Prisoner Psychology Analysis and Rehabilitation

Introduction

One of the reasons for punishments given to the criminals is that the prisoner does not commit the crime again but sadly this is not the outcome for majority of the cases. With the help of this assignment one of the major task is to understand the measures of different states take with regards to the criminals and how these factors effects criminal's psychology. The data used for the tasks is criminal records for years between 2000 and 2010. The country chosen to understand the relationship among different factors is my country of origin i.e. India.

The two problem statement that we try to figure out using the visualisation are the effect of prison conditions on prisoners psychology and how can a prisoner be rehabilitated ? Also, in the assignment we would observe different factors to understand the characteristics of criminals in India. The conclusion is made by comparing data from different states who work differently with the prisoners.

Personally, I feel it is very important to understand the criminal records and the conditions they are living in to make any improvement with rehabilitation. Only if there was a way to reduce the number of reoffenders and improve number of rehabilitated prisoners, we could be sure that the prison system is efficient enough.

Data Wrangling

The data used for this assignment has been taken from dataworld.com. The data was verified from the Indian government website to make sure that the insights obtained from the dataset was reasonable enough to draw any conclusions.
Data Sources :

- https://data.gov.in/dataset-group-name/prison-statistics
- https://data.world/rajanand/prison-in-india

The dataset consists of 36 tables and information regarding different factors related to prisons and prisoners. The task makes use of different tables in combination or exclusively to obtain the results.

Since the data was huge, a few transformations were made very often to make the data understandable and easy to work with.

After the data was cleaned with respect to the consistency, the data for each table had to be transformed to summarise each dataset to get a better understanding of the factors affecting criminals.

```
type = aggregate(age_df[,c(7,8,9,10)],list(age_df$category),sum)
type["Total"] = c(0)
for (i in c(1:dim(type)[1])){
  type[i,6] = sum(type[i,2:5])
}

total = sum(type$Total)

for (i in c(1:dim(type)[1])){
  type[i,6] = (type[i,6]/total)*100
}
```

```
voc = aggregate(vocation_df[,4],list(vocation_df$state_name),sum)
voc["Total convicts"] = recidivism$convicts_admitted
voc["Percent"] = c(0)
for (i in c(1:dim(voc)[1])){
    voc[i,4] = (voc[i,2]/voc[i,3])*100
}

write.csv(voc, file = "/Users/vachananand/Desktop/a/voc.csv")
```

As shown above, multiple similar transformations were made on different tables to get the insight of the data. As percentage is a better indicator of comparison than a number, almost all the tables were first changed into percentages of inmates with respect to total number of inmates in that state using interaction between multiple tables. The interaction can be seen in the above code on the right hand side were a new data frame "voc" is created using Vocational training data and Recidivism data.

	state_name	year	vocational_trainings_program	inmates_trained
1	Andhra Pradesh	2001	Steel Unit	270
2	Andhra Pradesh	2001	Phenyl	9
3	Andhra Pradesh	2001	Soap Unit	115
4	Andhra Pradesh	2001	Weaving	328
5	Andhra Pradesh	2001	Tailoring Unit	122
6	Andhra Pradesh	2001	Durry Unit	337
7	Andhra Pradesh	2001	Dyeing Unit	73
8	Andhra Pradesh	2001	Printing Unit	143
9	Andhra Pradesh	2001	Coir	65
10	Andhra Pradesh	2001	Book Binding	4
11	Andhra Pradesh	2001	House Wiring	6
12	Andhra Pradesh	2001	Plumbering	3
13	Andhra Pradesh	2001	Others	23
14	Andhra Pradesh	2002	Steel	530
15	Andhra Pradesh	2002	Phenyle	16
16	Andhra Pradesh	2002	Soap	9

Group.1	x	Total convicts	Percent
A & N Islands	1265	3772	33.536585
Andhra Pradesh	18375	142319	12.911136
Arunachal Pradesh	0	11	0.000000
Assam	2777	26299	10.559337
Bihar	36988	115176	32.114329
Chandigarh	830	2061	40.271713
Chhattisgarh	16080	47662	33.737569
D & N Haveli	0	18	0.000000
Daman & Diu	0	34	0.000000
Delhi	13026	93371	13.950798
Goa	526	1165	45.150215
Gujarat	28458	81895	34.749374
Haryana	5042	62621	8.051612
Himachal Pradesh	835	3350	24.925373
Jammu & Kashmir	3654	2552	143.181818
Jharkhand	50281	69570	72.273969

Fig. Data Before (left), Data After(right)

Here we can see that the data is transformed by aggregating first and then calculating the percentage of convicts given vocational training. This step is really important as it is relative and does not necessarily increase if the number of inmates are high due to a larger state size.

state_name	year	details	male	female	total
Andhra Pradesh	2001	Natural Deaths	71	0	71
Andhra Pradesh	2001	Un-natural Deaths	10	0	10
Andhra Pradesh	2001	Un-natural Deaths - Suicides	6	0	6
Andhra Pradesh	2001	Un-natural Deaths - Execution	0	0	0
Andhra Pradesh	2001	Un-natural Deaths - Murder by inmates	1	0	1

Group.1	Group.2	x
A & N Islands	Un-natural Deaths - Death due to assault by outside elements during transit or	0
Andhra Pradesh	Un-natural Deaths - Death due to assault by outside elements during transit or	6
Arunachal Pradesh	Un-natural Deaths - Death due to assault by outside elements during transit or	0
Assam	Un-natural Deaths - Death due to assault by outside elements during transit or	0
Bihar	Un-natural Deaths - Death due to assault by outside elements during transit or	3

```
deaths = aggregate(deaths_df[,6],list(deaths_df$state_name,deaths_df$details),sum)
deaths = deaths[which(deaths$Group.2 != "Natural Deaths"),]
un = deaths[which(deaths$Group.2 != "Un-natural Deaths" ),]
un[1:5,]
```

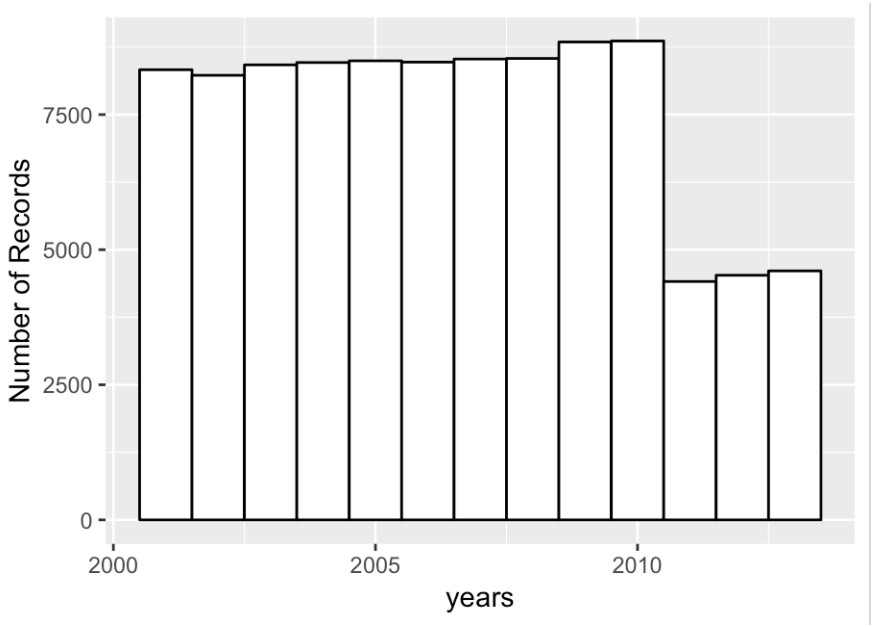
Fig. Data Transformation

Here, we can see that after aggregating, only features of interest are extracted from the data frame. Similar transformations were made on other tables as well to get the desired output. The tools used for this assignments are:

- Tableau (for plotting maps)
- R (for plotting graphs and for data wrangling and cleaning)

Data Checking

Firstly, the data in the dataset was not consistent enough. The data was spread across 15 years but had a lots of missing value of last few years. Since the number of missing values was almost 50%, imputation didn't seem to be a good idea. Therefore it had to be cleaned to relevant years for which the data was recorded properly.




```
for (each in c(1:length(all_df))){
  print(names(all_df[each]))
  if (names(all_df[each]) == "year"){
    years = c(years,as.vector(all_df[each]),recursive=TRUE)
  }
}
```

```
clean_data <- function(df){
  df = df[which(df$year <= 2010),]
  df
}
```

After the data was checked, cleaned and wrangled the data was easy for exploration and visualisation. The tool used for data checking was R.

Data Exploration

Overview of Inmate Population

Before we start looking at the problem statement it is always a good idea to understand the data. To start with, since the data is stored in more than 30 sheets, we can start exploring the sheets that may be related to the problem statement. We can start by visualising the overview of all inmates across India.

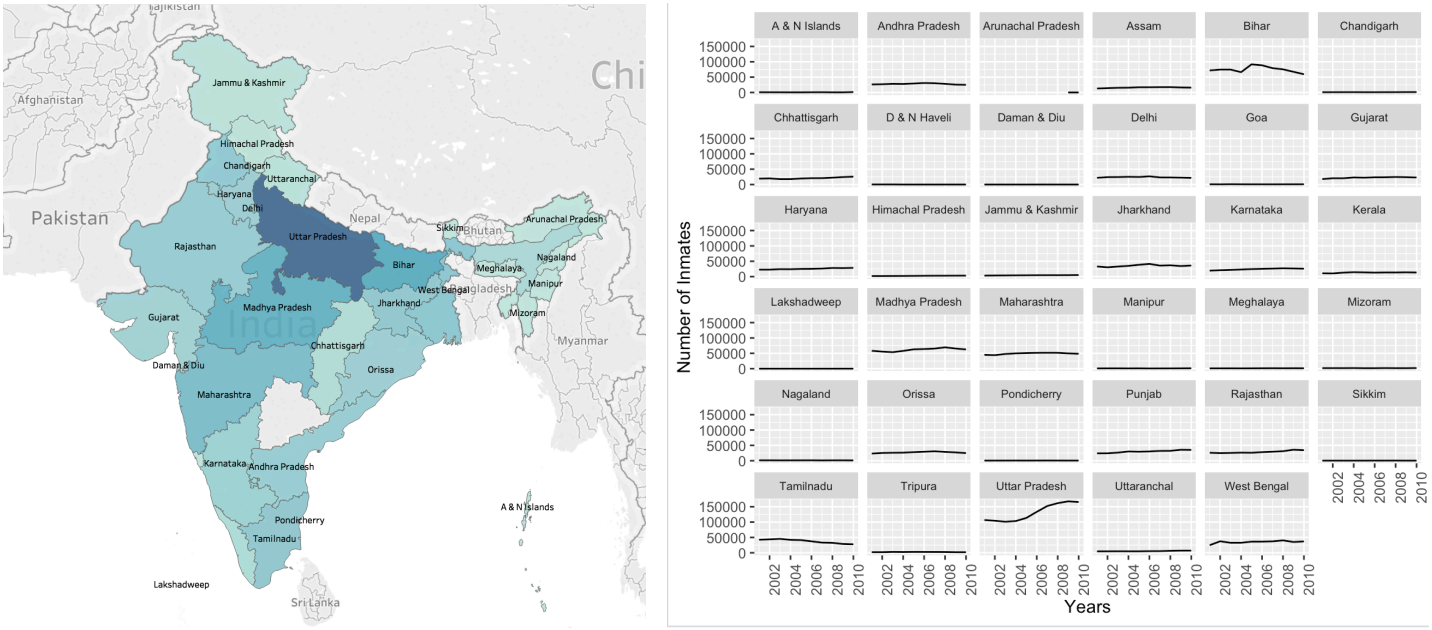


Fig. 1 Inmate population

The two graphs shown above can help us understand a few kew concepts. Firstly , the figure on the left help us understand the distribution of inmate population across India. Secondly, the graph on the right shows us the relation of year vs number of inmates across every state throughout India.

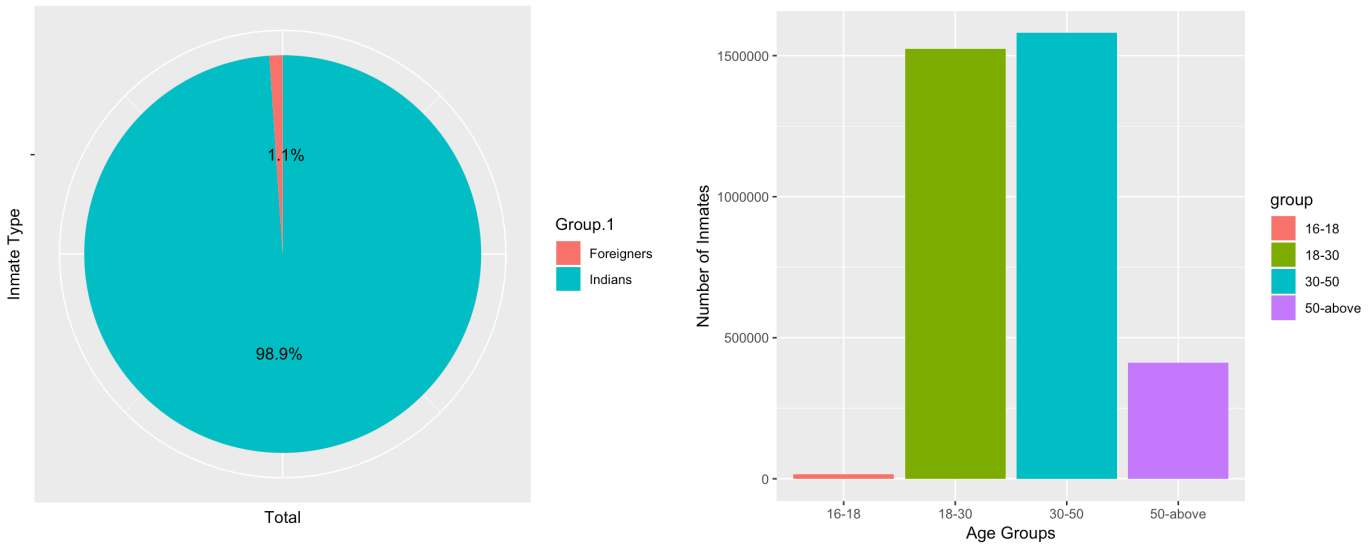


Fig. 2 Inmate Characteristics

In the figure above it is quite important to understand the age distribution of the inmates across the nation. Not only this but also it is necessary to know to the characteristics such as citizenship of inmates to understand the data even better.

Findings :

1. Uttar Pradesh has maximum number of Inmates Population (Fig. 1)
2. The inmates population density had very little variation throughout the decade except for Bihar and Uttar Pradesh (Fig. 1)
3. About 99% of inmates are of local origin and foreigners contribute only about 1% of the total inmates. (Fig. 2)
4. The people of age group 18 to 50 are more prone to commit a crime than any other age group. (Fig. 2)

State Specific Characteristics

It is not only important to know the statistics of inmate population but also the characteristics of the place they commit crime in, in order to understand inmates better.

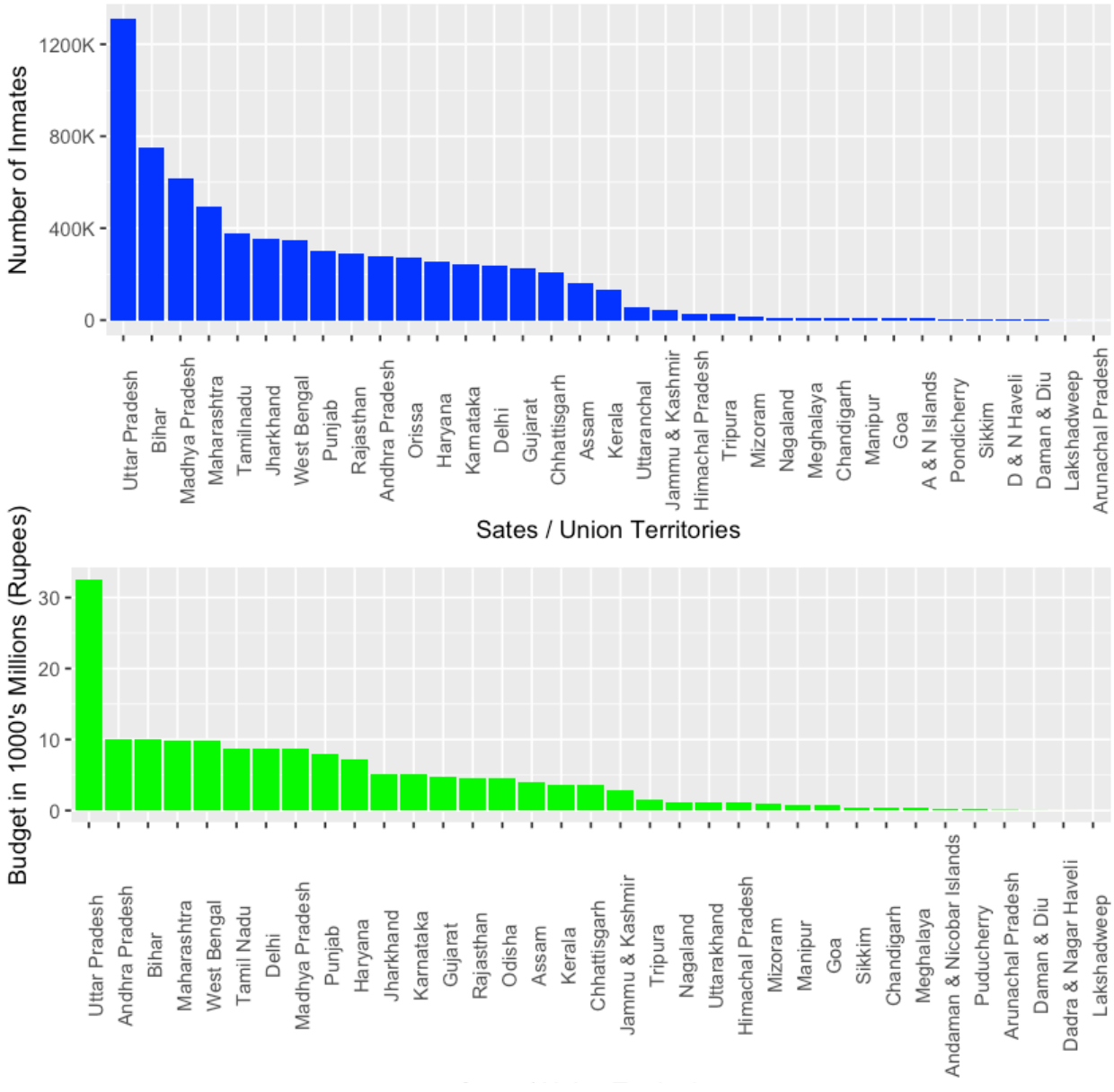


Fig. 3 Budget and Number of Inmates vs State

The graphs above is cornerstone of understanding the relation between budget of the State and the number of crimes committed which is directly related to number of prisoners in each state.

Findings :

5. One of the key findings here is that the Budget of the state **does not** necessarily affect the crime rate by a large extent. Here we can see that Andra Pradesh with high budget has lower number of inmates as compared to Bihar which has almost twice the amount of Inmates with almost same State budget and almost same state size. This trend is seen in other states as well such as Madhya Pradesh and Maharashtra.

Exploring Characteristics of Inmates

Now that we have explored the overview of Inmates and states, let's start focusing on the problem at hand. We do this by understanding more about the inmates.

The figure on the right is really important to understand the relationship of education with the number of inmates. It is clear from the graph that there is an inverse relation between the education level and number of criminals.

Findings :

6. It clearly shows that better the education, lesser are the chances of committing crime.

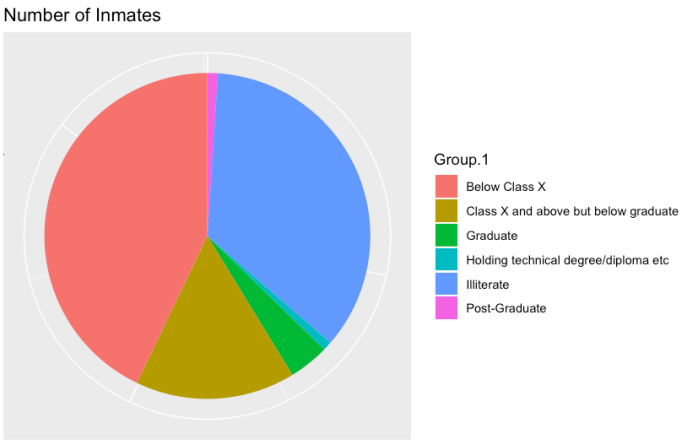


Fig 4. Education Level vs Number of inmates.

Effects of prison conditions on prisoners psychology and well being

With respect to the dataset as there is no direct data on mental health of the prisoners, we can deduce a relation between the inmates characteristics and mental health using certain factors as suggested below.
Here there is one very important thing to notice, for unnatural deaths, suicides are the major cause of such demise indicating psychological disorder among inmates not dying a natural death.

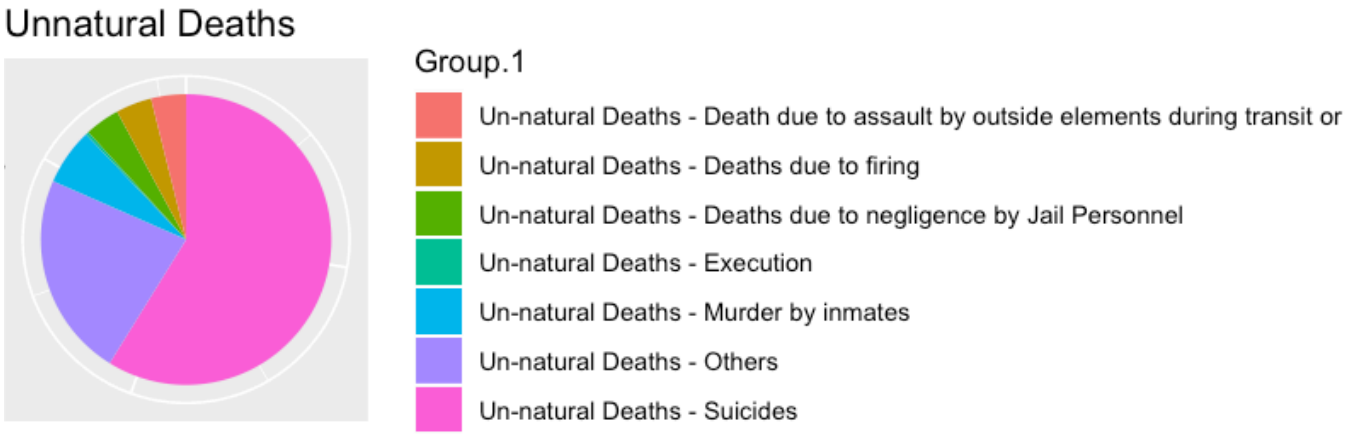
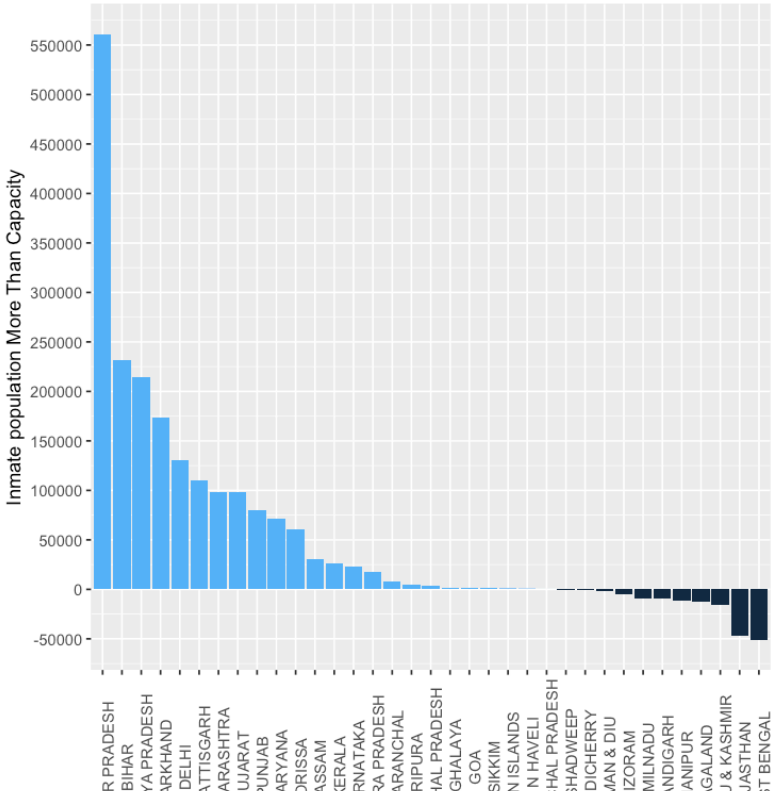


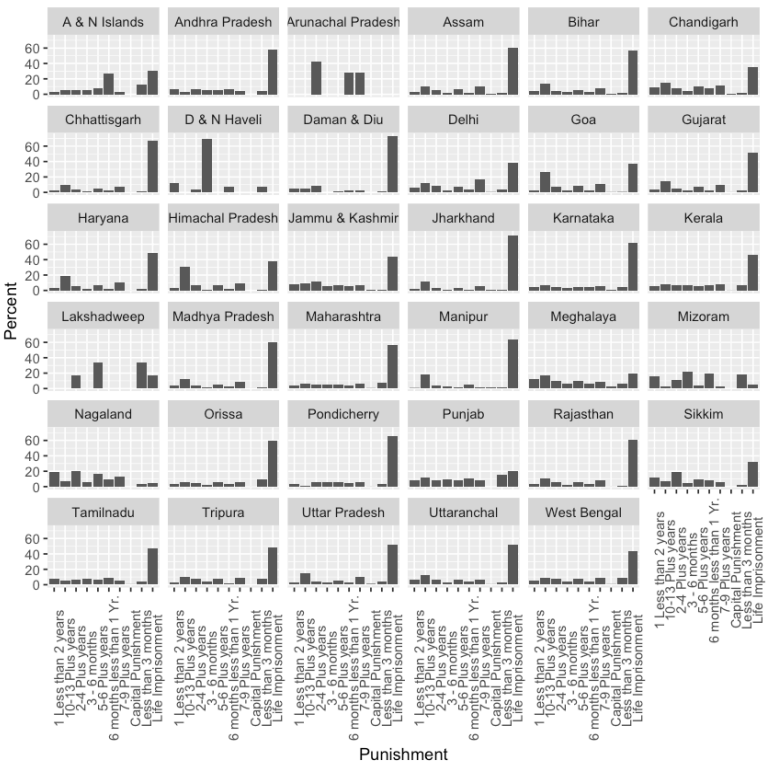
Fig 5. Causes of Un-natural Deaths

Fig 6. Population & Capacity vs States



The figure on the right can help us explain one of the causes behind such a behaviour among inmates.

It can be viewed from the graphs that suicide is the major cause of unnatural death in all the state. Also, from the population graph it can be inferred that the suicide rate was much higher for the states which were not overpopulated. The majority of the states who have extremely large values of suicide are generally on the right hand side of the graph. This can be seen in states like Tamil Nadu and West Bengal where even though the prisons were under populated, still they accounted for the maximum number of suicides recorded.



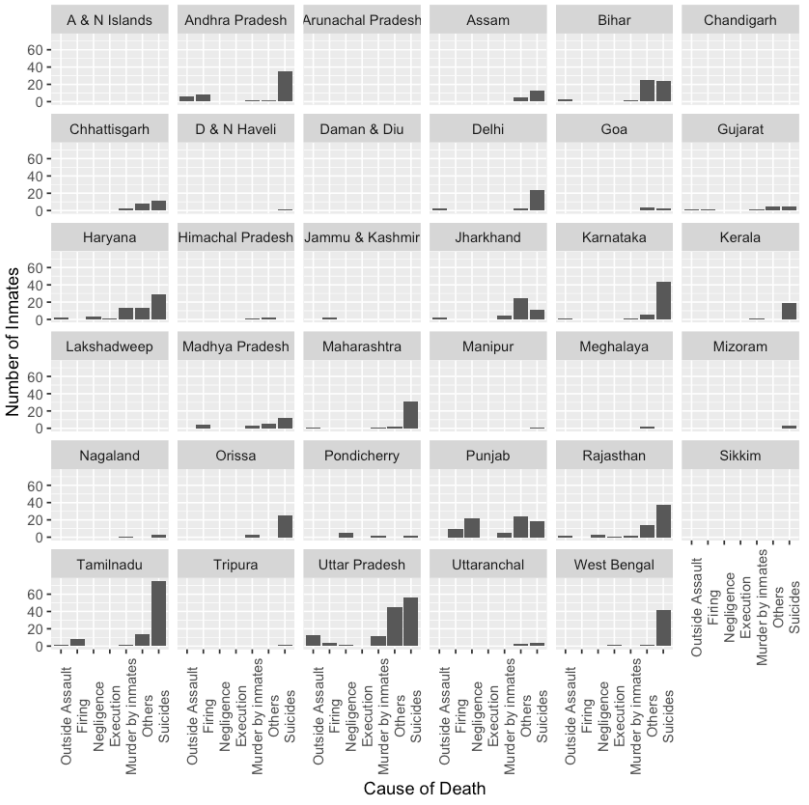


Fig 7. Punishment Percent (Left), Cause of Unnatural Death (Right)

Findings :

7. Jail capacity and jail population plays some role in psychology of the inmates. More the jail is populated, lesser are the chances of suicides.
8. Suicides are major cause of unnatural deaths among inmates.
9. Also, it is important to understand that the budget of the state on the inmates effect the rate of suicide in that state. More is the budget spent on the inmate, lesser are the chances of suicide.
10. Finally, the punishment of the prisoners play an important role in un-Natural Deaths. States giving less term of punishments such as Sikkim, A & N Islands shows almost zero unnatural death thereby suggesting more stability in prisoners psychology.

How can a prisoner be rehabilitated ?

One of the most important task for the jails is to rehabilitate the prisoners. Here we can try to find out factors that promote rehabilitation of inmates.

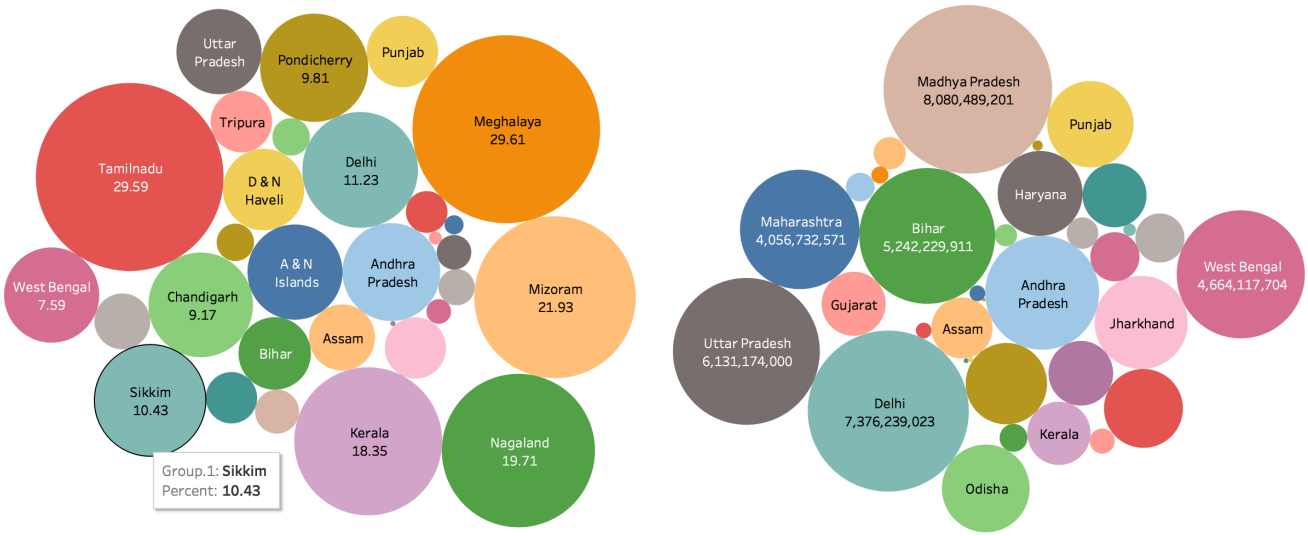


Fig. 8 Re-offenders percentage (left) & Budget for inmates (Right)

The graph above gives us insight that there is a relation between the money spent on inmates during their term and their chances of committing a crime again. Here states like Tamil Nadu, that has highest number of re offender has low budget spent on inmates while states like Madhya Pradesh that has high budget spent on inmates has lower percentage of re-offenders . This pattern can be seen as an ***inverse relation*** between the bubbles of same colors in the graphs above.

Findings :

10. More the money spent on inmates, lesser are the chances of them to commit a crime again.

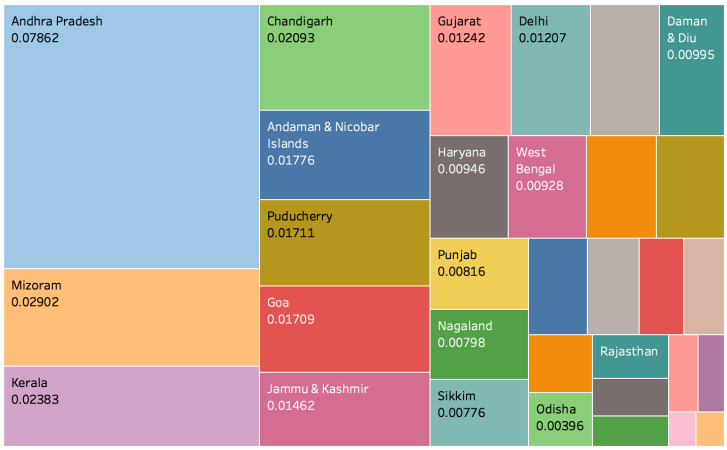


Fig. 9 Trained Officers per Criminals

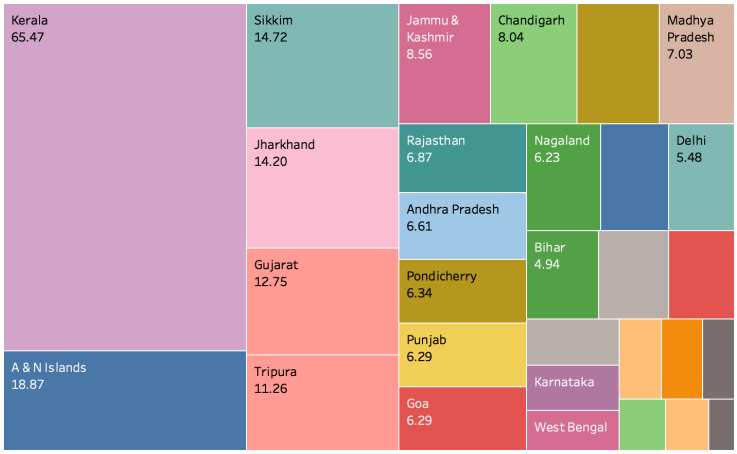


Fig. 10 Vocation Training Percent

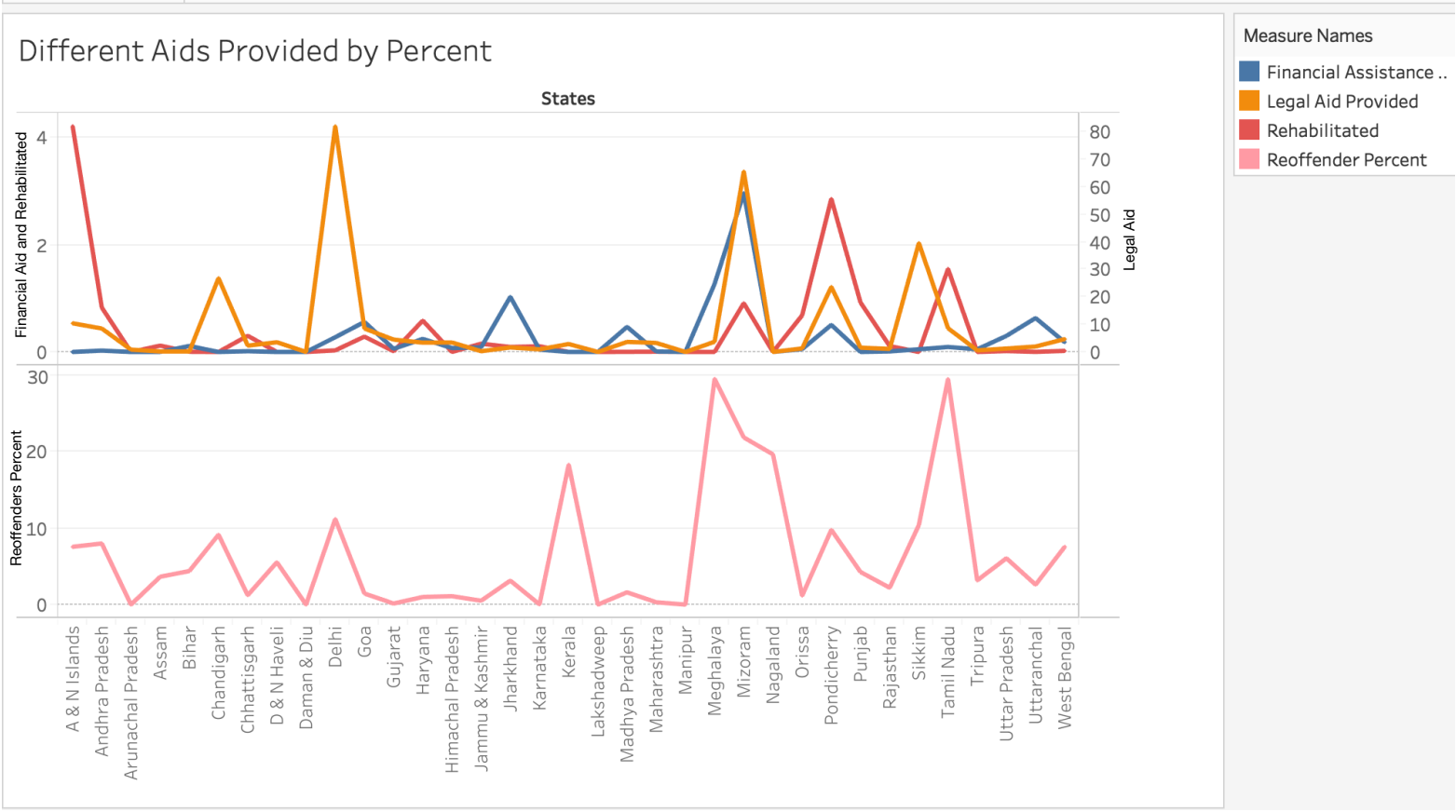


Fig. 11 Government Aid Percent

The line graph above shows an interesting pattern that can give us an insight about the reoffenders. Though the rehabilitation in Tamil Nadu was Third highest still number of re offenders remain high in the state. State like Madhya Pradesh who not only focused on rehabilitation but also focused on inmates experience inside the prison (expenditure on inmates fig. 8) had low number of re offenders . After working on different aspects it is still unclear on what the major factor of reoffenders could be. Although there are no clear factors that affect the rehabilitation, still factors like vocational training, legal aid and budget spent of inmates show a weak relationship between themselves and rehabilitation while the budget spent on inmates being the strongest relation among rest.

Findings :

11. Budget spent on inmates is one of the strongest factor affecting rehabilitation as per the dataset.
12. Vocational training and legal aid have some relationship between themselves and rehabilitation. States like Tamil Nadu and Meghalaya that had highest number of re-offenders lagged behind in terms of Trained officers and Vocational Training provided inside the prison.
13. Still there must be factors that are not very clear in the dataset that may be affecting rehabilitation in a stronger sense than mentioned above.

Conclusion

After examining different factors that effect the nature of criminals there are a few conclusions that can be drawn.

Firstly, it is really important to understand the characteristics of criminals. From the series of graph viewed above it is clear that majority of criminals lie between age group18 and 50. Also most of the criminals are either illiterate or have low level of educational qualifications. The latter is really important in understanding the importance of education for every country in order to **reduce crime rate**.

Secondly, to understand the psychological changes that a criminal goes through while inside a prison we observed that if the government uses more budget on inmates not only were they able to improve the psychological balance of the inmates but also were able to support them in rehabilitation. Since rehabilitation is one of the most important aspects of a jail, this is definitely something governments must look into. The money spent is not only limited to food and clothing but also to medicine, vocational train and other utilities which promote a health life.

Finally, it was quite surprising to see that rehabilitation had a weak link to vocational training and aids of other sort. Though these factors reduced the number of re offenders by a small amount, the percentage change in reoffenders was not high enough. Therefore, we can say that there is a weak association between these factors and rehabilitation. Out of all these, again budget spent on inmates was most prevalent.

Reflection

The assignment was really helpful in understanding the factors affecting the criminals rehabilitation and psychology.Though we could see a direct relationship between the factors like budget and inmate capacity with criminal psychology, still no strong relationship was found between different factors and rehabilitation.

The lack of sufficient data and factors made it difficult to derive any conclusion with respect to rehabilitation. On the contrary we could have used datasets from even other countries to bolster our conclusion with respect to psychology and rehabilitation. This would have made it easier to generalise the cause and effect of different factors with the problem statement throughout the world.