R Notebook for creation Scotland Vulnerability Resource

Rscript created by  
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Date: 2020-06-11

Data set created by  
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## [1] "Dataset version: 0.2"

## [1] "Date: 2020-06-18"

## [1] "R version 4.0.0 (2020-04-24)"

### 1. Summary:

**The data set name (Grampian data) is misleading at the moment as it has all of Scotland’s SIMD data. Sorry**

This script adds additional information to the Scottish Index of Multiple Deprivation indicators (SIMD2020v2) data set. ***Consider adding more details e.g. best on openly accessible information bla and when information access. However, not 100% here would be the right place*** The current version of the script adds the postcodes (PC) of the respective SIMD2020v2 data zones, their data zone names adn the NHS Health board regions.

### 2. Creating the data set

#### 2.1 Loading source data

setwd("~/Scotland\_Vulnerability\_Resource/Raw\_data/")  
dir()

## [1] "NHS\_Health\_Board\_regions.csv" "SIMD2020v2datazones.csv"   
## [3] "SIMD2020v2indicators.csv" "SIMD2020v2indicators\_desc.csv"  
## [5] "SIMD2020v2postcodes.csv"

df\_SIMD2020.indi <- read.csv("SIMD2020v2indicators.csv")  
df\_SIMD2020.dz <- read.csv("SIMD2020v2datazones.csv")  
df\_SIMD2020.pc <- read.csv("SIMD2020v2postcodes.csv")  
df\_NHS\_regions <- read.csv("NHS\_Health\_Board\_regions.csv")

#### 2.2 Cleaning source data

##### 2.2.1 Removing excess data from source data

# df\_SIMD.dz we only need column 1,3:13,16,17. See Issues #19 here for details https://github.com/AbdnCHDS/grampian\_data/issues/19  
df\_SIMD2020.dz <- df\_SIMD2020.dz[,c(1,3:13,16,17)]  
# From df\_SIMD2020.pc we only need the first two columns "Postcode" & "DZ"  
df\_SIMD2020.pc <- df\_SIMD2020.pc[,c(1,2)]

##### 2.2.2 Checking source data for duplicates

sapply(df\_SIMD2020.indi, function(x) sum(duplicated(x)))

## Data\_Zone Intermediate\_Zone Council\_area   
## 0 5726 6944   
## Total\_population Working\_age\_population Income\_rate   
## 6016 6201 6921   
## Income\_count Employment\_rate Employment\_count   
## 6605 6930 6766   
## CIF ALCOHOL DRUG   
## 6909 1109 2222   
## SMR DEPRESS LBWT   
## 1577 6936 6944   
## EMERG Attendance Attainment   
## 1685 6920 6684   
## no\_qualifications not\_participating University   
## 1119 6941 6926   
## drive\_petrol drive\_GP drive\_post   
## 5931 5996 6203   
## drive\_primary drive\_retail drive\_secondary   
## 6332 5682 5604   
## PT\_GP PT\_post PT\_retail   
## 4972 5278 4622   
## Broadband crime\_count crime\_rate   
## 6876 5636 927   
## overcrowded\_count nocentralheat\_count overcrowded\_rate   
## 6628 6856 6922   
## nocentralheat\_rate   
## 6955

# "Data\_Zone" should be 0, as they are our primary key here  
  
sapply(df\_SIMD2020.dz, function(x) sum(duplicated(x)))

## DZ SIMD2020v2\_Rank   
## 0 0   
## SIMD2020v2\_Vigintile SIMD2020v2\_Decile   
## 6956 6966   
## SIMD2020v2\_Quintile SIMD2020v2\_Income\_Domain\_Rank   
## 6971 471   
## SIMD2020\_Employment\_Domain\_Rank SIMD2020\_Education\_Domain\_Rank   
## 420 0   
## SIMD2020\_Health\_Domain\_Rank SIMD2020\_Access\_Domain\_Rank   
## 0 0   
## SIMD2020\_Crime\_Domain\_Rank SIMD2020\_Housing\_Domain\_Rank   
## 174 296   
## URclass URname   
## 6970 6970

# "DZ" (Data zone) should be 0, as they are our primary key here  
  
sapply(df\_SIMD2020.pc, function(x) sum(duplicated(x)))

## Postcode DZ   
## 0 150858

# "Postcode" should be 0, as they are our primary key here

##### 2.2.3 Checking source data for NA-values

sapply(df\_SIMD2020.indi, function(x) sum(is.na(x)))

## Data\_Zone Intermediate\_Zone Council\_area   
## 0 0 0   
## Total\_population Working\_age\_population Income\_rate   
## 0 0 0   
## Income\_count Employment\_rate Employment\_count   
## 0 0 0   
## CIF ALCOHOL DRUG   
## 0 0 0   
## SMR DEPRESS LBWT   
## 0 0 0   
## EMERG Attendance Attainment   
## 0 0 0   
## no\_qualifications not\_participating University   
## 0 0 0   
## drive\_petrol drive\_GP drive\_post   
## 0 0 0   
## drive\_primary drive\_retail drive\_secondary   
## 0 0 0   
## PT\_GP PT\_post PT\_retail   
## 0 0 0   
## Broadband crime\_count crime\_rate   
## 0 0 0   
## overcrowded\_count nocentralheat\_count overcrowded\_rate   
## 0 0 0   
## nocentralheat\_rate   
## 0

# Data\_Zone should be 0. However, currently in the SIM2020v2 source data set missing values and suppressed values are denoted by "\*"   
  
# Lets check how many missing values and suppressed values are denoted by "\*" in the source data   
sapply(df\_SIMD2020.indi, function(x) sum(x=="\*"))

## Data\_Zone Intermediate\_Zone Council\_area   
## 0 0 0   
## Total\_population Working\_age\_population Income\_rate   
## 0 0 3   
## Income\_count Employment\_rate Employment\_count   
## 0 3 0   
## CIF ALCOHOL DRUG   
## 3 2 2   
## SMR DEPRESS LBWT   
## 2 1 1   
## EMERG Attendance Attainment   
## 2 567 189   
## no\_qualifications not\_participating University   
## 0 3 2   
## drive\_petrol drive\_GP drive\_post   
## 0 0 0   
## drive\_primary drive\_retail drive\_secondary   
## 0 0 0   
## PT\_GP PT\_post PT\_retail   
## 0 0 0   
## Broadband crime\_count crime\_rate   
## 2 500 501   
## overcrowded\_count nocentralheat\_count overcrowded\_rate   
## 0 0 0   
## nocentralheat\_rate   
## 0

# storing for a quick comparision   
df\_Star <-sapply(df\_SIMD2020.indi, function(x) sum(x=="\*"))  
  
# Here we replace the "\*" denotation with NA in the SIMD data set  
df\_SIMD2020.indi[df\_SIMD2020.indi=="\*"] <- NA  
# Comparing, if number of "\*" denotes is the same as the number of NA now for the respective columns  
df\_Star == sapply(df\_SIMD2020.indi, function(x) sum(is.na(x)))

## Data\_Zone Intermediate\_Zone Council\_area   
## TRUE TRUE TRUE   
## Total\_population Working\_age\_population Income\_rate   
## TRUE TRUE TRUE   
## Income\_count Employment\_rate Employment\_count   
## TRUE TRUE TRUE   
## CIF ALCOHOL DRUG   
## TRUE TRUE TRUE   
## SMR DEPRESS LBWT   
## TRUE TRUE TRUE   
## EMERG Attendance Attainment   
## TRUE TRUE TRUE   
## no\_qualifications not\_participating University   
## TRUE TRUE TRUE   
## drive\_petrol drive\_GP drive\_post   
## TRUE TRUE TRUE   
## drive\_primary drive\_retail drive\_secondary   
## TRUE TRUE TRUE   
## PT\_GP PT\_post PT\_retail   
## TRUE TRUE TRUE   
## Broadband crime\_count crime\_rate   
## TRUE TRUE TRUE   
## overcrowded\_count nocentralheat\_count overcrowded\_rate   
## TRUE TRUE TRUE   
## nocentralheat\_rate   
## TRUE

sapply(df\_SIMD2020.dz, function(x) sum(is.na(x)))

## DZ SIMD2020v2\_Rank   
## 0 0   
## SIMD2020v2\_Vigintile SIMD2020v2\_Decile   
## 0 0   
## SIMD2020v2\_Quintile SIMD2020v2\_Income\_Domain\_Rank   
## 0 0   
## SIMD2020\_Employment\_Domain\_Rank SIMD2020\_Education\_Domain\_Rank   
## 0 0   
## SIMD2020\_Health\_Domain\_Rank SIMD2020\_Access\_Domain\_Rank   
## 0 0   
## SIMD2020\_Crime\_Domain\_Rank SIMD2020\_Housing\_Domain\_Rank   
## 0 0   
## URclass URname   
## 0 0

# DZ (Data zone) should be 0  
sapply(df\_SIMD2020.pc, function(x) sum(is.na(x)))

## Postcode DZ   
## 0 0

# Postcode should be 0

Nothing concerning here :)

### 2.3 Joining the source data set

#### 2.3.1 Merging/Joining data zone names to SIMD2020v2

df\_SIMD2020.1merge <- merge(df\_SIMD2020.indi, df\_SIMD2020.dz, by.x="Data\_Zone", by.y="DZ", all = TRUE) #all= TRUE to include potential missing values. In case something goes wrong with merge().  
  
# Check if we introduced NA values  
sapply(df\_SIMD2020.1merge, function(x) sum(is.na(x)))

## Data\_Zone Intermediate\_Zone   
## 0 0   
## Council\_area Total\_population   
## 0 0   
## Working\_age\_population Income\_rate   
## 0 3   
## Income\_count Employment\_rate   
## 0 3   
## Employment\_count CIF   
## 0 3   
## ALCOHOL DRUG   
## 2 2   
## SMR DEPRESS   
## 2 1   
## LBWT EMERG   
## 1 2   
## Attendance Attainment   
## 567 189   
## no\_qualifications not\_participating   
## 0 3   
## University drive\_petrol   
## 2 0   
## drive\_GP drive\_post   
## 0 0   
## drive\_primary drive\_retail   
## 0 0   
## drive\_secondary PT\_GP   
## 0 0   
## PT\_post PT\_retail   
## 0 0   
## Broadband crime\_count   
## 2 500   
## crime\_rate overcrowded\_count   
## 501 0   
## nocentralheat\_count overcrowded\_rate   
## 0 0   
## nocentralheat\_rate SIMD2020v2\_Rank   
## 0 0   
## SIMD2020v2\_Vigintile SIMD2020v2\_Decile   
## 0 0   
## SIMD2020v2\_Quintile SIMD2020v2\_Income\_Domain\_Rank   
## 0 0   
## SIMD2020\_Employment\_Domain\_Rank SIMD2020\_Education\_Domain\_Rank   
## 0 0   
## SIMD2020\_Health\_Domain\_Rank SIMD2020\_Access\_Domain\_Rank   
## 0 0   
## SIMD2020\_Crime\_Domain\_Rank SIMD2020\_Housing\_Domain\_Rank   
## 0 0   
## URclass URname   
## 0 0

#### 2.3.2 Merging/Joining postcodes to SIMD2020v2

df\_SIMD2020.2merge <- merge(df\_SIMD2020.1merge, df\_SIMD2020.pc, by.x="Data\_Zone", by.y="DZ", all = TRUE)  
# reordering the data frame, placing the postcode column in the first position  
df\_SIMD2020.2merge <- df\_SIMD2020.2merge[,c(51,1:50)]  
  
  
# find the column with the NA values  
sapply(df\_SIMD2020.2merge, function(x) sum(is.na(x)))

## Postcode Data\_Zone   
## 2 0   
## Intermediate\_Zone Council\_area   
## 0 0   
## Total\_population Working\_age\_population   
## 0 0   
## Income\_rate Income\_count   
## 4 0   
## Employment\_rate Employment\_count   
## 4 0   
## CIF ALCOHOL   
## 4 3   
## DRUG SMR   
## 3 3   
## DEPRESS LBWT   
## 1 1   
## EMERG Attendance   
## 3 12739   
## Attainment no\_qualifications   
## 4722 0   
## not\_participating University   
## 44 3   
## drive\_petrol drive\_GP   
## 0 0   
## drive\_post drive\_primary   
## 0 0   
## drive\_retail drive\_secondary   
## 0 0   
## PT\_GP PT\_post   
## 0 0   
## PT\_retail Broadband   
## 0 2   
## crime\_count crime\_rate   
## 8976 8978   
## overcrowded\_count nocentralheat\_count   
## 0 0   
## overcrowded\_rate nocentralheat\_rate   
## 0 0   
## SIMD2020v2\_Rank SIMD2020v2\_Vigintile   
## 0 0   
## SIMD2020v2\_Decile SIMD2020v2\_Quintile   
## 0 0   
## SIMD2020v2\_Income\_Domain\_Rank SIMD2020\_Employment\_Domain\_Rank   
## 0 0   
## SIMD2020\_Education\_Domain\_Rank SIMD2020\_Health\_Domain\_Rank   
## 0 0   
## SIMD2020\_Access\_Domain\_Rank SIMD2020\_Crime\_Domain\_Rank   
## 0 0   
## SIMD2020\_Housing\_Domain\_Rank URclass   
## 0 0   
## URname   
## 0

# find affected rows  
df\_SIMD2020.2merge[is.na(df\_SIMD2020.2merge$Postcode),]

## Postcode Data\_Zone Intermediate\_Zone Council\_area Total\_population  
## 85669 <NA> S01010206 Petershill Glasgow City 0  
## 86063 <NA> S01010226 Sighthill Glasgow City 0  
## Working\_age\_population Income\_rate Income\_count Employment\_rate  
## 85669 0 <NA> 0 <NA>  
## 86063 0 <NA> 0 <NA>  
## Employment\_count CIF ALCOHOL DRUG SMR DEPRESS LBWT EMERG Attendance  
## 85669 0 <NA> <NA> <NA> <NA> <NA> <NA> <NA> <NA>  
## 86063 0 <NA> 95.22 57.20 153.32 0.01 0.00 87.37 0.84  
## Attainment no\_qualifications not\_participating University drive\_petrol  
## 85669 <NA> 353.08 <NA> <NA> 2.64  
## 86063 <NA> 202.42 0.00 0.24 2.41  
## drive\_GP drive\_post drive\_primary drive\_retail drive\_secondary PT\_GP  
## 85669 4.19 4.17 3.66 5.48 5.22 7.31  
## 86063 2.74 2.53 3.00 2.60 2.92 7.93  
## PT\_post PT\_retail Broadband crime\_count crime\_rate overcrowded\_count  
## 85669 12.67 13.54 <NA> <NA> <NA> 243  
## 86063 10.40 9.51 <NA> <NA> <NA> 339  
## nocentralheat\_count overcrowded\_rate nocentralheat\_rate SIMD2020v2\_Rank  
## 85669 21 0.49 0.04 4172  
## 86063 45 0.42 0.06 6058  
## SIMD2020v2\_Vigintile SIMD2020v2\_Decile SIMD2020v2\_Quintile  
## 85669 12 6 3  
## 86063 18 9 5  
## SIMD2020v2\_Income\_Domain\_Rank SIMD2020\_Employment\_Domain\_Rank  
## 85669 6969 6974  
## 86063 6969 6974  
## SIMD2020\_Education\_Domain\_Rank SIMD2020\_Health\_Domain\_Rank  
## 85669 811 3436  
## 86063 3517 4559  
## SIMD2020\_Access\_Domain\_Rank SIMD2020\_Crime\_Domain\_Rank  
## 85669 1682 6928  
## 86063 4634 6928  
## SIMD2020\_Housing\_Domain\_Rank URclass URname  
## 85669 18 1 Large Urban Areas  
## 86063 50 1 Large Urban Areas

There are no postcodes for those to data zone. Also they don’t have any population. See issue #9 on [link](https://github.com/AbdnCHDS/grampian_data/issues).

## duplicated values  
sapply(df\_SIMD2020.2merge, function(x) sum(duplicated(x)))

## Postcode Data\_Zone   
## 1 150858   
## Intermediate\_Zone Council\_area   
## 156584 157802   
## Total\_population Working\_age\_population   
## 156874 157059   
## Income\_rate Income\_count   
## 157779 157463   
## Employment\_rate Employment\_count   
## 157788 157624   
## CIF ALCOHOL   
## 157767 151967   
## DRUG SMR   
## 153080 152435   
## DEPRESS LBWT   
## 157794 157802   
## EMERG Attendance   
## 152543 157778   
## Attainment no\_qualifications   
## 157542 151977   
## not\_participating University   
## 157799 157784   
## drive\_petrol drive\_GP   
## 156789 156854   
## drive\_post drive\_primary   
## 157061 157190   
## drive\_retail drive\_secondary   
## 156540 156462   
## PT\_GP PT\_post   
## 155830 156136   
## PT\_retail Broadband   
## 155480 157734   
## crime\_count crime\_rate   
## 156494 151785   
## overcrowded\_count nocentralheat\_count   
## 157486 157714   
## overcrowded\_rate nocentralheat\_rate   
## 157780 157813   
## SIMD2020v2\_Rank SIMD2020v2\_Vigintile   
## 150858 157814   
## SIMD2020v2\_Decile SIMD2020v2\_Quintile   
## 157824 157829   
## SIMD2020v2\_Income\_Domain\_Rank SIMD2020\_Employment\_Domain\_Rank   
## 151329 151278   
## SIMD2020\_Education\_Domain\_Rank SIMD2020\_Health\_Domain\_Rank   
## 150858 150858   
## SIMD2020\_Access\_Domain\_Rank SIMD2020\_Crime\_Domain\_Rank   
## 150858 151032   
## SIMD2020\_Housing\_Domain\_Rank URclass   
## 151154 157828   
## URname   
## 157828

# However, there is one duplicated postcode. The Postcodes should be 0  
# let find it  
  
df\_SIMD2020.2merge[duplicated(df\_SIMD2020.2merge$Postcode, fromLast=FALSE),]

## Postcode Data\_Zone Intermediate\_Zone Council\_area Total\_population  
## 86063 <NA> S01010226 Sighthill Glasgow City 0  
## Working\_age\_population Income\_rate Income\_count Employment\_rate  
## 86063 0 <NA> 0 <NA>  
## Employment\_count CIF ALCOHOL DRUG SMR DEPRESS LBWT EMERG Attendance  
## 86063 0 <NA> 95.22 57.20 153.32 0.01 0.00 87.37 0.84  
## Attainment no\_qualifications not\_participating University drive\_petrol  
## 86063 <NA> 202.42 0.00 0.24 2.41  
## drive\_GP drive\_post drive\_primary drive\_retail drive\_secondary PT\_GP  
## 86063 2.74 2.53 3 2.6 2.92 7.93  
## PT\_post PT\_retail Broadband crime\_count crime\_rate overcrowded\_count  
## 86063 10.4 9.51 <NA> <NA> <NA> 339  
## nocentralheat\_count overcrowded\_rate nocentralheat\_rate SIMD2020v2\_Rank  
## 86063 45 0.42 0.06 6058  
## SIMD2020v2\_Vigintile SIMD2020v2\_Decile SIMD2020v2\_Quintile  
## 86063 18 9 5  
## SIMD2020v2\_Income\_Domain\_Rank SIMD2020\_Employment\_Domain\_Rank  
## 86063 6969 6974  
## SIMD2020\_Education\_Domain\_Rank SIMD2020\_Health\_Domain\_Rank  
## 86063 3517 4559  
## SIMD2020\_Access\_Domain\_Rank SIMD2020\_Crime\_Domain\_Rank  
## 86063 4634 6928  
## SIMD2020\_Housing\_Domain\_Rank URclass URname  
## 86063 50 1 Large Urban Areas

# duplicated also picked up on the two NA in the postcodes

#### 2.3.2 Merging/Joining NHS Health Board regions to SIMD2020v2

df\_SIMD2020.3merge <- merge(df\_SIMD2020.2merge, df\_NHS\_regions, by.x="Council\_area", by.y="Council\_area", all = TRUE)  
# reordering the data frame  
df\_SIMD2020.3merge <- df\_SIMD2020.3merge[,c(2:4,1,52,5:51)]  
# find the column with the NA values  
sapply(df\_SIMD2020.3merge, function(x) sum(is.na(x)))

## Postcode Data\_Zone   
## 2 0   
## Intermediate\_Zone Council\_area   
## 0 0   
## NHS\_Health\_Board\_Region Total\_population   
## 0 0   
## Working\_age\_population Income\_rate   
## 0 4   
## Income\_count Employment\_rate   
## 0 4   
## Employment\_count CIF   
## 0 4   
## ALCOHOL DRUG   
## 3 3   
## SMR DEPRESS   
## 3 1   
## LBWT EMERG   
## 1 3   
## Attendance Attainment   
## 12739 4722   
## no\_qualifications not\_participating   
## 0 44   
## University drive\_petrol   
## 3 0   
## drive\_GP drive\_post   
## 0 0   
## drive\_primary drive\_retail   
## 0 0   
## drive\_secondary PT\_GP   
## 0 0   
## PT\_post PT\_retail   
## 0 0   
## Broadband crime\_count   
## 2 8976   
## crime\_rate overcrowded\_count   
## 8978 0   
## nocentralheat\_count overcrowded\_rate   
## 0 0   
## nocentralheat\_rate SIMD2020v2\_Rank   
## 0 0   
## SIMD2020v2\_Vigintile SIMD2020v2\_Decile   
## 0 0   
## SIMD2020v2\_Quintile SIMD2020v2\_Income\_Domain\_Rank   
## 0 0   
## SIMD2020\_Employment\_Domain\_Rank SIMD2020\_Education\_Domain\_Rank   
## 0 0   
## SIMD2020\_Health\_Domain\_Rank SIMD2020\_Access\_Domain\_Rank   
## 0 0   
## SIMD2020\_Crime\_Domain\_Rank SIMD2020\_Housing\_Domain\_Rank   
## 0 0   
## URclass URname   
## 0 0

# find affected rows  
df\_SIMD2020.3merge[is.na(df\_SIMD2020.3merge$Postcode),]

## Postcode Data\_Zone Intermediate\_Zone Council\_area  
## 84706 <NA> S01010206 Petershill Glasgow City  
## 85100 <NA> S01010226 Sighthill Glasgow City  
## NHS\_Health\_Board\_Region Total\_population Working\_age\_population  
## 84706 Greater Glasgow and Clyde 0 0  
## 85100 Greater Glasgow and Clyde 0 0  
## Income\_rate Income\_count Employment\_rate Employment\_count CIF ALCOHOL  
## 84706 <NA> 0 <NA> 0 <NA> <NA>  
## 85100 <NA> 0 <NA> 0 <NA> 95.22  
## DRUG SMR DEPRESS LBWT EMERG Attendance Attainment no\_qualifications  
## 84706 <NA> <NA> <NA> <NA> <NA> <NA> <NA> 353.08  
## 85100 57.20 153.32 0.01 0.00 87.37 0.84 <NA> 202.42  
## not\_participating University drive\_petrol drive\_GP drive\_post  
## 84706 <NA> <NA> 2.64 4.19 4.17  
## 85100 0.00 0.24 2.41 2.74 2.53  
## drive\_primary drive\_retail drive\_secondary PT\_GP PT\_post PT\_retail  
## 84706 3.66 5.48 5.22 7.31 12.67 13.54  
## 85100 3.00 2.60 2.92 7.93 10.40 9.51  
## Broadband crime\_count crime\_rate overcrowded\_count nocentralheat\_count  
## 84706 <NA> <NA> <NA> 243 21  
## 85100 <NA> <NA> <NA> 339 45  
## overcrowded\_rate nocentralheat\_rate SIMD2020v2\_Rank SIMD2020v2\_Vigintile  
## 84706 0.49 0.04 4172 12  
## 85100 0.42 0.06 6058 18  
## SIMD2020v2\_Decile SIMD2020v2\_Quintile SIMD2020v2\_Income\_Domain\_Rank  
## 84706 6 3 6969  
## 85100 9 5 6969  
## SIMD2020\_Employment\_Domain\_Rank SIMD2020\_Education\_Domain\_Rank  
## 84706 6974 811  
## 85100 6974 3517  
## SIMD2020\_Health\_Domain\_Rank SIMD2020\_Access\_Domain\_Rank  
## 84706 3436 1682  
## 85100 4559 4634  
## SIMD2020\_Crime\_Domain\_Rank SIMD2020\_Housing\_Domain\_Rank URclass  
## 84706 6928 18 1  
## 85100 6928 50 1  
## URname  
## 84706 Large Urban Areas  
## 85100 Large Urban Areas

#### 2.4 Saving the data set

setwd("~/Scotland\_Vulnerability\_Resource/Processed\_data/")  
  
write.csv(df\_SIMD2020.3merge, paste("Scotland\_Vulnerability\_Resource\_v",Dataset\_version,".csv", sep = ""), row.names=FALSE)