Deforestation

Load dataframe

```
library(tidyverse)
```

```
## -- Attaching packages ------------------------------------------------------------------- tidyver

## v ggplot2 3.2.1     v purrr   0.3.3
## v tibble  2.1.3     v dplyr   0.8.3
## v tidyr   1.0.2     v stringr 1.4.0
## v readr   1.3.1     v forcats 0.4.0

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

```
library(ggplot2)
load("Dataframes/si.df.rda")
```

T-test of mean forest reserves of SPS and conventional farmers

```
t.test(x=si.df$forest_reserves[si.df$SPS==FALSE],
       y=si.df$forest_reserves[si.df$SPS==TRUE]
       )
```

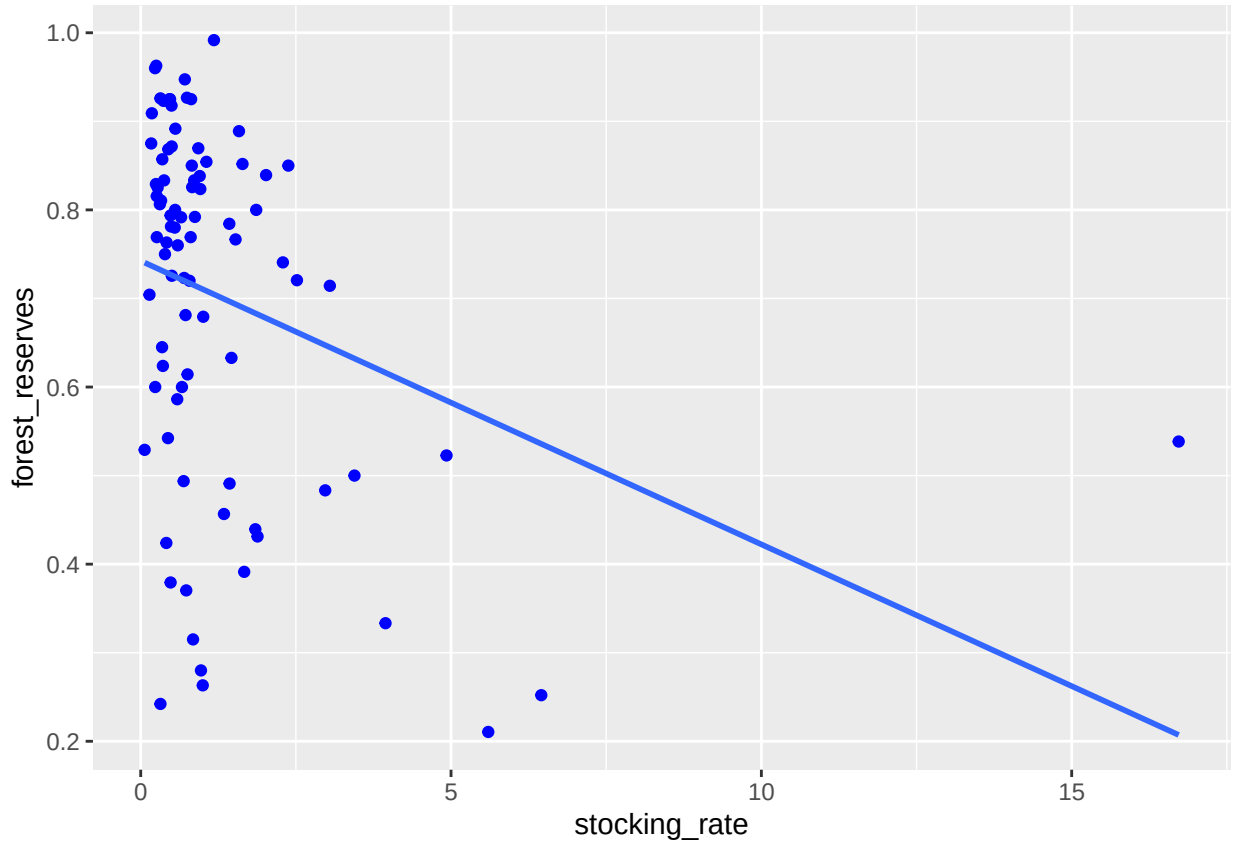
```
##
##  Welch Two Sample t-test
##
## data:  si.df$forest_reserves[si.df$SPS == FALSE] and si.df$forest_reserves[si.df$SPS == TRUE]
## t = -1.1656, df = 27.747, p-value = 0.2537
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.16721155  0.04596274
## sample estimates:
## mean of x mean of y
## 0.6890530 0.7496774
```

Regression of stocking rate as indipendent and forest reserves as dependent variable

```
fr_stock_reg <- lm(forest_reserves ~ stocking_rate, data = si.df)
summary(fr_stock_reg)
```

```
##
## Call:
## lm(formula = forest_reserves ~ stocking_rate, data = si.df)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.49004 -0.12941  0.06807  0.13968  0.33132
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)    0.74241    0.02443  30.387  < 2e-16 ***
## stocking_rate -0.03201    0.01017  -3.149  0.00227 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.1923 on 84 degrees of freedom
## Multiple R-squared:  0.1056, Adjusted R-squared:  0.09492
## F-statistic: 9.914 on 1 and 84 DF,  p-value: 0.002271
```

```
ggplot(data = filter(si.df), aes(x = stocking_rate, y = forest_reserves)) +
  geom_point(color='blue') +
  geom_smooth(method = "lm", se = FALSE)
```



Regression of stocking rate as indipendent, SPS as dummy and forest reserves as dependent variable

```
fr_sr_sps_reg <- lm(forest_reserves ~ stocking_rate+SPS, data = si.df)
summary(fr_sr_sps_reg)
```

```
##
## Call:
## lm(formula = forest_reserves ~ stocking_rate + SPS, data = si.df)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.47366 -0.13015  0.07108  0.13119  0.31197
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)    0.72718    0.02546  28.560  < 2e-16 ***
## stocking_rate -0.03559    0.01021  -3.487 0.000785 ***
## SPSTRUE        0.09458    0.05120   1.847 0.068256 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.1896 on 83 degrees of freedom
## Multiple R-squared:  0.1409, Adjusted R-squared:  0.1202
## F-statistic: 6.806 on 2 and 83 DF,  p-value: 0.001832
```

Including Distance

```
fr_sr_sps_distance_reg <- lm(forest_reserves ~ stocking_rate+SPS+distance, data = si.df)
summary(fr_sr_sps_distance_reg)
```

```
##
## Call:
## lm(formula = forest_reserves ~ stocking_rate + SPS + distance,
##     data = si.df)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.43348 -0.13185  0.06667  0.13826  0.29589
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)    8.288e-01  6.172e-02  13.429  < 2e-16 ***
## stocking_rate -3.664e-02  1.009e-02  -3.631  0.00049 ***
## SPSTRUE        1.058e-01  5.090e-02   2.078  0.04081 *
## distance      -6.677e-06  3.703e-06  -1.803  0.07507 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.1871 on 82 degrees of freedom
```

```
## Multiple R-squared:  0.1736, Adjusted R-squared:  0.1434
## F-statistic: 5.744 on 3 and 82 DF,  p-value: 0.001286
```

Simple Regression of forest reserves and milk yield

```
fr_my_reg <- lm(forest_reserves ~ milkperhectare, data = si.df)
summary(fr_my_reg)
```

```
##
## Call:
## lm(formula = forest_reserves ~ milkperhectare, data = si.df)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.52457 -0.11733  0.05956  0.14231  0.24592
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)     7.744e-01  3.194e-02  24.248  < 2e-16 ***
## milkperhectare -1.077e-04  3.589e-05  -3.001  0.00354 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.1933 on 84 degrees of freedom
## Multiple R-squared:  0.09685,    Adjusted R-squared:  0.0861
## F-statistic: 9.008 on 1 and 84 DF,  p-value: 0.003538
```

Regression of PFP and forest reserves

```
fr_pfp_reg <- lm(forest_reserves ~ pfp, data = si.df)
summary(fr_pfp_reg)
```

```
##
## Call:
## lm(formula = forest_reserves ~ pfp, data = si.df)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.48393 -0.14181  0.07417  0.15057  0.29425
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) 6.911e-01  2.599e-02  26.586   <2e-16 ***
## pfp         3.680e-06  4.865e-06   0.756    0.452
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2027 on 84 degrees of freedom
## Multiple R-squared:  0.006765,   Adjusted R-squared:  -0.005059
## F-statistic: 0.5721 on 1 and 84 DF,  p-value: 0.4515
```

Regression of labour hours and forest reserves

```r
fr_lh_reg <- lm(forest_reserves ~ labourperhectare, data = si.df)
summary(fr_lh_reg)
```

```
##
## Call:
## lm(formula = forest_reserves ~ labourperhectare, data = si.df)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.49070 -0.14719  0.06778  0.14738  0.29190
##
## Coefficients:
##                   Estimate Std. Error t value Pr(>|t|)
## (Intercept)      0.6996780  0.0226607  30.876   <2e-16 ***
## labourperhectare 0.0006191  0.0017342   0.357    0.722
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2032 on 84 degrees of freedom
## Multiple R-squared:  0.001515,   Adjusted R-squared:  -0.01037
## F-statistic: 0.1275 on 1 and 84 DF,  p-value: 0.722
```

Regression of milk yield, labour hours and pfp on forest reserves

```r
fr_my_lh_pfp_reg <- lm(forest_reserves ~ milkperhectare+labourperhectare+pfp, data = si.df)
summary(fr_my_lh_pfp_reg)
```

```
##
## Call:
## lm(formula = forest_reserves ~ milkperhectare + labourperhectare +
##     pfp, data = si.df)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.51178 -0.11202  0.06419  0.13745  0.25099
##
## Coefficients:
##                    Estimate Std. Error t value Pr(>|t|)
## (Intercept)       7.599e-01  3.330e-02  22.817  < 2e-16 ***
## milkperhectare   -1.284e-04  3.735e-05  -3.439 0.000922 ***
## labourperhectare  2.501e-03  1.724e-03   1.451 0.150543
## pfp               6.939e-06  4.730e-06   1.467 0.146204
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.1915 on 82 degrees of freedom
## Multiple R-squared:  0.1344, Adjusted R-squared:  0.1027
## F-statistic: 4.242 on 3 and 82 DF,  p-value: 0.007729
```

Regression of milk yield, sps, stocking rates and distance on forest reserves

```r
fr_my_sps_d_sr_reg <- lm(forest_reserves ~ milkperhectare+SPS+stocking_rate+distance, data = si.df)
summary(fr_my_sps_d_sr_reg)
```

```
##
## Call:
## lm(formula = forest_reserves ~ milkperhectare + SPS + stocking_rate +
##     distance, data = si.df)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.47182 -0.11388  0.04685  0.14736  0.23160
##
## Coefficients:
##                   Estimate Std. Error t value Pr(>|t|)
## (Intercept)     8.712e-01  6.402e-02  13.609  < 2e-16 ***
## milkperhectare -7.462e-05  3.655e-05  -2.041  0.04446 *
## SPSTRUE         1.008e-01  5.000e-02   2.016  0.04715 *
## stocking_rate  -2.886e-02  1.061e-02  -2.721  0.00797 **
## distance       -6.735e-06  3.634e-06  -1.853  0.06748 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.1836 on 81 degrees of freedom
## Multiple R-squared:  0.2141, Adjusted R-squared:  0.1753
## F-statistic: 5.516 on 4 and 81 DF,  p-value: 0.00056
```

```r
fr_d_reg <- lm(forest_reserves ~ distance, data = si.df)
summary(fr_d_reg)
```

```
##
## Call:
## lm(formula = forest_reserves ~ distance, data = si.df)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.45146 -0.13021  0.06258  0.14627  0.32279
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  7.836e-01  6.449e-02  12.150   <2e-16 ***
## distance    -5.322e-06  3.950e-06  -1.347    0.182
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2012 on 84 degrees of freedom
## Multiple R-squared:  0.02115,    Adjusted R-squared:  0.0095
## F-statistic: 1.815 on 1 and 84 DF,  p-value: 0.1815
```