Final_Proj_20201118tt

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```
forest <- read.csv("forest.csv")
water <- read.csv("Water_per_Capita.csv")
population <- read.csv("population_world.csv")

forest_mutate <- forest %>%
  select(CountryID, Country.and.Area, Forest.loss...1990.2020, Losing.forest.in.the.last.30.years.) %>%
  arrange(Forest.loss...1990.2020)

water_mutate <- water %>%
  select(CountryID, Country, Coef)

forest_and_water <- forest %>%
  inner_join(water, by = "CountryID")

forest_and_water
```

```
##    CountryID                                Country.and.Area
## 1        270                                          Gambia
## 2         84                                          Belize
## 3        222                                     El Salvador
## 4         76                                          Brazil
## 5        218                                         Ecuador
## 6        768                                            Togo
## 7        862                 Venezuela (Bolivarian Republic of)
## 8        450                                      Madagascar
## 9        591                                          Panama
## 10       716                                        Zimbabwe
## 11       780                             Trinidad and Tobago
## 12       480                                       Mauritius
## 13       620                                        Portugal
## 14        50                                      Bangladesh
## 15        51                                         Armenia
## 16        70                          Bosnia and Herzegovina
## 17       752                                          Sweden
## 18        20                                         Andorra
## 19        60                                         Bermuda
## 20       531                                       Cura\x8dao
## 21       400                                          Jordan
## 22       466                                            Mali
## 23       887                                           Yemen
## 24         8                                         Albania
```

```
## 25       578                                                Norway
## 26       643                                  Russian Federation
## 27       276                                             Germany
## 28       703                                            Slovakia
## 29        56                                             Belgium
## 30       203                                             Czechia
## 31       246                                             Finland
## 32       422                                             Lebanon
## 33       368                                                Iraq
## 34       818                                               Egypt
## 35       442                                          Luxembourg
## 36       705                                            Slovenia
## 37       188                                          Costa Rica
## 38       504                                             Morocco
## 39       191                                             Croatia
## 40       616                                              Poland
## 41       528                                         Netherlands
## 42       196                                              Cyprus
## 43       428                                              Latvia
## 44       642                                             Romania
## 45       788                                             Tunisia
## 46       398                                          Kazakhstan
## 47       807                                      North Macedonia
## 48       756                                          Switzerland
## 49       233                                              Estonia
## 50       112                                              Belarus
## 51       440                                            Lithuania
## 52       348                                              Hungary
## 53       826 United Kingdom of Great Britain and Northern Ireland
## 54       417                                           Kyrgyzstan
## 55        12                                              Algeria
## 56       100                                             Bulgaria
## 57       688                                               Serbia
## 58       498                                    Republic of Moldova
## 59       250                                               France
## 60        31                                           Azerbaijan
## 61       380                                                Italy
## 62       470                                                Malta
## 63       724                                                Spain
## 64       760                                  Syrian Arab Republic
## 65       192                                                Cuba
## 66       372                                             Ireland
## 67       414                                              Kuwait
## 68       352                                             Iceland
##    Forest.Area..1990 Forest.Area..2000 Forest.Area..2010 Forest.Area..2015
## 1             414.66            357.33            300.00            271.34
## 2            1600.03           1459.30           1391.39           1332.83
## 3             718.88            673.88            628.88            606.38
## 4          588898.00         551088.60         511580.70         503884.80
## 5           14632.21          13730.50          13028.19          12819.18
## 6            1361.66           1268.46           1238.87           1224.07
## 7           52026.00          49151.00          47505.00          46683.00
## 8           13693.45          13030.67          12561.98          12495.89
## 9            4607.40           4442.14           4327.99           4270.91
```

```
## 10          18826.68          18365.98          17905.28          17674.93
## 11            242.06            236.65            232.41            230.29
## 12             41.07             41.93             38.39             38.30
## 13           3399.00           3281.00           3252.00           3312.00
## 14           1920.33           1920.33           1888.34           1883.40
## 15            334.73            332.64            330.56            329.52
## 16           2210.00           2111.65           2102.66           2160.50
## 17          28063.00          28163.00          28073.00          27980.00
## 18             16.00             16.00             16.00             16.00
## 19              1.00              1.00              1.00              1.00
## 20              0.07              0.07              0.07              0.07
## 21             97.50             97.50             97.50             97.50
## 22          13296.00          13296.00          13296.00          13296.00
## 23            549.00            549.00            549.00            549.00
## 24            788.80            769.30            782.07            789.19
## 25          12132.00          12113.00          12102.00          12141.00
## 26         808949.90         809268.50         815135.60         814930.46
## 27          11300.00          11354.00          11409.00          11419.00
## 28           1902.48           1901.41           1917.91           1921.75
## 29            677.40            667.30            689.87            689.30
## 30           2629.42           2637.29           2657.38           2668.39
## 31          21875.33          22445.64          22242.00          22409.00
## 32            139.70            138.18            137.35            140.33
## 33            804.00            818.00            825.00            825.00
## 34             43.81             59.21             65.64             48.42
## 35             85.80             86.70             88.70             88.70
## 36           1188.00           1233.00           1247.00           1248.00
## 37           2907.40           2857.22           2871.20           2953.03
## 38           5485.29           5506.54           5674.57           5684.69
## 39           1850.00           1885.00           1920.00           1922.00
## 40           8882.00           9059.00           9329.00           9420.00
## 41            345.33            359.50            373.48            364.83
## 42            161.11            171.61            172.84            172.71
## 43           3173.00           3241.00           3372.12           3391.44
## 44           6371.00           6366.00           6515.00           6900.96
## 45            643.98            667.85            687.43            695.08
## 46           3162.24           3156.93           3082.18           3308.46
## 47            912.00            957.55            960.43            994.40
## 48           1153.50           1196.18           1234.72           1251.91
## 49           2205.90           2238.89           2336.02           2421.01
## 50           7780.00           8273.00           8630.00           8633.50
## 51           1945.00           2020.00           2170.00           2187.00
## 52           1813.90           1921.17           2046.39           2060.82
## 53           2778.00           2954.00           3059.00           3155.00
## 54           1136.42           1180.90           1229.68           1251.81
## 55           1667.00           1579.00           1918.00           1956.00
## 56           3327.00           3375.00           3737.00           3833.00
## 57           2313.00           2460.00           2713.00           2719.53
## 58            325.40            344.40            374.50            386.40
## 59          14436.00          15288.00          16419.00          16836.00
## 60            944.74            987.22           1032.49           1077.89
## 61           7589.75           8369.25           9028.04           9297.08
## 62              0.35              0.35              0.35              0.35
## 63          13904.66          17093.93          18545.34          18551.18
```

```
## 64            372.08            432.08            492.08            522.08
## 65           2058.00           2435.00           2932.00           3184.00
## 66            461.64            630.36            720.38            754.67
## 67              3.45              4.85              6.25              6.25
## 68             17.07             29.83             44.67             48.16
##    Forest.Area..2020 Total.Land.Area..2020
## 1             242.67                1012.0
## 2            1277.05                2281.0
## 3             583.88                2072.0
## 4          496619.60              835814.0
## 5           12497.83               24836.0
## 6            1209.27                5439.0
## 7           46230.90               88205.0
## 8           12429.81               58180.0
## 9            4213.84                7434.0
## 10          17444.58               38685.0
## 11            228.19                 513.0
## 12             38.77                 203.0
## 13           3312.00                9161.0
## 14           1883.40               13017.0
## 15            328.47                2847.0
## 16           2187.91                5120.0
## 17          27980.00               40731.0
## 18             16.00                  47.0
## 19              1.00                   5.0
## 20              0.07                  44.4
## 21             97.50                8878.0
## 22          13296.00              122019.0
## 23            549.00               52797.0
## 24            788.90                2740.0
## 25          12180.00               30413.0
## 26         815311.60             1637687.0
## 27          11419.00               34886.0
## 28           1925.90                4808.0
## 29            689.30                3028.0
## 30           2677.09                7721.0
## 31          22409.00               30391.0
## 32            143.33                1023.0
## 33            825.00               43412.8
## 34             44.98               99545.0
## 35             88.70                 243.0
## 36           1237.83                2014.0
## 37           3034.87                5106.0
## 38           5742.49               44630.0
## 39           1939.11                5596.0
## 40           9483.00               30619.0
## 41            369.50                3369.0
## 42            172.53                 924.0
## 43           3410.79                6218.0
## 44           6929.05               23008.0
## 45            702.73               15536.0
## 46           3454.68              269970.0
## 47           1001.49                2522.0
## 48           1269.11                3952.0
```

```
## 49           2438.40                4347.0
## 50           8767.60               20297.8
## 51           2201.00                6265.0
## 52           2053.01                9053.0
## 53           3190.00               24193.0
## 54           1315.38               19180.0
## 55           1949.00              238174.0
## 56           3893.00               10856.0
## 57           2722.65                8746.0
## 58            386.50                3288.0
## 59          17253.00               54756.0
## 60           1131.77                8266.0
## 61           9566.13               29414.0
## 62              0.46                  32.0
## 63          18572.17               49966.1
## 64            522.08               18363.0
## 65           3242.00               10402.0
## 66            782.02                6889.0
## 67              6.25                1782.0
## 68             51.35               10025.0
##    Forest.Area.as.a..Proportion.of..Total.Land.Area..2020
## 1                                                   23.98
## 2                                                   55.99
## 3                                                   28.18
## 4                                                   59.42
## 5                                                   50.32
## 6                                                   22.23
## 7                                                   52.41
## 8                                                   21.36
## 9                                                   56.68
## 10                                                  45.09
## 11                                                  44.48
## 12                                                  19.10
## 13                                                  36.15
## 14                                                  14.47
## 15                                                  11.54
## 16                                                  42.73
## 17                                                  68.69
## 18                                                  34.04
## 19                                                  20.00
## 20                                                   0.16
## 21                                                   1.10
## 22                                                  10.90
## 23                                                   1.04
## 24                                                  28.79
## 25                                                  40.05
## 26                                                  49.78
## 27                                                  32.73
## 28                                                  40.06
## 29                                                  22.76
## 30                                                  34.67
## 31                                                  73.74
## 32                                                  14.01
## 33                                                   1.90
```

```
## 34                                                 0.05
## 35                                                36.50
## 36                                                61.46
## 37                                                59.44
## 38                                                12.87
## 39                                                34.65
## 40                                                30.97
## 41                                                10.97
## 42                                                18.67
## 43                                                54.85
## 44                                                30.12
## 45                                                 4.52
## 46                                                 1.28
## 47                                                39.71
## 48                                                32.11
## 49                                                56.09
## 50                                                43.19
## 51                                                35.13
## 52                                                22.68
## 53                                                13.19
## 54                                                 6.86
## 55                                                 0.82
## 56                                                35.86
## 57                                                31.13
## 58                                                11.75
## 59                                                31.51
## 60                                                13.69
## 61                                                32.52
## 62                                                 1.44
## 63                                                37.17
## 64                                                 2.84
## 65                                                31.17
## 66                                                11.35
## 67                                                 0.35
## 68                                                 0.51
##    Deforestation...2015.2020 Total.Forest.Area..Affected.by.Fire..2015  X
## 1                        ...                                      ... NA
## 2                      11.16                                      ... NA
## 3                        4.5                                      ... NA
## 4                     1695.7                                32998.07 NA
## 5                      87.22                                      ... NA
## 6                       4.96                                      ... NA
## 7                     108.29                                      ... NA
## 8                        ...                                      ... NA
## 9                      12.49                                     2.02 NA
## 10                     46.07                                     2830 NA
## 11                       ...                                      1.5 NA
## 12                      0.12                                     0.08 NA
## 13                       ...                                     23.5 NA
## 14                         0                                      ... NA
## 15                       ...                                      ... NA
## 16                       ...                                     9.47 NA
## 17                     13.05                                     0.35 NA
## 18                       ...                                      ... NA
```

```
## 19                          ...                                    ... NA
## 20                          ...                                    ... NA
## 21                          ...                                    ... NA
## 22                            0                                    ... NA
## 23                          ...                                    ... NA
## 24                          ...                                    ... NA
## 25                         5.82                                   0.14 NA
## 26                            0                                 2748.9 NA
## 27                            7                                   0.53 NA
## 28                          ...                                   0.35 NA
## 29                          1.5                                      0 NA
## 30                          ...                                   0.34 NA
## 31                          ...                                   0.15 NA
## 32                          ...                                   0.06 NA
## 33                            0                                    ... NA
## 34                          ...                                    ... NA
## 35                          ...                                    ... NA
## 36                         2.03                                   0.06 NA
## 37                            0                                      2 NA
## 38                            0                                   0.99 NA
## 39                         0.05                                   1.77 NA
## 40                         0.77                                   5.51 NA
## 41                         2.19                                   0.02 NA
## 42                          ...                                   0.03 NA
## 43                         0.36                                   0.32 NA
## 44                         0.02                                   1.67 NA
## 45                         0.57                                   5.04 NA
## 46                          ...                                    9.6 NA
## 47                          ...                                   3.17 NA
## 48                         1.34                                   0.02 NA
## 49                         5.01                                   0.08 NA
## 50                          3.5                                  13.89 NA
## 51                         0.14                                   0.07 NA
## 52                         3.14                                    1.6 NA
## 53                          ...                                      1 NA
## 54                            0                                   0.02 NA
## 55                          5.4                                    ... NA
## 56                            0                                    4.3 NA
## 57                         0.04                                   1.85 NA
## 58                         0.34                                   0.35 NA
## 59                          ...                                   6.21 NA
## 60                        86.36                                    ... NA
## 61                          ...                                  25.87 NA
## 62                          ...                                    ... NA
## 63                         3.74                                  32.88 NA
## 64                          ...                                    ... NA
## 65                            0                                   8.39 NA
## 66                         0.62                                   0.18 NA
## 67                            0                                    ... NA
## 68                            0                                      0 NA
##    Forest.loss...1990.2000..yearly.ave.. Forest.loss...2000.2010..yearly.ave..
## 1                                 -1.383                                -1.604
## 2                                 -0.880                                -0.465
## 3                                 -0.626                                -0.668
```

```
## 4                -0.642                -0.717
## 5                -0.616                -0.511
## 6                -0.684                -0.233
## 7                -0.553                -0.335
## 8                -0.484                -0.360
## 9                -0.359                -0.257
## 10               -0.245                -0.251
## 11               -0.223                -0.179
## 12                0.209                -0.844
## 13               -0.347                -0.088
## 14                0.000                -0.167
## 15               -0.062                -0.063
## 16               -0.445                -0.043
## 17                0.036                -0.032
## 18                0.000                 0.000
## 19                0.000                 0.000
## 20                0.000                 0.000
## 21                0.000                 0.000
## 22                0.000                 0.000
## 23                0.000                 0.000
## 24               -0.247                 0.166
## 25               -0.016                -0.009
## 26                0.004                 0.072
## 27                0.048                 0.048
## 28               -0.006                 0.087
## 29               -0.149                 0.338
## 30                0.030                 0.076
## 31                0.261                -0.091
## 32               -0.109                -0.060
## 33                0.174                 0.086
## 34                3.515                 1.086
## 35                0.105                 0.231
## 36                0.379                 0.114
## 37               -0.173                 0.049
## 38                0.039                 0.305
## 39                0.189                 0.186
## 40                0.199                 0.298
## 41                0.410                 0.389
## 42                0.652                 0.072
## 43                0.214                 0.405
## 44               -0.008                 0.234
## 45                0.371                 0.293
## 46               -0.017                -0.237
## 47                0.499                 0.030
## 48                0.370                 0.322
## 49                0.150                 0.434
## 50                0.634                 0.432
## 51                0.386                 0.743
## 52                0.591                 0.652
## 53                0.634                 0.355
## 54                0.391                 0.413
## 55               -0.528                 2.147
## 56                0.144                 1.073
## 57                0.636                 1.028
```

```
## 58                                    0.584                                    0.874
## 59                                    0.590                                    0.740
## 60                                    0.450                                    0.459
## 61                                    1.027                                    0.787
## 62                                    0.000                                    0.000
## 63                                    2.294                                    0.849
## 64                                    1.613                                    1.389
## 65                                    1.832                                    2.041
## 66                                    3.655                                    1.428
## 67                                    4.058                                    2.887
## 68                                    7.475                                    4.975
##    Forest.loss...2010.2015..yearly.ave.. Forest.loss...2015.2020..yearly.ave..
## 1                                  -1.911                                   -2.113
## 2                                  -0.842                                   -0.837
## 3                                  -0.716                                   -0.742
## 4                                  -0.301                                   -0.288
## 5                                  -0.321                                   -0.501
## 6                                  -0.239                                   -0.242
## 7                                  -0.346                                   -0.194
## 8                                  -0.105                                   -0.106
## 9                                  -0.264                                   -0.267
## 10                                 -0.257                                   -0.261
## 11                                 -0.182                                   -0.182
## 12                                 -0.047                                    0.245
## 13                                  0.369                                    0.000
## 14                                 -0.052                                    0.000
## 15                                 -0.063                                   -0.064
## 16                                  0.550                                    0.254
## 17                                 -0.066                                    0.000
## 18                                  0.000                                    0.000
## 19                                  0.000                                    0.000
## 20                                  0.000                                    0.000
## 21                                  0.000                                    0.000
## 22                                  0.000                                    0.000
## 23                                  0.000                                    0.000
## 24                                  0.182                                   -0.007
## 25                                  0.064                                    0.064
## 26                                 -0.005                                    0.009
## 27                                  0.018                                    0.000
## 28                                  0.040                                    0.043
## 29                                 -0.017                                    0.000
## 30                                  0.083                                    0.065
## 31                                  0.150                                    0.000
## 32                                  0.434                                    0.428
## 33                                  0.000                                    0.000
## 34                                 -5.247                                   -1.421
## 35                                  0.000                                    0.000
## 36                                  0.016                                   -0.163
## 37                                  0.570                                    0.554
## 38                                  0.036                                    0.203
## 39                                  0.021                                    0.178
## 40                                  0.195                                    0.134
## 41                                 -0.463                                    0.256
## 42                                 -0.015                                   -0.021
```

```
## 43                                0.115                                0.114
## 44                                1.185                                0.081
## 45                                0.223                                0.220
## 46                                1.468                                0.884
## 47                                0.707                                0.143
## 48                                0.278                                0.275
## 49                                0.728                                0.144
## 50                                0.008                                0.311
## 51                                0.157                                0.128
## 52                                0.141                               -0.076
## 53                                0.628                                0.222
## 54                                0.360                                1.016
## 55                                0.396                               -0.072
## 56                                0.514                                0.313
## 57                                0.048                                0.023
## 58                                0.636                                0.005
## 59                                0.508                                0.495
## 60                                0.879                                1.000
## 61                                0.596                                0.579
## 62                                0.000                                6.286
## 63                                0.006                                0.023
## 64                                1.219                                0.000
## 65                                1.719                                0.364
## 66                                0.952                                0.725
## 67                                0.000                                0.000
## 68                                1.563                                1.325
##    Forest.loss...1990.2020 Losing.forest.in.the.last.five.years.
## 1                   -41.477                                    1
## 2                   -20.186                                    1
## 3                   -18.779                                    1
## 4                   -15.670                                    1
## 5                   -14.587                                    1
## 6                   -11.191                                    1
## 7                   -11.139                                    1
## 8                    -9.228                                    1
## 9                    -8.542                                    1
## 10                   -7.341                                    1
## 11                   -5.730                                    1
## 12                   -5.600                                    0
## 13                   -2.560                                    0
## 14                   -1.923                                    0
## 15                   -1.870                                    1
## 16                   -1.000                                    0
## 17                   -0.296                                    0
## 18                    0.000                                    0
## 19                    0.000                                    0
## 20                    0.000                                    0
## 21                    0.000                                    0
## 22                    0.000                                    0
## 23                    0.000                                    0
## 24                    0.013                                    1
## 25                    0.396                                    0
## 26                    0.786                                    0
## 27                    1.053                                    0
```

```
## 28                   1.231                                        0
## 29                   1.757                                        0
## 30                   1.813                                        0
## 31                   2.440                                        0
## 32                   2.598                                        0
## 33                   2.612                                        0
## 34                   2.671                                        1
## 35                   3.380                                        0
## 36                   4.194                                        1
## 37                   4.384                                        0
## 38                   4.689                                        0
## 39                   4.817                                        0
## 40                   6.766                                        0
## 41                   6.999                                        0
## 42                   7.088                                        1
## 43                   7.494                                        0
## 44                   8.759                                        0
## 45                   9.123                                        0
## 46                   9.248                                        0
## 47                   9.813                                        0
## 48                  10.023                                        0
## 49                  10.540                                        0
## 50                  12.694                                        0
## 51                  13.162                                        0
## 52                  13.182                                        1
## 53                  14.831                                        0
## 54                  15.748                                        0
## 55                  16.917                                        1
## 56                  17.012                                        0
## 57                  17.711                                        0
## 58                  18.777                                        0
## 59                  19.514                                        0
## 60                  19.797                                        0
## 61                  26.040                                        0
## 62                  31.429                                        0
## 63                  33.568                                        0
## 64                  40.314                                        0
## 65                  57.532                                        0
## 66                  69.400                                        0
## 67                  81.159                                        0
## 68                 200.820                                        0
##    Deforestation.worsened.in.the.last.five.years.
## 1                                               1
## 2                                               0
## 3                                               1
## 4                                               0
## 5                                               1
## 6                                               1
## 7                                               0
## 8                                               1
## 9                                               1
## 10                                              1
## 11                                              0
## 12                                              0
```

```
## 13                                    0
## 14                                    0
## 15                                    1
## 16                                    0
## 17                                    0
## 18                                    0
## 19                                    0
## 20                                    0
## 21                                    0
## 22                                    0
## 23                                    0
## 24                                    1
## 25                                    0
## 26                                    0
## 27                                    0
## 28                                    0
## 29                                    0
## 30                                    0
## 31                                    0
## 32                                    0
## 33                                    0
## 34                                    0
## 35                                    0
## 36                                    1
## 37                                    0
## 38                                    0
## 39                                    0
## 40                                    0
## 41                                    0
## 42                                    1
## 43                                    0
## 44                                    0
## 45                                    0
## 46                                    0
## 47                                    0
## 48                                    0
## 49                                    0
## 50                                    0
## 51                                    0
## 52                                    1
## 53                                    0
## 54                                    0
## 55                                    1
## 56                                    0
## 57                                    0
## 58                                    0
## 59                                    0
## 60                                    0
## 61                                    0
## 62                                    0
## 63                                    0
## 64                                    0
## 65                                    0
## 66                                    0
```

```
## 67                                          0
## 68                                          0
##    Losing.forest.in.the.last.30.years.
## 1                                    1
## 2                                    1
## 3                                    1
## 4                                    1
## 5                                    1
## 6                                    1
## 7                                    1
## 8                                    1
## 9                                    1
## 10                                   1
## 11                                   1
## 12                                   1
## 13                                   1
## 14                                   1
## 15                                   1
## 16                                   1
## 17                                   1
## 18                                   0
## 19                                   0
## 20                                   0
## 21                                   0
## 22                                   0
## 23                                   0
## 24                                   0
## 25                                   0
## 26                                   0
## 27                                   0
## 28                                   0
## 29                                   0
## 30                                   0
## 31                                   0
## 32                                   0
## 33                                   0
## 34                                   0
## 35                                   0
## 36                                   0
## 37                                   0
## 38                                   0
## 39                                   0
## 40                                   0
## 41                                   0
## 42                                   0
## 43                                   0
## 44                                   0
## 45                                   0
## 46                                   0
## 47                                   0
## 48                                   0
## 49                                   0
## 50                                   0
## 51                                   0
```

```
## 52                                     0
## 53                                     0
## 54                                     0
## 55                                     0
## 56                                     0
## 57                                     0
## 58                                     0
## 59                                     0
## 60                                     0
## 61                                     0
## 62                                     0
## 63                                     0
## 64                                     0
## 65                                     0
## 66                                     0
## 67                                     0
## 68                                     0
##    Deforestation.worsened.in.the.last.five.years..1
## 1                                                  1
## 2                                                  0
## 3                                                  1
## 4                                                  0
## 5                                                  1
## 6                                                  1
## 7                                                  0
## 8                                                  1
## 9                                                  1
## 10                                                 1
## 11                                                 0
## 12                                                 0
## 13                                                 1
## 14                                                 0
## 15                                                 1
## 16                                                 1
## 17                                                 0
## 18                                                 0
## 19                                                 0
## 20                                                 0
## 21                                                 0
## 22                                                 0
## 23                                                 0
## 24                                                 0
## 25                                                 0
## 26                                                 0
## 27                                                 0
## 28                                                 0
## 29                                                 0
## 30                                                 0
## 31                                                 0
## 32                                                 0
## 33                                                 0
## 34                                                 0
## 35                                                 0
## 36                                                 0
```

```
## 37                                      0
## 38                                      0
## 39                                      0
## 40                                      0
## 41                                      0
## 42                                      0
## 43                                      0
## 44                                      0
## 45                                      0
## 46                                      0
## 47                                      0
## 48                                      0
## 49                                      0
## 50                                      0
## 51                                      0
## 52                                      0
## 53                                      0
## 54                                      0
## 55                                      0
## 56                                      0
## 57                                      0
## 58                                      0
## 59                                      0
## 60                                      0
## 61                                      0
## 62                                      0
## 63                                      0
## 64                                      0
## 65                                      0
## 66                                      0
## 67                                      0
## 68                                      0
##                                   Country  X1990  X1995   X1996
## 1                                  Gambia    449  1,765
## 2                                  Belize
## 3                             El Salvador  4,212  4,777
## 4                                  Brazil
## 5                                 Ecuador  3,373  7,585
## 6                                    Togo  4,753  4,211   4,097
## 7  Venezuela (Bolivarian Republic of) 56,240 49,892 334,669
## 8                              Madagascar
## 9                                  Panama 43,089
## 10                               Zimbabwe  4,092  2,716
## 11                  Trinidad and Tobago
## 12                            Mauritius  2,122  2,539
## 13                             Portugal         1,395
## 14                           Bangladesh 16,399
## 15                              Armenia         1,887
## 16                Bosnia and Herzegovina
## 17                                Sweden 22,795 22,746  13,083
## 18                               Andorra  5,734  4,177
## 19                               Bermuda
## 20                             Cura\x8dao
## 21                                 Jordan
```

```
## 22                                                 Mali 11,092
## 23                                                Yemen    207    163
## 24                                              Albania
## 25                                               Norway         98,220  71,730
## 26                                   Russian Federation         29,198
## 27                                              Germany  2,048  2,733
## 28                                             Slovakia 13,560 16,279  14,576
## 29                                              Belgium
## 30                                              Czechia    966  1,758
## 31                                              Finland 18,114 21,293
## 32                                              Lebanon
## 33                                                 Iraq
## 34                                                Egypt
## 35                                           Luxembourg  4,717  4,236
## 36                                             Slovenia 15,172 15,810  18,093
## 37                                           Costa Rica
## 38                                              Morocco         2,110
## 39                                              Croatia
## 40                                               Poland  1,137  1,583   1,577
## 41                                          Netherlands  4,763  7,063   4,301
## 42                                               Cyprus
## 43                                               Latvia 20,529 15,609
## 44                                              Romania    961  1,623   1,932
## 45                                              Tunisia    702    308
## 46                                           Kazakhstan
## 47                                       North Macedonia
## 48                                          Switzerland  6,459  9,031   5,774
## 49                                              Estonia 11,433  9,245
## 50                                              Belarus  8,889  5,104
## 51                                            Lithuania  8,167  7,183
## 52                                              Hungary  8,905 12,529
## 53 United Kingdom of Great Britain and Northern Ireland  3,295  2,878   2,199
## 54                                           Kyrgyzstan  7,808  5,483
## 55                                              Algeria
## 56                                             Bulgaria
## 57                                               Serbia 11,898 18,486
## 58                                   Republic of Moldova -1,895  1,114
## 59                                               France
## 60                                           Azerbaijan  3,688  3,824
## 61                                                Italy  3,011
## 62                                                Malta    269    297
## 63                                                Spain  2,864  1,841   4,198
## 64                                   Syrian Arab Republic
## 65                                                 Cuba
## 66                                              Ireland
## 67                                               Kuwait
## 68                                              Iceland
##      X1997   X1998   X1999   X2000  X2001  X2002  X2003  X2004   X2005   X2006
## 1                           2,801  2,146 -1,540  2,232  1,993   4,519    -677
## 2                                 38,242 16,769 10,411 12,297  45,793
## 3                           3,448  2,445  2,977  3,288  2,732   5,039   4,273
## 4                                 53,779 54,280 50,812 50,202  48,457  49,685
## 5                           7,670  7,590  9,358  6,340  3,924   3,848   6,976
## 6    3,994   3,892   3,791   3,621  3,521  3,428  3,339  3,252   3,167   3,083
```

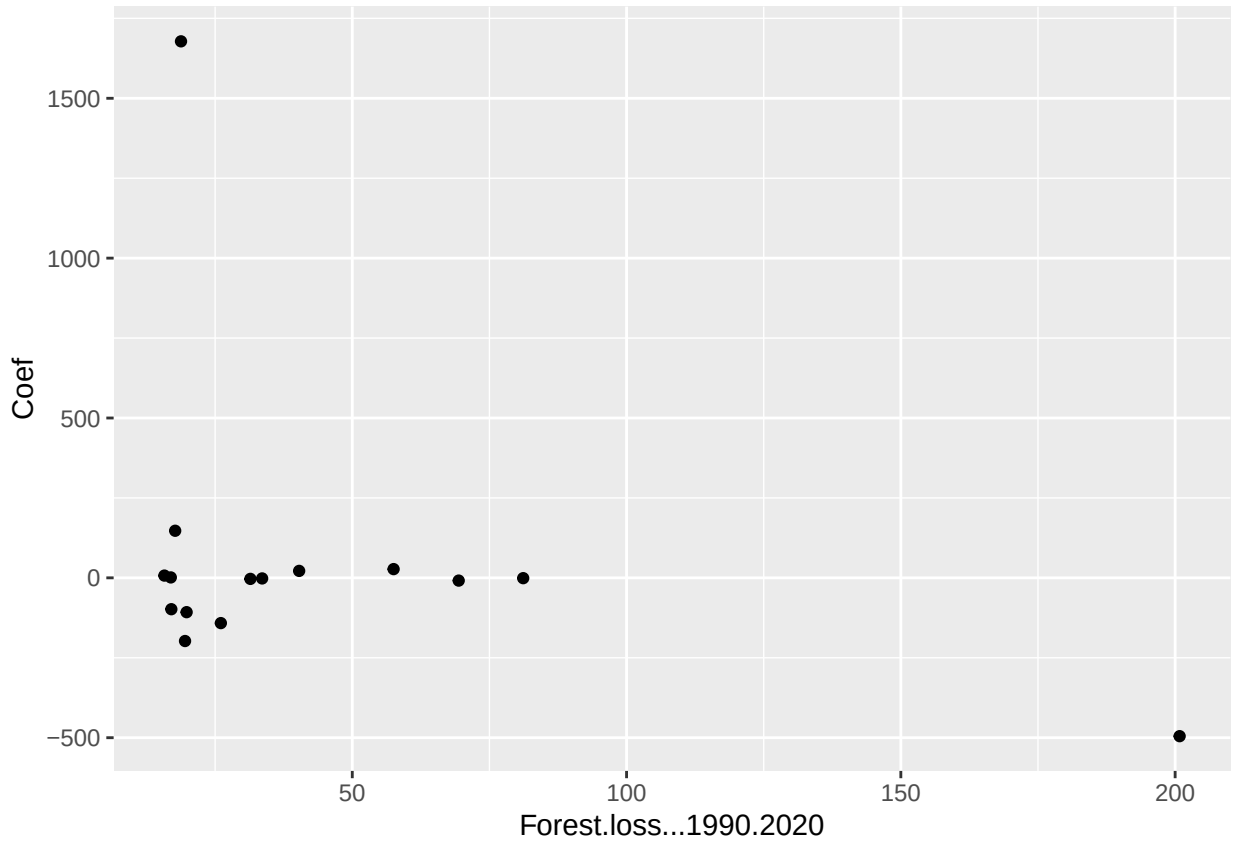
```
## 7  350,528 341,598 345,081  41,123 40,365 40,421 30,627 38,251  40,959  32,198
## 8                           21,374
## 9                           43,865 40,178 38,993 47,938 41,524  43,035  40,084
## 10                           4,777  4,650  3,164  3,982  4,999   2,925   4,869
## 11                           5,178  2,425  4,121   -200  3,316   3,137   3,340
## 12                           2,158  2,019  2,193  2,481  2,240   2,750   2,030
## 13                           1,991                3,927  2,450   1,126     999
## 14                                                       10,411   8,460   9,016
## 15                             936  1,089  2,602  2,878  2,100   2,837   2,276
## 16                           5,205  7,122  6,515  5,142  6,995   7,220   5,811
## 17  16,749  25,682  20,101  29,698 24,793 18,210 17,362 21,579  20,755  21,160
## 18                           5,023  3,953  5,151  4,211  2,650   2,617   2,131
## 19                                                                        61
## 20
## 21                                   195    240    263    213             107
## 22                                                        6,946   8,195   7,045
## 23                             123          211
## 24
## 25  94,911  87,603  90,555 104,470 81,594 77,547 79,287 82,068   3,238   2,309
## 26                          30,896 29,912 32,249 29,677 31,269  31,727  30,410
## 27                           2,503  3,005  3,308  1,249  2,129   1,849   1,840
## 28  14,612  14,563  17,031  16,869 16,823 18,075 11,020 13,201  15,226  14,526
## 29
## 30                           1,453  1,576  2,351  1,162  1,250   1,525   1,873
## 31                          23,323 19,614 15,671 16,874 27,126  22,970  20,260
## 32                           1,329
## 33                           5,484  4,379  6,024  6,350  5,320   4,244   5,928
## 34                                                  805    610     716     889
## 35
## 36  12,995  15,544  16,073  16,110 13,951 13,355  9,237 17,145  14,713  12,594
## 37                                 27,517 26,862 27,645 27,981  26,352  24,154
## 38                                                          961
## 39                                                                  5,693   2,993
## 40   1,738   1,898   2,086   1,696  1,715  1,769  1,243  1,313   1,474   1,307
## 41   4,747   6,634   7,056   6,617  7,401  7,389  4,142  4,924   4,666   4,977
## 42                             363    334    291    323    320     224     223
## 43                          14,727 15,694 17,634 18,735 14,352  13,344  10,773
## 44   2,296   2,369   2,369   1,604  1,744  1,825  1,388  1,850   2,975   2,657
## 45                             298    224    223    399    443     303     348
## 46                                                  8,213  8,352   8,596   6,622
## 47                                                                  9,307   6,719
## 48   7,275   5,925   9,668   7,746  9,449  6,984  6,667  6,179   5,954   6,252
## 49                                                                 21,382   5,659
## 50                           8,433  8,110  7,168  7,253  8,376   8,803   8,371
## 51                           6,902  7,258  7,109  4,921  7,560   7,446   5,760
## 52                          11,706 11,940 12,755  8,229 11,855  13,682  13,215
## 53   2,379   3,382   3,364   3,890  2,770  3,495  1,983  2,966   2,595   2,708
## 54                           4,544  4,625  6,004  4,846  4,302   4,190   3,642
## 55                             354    324    320    348    343     339     376
## 56
## 57                          17,429 18,178 19,284 13,352 18,935  22,360  22,728
## 58                              10  1,688
## 59                                                                  1,247   8,278
## 60                           3,450  3,370  4,258  4,570  4,238   3,442   4,156
```

```
## 61                                          1,850  2,223  1,804  2,539   2,022   1,287
## 62                                    192     143    189    374    195     214     228
## 63   3,610   3,036   1,480   4,112  1,506  3,129  2,850  1,239  1,915   2,452
## 64                                    651     713    806  1,150    966     947     857
## 65                                                                2,183   5,739   4,602
## 66                                                                       10,815  13,262
## 67
## 68                                                                              458,172 548,250
##      X2007   X2008   X2009   X2010   X2011   X2012   X2013   X2014  X2015
## 1     -564   3,375   7,438
## 2
## 3    3,571   4,439   3,013   5,559   5,192   2,870   2,452   2,446  2,115
## 4   49,834  47,409  47,754  46,374  30,432  20,760  29,891  28,186 19,773
## 5    6,947  11,830
## 6    3,001                                   1,677
## 7   34,355  32,307  19,292
## 8   17,341
## 9   46,993  38,350  35,725  47,604  37,318  30,471  27,509  28,249 23,343
## 10   4,394   4,994   4,868   4,737   4,921   3,722   4,586   4,451  3,184
## 11
## 12   2,089   2,360   2,371   2,203   1,844   1,754   2,058   2,077  2,652
## 13   3,065   1,596   1,675   5,125   3,066
## 14   9,068   9,486   7,677   8,379   7,041   7,801  10,304   9,229  9,479
## 15   3,194   1,526   2,885   3,017   3,229   2,020   2,201   1,899  2,202
## 16   6,260   5,812   6,987  14,483   3,962   8,057  10,267  14,568  7,584
## 17  21,872  22,774  20,321  19,988  23,231  24,664  17,591  18,997 22,582
## 18   1,684   3,882   3,478   3,391   2,135   2,652   4,273   4,593  3,545
## 19      57      56      57      47      42      42      41      41     41
## 20                          7,398   4,177  31,133   3,375   2,426  2,129
## 21     107      80      98     118      79      72      69      67     94
## 22   8,666   8,722   8,556   9,526   7,670   9,408   7,964   7,345  8,085
## 23
## 24                                                  10,927  12,913 11,794
## 25   2,729   2,581   2,358  35,252  58,860  48,988  49,371  41,097 55,757
## 26  34,115  32,897  31,368  30,259  30,703  29,409  31,974  31,957 32,058
## 27   2,532   2,058   2,124   2,336   1,606   2,085   2,230   1,608  1,614
## 28  15,000  14,661  15,294  19,173  11,699  15,274  18,085  14,647 12,253
## 29                                          2,702   2,678   2,225  2,340
## 30   1,351   1,046   1,138   2,383   1,323   1,234   1,878     804    945
## 31  18,686  28,832  17,222  19,932  23,572  29,435  20,341  18,545 27,351
## 32                    980
## 33   4,270   3,010   1,074   1,629   2,510   1,881   1,961   1,422  1,272
## 34   1,066     954     689     516     752     585                    614
## 35           2,138   1,868   3,776   2,900
## 36  13,553  17,834  18,881  17,982   9,611  16,211  18,280  22,417 11,483
## 37  27,254  27,461  23,737  29,926  23,966  20,597  20,256  23,421 22,064
## 38     705   1,393   1,344
## 39   3,716                          26,119  28,747  34,027  34,006 27,062
## 40   1,480   1,414   1,436   2,264   1,993   1,295   1,754   1,371  1,072
## 41   6,056   5,227   4,862   5,608   4,426   5,596   5,970   4,872  4,830
## 42     260     153     341     231     298     418     155     205    250
## 43  17,512  16,979  19,179  24,249  15,382  22,042  18,555  18,515 14,204
## 44   1,797   1,893   1,672   3,027   1,512   1,212   1,767   2,106  1,748
## 45     356     201     321     201     270     295     166
```

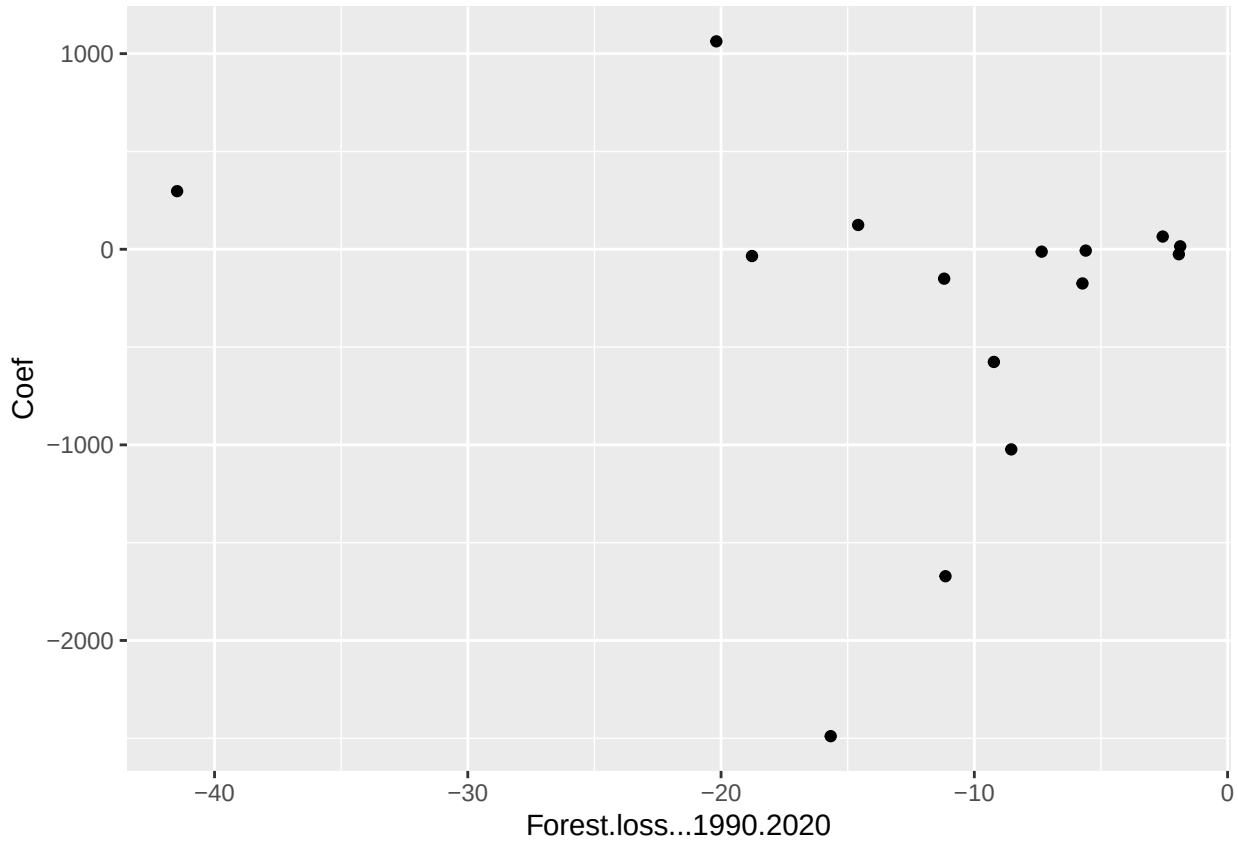
```
## 46   7,417   5,606   6,179   8,757   6,115   5,478   7,113   6,346  6,112
## 47   7,467   6,288   7,021  10,108
## 48   6,793   6,660   6,139   6,108   5,029   6,184   7,626   6,491  6,168
## 49  23,385                           22,862  22,602  15,130
## 50   7,030   9,407  10,466
## 51   8,345   6,991   6,366   9,369   8,457   9,242   6,826   8,146  6,846
## 52  10,784  11,006  12,562  16,724   8,934   9,634  12,828  11,600  9,381
## 53   2,635   3,040   2,560   1,753
## 54   4,237   4,082   5,337   5,389   4,030   5,483
## 55     370     365     358     352     345     338
## 56                                             11,451  15,042  16,388 14,720
## 57  16,601  17,178  19,421  27,331  15,098  15,908  22,097  21,902 18,038
## 58
## 59   8,219   3,476   2,727   3,379   2,142   3,347   4,388   3,862  2,138
## 60   3,832   3,055   3,273   3,739   3,560   2,857   2,597   2,488  2,307
## 61   1,221   2,264   2,619   3,037       0       0       0
## 62     261     209     283     219     251     192     176     184    203
## 63   1,512   1,734   3,678   2,297   1,718   3,591   1,352          3,479
## 64     775
## 65   6,598   5,042   2,908   4,274   3,997   5,223   4,585   4,413  3,909
## 66  10,069  14,552  15,393   9,282  12,027  12,182  10,724  13,817 15,410
## 67      38      11      38       8      24      36      31      18     24
## 68 537,041 467,573 501,848 383,148 534,748 463,637 477,982 535,323
##     X2016  X2017         Coef
## 1                  297.052496
## 2                 1062.953943
## 3   1,671  3,863   -34.662439
## 4  19,632        -2489.197842
## 5                  124.238786
## 6                 -150.419961
## 7                -1671.520192
## 8                 -576.121505
## 9  29,967 32,714 -1023.182260
## 10  3,320  4,758   -12.196052
## 11                -174.759543
## 12  2,001  2,237    -6.802983
## 13  4,475  1,664    65.094107
## 14                 -25.495959
## 15  2,344  1,583    15.124877
## 16  9,350  8,386   265.207015
## 17 16,696 19,668  -230.540417
## 18                 -45.653374
## 19     41     41    -1.949208
## 20  3,359  3,202 -1445.508390
## 21     86     67   -10.697597
## 22  8,119    732  -185.912944
## 23                  44.173415
## 24 13,898 11,529   218.889095
## 25               -2709.079971
## 26 30,570 32,169    33.623322
## 27                 -53.941922
## 28 15,856 14,565   -47.644835
## 29  2,568  1,951  -113.505007
## 30  1,107  1,363   -27.582812
```

```
## 31 23,202 23,359   224.484343
## 32                 -38.771128
## 33  1,579  1,230  -313.755858
## 34                 -17.434266
## 35                 419.645742
## 36 16,090 15,499   167.657436
## 37 21,430 22,188  -431.661370
## 38                  85.580021
## 39 48,698 44,920  3664.875741
## 40  1,091  1,608   -10.283801
## 41  5,429          -77.023008
## 42    220    166    -6.741129
## 43 22,058 23,405   351.018300
## 44  2,058  1,487    -5.926791
## 45                 -6.139757
## 46  8,194  7,688   -69.215155
## 47                 106.631849
## 48                 -98.771991
## 49                 427.227776
## 50                 184.631394
## 51 11,530 11,871   208.986702
## 52 11,759 10,411   -54.825294
## 53                -107.663904
## 54                   7.051982
## 55                   1.311990
## 56 14,273 11,559   -98.128648
## 57                 147.254838
## 58                1678.067086
## 59  3,550  2,506  -197.597813
## 60  2,634  2,108  -107.328896
## 61                -141.556243
## 62    117    158    -3.246649
## 63                  -1.845994
## 64                  21.722105
## 65  4,033  5,903    27.335887
## 66 10,202 10,984    -8.587809
## 67     21     11    -1.001452
## 68                -495.182066
```

```
forest_and_water_worst <- forest_and_water %>%
  arrange(Forest.loss...1990.2020) %>%
  slice(1:15)

forest_and_water_best <- forest_and_water %>%
  arrange(desc(Forest.loss...1990.2020)) %>%
  slice(1:15)

forest_and_water_best_plot <- forest_and_water_best %>%
  ggplot(aes(x = Forest.loss...1990.2020, y = Coef)) +
  geom_point()

forest_and_water_best_plot
```




```
forest_and_water_worst_plot <- forest_and_water_worst %>%
  ggplot(aes(x = Forest.loss...1990.2020, y = Coef)) +
  geom_point()

forest_and_water_worst_plot
```




```
ate <- forest_and_water %>%
  group_by(Losing.forest.in.the.last.30.years.) %>%
  summarize(mean = mean(Coef)) %>%
  summarize(ate = mean[2] - mean[1])
```

```
## `summarise()` ungrouping output (override with `.groups` argument)
```

```
ate
```

```
## # A tibble: 1 x 1
##     ate
##   <dbl>
## 1 -290.
```