

# Producto 6 (Proyecto 1)

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## Descripción

# 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 poblaciones no es homogénea. Existen municipios con marcada disproporción en la distribución de géneros en las localidades menores.

## Parámetros generales

Cargar módulos

```
#library(foreign)  # puede ser necesario para lectura de archivos 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 ...
## $ NOM_ENT : Factor w/ 1 level "Jalisco": 1 1 1 1 1 1 1 1 1 ...
## $ MUN : int 0 0 0 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","1","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 mayor 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$POBFEM <- as.numeric(as.character(censo_2010A_sel$POBFEM))
censo_2010A_sel$POBMAS <- as.numeric(as.character(censo_2010A_sel$POBMAS))

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

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

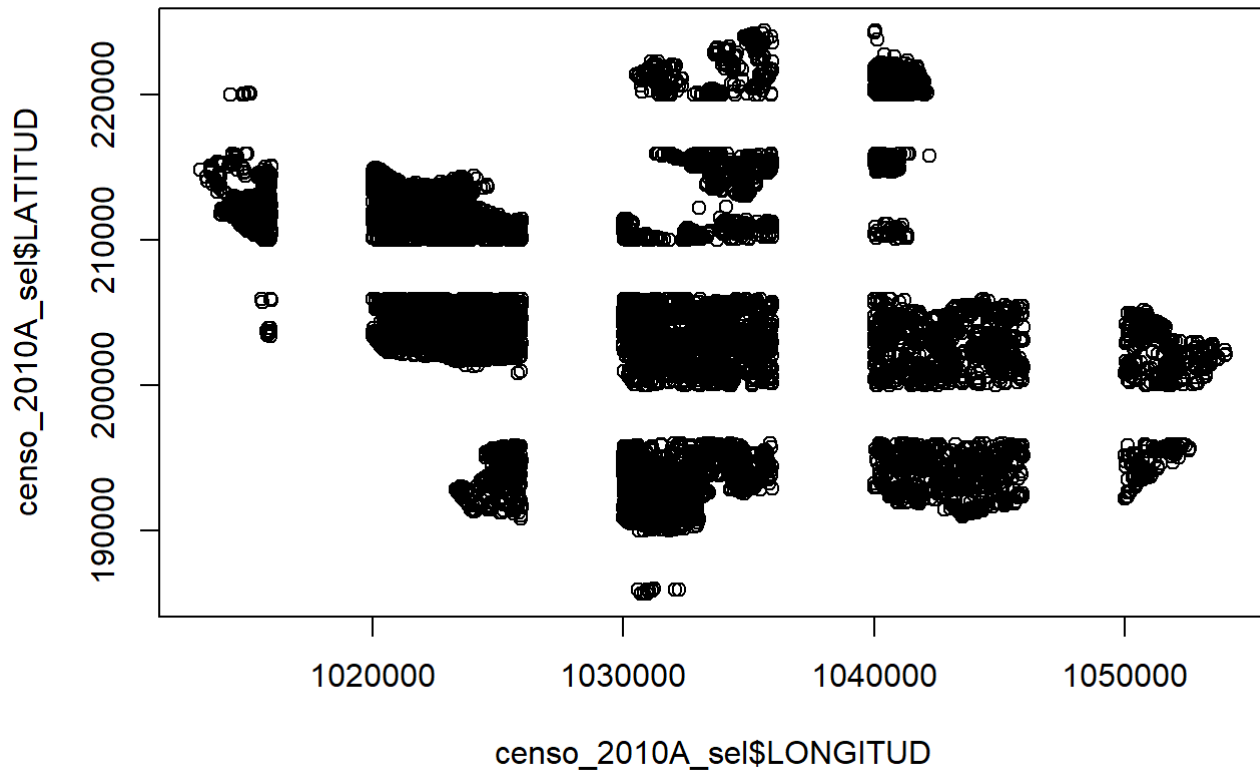
```
# quitar los registros con el código de localidad 0 (corresponden a subtoales)
censo_2010A_sel <- censo_2010A_sel[censo_2010A_sel$LOC != 0
                                   & censo_2010A_sel$LOC != 9999
                                   & censo_2010A_sel$LOC != 9998,]

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

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

## Revisión de georeferenciación de localidades

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



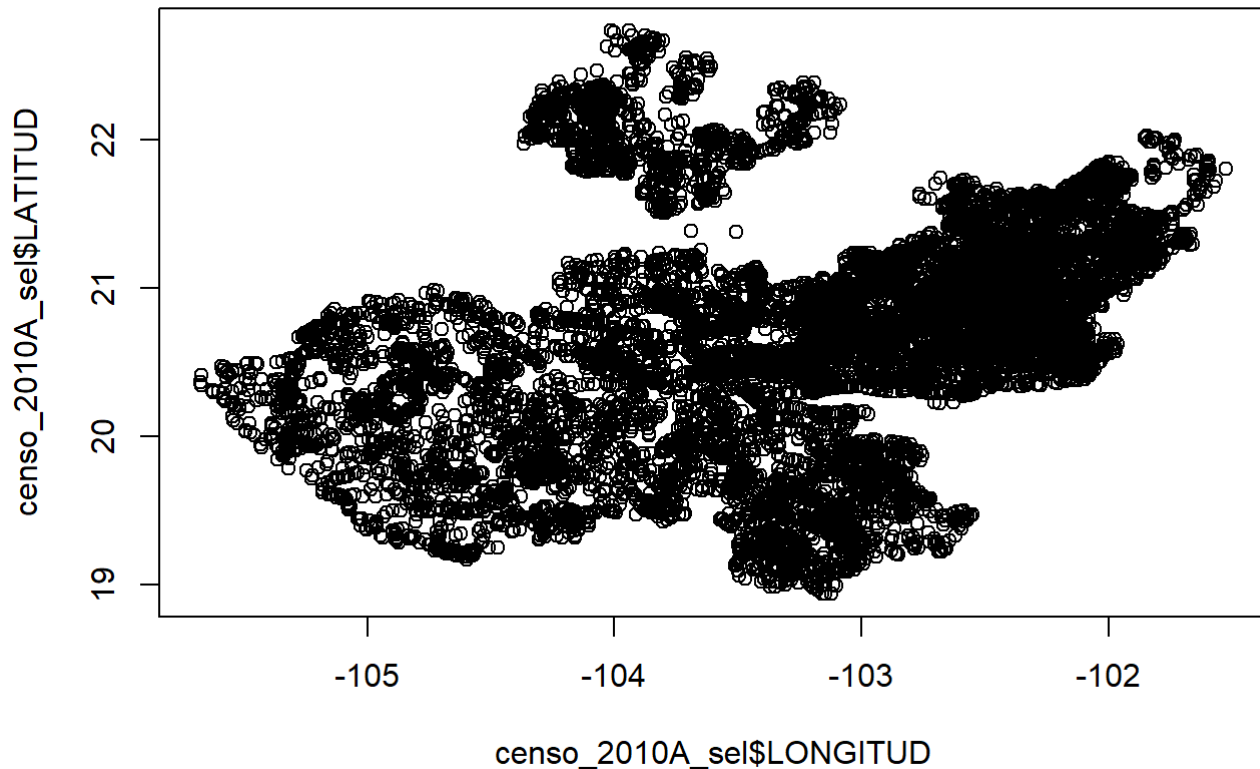
```
#a1 <- substr(censo_2010A_sel$LONGITUD,1,3)
#a2 <- substr(censo_2010A_sel$LONGITUD,4,5)
#a3 <- substr(censo_2010A_sel$LONGITUD,6,7)
#a1
#a2
#a3

# 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", layer: "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 ...
## $ 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

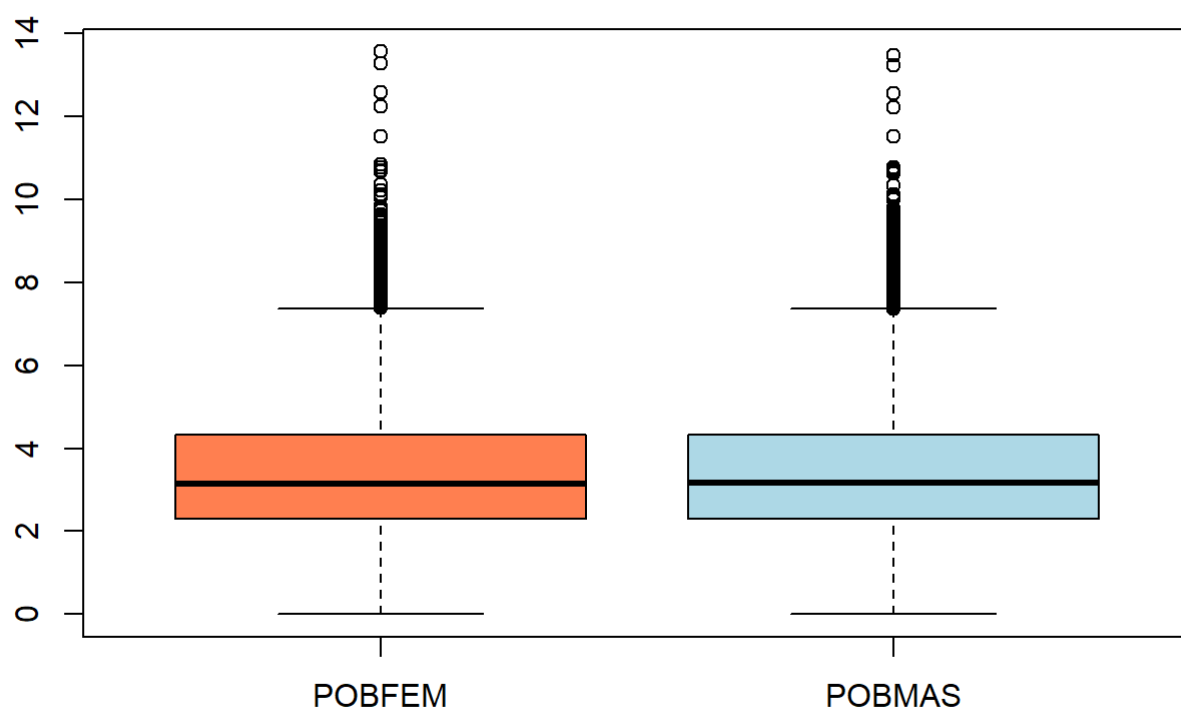
Rvisar estaísticas generales de población, clasificar en localidades en menores (<50 habitantes) y mayores, calcular subtotales por municipio y por tipo de poblacion, calcular proporción de mujeres

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

```
##      POBTOT      POBFEM      POBMAS
## Min.   :    1.0  Min.   :    0.0  Min.   :    1.0
## 1st Qu.:    5.0  1st Qu.:   10.0  1st Qu.:   10.0
## Median :   14.0  Median :   23.0  Median :   24.0
## Mean   :  671.5  Mean   :  598.9  Mean   :  574.3
## 3rd Qu.:   60.0  3rd Qu.:   76.0  3rd Qu.:   76.0
## Max.   :1495182.0 Max.   :777783.0 Max.   :717399.0
##                NA's   :4704      NA's   :4704
```

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

```
## Warning in bplt(at[i], wid = width[i], stats = z$stats[, i], out =
## z$out[z$group == : Outlier (-Inf) in boxplot 1 is not drawn
```



```
#hist(censo_2010A_sel$POBTOT)
```

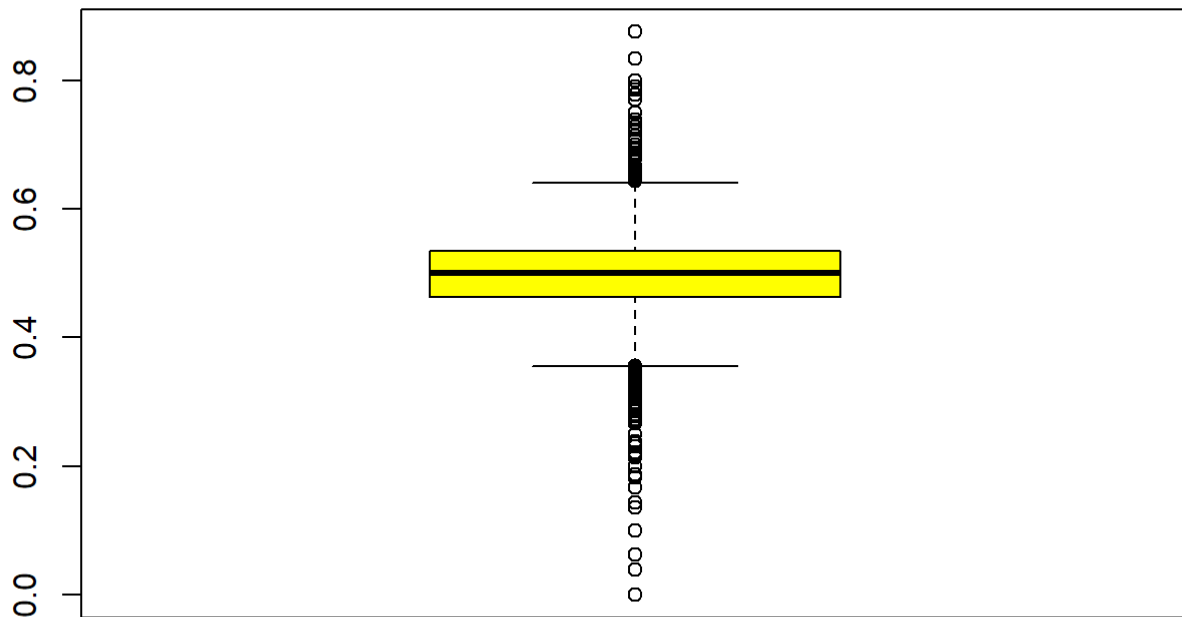
```
sum(censo_2010A_sel$POBTOT)
```

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

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

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

## Proporción hombres/mujeres



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

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

##	MUN	NOM_MUN	POBL_MENORES	POBFEM	POBMAS	FEM_PROP
## 1	1	Acatic	FALSE	10245	9760	0.5121220
## 2	2	Acatlán de Juárez	FALSE	10899	10633	0.5061769
## 3	3	Ahualulco de Mercado	FALSE	10967	10598	0.5085555
## 4	4	Amacueca	FALSE	2670	2508	0.5156431
## 5	5	Amatitán	FALSE	7293	7187	0.5036602
## 6	6	Ameca	FALSE	29131	27804	0.5116536
## 7	8	Arandas	FALSE	35719	33231	0.5180421
## 8	10	Atemajac de Brizuela	FALSE	3277	3213	0.5049307
## 9	11	Atengo	FALSE	2553	2733	0.4829739
## 10	12	Atenguillo	FALSE	1870	1785	0.5116279
## 11	13	Atotonilco el Alto	FALSE	29043	27761	0.5112844
## 12	14	Atoyac	FALSE	4228	3881	0.5213960
## 13	15	Autlán de Navarro	FALSE	28970	27712	0.5110970
## 14	16	Ayotlán	FALSE	19326	18240	0.5144546
## 15	17	Ayutla	FALSE	5982	5909	0.5030695
## 16	19	Bolaños	FALSE	2534	2540	0.4994088
## 17	20	Cabo Corrientes	FALSE	4334	4499	0.4906600
## 18	117	Cañadas de Obregón	FALSE	1959	1841	0.5155263
## 19	21	Casimiro Castillo	FALSE	10723	10554	0.5039714
## 20	30	Chapala	FALSE	24797	23761	0.5106677
## 21	31	Chimaltitán	FALSE	1435	1376	0.5104945
## 22	32	Chiquilistlán	FALSE	2844	2814	0.5026511
## 23	22	Cihuatlán	FALSE	19083	19415	0.4956881
## 24	24	Cocula	FALSE	13359	12620	0.5142230
## 25	25	Colotlán	FALSE	9084	8421	0.5189374
## 26	26	Concepción de Buenos Aires	FALSE	2870	2956	0.4926193
## 27	27	Cuautitlán de García Barragán	FALSE	8012	8175	0.4949651
## 28	28	Cuautla	FALSE	1007	925	0.5212215
## 29	29	Cuquío	FALSE	8624	7844	0.5236823
## 30	33	Degollado	FALSE	10590	9708	0.5217263
## 31	34	Ejutla	FALSE	954	988	0.4912461
## 32	9	El Arenal	FALSE	8733	8445	0.5083828
## 33	37	El Grullo	FALSE	12157	11535	0.5131268
## 34	54	El Limón	FALSE	2718	2727	0.4991736
## 35	70	El Salto	FALSE	69144	68935	0.5007568
## 36	35	Encarnación de Díaz	FALSE	24817	22800	0.5211794
## 37	36	Etzatlán	FALSE	9399	9061	0.5091549
## 38	79	Gómez Farías	FALSE	7187	6735	0.5162333
## 39	38	Guachinango	FALSE	1960	1944	0.5020492
## 40	39	Guadalajara	FALSE	777783	717399	0.5201929
## 41	40	Hostotipaquillo	FALSE	4600	5294	0.4649282
## 42	41	Huejúcar	FALSE	2957	2702	0.5225305
## 43	42	Huejuquilla el Alto	FALSE	4262	3966	0.5179874
## 44	44	Ixtlahuacán de los Membrillos	FALSE	20155	19860	0.5036861
## 45	45	Ixtlahuacán del Río	FALSE	9114	8417	0.5198791
## 46	46	Jalostotitlán	FALSE	15203	14449	0.5127142
## 47	47	Jamay	FALSE	11513	11299	0.5046905
## 48	48	Jesús María	FALSE	9111	7671	0.5429031
## 49	49	Jilotlán de los Dolores	FALSE	3916	4099	0.4885839
## 50	50	Jocotepec	FALSE	21118	20610	0.5060870
## 51	51	Juanacatlán	FALSE	6500	6616	0.4955779
## 52	52	Juchitlán	FALSE	2792	2551	0.5225529
## 53	18	La Barca	FALSE	33135	30661	0.5193899
## 54	43	La Huerta	FALSE	11167	11357	0.4957823
## 55	57	La Manzanilla de la Paz	FALSE	1925	1742	0.5249523
## 56	53	Lagos de Moreno	FALSE	77025	72090	0.5165476

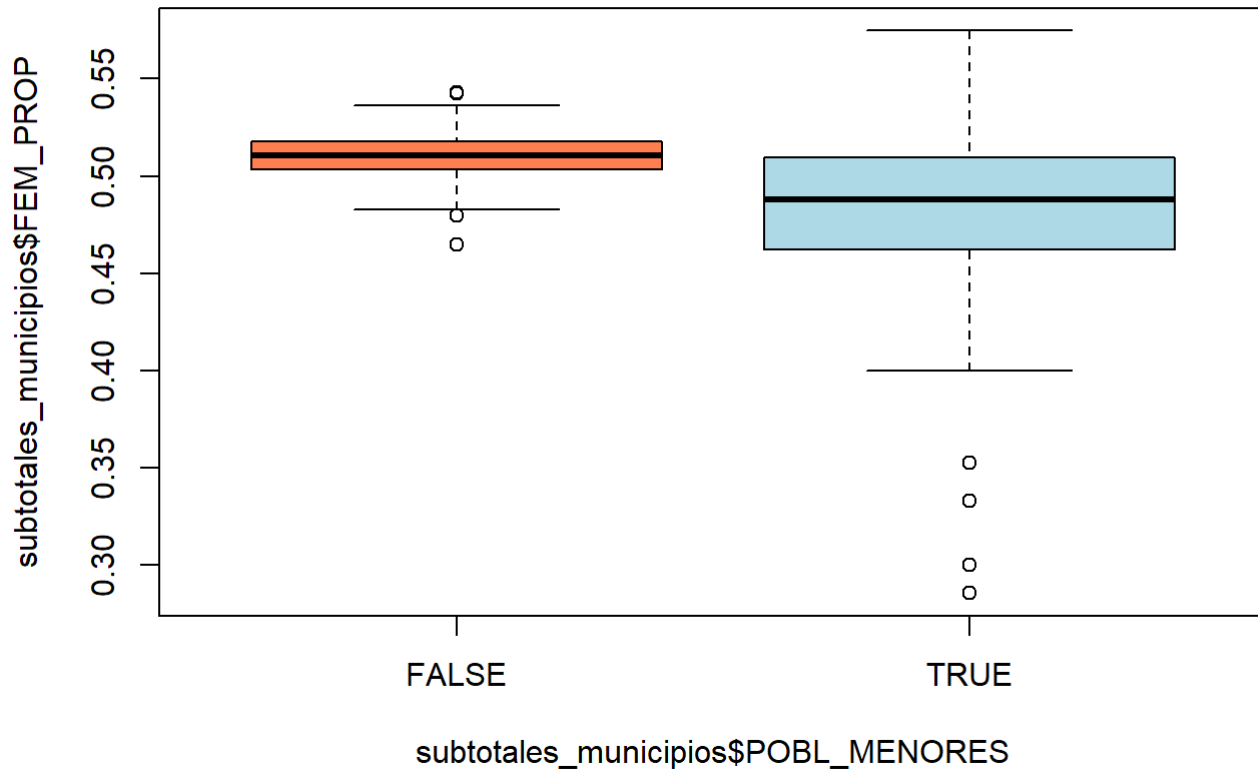
## 57	55	Magdalena	FALSE	10688	10517	0.5040321
## 58	58	Mascota	FALSE	6545	6284	0.5101723
## 59	59	Mazamitla	FALSE	6704	6056	0.5253918
## 60	60	Mexticacán	FALSE	3036	2560	0.5425304
## 61	61	Mezquitic	FALSE	6278	5903	0.5153928
## 62	62	Mixtlán	FALSE	1685	1702	0.4974904
## 63	63	Ocotlán	FALSE	47348	45259	0.5112788
## 64	64	Ojuelos de Jalisco	FALSE	15273	14435	0.5141039
## 65	65	Pihuamo	FALSE	5674	5608	0.5029250
## 66	66	Poncitlán	FALSE	24486	23511	0.5101569
## 67	67	Puerto Vallarta	FALSE	126754	128174	0.4972149
## 68	69	Quitupan	FALSE	3961	3426	0.5362123
## 69	71	San Cristóbal de la Barranca	FALSE	1143	1154	0.4976056
## 70	72	San Diego de Alejandría	FALSE	3028	2751	0.5239661
## 71	113	San Gabriel	FALSE	7634	7321	0.5104647
## 72	125	San Ignacio Cerro Gordo	FALSE	8799	8171	0.5185032
## 73	73	San Juan de los Lagos	FALSE	31544	30292	0.5101236
## 74	7	San Juanito de Escobedo	FALSE	4431	4451	0.4988741
## 75	74	San Julián	FALSE	7857	6990	0.5291978
## 76	75	San Marcos	FALSE	1729	1768	0.4944238
## 77	76	San Martín de Bolaños	FALSE	1445	1390	0.5097002
## 78	77	San Martín Hidalgo	FALSE	13453	12696	0.5144747
## 79	78	San Miguel el Alto	FALSE	14933	13781	0.5200599
## 80	80	San Sebastián del Oeste	FALSE	2447	2653	0.4798039
## 81	81	Santa María de los Ángeles	FALSE	1927	1706	0.5304156
## 82	56	Santa María del Oro	FALSE	793	757	0.5116129
## 83	82	Sayula	FALSE	17981	16597	0.5200127
## 84	83	Tala	FALSE	34499	34069	0.5031356
## 85	84	Talpa de Allende	FALSE	6567	6455	0.5043004
## 86	85	Tamazula de Gordiano	FALSE	18723	17713	0.5138599
## 87	86	Tapalpa	FALSE	8881	8501	0.5109308
## 88	87	Tecalitlán	FALSE	7684	7155	0.5178247
## 89	89	Techaluta de Montenegro	FALSE	1767	1699	0.5098096
## 90	88	Tecolotlán	FALSE	8185	8178	0.5002139
## 91	90	Tenamaxtlán	FALSE	3432	3365	0.5049286
## 92	91	Teocaltiche	FALSE	20496	18325	0.5279617
## 93	92	Teocuitatlán de Corona	FALSE	5418	5201	0.5102175
## 94	93	Tepatitlán de Morelos	FALSE	67958	64278	0.5139145
## 95	94	Tequila	FALSE	19765	19184	0.5074585
## 96	95	Teuchitlán	FALSE	4631	4387	0.5135285
## 97	96	Tizapán el Alto	FALSE	10630	10096	0.5128824
## 98	97	Tlajomulco de Zúñiga	FALSE	208576	205810	0.5033375
## 99	98	Tlaquepaque	FALSE	308134	299821	0.5068369
## 100	99	Tolimán	FALSE	4696	4531	0.5089412
## 101	100	Tomatlán	FALSE	16699	17224	0.4922619
## 102	101	Tonalá	FALSE	235196	242927	0.4919153
## 103	102	Tonaya	FALSE	2988	2797	0.5165082
## 104	103	Tonila	FALSE	3657	3536	0.5084110
## 105	104	Totatiche	FALSE	1887	1849	0.5050857
## 106	105	Tototlán	FALSE	10983	10390	0.5138726
## 107	106	Tuxcacuesco	FALSE	2010	2116	0.4871546
## 108	107	Tuxcueca	FALSE	3188	2967	0.5179529
## 109	108	Tuxpan	FALSE	17542	16229	0.5194398
## 110	109	Unión de San Antonio	FALSE	8390	7683	0.5219934
## 111	110	Unión de Tula	FALSE	6994	6486	0.5188427
## 112	111	Valle de Guadalupe	FALSE	2935	2852	0.5071712
## 113	112	Valle de Juárez	FALSE	2846	2646	0.5182083
## 114	114	Villa Corona	FALSE	8523	8243	0.5083502

## 115	115	Villa Guerrero	FALSE	2572	2515	0.5056025
## 116	116	Villa Hidalgo	FALSE	9557	8925	0.5170977
## 117	68	Villa Purificación	FALSE	5163	5249	0.4958701
## 118	118	Yahualica de González Gallo	FALSE	10931	9866	0.5256047
## 119	119	Zacoalco de Torres	FALSE	14136	13632	0.5090752
## 120	120	Zapopan	FALSE	634924	606710	0.5113616
## 121	121	Zapotiltic	FALSE	14943	14111	0.5143182
## 122	122	Zapotitlán de Vadillo	FALSE	3218	3184	0.5026554
## 123	123	Zapotlán del Rey	FALSE	8780	8532	0.5071627
## 124	23	Zapotlán el Grande	FALSE	51640	47453	0.5211266
## 125	124	Zapotlanejo	FALSE	31486	29991	0.5121590
## 126	1	Acatic	TRUE	532	509	0.5110471
## 127	2	Acatlán de Juárez	TRUE	69	76	0.4758621
## 128	3	Ahualulco de Mercado	TRUE	43	48	0.4725275
## 129	4	Amacueca	TRUE	127	117	0.5204918
## 130	5	Amatitán	TRUE	56	55	0.5045045
## 131	6	Ameca	TRUE	134	149	0.4734982
## 132	8	Arandas	TRUE	1688	1613	0.5113602
## 133	10	Atemajac de Brizuela	TRUE	58	74	0.4393939
## 134	11	Atengo	TRUE	34	46	0.4250000
## 135	12	Atenguillo	TRUE	188	174	0.5193370
## 136	13	Atotonilco el Alto	TRUE	344	312	0.5243902
## 137	14	Atoyac	TRUE	54	48	0.5294118
## 138	15	Autlán de Navarro	TRUE	212	204	0.5096154
## 139	16	Ayotlán	TRUE	315	307	0.5064309
## 140	17	Ayutla	TRUE	301	322	0.4831461
## 141	19	Bolaños	TRUE	574	512	0.5285451
## 142	20	Cabo Corrientes	TRUE	429	547	0.4395492
## 143	117	Cañadas de Obregón	TRUE	117	112	0.5109170
## 144	21	Casimiro Castillo	TRUE	41	54	0.4315789
## 145	30	Chapala	TRUE	86	84	0.5058824
## 146	31	Chimaltitán	TRUE	401	417	0.4902200
## 147	32	Chiquilistlán	TRUE	67	73	0.4785714
## 148	22	Cihuatlán	TRUE	168	191	0.4679666
## 149	24	Cocula	TRUE	63	54	0.5384615
## 150	25	Colotlán	TRUE	271	255	0.5152091
## 151	26	Concepción de Buenos Aires	TRUE	41	44	0.4823529
## 152	27	Cuautitlán de García Barragán	TRUE	466	498	0.4834025
## 153	28	Cuautla	TRUE	77	77	0.5000000
## 154	29	Cuquío	TRUE	558	509	0.5229616
## 155	33	Degollado	TRUE	346	333	0.5095729
## 156	34	Ejutla	TRUE	50	72	0.4098361
## 157	9	El Arenal	TRUE	153	156	0.4951456
## 158	37	El Grullo	TRUE	20	27	0.4255319
## 159	54	El Limón	TRUE	24	21	0.5333333
## 160	70	El Salto	TRUE	50	37	0.5747126
## 161	35	Encarnación de Díaz	TRUE	1435	1418	0.5029793
## 162	36	Etzatlán	TRUE	43	50	0.4623656
## 163	79	Gómez Farías	TRUE	23	24	0.4893617
## 164	38	Guachinango	TRUE	119	140	0.4594595
## 165	39	Guadalajara	TRUE	2	5	0.2857143
## 166	40	Hostotipaquillo	TRUE	148	161	0.4789644
## 167	41	Huejúcar	TRUE	205	188	0.5216285
## 168	42	Huejuquilla el Alto	TRUE	239	221	0.5195652
## 169	44	Ixtlahuacán de los Membrillos	TRUE	345	372	0.4811715
## 170	45	Ixtlahuacán del Río	TRUE	529	555	0.4880074
## 171	46	Jalostotitlán	TRUE	973	936	0.5096909
## 172	47	Jamay	TRUE	20	20	0.5000000

## 173	48	Jesús María	TRUE	820	782	0.5118602
## 174	49	Jilotlán de los Dolores	TRUE	545	593	0.4789104
## 175	50	Jocotepec	TRUE	142	157	0.4749164
## 176	51	Juanacatlán	TRUE	28	41	0.4057971
## 177	52	Juchitlán	TRUE	62	58	0.5166667
## 178	18	La Barca	TRUE	120	111	0.5194805
## 179	43	La Huerta	TRUE	314	350	0.4728916
## 180	57	La Manzanilla de la Paz	TRUE	37	45	0.4512195
## 181	53	Lagos de Moreno	TRUE	1829	1853	0.4967409
## 182	55	Magdalena	TRUE	31	43	0.4189189
## 183	58	Mascota	TRUE	492	511	0.4905284
## 184	59	Mazamitla	TRUE	203	202	0.5012346
## 185	60	Mexticacán	TRUE	164	138	0.5430464
## 186	61	Mezquitic	TRUE	1845	1719	0.5176768
## 187	62	Mixtlán	TRUE	60	60	0.5000000
## 188	63	Ocotlán	TRUE	122	144	0.4586466
## 189	64	Ojuelos de Jalisco	TRUE	111	122	0.4763948
## 190	65	Pihuamo	TRUE	252	260	0.4921875
## 191	66	Poncitlán	TRUE	129	151	0.4607143
## 192	67	Puerto Vallarta	TRUE	254	305	0.4543828
## 193	69	Quitupan	TRUE	594	562	0.5138408
## 194	71	San Cristóbal de la Barranca	TRUE	369	354	0.5103734
## 195	72	San Diego de Alejandría	TRUE	351	316	0.5262369
## 196	113	San Gabriel	TRUE	129	123	0.5119048
## 197	125	San Ignacio Cerro Gordo	TRUE	278	295	0.4851658
## 198	73	San Juan de los Lagos	TRUE	1364	1346	0.5033210
## 199	7	San Juanito de Escobedo	TRUE	4	8	0.3333333
## 200	74	San Julián	TRUE	242	241	0.5010352
## 201	75	San Marcos	TRUE	71	85	0.4551282
## 202	76	San Martín de Bolaños	TRUE	186	231	0.4460432
## 203	77	San Martín Hidalgo	TRUE	46	69	0.4000000
## 204	78	San Miguel el Alto	TRUE	1007	989	0.5045090
## 205	80	San Sebastián del Oeste	TRUE	245	276	0.4702495
## 206	81	Santa María de los Ángeles	TRUE	36	47	0.4337349
## 207	56	Santa María del Oro	TRUE	314	372	0.4577259
## 208	82	Sayula	TRUE	38	38	0.5000000
## 209	83	Tala	TRUE	106	110	0.4907407
## 210	84	Talpa de Allende	TRUE	396	472	0.4562212
## 211	85	Tamazula de Gordiano	TRUE	579	580	0.4995686
## 212	86	Tapalpa	TRUE	277	269	0.5073260
## 213	87	Tecalitlán	TRUE	731	799	0.4777778
## 214	89	Techaluta de Montenegro	TRUE	6	6	0.5000000
## 215	88	Tecolotlán	TRUE	81	88	0.4792899
## 216	90	Tenamaxtlán	TRUE	94	101	0.4820513
## 217	91	Teocaltiche	TRUE	432	433	0.4994220
## 218	92	Teocuitatlán de Corona	TRUE	103	99	0.5099010
## 219	93	Tepatitlán de Morelos	TRUE	1607	1640	0.4949184
## 220	94	Tequila	TRUE	618	673	0.4786987
## 221	95	Teuchitlán	TRUE	6	14	0.3000000
## 222	96	Tizapán el Alto	TRUE	32	38	0.4571429
## 223	97	Tlajomulco de Zúñiga	TRUE	819	861	0.4875000
## 224	98	Tlaquepaque	TRUE	58	65	0.4715447
## 225	99	Tolimán	TRUE	140	163	0.4620462
## 226	100	Tomatlán	TRUE	334	344	0.4926254
## 227	101	Tonalá	TRUE	214	257	0.4543524
## 228	102	Tonaya	TRUE	52	62	0.4561404
## 229	103	Tonila	TRUE	12	22	0.3529412
## 230	104	Totatiche	TRUE	290	304	0.4882155

## 231 105	Tototlán	TRUE	111	139	0.4440000
## 232 106	Tuxcacuesco	TRUE	47	44	0.5164835
## 233 107	Tuxcueca	TRUE	59	69	0.4609375
## 234 108	Tuxpan	TRUE	114	124	0.4789916
## 235 109	Unión de San Antonio	TRUE	439	427	0.5069284
## 236 110	Unión de Tula	TRUE	79	78	0.5031847
## 237 111	Valle de Guadalupe	TRUE	324	344	0.4850299
## 238 112	Valle de Juárez	TRUE	99	113	0.4669811
## 239 114	Villa Corona	TRUE	76	94	0.4470588
## 240 115	Villa Guerrero	TRUE	220	196	0.5288462
## 241 116	Villa Hidalgo	TRUE	82	91	0.4739884
## 242 68	Villa Purificación	TRUE	419	515	0.4486081
## 243 118	Yahualica de González Gallo	TRUE	634	582	0.5213816
## 244 119	Zacoalco de Torres	TRUE	43	41	0.5119048
## 245 120	Zapopan	TRUE	650	705	0.4797048
## 246 121	Zapotiltic	TRUE	36	38	0.4864865
## 247 122	Zapotitlán de Vadillo	TRUE	120	123	0.4938272
## 248 123	Zapotlán del Rey	TRUE	58	66	0.4677419
## 249 23	Zapotlán el Grande	TRUE	79	68	0.5374150
## 250 124	Zapotlanejo	TRUE	904	978	0.4803401

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



## Reacomodar y vincular datos en tablas

```
# 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	10245	9760	0.5121220	532
## 2	2	10899	10633	0.5061769	69
## 3	3	10967	10598	0.5085555	43
## 4	4	2670	2508	0.5156431	127
## 5	5	7293	7187	0.5036602	56
## 6	6	29131	27804	0.5116536	134

##	POBMAS_MENORES	FEM_PROP_MENORES
## 1	509	0.5110471
## 2	76	0.4758621
## 3	48	0.4725275
## 4	117	0.5204918
## 5	55	0.5045045
## 6	149	0.4734982

```
# realizar JOIN de la tabla vinculada 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	126754
## 43	43	14	La Huerta	14043	11167
## 81	81	14	Santa María de los Ángeles	14081	1927
## 41	41	14	Huejúcar	14041	2957
## 42	42	14	Huejuquilla el Alto	14042	4262
## 115	115	14	Villa Guerrero	14115	2572

##	POBMAS_MYORES	FEM_PROP_MAYORES	POBFEM_MENORES	POBMAS_MENORES
## 67	128174	0.4972149	254	305
## 43	11357	0.4957823	314	350
## 81	1706	0.5304156	36	47
## 41	2702	0.5225305	205	188
## 42	3966	0.5179874	239	221
## 115	2515	0.5056025	220	196

##	FEM_PROP_MENORES
## 67	0.4543828
## 43	0.4728916
## 81	0.4337349
## 41	0.5216285
## 42	0.5195652
## 115	0.5288462

```
#municipios_jalisco@data
```

## 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

Vesión con *hcl.colors()*

```
# categorías para clasificación
rangos <- c(0,0.3,0.4,0.45,0.47,0.49,0.51,0.53,0.55,0.6,0.7,1)

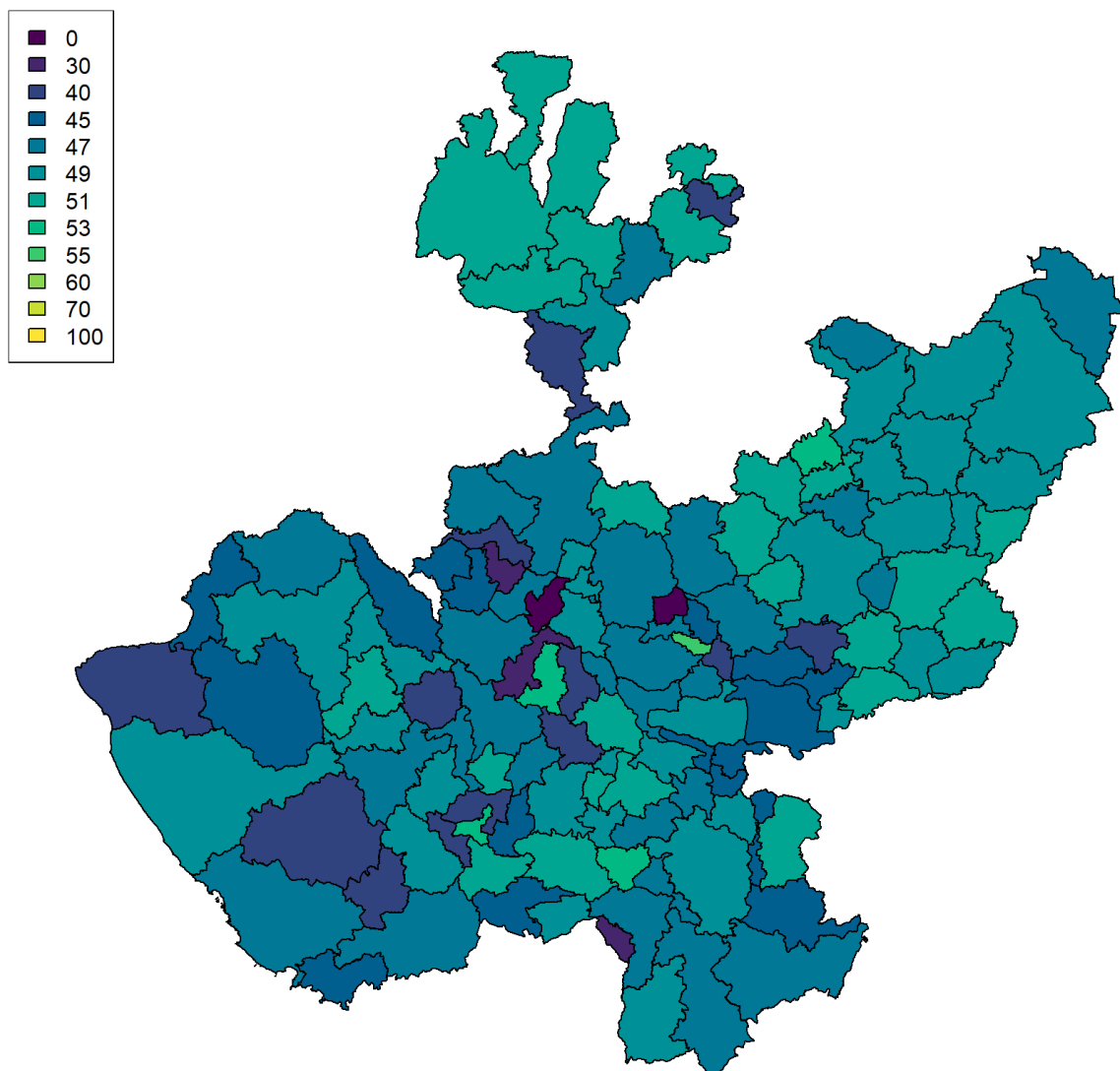
# generar vectores con gama de colores conforme a categorías
municipios_jalisco@data$Col1 <- hcl.colors(12)[as.numeric(
  cut(municipios_jalisco@data$FEM_PROP_MENORES, rangos))]

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

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

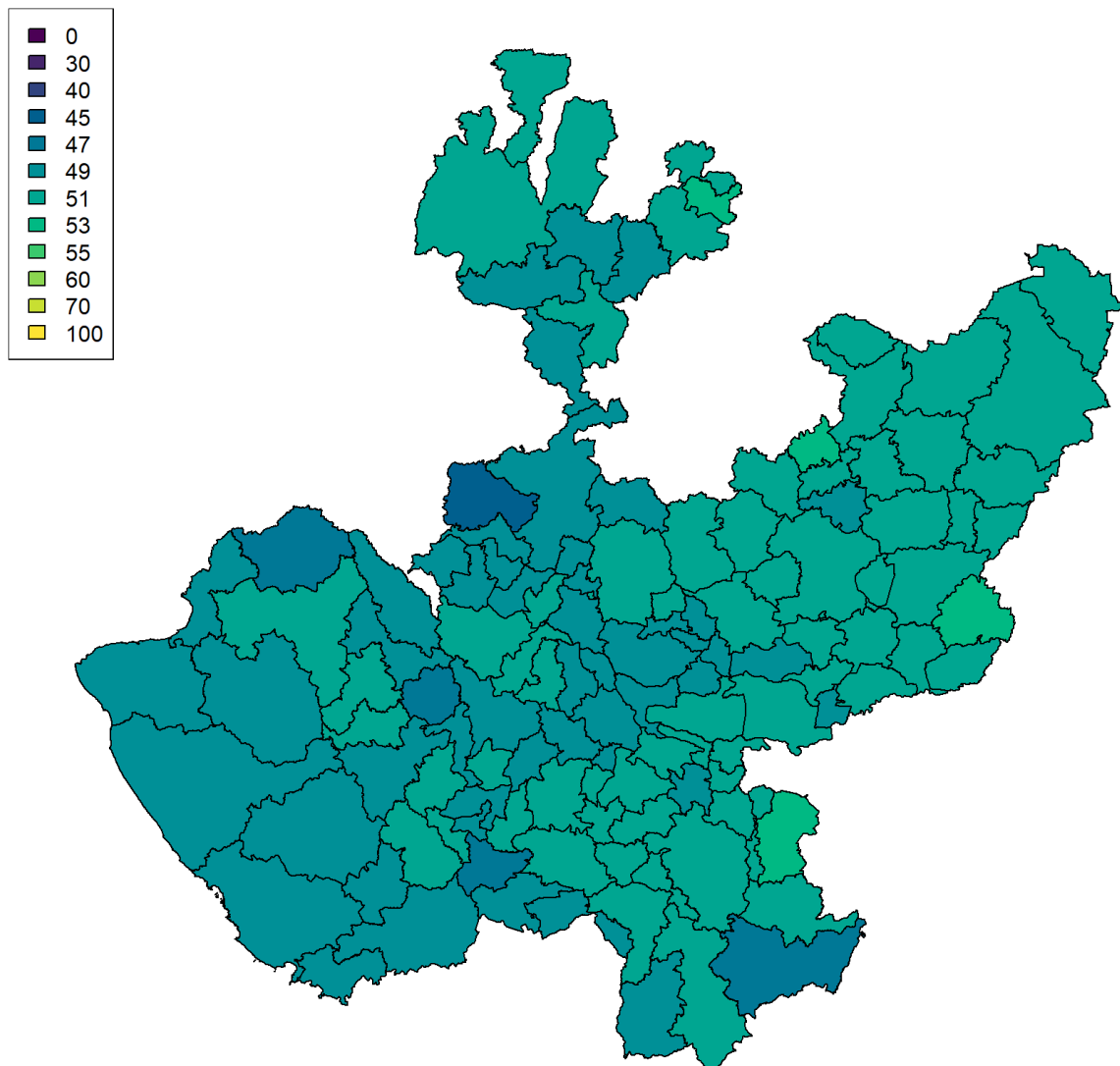
legend("topleft", fill = hcl.colors(12),
     legend = rangos * 100)
```

### Porcentaje de mujeres en localidades menores



```
plot(municipios_jalisco, col = municipios_jalisco@data$Col2,  
     main = "Porcentaje de mujeres en localidades mayores")  
  
legend("topleft", fill = hcl.colors(12),  
      legend = rangos * 100)
```

### Porcentaje de mujeres en localidades mayores



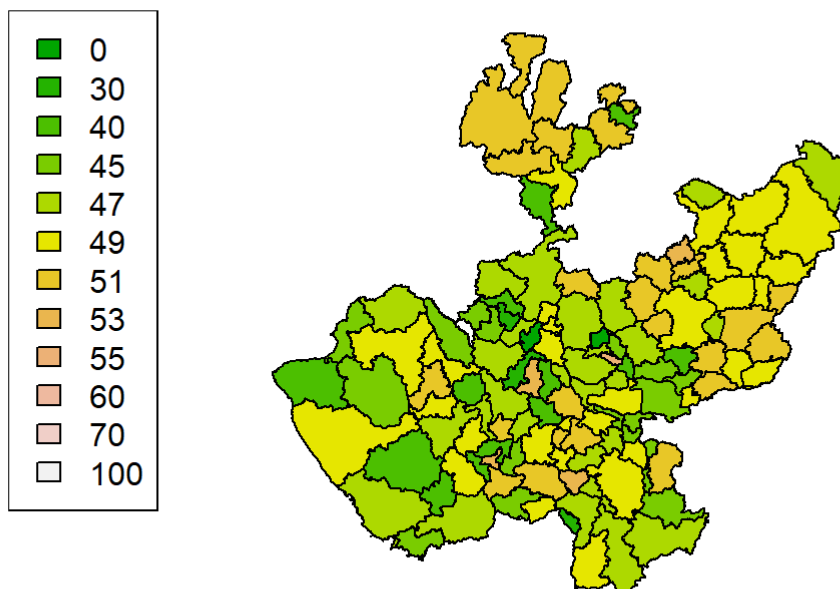
### Alternativa de gradiente de colores con *terrain.colors()*

```
municipios_jalisco@data$Col1 <- terrain.colors(12)[as.numeric(cut(municipios_jalisco@data$FEM
_PROP_MENORES,
                                rangos)))]

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

legend("topleft", fill = terrain.colors(12),
      legend = rangos * 100)
```

## Porcentaje de mujeres en localidades menores



## Grafica de barras por municipio

```
par(mar=c(5,15,1,1), cex = 0.9)
# barplot
barplot(t(as.matrix(
  municipios_jalisco@data[
    order(municipios_jalisco@data$FEM_PROP_MENORES),
    c("FEM_PROP_MENORES", "FEM_PROP_MAYORES")
  ]
)),
names.arg = municipios_jalisco@data[order(municipios_jalisco@data$FEM_PROP_MENORES),
"NOM_MUN"],
main = "Proporción mujeres/hombres por municipio de Jalisco",
xlab = "proporción de mujeres",
col = c("lightgreen", "tan"),
beside = TRUE, horiz = TRUE, las = 1)

legend("bottomright", fill = c("lightgreen", "tan"), bty = "n",
legend = c("localidades menores", "localidades mayores"))
```

Proporción mujeres/hombres por municipio de Jalisco

