King Sejong National Referendum on the Map

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Map Data

Global Administrative Areas (http://www.gadm.org/country) 에서 다운로드한 zip 파일을 풀고 shape 파일을 mapshaper (https://mapshaper.org) 에서 간략히 한 후 작업에 착수한다. `.shp` 형태로만 불러들일 수 있기 때문에 `@data` 는 원본에서 복사하여야 한다.

Libraries

```
library(sf)
library(rgeos)
library(maptools) #> `readShapePoly()`, `rgdal::readOGR()`로 대체
library(GISTools) #> `choropleth`
library(ggmap) #> `geocode()`, `ggmap()`, `qmap()`, `revgeocode()`
library(ggplot2) #> `ggplot()`
library(rgdal) #> `CRS`, `ogrInfo()`, `ogrListLayers()`, `readOGR()`, `spTransform()`
library(dplyr) #> `arrange()`, `filter()`, `group_by()`, `left_join()`, `mutate()`,
library(broom) #> `tidy()`
library(extrafont) #> "HCR Dotum LVT"
options(width = 132)
```

Simplified Versions

from mapshaper (https://mapshaper.org)

Simplified Shape files

```
shp_S <- readOGR(dsn = "../data/KOR_adm",
                 layer = "KOR_adm1",
                 stringsAsFactors = FALSE)
shp_N <- readOGR(dsn = "../data/PRK_adm",
                 layer = "PRK_adm1",
                 stringsAsFactors = FALSE)
ogrInfo(dsn = "../data/KOR_adm1",  #> `ogrInfo()`
        layer = "KOR_adm1")
shp_S_1 <- readOGR(dsn = "../data/KOR_adm1",
                 layer = "KOR_adm1",
                 stringsAsFactors = FALSE)
#                  encoding = "CP949")
ogrInfo(dsn = "../data/PRK_adm1",  #> `ogrInfo()`
        layer = "PRK_adm1")
shp_N_1 <- readOGR(dsn = "../data/PRK_adm",
                 layer = "PRK_adm1",
                 stringsAsFactors = FALSE)
#                  encoding = "CP949")
```

Data

Shape Files

```
shp_S_1@data <- shp_S@data
shp_N_1@data <- shp_N@data
data.frame(shp_S_1)
data.frame(shp_N_1)
class(shp_S_1)
class(shp_N_1)
summary(shp_S_1)
summary(shp_N_1)
coordinates(shp_S_1)
coordinates(shp_N_1)
glimpse(shp_S_1)
glimpse(shp_N_1)
```

Names

```
Names_S <- shp_S_1$NL_NAME_1
Names_N <- shp_N_1$NL_NAME_1
shp_S_1$Names_kr <- c("부산", "충북", "충남", "대구", "대전", "강원", "광주", "경기", "경북",
                      "경남", "인천", "제주", "전북", "전남", "세종", "서울", "울산")
shp_N_1$Names_kr <- c("자강", "함북", "함남", "황북", "황남", "개성", "강원", "금강", "평북",
                      "평남", "평양", "라선", "량강", "신의")
shp_S_1$Names_kr_old <-
  ifelse(shp_S_1$Names_kr %in% c("부산","대구", "경북", "경남", "울산"),
         "경상", ifelse(shp_S_1$Names_kr %in% c("광주", "제주", "전북", "전남"),
                      "전라", ifelse(shp_S_1$Names_kr %in% c("충북", "충남", "대전", "세종"
),
                                   "충청", ifelse(shp_S_1$Names_kr %in% c("경기", "인천")
,
                                                  "경기", ifelse(shp_S_1$Names_kr == "서
울",
                                                                 "서울", "강원")))))
shp_N_1$Names_kr_old <-
  ifelse(shp_N_1$Names_kr %in% c("자강","평북", "평남", "평양", "신의"),
         "평안", ifelse(shp_N_1$Names_kr %in% c("함북", "함남", "라선", "량강"),
                      "함길", ifelse(shp_N_1$Names_kr %in% c("황북", "황남"),
                                   "황해", ifelse(shp_N_1$Names_kr %in% c("강원", "금강")
,
                                                  "강원", "유후"))))
shp_N_1$Names_kr_old
# shp_S_1$Names_kr_old <- c("경상", "충청", "충청", "경상", "충청", "강원", "전라", "경기",
#                           "경상", "경상", "경기", "전라", "전라", "전라", "충청", "서울",
#                           "경상")
# shp_N_1$Names_kr_old <- c("평안", "함길", "함길", "황해", "황해", "유후", "강원", "강원",
#                           "평안", "평안", "평안", "함길", "함길", "평안")
```

찬성율

```
rates <- c(50.7, 94.1, 98.6, 4.5, 22.3, 33.3, 12.0, 1.0, 98.9, 99.1)
names(rates) <- c("서울", "유후", "경기", "평안", "황해", "충청", "강원", "함길", "경상", "전라"
)
rates
rates_b <- c(50.7, 85.3, 14.3, 50.0, 55.6, 33.3, 16.7, 77.5, 75.0)
names(rates_b) <- c("서울", "경기", "평안", "황해", "충청", "강원", "함길", "경상", "전라")
rates_b
rates_c <- c(94.1, 98.6, 4.4, 22.2, 33.3, 12.0, 1.0, 99.0, 99.1)
names(rates_c) <- c("유후", "경기", "평안", "황해", "충청", "강원", "함길", "경상", "전라")
rates_c
rates_SL <- c(9.8, 39.7, 79.1)
names(rates_SL) <- c("대신", "현직", "전직")
N_SL <- c(215, 652, 560)
match(shp_S_1$Names_kr_old, names(rates_b))
shp_S_1$rates <- rates[match(shp_S_1$Names_kr_old, names(rates))]
shp_N_1$rates <- rates[match(shp_N_1$Names_kr_old, names(rates))]
shp_S_1$rates_b <- rates_b[match(shp_S_1$Names_kr_old, names(rates_b))]
shp_N_1$rates_b <- rates_b[match(shp_N_1$Names_kr_old, names(rates_b))]
shp_S_1$rates_c <- rates_c[match(shp_S_1$Names_kr_old, names(rates_c))]
shp_N_1$rates_c <- rates_c[match(shp_N_1$Names_kr_old, names(rates_c))]
```

Coordinates

```
index_S <- shp_S_1$Names_kr %in% c("경북", "대전", "강원", "전북", "경기", "서울")
index_N <- shp_N_1$Names_kr %in% c("개성", "황북", "평남", "함남")
Lon_S <- coordinates(shp_S_1)[, 1]
Lat_S <- coordinates(shp_S_1)[, 2]
Lon_S_1 <- Lon_S[index_S]
Lat_S_1 <- Lat_S[index_S]
Lat_S_1[c(3, 6)] <- Lat_S_1[c(3, 6)] + c(-0.3, 0.2)
Lon_N <- coordinates(shp_N_1)[, 1]
Lat_N <- coordinates(shp_N_1)[, 2]
Lon_N_1 <- Lon_N[index_N]
Lat_N_1 <- Lat_N[index_N]
```

Labels

```
labels_S_b <- paste(shp_S_1$Names_kr_old[index_S],
                  paste0(shp_S_1$rates_b[index_S], "%"), sep = ":")
labels_N_b <- paste(shp_N_1$Names_kr_old[index_N],
                  paste0(shp_N_1$rates_b[index_N], "%"), sep = ":")
labels_S_c <- paste(shp_S_1$Names_kr_old[index_S],
                  paste0(shp_S_1$rates_c[index_S], "%"), sep = ":")
labels_N_c <- paste(shp_N_1$Names_kr_old[index_N],
                  paste0(shp_N_1$rates_c[index_N], "%"), sep = ":")
(labels_S <- paste(shp_S_1$Names_kr_old[index_S],
                  paste0(shp_S_1$rates[index_S], "%"), sep = ":"))
(labels_N <- paste(shp_N_1$Names_kr_old[index_N],
                  paste0(shp_N_1$rates[index_N], "%"), sep = ":"))
```

Colours

```
col_S <- c("black", "black", "white", "white", "white", "white")
col_N <- c("black", "black", "white", "black")
```

Simple Plots

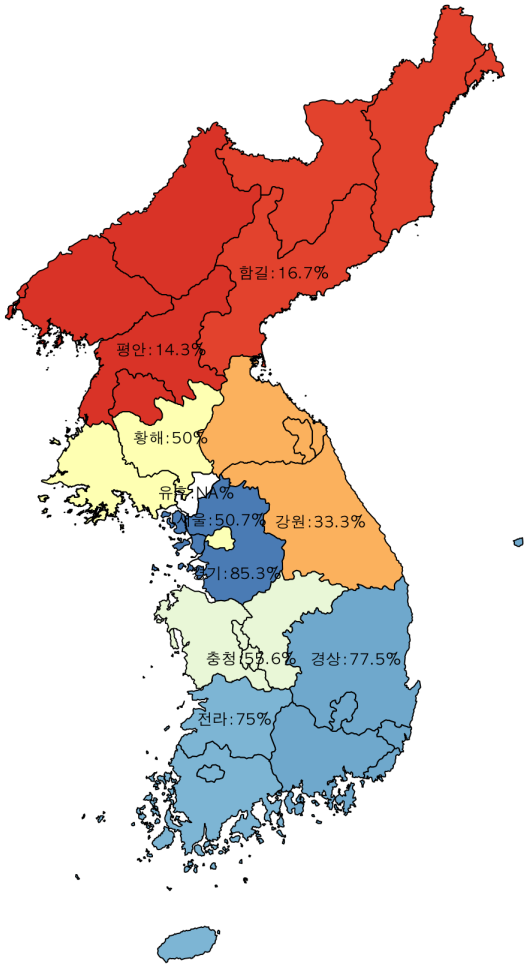
```
library(extrafont)
par(mar = c(0, 0, 0, 0))
plot(shp_S_1, ylim = c(32, 44))
plot(shp_N_1, add = TRUE)
p_S <- pointLabel(Lon_S, Lat_S, Names_S, offset = 0, cex = 0.5, family = "HCR Dotum L
VT")
p_N <- pointLabel(Lon_N, Lat_N, Names_N, offset = 0, cex = 0.5, family = "HCR Dotum L
VT")
```

관료와 품관 촌민

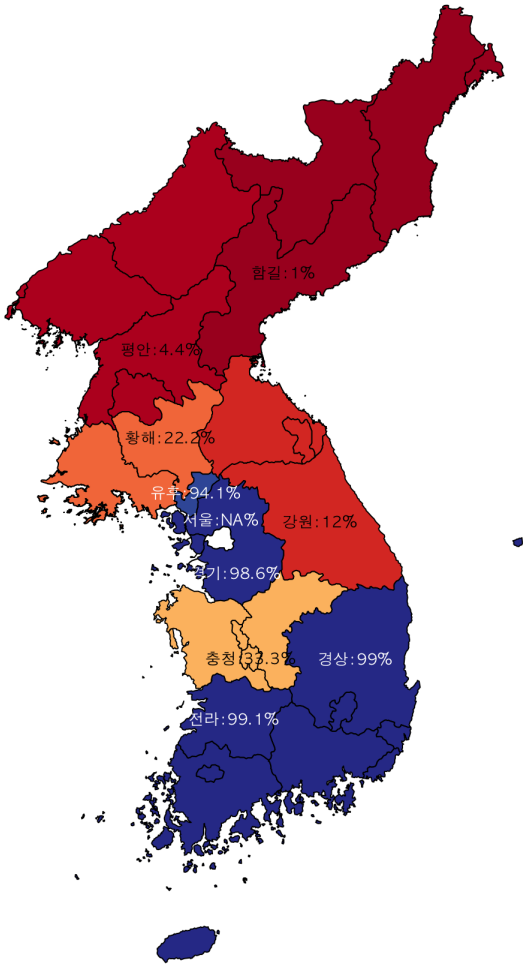
```
# png("./pics/Sejong_map.png")
# shades <- shading(breaks = seq(0, 100, by = 0.1),
#                    cols = colorRampPalette(brewer.pal(11, "Spectral"))(1001))
shades <- shading(breaks = seq(0, 100, by = 0.1),
                  cols = colorRampPalette(brewer.pal(11, "RdYlBu"))(1001))
# shades <- shading(breaks = seq(0, 100, by = 0.1),
#                   cols = colorRampPalette(c("Red", "Pink", "Green", "Cyan"))(1001))
# rates_S_shades <- auto.shading(shp_S_1$rates, cols = rev(brewer.pal(5, "Greens")))
# rates_N_shades <- auto.shading(shp_N_1$rates, cols = rev(brewer.pal(5, "Greens")))
# choropleth(shp_S_1, shp_S_1$rates, shading = rates_S_shades, ylim = c(32, 44))
# choropleth(shp_N_1, shp_N_1$rates, shading = rates_N_shades, add = TRUE)
par(mar = c(0, 0, 3.1, 0), mfrow = c(1, 2), oma = c(0, 0, 2, 0), family = "HCR Dotum
 LVT")
choropleth(shp_S_1, shp_S_1$rates_b, shading = shades, ylim = c(32, 44))
choropleth(shp_N_1, shp_N_1$rates_b, shading = shades, add = TRUE)
text(Lon_S_1, Lat_S_1, labels = labels_S_b, col = "black", cex = 0.8)
text(Lon_N_1, Lat_N_1, labels = labels_N_b, col = "black", cex = 0.8)
title(main = "관료", cex.main = 2, line = -2)
choropleth(shp_S_1, shp_S_1$rates_c, shading = shades, ylim = c(32, 44))
choropleth(shp_N_1, shp_N_1$rates_c, shading = shades, add = TRUE)
text(Lon_S_1, Lat_S_1, labels = labels_S_c, col = col_S, cex = 0.8)
text(Lon_N_1, Lat_N_1, labels = labels_N_c, col = col_N, cex = 0.8)
title(main = "품관 촌민", cex.main = 2, line = -2)
title(main = "세종대왕의 세법개혁 국민투표 지지율", outer = TRUE, cex.main = 2.5)
```

세종대왕의 세법개혁 국민투표 지지율

관료

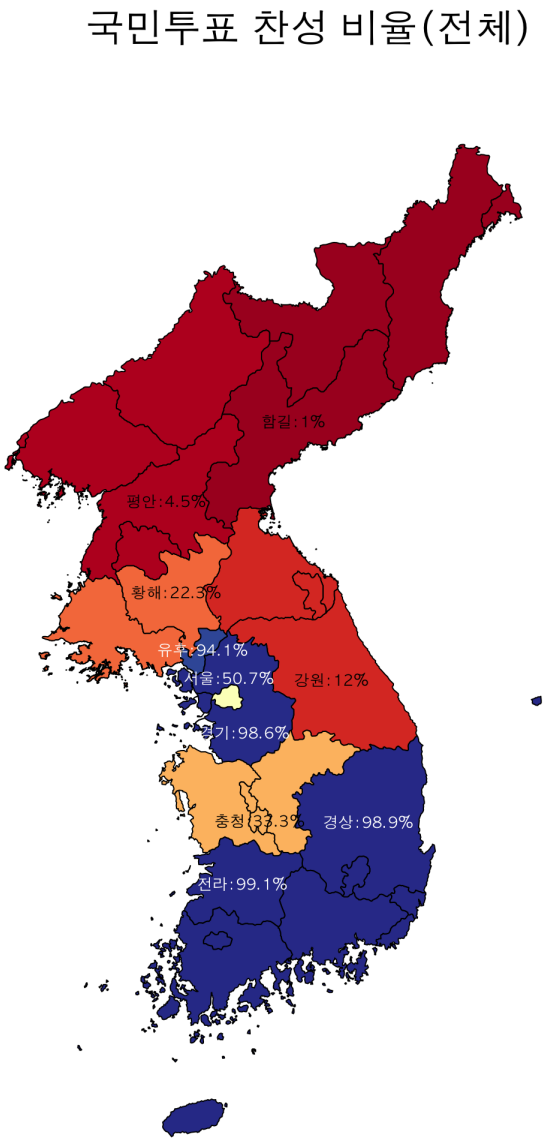


품관 촌민



전체

```
par(mar = c(0, 0, 3.1, 0), family = "HCR Dotum LVT")
choropleth(shp_S_1, shp_S_1$rates, shading = shades, ylim = c(32, 44))
choropleth(shp_N_1, shp_N_1$rates, shading = shades, add = TRUE)
text(Lon_S_1, Lat_S_1, labels = labels_S, col = col_S, cex = 0.8)
text(Lon_N_1, Lat_N_1, labels = labels_N, col = col_N, cex = 0.8)
title(main = "국민투표 찬성 비율(전체)", cex.main = 2, line = -2)
```




```
# choro.legend(1110000, 1600000, AREA.shades)
# dev.off()
# dev.copy(png, file = "../pics/Sejong_ref_map.png", width = 960, height = 960)
# dev.off()
```

ggplot

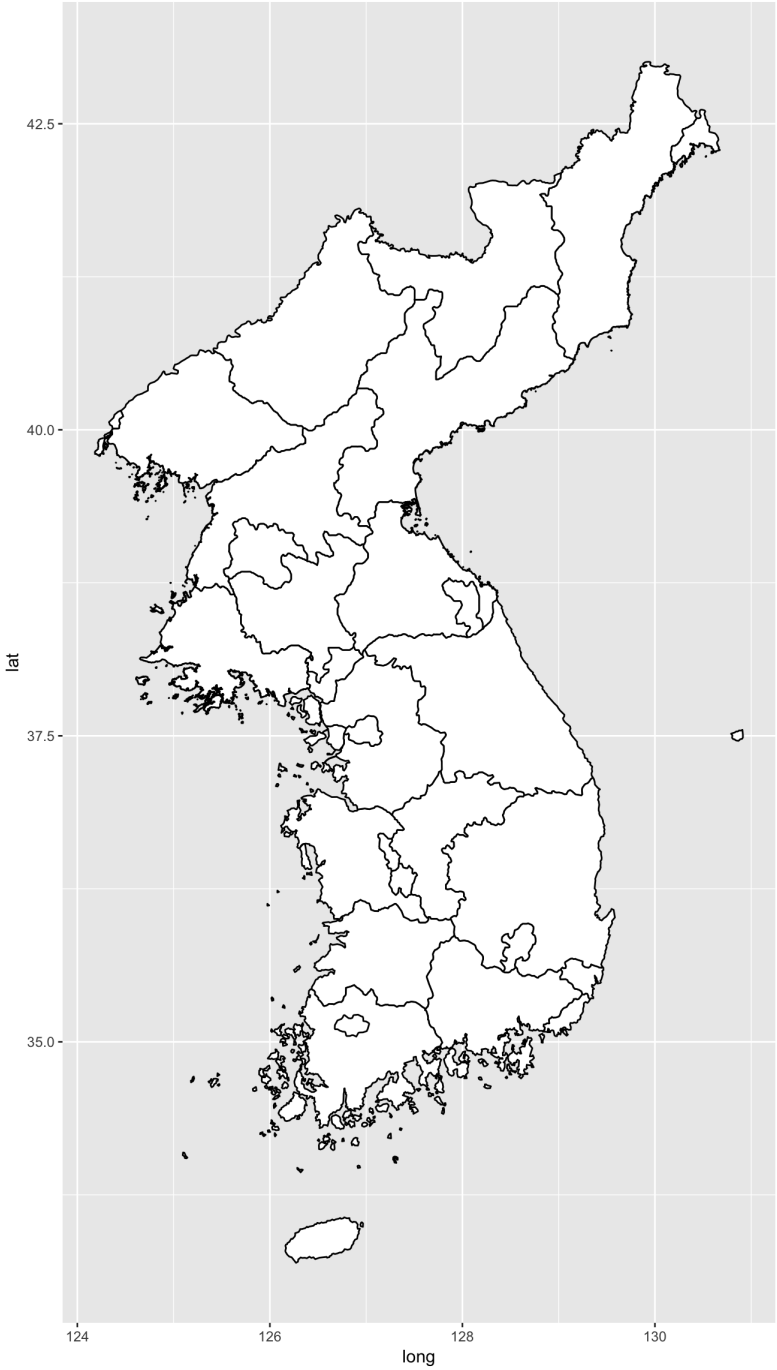
```
shp_S_df <- tidy(shp_S_1)
```

```
## Regions defined for each Polygons
```

```
shp_N_df <- tidy(shp_N_1)
```

```
## Regions defined for each Polygons
```

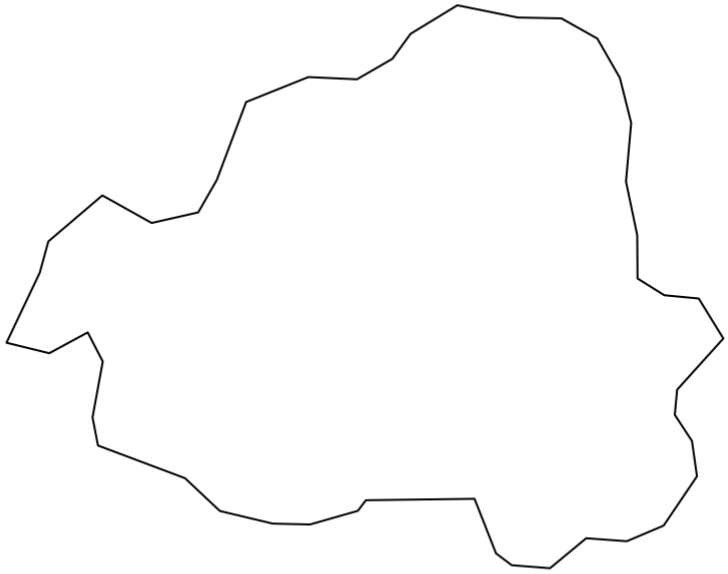
```
g0 <- ggplot() +
  geom_polygon(data = shp_S_df, aes(x = long, y = lat, group = group),
               color = "black", fill = "white") +
  geom_polygon(data = shp_N_df, aes(x = long, y = lat, group = group),
               color = "black", fill = "white")
g0 +
  coord_quickmap()
```



Piece by piece into Unification

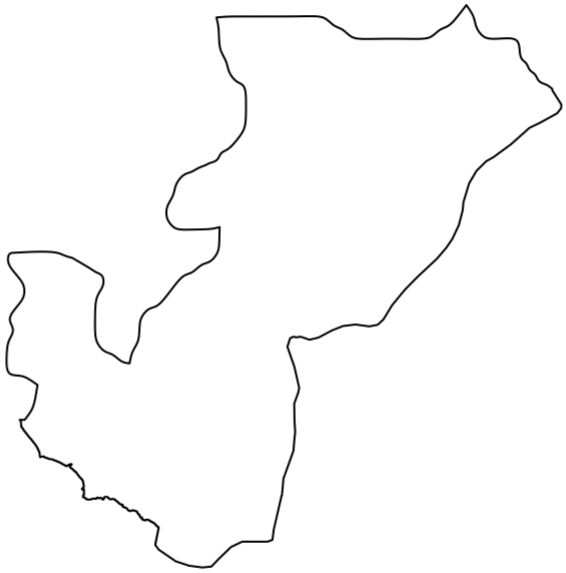
서울

```
index_SL <- shp_S_1$Names_kr_old == "서울"
shp_SL <- shp_S_1[index_SL, ]
plot(shp_SL)
```



유후사

```
index_YH <- shp_N_1$Names_kr_old == "유후"
shp_YH <- shp_N_1[index_YH, ]
plot(shp_YH)
```

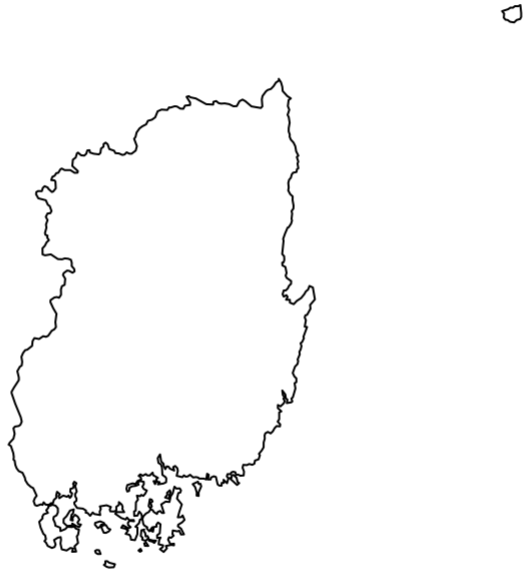


경상도

```
index_GS <- shp_S_1$Names_kr_old == "경상"
index_GS
```

```
##  [1]  TRUE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE  TRUE  TRUE FALSE FALSE FALSE
FALSE FALSE FALSE  TRUE
```

```
shp_GS <- shp_S_1[index_GS, ]
shp_GS_u <- gUnaryUnion(shp_GS)
plot(shp_GS_u)
```



전라도

```
index_JL <- shp_S_1$Names_kr_old == "전라"
index_JL
```

```
##  [1] FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE FALSE FALSE  TRUE  TRUE
  TRUE FALSE FALSE FALSE
```

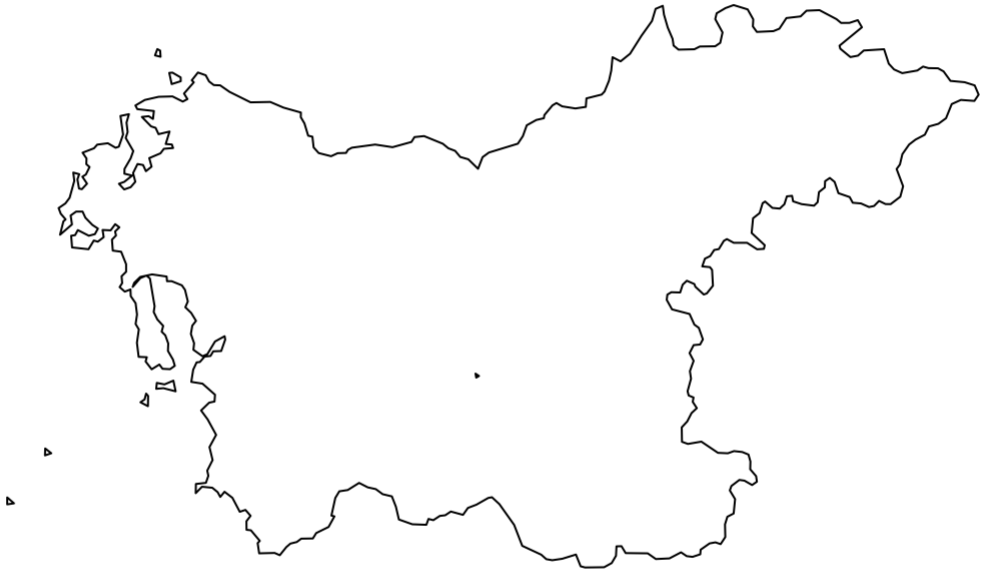
```
shp_JL <- shp_S_1[index_JL, ]
shp_JL_u <- gUnaryUnion(shp_JL)
plot(shp_JL_u)
```

충청도

```
index_CC <- shp_S_1$Names_kr_old == "충청"
index_CC
```

```
##  [1] FALSE  TRUE  TRUE FALSE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
FALSE  TRUE FALSE FALSE
```

```
shp_CC <- shp_S_1[index_CC, ]
shp_CC_u <- gUnaryUnion(shp_CC)
plot(shp_CC_u)
```



경기도

```
index_GG <- shp_S_1$Names_kr_old == "경기"
index_GG
```

```
##  [1] FALSE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE FALSE FALSE  TRUE FALSE FALSE
FALSE FALSE FALSE FALSE
```

```
shp_GG <- shp_S_1[index_GG, ]
#> Using a zero-width buffer cleans up many toplogical problems in R
shp_GG <- gBuffer(shp_GG, byid = TRUE, width = 0)
```

```
## Warning in gBuffer(shp_GG, byid = TRUE, width = 0): Spatial object is not projecte
d; GEOS expects planar coordinates
```

```
plot(shp_GG)
```

```
shp_GG_u <- gUnaryUnion(shp_GG)
plot(shp_GG_u)
```

평안도

```
index_PA <- shp_N_1$Names_kr_old == "평안"
index_PA
```

```
##  [1]  TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE  TRUE  TRUE FALSE FALSE
  TRUE
```

```
shp_PA <- shp_N_1[index_PA, ]
shp_PA_u <- gUnaryUnion(shp_PA)
plot(shp_PA_u)
```

북강원

```
index_GW <- shp_N_1$Names_kr_old == "강원"
index_GW
```

```
##  [1] FALSE FALSE FALSE FALSE FALSE FALSE  TRUE  TRUE FALSE FALSE FALSE FALSE FALSE
FALSE
```

```
shp_GW <- shp_N_1[index_GW, ]
shp_GW_u <- gUnaryUnion(shp_GW)
plot(shp_GW_u)
```

황해도

```
index_HH <- shp_N_1$Names_kr_old == "황해"
index_HH
```

```
##  [1] FALSE FALSE FALSE  TRUE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
FALSE
```

```
shp_HH <- shp_N_1[index_HH, ]
shp_HH_u <- gUnaryUnion(shp_HH)
plot(shp_HH_u)
```

함길도

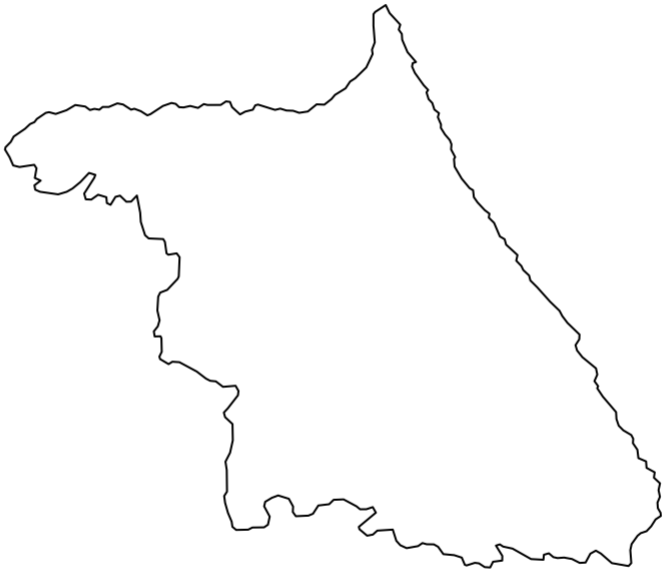
```
index_HG <- shp_N_1$Names_kr_old == "함길"
index_HG
```

```
##  [1] FALSE  TRUE  TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE  TRUE  TRUE
FALSE
```

```
shp_HG <- shp_N_1[index_HG, ]
shp_HG_u <- gUnaryUnion(shp_HG)
plot(shp_HG_u)
```

남강원

```
shp_GW_S <- shp_S_1[shp_S_1$Names_kr_old == "강원", ]
plot(shp_GW_S)
```



강원도

```
bbox(shp_GW_u)
```

```
##         min       max
## x 126.67380 128.36874
## y  38.15927  39.42428
```

```
bbox(shp_GW_S)
```

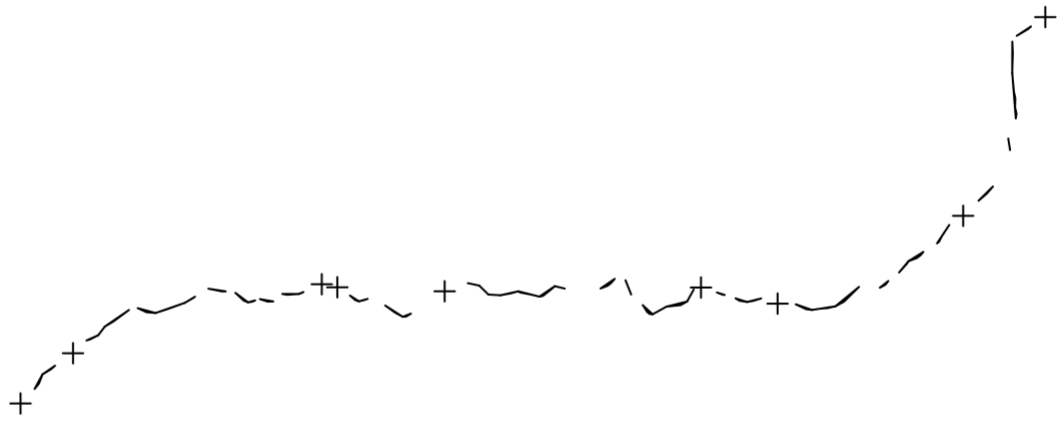
```
##         min       max
## x 126.98503 129.35239
## y  37.00888  38.61215
```

```
xlim_u <- c(min(bbox(shp_GW_u)[1, 1], bbox(shp_GW_S)[1, 1]),
            max(bbox(shp_GW_u)[1, 2], bbox(shp_GW_S)[1, 2]))
ylim_u <- c(min(bbox(shp_GW_u)[2, 1], bbox(shp_GW_S)[2, 1]),
            max(bbox(shp_GW_u)[2, 2], bbox(shp_GW_S)[2, 2]))
plot(shp_GW_u, xlim = xlim_u, ylim = ylim_u)
plot(shp_GW_S, add = TRUE)
```

```
shp_GW_I <- gIntersection(shp_GW_u, shp_GW_S)
class(shp_GW_I)
```

```
## [1] "SpatialCollections"
## attr(,"package")
## [1] "rgeos"
```

```
plot(shp_GW_I)
```



```
# shp_GW_u_sf <- st_as_sfc(shp_GW_u)
# class(shp_GW_u_sf)
# plot(shp_GW_u_sf)
# shp_GW_S_sf <- st_as_sfc(shp_GW_S)
# class(shp_GW_S_sf)
# plot(shp_GW_S_sf)
# shp_GW_st_u <- st_union(shp_GW_u_sf, shp_GW_S_sf)
# plot(shp_GW_st_u)
# shp_GW_st_i <- st_intersection(shp_GW_u_sf, shp_GW_S_sf)
# plot(shp_GW_st_i)
# shp_GW_st_d <- st_sym_difference(shp_GW_st_u, shp_GW_st_i)
# plot(shp_GW_st_d)
# shp_GW_st_c <- st_union(shp_GW_st_d)
# plot(shp_GW_st_c)
shp_GW <- gUnion(shp_GW_u, shp_GW_S)
class(shp_GW)
```

```
## [1] "SpatialPolygons"
## attr(,"package")
## [1] "sp"
```

```
coordinates(shp_GW)
```

```
##       [,1]     [,2]
## 1 127.9615 38.10755
```

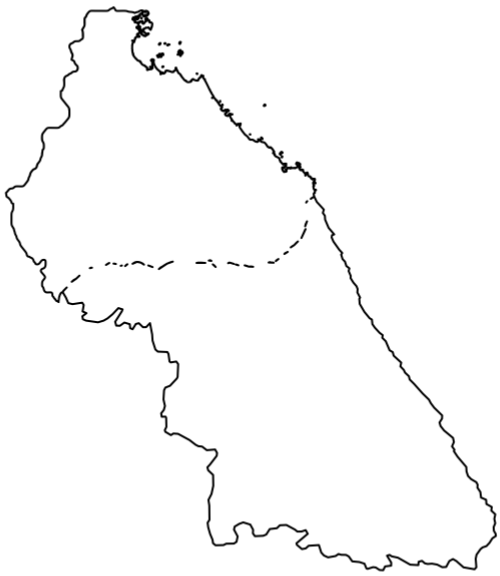
```
coordinates(shp_GW_u)
```

```
##       [,1]     [,2]
## 1 127.4634 38.71698
```

```
coordinates(shp_GW_S)
```

```
##       [,1]    [,2]
## 5 128.2809 37.7168
```

```
# shp_GW_spdf <- SpatialPolygonsDataFrame(shp_GW,
#                                         data = data.frame(dummy = 1:nrow(coordinate
s(shp_GW))))
# writeOGR(shp_GW_spdf, dsn = "../data/GW", layer = "GW", driver = "ESRI Shapefile")
plot(shp_GW)
```



```
summary(shp_GW)
```

```
## Object of class SpatialPolygons
## Coordinates:
##         min       max
## x 126.67380 129.35239
## y  37.00888  39.42428
## Is projected: FALSE
## proj4string :
## [+proj=longlat +datum=WGS84 +no_defs +ellps=WGS84 +towgs84=0,0,0]
```

```
class(shp_GW_u)
```

```
## [1] "SpatialPolygons"
## attr(,"package")
## [1] "sp"
```

```
class(shp_CC)
```

```
## [1] "SpatialPolygonsDataFrame"
## attr(,"package")
## [1] "sp"
```

Old Map

```
par(mar = c(0, 0, 0, 0))
plot(shp_HG_u, xlim = c(123, 132), ylim = c(32, 44))
plot(shp_PA_u, add = TRUE)
plot(shp_HH_u, add = TRUE)
plot(shp_GW, add = TRUE)
plot(shp_GG_u, add = TRUE)
plot(shp_CC_u, add = TRUE)
plot(shp_JL_u, add = TRUE)
plot(shp_GS_u, add = TRUE)
plot(shp_SL, add = TRUE)
plot(shp_YH, add = TRUE)
```

Colours

```
par(mar = c(0, 0, 0, 0), mfrow  = c(2, 2), family = "HCR Dotum LVT")
cols_b <- rates_b * 10
cols_b
```

```
## 서울 경기 평안 황해 충청 강원 함길 경상 전라
##  507  853  143  500  556  333  167  775  750
```

```
cols_c <- rates_c * 10
cols_c
```

```
## 유후 경기 평안 황해 충청 강원 함길 경상 전라
##  941  986   44  222  333  120   10  990  991
```

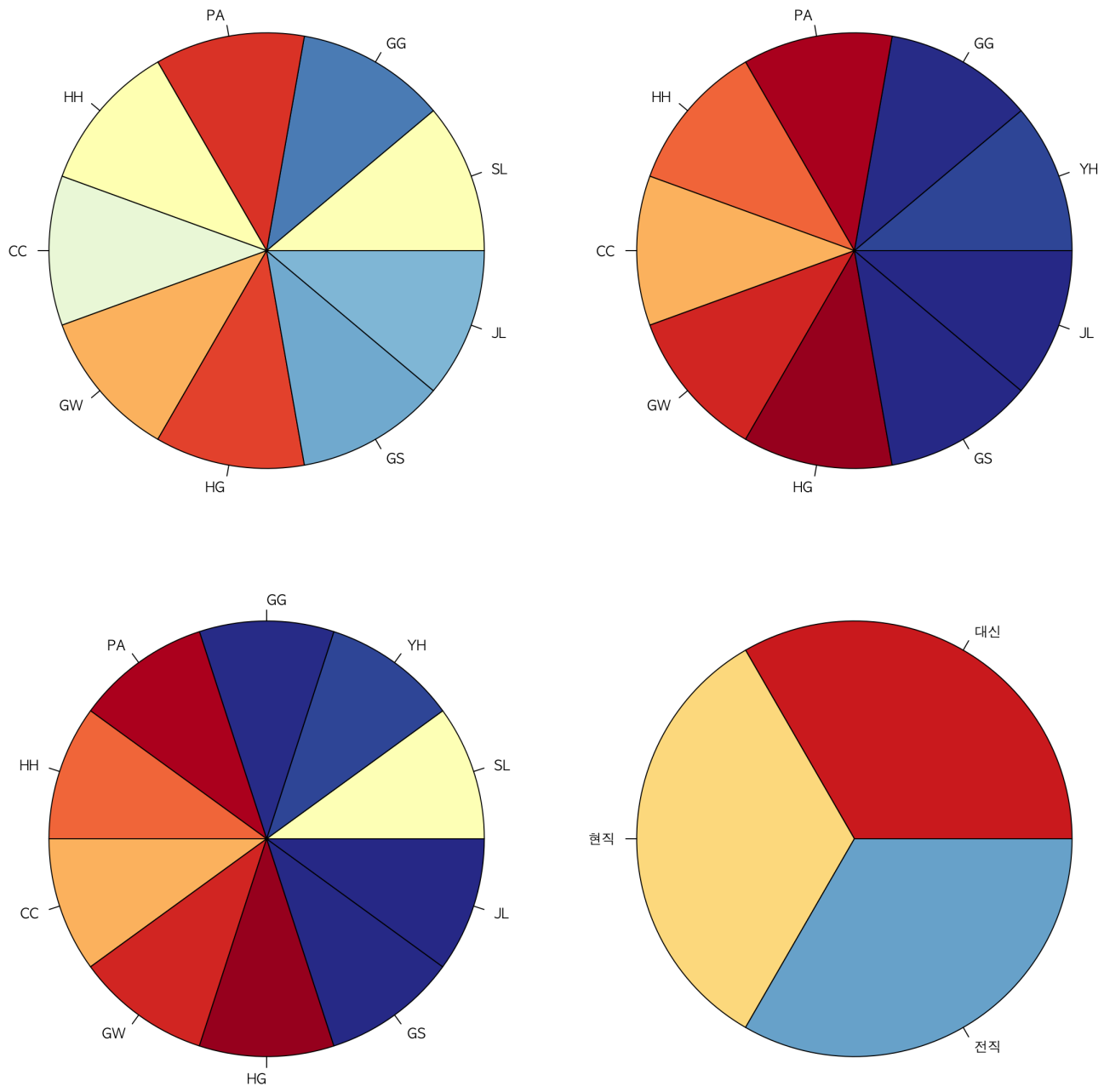
```
cols <- rates * 10
cols
```

```
## 서울 유후 경기 평안 황해 충청 강원 함길 경상 전라
##  507  941  986   45  223  333  120   10  989  991
```

```
cols_SL <- rates_SL * 10
cols_SL
```

```
## 대신 현직 전직
##   98  397  791
```

```
# c(shp_S_1$rates, shp_N_1$rates)
# unique(c(shp_S_1$rates, shp_N_1$rates))
# cols
names(cols_b) <- c("SL", "GG", "PA", "HH", "CC", "GW", "HG", "GS", "JL")
names(cols_c) <- c("YH", "GG", "PA", "HH", "CC", "GW", "HG", "GS", "JL")
names(cols) <- c("SL", "YH", "GG", "PA", "HH", "CC", "GW", "HG", "GS", "JL")
pie(rep(1, 9),
    col = colorRampPalette(brewer.pal(11, "RdYlBu"))(1001)[cols_b],
    labels = names(cols_b))
pie(rep(1, 9),
    col = colorRampPalette(brewer.pal(11, "RdYlBu"))(1001)[cols_c],
    labels = names(cols_c))
pie(rep(1, 10),
    col = colorRampPalette(brewer.pal(11, "RdYlBu"))(1001)[cols],
    labels = names(cols))
pie(rep(1, 3),
    col = colorRampPalette(brewer.pal(11, "RdYlBu"))(1001)[cols_SL],
    labels = names(cols_SL))
```




```
cols_hex_b <- colorRampPalette(brewer.pal(11, "RdYlBu"))(1001)[cols_b]
cols_hex_c <- colorRampPalette(brewer.pal(11, "RdYlBu"))(1001)[cols_c]
cols_hex <- colorRampPalette(brewer.pal(11, "RdYlBu"))(1001)[cols]
cols_hex_SL <- colorRampPalette(brewer.pal(11, "RdYlBu"))(1001)[cols_SL]
names(cols_hex_b) <- names(cols_b)
names(cols_hex_c) <- names(cols_c)
names(cols_hex) <- names(cols)
cols_hex_b
```

```
##        SL        GG        PA        HH        CC        GW        HG        GS
     JL
## "#FDFEC2" "#5B8FC1" "#E34932" "#FEFEBE" "#EDF8DE" "#FDBE70" "#EA5839" "#82B8D7" "#
90C3DD"
```

```
cols_hex_c
```

```
##         YH         GG         PA         HH         CC         GW         HG         GS
     JL
## "#3C5BA7" "#343F99" "#BA1426" "#F57A49" "#FDBE70" "#DC3B2C" "#A90426" "#333C98" "#
333C98"
```

```
cols_hex
```

```
##         SL         YH         GG         PA         HH         CC         GW         HG
     GS         JL
## "#FDFEC2" "#3C5BA7" "#343F99" "#BB1526" "#F57B49" "#FDBE70" "#DC3B2C" "#A90426" "#
333D98" "#333C98"
```

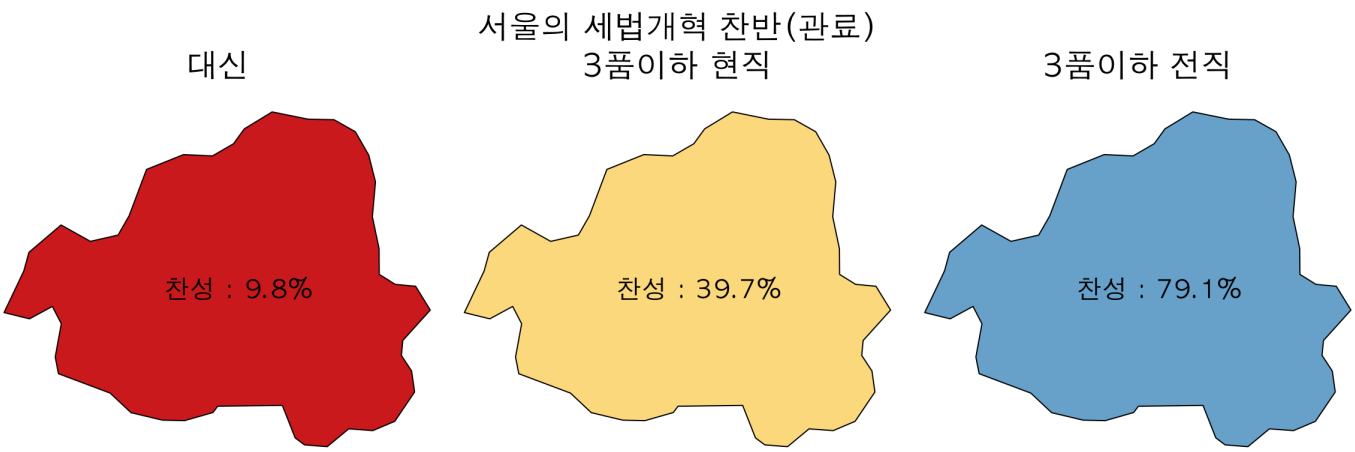
```
cols_hex_SL
```

```
## [1] "#D52E26" "#FDDE8E" "#79B1D3"
```

Combined

서울

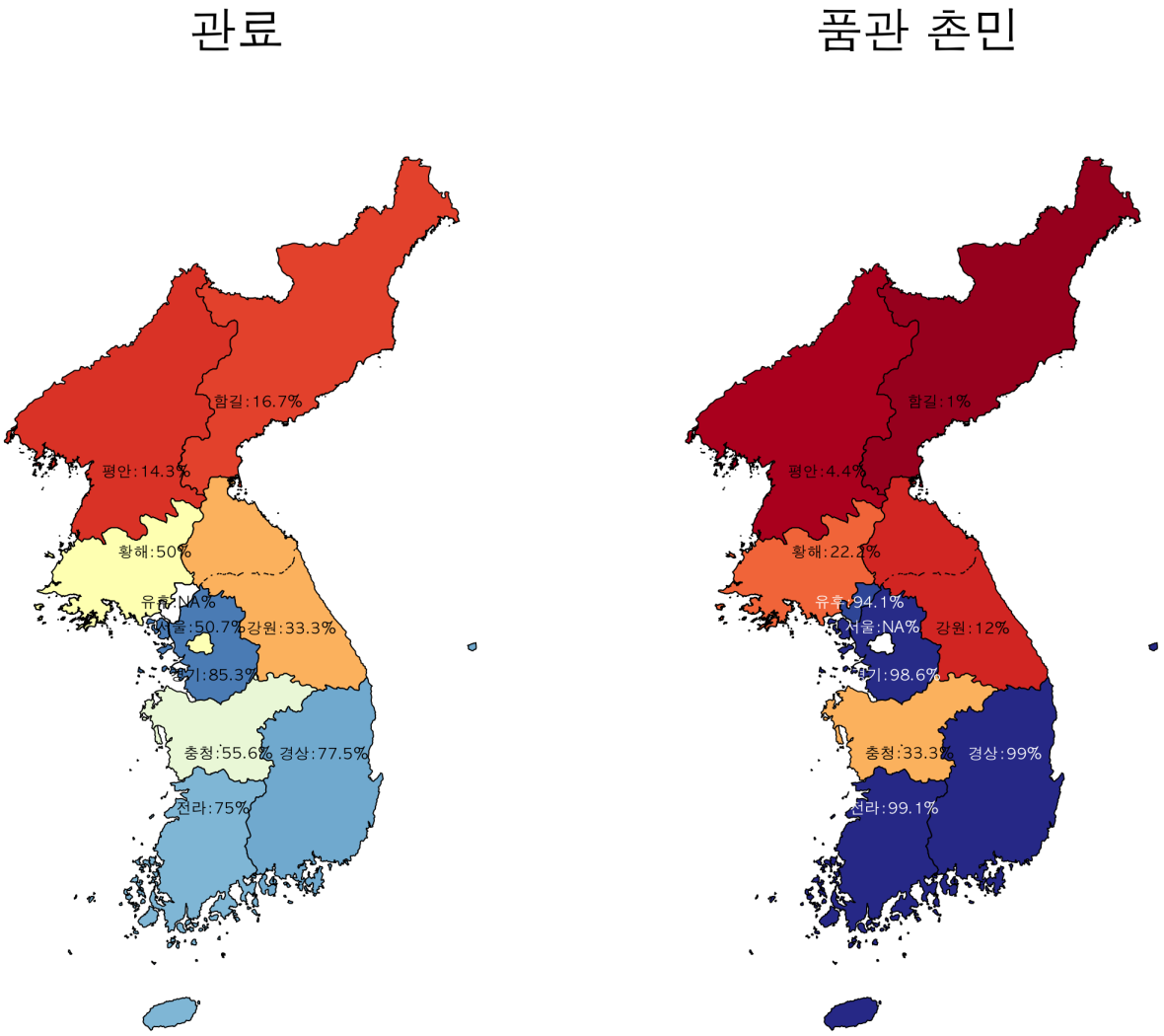
```
par(mar = c(0, 0, 3.1, 0), mfrow = c(1, 3), oma = c(0, 0, 2, 0), family = "HCR Dotum
 LVT")
plot(shp_SL, col = cols_hex_SL[1], main = "대신", cex.main = 2.5)
text(coordinates(shp_SL), labels = paste0("찬성 : ", rates_SL[1], "%"), cex = 2)
plot(shp_SL, col = cols_hex_SL[2], main = "3품이하 현직", cex.main = 2.5)
text(coordinates(shp_SL), labels = paste0("찬성 : ", rates_SL[2], "%"), cex = 2)
plot(shp_SL, col = cols_hex_SL[3], main = "3품이하 전직", cex.main = 2.5)
text(coordinates(shp_SL), labels = paste0("찬성 : ", rates_SL[3], "%"), cex = 2)
title(main = "서울의 세법개혁 찬반(관료)", outer = TRUE, cex.main = 2.5)
```



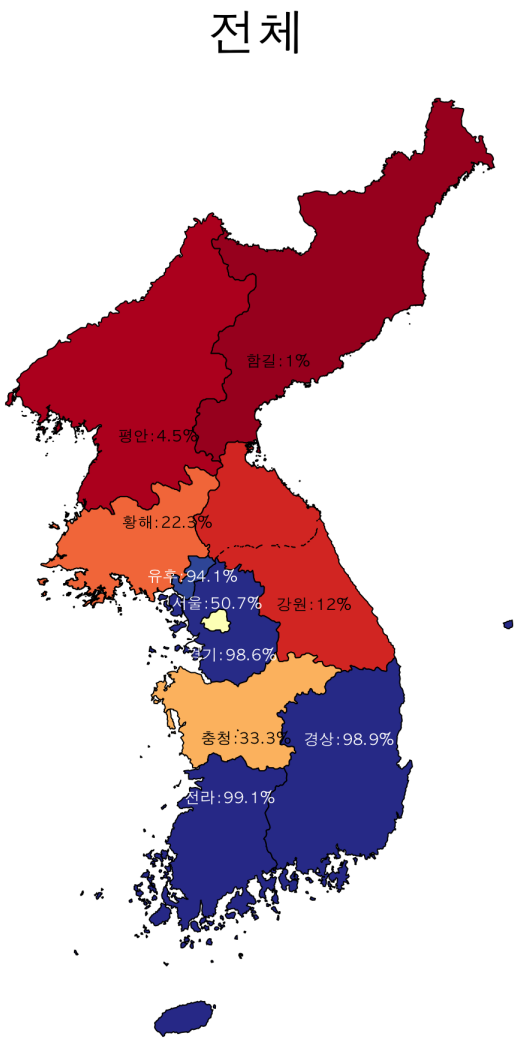

```
par(mfrow = c(1, 1))
```

관료와 품관 촌민

```
par(mar = c(0, 0, 3.1, 0), mfrow = c(1, 2), family = "HCR Dotum LVT")
plot(shp_HG_u, xlim = c(123, 132), ylim = c(32, 44), col = cols_hex_b["HG"])
plot(shp_PA_u, add = TRUE, col = cols_hex_b["PA"])
plot(shp_HH_u, add = TRUE, col = cols_hex_b["HH"])
plot(shp_GW, add = TRUE, col = cols_hex_b["GW"])
plot(shp_GG_u, add = TRUE, col = cols_hex_b["GG"])
plot(shp_CC_u, add = TRUE, col = cols_hex_b["CC"])
plot(shp_JL_u, add = TRUE, col = cols_hex_b["JL"])
plot(shp_GS_u, add = TRUE, col = cols_hex_b["GS"])
plot(shp_SL, add = TRUE, col = cols_hex_b["SL"])
plot(shp_YH, add = TRUE, col = cols_hex_b["YH"])
text(Lon_S_1, Lat_S_1, labels = labels_S_b, col = "black", cex = 0.8)
text(Lon_N_1, Lat_N_1, labels = labels_N_b, col = "black", cex = 0.8)
title(main = "관료", cex.main = 2.5, line = -4)
# par(mar = c(0, 0, 0, 0), family = "HCR Dotum LVT")
plot(shp_HG_u, xlim = c(123, 132), ylim = c(32, 44), col = cols_hex_c["HG"])
plot(shp_PA_u, add = TRUE, col = cols_hex_c["PA"])
plot(shp_HH_u, add = TRUE, col = cols_hex_c["HH"])
plot(shp_GW, add = TRUE, col = cols_hex_c["GW"])
plot(shp_GG_u, add = TRUE, col = cols_hex_c["GG"])
plot(shp_CC_u, add = TRUE, col = cols_hex_c["CC"])
plot(shp_JL_u, add = TRUE, col = cols_hex_c["JL"])
plot(shp_GS_u, add = TRUE, col = cols_hex_c["GS"])
plot(shp_SL, add = TRUE, col = cols_hex_c["SL"])
plot(shp_YH, add = TRUE, col = cols_hex_c["YH"])
text(Lon_S_1, Lat_S_1, labels = labels_S_c, col = col_S, cex = 0.8)
text(Lon_N_1, Lat_N_1, labels = labels_N_c, col = col_N, cex = 0.8)
title(main = "품관 촌민", cex.main = 2.5, line = -4)
```




```
# dev.copy(png, file = "../pics/sejong_ref_commons.png", width = 960, height = 960)
# dev.off()
```

전체

```
par(mar = c(3.1, 0, 3.1, 0), family = "HCR Dotum LVT")
plot(shp_HG_u, xlim = c(123, 132), ylim = c(32, 44), col = cols_hex["HG"])
plot(shp_PA_u, add = TRUE, col = cols_hex["PA"])
plot(shp_HH_u, add = TRUE, col = cols_hex["HH"])
plot(shp_GW, add = TRUE, col = cols_hex["GW"])
plot(shp_GG_u, add = TRUE, col = cols_hex["GG"])
plot(shp_CC_u, add = TRUE, col = cols_hex["CC"])
plot(shp_JL_u, add = TRUE, col = cols_hex["JL"])
plot(shp_GS_u, add = TRUE, col = cols_hex["GS"])
plot(shp_SL, add = TRUE, col = cols_hex["SL"])
plot(shp_YH, add = TRUE, col = cols_hex["YH"])
text(Lon_S_1, Lat_S_1, labels = labels_S, col = col_S, cex = 0.8)
text(Lon_N_1, Lat_N_1, labels = labels_N, col = col_N, cex = 0.8)
title(main = "전체", cex.main = 2.5, line = -4)
```