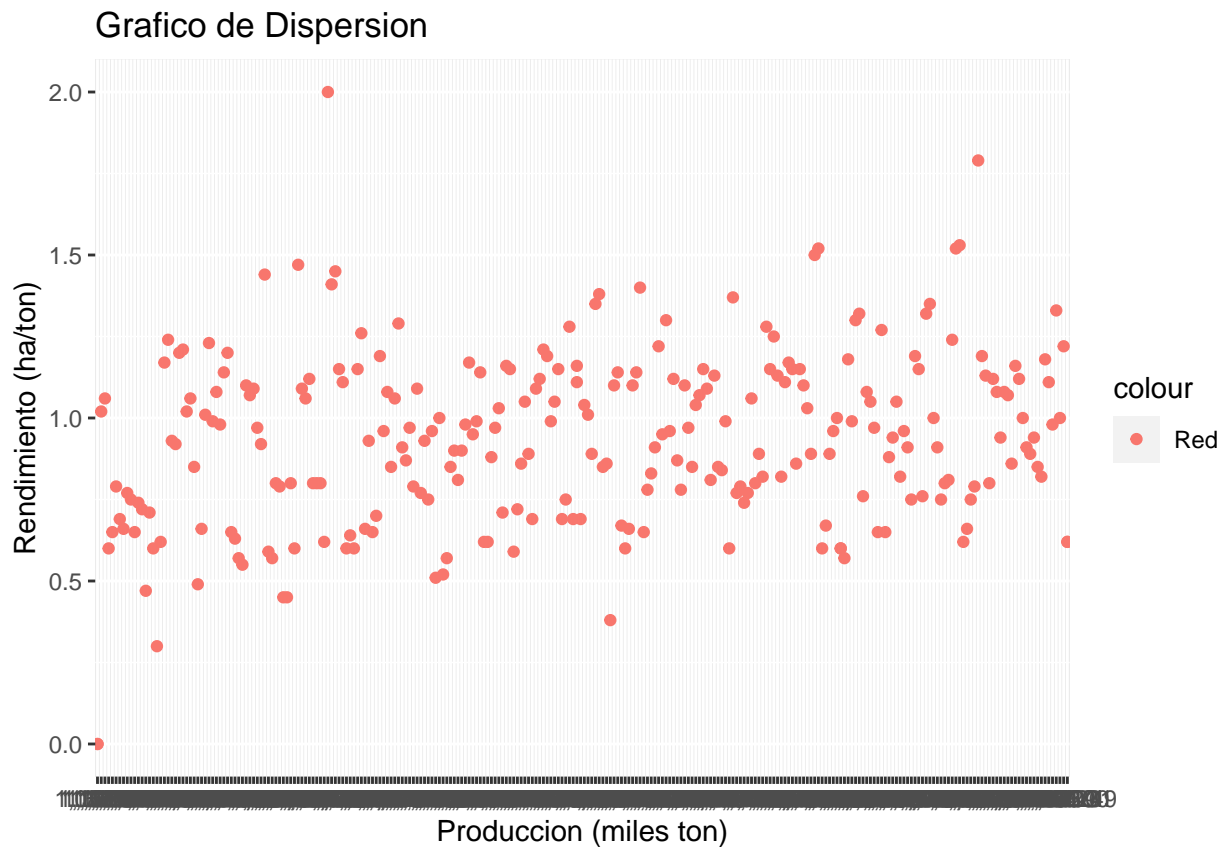
#GRAFICO DE DISPERSION SEL COMPORTAMIENTO DE LA PRODUCCION NACIONAL VS RENDIMIENTO.

```
qplot(Produccion.Nacional..ton., Rendimiento..ha.ton., data = cafe_df,
    main ="Grafico de Dispersion",
    col = "Red",
    xlab ="Produccion Nacional (miles ton)",
    ylab = "Rendimiento (ha/ton)")
```

Grafico de Dispersion
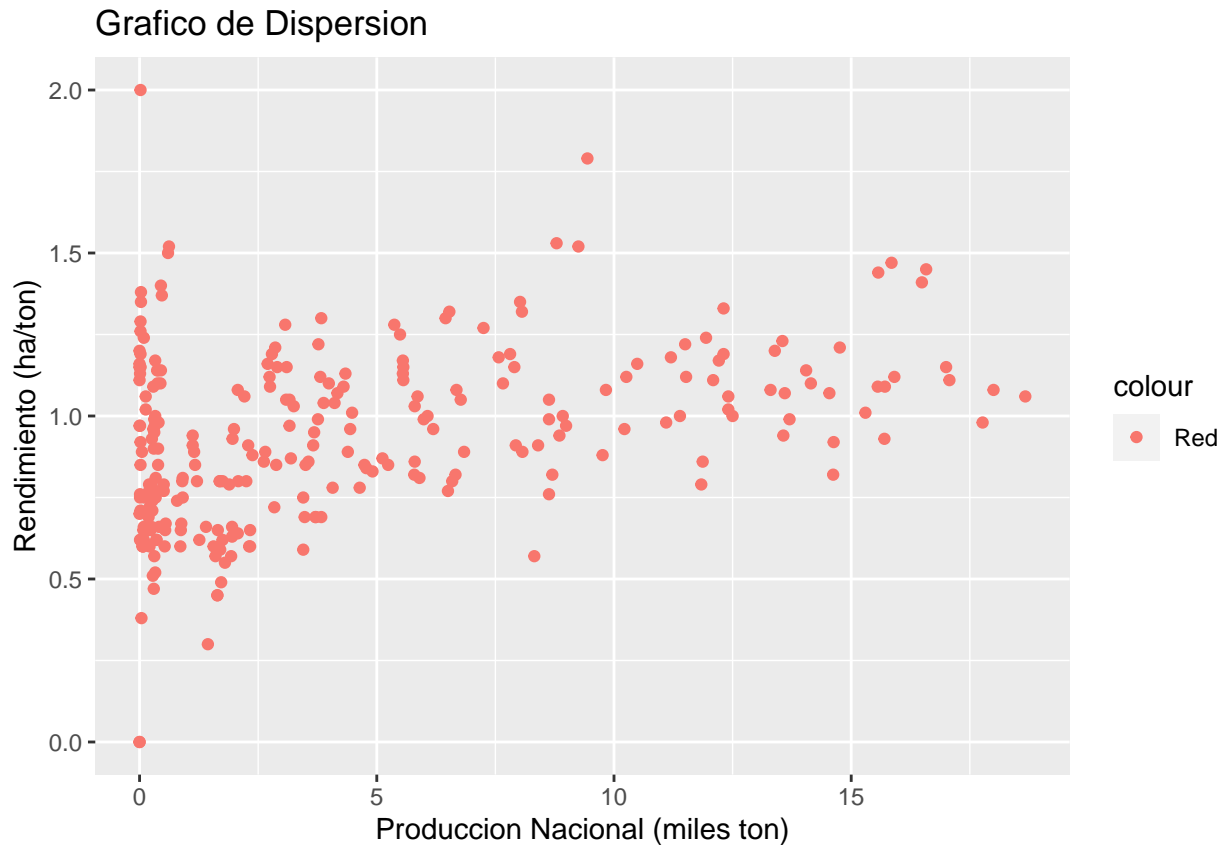
#COEFICIENTE DE CORRELACION DE PEARSON ENTRE LA PRODUCCION NACIONAL Y EL RENDIMIENTO. #HALLAS LA CORRELACION ENTRE LAS VARIABLES POR CORRELACION DE PEARSON #INDICAMOS QUE UTILIZA LAS VARIABLES CON VALORES DESCARTANDO LOS VALORES NULOS QUE EXISTAN

```
cor(cafe_df$Produccion.Nacional..ton.,cafe_df$Rendimiento..ha.ton., use="complete.obs")
```

```
## [1] 0.3855697
```

#GRAFICO DE DISPERSION DEL COMPORTAMIENTO ENTRE EL AREA NACIONAL VS EL RENDIMIENTO. PERMITE ENTENDER O DESCUBRIR PATRONES EN LOS DATOS

```
qplot(Area.Nacional..ha., Rendimiento..ha.ton., data = cafe_df,
    main ="Grafico de Dispersion",
    col = "Red",
    xlab ="Area Nacional ha",
    ylab = "Rendimiento (ha/ton)")
```

Grafico de Dispersion
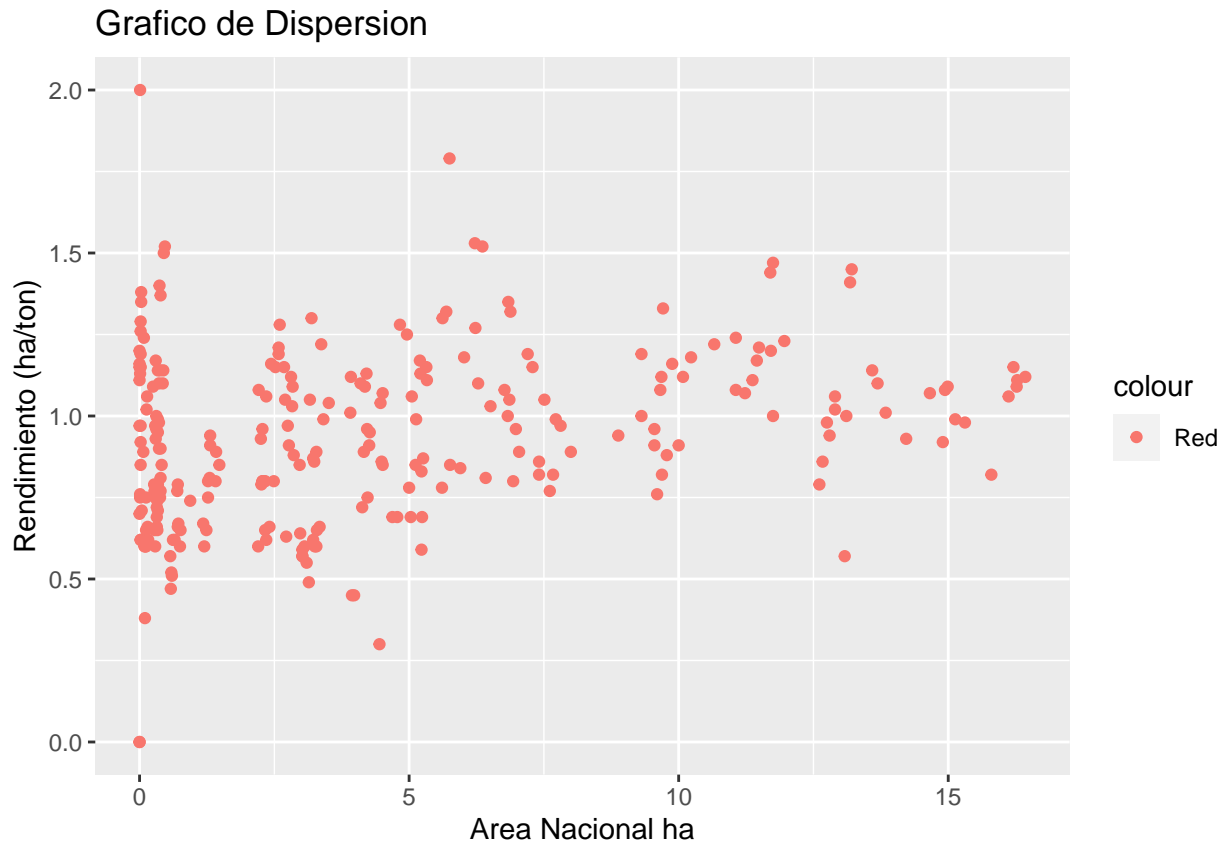
#COEFICIENTE DE CORRELACION DE PEARSON #COEFICIENTE DE CORRELACIÓN ENTRE EL AREA NA-CIONAL Y EL RENDIMIENTO #HALLAR LA CORRELACION ENTRE LAS VARIABLES POR METODO CORRELACION DE PEARSON #INDICAMOS QUE UTILIZA LAS VARIABLES CON VALORES DESCARTANDO LOS VALORES NULOS QUE EXISTAN

```
cor(cafe_df$Area.Nacional..ha.,cafe_df$Rendimiento..ha.ton., use="complete.obs")
```

```
## [1] 0.2806767
```

```
qplot(Anio, Rendimiento..ha.ton., data = cafe_df,
      main ="Grafico de Dispersion",
      col = "Red",
      xlab ="Area Nacional ha",
      ylab = "Rendimiento (ha/ton)")
```

Grafico de Dispersion
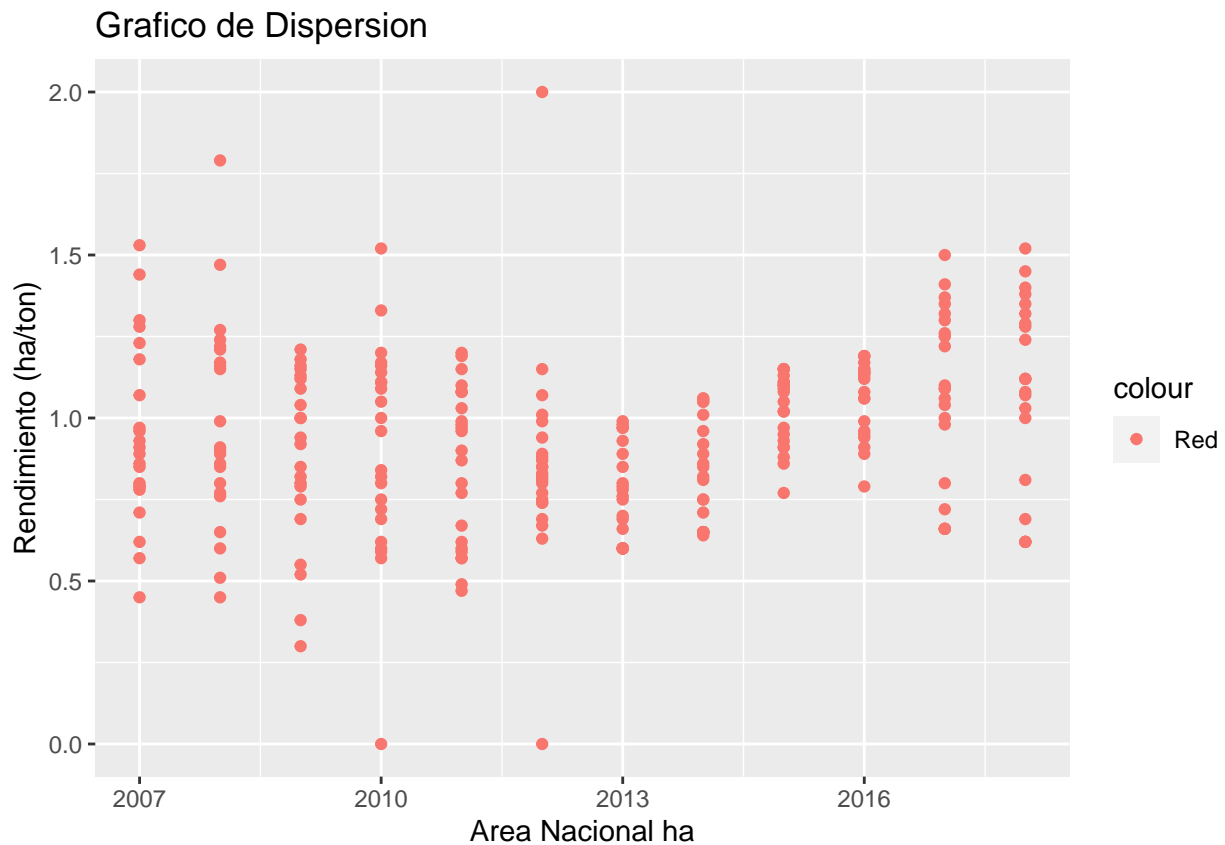
#ESPECIFICAR EL DATAFRAME ES EL PRIMER ARGUMENTO EN LA FUNCIÓN GGPLOT # DENTRO DE AES() ESCRIBIMOS LAS VARIABLES (X,Y) QUE QUEREMOS GRAFICAR # PERMITE ENTENDER O DESCUBRIR PATRONES EN LOS DATOS # SE PUEDE UTILIZAR EL PARAMETRO COLOR PARA REPRESENTAR UNA TERCERA VARIABLE # GRÁFICO DE DISPERSION: AREA NACIONAL VS RENDIMIENTO

```
ggplot(cafe_df) +
        geom_point(aes(x = Area.Nacional..ha., y = Rendimiento..ha.ton., color = Anio))
```
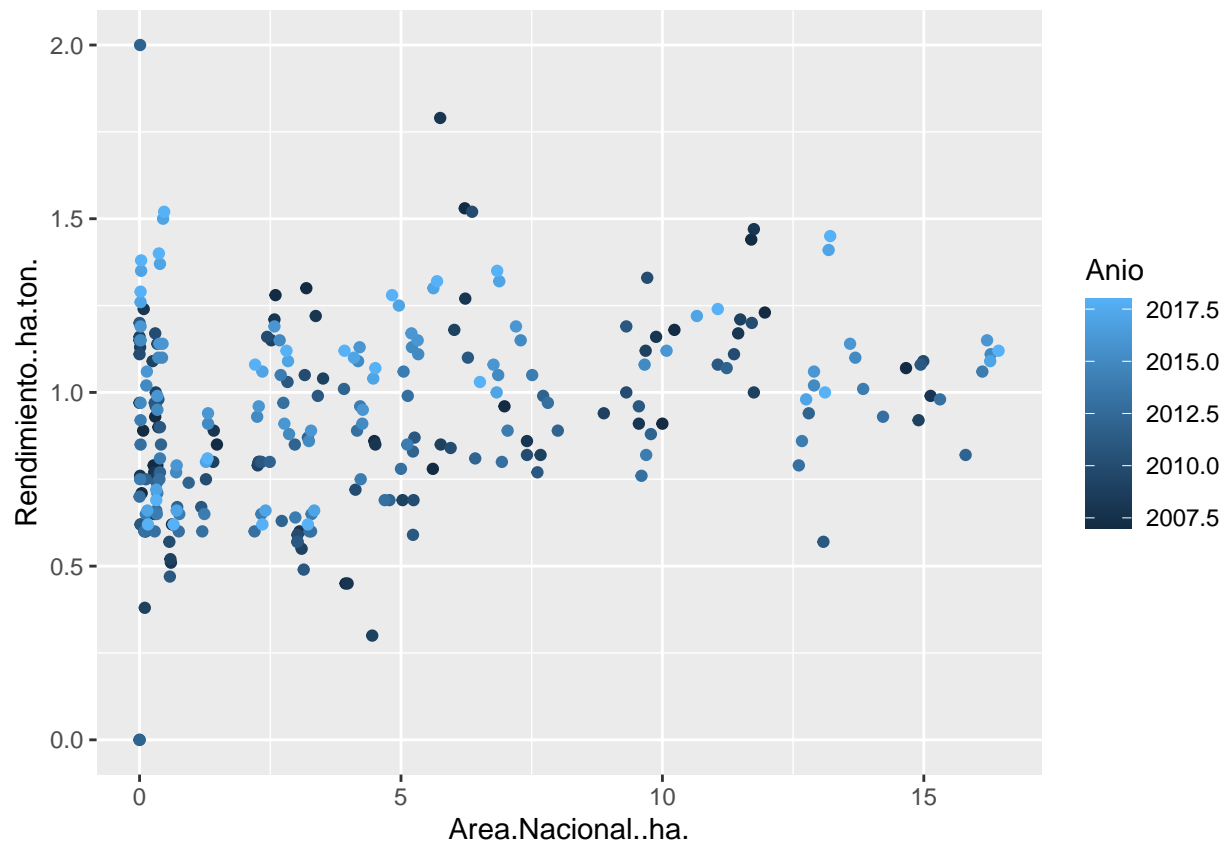
#GRAFICO DE LINEAS: AREA NACIONAL VS RENDIMIENTO

```
ggplot(cafe_df) +
        geom_line(aes(x = Area.Nacional..ha., y = Rendimiento..ha.ton., color = Anio))
```
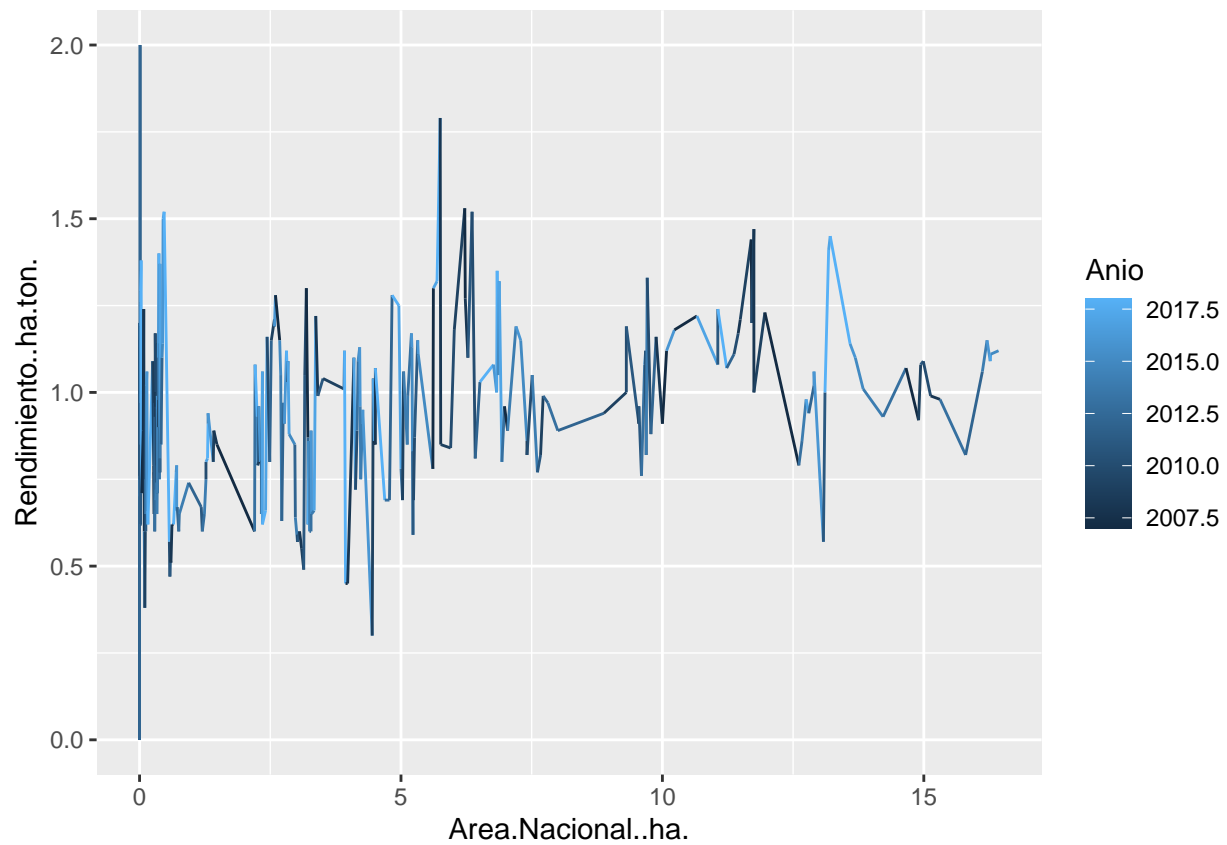
#GRAFICO DE DISPERSION: PRODUCCION NACIONAL VS RENDIMIENTO

```
ggplot(cafe_df) +
        geom_point(aes(x = Produccion.Nacional..ton., y = Rendimiento..ha.ton., color = Anio))
```
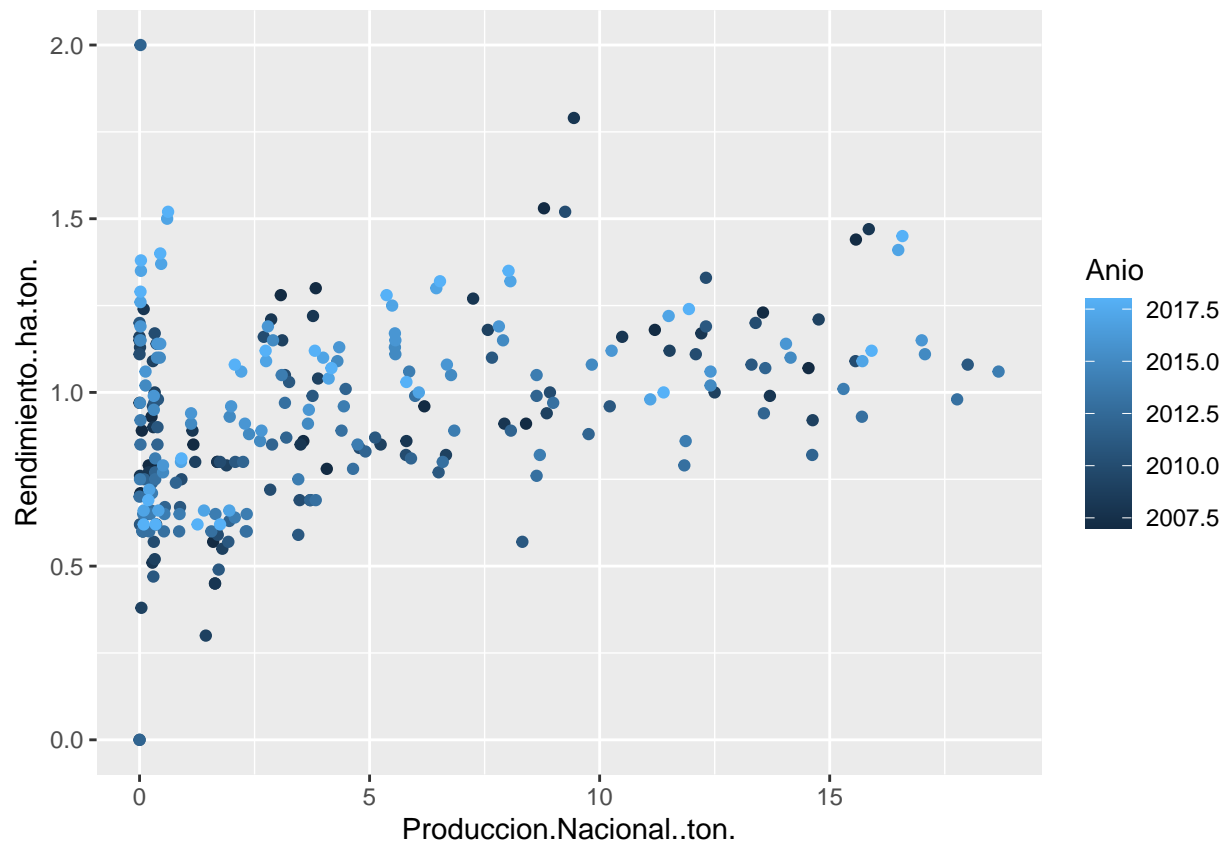
#GRAFICO DE LINEAS: PRODUCCION NACIONAL VS RENDIMIENTO

```
ggplot(cafe_df) +
        geom_line(aes(x = Produccion.Nacional..ton., y = Rendimiento..ha.ton., color = Anio))
```
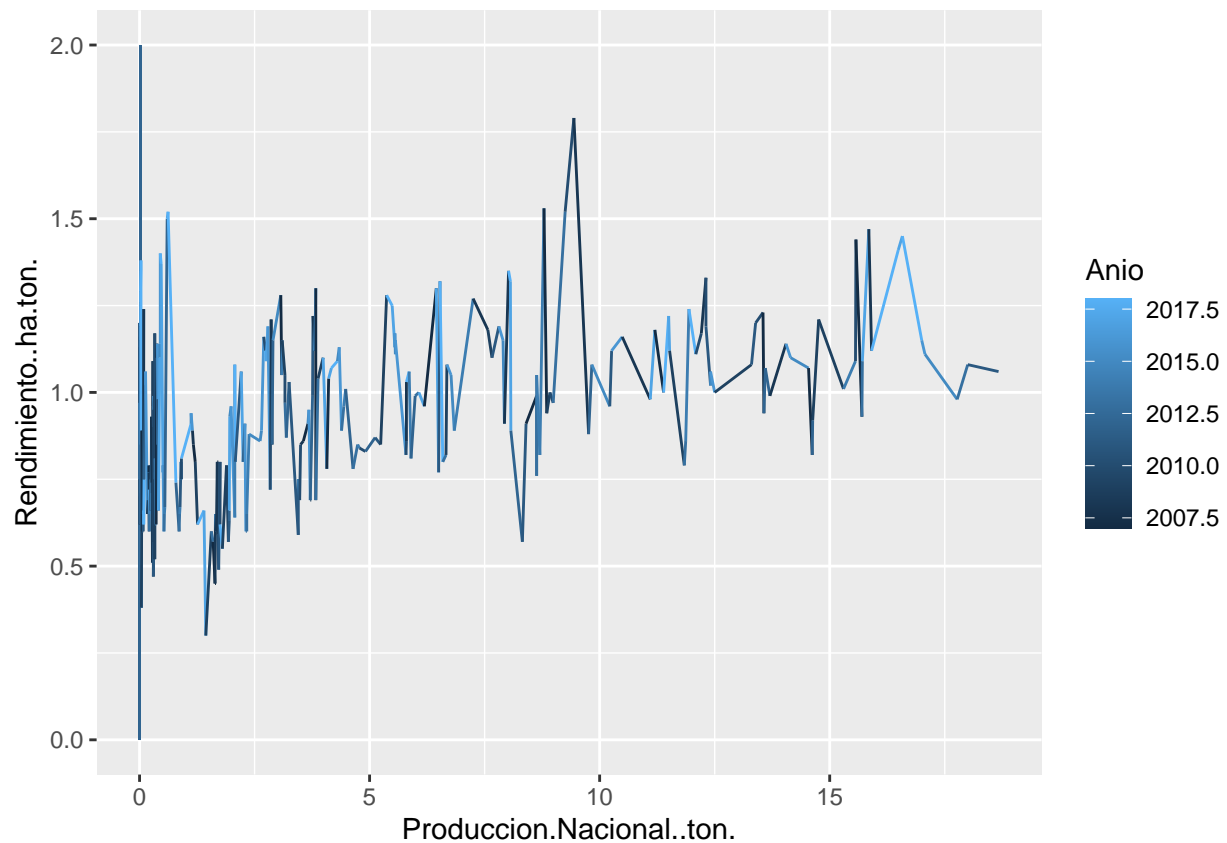
#OTRA FORMA DE GRAFICO DE LINEAS SIN REPRESENTAR LOS AÑOS

```
data(cafe_df)
```
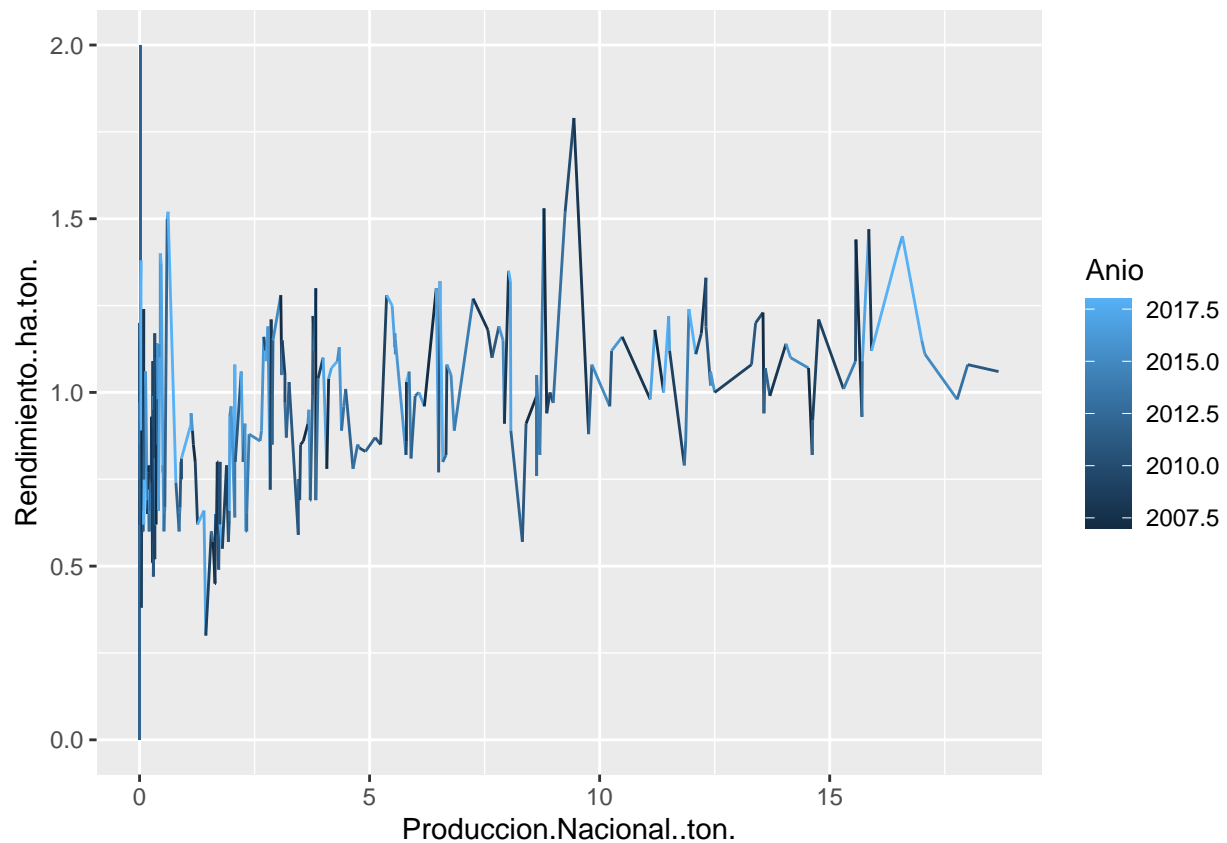
```
## Warning in data(cafe_df): data set 'cafe_df' not found
```

```
ggplot(cafe_df, aes(x = Produccion.Nacional..ton., y = Rendimiento..ha.ton., color ="red")) +
        geom_line()
```
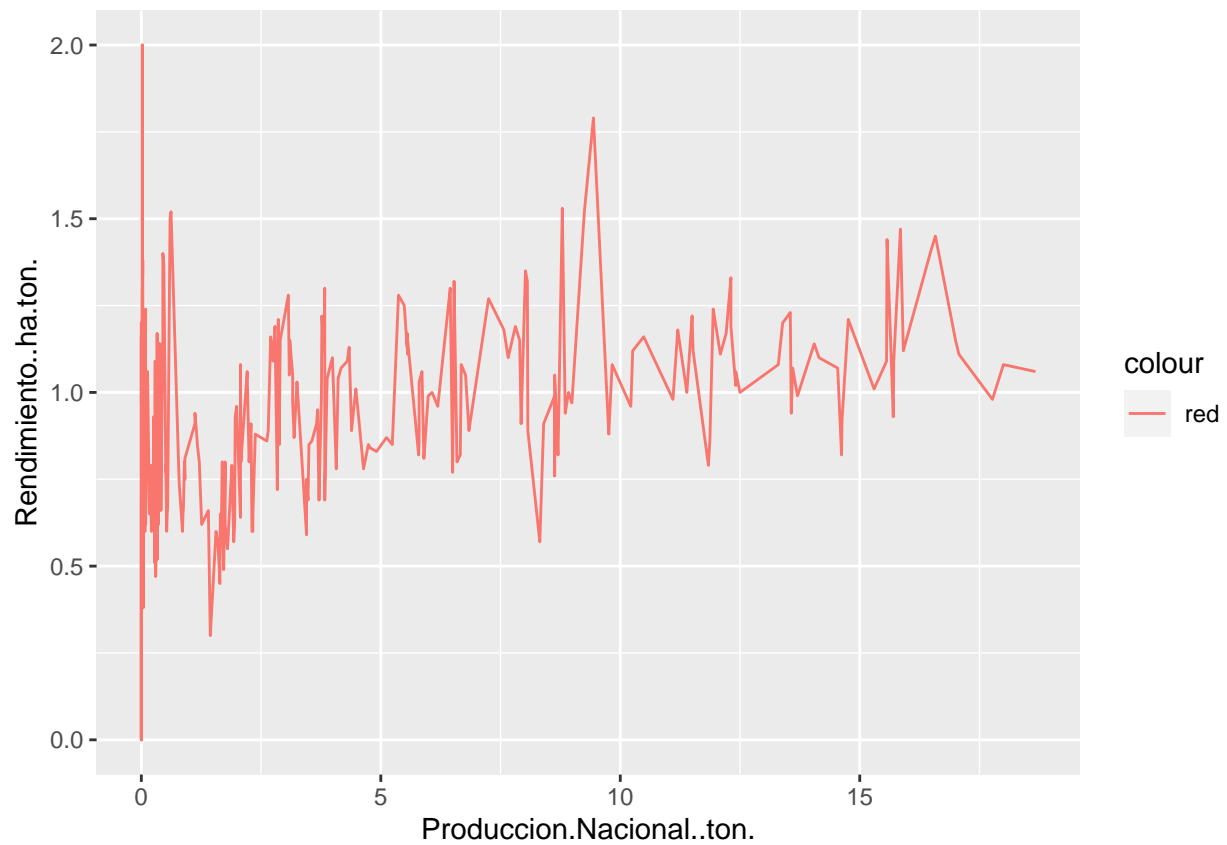
#HISTOGRAMA: AREA NACIONAL

```
ggplot(cafe_df) +
        geom_histogram(aes(x = Area.Nacional..ha., color="red"))
```

`stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
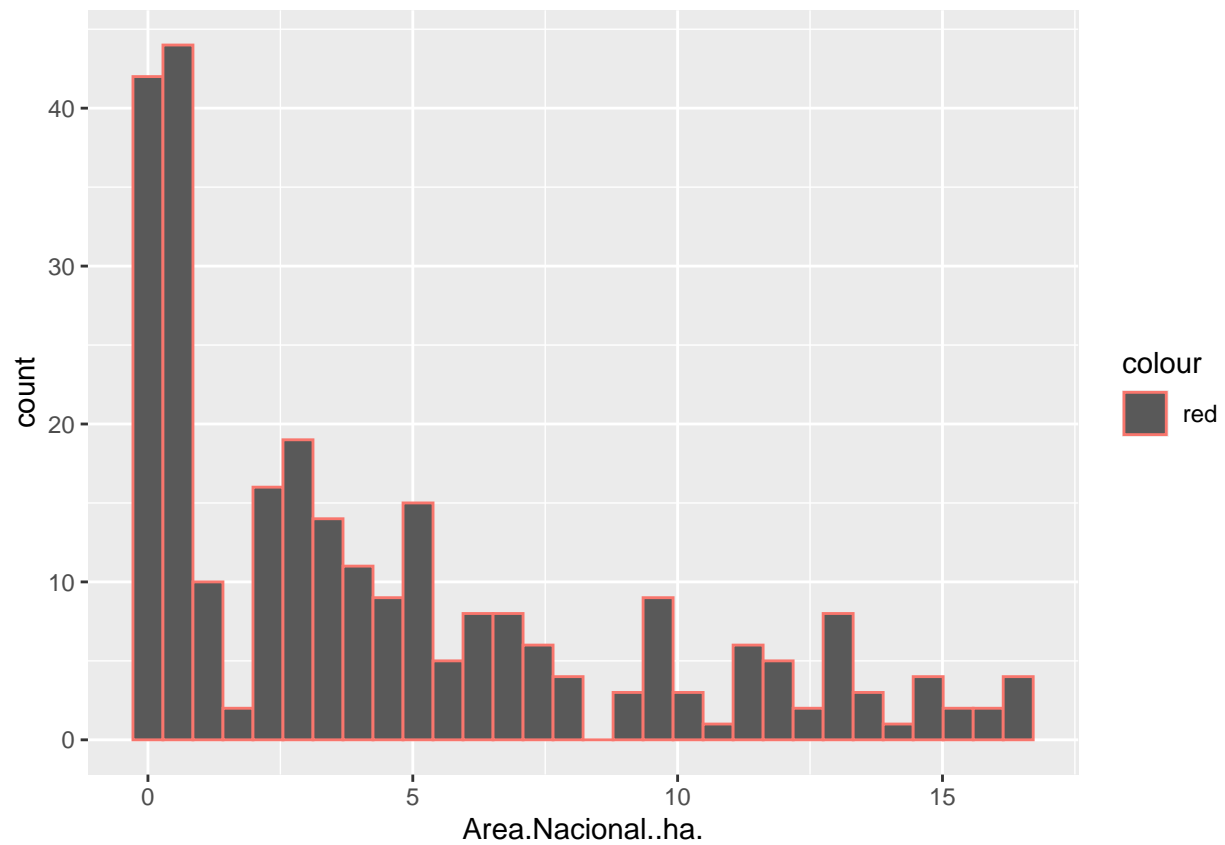
#HISTOGRAMA PRODUCCION NACIONAL

```
ggplot(cafe_df) +
        geom_histogram(aes(x = Produccion.Nacional..ton., color="red"))
```

`stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
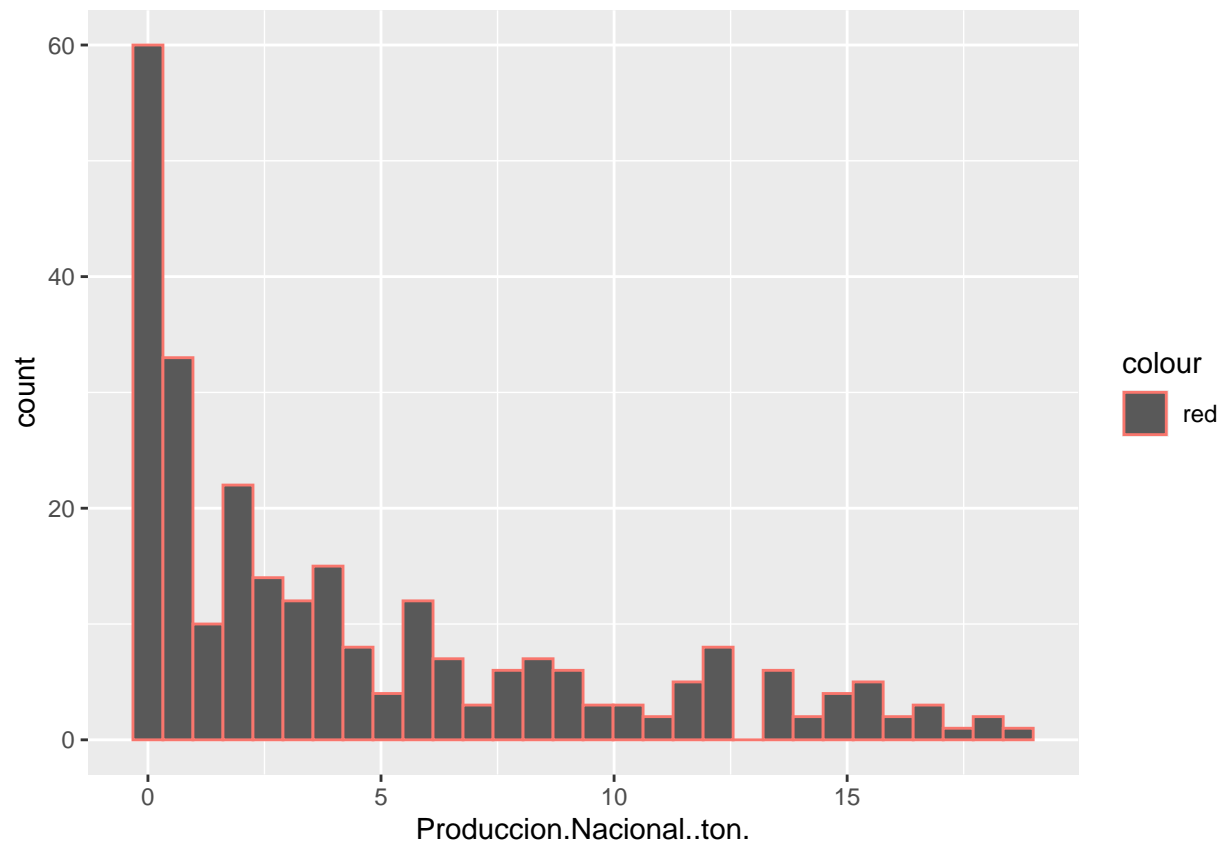
#HISTOGRAMA RENDIMIENTO

```
ggplot(cafe_df) +
        geom_histogram(aes(x = Rendimiento..ha.ton., color="red"))
```

`stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
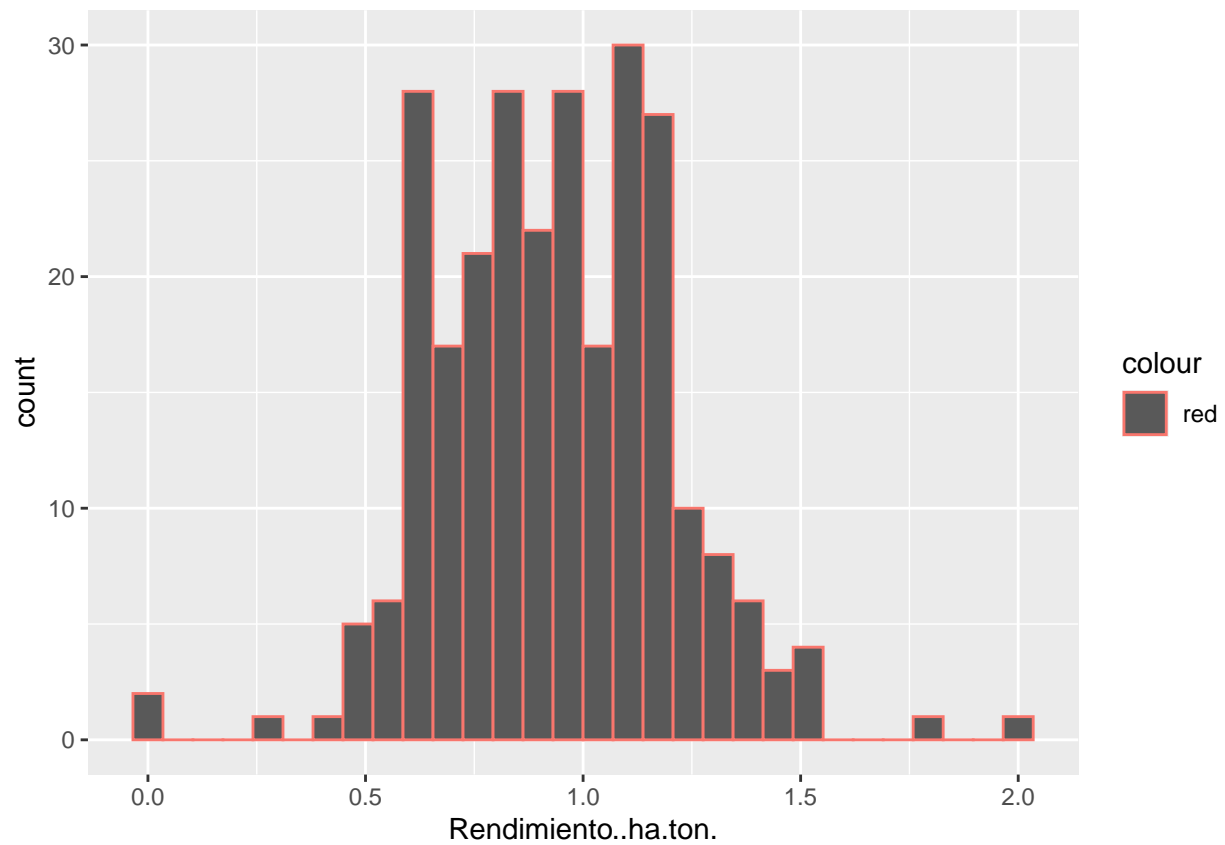
#GRAFICO DE LINEAS: PRODUCCION NACIONAL VS RENDIMIENTO

```
ggplot(cafe_df) +
        geom_line(aes(x = Produccion.Nacional..ton., y = Rendimiento..ha.ton., color = Anio))
```

#GRAFICO DE CAJAS: PRODUCCION NACIONA VS RENDIMIENTO

```
ggplot(cafe_df) +
        geom_boxplot(aes(x = Produccion.Nacional..ton., y = Rendimiento..ha.ton., color = Anio))
```

```
## Warning: Continuous x aesthetic -- did you forget aes(group=...)?
```
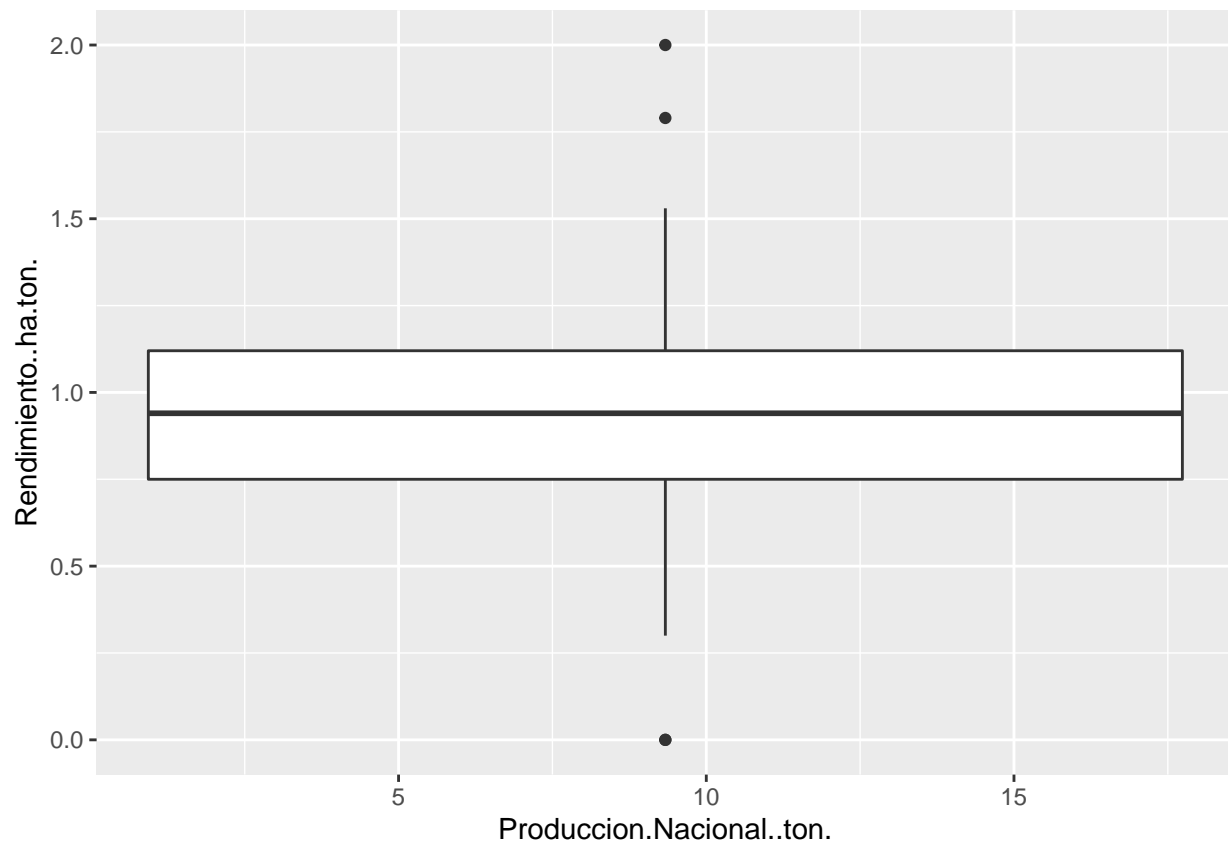
#GRAFICO DE CAJAS: AREA NACIONAS VS RENDIMIENTO

```
ggplot(cafe_df) +
        geom_boxplot(aes(x = Area.Nacional..ha., y = Rendimiento..ha.ton., color = Anio))
```

```
## Warning: Continuous x aesthetic -- did you forget aes(group=...)?
```
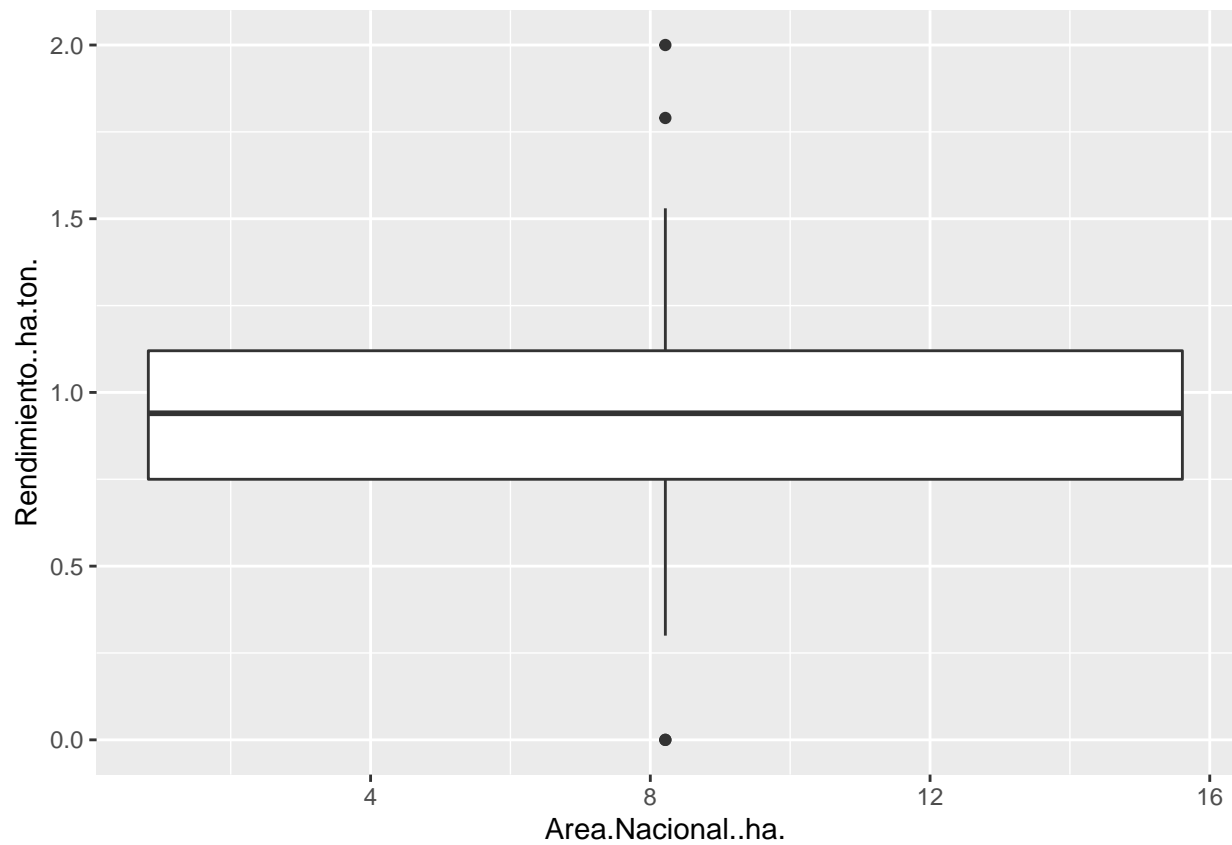
#GRAFICO DE DISPERSION JITTER: AREA NACIONAL VS RENDIMIENTO

```
ggplot(cafe_df) +
        geom_jitter(aes(x = Area.Nacional..ha., y = Rendimiento..ha.ton., color = Anio))
```

#GRAFICO DE DISPERSION PRODUCCION NACIONAL VS RENDIMIENTO

```
ggplot(cafe_df) +
        geom_point(aes(x = Produccion.Nacional..ton., y = Rendimiento..ha.ton., color = Anio))
```

#GRAFICO DE DISPERCION JITTER: PRODUCCION NACIONAL VS RENDIMIENTO

```
ggplot(cafe_df) +
    geom_jitter(aes(x = Produccion.Nacional..ton., y = Rendimiento..ha.ton., color = Anio))
```

#OTRA FORMA CON GRAFICO DE DISPERSION SIN REPRESENTAR LOS AÑOS

```
data(cafe_df)
```

```
## Warning in data(cafe_df): data set 'cafe_df' not found
```
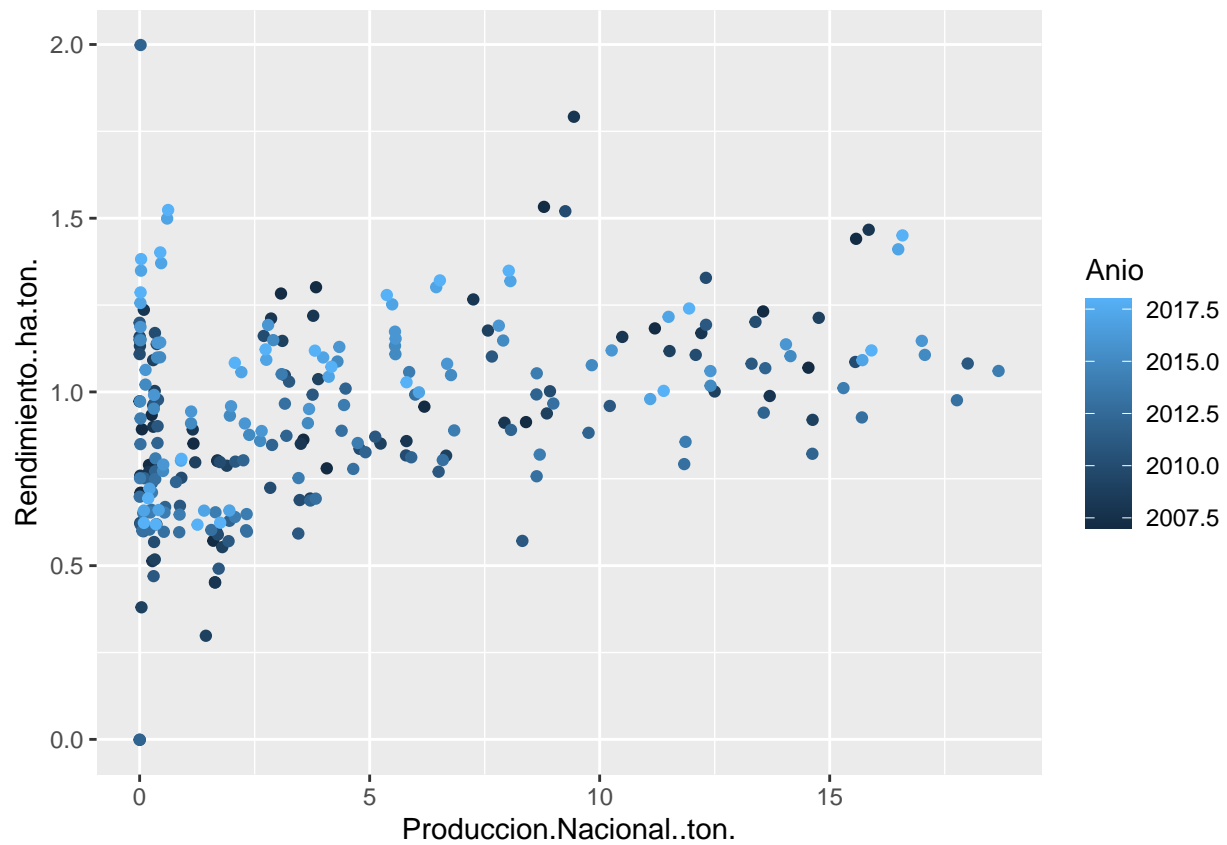
```
ggplot(cafe_df, aes(x = Produccion.Nacional..ton., y = Rendimiento..ha.ton., color ="red")) +
        geom_point()
```
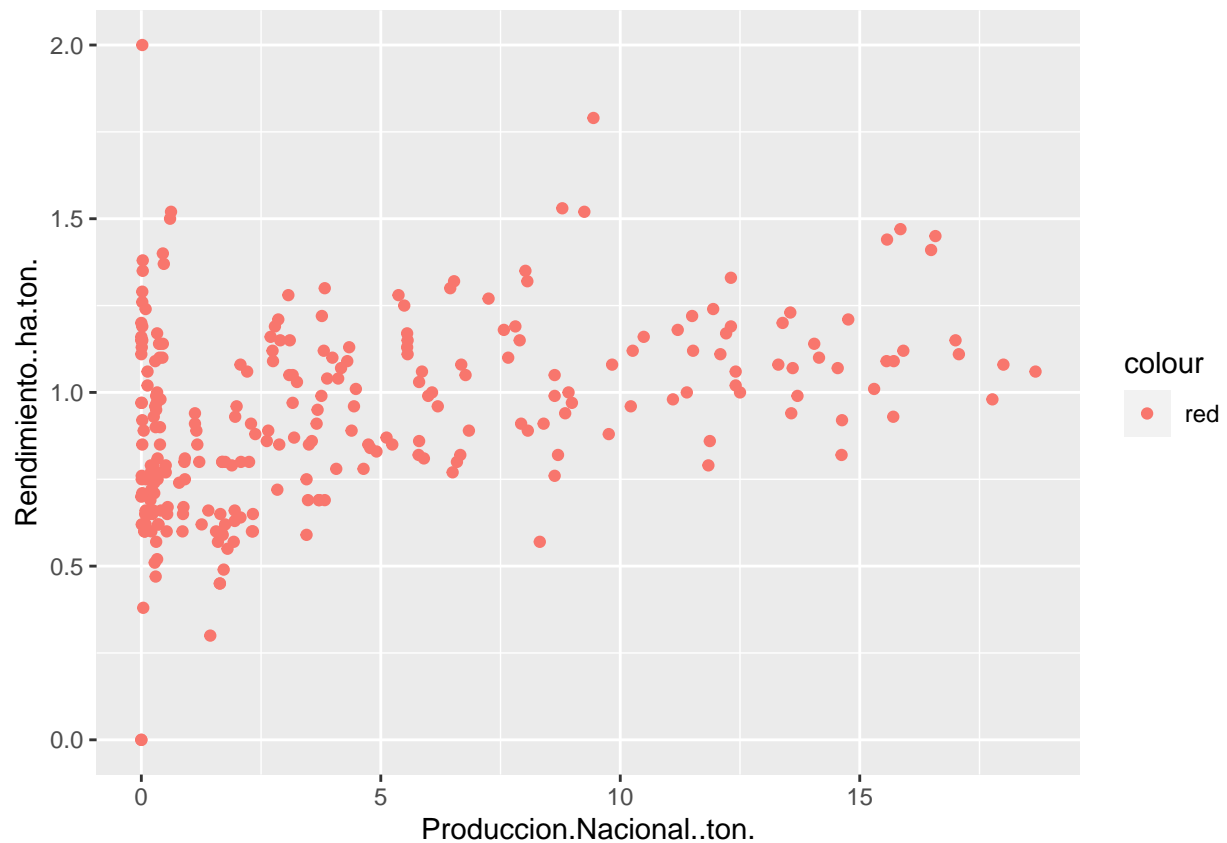
#OTRA FORMA CON GRAFICO DE LINEAS SIN REPRESENTAR LOS AÑOS

```
data(cafe_df)
```

```
## Warning in data(cafe_df): data set 'cafe_df' not found
```

```
ggplot(cafe_df, aes(x = Produccion.Nacional..ton., y = Rendimiento..ha.ton., color ="red")) +
        geom_line()
```
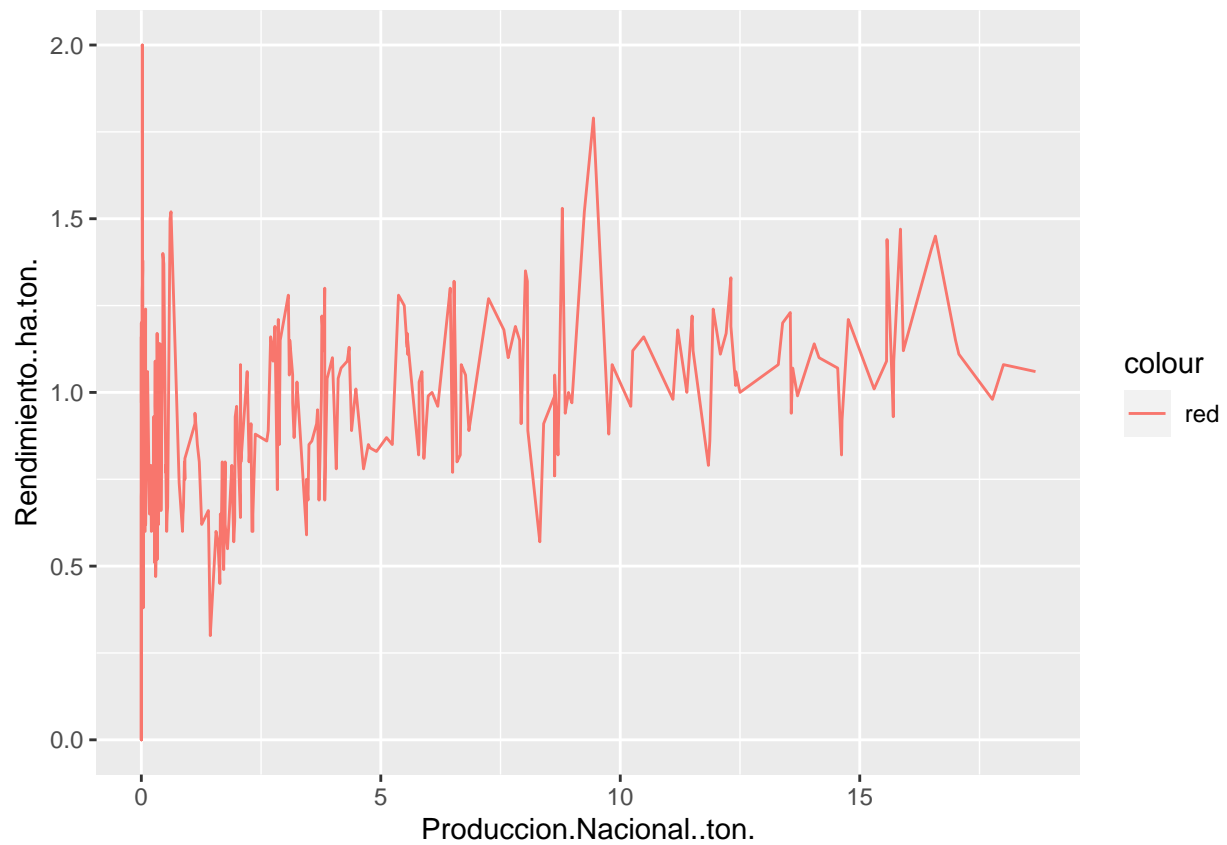
#COMPARANDO CUANDO TIENE REPRESENTADO LOS AÑOS A CONTINUACION

```
ggplot(cafe_df, aes(x = Produccion.Nacional..ton., y = Rendimiento..ha.ton., color = Anio)) +
    geom_line()
```

#TAMBIEN SE PUEDE REALIZAR DISPERSION EN PANELES POR AÑOS. #PERMITE ENTENDER O DESCUBRIR PATRONES EN LOS DATOS

```
ggplot(cafe_df, aes(x = Produccion.Nacional..ton., y = Rendimiento..ha.ton.)) +
  geom_jitter() +
  facet_grid(.~ Anio)
```
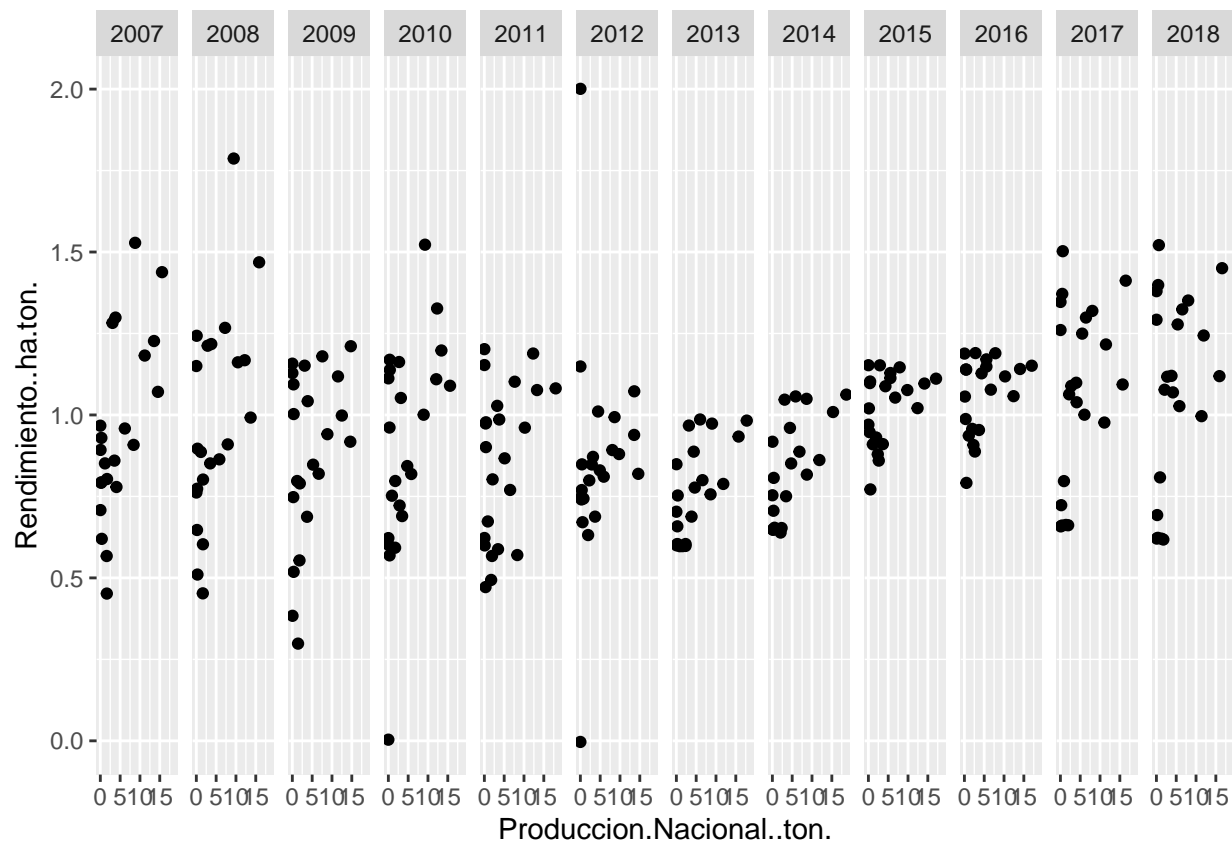
#PANELES SEPARADOS #TAMBIEN SE PUEDE REALIZAR DISPERSION EN PANELES SEPARADOS POR AÑOS

```
ggplot(cafe_df, aes(x = Produccion.Nacional..ton., y = Rendimiento..ha.ton.)) +
  geom_point() +
  facet_wrap(.~ Anio)
```
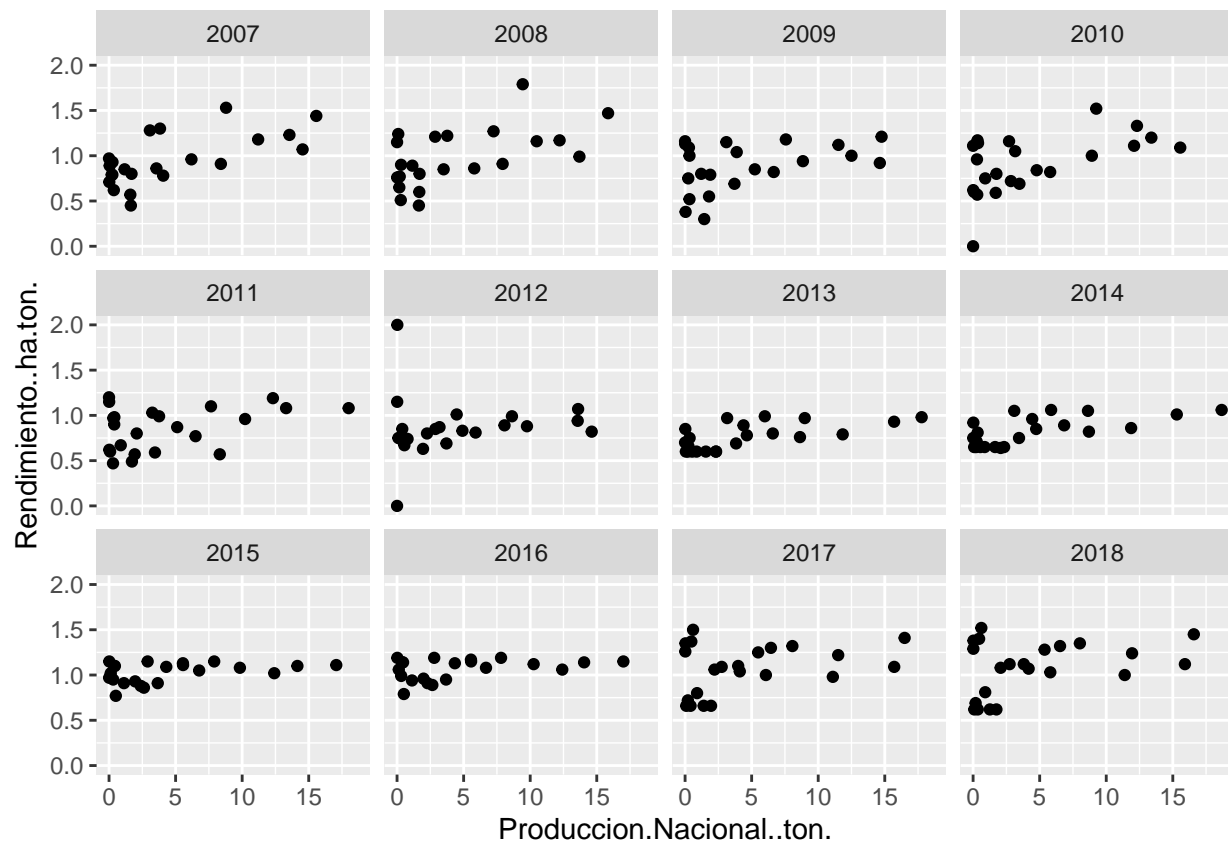
```
ggplot(cafe_df, aes(x = Area.Nacional..ha., y = Rendimiento..ha.ton.)) +
  geom_point() +
  facet_wrap(.~ Anio)
```
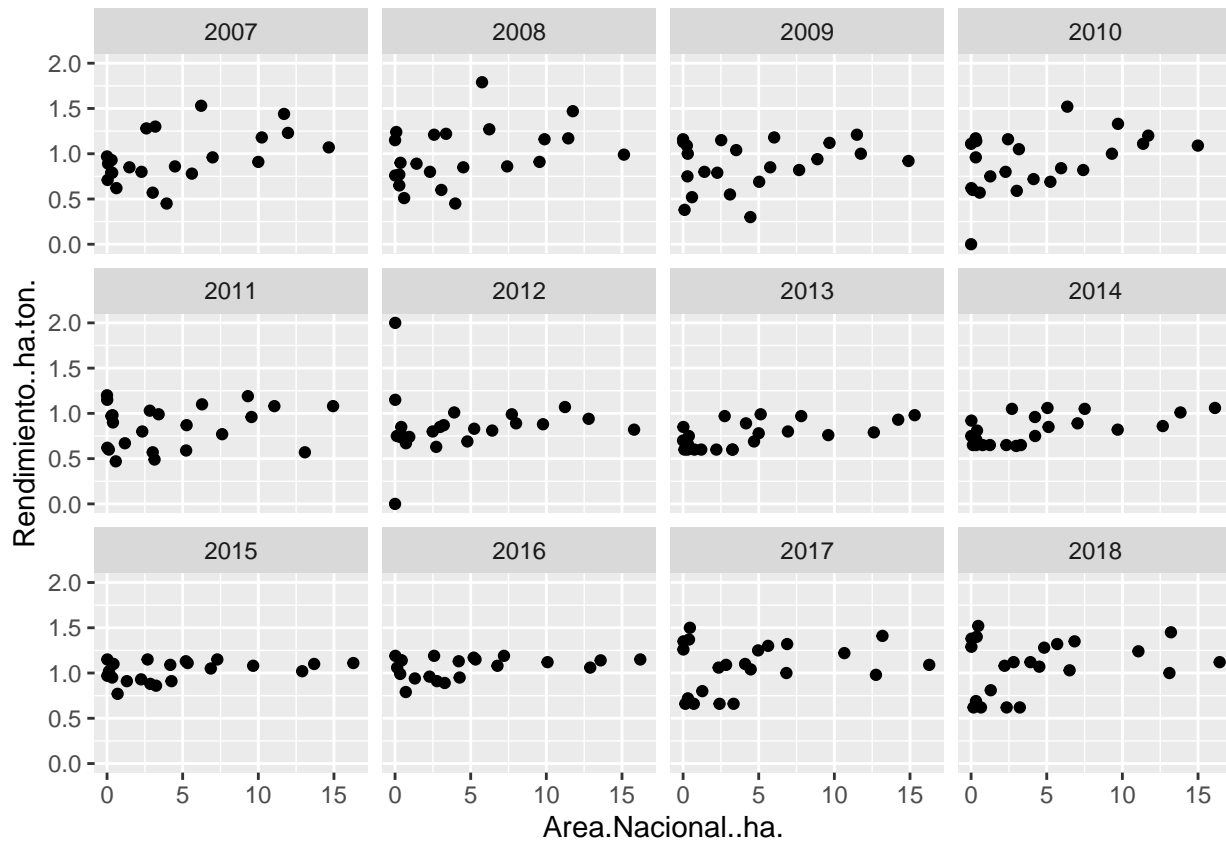
##COMPARANDO EL ANTERIOR CON EL GRAFICO DE DISPERSION SIN AÑOS # OTRA FORMA
CON GRAFICO DE DISPERSION SIN REPRESENTAR LOS AÑOS

```
data(cafe_df)
```

```
## Warning in data(cafe_df): data set 'cafe_df' not found
```

```
ggplot(cafe_df, aes(x = Produccion.Nacional..ton., y = Rendimiento..ha.ton., color ="red")) +
  geom_point()
```
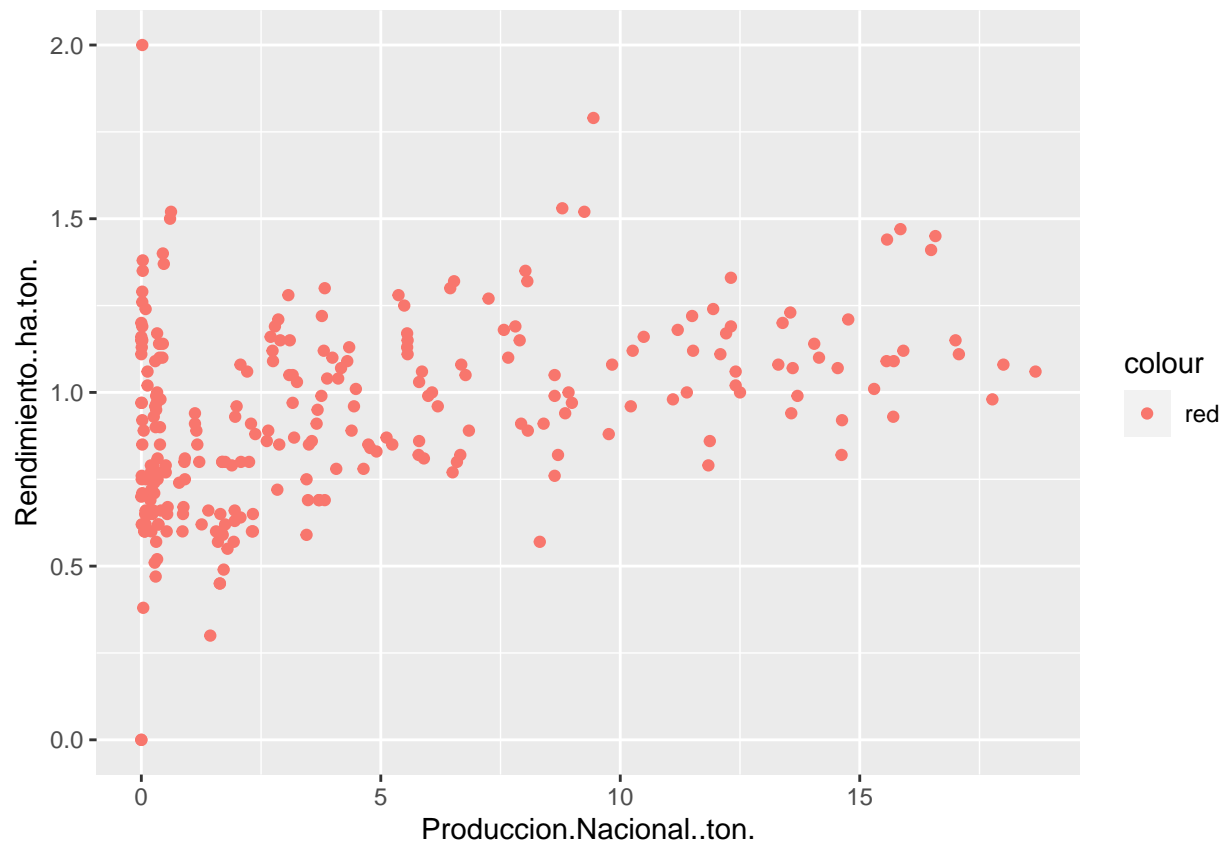
#COMPARAR CON GRAFICO DE DISPERSION PRODUCCION NACIONAL VS RENDIMIENTO CON AÑOS

```
ggplot(cafe_df) +
  geom_jitter(aes(x = Produccion.Nacional..ton., y = Rendimiento..ha.ton., color = Anio))
```
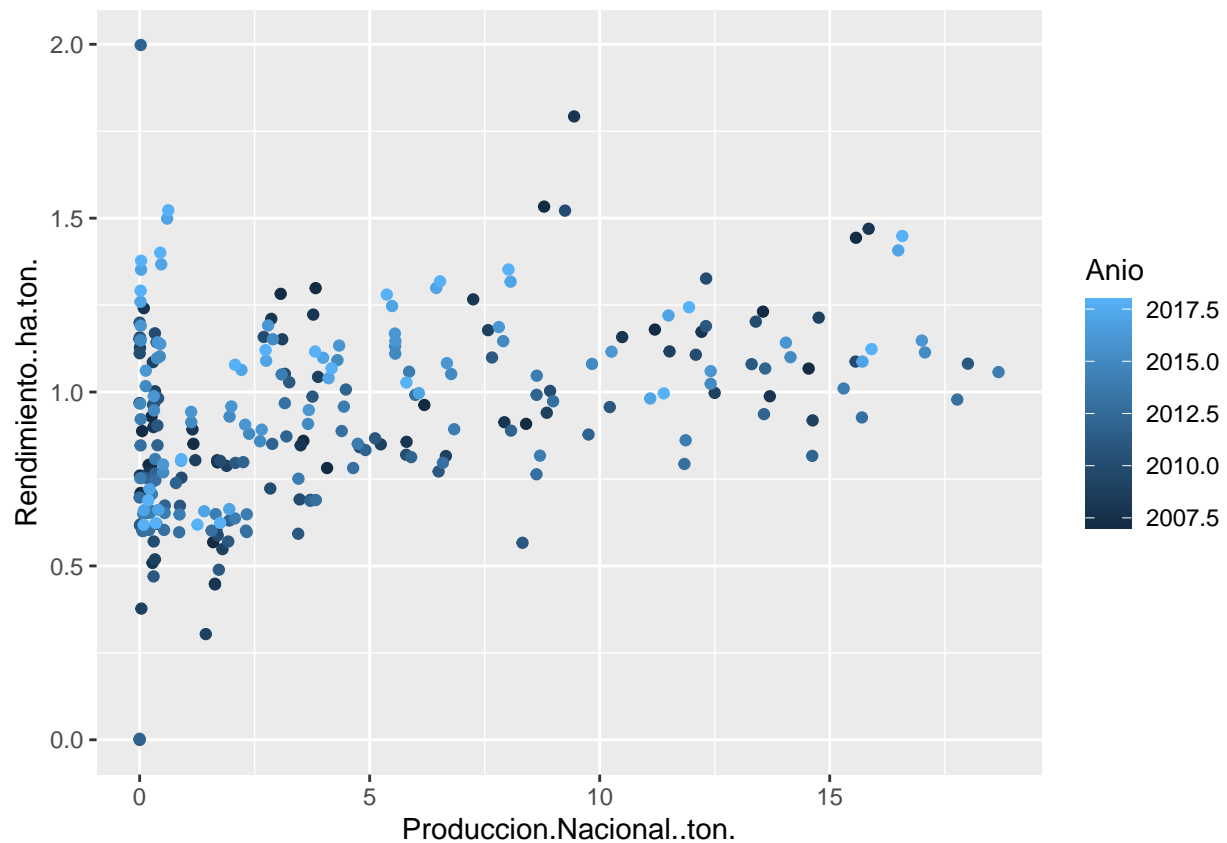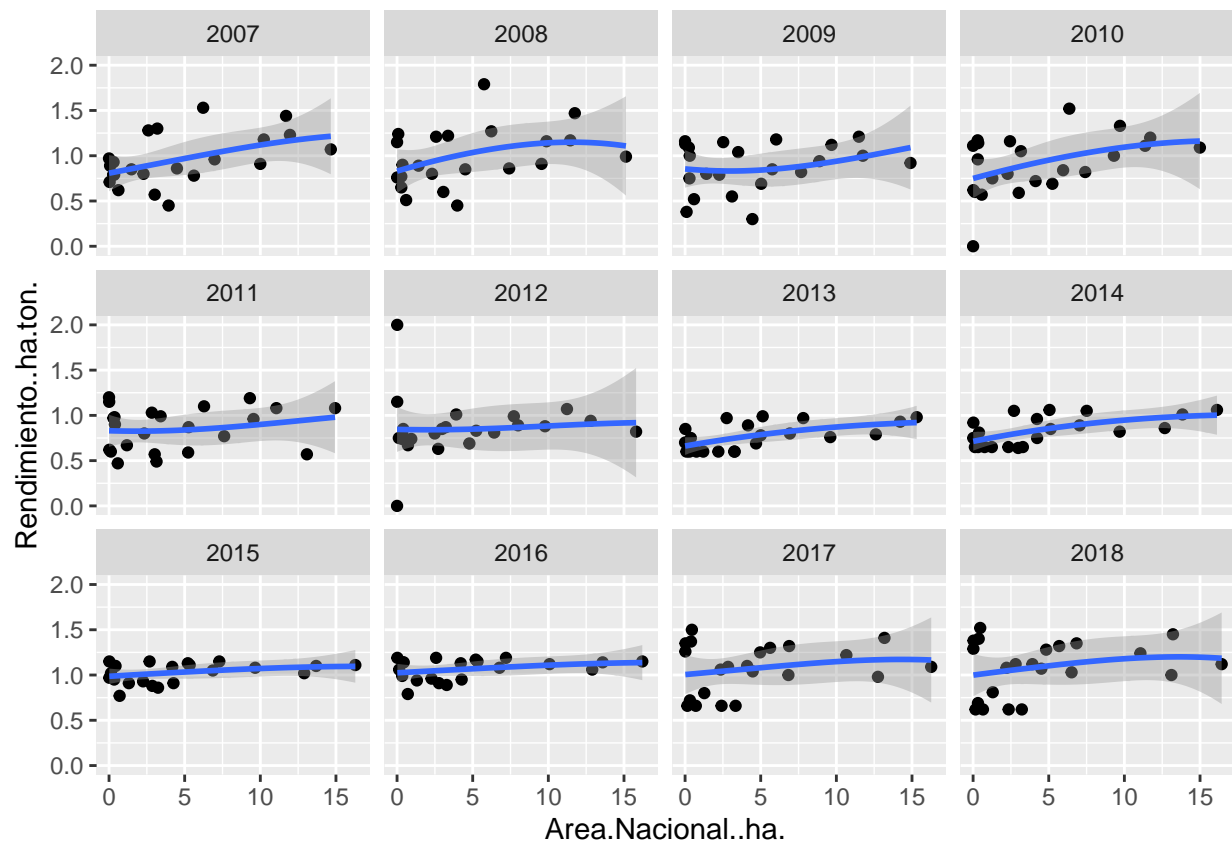
#AHORA SE UTILIZARA UN SUAVIZADOR #LA GRAFICA LINEAL SUAVIZADA

```
ggplot(cafe_df, aes(x = Area.Nacional..ha., y = Rendimiento..ha.ton.)) +
  geom_point() +
  facet_wrap(.~ Anio) +
  geom_smooth(span = 3)
```

`geom_smooth()` using method = 'loess' and formula 'y ~ x'

FIN