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title: "Chosun Field"
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date: "`r Sys.Date()`"
output: html_document
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## Problem

조선시대 전답 통계를 stacked area graph로 표시

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```{r, field table}
options(warn = -1)
library(knitr)
include_graphics("../pics/chosun_field_history.png", dpi = NA)
```

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## Data

```{r, data}
library(knitr)
year <- c(1404, 1414, 1432, 1592, 1603, 1634, 1719, 1784, 1786, 1807, 1864)
province <- c("경기도", "충청도", "전라도", "경상도", "황해도", "강원도", "함경도", "평안도")
field <- matrix(c(NA, 223090, 173990, 224625, 90922, 59989, 3271, 6648,
                 NA, 223090, 279090, 226025, 90925, 59989, 3271, 6648,
                 207119, 236300, 377588, 301147, 104772, 65916, 130413, 308751,
                 147370, 250503, 442189, 315026, 106832, 34831, 63821, 153009,
                 141959, 240744, 198672, 173902, 108211, 33884, 54377, 153009,
                 100359, 258461, 335305, 301819, 128834, 33884, 61243, 94000,
                 101256, 255208, 377159, 336778, 128834, 44051, 61243, 90804,
                 110932, 255519, 348489, 335730, 129244, 40889, 109556, 105760,
                 109932, 255519, 348489, 336730, 129244, 40889, 109556, 106041,
                 112090, 256528, 340103, 337128, 132211, 41151, 117746, 119635,
                 111912, 255585, 339743, 337472, 132373, 40926, 117746, 119735),
                 ncol = 8,
                 byrow = TRUE)
rownames(field) <- year
colnames(field) <- province
str(field)
options(digits = 2)
mean.field <- colMeans(field, na.rm = TRUE)
prop.field <- colMeans(field, na.rm = TRUE)/sum(colMeans(field, na.rm = TRUE)) * 100
```

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## Reshape

`matrix` (array)에 특화된 `melt` 사용

```{r, reshape}
library(reshape2)
field.melt <- melt(field, varnames = c("Year", "Province"), value.name = "Area")
kable(field.melt)
```

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## ggplot

```{r, ggplot, warning = FALSE, message = FALSE, fig.width = 9, fig.height = 5}
library(ggplot2)

```

```

# library(extrafont)
source("../theme_kr.R")
g0 <- ggplot()
g1 <- g0 +
  geom_area(data = field.melt,
            mapping = aes(x = Year, y = Area, fill = Province),
            colour = "black",
            size = 0.2,
            alpha = 0.4,
            na.rm = TRUE)

g1
```

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```{r, ggplot2, warning = FALSE, message = FALSE, fig.width = 9, fig.height = 5}
g2 <- g1 +
  scale_fill_brewer(palette = "Spectral",
                    name = "",
                    breaks = levels(field.melt$Province)) +
  theme_bw() +
  theme.kr
g2
```

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```{r, warning = FALSE, message = FALSE, fig.width = 9, fig.height = 5}
g3<- g2 +
  scale_x_continuous(name = "연도",
                     breaks = as.numeric(row.names(field)[-9]),
                     labels = row.names(field)[-9])
g3
```

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```{r, warning = FALSE, message = FALSE, fig.width = 9, fig.height = 5}
g4 <- g3 +
  theme(axis.text.x = element_text(angle = 90))
g4
```

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```{r, warning = FALSE, message = FALSE, fig.width = 9, fig.height = 5}
g5 <- g4 +
  scale_y_continuous(name = "토지 면적(결)",
                     breaks = cumsum(rev(field[3, ])),
                     labels = format(cumsum(rev(field[3, ])), big.mark = ","))
g5
```

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```{r, warning = FALSE, message = FALSE, fig.width = 9, fig.height = 5}
g6 <- g5 +
  labs(title = "조선 시대 도별 논밭통계", subtitle = "(도표 안의 수치는 기록된 값들의 평균)") +
  theme(plot.subtitle = element_text(family = "HCR Dotum LVT", hjust = 1))
g6
```

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```{r, warning = FALSE, message = FALSE, fig.width = 9, fig.height = 5}
g7 <- g6 +
  theme(plot.title = element_text(size = 16, hjust = 0.5))
g7
```

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```
```{r, warning = FALSE, message = FALSE, fig.width = 9, fig.height = 5}
# x.max <- max(year) + 0.15 * diff(range(year))
# g8 <- g7 +
#   scale_x_continuous(name = "연도",
#                       breaks = as.numeric(row.names(field)[-9]),
#                       labels = row.names(field)[-9],
#                       limits = c(min(year), x.max)) +
#   theme(legend.position = c(0.95, 0.5),
#         legend.box.background = element_rect(fill = "white", colour = "black"),
#         legend.title = element_blank())
# g8
g9 <- g7 +
  theme(legend.position = c(0.75, 0.9),
        legend.box.background = element_rect(fill = "white", colour = "black"),
        legend.direction = "horizontal")
g9
```
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```
```{r, warning = FALSE, message = FALSE, fig.width = 9, fig.height = 5}
y.coord <- apply(field[3:4, ], 2, mean)
y.text <- cumsum(c(0, head(rev(y.coord), -1))) + rev(y.coord) / 2
mean.text <- rev(paste(province,
                       ":",
                       format(mean.field, big.mark = ","),
                       "결(",
                       format(prop.field, digits = 2, nsmall = 0),
                       "%)",
                       sep = " " ))
text.df <- data.frame(x = (year[3] + year[4]) / 2,
                     y = y.text,
                     label = mean.text,
                     row.names = NULL,
                     stringsAsFactors = FALSE)
```
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```
```{r, warning = FALSE, message = FALSE, fig.width = 9, fig.height = 6.75}
g10 <- g9 +
  guides(fill = FALSE) +
  geom_text(data = text.df,
            mapping = aes(x = x, y = y),
            label = mean.text,
            family = "HCR Dotum LVT", size = 3) +
  annotate("text", x = 1592, y = 1650000,
          label = "임진왜란",
          colour = "red",
          size = 5,
          family = "HCR Dotum LVT")
# theme(text = element_text(family = "HCR Dotum LVT"))
# annotate("text",
#         x = text.df$x,
#         y = text.df$y,
#         label = mean.text,
#         family = "HCR Dotum LVT")

g10

ggsave("../pics/chosun_field_ggplot.png", dpi = 72)
```
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