

DA Lab task-1

Annual Vital Statistics Report-CRS

Name: **Ankit Dimri**

Roll No.: **17BCS004**

Code: (output along with code)

```
# importing libraries
```

```
library (tabulizer)
```

```
library (dplyr)
```

```
library (tidyr)
```

```
library (ggplot2)
```

```
library (stringr)
```

```
# extract all tables from the file
```

```
tab = extract_tables (file = "~/ankit/Github/Data-Analytics/datasets/task1/CRS-2016.pdf")
```

```
# Display table 6
```

```
tab [[6]]
```

```
> tab [[6]]
```

	[,1]	[,2]	[,3]	[,4]
[1,]	""	""	""	"Percentage of CRS"
[2,]	""	"Number of vital events registered"	"CRS Vital rates"	""
[3,]	"Year"	""	""	"rates to SRS rates"
[4,]	""	"Live births Still births Deaths"	"Births Deaths"	"Births Deaths"
[5,]	"1"	"2 3 4"	"5 6"	"7 8"
[6,]	"2000"	"1009716 5472 351736"	"20.04 6.98"	"91.07 89.48"
[7,]	"2001"	"1017224 4557 365181"	"19.51 7.00"	"87.88 92.15"
[8,]	"2002"	"973653 4187 355662"	"18.85 6.89"	"85.29 95.69"
[9,]	"2003"	"1001749 3628 359661"	"19.31 6.93"	"88.58 96.25"
[10,]	"2004"	"988520 3943 343644"	"18.82 6.54"	"90.05 94.78"
[11,]	"2005"	"1007868 4538 364415"	"18.51 6.69"	"89.85 94.23"
[12,]	"2006"	"1046531 5091 387604"	"18.95 7.02"	"94.28 98.87"
[13,]	"2007"	"1046424 5526 381890"	"18.95 6.92"	"95.23 94.79"
[14,]	"2008"	"1082450 5069 372062"	"19.30 6.63"	"97.47 89.59"
[15,]	"2009"	"1076383 5729 373290"	"19.05 6.61"	"97.69 91.81"
[16,]	"2010"	"1071518 6587 381743"	"18.29 6.51"	"95.26 91.69"
[17,]	"2011"	"1108562 6940 384745"	"18.72 6.50"	"99.47 91.55"
[18,]	"2012"	"1124490 6524 407015"	"18.62 6.74"	"100.00 94.93"
[19,]	"2013"	"1068671 5708 413635"	"17.54 6.79"	"95.85 97.00"
[20,]	"2014"	"1087530 5685 411533"	"17.21 6.51"	"94.04 93.00"
[21,]	"2015"	"1053248 5067 393731"	"16.44 6.15"	"92.00 95.00"

```
[22,] "2016" "1107258 4477 420774" "16.42 6.28" "92.00 95.00"
```

Display data for years 2011 to 16

```
tab [[6]][17:22, ]
```

```
> tab [[6]][17:22, ]
      [,1]      [,2]      [,3]      [,4]
[1,] "2011" "1108562 6940 384745" "18.72 6.50" "99.47 91.55"
[2,] "2012" "1124490 6524 407015" "18.62 6.74" "100.00 94.93"
[3,] "2013" "1068671 5708 413635" "17.54 6.79" "95.85 97.00"
[4,] "2014" "1087530 5685 411533" "17.21 6.51" "94.04 93.00"
[5,] "2015" "1053248 5067 393731" "16.44 6.15" "92.00 95.00"
[6,] "2016" "1107258 4477 420774" "16.42 6.28" "92.00 95.00"
```

Put this in data frame

```
df = as.data.frame (tab [[6]] [17:22, ])
```

Print data frame

```
df
```

```
> df
      V1      V2      V3      V4
1 2011 1108562 6940 384745 18.72 6.50 99.47 91.55
2 2012 1124490 6524 407015 18.62 6.74 100.00 94.93
3 2013 1068671 5708 413635 17.54 6.79 95.85 97.00
4 2014 1087530 5685 411533 17.21 6.51 94.04 93.00
5 2015 1053248 5067 393731 16.44 6.15 92.00 95.00
6 2016 1107258 4477 420774 16.42 6.28 92.00 95.00
```

Tidy the data by separating V2, V3 and V4 into separate columns

```
df = separate(df, V2, into = c("2", "3", "4"), sep = ' ')
df = separate(df, V3, into = c("5", "6"), sep = ' ')
df = separate(df, V4, into = c("7", "8"), sep = ' ')
```

Rename columns

```
colnames(df)[colnames(df) == "V1"] <- "year"
```

```
colnames(df)[colnames(df) == "2"] <- "live.births"
```

```
colnames(df)[colnames(df) == "3"] <- "still.birch"
```

```
colnames(df)[colnames(df) == "4"] <- "deaths"
```

```
colnames(df)[colnames(df) == "5"] <- "crs.births"
```

```
colnames(df)[colnames(df) == "6"] <- "crs.deaths"
```

```
colnames(df)[colnames(df) == "7"] <- "srs.births"
```

```
colnames(df)[colnames(df) == "8"] <- "srs.deaths"
```

Print the tidy data frame

df

> df

	year	live.births	still.birch	deaths	crs.births	crs.deaths	srs.births	srs.deaths
1	2011	1108562	6940	384745	18.72	6.50	99.47	91.55
2	2012	1124490	6524	407015	18.62	6.74	100.00	94.93
3	2013	1068671	5708	413635	17.54	6.79	95.85	97.00
4	2014	1087530	5685	411533	17.21	6.51	94.04	93.00
5	2015	1053248	5067	393731	16.44	6.15	92.00	95.00
6	2016	1107258	4477	420774	16.42	6.28	92.00	95.00

vital = df [, 1:4]

vital\$year = vital\$year

vital\$live.births = as.numeric(vital\$live.births) /1000

vital\$still.birch = as.numeric(vital\$still.birch) /10

vital\$deaths = as.numeric(vital\$deaths) / 400

Changes for plot facilitation

y = c()

for (year in vital\$year) {

y = c(y, rep (c(year), 3))

}

class = rep (c("live.births", "still.birch", "deaths"), 6)

val = c()

for (i in 1:length (vital [,1])) {

val = c(val, c(vital\$live.births[i], vital\$still.birch[i], vital\$deaths[i]))

}

data = data.frame (y, class, val)

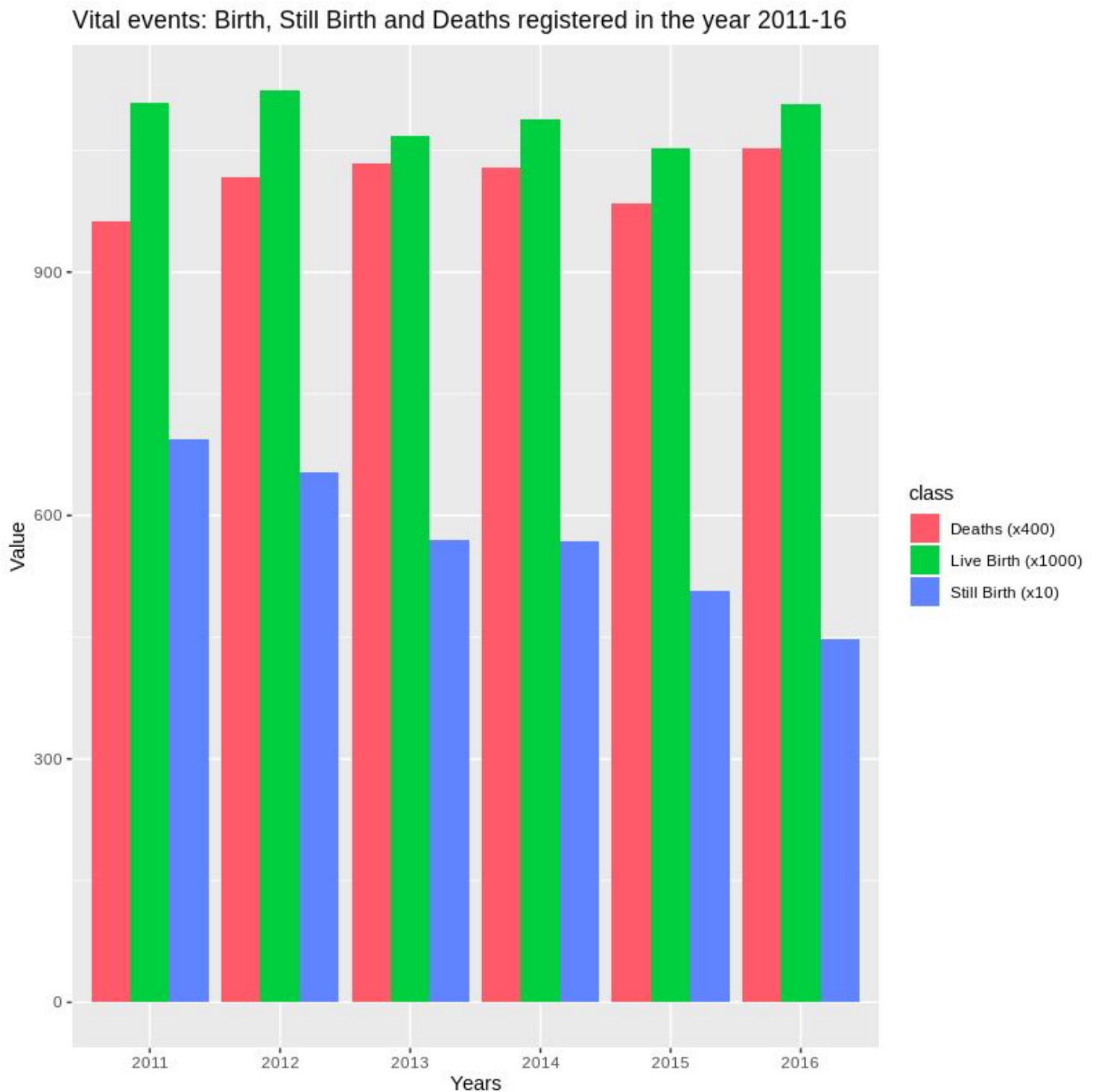
```
# Plot 1: Vital statistics
```

```
# Death: 1 unit is 400 deaths
```

```
# Live birth: 1 unit is 1000 live births
```

```
# Still birth: 1 unit is 10 still births
```

```
ggplot(data, aes(fill=class, y=val, x=factor(y))) + geom_bar(position="dodge", stat="identity") + xlab  
("Years") + ylab ("Value") + ggtitle ("Vital events: Birth, Still Birth and Deaths registered in the year  
2011-16") + scale_fill_discrete (labels=c("Deaths (x400)", "Live Birth (x1000)", "Still Birth (x10)"))
```



#####

District wise registered birth and deaths

dist = tab [[10]]

dist

> dist

```
      [,1]  [,2]
[1,] ""    "DISTRICTWISE REGISTERED BIRTHS, DEATHS, INFANT DEATHS,"
[2,] ""    "STILL BIRTHS AND RATES  URBAN-2016"
[3,] ""    "Birth Death Still Birth"
[4,] "Sl." "Registered"
[5,] ""    "District"
[6,] "No"  "Infant Death"
[7,] ""    "Registered Rate Registered Rate Registered Rate"
[8,] "1"   "2 3 4 5 6 7 8 9"
[9,] "1"   "BAGALKOTE 40009 21.91 5781 6.64 291 180 4.52"
[10,] "2"  "BANGALORE (R) 8674 17.93 1767 5.59 20 33 6.04"
[11,] "3"  "BANGALORE (U) 151277 13.97 56758 5.21 904 265 1.84"
[12,] "4"  "BELGAUM 66096 20.19 13315 6.52 614 547 9.21"
[13,] "5"  "BELLARY 38555 20.52 8371 6.12 425 163 5.35"
[14,] "6"  "BIDAR 31401 30.53 3996 6.06 256 353 9.05"
[15,] "7"  "BIJAPUR 35269 25.96 4878 6.18 286 47 3.17"
[16,] "8"  "CHAMARAJANAGAR 6795 11.99 1722 8.10 20 54 10.36"
[17,] "9"  "CHICKBALLAPUR 14527 17.90 2135 5.95 60 20 1.74"
[18,] "10" "CHIKMAGALUR 12409 23.91 2085 8.20 193 26 2.68"
[19,] "11" "CHITRADURGA 18847 16.51 3302 6.65 248 88 7.44"
[20,] "12" "DAKSHINA KANNADA 35027 13.81 12044 4.61 589 274 8.12"
[21,] "13" "DAVANAGERE 30788 21.16 6231 7.26 1138 435 13.16"
[22,] "14" "DHARWAD 33896 19.64 10655 7.36 901 157 5.1"
[23,] "15" "GADAG 15026 15.67 4115 6.95 345 245 12.27"
[24,] "16" "GULBARGA 47107 27.50 5526 4.90 459 80 1.33"
[25,] "17" "HASSAN 21205 20.31 4255 6.72 304 36 3.37"
[26,] "18" "HAVERI 18454 16.13 3018 5.79 307 240 12.1"
[27,] "19" "KODAGU 4968 27.80 880 6.17 57 2 2.13"
[28,] "20" "KOLAR 18251 23.98 3699 4.22 171 109 8.57"
[29,] "21" "KOPPAL 19956 19.73 2129 6.33 51 83 6.71"
[30,] "22" "MANDYA 15615 14.99 3287 6.28 209 12 2.88"
[31,] "23" "MYSORE 50055 20.01 16072 6.75 1404 16 0.46"
[32,] "24" "RAICHUR 21144 19.40 3929 5.20 506 4 0.39"
[33,] "25" "RAMANAGAR 7700 12.85 1764 5.43 31 14 2.06"
[34,] "26" "SHIMOGA 30940 17.88 6558 5.57 472 294 4.6"
[35,] "27" "TUMKUR 34417 16.35 5802 6.17 253 91 6.31"
[36,] "28" "UDUPI 15145 13.06 4090 3.79 163 104 8.61"
[37,] "29" "UTTARA KANNADA 21761 20.61 3155 5.10 140 148 9.58"
[38,] "30" "YADGIR 11604 23.00 1564 5.84 35 0 0.67"
[39,] ""   "STATE 876918 17.50 202883 5.72 10852 4120 4.41"
```

Clean-up the data

dist = dist [9:38,]

dist

```
> dist
      [,1] [,2]
[1,] "1"  "BAGALKOTE 40009 21.91 5781 6.64 291 180 4.52"
[2,] "2"  "BANGALORE (R) 8674 17.93 1767 5.59 20 33 6.04"
[3,] "3"  "BANGALORE (U) 151277 13.97 56758 5.21 904 265 1.84"
[4,] "4"  "BELGAUM 66096 20.19 13315 6.52 614 547 9.21"
[5,] "5"  "BELLARY 38555 20.52 8371 6.12 425 163 5.35"
[6,] "6"  "BIDAR 31401 30.53 3996 6.06 256 353 9.05"
[7,] "7"  "BIJAPUR 35269 25.96 4878 6.18 286 47 3.17"
[8,] "8"  "CHAMARAJANAGAR 6795 11.99 1722 8.10 20 54 10.36"
[9,] "9"  "CHICKBALLAPUR 14527 17.90 2135 5.95 60 20 1.74"
[10,] "10" "CHIKMAGALUR 12409 23.91 2085 8.20 193 26 2.68"
[11,] "11" "CHITRADURGA 18847 16.51 3302 6.65 248 88 7.44"
[12,] "12" "DAKSHINA KANNADA 35027 13.81 12044 4.61 589 274 8.12"
[13,] "13" "DAVANAGERE 30788 21.16 6231 7.26 1138 435 13.16"
[14,] "14" "DHARWAD 33896 19.64 10655 7.36 901 157 5.1"
[15,] "15" "GADAG 15026 15.67 4115 6.95 345 245 12.27"
[16,] "16" "GULBARGA 47107 27.50 5526 4.90 459 80 1.33"
[17,] "17" "HASSAN 21205 20.31 4255 6.72 304 36 3.37"
[18,] "18" "HAVERI 18454 16.13 3018 5.79 307 240 12.1"
[19,] "19" "KODAGU 4968 27.80 880 6.17 57 2 2.13"
[20,] "20" "KOLAR 18251 23.98 3699 4.22 171 109 8.57"
[21,] "21" "KOPPAL 19956 19.73 2129 6.33 51 83 6.71"
[22,] "22" "MANDYA 15615 14.99 3287 6.28 209 12 2.88"
[23,] "23" "MYSORE 50055 20.01 16072 6.75 1404 16 0.46"
[24,] "24" "RAICHUR 21144 19.40 3929 5.20 506 4 0.39"
[25,] "25" "RAMANAGAR 7700 12.85 1764 5.43 31 14 2.06"
[26,] "26" "SHIMOGA 30940 17.88 6558 5.57 472 294 4.6"
[27,] "27" "TUMKUR 34417 16.35 5802 6.17 253 91 6.31"
[28,] "28" "UDUPI 15145 13.06 4090 3.79 163 104 8.61"
[29,] "29" "UTTARA KANNADA 21761 20.61 3155 5.10 140 148 9.58"
[30,] "30" "YADGIR 11604 23.00 1564 5.84 35 0 0.67"
```

dist = as.data.frame (dist)

dist

```
> dist
      V1 V2
1 1 BAGALKOTE 40009 21.91 5781 6.64 291 180 4.52
2 2 BANGALORE (R) 8674 17.93 1767 5.59 20 33 6.04
3 3 BANGALORE (U) 151277 13.97 56758 5.21 904 265 1.84
4 4 BELGAUM 66096 20.19 13315 6.52 614 547 9.21
5 5 BELLARY 38555 20.52 8371 6.12 425 163 5.35
6 6 BIDAR 31401 30.53 3996 6.06 256 353 9.05
7 7 BIJAPUR 35269 25.96 4878 6.18 286 47 3.17
8 8 CHAMARAJANAGAR 6795 11.99 1722 8.10 20 54 10.36
9 9 CHICKBALLAPUR 14527 17.90 2135 5.95 60 20 1.74
10 10 CHIKMAGALUR 12409 23.91 2085 8.20 193 26 2.68
```

11	11	CHITRADURGA	18847	16.51	3302	6.65	248	88	7.44
12	12	DAKSHINA KANNADA	35027	13.81	12044	4.61	589	274	8.12
13	13	DAVANAGERE	30788	21.16	6231	7.26	1138	435	13.16
14	14	DHARWAD	33896	19.64	10655	7.36	901	157	5.1
15	15	GADAG	15026	15.67	4115	6.95	345	245	12.27
16	16	GULBARGA	47107	27.50	5526	4.90	459	80	1.33
17	17	HASSAN	21205	20.31	4255	6.72	304	36	3.37
18	18	HAVERI	18454	16.13	3018	5.79	307	240	12.1
19	19	KODAGU	4968	27.80	880	6.17	57	2	2.13
20	20	KOLAR	18251	23.98	3699	4.22	171	109	8.57
21	21	KOPPAL	19956	19.73	2129	6.33	51	83	6.71
22	22	MANDYA	15615	14.99	3287	6.28	209	12	2.88
23	23	MYSORE	50055	20.01	16072	6.75	1404	16	0.46
24	24	RAICHUR	21144	19.40	3929	5.20	506	4	0.39
25	25	RAMANAGAR	7700	12.85	1764	5.43	31	14	2.06
26	26	SHIMOGA	30940	17.88	6558	5.57	472	294	4.6
27	27	TUMKUR	34417	16.35	5802	6.17	253	91	6.31
28	28	UDUPI	15145	13.06	4090	3.79	163	104	8.61
29	29	UTTARA KANNADA	21761	20.61	3155	5.10	140	148	9.58
30	30	YADGIR	11604	23.00	1564	5.84	35	0	0.67

```
dst = str_extract(dist$V2, '^[[:digit:]]+')
val = str_remove_all (dist$V2, "[A-Z]\\(\\)")
val = str_remove (val, "[[:space:]]+")
```

```
dist = data.frame (District = dst, v = val)
```

```
dist = separate(dist, v, into = c("Birth", "Birth.rate", "Death", "Death.rate", "Infant.death", "Still.Birth",
"Still.Birth.rate"), sep = '[:blank:]+')
```

```
dist$Birth = as.numeric (dist$Birth)
dist$Birth.rate = as.numeric (dist$Birth.rate)
dist$Death = as.numeric (dist$Death)
dist$Death.rate = as.numeric (dist$Death.rate)
dist$Infant.death = as.numeric (dist$Infant.death)
dist$Still.Birth = as.numeric (dist$Still.Birth)
dist$Still.Birth.rate = as.numeric (dist$Still.Birth.rate)
```

cleaned up data frame

dist

> dist

	District	Birth	Birth.rate	Death	Death.rate	Infant.death	Still.Birth	Still.Birth.rate
1	BAGALKOTE	40009	21.91	5781	6.64	291	180	4.52
2	BANGALORE (R)	8674	17.93	1767	5.59	20	33	6.04
3	BANGALORE (U)	151277	13.97	56758	5.21	904	265	1.84
4	BELGAUM	66096	20.19	13315	6.52	614	547	9.21
5	BELLARY	38555	20.52	8371	6.12	425	163	5.35
6	BIDAR	31401	30.53	3996	6.06	256	353	9.05
7	BIJAPUR	35269	25.96	4878	6.18	286	47	3.17
8	CHAMARAJANAGAR	6795	11.99	1722	8.10	20	54	10.36
9	CHICKBALLAPUR	14527	17.90	2135	5.95	60	20	1.74
10	CHIKMAGALUR	12409	23.91	2085	8.20	193	26	2.68
11	CHITRADURGA	18847	16.51	3302	6.65	248	88	7.44
12	DAKSHINA KANNADA	35027	13.81	12044	4.61	589	274	8.12
13	DAVANAGERE	30788	21.16	6231	7.26	1138	435	13.16
14	DHARWAD	33896	19.64	10655	7.36	901	157	5.10
15	GADAG	15026	15.67	4115	6.95	345	245	12.27
16	GULBARGA	47107	27.50	5526	4.90	459	80	1.33
17	HASSAN	21205	20.31	4255	6.72	304	36	3.37
18	HAVERI	18454	16.13	3018	5.79	307	240	12.10
19	KODAGU	4968	27.80	880	6.17	57	2	2.13
20	KOLAR	18251	23.98	3699	4.22	171	109	8.57
21	KOPPAL	19956	19.73	2129	6.33	51	83	6.71
22	MANDYA	15615	14.99	3287	6.28	209	12	2.88
23	MYSORE	50055	20.01	16072	6.75	1404	16	0.46
24	RAICHUR	21144	19.40	3929	5.20	506	4	0.39
25	RAMANAGAR	7700	12.85	1764	5.43	31	14	2.06
26	SHIMOGA	30940	17.88	6558	5.57	472	294	4.60
27	TUMKUR	34417	16.35	5802	6.17	253	91	6.31
28	UDUPI	15145	13.06	4090	3.79	163	104	8.61
29	UTTARA KANNADA	21761	20.61	3155	5.10	140	148	9.58
30	YADGIR	11604	23.00	1564	5.84	35	0	0.67

rates = data.frame (District = dist\$District, Birth.rate = dist\$Birth.rate, Death.rate = dist\$Death.rate, Still.Birth.rate = dist\$Still.Birth.rate)

rates

```
> rates
```

	District	Birth.rate	Death.rate	Still.Birth.rate
1	BAGALKOTE	21.91	6.64	4.52
2	BANGALORE (R)	17.93	5.59	6.04
3	BANGALORE (U)	13.97	5.21	1.84
4	BELGAUM	20.19	6.52	9.21
5	BELLARY	20.52	6.12	5.35
6	BIDAR	30.53	6.06	9.05
7	BIJAPUR	25.96	6.18	3.17
8	CHAMARAJANAGAR	11.99	8.10	10.36
9	CHICKBALLAPUR	17.90	5.95	1.74
10	CHIKMAGALUR	23.91	8.20	2.68
11	CHITRADURGA	16.51	6.65	7.44
12	DAKSHINA KANNADA	13.81	4.61	8.12
13	DAVANAGERE	21.16	7.26	13.16
14	DHARWAD	19.64	7.36	5.10
15	GADAG	15.67	6.95	12.27
16	GULBARGA	27.50	4.90	1.33
17	HASSAN	20.31	6.72	3.37
18	HAVERI	16.13	5.79	12.10
19	KODAGU	27.80	6.17	2.13
20	KOLAR	23.98	4.22	8.57
21	KOPPAL	19.73	6.33	6.71
22	MANDYA	14.99	6.28	2.88
23	MYSORE	20.01	6.75	0.46
24	RAICHUR	19.40	5.20	0.39
25	RAMANAGAR	12.85	5.43	2.06
26	SHIMOGA	17.88	5.57	4.60
27	TUMKUR	16.35	6.17	6.31
28	UDUPI	13.06	3.79	8.61
29	UTTARA KANNADA	20.61	5.10	9.58
30	YADGIR	23.00	5.84	0.67

```
# rate data for plotting
```

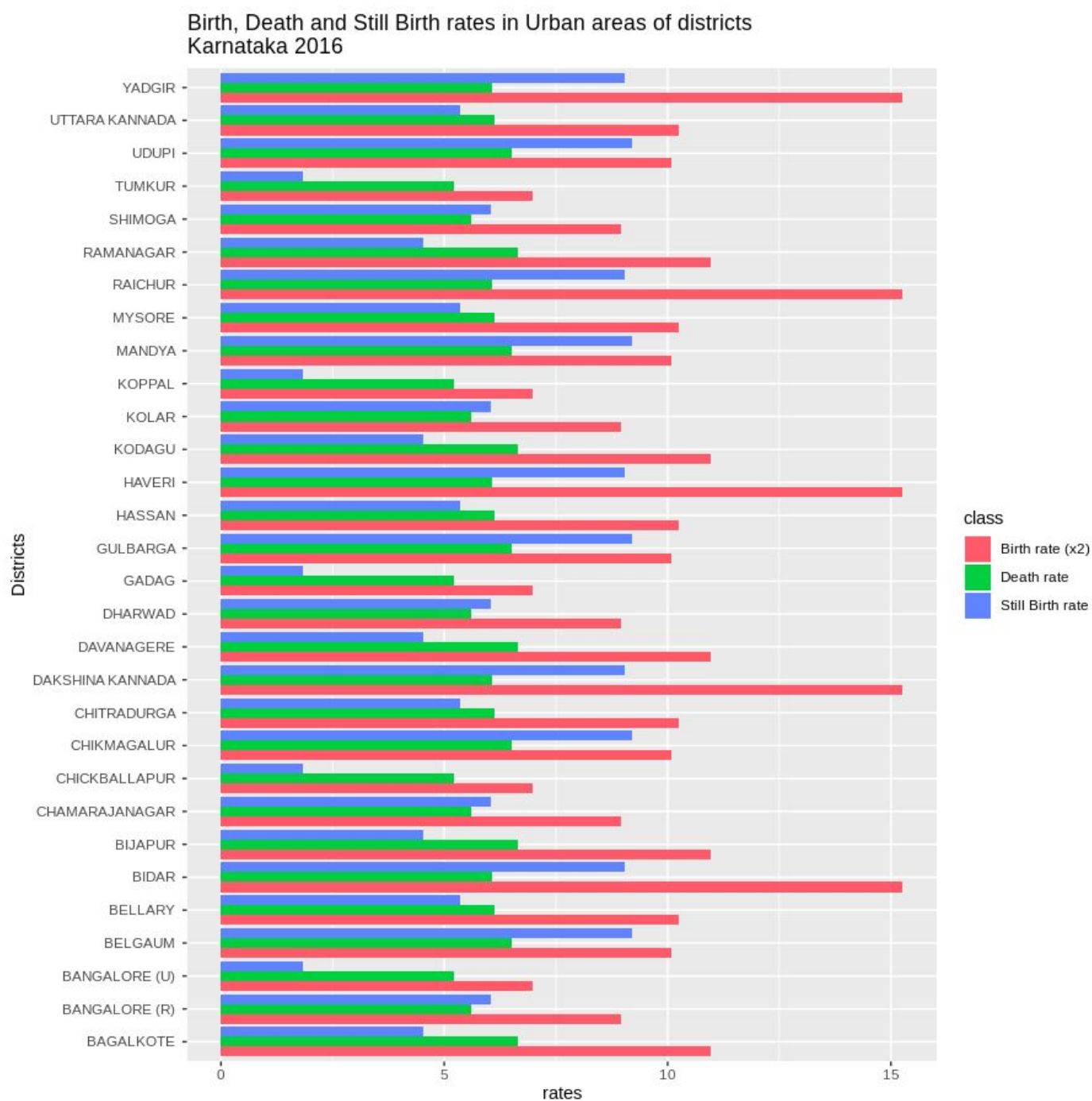
```
di = c()
for (dis in rates$District) {
  di = c(di, rep (c(dis), 3))
}
```

```
class = rep (c("Birth.rate", "Death.rate", "Still.Birth.rate"), 30)
```

```
val = c()
for (i in 1:length (vital [,1])) {
  val = c(val, c(rates$Birth.rate[i] / 2, rates$Death.rate[i], rates$Still.Birth.rate[i]))
}
```

```
dis_data = data.frame (di, class, val)
```

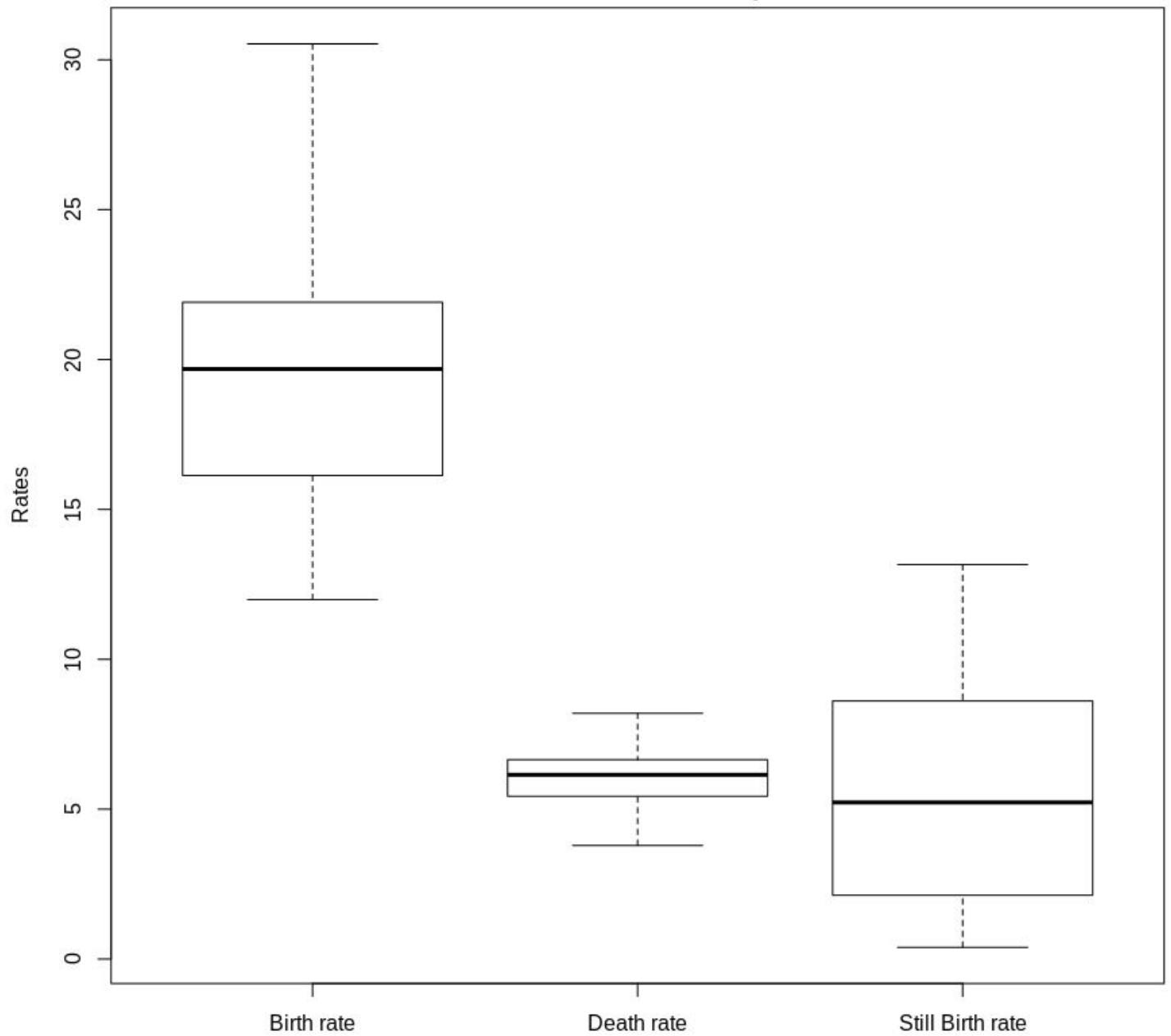
```
# plot
# Birth rate: multiply the unit by 2 to get actual rate
ggplot(dis_data, aes(fill=class, y=val, x=factor (di))) + geom_bar(position="dodge", stat="identity") +
xlab ("Districts") + ylab ("rates") + ggtitle ("Birth, Death and Still Birth rates in Urban areas of
districts\nKarnataka 2016") + scale_fill_discrete (labels=c("Birth rate (x2)", "Death rate", "Still Birth
rate")) + coord_flip()
```



Boxplot for different rates across districts 2016

boxplot (rates\$Birth.rate, rates\$Death.rate, rates\$Still.Birth.rate, names = c("Birth rate", "Death rate", "Still Birth rate"), ylab = "Rates", main = "Rate boxplot (No outliers for any rate\ndepicting no difference in rate across Urban\nareas in all districts)")

**Rate boxplot (No outliers for any rate
depicting no difference in rate across Urban
areas in all districts)**



```
# Finding outliers
```

```
br_out = boxplot (dist$Still.Birth.rate)$out
```

```
br_out
```

```
> br_out
```

```
numeric(0)
```

```
which (br_out %in% dist$Birth.rate)
```

```
> which (br_out %in% dist$Birth.rate)
```

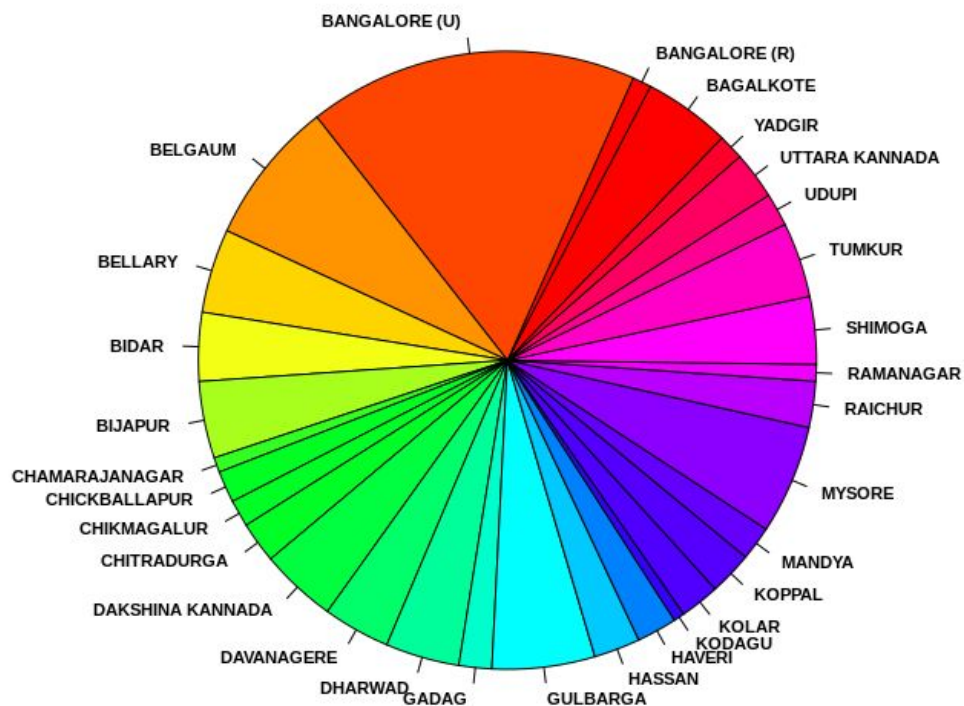
```
integer(0)
```

Inference:

No outliers in the plots, therefore the rates are similar across all districts of Karnataka in 2016

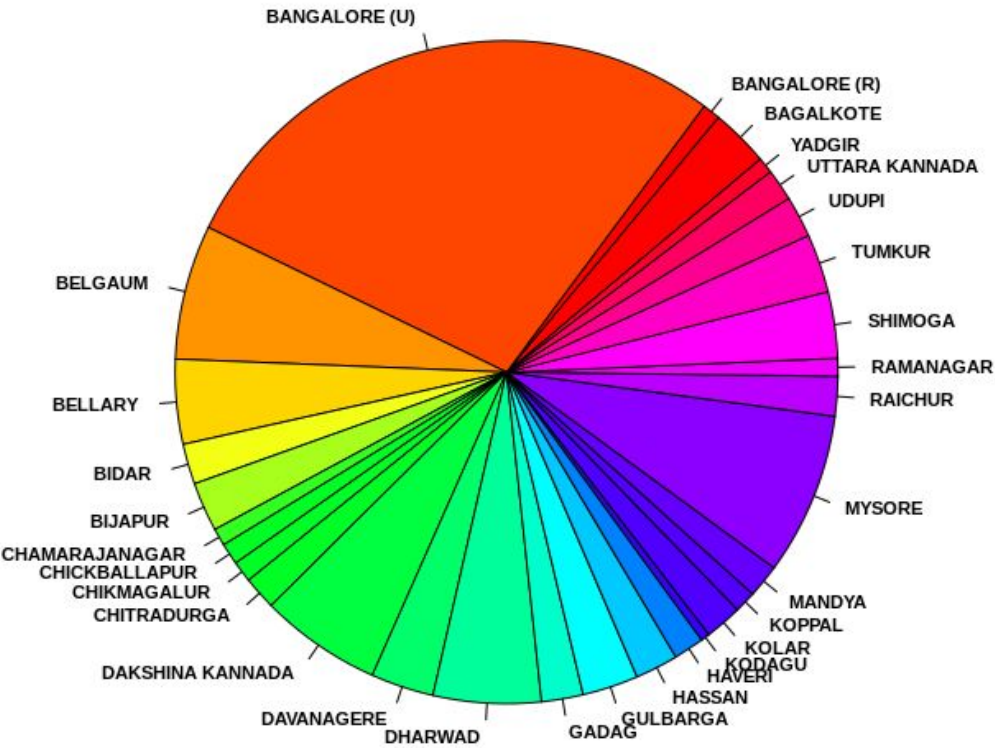
```
# Pie charts showing the contribution of each district in the total birth and death across the state  
pie (dist$Birth, labels = dist$District, col=rainbow(length(dist$District)), main = "Birth contribution  
across Districts in Urban areas-2016", radius = 0.9, cex = 0.7, font = 2, init.angle = 46)
```

Birth contribution accross Districts in Urban areas-2016



pie (dist\$Death, labels = dist\$District, col=rainbow(length(dist\$District)), main = "Death contribution across Districts in Urban areas-2016", radius = 0.9, cex = 0.7, font = 2, init.angle = 40)

Death contribution accross Districts in Urban areas-2016



```
#####
```

```
# Basic Statistics #
```

```
#####
```

```
# District with minimum birth rate 2016
```

```
rates [which (rates$Birth.rate == min (rates$Birth.rate)),c(1,2)]
```

```
> rates [which (rates$Birth.rate == min (rates$Birth.rate)),c(1,2)]  
      District Birth.rate  
8 CHAMARAJANAGAR      11.99
```

```
# District with maximum birth rate 2016
```

```
rates [which (rates$Birth.rate == max (rates$Birth.rate)),c(1,2)]
```

```
> rates [which (rates$Birth.rate == max (rates$Birth.rate)),c(1,2)]  
      District Birth.rate  
6      BIDAR      30.53
```

```
# Mean of birth rate 2016
```

```
print (mean (rates$Birth.rate))
```

```
> print (mean (rates$Birth.rate))  
[1] 19.50667
```

```
# Mean birth across districts 2016
```

```
print (as.integer (mean (dist$Birth)))
```

```
> print (as.integer (mean (dist$Birth)))  
[1] 29230
```

```
# Median of birth rate across districts 2016
```

```
print (median (rates$Birth.rate))
```

```
> print (median (rates$Birth.rate))  
[1] 19.685
```

```
# variance of birth rate across districts
```

```
print (var (rates$Birth.rate))
```

```
> print (var (rates$Birth.rate))  
[1] 22.01006
```

```
# Standard deviation of birth rate across districts 2016
```

```
print (sd (rates$Birth.rate))
```

```
> print (sd (rates$Birth.rate))  
[1] 4.691488
```

```
# Total summary of rates across districts in 2016
```

```
summary (rates)
```

```
> summary (rates)
```

District		Birth.rate	Death.rate	Still.Birth.rate
BAGALKOTE	: 1	Min. :11.99	Min. :3.790	Min. : 0.390
BANGALORE (R)	: 1	1st Qu.:16.18	1st Qu.:5.465	1st Qu.: 2.268
BANGALORE (U)	: 1	Median :19.68	Median :6.145	Median : 5.225
BELGAUM	: 1	Mean :19.51	Mean :6.055	Mean : 5.661
BELLARY	: 1	3rd Qu.:21.72	3rd Qu.:6.647	3rd Qu.: 8.600
BIDAR	: 1	Max. :30.53	Max. :8.200	Max. :13.160
(Other)	:24			