PFI: Yields

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Yields for SB and Corn in acre buschel per pound.

Read data and load libraries.

```
pfi <- read.csv("/Users/marianwaitwalsh/GitHub/PFI/data/PFI_clean.csv")
weather <- read.csv("/Users/marianwaitwalsh/GitHub/PFI/2-topics/yield/IA_annual_rainfall_raw.csv")
library(dplyr)
library(tidyr)
library(reshape2)
library(ggplot2)
```

Subset the `PFI` data.

```
yields <- pfi %>%
  filter(item_type == "Unit Quantity", crop %in% c("Corn","SB")) %>%
  select(-c(item, item_type)) %>%
  group_by(field_id, year)
```

Clean the weather data and join with `yields`.

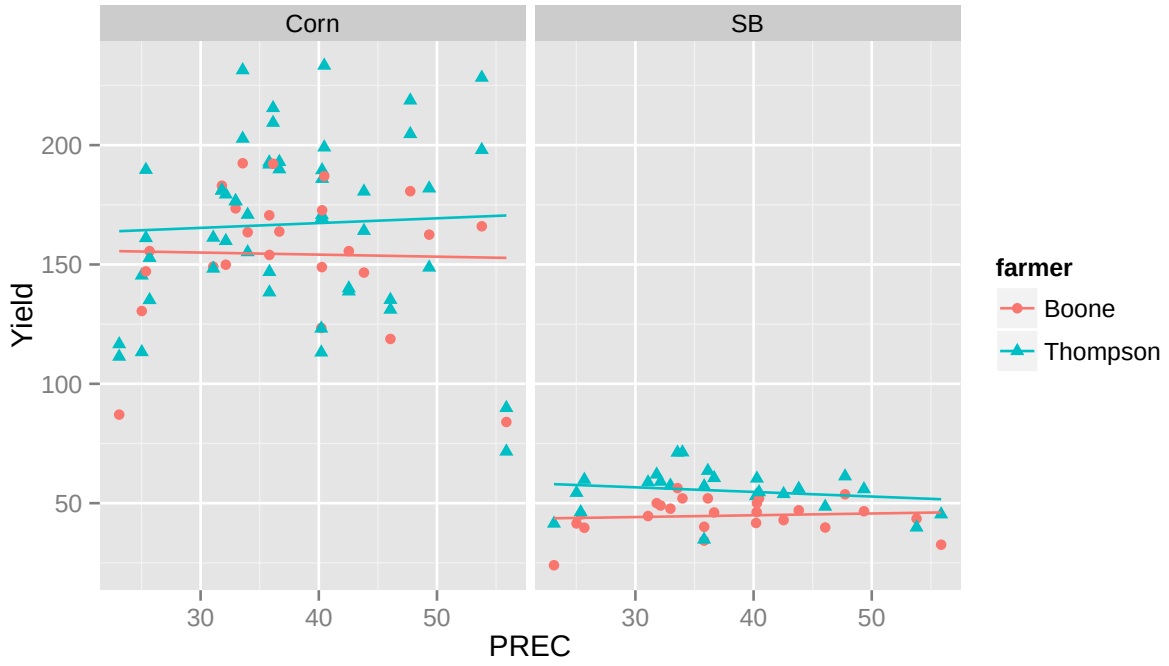
```
wBoone <- weather %>%
  filter(stationName == "Boone") %>%
  gather(key, value, 5:373) %>%
  separate(key, into = c("year", "key"), sep = "\\_") %>%
  spread(key, value) %>%
  select(year, MAXT, MINT, PREC)

wBoone$year <- sapply(wBoone$year, FUN = function(x) extract_numeric(x))
yields2 <- inner_join(yields, wBoone, by = "year")
yields2$MAXT <- as.numeric(yields2$MAXT)
yields2$MINT <- as.numeric(yields2$MINT)
yields2$PREC <- as.numeric(yields2$PREC)
```

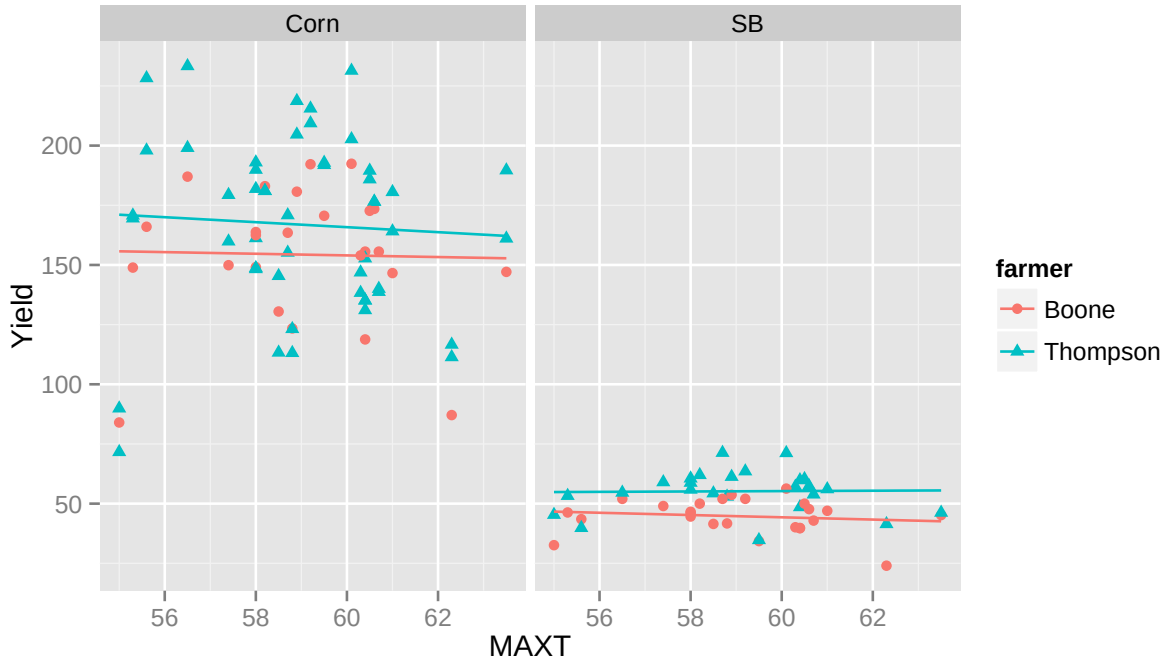
```
head(yields2)
```

```
## Source: local data frame [6 x 8]
## Groups: field_id, year
##
##   year   farmer field_id crop  value MAXT MINT  PREC
## 1 1988    Boone        1 Corn  87.10 62.3 34.9 23.11
## 2 1988    Boone        2   SB  24.00 62.3 34.9 23.11
## 3 1988 Thompson        1 Corn 116.63 62.3 34.9 23.11
## 4 1988 Thompson        2   SB  41.45 62.3 34.9 23.11
## 5 1988 Thompson      4CD Corn 111.39 62.3 34.9 23.11
## 6 1989    Boone        1 Corn 130.50 58.5 34.5 25.02
```

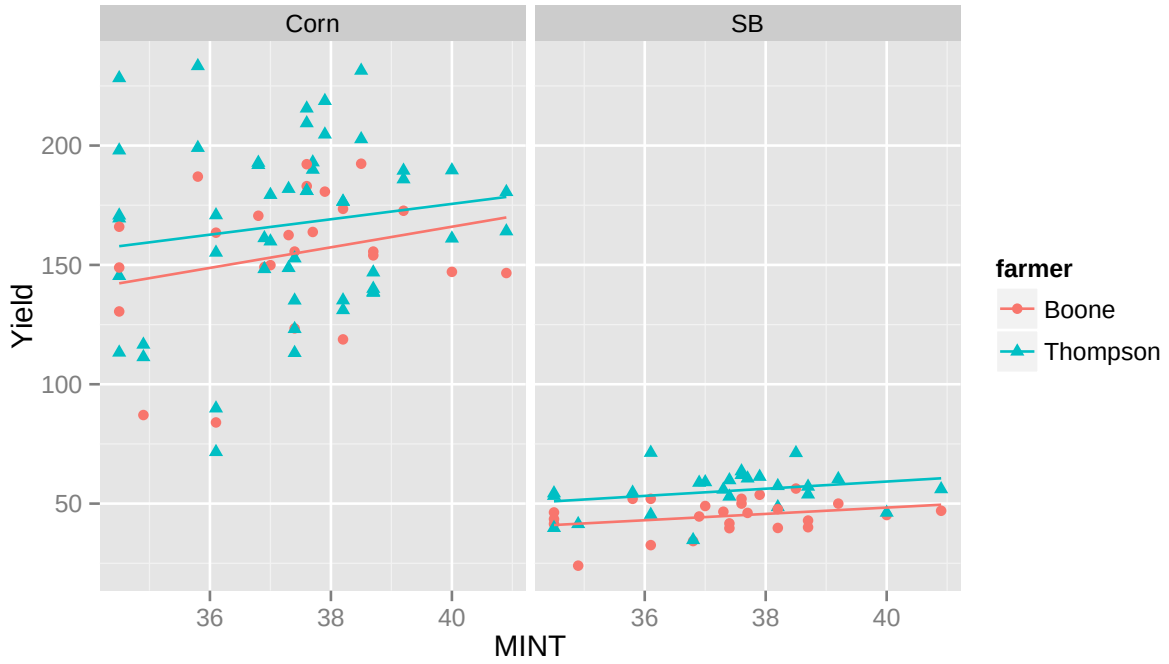
```
qplot(PREC, value, data=yields2, colour=farmer, shape=farmer,
      facets=~crop) + geom_smooth(method="lm", se=F) +
  ylab("Yield")
```




```
qplot(MAXT, value, data=yields2, colour=farmer, shape=farmer,
      facets=~crop) + geom_smooth(method="lm", se=F)+
  ylab("Yield")
```



```
qplot(MINT, value, data=yields2, colour=farmer, shape=farmer,
      facets=~crop) + geom_smooth(method="lm", se=F)+
  ylab("Yield")
```



Fields by year for Thompson that were used for `SB` or `corn`.

```
pfi %>%
  filter(item_type == "Unit Quantity", crop %in% c("Corn","SB"),
         farmer == "Thompson") %>%
  group_by(year, field_id) %>%
  select(1:4)
```

```
## Source: local data frame [75 x 4]
## Groups: year, field_id
##
##    year   farmer field_id crop
## 1  1988 Thompson        1 Corn
## 2  1988 Thompson        2   SB
## 3  1988 Thompson      4CD Corn
## 4  1989 Thompson        2 Corn
## 5  1989 Thompson      4CD   SB
## 6  1989 Thompson        5 Corn
## 7  1990 Thompson        3 Corn
## 8  1990 Thompson      4CD Corn
## 9  1990 Thompson        5   SB
## 10 1991 Thompson        1 Corn
## 11 1991 Thompson        3   SB
## 12 1991 Thompson        5 Corn
## 13 1992 Thompson        1   SB
## 14 1992 Thompson        2 Corn
```

```
## 15 1992 Thompson        3 Corn
## 16 1993 Thompson        1 Corn
## 17 1993 Thompson        2   SB
## 18 1993 Thompson      4CD Corn
## 19 1994 Thompson        2 Corn
## 20 1994 Thompson      4CD   SB
## 21 1994 Thompson        5 Corn
## 22 1995 Thompson        3 Corn
## 23 1995 Thompson      4CD Corn
## 24 1995 Thompson        5   SB
## 25 1996 Thompson        1 Corn
## 26 1996 Thompson        3   SB
## 27 1996 Thompson        5 Corn
## 28 1997 Thompson        1   SB
## 29 1997 Thompson        3 Corn
## 30 1997 Thompson        4 Corn
## 31 1998 Thompson        1 Corn
## 32 1998 Thompson        2 Corn
## 33 1998 Thompson        4   SB
## 34 1999 Thompson        2   SB
## 35 1999 Thompson        4 Corn
## 36 1999 Thompson        5 Corn
## 37 2000 Thompson        2 Corn
## 38 2000 Thompson        3 Corn
## 39 2000 Thompson        5   SB
## 40 2001 Thompson        3   SB
## 41 2001 Thompson        4 Corn
## 42 2001 Thompson        5 Corn
## 43 2002 Thompson        1 Corn
## 44 2002 Thompson        3 Corn
## 45 2002 Thompson        4   SB
## 46 2003 Thompson        1   SB
## 47 2003 Thompson        2 Corn
## 48 2003 Thompson        4 Corn
## 49 2004 Thompson        1 Corn
## 50 2004 Thompson        2   SB
## 51 2004 Thompson        5 Corn
## 52 2005 Thompson        2 Corn
## 53 2005 Thompson        3 Corn
## 54 2005 Thompson        5   SB
## 55 2006 Thompson        3   SB
## 56 2006 Thompson        4 Corn
## 57 2006 Thompson        5 Corn
## 58 2007 Thompson        1 Corn
## 59 2007 Thompson        3 Corn
## 60 2007 Thompson        4   SB
## 61 2008 Thompson        1   SB
## 62 2008 Thompson        2 Corn
## 63 2008 Thompson        4 Corn
## 64 2009 Thompson        1 Corn
## 65 2009 Thompson        2   SB
## 66 2009 Thompson        5 Corn
## 67 2010 Thompson        2 Corn
## 68 2010 Thompson        3 Corn
```

```
## 69 2010 Thompson        5   SB
## 70 2011 Thompson        3   SB
## 71 2011 Thompson        4 Corn
## 72 2011 Thompson        5 Corn
## 73 2012 Thompson        1 Corn
## 74 2012 Thompson        3 Corn
## 75 2012 Thompson        4   SB
```

```
yields3 <- pfi %>%
  filter(item_type == "Expense", crop  %in% c("Corn", "SB")) %>%
  spread(item, value) %>%
  select(-c(5))
head(yields3)
```

```
##   year   farmer field_id crop Apply_NH4 Bale_Hay Chop_StksCc Corn_RSL
## 1 1988    Boone        1 Corn       5.3        0         0.0     2.61
## 2 1988    Boone        2   SB       0.0        0         0.0     0.00
## 3 1988 Thompson        1 Corn       0.0        0         0.0     0.00
## 4 1988 Thompson        2   SB       0.0        0         5.1     0.00
## 5 1988 Thompson      4CD Corn       0.0        0         0.0     0.00
## 6 1989    Boone        1 Corn      24.0        0         0.0     3.92
##   Cover_Crop Crop_Ins Cultivation Drying_Cost Fall_Tillage Grain_Handling
## 1          0     5.50         4.7       13.07          0.0           5.75
## 2          0     6.80         9.4        0.00         14.4           1.58
## 3          0     4.13        15.8        0.00          0.0          12.83
## 4          0     5.10        15.8        0.00          0.0           3.03
## 5          0     4.13        15.8        0.00         16.7          12.25
## 6          0     6.05         4.8       19.58          0.0           8.61
##   Grain_Harvest Hedge_per_PL Herbicides Interest Land_Change
## 1          22.0         3.48      17.30     8.38          93
## 2          20.6         0.96      15.55     6.03          93
## 3          16.2         0.00       0.00     4.48          93
## 4          20.6         0.00       0.00     3.68          93
## 5          16.2         0.00       0.00     4.92          93
## 6          22.1         5.22      21.00     9.39         104
##   Maunure_Charge Misc_Expense_Per_Acre Mov_and_Stor_bales Mow_per_Windrow
## 1           0.00                    10              0.00               0
## 2           0.00                    10              0.00               0
## 3          17.73                    10              2.25               0
## 4          13.51                    10              0.00               0
## 5          17.73                    10              0.00               0
## 6           0.00                    10              0.00               0
##   Planting Purch_Pert Rake Rotary_Hoe  Seed Shell_per_Grind Spray_per_Walk
## 1     6.80      45.70    0          0 21.60            0.00            3.5
## 2     6.80      25.20    0          0 12.00            0.00            3.5
## 3     9.80      16.12    0          7 21.60           11.66            0.0
## 4     9.80       0.00    0          7 14.00            0.00            0.0
## 5     9.80       7.20    0          7 21.60           11.14            0.0
## 6     7.75      18.33    0          0 24.03            0.00            0.0
##   Spring_Tillage Stack_Residues Storage Straw_Costs Stubble_Costs
## 1           11.0            0.0    8.71           0             0
## 2           17.0            0.0    2.40           0             0
## 3            0.0           22.5   10.73           0             0
## 4            0.0            0.0    4.73           0             0
```

```
## 5            0.0            0.0   10.25           0             0
## 6           13.7            0.0   13.05           0             0
##   Windrow_Oats
## 1            0
## 2            0
## 3            0
## 4            0
## 5            0
## 6            0
```