finalproject

2022-12-16

```r
# import relevant libraries
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.2 --
## v ggplot2 3.4.0      v purrr   0.3.5
## v tibble  3.1.8      v dplyr   1.0.10
## v tidyr   1.2.1      v stringr 1.4.1
## v readr   2.1.3      v forcats 0.5.2
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```r
library(magrittr)
```

```
##
## Attaching package: 'magrittr'
##
## The following object is masked from 'package:purrr':
##
##     set_names
##
## The following object is masked from 'package:tidyr':
##
##     extract
```

```r
library(ggplot2)
library(maps)
```

```
##
## Attaching package: 'maps'
##
## The following object is masked from 'package:purrr':
##
##     map
```

```r
library(mapproj)
library(geobr)
```

```
## Loading required namespace: sf
```

1

```
library(sf)
```

```
## Linking to GEOS 3.11.0, GDAL 3.5.3, PROJ 9.1.0; sf_use_s2() is TRUE
```

```
library(dplyr)
library(units)
```

```
## udunits database from /Library/Frameworks/R.framework/Versions/4.2-arm64/Resources/library/units/sha
```

```
#create Brazil
datasets <- list_geobr()
datasets
```

```
##                              function
## 1                      'read_country'
## 2                       'read_region'
## 3                        'read_state'
## 4                   'read_meso_region'
## 5                  'read_micro_region'
## 6           'read_intermediate_region'
## 7             'read_immediate_region'
## 8                 'read_municipality'
## 9               'read_municipal_seat'
## 10             'read_weighting_area'
## 11                'read_census_tract'
## 12           'read_statistical_grid'
## 13                 'read_metro_area'
## 14                 'read_urban_area'
## 15                     'read_amazon'
## 16                     'read_biomes'
## 17         'read_conservation_units'
## 18         'read_disaster_risk_area'
## 19             'read_indigenous_land'
## 20                   'read_semiarid'
## 21         'read_health_facilities'
## 22             'read_health_region'
## 23             'read_neighborhood'
## 24                   'read_schools'
## 25         'read_comparable_areas'
## 26 'read_urban_concentrations'
## 27       'read_pop_arrangements'
##                                                                     geography
## 1                                                                     Country
## 2                                                                      Region
## 3                                                                      States
## 4                                                                 Meso region
## 5                                                                Micro region
## 6                                                        Intermediate region
## 7                                                          Immediate region
## 8                                                                Municipality
## 9                                    Municipality seats (sedes municipais)
## 10                                  Census weighting area (área de ponderação)
```

```
## 11                                           Census tract (setor censitário)
## 12                                        Statistical Grid of 200 x 200 meters
## 13                                                        Metropolitan areas
## 14                                                           Urban footprints
## 15                                                        Brazil's Legal Amazon
## 16                                                                      Biomes
## 17                                              Environmental Conservation Units
## 18                                                          Disaster risk areas
## 19                                                             Indigenous lands
## 20                                                             Semi Arid region
## 21                                                             Health facilities
## 22                                              Health regions and macro regions
## 23                                                           Neighborhood limits
## 24                                                                       Schools
## 25 Historically comparable municipalities, aka Areas minimas comparaveis (AMCs)
## 26                           Urban concentration areas (concentrações urbanas)
## 27                           Population arrangements (arranjos populacioanis)
##
## 1              1872, 1900, 1911, 1920, 1933, 1940, 1950, 1960, 1970, 1980, 1991, 2000, 2001, 2010, 20
## 2                                                                 2000, 2001, 2010, 20
## 3              1872, 1900, 1911, 1920, 1933, 1940, 1950, 1960, 1970, 1980, 1991, 2000, 2001, 2010, 20
## 4                                                                 2000, 2001, 2010, 20
## 5                                                                 2000, 2001, 2010, 20
## 6
## 7
## 8   1872, 1900, 1911, 1920, 1933, 1940, 1950, 1960, 1970, 1980, 1991, 2000, 2001, 2005, 2007, 2010, 20
## 9                                                                 1872, 1900, 1911, 1920, 19
## 10
## 11
## 12
## 13                                                      1970, 2001, 2002, 2003, 20
## 14
## 15
## 16
## 17
## 18
## 19
## 20
## 21
## 22
## 23
## 24
## 25                                                                          1872,1900,1911,1920
## 26
## 27
##             source
## 1             IBGE
## 2             IBGE
## 3             IBGE
## 4             IBGE
## 5             IBGE
## 6             IBGE
## 7             IBGE
## 8             IBGE
```

```
## 9                 IBGE
## 10                IBGE
## 11                IBGE
## 12                IBGE
## 13                IBGE
## 14                IBGE
## 15                 MMA
## 16                IBGE
## 17                 MMA
## 18 CEMADEN and IBGE
## 19               FUNAI
## 20                IBGE
## 21     CNES, DataSUS
## 22             DataSUS
## 23                IBGE
## 24                INEP
## 25                IBGE
## 26                IBGE
## 27                IBGE
```

```r
# Download all municipalities of BR
all_muni <- read_municipality(
  year= 2020,
  showProgress = FALSE
)
```

Using year 2020

```r
#load deforestation data
deforestation <- read.csv("/Users/nicholasharterre/Downloads/terrabrasilis_legal_amazon_30_10_2022_16698
deforestation <- rename(deforestation, code_muni = geocode_ibge)

#merge data
brazil_deforest <- merge(all_muni, deforestation, by="code_muni")

#calculate sq km
brazil_deforest <- st_make_valid(brazil_deforest) %>% arrange(code_muni)

brazil_deforest <- brazil_deforest %>%
  mutate(area = st_area(brazil_deforest))

brazil_deforest <- brazil_deforest %>%
  mutate(ratio = (areakm/area)*100000)

brazil_deforest <- brazil_deforest %>%
  mutate(ratio = drop_units(brazil_deforest$ratio))


#only year 2020
b2020 <- subset(brazil_deforest, year == 2020)
b2019 <- subset(brazil_deforest, year == 2019)
b2018 <- subset(brazil_deforest, year == 2018)
b2015<- subset(brazil_deforest, year == 2015)
```
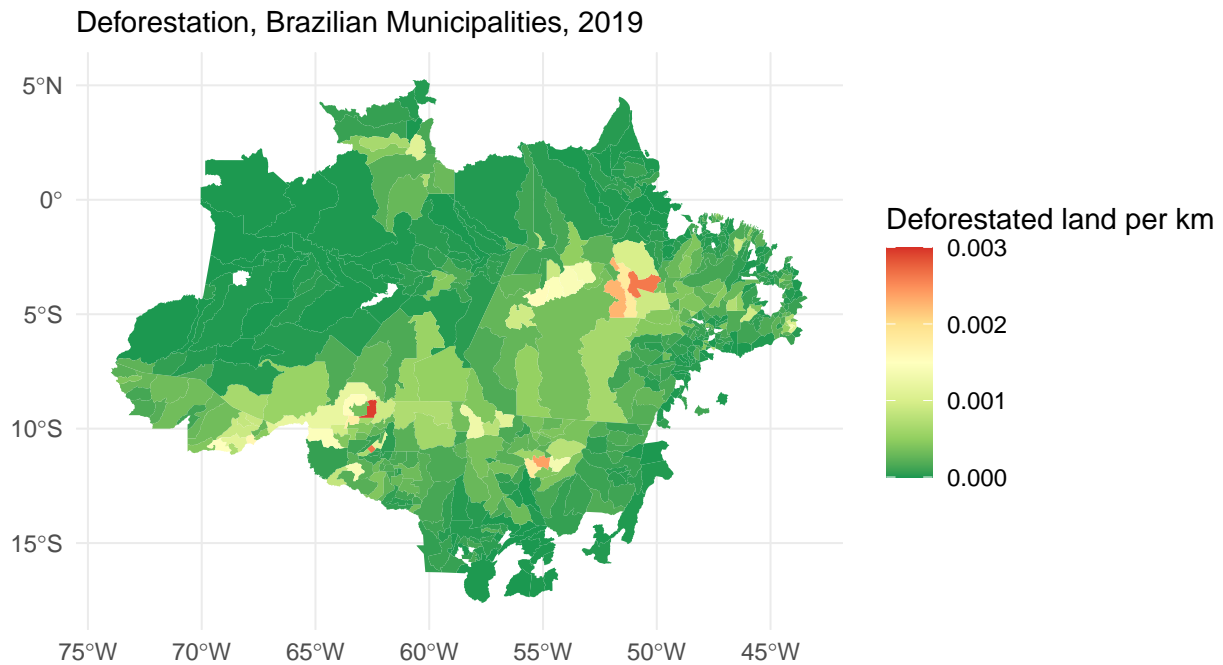
```
#plot it out!
ggplot() +
  geom_sf(data=b2019, aes(fill=ratio), color= NA, size=.15) +
  labs(subtitle="Deforestation, Brazilian Municipalities, 2019", size=8) +
  scale_fill_distiller(direction = -1, palette = "RdYlGn", name="Deforestated land per km", limits = c(0
  theme_minimal()
```

Deforestation, Brazilian Municipalities, 2019


```
write.csv(brazil_deforest,"/Users/nicholasharterre/Desktop/ECON323/FInal project/brazil_deforestation.cs
```