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##### Area table for land cover atlas #####
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#####rm(list=ls())

# rootdir = "E:/Atlas/" # Laptop

rootdir = "C:/Users/Rashed/Desktop/Atlas/"
setwd(rootdir)

options(stringsAsFactors = F)

library(grid) # http://ww2.amstat.org/publications/jse/v18n3/zhou.pdf
# library(magick) # https://cran.r-project.org/web/packages/magick/vignettes/intro.html
library(xlsx)
# library(gridExtra)
# library(jpeg)
library(foreign)

## Read the excel file rgb values for each LC class
# Legend color
legend_color <- read.xlsx(paste0(rootdir,"Legend/Color/Draft_Color_composition_for_each_class_final_
head(legend_color)

# Create rgb colors in R
for (i in 1:nrow(legend_color)) {
  r <- legend_color$R[i]/255
  g <- legend_color$G[i]/255
  b <- legend_color$B[i]/255
  legend_color$Color[i] <- rgb(r,g,b)
}

head(legend_color)
nrow(legend_color)

# Paper size and orientation

w <- 10 # Based on papre size (should be 9 by 5.5)
h <- 6

##### Read LC dbf file and check with clolour code file #####
lc_dbf <- read.dbf("DBF/LC_2015_BUTM_Atlas.dbf")

lc_dbf$Area_ha <- lc_dbf$Shape_Area/10000
lc_dbf$Area_ha_fac <- lc_dbf$Area_ha / sum(lc_dbf$Area_ha)* 14757000
sum(lc_dbf$Area_ha_fac)

Code <- unique(lc_dbf$CODE_R)

sum(legend_color$Code %in% Code)
sum(Code %in% legend_color$Code)
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legend_color$class_code <- paste0(legend_color$Land_cover, " (", legend_color$Code, ")")
# max(nchar(legend_color$class_code))

##### Make area table #####
dist_area <- aggregate(lc_dbf$Area_ha_fac, list(lc_dbf$DISTNAME, lc_dbf$CODE_R), FUN = "sum")
names(dist_area) <- c("District", "Code", "Area_ha")
head(dist_area)

results <- paste0(rootdir,"Area_table/Results/")
dir.create(results)

##### Legend color column #####
dist_list <- unique(lc_dbf$DISTNAME)
dev.off()

margin_1 <- 0.2
margin_2 <- margin_1 + 4.5
offset <- h - 0.5
diff <- 0.27
f_size <- 10

line_col <- rgb(0/255, 176/255, 77/255)

for (i in 1:length(dist_list)){
  df <- dist_area[dist_area$District == dist_list[i],]
  tot_area <- sum(df$Area_ha)

  name <- paste0(results,dist_list[i],".png")
  png(name, width = w, height = h, units = "in", res = 600, bg = "transparent")
  grid.newpage()

  # # Insert line column
  # vp_line <- viewport(x=unit(0.1,"inches"),y= unit(5,"inches"), height=unit(10,"inches"), width=
  # pushViewport(vp_line)
  # grid.rect(gp = gpar(lty = 0,fill = rgb(0/255, 176/255, 77/255)))
  # upViewport()

  ##### Insert table heading #####
  # First heading
  vp_head <- viewport(x=unit(margin_1,"inches"),y= unit(offset,"inches"), height=unit(8/40,"inches")
  pushViewport(vp_head)
  grid.text("Land cover", gp = gpar(fontsize = f_size+2, fontface = "bold"),
            x = unit(0,"inches"), y = unit(0.5,"npc"), just = "left")
  grid.text("Area (ha)", gp = gpar(fontsize = f_size+2, fontface = "bold"),
            x = unit(w/2 - 1.5,"inches"), y = unit(0.5,"npc"), just = "right")
  grid.text("%", gp = gpar(fontsize = f_size+2, fontface = "bold"),
            x = unit(w/2 - 0.75,"inches"), y = unit(0.5,"npc"), just = "right")
  upViewport()

  # Second heading
  vp_head <- viewport(x=unit(margin_2,"inches"),y= unit(offset,"inches"), height=unit(8/40,"inches")
  pushViewport(vp_head)
  grid.text("Land cover", gp = gpar(fontsize = f_size+2, fontface = "bold"),
            x = unit(0,"inches"), y = unit(0.5,"npc"), just = "left")
  grid.text("Area (ha)", gp = gpar(fontsize = f_size+2, fontface = "bold"),
            x = unit(w/2 - 1.5,"inches"), y = unit(0.5,"npc"), just = "right")
  grid.text("%", gp = gpar(fontsize = f_size+2, fontface = "bold"),
            x = unit(w/2 - 0.75,"inches"), y = unit(0.5,"npc"), just = "right")
  upViewport()

  ##### Insert total area #####
  vp_tot <- viewport(x=unit(margin_1,"inches"),y= unit(offset-diff*(17+1),"inches"), height=unit(8/40,"inches")
  pushViewport(vp_tot)
  grid.text("Total", gp = gpar(fontsize = f_size+2, fontface = "bold"),
            x = unit(12,"mm"), y = unit(0.5,"npc"), just = "left")
  grid.text(round(tot_area), gp = gpar(fontsize = f_size+2, fontface = "bold"),

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        x = unit(90,"mm"), y = unit(0.5,"npc"), just = "right")
upViewport()

# Insert main body > class name, area, percentage, class color, shade
for (j in 1:17) {
  # Insert shade
  if (!j %% 2 == 0){
    vp_shade <- viewport(x=unit(margin_1 + 2.2,"inches"),y= unit(offset-diff*j,"inches"), height=unit(8/40,"inches"))
    pushViewport(vp_shade)
    grid.rect(gp = gpar(lty = 0,fill = rgb(235/255, 241/255, 222/255)))
    upViewport()
  }
  vp <- viewport(x=unit(margin_1,"inches"),y= unit(offset-diff*j,"inches"), height=unit(8/40,"inches"))
  pushViewport(vp)
  grid.rect(gp = gpar(lty = 0,fill = legend_color$Color[j]))
  grid.text(legend_color$class_code[j], gp = gpar(fontsize = f_size),
            x = unit(12,"mm"), y = unit(0.5,"npc"), just = "left")

  # insert area
  area <- round(df$Area_ha[df$Code == legend_color$Code[j]])
  if (length(area) == 0){
    grid.text("- -", gp = gpar(fontsize = f_size),
              x = unit(w/2 - 1.5,"inches"), y = unit(0.5,"npc"), just = "right")
  } else {
    grid.text(area, gp = gpar(fontsize = f_size),
              x = unit(w/2 - 1.5,"inches"), y = unit(0.5,"npc"), just = "right")
  }

  # insert percentage
  # tot_area <- sum(df$Area_ha)
  prcnt <- round((df$Area_ha[df$Code == legend_color$Code[j]]) / tot_area * 100,2)
  if (length(area) == 0){
    grid.text("- -", gp = gpar(fontsize = f_size),
              x = unit(w/2 - 0.75,"inches"), y = unit(0.5,"npc"), just = "right")
  } else {
    grid.text(prcnt, gp = gpar(fontsize = f_size),
              x = unit(w/2 - 0.75,"inches"), y = unit(0.5,"npc"), just = "right")
  }
  upViewport()
}

for (j in 18:33) {
  # Insert shade
  if (!j %% 2 == 0){
    vp_shade <- viewport(x=unit(margin_2 + 2.2,"inches"),y= unit(offset-diff*(j-17),"inches"), height=unit(8/40,"inches"))
    pushViewport(vp_shade)
    grid.rect(gp = gpar(lty = 0,fill = rgb(235/255, 241/255, 222/255)))
    upViewport()
  }
  vp <- viewport(x=unit(margin_2,"inches"),y= unit(offset-diff*(j-17),"inches"), height=unit(8/40,"inches"))
  pushViewport(vp)
  grid.rect(gp = gpar(lty = 0,fill = legend_color$Color[j]))
  grid.text(legend_color$class_code[j], gp = gpar(fontsize = f_size),
            x = unit(12,"mm"), y = unit(0.5,"npc"), just = "left")

  # insert area
  area <- round(df$Area_ha[df$Code == legend_color$Code[j]])
  if (length(area) == 0){
    grid.text("- -", gp = gpar(fontsize = f_size),
              x = unit(w/2 - 1.5,"inches"), y = unit(0.5,"npc"), just = "right")
  } else {
    grid.text(area, gp = gpar(fontsize = f_size),
              x = unit(w/2 - 1.5,"inches"), y = unit(0.5,"npc"), just = "right")
  }

  # insert percentage
  # tot_area <- sum(df$Area_ha)
  prcnt <- round((df$Area_ha[df$Code == legend_color$Code[j]]) / tot_area * 100,2)
  if (length(area) == 0){

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    grid.text("-", gp = gpar(fontsize = f_size),
              x = unit(w/2 - 0.75,"inches"), y = unit(0.5,"npc"), just = "right")
  } else {
    grid.text(prcnt, gp = gpar(fontsize = f_size),
             x = unit(w/2 - 0.75,"inches"), y = unit(0.5,"npc"), just = "right")
  }
  upViewport()
}

##### Insert table boarder #####
# Inner boarder
for (k in 1:17) {
  vp_brd <- viewport(x=unit(margin_1 + 2.2,"inches"),y= unit(offset-diff*(k-1),"inches"), height=unit(h,"inches"), width=unit(w,"inches"))
  pushViewport(vp_brd)
  grid.lines(x = unit(c(0, 100), "mm"),
            y = unit(c(-0.3, -0.3), "npc"),
            gp=gpar(lwd = 1, col = line_col))
  upViewport()
}

for (k in 1:17) {
  vp_brd <- viewport(x=unit(margin_2 + 2.2,"inches"),y= unit(offset-diff*(k-1),"inches"), height=unit(h,"inches"), width=unit(w,"inches"))
  pushViewport(vp_brd)
  grid.lines(x = unit(c(0, 100), "mm"),
            y = unit(c(-0.3, -0.3), "npc"),
            gp=gpar(lwd = 1, col = line_col))
  upViewport()
}

# Outer boarder
vp_brd_out <- viewport(x=unit(w/2,"inches"),y= unit(h/2,"inches"), height=unit(h,"inches"), width=unit(w,"inches"))
pushViewport(vp_brd_out)
grid.lines(x = unit(c(margin_1-45/254, 9), "inches"),
          y = unit(c(0.45,0.45), "inches"),
          gp=gpar(lwd = 3, col = line_col))
grid.lines(x = unit(c(margin_1-45/254, 9), "inches"),
          y = unit(c(5.7, 5.7), "inches"),
          gp=gpar(lwd = 3, col = line_col))

grid.lines(x = unit(c(margin_1-45/254, 9), "inches"),
          y = unit(c(offset-diff*k-0.15,offset-diff*k-0.15), "inches"),
          gp=gpar(lwd = 1, col = line_col))

upViewport()

out <- paste0("Creating table for district ", i, ": ",dist_list[i])
print(out)
dev.off()
}

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