Producto 6 (Proyecto 1)

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Descrpcón

Analisis de datos de población por municipios en el estado de Jalisco.

Hipotesis: La proporción de hombres/mujeres en localidades menores (con población menos que 50 habitantes) y en resto de poblacones no es homogenea. Existen municipios con marcada disproporcion en la distribución de génros en las localidades menores.

Parámetros generales

Cargar modulos

```
#library(foreign)   # puede ser necesario para lectura de archvos DBF
library(sp)
library(rgdal)
```

```
## rgdal: version: 1.4-4, (SVN revision 833)
##  Geospatial Data Abstraction Library extensions to R successfully loaded
##  Loaded GDAL runtime: GDAL 2.2.3, released 2017/11/20
##  Path to GDAL shared files: C:/Users/vshal/Documents/R/win-library/3.6/rgdal/gdal
##  GDAL binary built with GEOS: TRUE
##  Loaded PROJ.4 runtime: Rel. 4.9.3, 15 August 2016, [PJ_VERSION: 493]
##  Path to PROJ.4 shared files: C:/Users/vshal/Documents/R/win-library/3.6/rgdal/proj
##  Linking to sp version: 1.3-1
```

Datos fuente

Lectura de datos iniciales y su tratamiento inicial

```
# censo de población y vivienda de INEGI como archivo de texto
censo_2010A <- read.delim("datos/ITER_14TXT10.txt")
str(censo_2010A)
```

```
## 'data.frame':    11314 obs. of  201 variables:
##  $ ENTIDAD   : int  14 14 14 14 14 14 14 14 14 14 ...
##  $ NOM_ENT   : Factor w/ 1 level "Jalisco": 1 1 1 1 1 1 1 1 1 1 ...
##  $ MUN       : int  0 0 0 1 1 1 1 1 1 1 ...
##  $ NOM_MUN   : Factor w/ 126 levels "Acatic","Acatlán de Juárez",..: 105 105 105 1 1 1 1 1
1 1 ...
##  $ LOC       : int  0 9998 9999 0 1 2 3 6 9 10 ...
##  $ NOM_LOC   : Factor w/ 7067 levels "Abandono de Abajo",..: 6878 4240 4239 6879 14 70 105
1164 5898 1248 ...
##  $ LONGITUD  : int  NA NA NA NA 1025419 1025331 1025103 1025849 1025619 1025217 ...
##  $ LATITUD   : int  NA NA NA NA 204646 204737 204925 204344 204154 204734 ...
##  $ ALTITUD   : int  NA NA NA NA 1693 1735 1794 1708 1630 1717 ...
##  $ POBTOT    : int  7350682 16735 11116 21206 11890 107 10 36 215 27 ...
##  $ POBMAS    : Factor w/ 919 levels "*","1","10","100",..: 518 17 709 21 706 679 1 265 36
155 ...
##  $ POBFEM    : Factor w/ 923 levels "*","0","1","10",..: 528 759 675 32 732 673 1 213 29 1
13 ...
##  $ P_0A2     : Factor w/ 440 levels "*","0","1","10",..: 273 390 363 74 393 421 1 3 61 152
...
##  $ P_0A2_M   : Factor w/ 340 levels "*","0","1","10",..: 101 196 171 286 192 194 1 2 282 3
...
##  $ P_0A2_F   : Factor w/ 339 levels "*","0","1","10",..: 103 188 175 280 196 232 1 3 261 3
...
##  $ P_3YMAS   : Factor w/ 1159 levels "*","0","10","100",..: 973 231 25 333 63 1151 1 642 3
47 467 ...
##  $ P_3YMAS_M : Factor w/ 900 levels "*","0","1","10",..: 475 893 669 883 665 634 1 252 5 1
13 ...
##  $ P_3YMAS_F : Factor w/ 885 levels "*","0","1","10",..: 493 705 631 14 677 621 1 190 15 8
4 ...
##  $ P_5YMAS   : Factor w/ 1126 levels "*","0","10","100",..: 935 209 1124 303 35 1100 1 613
321 390 ...
##  $ P_5YMAS_M : Factor w/ 875 levels "*","0","1","10",..: 441 857 627 839 623 600 1 232 854
83 ...
##  $ P_5YMAS_F : Factor w/ 876 levels "*","0","1","10",..: 459 676 597 865 650 587 1 177 5 4
...
##  $ P_12YMAS  : Factor w/ 1055 levels "*","0","10","100",..: 786 132 962 191 997 965 1 476
209 236 ...
##  $ P_12YMAS_M: Factor w/ 832 levels "*","0","1","10",..: 347 775 522 716 507 491 1 163 734
4 ...
##  $ P_12YMAS_F: Factor w/ 829 levels "*","0","1","10",..: 376 563 495 748 550 520 1 63 757
702 ...
##  $ P_15YMAS  : Factor w/ 1019 levels "*","0","10","100",..: 731 67 896 154 934 890 1 452 1
74 182 ...
##  $ P_15YMAS_M: Factor w/ 790 levels "*","0","1","10",..: 301 666 466 648 455 425 1 128 653
715 ...
##  $ P_15YMAS_F: Factor w/ 807 levels "*","0","1","10",..: 332 506 439 696 497 466 1 63 720
678 ...
##  $ P_18YMAS  : Factor w/ 1001 levels "*","0","1","10",..: 684 1001 843 107 878 808 1 431 1
29 156 ...
##  $ P_18YMAS_M: Factor w/ 782 levels "*","0","1","10",..: 282 609 432 615 425 353 1 116 633
717 ...
##  $ P_18YMAS_F: Factor w/ 784 levels "*","0","1","10",..: 303 467 397 645 457 410 1 56 652
610 ...
##  $ P_3A5     : Factor w/ 444 levels "*","0","1","10",..: 284 407 370 66 377 272 1 3 16 218
...
##  $ P_3A5_M   : Factor w/ 333 levels "*","0","1","10",..: 113 194 179 281 178 3 1 3 283 3
...
```

```
##  $ P_3A5_F   : Factor w/ 343 levels "*","0","1","10",..: 111 208 173 279 184 158 1 2 198 1
03 ...
##  $ P_6A11    : Factor w/ 571 levels "*","0","1","10",..: 539 144 99 283 119 27 1 453 294 4
18 ...
##  $ P_6A11_M  : Factor w/ 454 levels "*","0","1","10",..: 298 429 392 98 414 435 1 145 94 1
45 ...
##  $ P_6A11_F  : Factor w/ 442 levels "*","0","1","10",..: 294 411 383 74 391 150 1 278 91 2
26 ...
##  $ P_8A14    : Factor w/ 588 levels "*","0","1","10",..: 7 296 135 312 144 132 1 425 334 4
70 ...
##  $ P_8A14_M  : Factor w/ 464 levels "*","0","1","10",..: 333 157 433 112 442 51 1 230 139
286 ...
##  $ P_8A14_F  : Factor w/ 467 levels "*","0","1","10",..: 334 9 430 104 436 294 1 156 105 1
56 ...
##  $ P_12A14   : Factor w/ 438 levels "*","0","1","10",..: 282 133 379 61 374 420 1 3 58 142
...
##  $ P_12A14_M : Factor w/ 346 levels "*","0","1","10",..: 116 62 194 279 187 230 1 3 332 10
4 ...
##  $ P_12A14_F : Factor w/ 342 levels "*","0","1","10",..: 111 211 180 277 176 198 1 2 198 2
...
##  $ P_15A17   : Factor w/ 432 levels "*","0","1","10",..: 285 93 374 74 368 42 1 3 91 3 ...
##  $ P_15A17_M : Factor w/ 336 levels "*","0","1","10",..: 114 20 193 271 176 280 1 3 221 2
...
##  $ P_15A17_F : Factor w/ 338 levels "*","0","1","10",..: 113 190 172 286 180 225 1 2 4 3
...
##  $ P_18A24   : Factor w/ 557 levels "*","0","1","10",..: 543 161 73 255 103 121 1 434 249
3 ...
##  $ P_18A24_M : Factor w/ 430 levels "*","0","1","10",..: 295 37 354 55 372 268 1 268 43 3
...
##  $ P_18A24_F : Factor w/ 438 levels "*","0","1","10",..: 311 394 374 86 399 59 1 148 91 2
...
##  $ P_15A49_F : Factor w/ 720 levels "*","0","1","10",..: 202 352 290 538 351 361 1 564 554
564 ...
##  $ P_60YMAS  : Factor w/ 543 levels "*","0","1","10",..: 455 167 85 189 62 341 1 517 197 1
74 ...
##  $ P_60YMAS_M: Factor w/ 432 levels "*","0","1","10",..: 227 55 386 7 325 216 1 302 25 3
...
##  $ P_60YMAS_F: Factor w/ 427 levels "*","0","1","10",..: 238 363 330 20 353 3 1 260 22 3
...
##  $ REL_H_M   : Factor w/ 1879 levels "*","0","100",..: 1665 1 1 1622 1546 92 1 415 1843 31
6 ...
##  $ POB0_14   : Factor w/ 773 levels "*","0","1","10",..: 247 559 432 659 458 405 1 741 647
62 ...
##  $ POB15_64  : Factor w/ 989 levels "*","0","1","10",..: 665 7 808 103 856 854 1 300 135 1
13 ...
##  $ POB65_MAS : Factor w/ 479 levels "*","0","1","10",..: 328 77 11 85 459 166 1 406 59 166
...
##  $ PROM_HNV  : Factor w/ 481 levels "*","0","0.40",..: 139 1 1 180 182 115 1 334 193 287
...
##  $ PNACENT   : Factor w/ 1134 levels "*","0","1","10",..: 897 134 1130 327 55 5 1 601 348
477 ...
##  $ PNACENT_M : Factor w/ 864 levels "*","0","1","10",..: 417 758 626 859 647 615 1 220 12
125 ...
##  $ PNACENT_F : Factor w/ 881 levels "*","0","1","10",..: 446 669 605 19 682 628 1 179 29 1
08 ...
##  $ PNACOE    : Factor w/ 506 levels "*","0","1","10",..: 498 268 17 402 278 424 1 2 2 2
...
##  $ PNACOE_M  : Factor w/ 398 levels "*","0","1","10",..: 275 167 306 207 96 254 1 2 2 2
```

```
...
##  $ PNACOE_F  : Factor w/ 400 levels "*","0","1","10",..: 277 348 279 197 97 191 1 2 2 2
...
##  $ PRES2005  : Factor w/ 1112 levels "*","0","1","10",..: 892 133 1090 273 11 1073 1 601 2
96 380 ...
##  $ PRES2005_M: Factor w/ 859 levels "*","0","1","10",..: 409 750 598 796 586 587 1 213 820
72 ...
##  $ PRES2005_F: Factor w/ 876 levels "*","0","1","10",..: 447 654 583 849 639 570 1 178 861
4 ...
##  $ PRESOE05  : Factor w/ 278 levels "*","0","1","10",..: 67 86 99 22 233 139 1 2 2 2 ...
##  $ PRESOE05_M: Factor w/ 202 levels "*","0","1","10",..: 185 47 21 153 110 3 1 2 2 2 ...
##  $ PRESOE05_F: Factor w/ 209 levels "*","0","1","10",..: 192 76 206 158 114 70 1 2 2 2 ...
##  $ P3YM_HLI  : Factor w/ 183 levels "*","0","1","10",..: 141 78 14 114 38 3 1 2 2 2 ...
##  $ P3YM_HLI_M: Factor w/ 136 levels "*","0","1","10",..: 58 19 93 52 130 3 1 2 2 2 ...
##  $ P3YM_HLI_F: Factor w/ 128 levels "*","0","1","10",..: 48 120 84 14 78 2 1 2 2 2 ...
##  $ P3HLINHE  : Factor w/ 73 levels "*","0","1","10",..: 53 49 37 2 2 2 1 2 2 2 ...
##  $ P3HLINHE_M: Factor w/ 44 levels "*","0","1","10",..: 20 16 9 2 2 2 1 2 2 2 ...
##  $ P3HLINHE_F: Factor w/ 57 levels "*","0","1","10",..: 33 30 20 2 2 2 1 2 2 2 ...
##  $ P3HLI_HE  : Factor w/ 147 levels "*","0","1","10",..: 81 38 121 28 102 3 1 2 2 2 ...
##  $ P3HLI_HE_M: Factor w/ 113 levels "*","0","1","10",..: 32 6 65 15 61 3 1 2 2 2 ...
##  $ P3HLI_HE_F: Factor w/ 95 levels "*","0","1","10",..: 25 76 49 29 3 2 1 2 2 2 ...
##  $ P5_HLI    : Factor w/ 175 levels "*","0","1","10",..: 133 67 9 107 37 3 1 2 2 2 ...
##  $ P5_HLI_NHE: Factor w/ 64 levels "*","0","1","10",..: 41 38 27 2 2 2 1 2 2 2 ...
##  $ P5_HLI_HE : Factor w/ 140 levels "*","0","1","10",..: 75 31 113 23 95 3 1 2 2 2 ...
##  $ PHOG_IND  : Factor w/ 210 levels "*","0","1","10",..: 199 56 18 164 90 165 1 2 2 2 ...
##  $ PCON_LIM  : Factor w/ 425 levels "*","0","1","10",..: 189 422 322 48 369 324 1 324 107
2 ...
##  $ PCLIM_MOT : Factor w/ 360 levels "*","0","1","10",..: 73 258 174 311 227 102 1 212 32 2
...
##  $ PCLIM_VIS : Factor w/ 255 levels "*","0","1","10",..: 211 98 36 123 63 84 1 3 184 2 ...
##  $ PCLIM_LENG: Factor w/ 146 levels "*","0","1","10",..: 59 137 100 7 108 2 1 2 45 2 ...
##  $ PCLIM_AUD : Factor w/ 165 levels "*","0","1","10",..: 79 10 149 26 134 3 1 3 100 2 ...
##  $ PCLIM_MOT2: Factor w/ 122 levels "*","0","1","10",..: 24 76 53 88 48 2 1 2 37 2 ...
##  $ PCLIM_MEN : Factor w/ 112 levels "*","0","1","10",..: 25 76 53 100 72 3 1 2 35 2 ...
##  $ PCLIM_MEN2: Factor w/ 172 levels "*","0","1","10",..: 98 52 149 30 157 2 1 2 3 2 ...
##  $ PSIN_LIM  : Factor w/ 1140 levels "*","0","10","100",..: 968 220 19 330 58 10 1 537 327
487 ...
##  $ P3A5_NOA  : Factor w/ 335 levels "*","0","1","10",..: 94 249 218 268 169 201 1 2 201 10
5 ...
##  $ P3A5_NOA_M: Factor w/ 257 levels "*","0","1","10",..: 254 115 105 138 58 3 1 2 81 3 ...
##  $ P3A5_NOA_F: Factor w/ 256 levels "*","0","1","10",..: 248 120 84 124 53 125 1 2 78 3
...
##  $ P6A11_NOA : Factor w/ 147 levels "*","0","1","10",..: 65 52 43 9 111 39 1 3 39 2 ...
##  $ P6A11_NOAM: Factor w/ 107 levels "*","0","1","10",..: 23 6 5 92 66 3 1 3 3 2 ...
##  $ P6A11_NOAF: Factor w/ 106 levels "*","0","1","10",..: 18 14 8 70 37 3 1 2 3 2 ...
##  $ P12A14NOA : Factor w/ 183 levels "*","0","1","10",..: 118 77 56 79 14 134 1 2 91 3 ...
##  $ P12A14NOAM: Factor w/ 146 levels "*","0","1","10",..: 59 27 6 21 107 75 1 2 48 3 ...
##   [list output truncated]
```

```
# tabla de menor tamaño para maypor comodidad
censo_2010A_sel <- censo_2010A[,c("MUN","NOM_MUN","LOC","LONGITUD",
                                  "LATITUD","POBTOT","POBMAS","POBFEM")]

# sustituir simbolos de * con NA
censo_2010A_sel[censo_2010A_sel == "*"] <- NA

# convertir el formato de columnas a numericas
censo_2010A_sel$POBFEM <- as.numeric(censo_2010A_sel$POBFEM)
censo_2010A_sel$POBMAS <- as.numeric(censo_2010A_sel$POBMAS)

# consultar tamaño de tabla
dim(censo_2010A_sel)
```

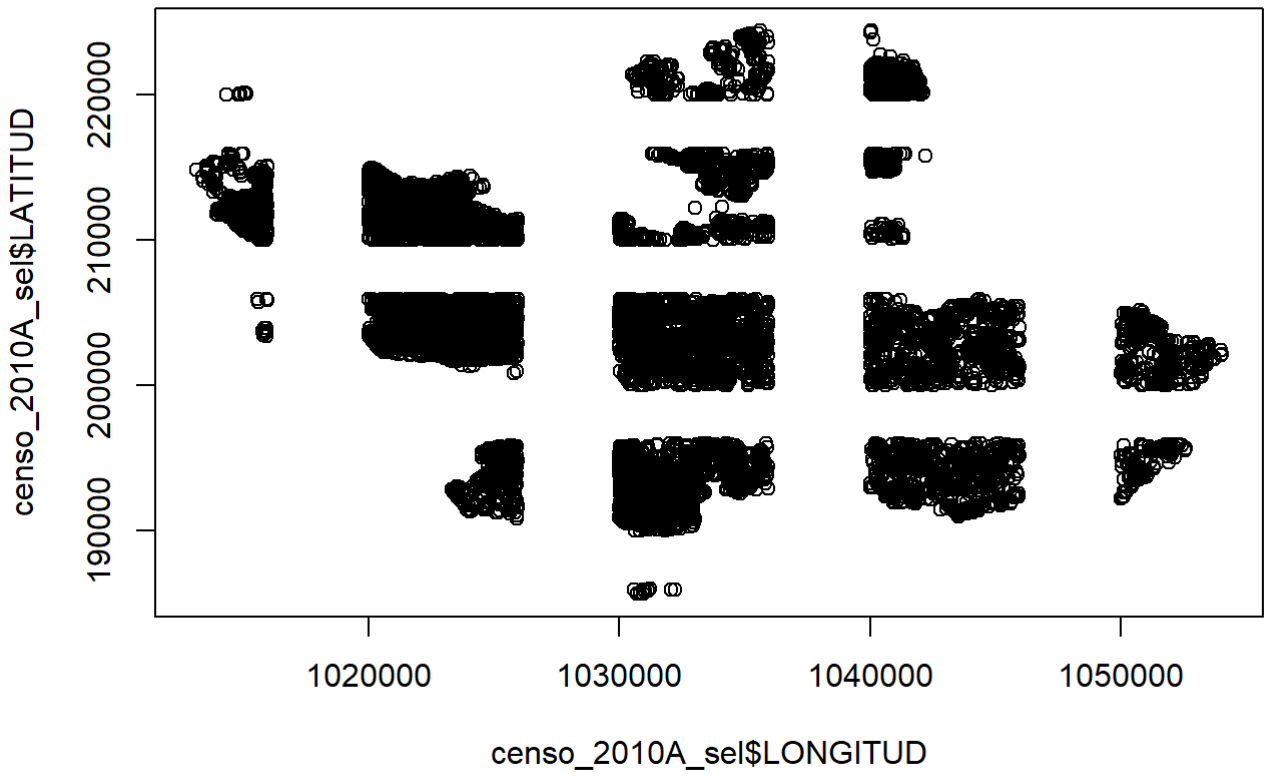
```
## [1] 11314     8
```

```
# quitar los registros con el código de localidad 0 (corresponden a subtoales)
censo_2010A_sel <- censo_2010A_sel[censo_2010A_sel$LOC != 0
                                   & censo_2010A_sel$LOC != 9999
                                   & censo_2010A_sel$LOC != 9998,]

# consultar tamaño de tabla despues de limpieza
dim(censo_2010A_sel)
```

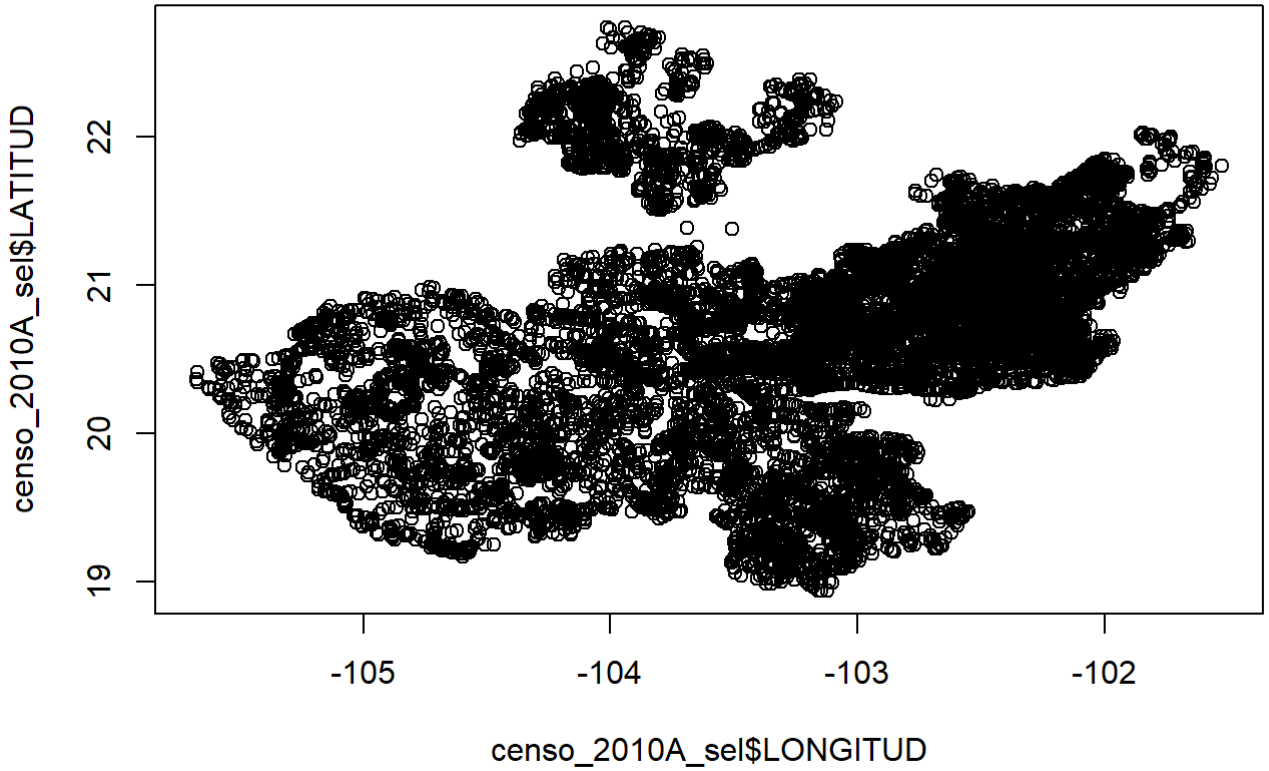
```
## [1] 10946     8
```

Revisión de georefferenciación de localidades

```
# visualiar datos de latitud y longitud como estan en la tabla original
plot(censo_2010A_sel$LONGITUD, censo_2010A_sel$LATITUD)
```




```
#a1 <- substr(censo_2010A_sel$LONGITUD,1,3)
#a2 <- substr(censo_2010A_sel$LONGITUD,4,5)
#a3 <- substr(censo_2010A_sel$LONGITUD,6,7)
#a1
#a2
#a3

# transformar coordenadas al formato correcto
censo_2010A_sel$LONGITUD <- -1 * (as.numeric(substr(censo_2010A_sel$LONGITUD,1,3))
                                  + as.numeric(substr(censo_2010A_sel$LONGITUD,4,5)) / 60
                                  + as.numeric(substr(censo_2010A_sel$LONGITUD,6,7)) / 3600
                                  )

censo_2010A_sel$LATITUD <- ( as.numeric(substr(censo_2010A_sel$LATITUD,1,2))
                                  + as.numeric(substr(censo_2010A_sel$LATITUD,3,4)) / 60
                                  + as.numeric(substr(censo_2010A_sel$LATITUD,5,6)) / 3600
                             )
#censo_2010A_sel$LONGITUD
#censo_2010A_sel$LATITUD

# visualizar datos despues de transformación de coordenadas
plot(censo_2010A_sel$LONGITUD, censo_2010A_sel$LATITUD)
```



Leer y preparar poligonos de municipios

```
# leer municipios (Shapefile)
municipios <- readOGR("datos/Municipios.shp", encoding = "UTF-8")
```

```
## OGR data source with driver: ESRI Shapefile
## Source: "C:\Users\vshal\GD\UdeG_Docencia\CUCSH_Curso_R\sources\datos\Municipios.shp", laye
r: "Municipios"
## with 2456 features
## It has 4 fields
```

```
# revisar estructura de tabla de atributos
str(municipios@data)
```

```
## 'data.frame':    2456 obs. of  4 variables:
##  $ CVE_ENT   : Factor w/ 32 levels "01","02","03",..: 9 9 9 9 9 9 9 9 9 9 ...
##  $ CVE_MUN   : Factor w/ 570 levels "001","002","003",..: 12 13 8 2 14 15 10 5 4 16 ...
##  $ NOM_MUN   : Factor w/ 2316 levels "Abalá","Abasolo",..: 2065 2241 816 185 206 456 73 61
0 450 945 ...
##  $ CVE_MUNENT: int  9012 9013 9008 9002 9014 9015 9010 9005 9004 9016 ...
```

```
# selecciona solo municipios de Jalisco (entidad 14)
municipios_jalisco <- municipios[municipios@data$CVE_ENT == '14',]
municipios_jalisco@data$CVE_MUN <- as.numeric(municipios_jalisco@data$CVE_MUN)

# revisar capa de municipios
plot(municipios_jalisco)
```

```
class(municipios_jalisco)
```

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

```
summary(municipios_jalisco)
```

```
## Object of class SpatialPolygonsDataFrame
## Coordinates:
##         min     max
## x 2115863.6 2550361
## y  770594.3 1193103
## Is projected: TRUE
## proj4string :
## [+proj=lcc +lat_1=17.5 +lat_2=29.5 +lat_0=12 +lon_0=-102
## +x_0=2500000 +y_0=0 +ellps=GRS80 +units=m +no_defs]
## Data attributes:
##     CVE_ENT       CVE_MUN                    NOM_MUN      CVE_MUNENT
##  14     :125   Min.   :  1   Acatic              :  1   Min.   :14001
##  01     :  0   1st Qu.: 32   Acatlán de Juárez   :  1   1st Qu.:14032
##  02     :  0   Median : 63   Ahualulco de Mercado:  1   Median :14063
##  03     :  0   Mean   : 63   Amacueca            :  1   Mean   :14063
##  04     :  0   3rd Qu.: 94   Amatitán            :  1   3rd Qu.:14094
##  05     :  0   Max.   :125   Ameca               :  1   Max.   :14125
##  (Other):  0                 (Other)             :119
```

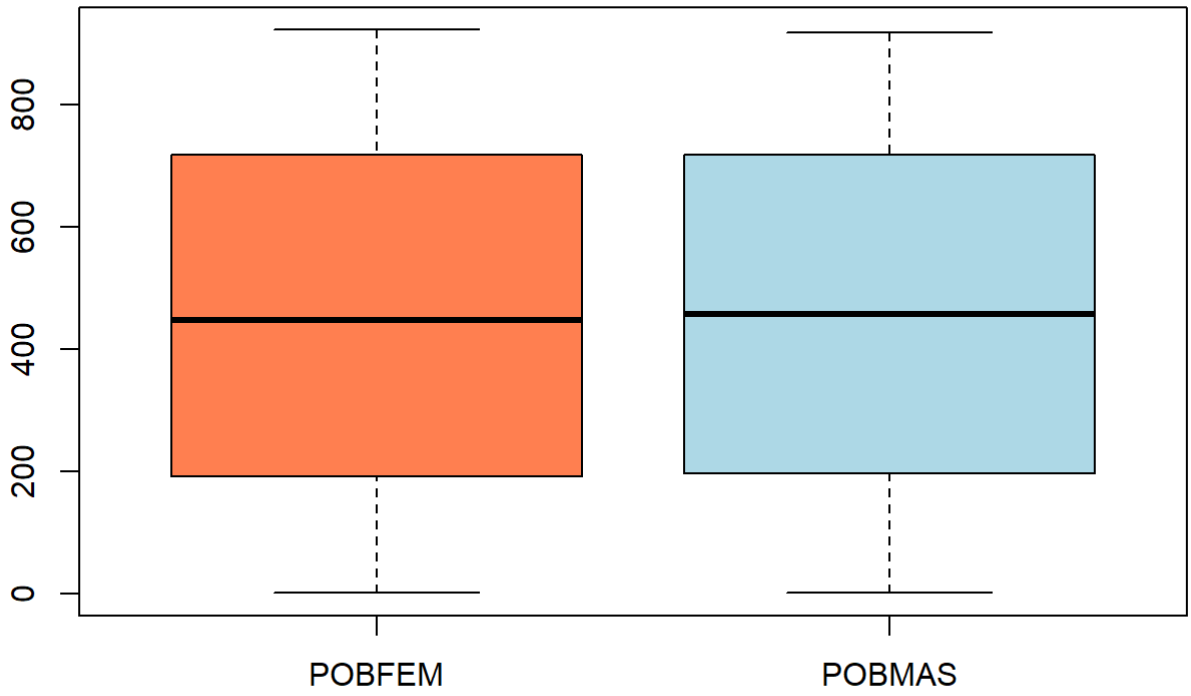
Análisis y resultados

Rvisar estaisticas generales de población, clasificar en localidades en menores (<50 habitantes) y mayores, calcular subtotales por municipio y por tipo de poblacion, calcular proporción de mujeres

```
summary(censo_2010A_sel[,c("POBTOT","POBFEM","POBMAS")])
```

```
##      POBTOT              POBFEM          POBMAS
##  Min.   :      1.0   Min.   :  2.0   Min.   :  2.0
##  1st Qu.:      5.0   1st Qu.:192.0   1st Qu.:197.0
##  Median :     14.0   Median :448.5   Median :458.0
##  Mean   :    671.5   Mean   :453.1   Mean   :457.7
##  3rd Qu.:     60.0   3rd Qu.:719.0   3rd Qu.:719.0
##  Max.   :1495182.0   Max.   :923.0   Max.   :919.0
##                      NA's   :4704    NA's   :4704
```

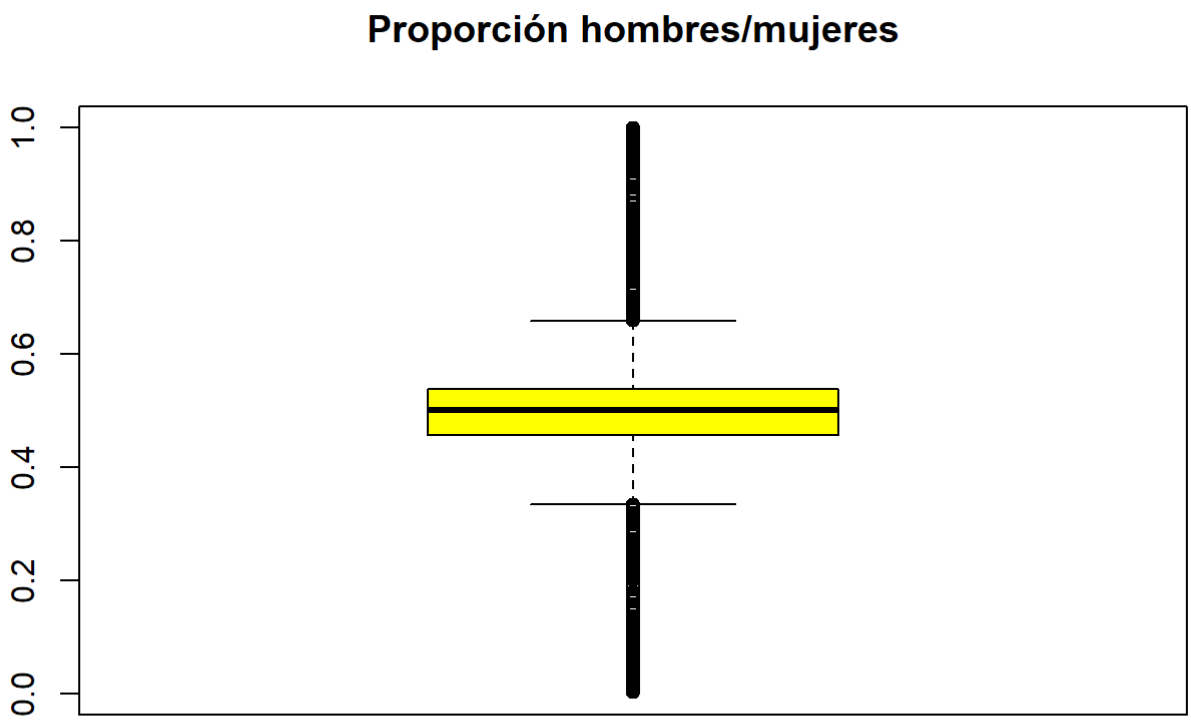
```
boxplot(censo_2010A_sel[,c("POBFEM","POBMAS")], col = c("coral","lightblue"))
```




```
#hist(censo_2010A_sel$POBTOT)

sum(censo_2010A_sel$POBTOT)
```

```
## [1] 7350682
```

```
censo_2010A_sel$FEM_PROP <- censo_2010A_sel$POBFEM / (censo_2010A_sel$POBFEM + censo_2010A_se
l$POBMAS)
censo_2010A_sel$POBL_MENORES <- censo_2010A_sel$POBTOT < 50


boxplot(censo_2010A_sel$FEM_PROP, col = "yellow", main = "Proporción hombres/mujeres")
```




```
subtotales_municipios <- aggregate(cbind(POBFEM, POBMAS) ~
                                     MUN + NOM_MUN + POBL_MENORES, data = censo_2010A_sel, su
m)

subtotales_municipios$FEM_PROP <- subtotales_municipios$POBFEM / (subtotales_municipios$POBFE
M + subtotales_municipios$POBMAS)
subtotales_municipios
```

```
##     MUN                       NOM_MUN POBL_MENORES POBFEM POBMAS  FEM_PROP
## 1     1                         Acatic        FALSE  16520  17859 0.4805259
## 2     2             Acatlán de Juárez        FALSE   2441   2486 0.4954333
## 3     3          Ahualulco de Mercado        FALSE   4286   4201 0.5050077
## 4     4                      Amacueca        FALSE   1826   1873 0.4936469
## 5     5                      Amatitán        FALSE   7754   7936 0.4942001
## 6     6                         Ameca        FALSE  19537  19366 0.5021978
## 7     8                      Arandas        FALSE  44208  44660 0.4974569
## 8    10          Atemajac de Brizuela        FALSE   4397   3432 0.5616298
## 9    11                        Atengo        FALSE   4732   5027 0.4848857
## 10   12                   Atenguillo        FALSE   5010   4888 0.5061629
## 11   13            Atotonilco el Alto        FALSE  31735  31561 0.5013745
## 12   14                        Atoyac        FALSE   6417   6862 0.4832442
## 13   15             Autlán de Navarro        FALSE  12941  11478 0.5299562
## 14   16                       Ayotlán        FALSE  19524  21043 0.4812779
## 15   17                        Ayutla        FALSE  10769  12257 0.4676887
## 16   19                       Bolaños        FALSE  13099  12795 0.5058701
## 17   20               Cabo Corrientes        FALSE  15946  15191 0.5121238
## 18  117            Cañadas de Obregón        FALSE   4203   4035 0.5101966
## 19   21             Casimiro Castillo        FALSE   6203   6380 0.4929667
## 20   30                       Chapala        FALSE   7158   6690 0.5168977
## 21   31                   Chimaltitán        FALSE   4689   4521 0.5091205
## 22   32                 Chiquilistlán        FALSE   4698   4130 0.5321704
## 23   22                     Cihuatlán        FALSE   6550   7091 0.4801701
## 24   24                        Cocula        FALSE   9647   9314 0.5087812
## 25   25                      Colotlán        FALSE  13569  13699 0.4976163
## 26   26    Concepción de Buenos Aires        FALSE   4254   4339 0.4950541
## 27   27 Cuautitlán de García Barragán        FALSE  28846  28960 0.4990139
## 28   28                       Cuautla        FALSE   3100   2892 0.5173565
## 29   29                        Cuquío        FALSE  25887  24705 0.5116817
## 30   33                     Degollado        FALSE  21396  20818 0.5068461
## 31   34                        Ejutla        FALSE   3804   4150 0.4782499
## 32    9                     El Arenal        FALSE   2663   3831 0.4100708
## 33   37                     El Grullo        FALSE   3110   3082 0.5022610
## 34   54                      El Limón        FALSE   2408   2450 0.4956772
## 35   70                      El Salto        FALSE   5941   6011 0.4970716
## 36   35           Encarnación de Díaz        FALSE  31816  32693 0.4932025
## 37   36                      Etzatlán        FALSE   6225   6249 0.4990380
## 38   79                 Gómez Farías        FALSE   3955   3831 0.5079630
## 39   38                   Guachinango        FALSE   8623   8825 0.4942114
## 40   39                   Guadalajara        FALSE    829    800 0.5089012
## 41   40              Hostotipaquillo        FALSE   8444   9771 0.4635740
## 42   41                      Huejúcar        FALSE   5384   4884 0.5243475
## 43   42           Huejuquilla el Alto        FALSE  12586  12190 0.5079916
## 44   44 Ixtlahuacán de los Membrillos        FALSE  11091  10543 0.5126652
## 45   45           Ixtlahuacán del Río        FALSE  22149  24099 0.4789180
## 46   46                Jalostotitlán        FALSE  16153  16318 0.4974593
## 47   47                        Jamay        FALSE   1545   2478 0.3840418
## 48   48                  Jesús María        FALSE  28066  28569 0.4955593
## 49   49       Jilotlán de los Dolores        FALSE  15087  16430 0.4786940
## 50   50                   Jocotepec        FALSE   7865   7919 0.4982894
## 51   51                  Juanacatlán        FALSE   6541   6116 0.5167891
## 52   52                    Juchitlán        FALSE   4748   4546 0.5108672
## 53   18                     La Barca        FALSE  12840  15427 0.4542399
## 54   43                    La Huerta        FALSE  21105  21451 0.4959348
## 55   57       La Manzanilla de la Paz        FALSE   2596   2394 0.5202405
## 56   53               Lagos de Moreno        FALSE  63900  64107 0.4991915
```

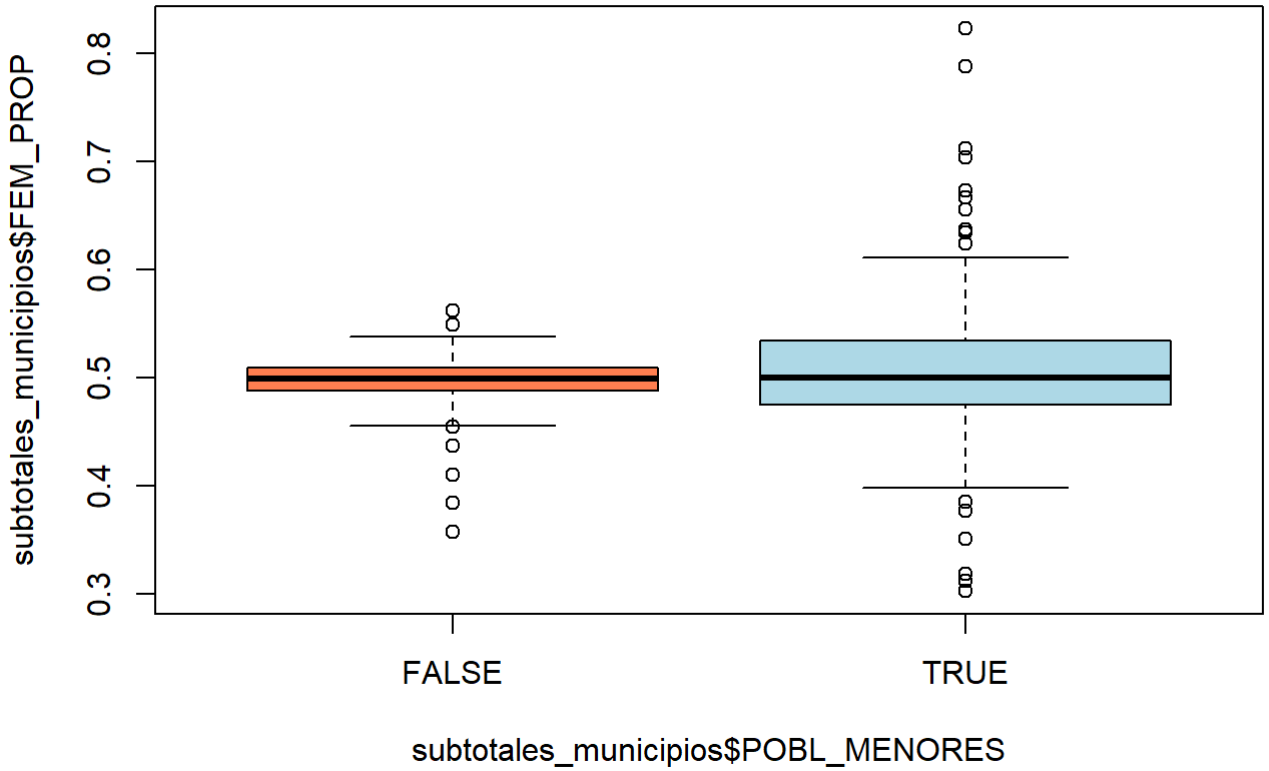
```
## 57   55                    Magdalena        FALSE   4943   4849 0.5047998
## 58   58                      Mascota        FALSE  13668  14663 0.4824397
## 59   59                    Mazamitla        FALSE  10071  10330 0.4936523
## 60   60                   Mexticacán        FALSE   5753   6871 0.4557193
## 61   61                    Mezquitic        FALSE  35776  34776 0.5070870
## 62   62                      Mixtlán        FALSE   4391   4679 0.4841235
## 63   63                      Ocotlán        FALSE   8301   8447 0.4956413
## 64   64           Ojuelos de Jalisco        FALSE  12698  13506 0.4845825
## 65   65                      Pihuamo        FALSE  11245  11852 0.4868598
## 66   66                    Poncitlán        FALSE  12140  11921 0.5045509
## 67   67               Puerto Vallarta        FALSE  12874  14446 0.4712299
## 68   69                     Quitupan        FALSE  19148  19042 0.5013878
## 69   71 San Cristóbal de la Barranca        FALSE   6275   6314 0.4984510
## 70   72      San Diego de Alejandría        FALSE   3674   3495 0.5124843
## 71  113                  San Gabriel        FALSE  12322  12958 0.4874209
## 72  125      San Ignacio Cerro Gordo        FALSE  19989  19894 0.5011910
## 73   73        San Juan de los Lagos        FALSE  36039  35495 0.5038024
## 74    7      San Juanito de Escobedo        FALSE   3354   2611 0.5622800
## 75   74                  San Julián        FALSE   3679   3769 0.4939581
## 76   75                  San Marcos        FALSE    901    932 0.4915439
## 77   76        San Martín de Bolaños        FALSE   3642   3739 0.4934291
## 78   77           San Martín Hidalgo        FALSE   8469   8962 0.4858585
## 79   78           San Miguel el Alto        FALSE  17404  17464 0.4991396
## 80   80      San Sebastián del Oeste        FALSE  10756   9229 0.5382037
## 81   81   Santa María de los Ángeles        FALSE   7755   7874 0.4961930
## 82   56         Santa María del Oro        FALSE   6114   6292 0.4928261
## 83   82                       Sayula        FALSE   1831   1676 0.5220987
## 84   83                         Tala        FALSE   8441   7808 0.5194781
## 85   84            Talpa de Allende        FALSE  11295  10526 0.5176206
## 86   85         Tamazula de Gordiano        FALSE  23946  24356 0.4957559
## 87   86                      Tapalpa        FALSE  14645  14603 0.5007180
## 88   87                   Tecalitlán        FALSE   6948   6944 0.5001440
## 89   89      Techaluta de Montenegro        FALSE   1386   1323 0.5116279
## 90   88                   Tecolotlán        FALSE  10207   9613 0.5149849
## 91   90                  Tenamaxtlán        FALSE   5114   5212 0.4952547
## 92   91                  Teocaltiche        FALSE  24313  27373 0.4703982
## 93   92       Teocuitatlán de Corona        FALSE   7974   8737 0.4771707
## 94   93        Tepatitlán de Morelos        FALSE  52561  53416 0.4959661
## 95   94                      Tequila        FALSE  15807  16624 0.4874040
## 96   95                   Teuchitlán        FALSE   2753   2663 0.5083087
## 97   96             Tizapán el Alto        FALSE   6400   5265 0.5486498
## 98   97         Tlajomulco de Zúñiga        FALSE  45865  46092 0.4987657
## 99   98                  Tlaquepaque        FALSE   8231   8557 0.4902907
## 100  99                      Tolimán        FALSE   8301   8268 0.5009958
## 101 100                     Tomatlán        FALSE  25492  27308 0.4828030
## 102 101                       Tonalá        FALSE  10898  10482 0.5097287
## 103 102                       Tonaya        FALSE   4496   8090 0.3572223
## 104 103                       Tonila        FALSE   1533   1652 0.4813187
## 105 104                    Totatiche        FALSE   4350   4455 0.4940375
## 106 105                     Tototlán        FALSE  17131  15549 0.5242044
## 107 106                   Tuxcacuesco        FALSE   5730   5279 0.5204832
## 108 107                     Tuxcueca        FALSE   3140   2965 0.5143325
## 109 108                      Tuxpan        FALSE   9442   9935 0.4872787
## 110 109         Unión de San Antonio        FALSE  19769  17985 0.5236266
## 111 110                Unión de Tula        FALSE   5445   7025 0.4366480
## 112 111           Valle de Guadalupe        FALSE   6258   6273 0.4994015
## 113 112              Valle de Juárez        FALSE   4036   3770 0.5170382
## 114 114                  Villa Corona        FALSE   3255   3198 0.5044166
```

```
## 115 115                Villa Guerrero        FALSE   5850   6074 0.4906072
## 116 116                 Villa Hidalgo        FALSE   9119   9742 0.4834844
## 117  68            Villa Purificación        FALSE  15888  15269 0.5099336
## 118 118   Yahualica de González Gallo        FALSE  18621  20066 0.4813245
## 119 119            Zacoalco de Torres        FALSE   7833   7001 0.5280437
## 120 120                       Zapopan        FALSE  24587  26271 0.4834441
## 121 121                    Zapotiltic        FALSE   4250   4046 0.5122951
## 122 122         Zapotitlán de Vadillo        FALSE  11458  11857 0.4914433
## 123 123              Zapotlán del Rey        FALSE  10758  10631 0.5029688
## 124  23            Zapotlán el Grande        FALSE   1981   1964 0.5021546
## 125 124                   Zapotlanejo        FALSE  52571  52652 0.4996151
## 126   1                        Acatic         TRUE  12642  14536 0.4651556
## 127   2             Acatlán de Juárez         TRUE   5027   4182 0.5458790
## 128   3          Ahualulco de Mercado         TRUE   1781   1936 0.4791499
## 129   4                      Amacueca         TRUE   2379   2254 0.5134902
## 130   5                      Amatitán         TRUE   2338   2454 0.4878965
## 131   6                         Ameca         TRUE   4401   4297 0.5059784
## 132   8                       Arandas         TRUE  47882  51282 0.4828567
## 133  10          Atemajac de Brizuela         TRUE   2290   2694 0.4594703
## 134  11                        Atengo         TRUE   2004   1854 0.5194401
## 135  12                    Atenguillo         TRUE   8412   8842 0.4875391
## 136  13            Atotonilco el Alto         TRUE  11289  11275 0.5003102
## 137  14                        Atoyac         TRUE   2784   2582 0.5188222
## 138  15             Autlán de Navarro         TRUE   7774   6621 0.5400486
## 139  16                       Ayotlán         TRUE   4855   6196 0.4393268
## 140  17                        Ayutla         TRUE   8802   8553 0.5071737
## 141  19                       Bolaños         TRUE  19963  22286 0.4725082
## 142  20                Cabo Corrientes         TRUE  15403  15116 0.5047020
## 143 117             Cañadas de Obregón         TRUE   4511   3378 0.5718088
## 144  21             Casimiro Castillo         TRUE   2853   2572 0.5258986
## 145  30                       Chapala         TRUE   6636   6329 0.5118396
## 146  31                   Chimaltitán         TRUE  13547  11981 0.5306722
## 147  32                 Chiquilistlán         TRUE   4389   3998 0.5233099
## 148  22                     Cihuatlán         TRUE   7231  11966 0.3766734
## 149  24                        Cocula         TRUE   1861   1579 0.5409884
## 150  25                      Colotlán         TRUE   5758   7866 0.4226365
## 151  26    Concepción de Buenos Aires         TRUE   3188   3257 0.4946470
## 152  27 Cuautitlán de García Barragán         TRUE  16789  15768 0.5156802
## 153  28                       Cuautla         TRUE   3059   1529 0.6667393
## 154  29                        Cuquío         TRUE  17766  17699 0.5009446
## 155  33                     Degollado         TRUE  10776  12367 0.4656268
## 156  34                        Ejutla         TRUE   1205    956 0.5576122
## 157   9                     El Arenal         TRUE   6023   7024 0.4616387
## 158  37                     El Grullo         TRUE    905    244 0.7876414
## 159  54                      El Limón         TRUE   1038    845 0.5512480
## 160  70                      El Salto         TRUE   1846   1995 0.4806040
## 161  35            Encarnación de Díaz         TRUE  57426  52219 0.5237448
## 162  36                      Etzatlán         TRUE   2601   1262 0.6733109
## 163  79                  Gómez Farías         TRUE    932   1009 0.4801649
## 164  38                   Guachinango         TRUE   5390   5339 0.5023767
## 165  39                   Guadalajara         TRUE    281    648 0.3024758
## 166  40                Hostotipaquillo         TRUE   7630   8417 0.4754783
## 167  41                       Huejúcar         TRUE   7486   5978 0.5560012
## 168  42             Huejuquilla el Alto         TRUE   6123   8186 0.4279125
## 169  44 Ixtlahuacán de los Membrillos         TRUE  14620  15349 0.4878374
## 170  45            Ixtlahuacán del Río         TRUE  22372  24594 0.4763446
## 171  46                  Jalostotitlán         TRUE  29446  30078 0.4946912
## 172  47                          Jamay         TRUE   2245   1280 0.6368794
```

```
## 173  48                  Jesús María         TRUE  27013  29881 0.4747952
## 174  49       Jilotlán de los Dolores         TRUE  20990  23069 0.4764066
## 175  50                     Jocotepec         TRUE   2027   4346 0.3180606
## 176  51                   Juanacatlán         TRUE    806   1776 0.3121611
## 177  52                     Juchitlán         TRUE   1695   3136 0.3508590
## 178  18                      La Barca         TRUE   3687   4140 0.4710617
## 179  43                     La Huerta         TRUE  17120  16413 0.5105419
## 180  57       La Manzanilla de la Paz         TRUE    493    661 0.4272097
## 181  53               Lagos de Moreno         TRUE  65034  62429 0.5102187
## 182  55                     Magdalena         TRUE    913    369 0.7121685
## 183  58                       Mascota         TRUE  21757  20504 0.5148245
## 184  59                     Mazamitla         TRUE   7732   5897 0.5673197
## 185  60                    Mexticacán         TRUE   7515   5958 0.5577822
## 186  61                     Mezquitic         TRUE  62044  61933 0.5004477
## 187  62                       Mixtlán         TRUE   2600   2694 0.4911220
## 188  63                       Ocotlán         TRUE   2626   2446 0.5177445
## 189  64            Ojuelos de Jalisco         TRUE   7871   7336 0.5175906
## 190  65                       Pihuamo         TRUE  12239  12113 0.5025871
## 191  66                     Poncitlán         TRUE   3313   5485 0.3765629
## 192  67                Puerto Vallarta         TRUE  13656  14255 0.4892695
## 193  69                     Quitupan         TRUE  19288  16826 0.5340865
## 194  71  San Cristóbal de la Barranca         TRUE  10472  10239 0.5056250
## 195  72       San Diego de Alejandría         TRUE  13172  11210 0.5402346
## 196 113                   San Gabriel         TRUE   6577   6656 0.4970150
## 197 125       San Ignacio Cerro Gordo         TRUE   7903   9320 0.4588631
## 198  73         San Juan de los Lagos         TRUE  42732  47303 0.4746154
## 199   7       San Juanito de Escobedo         TRUE    553    836 0.3981281
## 200  74                   San Julián         TRUE   9649   8206 0.5404088
## 201  75                   San Marcos         TRUE   3997   2627 0.6034118
## 202  76         San Martín de Bolaños         TRUE  13799  10839 0.5600698
## 203  77            San Martín Hidalgo         TRUE   1020   1631 0.3847605
## 204  78            San Miguel el Alto         TRUE  30907  31562 0.4947574
## 205  80       San Sebastián del Oeste         TRUE   9534   9752 0.4943482
## 206  81    Santa María de los Ángeles         TRUE    968    508 0.6558266
## 207  56           Santa María del Oro         TRUE  12453  12622 0.4966301
## 208  82                       Sayula         TRUE   1681   1542 0.5215638
## 209  83                         Tala         TRUE   3833   4477 0.4612515
## 210  84              Talpa de Allende         TRUE  18802  16404 0.5340567
## 211  85          Tamazula de Gordiano         TRUE  22347  26380 0.4586164
## 212  86                       Tapalpa         TRUE   4640   5582 0.4539229
## 213  87                    Tecalitlán         TRUE  32875  32612 0.5020080
## 214  89       Techaluta de Montenegro         TRUE    719    719 0.5000000
## 215  88                    Tecolotlán         TRUE   4429   5196 0.4601558
## 216  90                   Tenamaxtlán         TRUE   3343   2573 0.5650778
## 217  91                   Teocaltiche         TRUE  17251  17273 0.4996814
## 218  92        Teocuitatlán de Corona         TRUE   2766   2945 0.4843285
## 219  93         Tepatitlán de Morelos         TRUE  50123  50117 0.5000299
## 220  94                       Tequila         TRUE  23448  23649 0.4978661
## 221  95                    Teuchitlán         TRUE    719    155 0.8226545
## 222  96                Tizapán el Alto         TRUE   1409   1702 0.4529090
## 223  97          Tlajomulco de Zúñiga         TRUE  29980  29525 0.5038232
## 224  98                   Tlaquepaque         TRUE   1250   1531 0.4494786
## 225  99                       Tolimán         TRUE   4892   4582 0.5163606
## 226 100                     Tomatlán         TRUE  10458  13448 0.4374634
## 227 101                       Tonalá         TRUE   7549   9822 0.4345749
## 228 102                       Tonaya         TRUE   1819   2201 0.4524876
## 229 103                       Tonila         TRUE   1441    916 0.6113704
## 230 104                     Totatiche         TRUE  12093  10355 0.5387117
```

```
## 231 105                    Tototlán        TRUE   8912   6230 0.5885616
## 232 106                  Tuxcacuesco       TRUE   1724   1716 0.5011628
## 233 107                    Tuxcueca        TRUE   2030   2054 0.4970617
## 234 108                     Tuxpan         TRUE   3373   4086 0.4522054
## 235 109          Unión de San Antonio      TRUE  14387  17873 0.4459702
## 236 110                 Unión de Tula      TRUE   2939   1239 0.7034466
## 237 111            Valle de Guadalupe      TRUE  12348  11277 0.5226667
## 238 112               Valle de Juárez      TRUE   5085   3063 0.6240795
## 239 114                  Villa Corona      TRUE   4907   3854 0.5600959
## 240 115                Villa Guerrero      TRUE   9580   7510 0.5605617
## 241 116                  Villa Hidalgo     TRUE   3341   3620 0.4799598
## 242  68             Villa Purificación     TRUE  20412  20752 0.4958702
## 243 118   Yahualica de González Gallo      TRUE  25007  25710 0.4930694
## 244 119             Zacoalco de Torres     TRUE   4043   3736 0.5197326
## 245 120                      Zapopan       TRUE  27587  29343 0.4845776
## 246 121                   Zapotiltic       TRUE   2135   1232 0.6340956
## 247 122         Zapotitlán de Vadillo      TRUE   3806   4003 0.4873863
## 248 123              Zapotlán del Rey      TRUE   1963   1357 0.5912651
## 249  23             Zapotlán el Grande     TRUE   2395   2076 0.5356743
## 250 124                    Zapotlanejo     TRUE  22031  22372 0.4961602
```

```
boxplot(subtotales_municipios$FEM_PROP ~ subtotales_municipios$POBL_MENORES,
        col = c("coral","lightblue"))
```



```
# generar dos tablas intermedias para poblaciones mayores y menores
subtotales_municipios_pobl_mayores <- subtotales_municipios[subtotales_municipios$POBL_MENORE
S == FALSE,
                                                            c("MUN", "POBFEM", "POBMAS", "FEM
_PROP")]
subtotales_municipios_pobl_menores <- subtotales_municipios[subtotales_municipios$POBL_MENORE
S == TRUE,
                                                            c("MUN", "POBFEM", "POBMAS", "FEM
_PROP")]

# realizar join de las dos tablas
subtotales_municipios_pobl <- merge(subtotales_municipios_pobl_mayores,
                                    subtotales_municipios_pobl_menores,
                                    by = "MUN", all = TRUE)
names(subtotales_municipios_pobl) <- c("MUN", "POBFEM_MAYORES", "POBMAS_MYORES", "FEM_PROP_MA
YORES",
                                       "POBFEM_MENORES", "POBMAS_MENORES", "FEM_PROP_MENORES"
)
# revisar la tabla combinada
head(subtotales_municipios_pobl)
```

```
##   MUN POBFEM_MAYORES POBMAS_MYORES FEM_PROP_MAYORES POBFEM_MENORES
## 1   1          16520         17859        0.4805259          12642
## 2   2           2441          2486        0.4954333           5027
## 3   3           4286          4201        0.5050077           1781
## 4   4           1826          1873        0.4936469           2379
## 5   5           7754          7936        0.4942001           2338
## 6   6          19537         19366        0.5021978           4401
##   POBMAS_MENORES FEM_PROP_MENORES
## 1          14536        0.4651556
## 2           4182        0.5458790
## 3           1936        0.4791499
## 4           2254        0.5134902
## 5           2454        0.4878965
## 6           4297        0.5059784
```

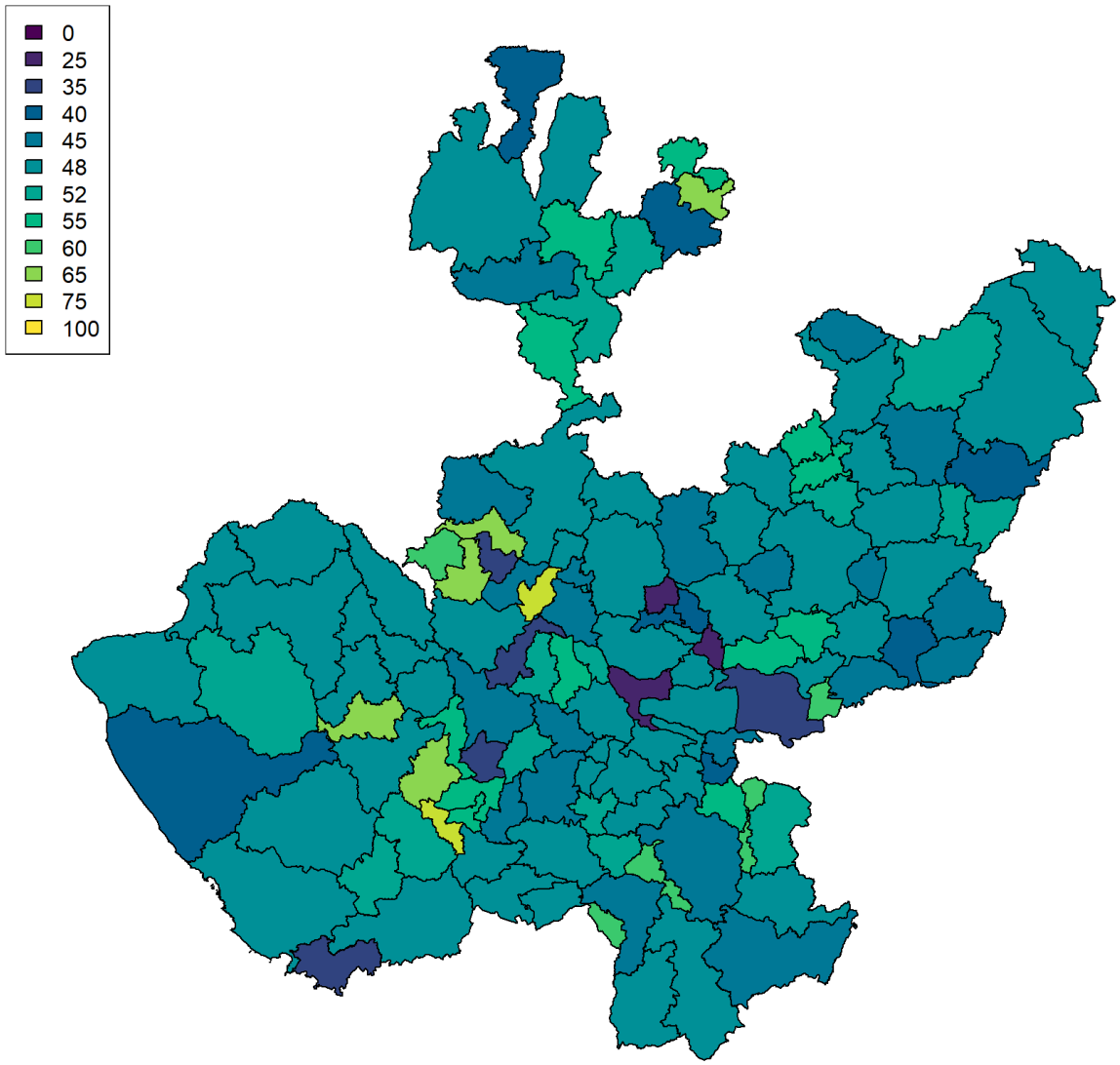
Presentación de resultados

Visualización de dos mapas de municipios del estado con el gradiente de colores para porcentaje de mujeres en localidades con menos que 50 habitantes, y en localidades con 50 habitantes o mas

```
# realizar join de la tabla vonculada con la capa de poligonos de municipios
municipios_jalisco <- merge(municipios_jalisco,
                            subtotales_municipios_pobl,
                            by.x = "CVE_MUN", by.y = "MUN", all = TRUE)

head(municipios_jalisco@data)
```

```
##     CVE_MUN CVE_ENT                   NOM_MUN CVE_MUNENT POBFEM_MAYORES
## 67       67      14            Puerto Vallarta      14067          12874
## 43       43      14                  La Huerta      14043          21105
## 81       81      14 Santa María de los Ángeles      14081           7755
## 41       41      14                   Huejúcar      14041           5384
## 42       42      14        Huejuquilla el Alto      14042          12586
## 115     115      14             Villa Guerrero      14115           5850
##     POBMAS_MYORES FEM_PROP_MAYORES POBFEM_MENORES POBMAS_MENORES
## 67          14446        0.4712299          13656          14255
## 43          21451        0.4959348          17120          16413
## 81           7874        0.4961930            968            508
## 41           4884        0.5243475           7486           5978
## 42          12190        0.5079916           6123           8186
## 115          6074        0.4906072           9580           7510
##     FEM_PROP_MENORES
## 67         0.4892695
## 43         0.5105419
## 81         0.6558266
## 41         0.5560012
## 42         0.4279125
## 115        0.5605617
```

```
#municipios_jalisco@data

# categoríaspara clasificación
rangos <- c(0,0.25,0.35,0.4,0.45,0.48,0.52,0.55,0.6,0.65,0.75,1)

# generar vectores con gama de colores conforme a categorias
#as.numeric(cut(municipios_jalisco@data$FEM_PROP_MENORES, rangos))
municipios_jalisco@data$Col1 <- hcl.colors(12)[as.numeric(cut(municipios_jalisco@data$FEM_PRO
P_MENORES,
                                                              rangos))]

municipios_jalisco@data$Col2 <- hcl.colors(12)[as.numeric(cut(municipios_jalisco@data$FEM_PRO
P_MAYORES,
                                                              rangos))]

# visualizar mapas
plot(municipios_jalisco, col = municipios_jalisco@data$Col1,
     main = "Porcentaje de mujeres en localidades menores")

legend("topleft", fill = hcl.colors(12),
       #col = municipios_jalisco@data$Col1,
       legend = rangos * 100)
```




```
plot(municipios_jalisco, col = municipios_jalisco@data$Col2,
     main = "Porcentaje de mujeres en localidades mayores")

legend("topleft", fill = hcl.colors(12),
       #col = municipios_jalisco@data$Col1,
       legend = rangos * 100)
```

Porcentaje de mujeres en localidades mayores