

India And Crime: An In-Depth Analysis

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Abstract

The motivation behind this project is to curate a holistic review of the varied types of crime and their nature committed in India through the years 2000-2010. This paper aims to explore the genesis of the crimes and trace them back to socio-economic, demographic, local, and institutional parameters. Data available of 27 states and 7 union territories is visualised and prominent trends, patterns, and gravity of crimes have been analyzed. The nature of atrocities that have been assessed range from property (Auto theft, arson, burglary, dacoity, viz. banditry) to crimes concomitant with human rights violations like abduction, incest rapes, assault against schedule castes of India. The end goal of the paper lies in creating a more streamlined inter-state analysis of crime, and raise awareness regarding the crucial need of reinforcing law enforcement, municipality, and local NGOs in those areas.

Keywords: Crime, India, Inter-state, Analysis

1 Introduction

One of the primary rights of every citizen of a country is a sense of ensured safety. The detriment in the security of a society directly affects the growth of a country on various grounds - be it in terms of economic growth, increasing the cost of living, impeding collaboration and trust between communities, loss of population etc.

These findings become increasingly important when we consider countries like India with a massive population with varying densities spread and varying crime rates throughout its landscape. As India continues its path as a developing country, the trends in various types of crimes present different trends throughout the years. While crimes such as dacoity, robberies, firebombing, etc have shown a downward frequency curve, crimes like domestic abuse, crimes against women, and crimes against the so-called lower caste have continued to increase and plague the country, hindering its development and further tarnishing its image as it continues to perform poorly in metrics such as quality of life index, e-security index etc. In 2019, India registered 3,225,701 for IPC crimes and 1,930,471 SLL crimes. Crimes increased by 1.6 percent from the previous year, with 32.6 percent of the total IPC crime accounted for crime against body. Crime against women increased by 7.3 percent, and 50,291 cases were registered in 2020, an increase of 9.4% from the previous year, (National Crime Records Bureau, n.d.). (ref . Crime, Crisis and Economic Growth: An Investigation of SocioEconomic Determinants of Crimes in the Indian States)

Hence the need for analysis of crime in detail arises to better map the trends and patterns of different crimes occurring in the country which will result in better policy development, better resource allocation and improved crime prevention strategies.

This paper attempts to analyze these trends by visualizing time-series-based and geospatial data and plotting the trends and rates of different crimes.

2 Literature Review

The United Nations Survey Of Crime Trends (UN-CTS) and International Crime Victims Survey (ICVS) project a steady decrease in crime rates all over the globe [?]. The study conducted by Jan Van Dijk over a time crime series portrays a substantial decline in material crimes, such as burglaries, car theft, and a moderate decline in crimes in European countries. The advent of decline globally presses the need to unequivocally analyse the trend in a cross-national setting, glossing over non-western countries: such as India. However, the poignant question of the nature of this crime, their degrees, their place of occurrence, also need to be duly addressed and noted.

The ICVS data show that globally only 40% of all committed crimes are reported to the police [?]. D. R. Singh's, 1996 paper on *The International Crime (Victim) Survey In Bombay*, investigates into how victims were dissatisfied with the attitude portrayed by police officers while logging FIR (First Information Report) : which is the first formal report of the crime. Sami Ansari's paper attributes this decline in crime reporting to the police's bias in documenting crimes, as well as the constraints of the police and criminal justice systems, result in the nonrecording of reported crimes. ICVS

theorizes that recording of a crime by police is negatively correlated with the economic condition of that country, and so to keep their slates clean, police officials are unwilling to record crimes. This is a key problem in a developing country like India.

Centering our lens on India, the single credible source of crime data is "Crime In India", compiled by National Crime Record Bureau (NCRB). Crime in India, 1954 was the first systematic report, which collected and published the summary statistics, frequency, rates, of property crimes, kidnapping, dacoity, robbery, housebreaking, and theft. The NCRB has continuously expanded its data collection coverage to its reports, and provided more classification and details of crime data.

Our study aims to curate an elaborate understanding of crime in India till the last decade. One way to understand the central trends is by analyzing regional crime data available and compartmentalizing them into varying subjects such as property crime, homicide, rape, crimes against dalits, crimes against SC/ST, and so on. Van Dijk in his written work *The International Crime Drop*, probes into gender-based violence, remarking an increase in violence against women [?]. In his text, it is also surmised that the police data on rape shows an increase from 11.7 per million in 1990 to 18.2 per million in 2007. In contrast, according to NCRB statistics, the total number of accidental deaths and suicides owing to the use of firearms have fell by a substantial delta.

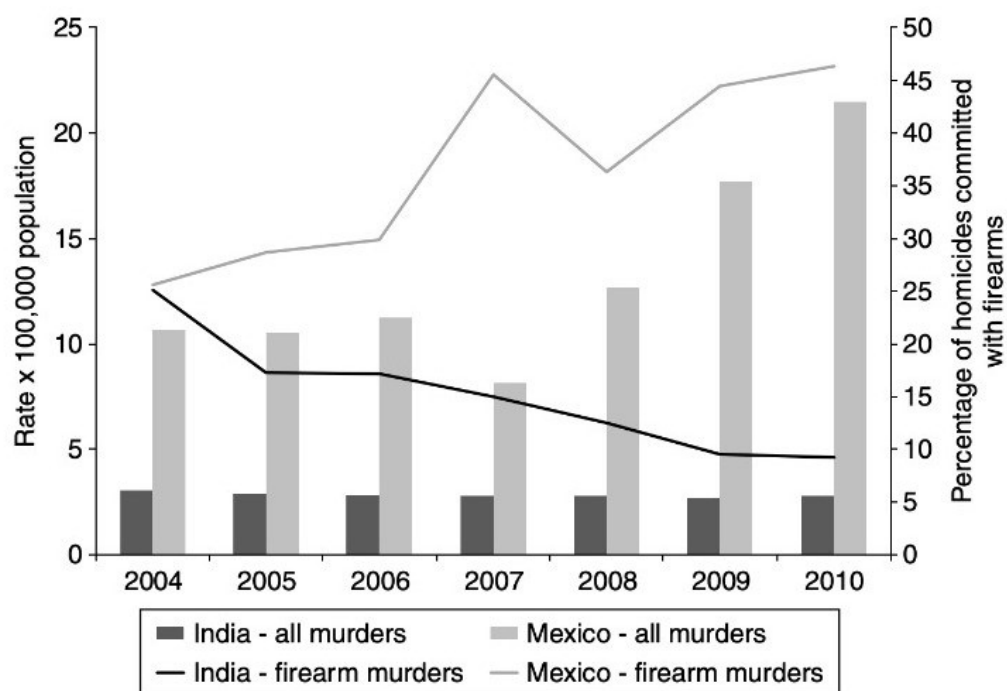


Fig. 1: Trends in homicide and homicide committed with firearms in India and Mexico ,2004-2010

The following figure illustrates all the studies that were reviewed to create a comprehensive study of crime trend analysis in India. By building upon this existing body of literature, this research paper aims to contribute by providing an elaborate analysis of the nature, crime rate, trends of India.

Author Reference	Origin	Purpose	Type Of Source	Major Themes
[1]	US (2015)	Illustrate the extended patterns of severe violent and property offenses, and investigate whether the crime trajectory in India aligns with the worldwide crime trend, particularly the decreasing pattern observed in the United States and West European nations.	Research	Global Crime Trend analysis and correlating it in the pretext of India.
[2]	UK (2012)	Generate perspectives on patterns of criminal activity, the underlying causes, and constraints of various strategies for addressing offenses on a broader scale.	Research	Exploring current downward trends in crimes at an international level.
[3]	India (2019)	Investigate the relative impact of socio-economic variables on crime rates in India, and curate a general crime profile of India.	Research	Analyse crime rate and derive an interstate crime comparison

Fig. 2: Findings of Reviewed Sources

3 Methodology

Crimes in India fall under two key classifications given by the Code of Criminal Procedure(CrC) based on the level of seriousness and the power of the police to make arrests without a warrant: Non-Cognizable and Cognizable crimes. Cognizable crimes include serious offenses that affect the public order, safety, or rights of citizens, and can be investigated by the police without a magistrate order, whereas non-cognizable crimes are those that comprise less serious offenses and cannot be investigated without an order of the magistrate.

Cognizable crimes can be further classified into either the Indian Penal Code(IPC) or Special and Local Laws(SLL). The IPC is the main criminal code of India that covers a wide range of offenses and punishments and the SLL are laws enacted by the state governments to deal with specific issues such as liquor and narcotic drugs, gambling, prostitution, etc. The National Crime Records Bureau(NCRB) releases an annual publication called Crime in India which contains comprehensive statistics on crimes from across the country and detailed information about the various types of crimes committed in various cities, districts, and states.

This study primarily focuses on cognizable IPC crimes reason being that SLL crimes are localized and vary greatly based on the cultural, social, and historical context of different regions and communities. For the analysis of such crimes, a comprehensive dataset () is used which contains state-wise and year-wise files of over 40+ classifications of crimes committed from 2001-2011 compiled using the data published by the NCRB and the Open Government Data(OGD) Platform India. The study focuses on providing a year-wise and state-wise trend analysis using temporal and geospatial data provided in the dataset.

For Cases of Reported Rapes, the dataset used consists of incidents of rape lodged between the years 2001 and 2010, grouped according to state, year, and various age-specific categories. The findings of this analysis aim to uncover the trends and dynamics of such cases considering the age distributions and geographical variations throughout the years consequently aiding in the betterment of prevention strategies and evaluating of interventions and policies implemented throughout the years. The dataset consists of 1050 unique entries with 11 attributes. The attributes include - Area Name, Year, Subgroup, Rape Cases Reported, Victims above 50 yrs, Victims between 10-14 yrs, Victims between 14-18 yrs, Victims between 18-30 yrs, Victims between 30-50 yrs, Victims under 10yrs and Victims of rape Total.

For Cases of Human Rights Violations by Police, the dataset used contains incidents of HR violations attributed to the law enforcement agencies covering the years from 2001 to 2010 grouped according to state, year, and the type of HR violation committed. The information present in this dataset also includes the number of policemen charge-sheeted and the number of policemen convicted which was used to derive the state of accountability and legal outcomes related to these incidents. Moreover, the findings help uncover the states and subgroups most affected by the atrocities of police. The dataset consists of 2267 entries with 7 attributes which include - Area Name, Year, Group Name, Subgroup Name, Human Rights Violations, Policemen Chargesheeted, and policemen convicted. The attribute "Group Name" consists of the various classifications of HR violations committed:

1. Torture
2. Extortion
3. Disappearance of Persons
4. Atrocities on SC/ST
5. Illegal detention/arrests
6. Indignity to Women
7. Fake encounter killings
8. False implication
9. Violation against terrorists/extremists
10. Failure to take action
11. Other violations

For Cases of auto theft, the dataset used contains incidents of such cases recorded from 2001 to 2010 grouped according to the state, year, class of vehicle stolen, and the status of recovery. The dataset consists of 1865 unique entries with 7 attributes which include - Area Name, Year, Group Name, Sub Group Name, Theft Coordinated/Traced, Auto Theft-Recovered, and Auto Theft - Stolen. The attribute "Group Name" consists of the class of Vehicle stolen :

1. Motorcycles/Scooters
2. Motor Car/Taxi/Jeep

3. Buses
4. Goods Carrying Vehicles
5. Others

For Cases of property theft, the used dataset gives insights into the cases related to property theft recorded from 2001 to 2010, grouped according to the state, year, type of property theft, and the value of property stolen and recovered. The inferences derived from the analysis can be used to help in better allocation of resources and will help judge the efficiency of law enforcement. The dataset consists of 2449 unique records with 8 attributes which include - Area Name, Year, Group, Sub Group, Cases of Property Recovered, Cases of Property Stolen, Value of Property Recovered, and Value of Property Stolen. The attribute "Group Name" consists of the various classes that come under property theft:

1. Burglary
2. Criminal Breach of Trust
3. Dacoity
4. Robbery
5. Theft
6. Others

For Cases of atrocities against SCs, the two datasets were concatenated, one containing the cases from 2001 to 2012 and one containing the cases pertaining to the year 2013. The incidents are grouped according to the state, district, year, and the number of atrocities committed. The analysis includes deriving inferences about the dynamics of atrocities against SCs is essential for formulating policies that address social inequalities and protect vulnerable communities. It contributes to the broader discourse on social justice and human rights, aiming to create a better and more welcoming environment for the oppressed. The dataset contains 9841 unique entries and 13 attributes which include - State/UT, District, Year, Murder, Rape, Kidnapping/Abduction, Dacoity, Robbery, Arson, Hurt, Prevention of Atrocities(POA) Act, Protection of Civil Rights(PCR) Act and Other Crimes Against SCs.

4 Analysis and Results

Data analysis is the methodical implementation of logical and statistical approaches to describe demonstrate, summarize, examine, and assess data.

4.1 Analysis of Rape Data

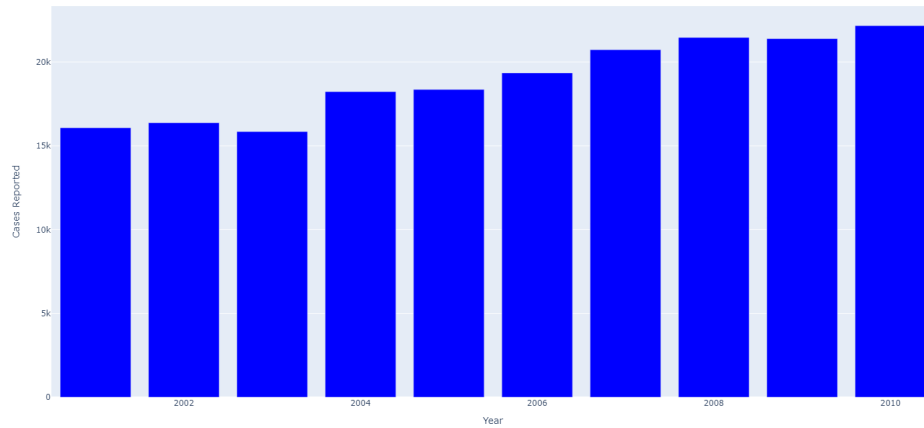


Fig. 3: Bar graph showing the year-wise distribution of rape cases reported between 2001 and 2010

Rape is considered one of the most heinous and vile crimes to still prevail in this country and amidst all the rapid development India has undergone, rape remains the fastest-growing crime in India (Tripathi, Kaushlendra and Chatterjee, Anindita,2017).

Table 1: Caption text

Sr. No.	Year	Total cases
1.	2001	data 2
2.	2002	data 5
3.	2003	data 8
4.	2004	new data
5.	2005	new data
6.	2006	new data
7.	2007	new data
8.	2008	new data
9.	2009	new data
10.	2010	new data

Fig.3 shows that the total reported cases of rape has

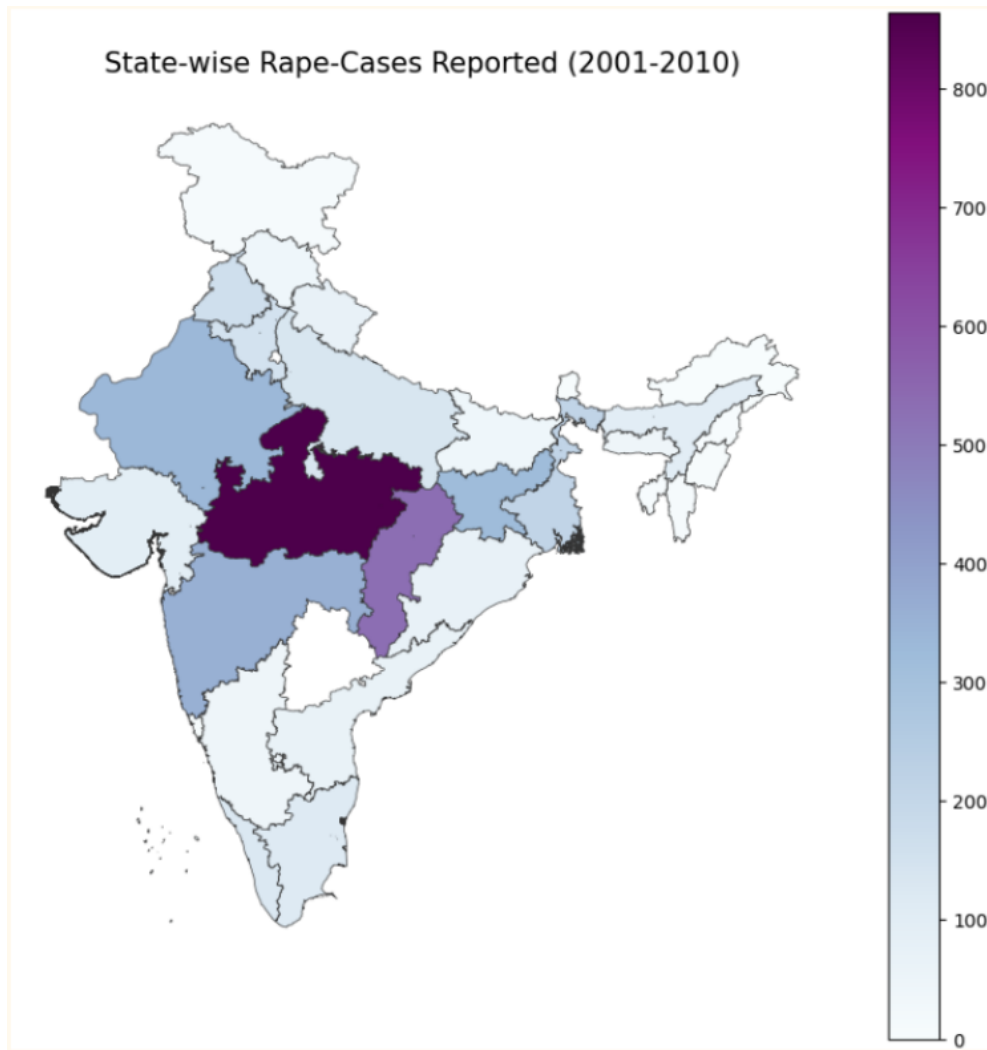


Fig. 4: Plot showing the state-wise distribution of rape cases reported between 2001 and 2010

The state-wise distribution(Fig.4) of the reported cases shows that the top 3 states having highest number of cases are Madhya Pradesh, Chhattisgarh and Rajasthan. The top 3 states having the lowest number of cases are Tripura, Manipur and Goa. Most of the cases reported were from the central part of India.



Fig. 5: Pie showing the age-wise distribution of rape cases reported between 2001 and 2010

The demographic data(Fig.5) shows that more than half(58.8%) of the cases belong to the age group 18-30. The least affected age group is 50 years and above(0.515%). The share of underage rape cases is 24.11%.

4.1.1 Analysis of Incest Rape Data

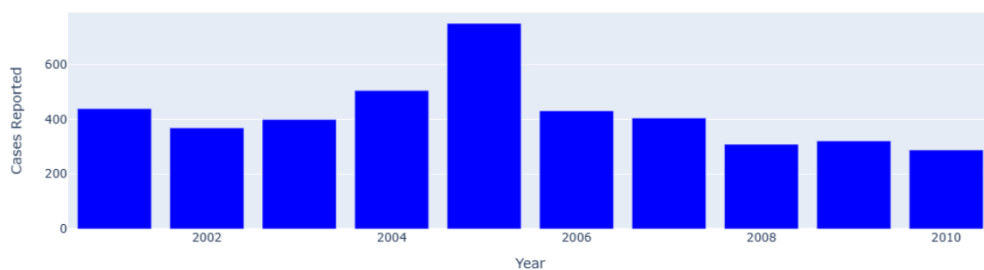


Fig. 6: Bar graph showing the year-wise distribution of incest rape cases reported between 2001 and 2010

The number of incest rape cases rose from 2002 to 2005 and declined 2005 onwards. In 2005, there was a major rise in incest rape cases across the country(750). The minimum number of cases occurred in 2010(288).

4.2 Analysis of cases under human rights violation by police

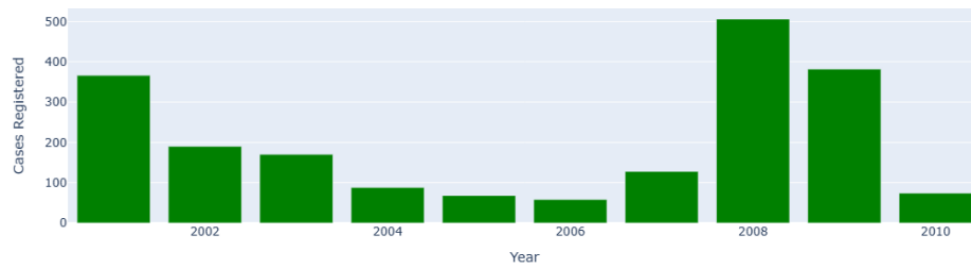


Fig. 7: Bar graph showing the year-wise distribution of HR violations by police reported between 2001 and 2010

The number of human rights violation by the police have been varying each year with maximum in 2008(506) and minimum in 2006(58) shown by [fig.7](#)

State-wise Cases Registered under Human Rights Violations

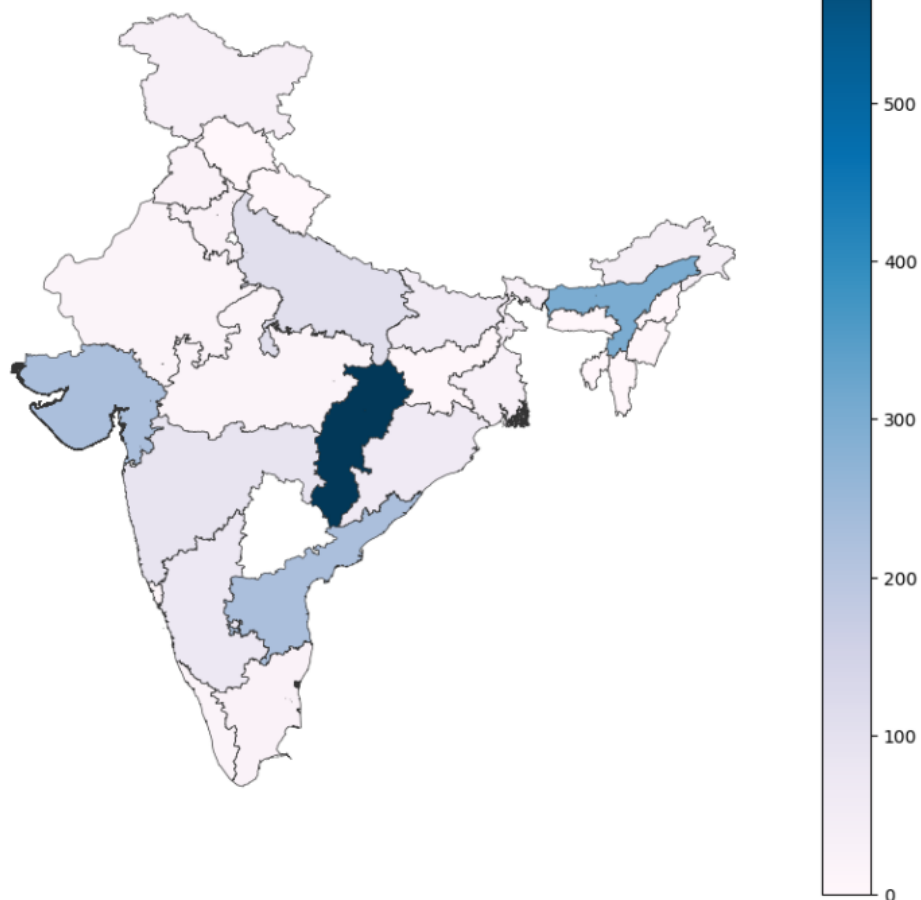


Fig. 8: Plot showing the state-wise distribution of HR violations by police reported between 2001 and 2010

The state-wise distribution(fig.8) of the reported cases shows that Chhattisgarh was the worst performing state followed by Assam and Gujarat. The best performing states were Manipur, Uttarakhand and Goa.

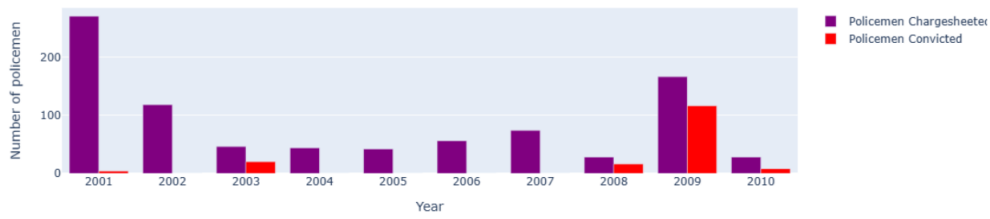


Fig. 9: Bar graph comparing the number of policemen chargesheeted vs the number of policemen convicted

The number of policemen chargesheeted were highest in 2001 and lowest in 2008. The maximum number of convictions happened in 2009 while there were zero convictions in 2002, 2004, 2005, 2006 and 2007.

4.3 Analysis of Theft Data

4.3.1 Analysis of Auto Theft

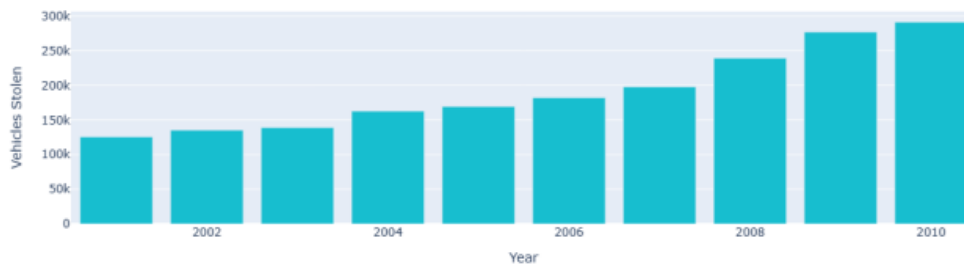


Fig. 10: Bar graph showing the year-wise distribution of Auto Theft cases reported between 2001 and 2010

There has been a year on year increase in the total number of auto thefts each year. The maximum happened in 2010 and minimum in 2001.(fig.10)

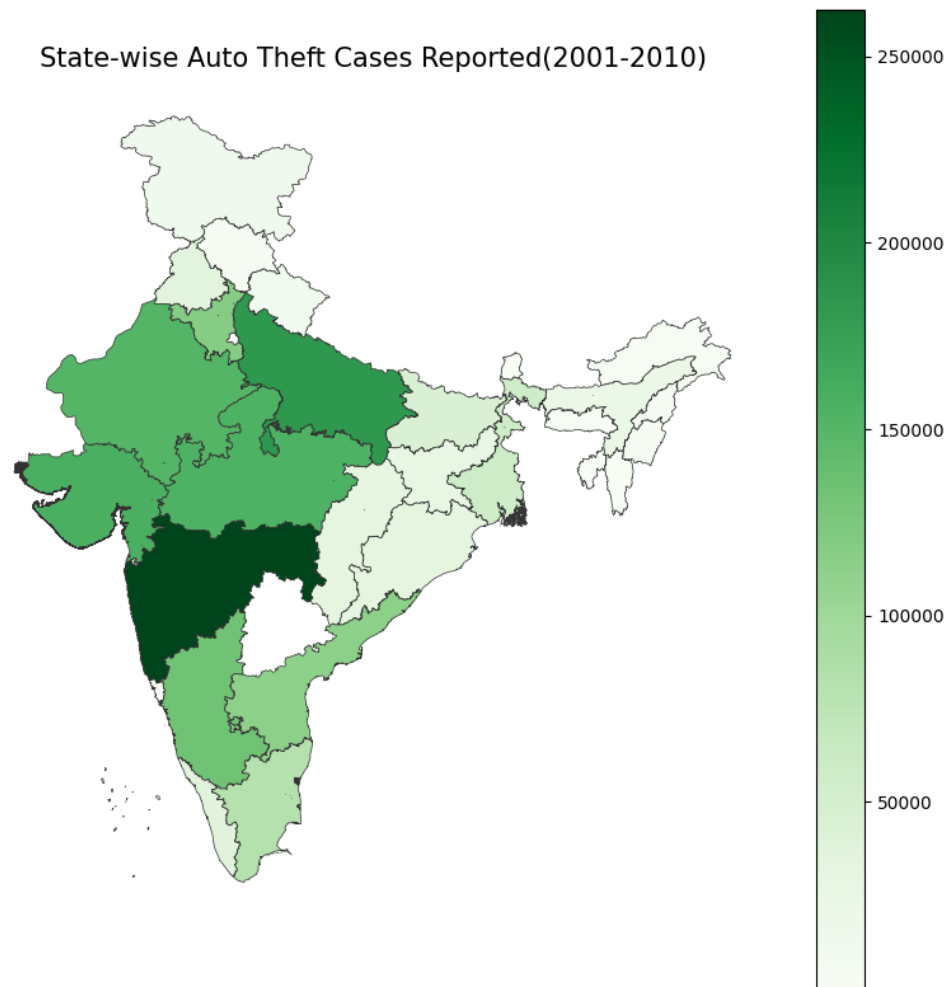


Fig. 11: Plot showing the state-wise distribution of Auto Theft cases reported between 2001 and 2010

Maharashtra leads the states by a huge margin which is followed by Uttar Pradesh and Gujarat(fig.11). We can also see that most of the cases are from the central and western part of the country.



Fig. 12: Pie showing the distribution of automobiles stolen, traced and recovered between 2001 and 2010

The pie chart(fig.12) shows that out of all the automobiles stolen, 74.4% were never found. Out of the 25.6% vehicles traced, 21.2% were recovered. This shows that if the stolen automobile was traced there was a high probability that it was recovered.

Sr No	Vehicle type
1	Motor Cycles/ Scooters
2	Motor Car/Taxi/Jeep
3	Buses
4	Goods carrying vehicles (Trucks/Tempo etc)
5	Other Motor vehicles

Fig. 13: Table showing the types of automobiles stolen between 2001 and 2010

The most stolen automobiles belonged to the 2 wheeler class of vehicles like Motor Cycles and Scooters. Following them were Light Motor Vehicles(LMVs) like Motor Car, Taxi and Jeep. Buses, Trucks and other vehicle types were the least stolen.

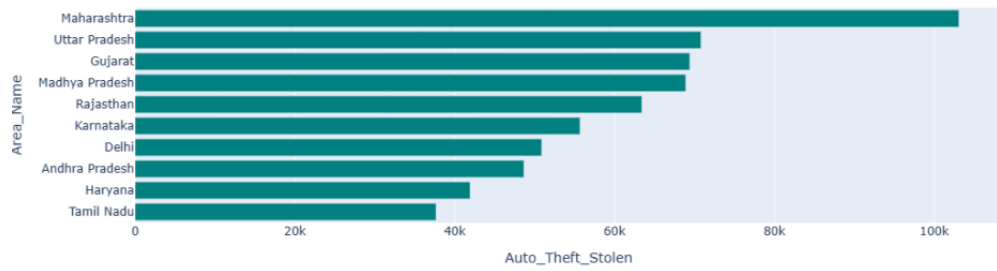


Fig. 14: Bar graph showing the top 10 States/UT with highest number of Motor Cycle/Scooters stolen between 2001 and 2010

The states with most number of automobile thefts also lead in the category of 2 wheeler thefts i.e Maharashtra, Uttar Pradesh and Gujarat.

4.3.2 Analysis of Property Theft

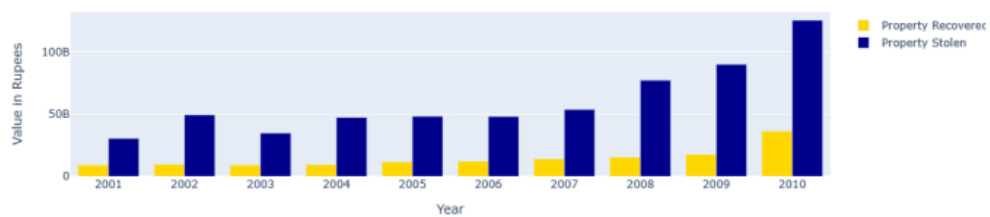


Fig. 15: Bar graph showing the year-wise distribution of Property Theft cases reported between 2001 and 2010

The value of the property stolen has increased every year but 2003. With the increase in the value of stolen property, the value of property recovered has also increased but it is still very low when compared the the stolen property's value.

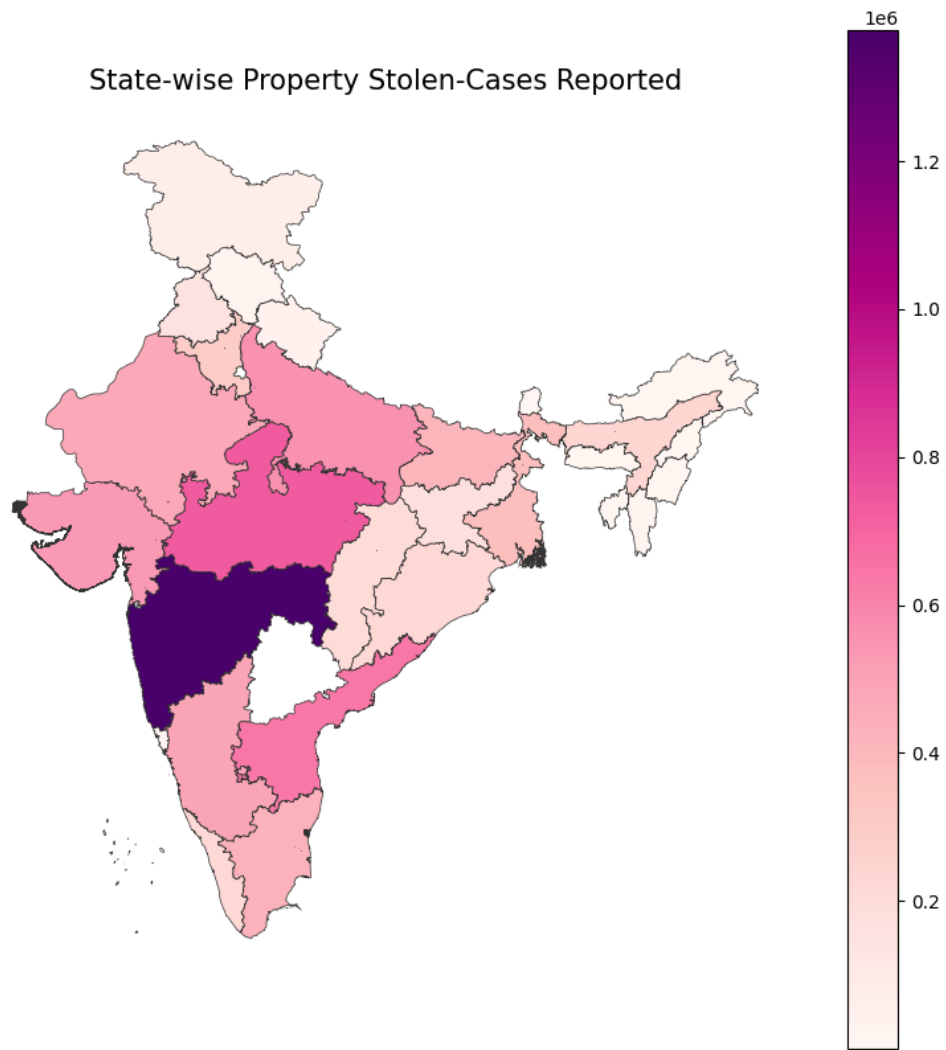


Fig. 16: Plot showing the state-wise distribution of Property Theft cases reported between 2001 and 2010

The top 3 states with most number of cases were Maharashtra, Madhya Pradesh and Andhra Pradesh.



Fig. 17: Pie showing the distribution of Property stolen and recovered between 2001 and 2010

Fig.17 shows that the only 26.5% of the property stolen was recovered.

4.4 Analysis of Crimes against Scheduled Castes

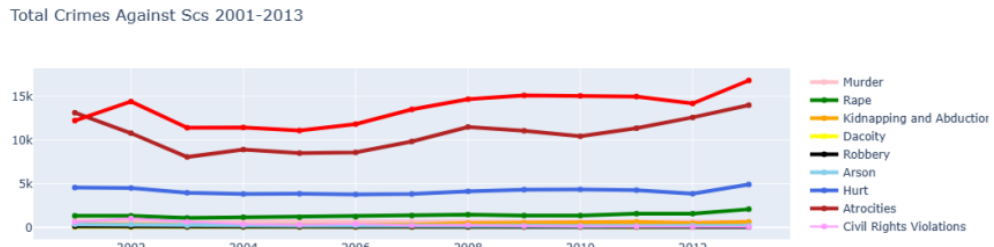


Fig. 18: Plot showing the year-wise distribution of automobiles stolen, traced and recovered between 2001 and 2010

From 2001-2013(fig.18) majority of the crimes registered were under Prevention of Atrocities(POA) act and other crimes. The number of other crimes has either decreased from 2001 to 2013 or has stayed almost same.

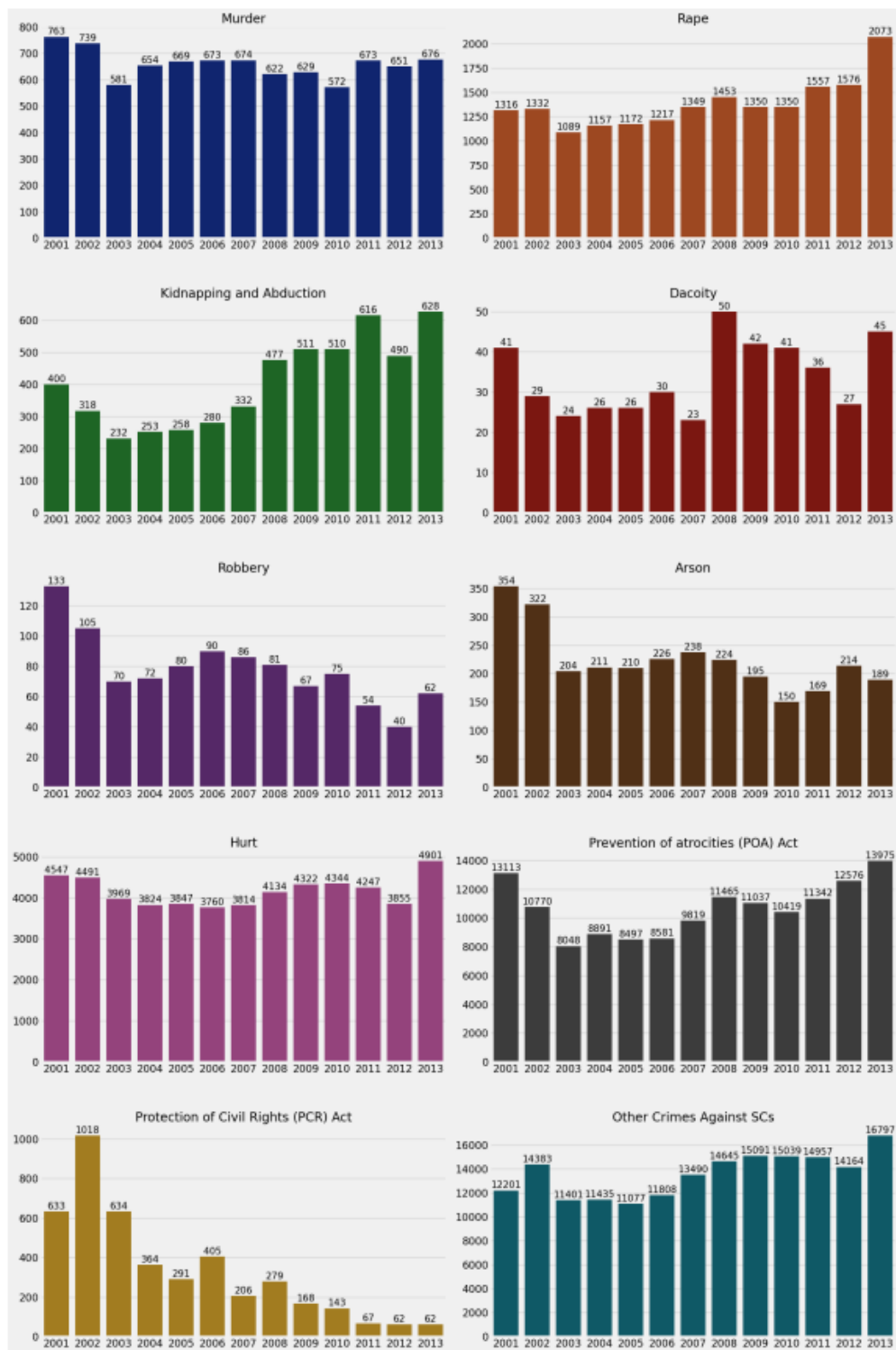


Fig. 19: Bar Graphs showing the year-wise distribution of different crimes between 2001 and 2010

We can see the year-wise distribution of different crimes against SCs from fig.19. From 2001-2013, the number of cases of murder had remained relatively same. The cases of rape had generally increased during this period. The number of kidnapping and abduction increased from 2003 to 2011. The cases of dacoity was highest(50) in 2008 and lowest in 2007(23). The number of cases of robbery has generally decreased during the period. Cases of arson was the highest in 2001-2002 and decreased after. Cases of hurt remained constant during the period. Cases of Prevention of atrocities generally increased in the period. The Protection of Civil Rights cases decreased. Other crimes against SCs increased from 2005 to 2009 and remained generally constant after that.

Table 2: Total number of different crimes against SC

S.no.	Crime	Total
1	Murder	8576
2	Rape	17991
3	Kidnapping and Abduction	5305
4	Dacoity	440
5	Robbery	1015
6	Arson	2906
7	Hurt	54055
8	Prevention of Atrocities (PoA) Act	138533
9	Protection of Civil Rights (PCR) Act	4332
10	Other Crimes Against SCs	176488

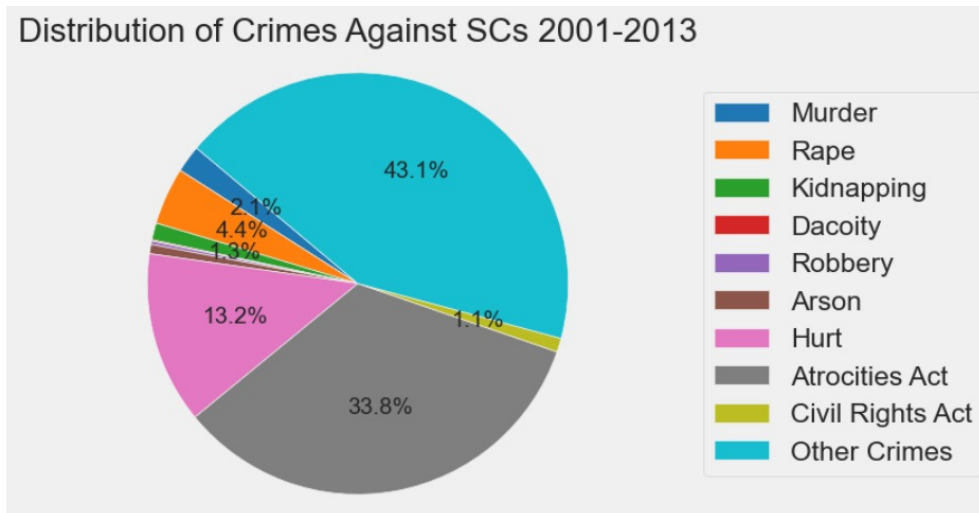


Fig. 20: Pie chart showing the distribution of different crimes against SCs between 2001 and 2013

The maximum number of cases against SCs were other crimes(176488)(table 2) which constituted 43.1% of the total crimes committed(fig.20) followed by Prevention of Atrocities(PoA) Act(138533)(33.8%) and Hurt(54055)(13.2%). The lowest cases were Dacoity(440)(0.11%), Robbery(1015)(0.24%) and Arson(2906)(0.71%).

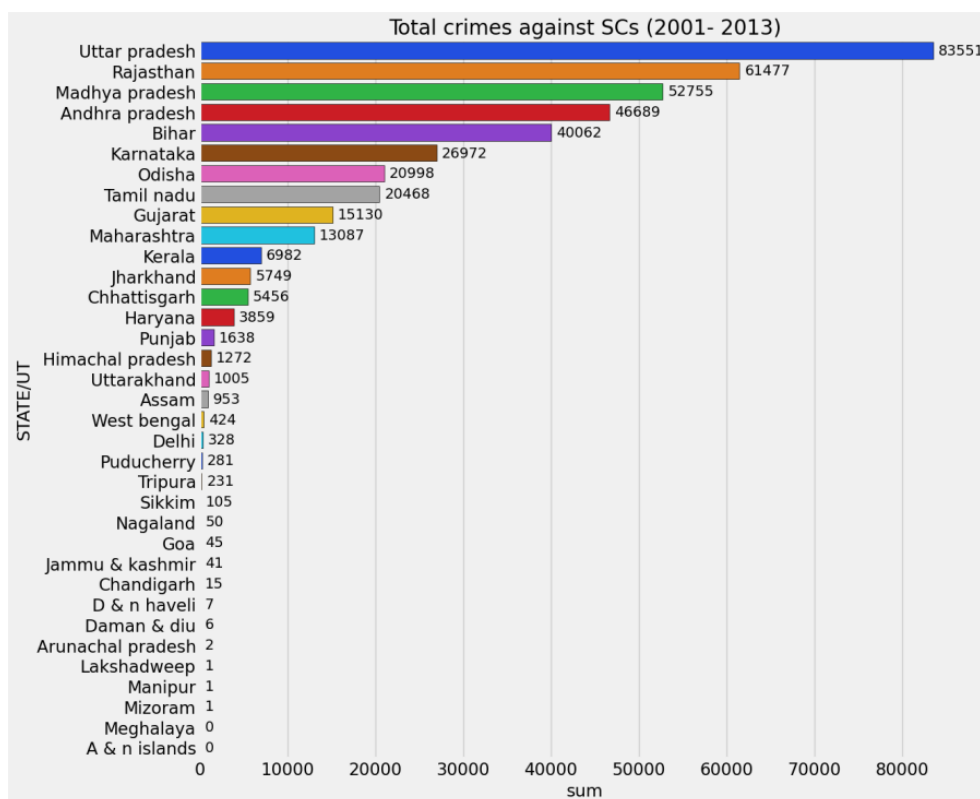


Fig. 21: Bar graph showing state-wise distribution of crimes against SCs between 2001 and 2013

Fig.21 shows that Uttar Pradesh saw the maximum number of crimes against SCs(83551) then Rajasthan(61477) and Madhya Pradesh(52755). Andaman and Nicobar Islands along with Meghalaya saw zero cases.

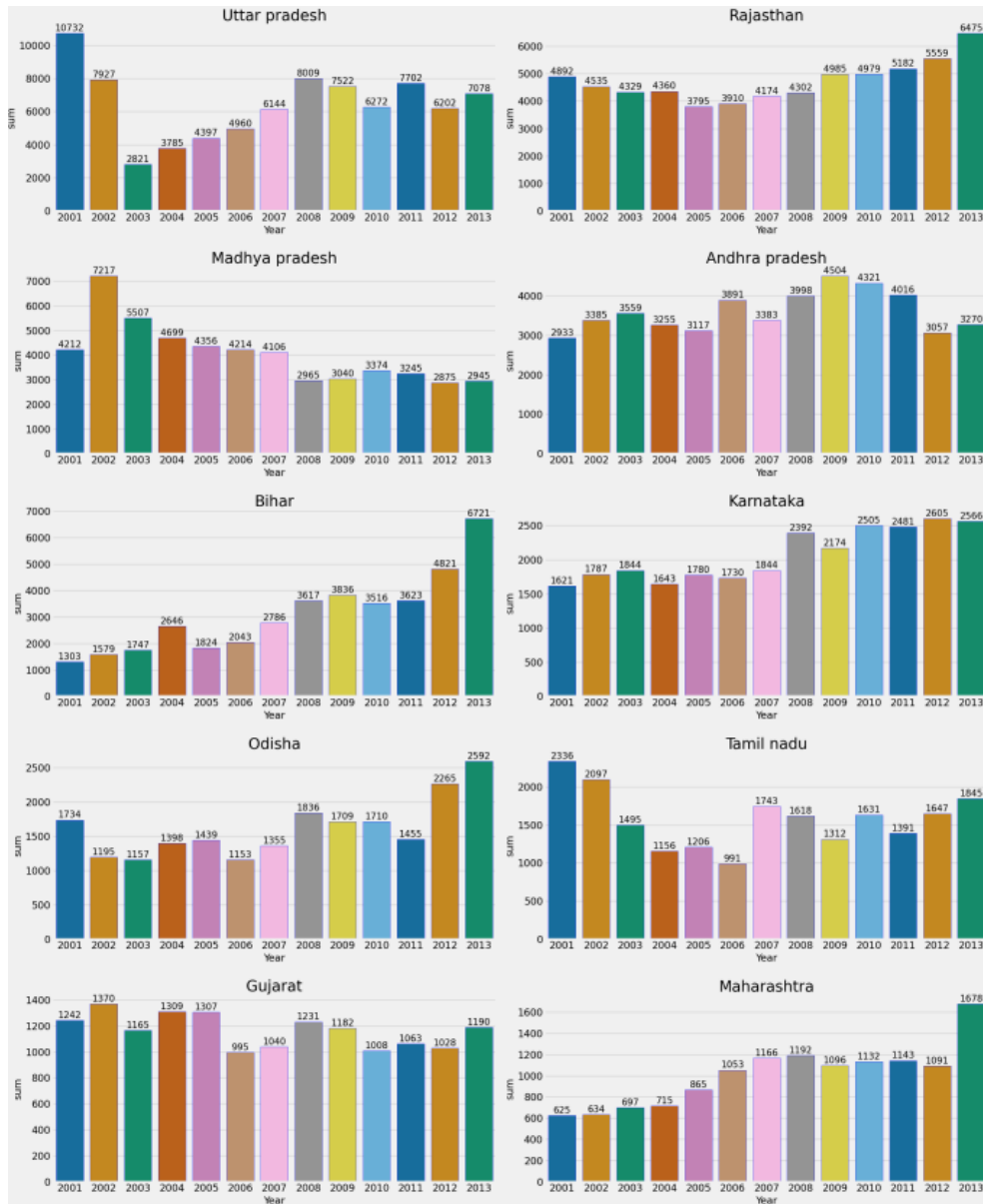


Fig. 22: Bar graph showing state-wise year-wise distribution of crimes against SCs between 2001 and 2013

Bar graphs in fig.22 shows the year wise distribution of total crimes in different states.

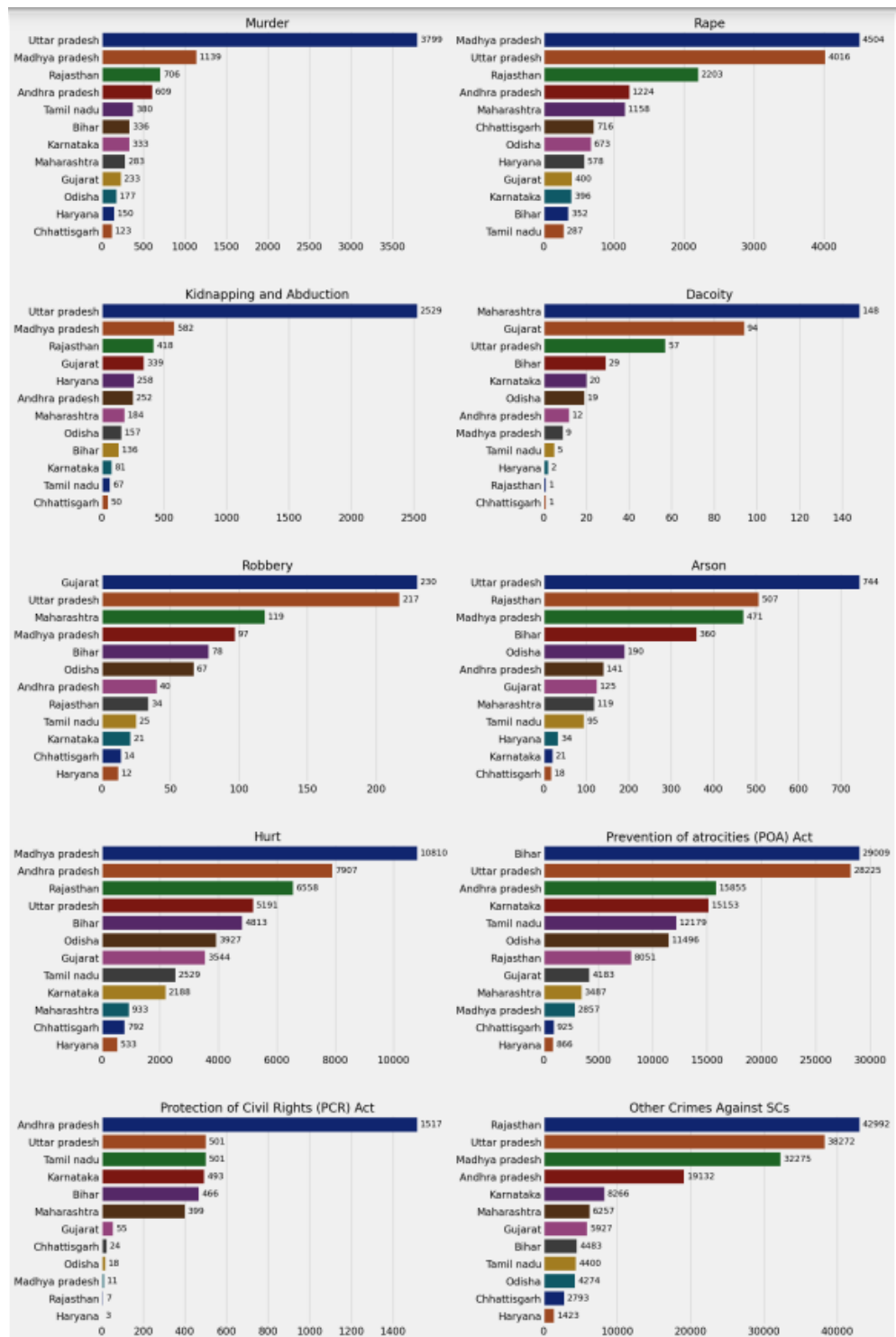


Fig. 23: Bar graph showing state-wise distribution of different crimes against SCs between 2011 and 2013

The top states of different crimes can be seen from fig.23

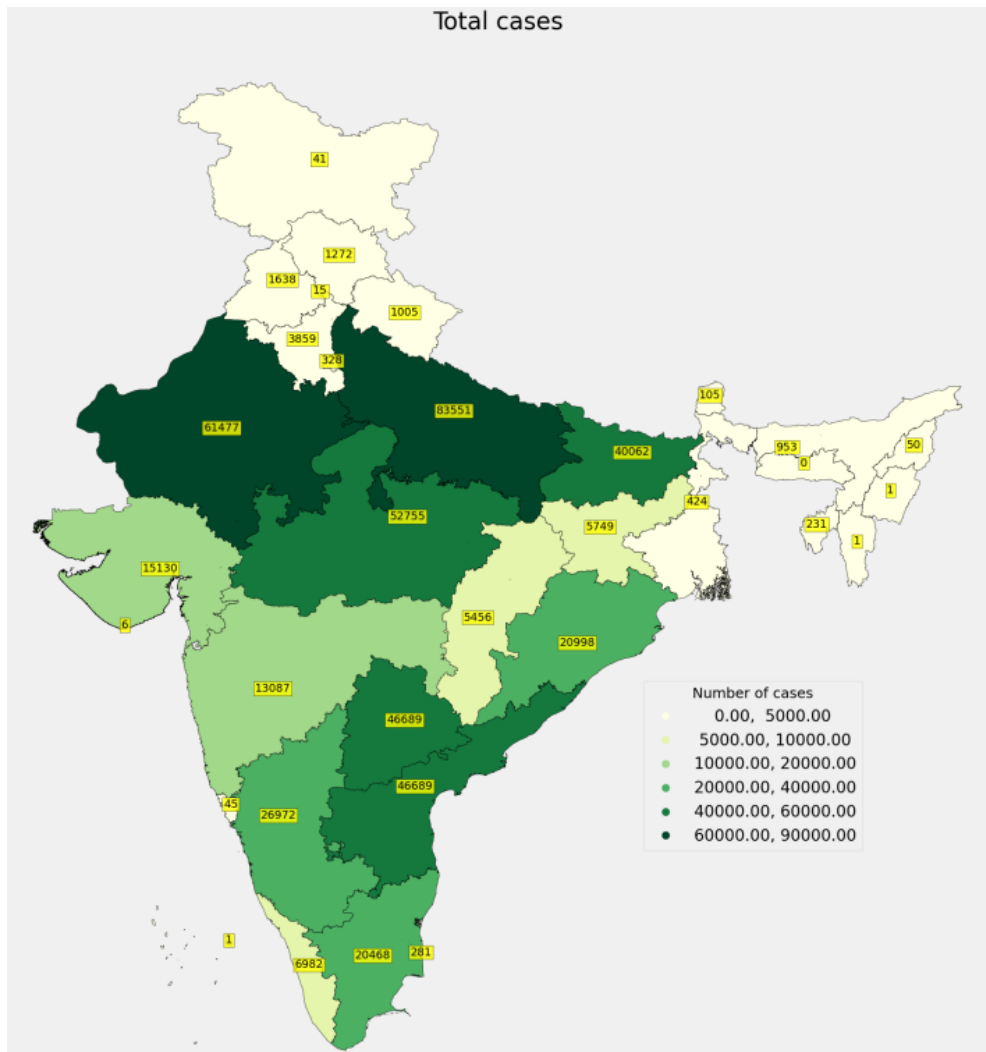


Fig. 24: Map showing state-wise distribution of total number of crimes against SCs between 2001 and 2013

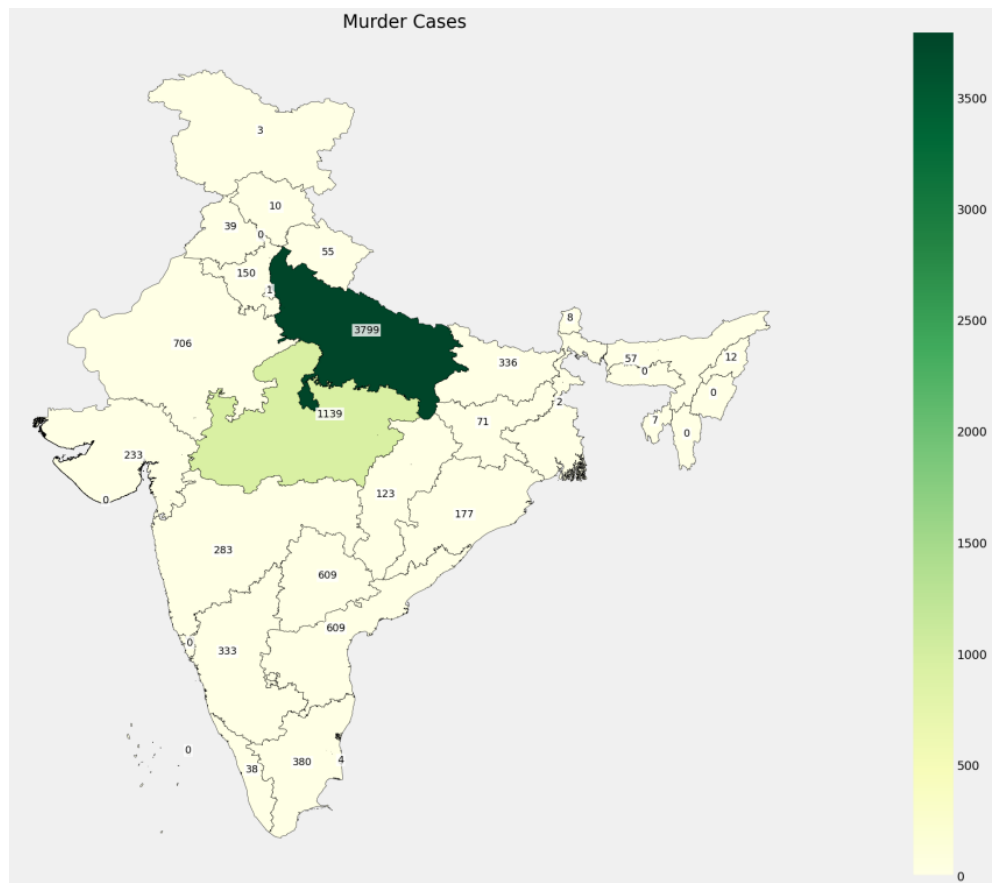


Fig. 25: Map showing state-wise distribution of SC murder cases between 2001 and 2013

SC murder cases were highest in Uttar Pradesh(3799), Madhya Pradesh(1139) and Rajasthan(706)(fig.25).

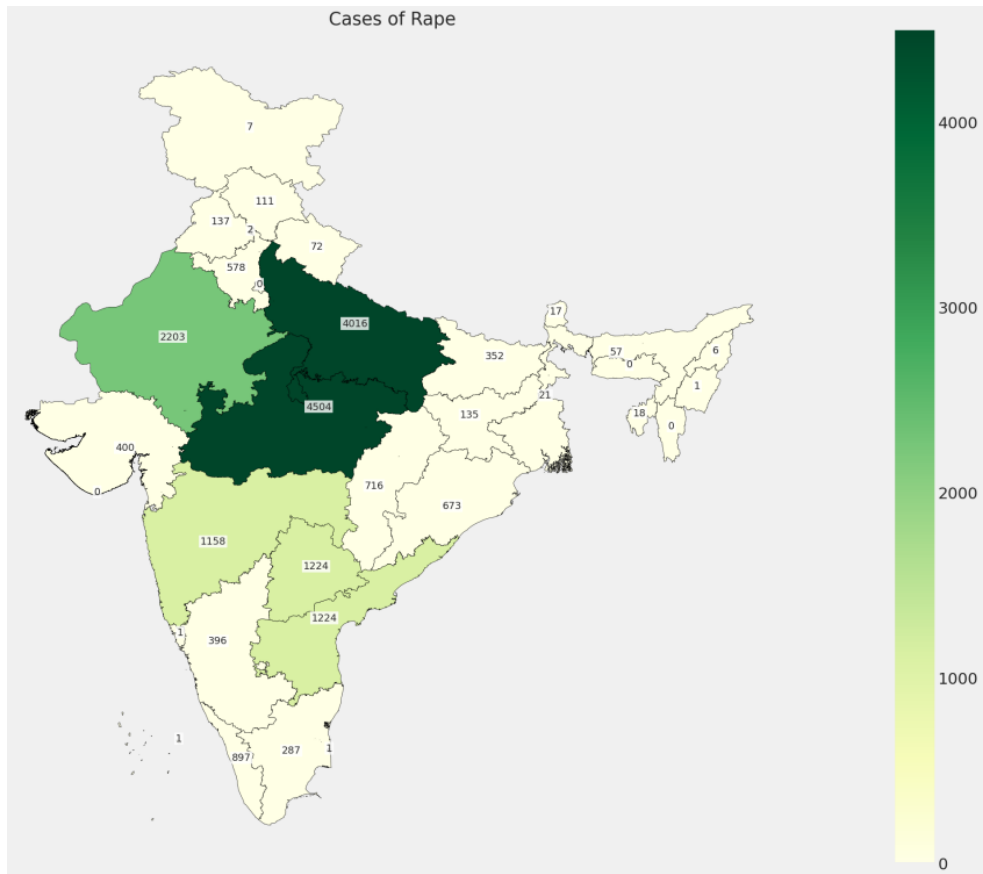


Fig. 26: Map showing state-wise distribution of SC rape cases between 2001 and 2013

Cases of SC rape were highest in Madhya Pradesh(4504), Uttar Pradesh(4016) and Rajasthan(2203). From the map(fig.26) we can also observe that most of the cases were from central part of the country.

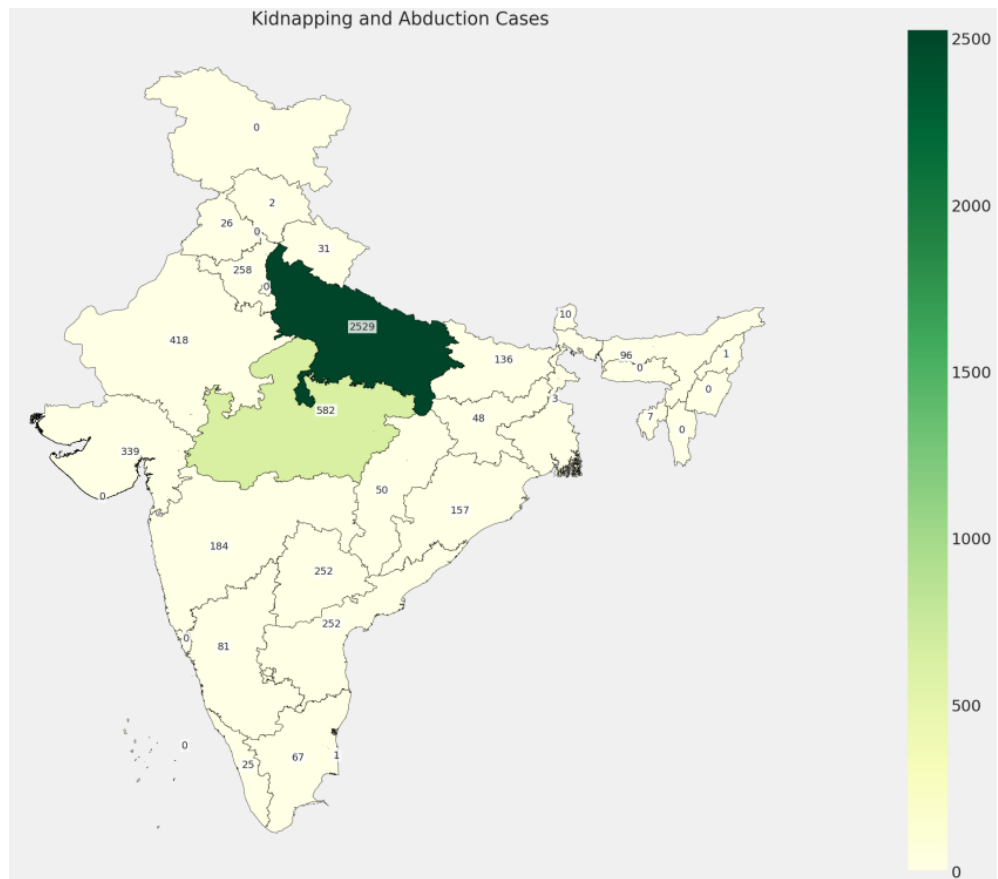


Fig. 27: Map showing state-wise distribution of SC kidnapping and abduction cases between 2001 and 2013

Most number of SC kidnapping cases were from Uttar Pradesh(2529) and Madhya Pradesh(582)(fig.27).

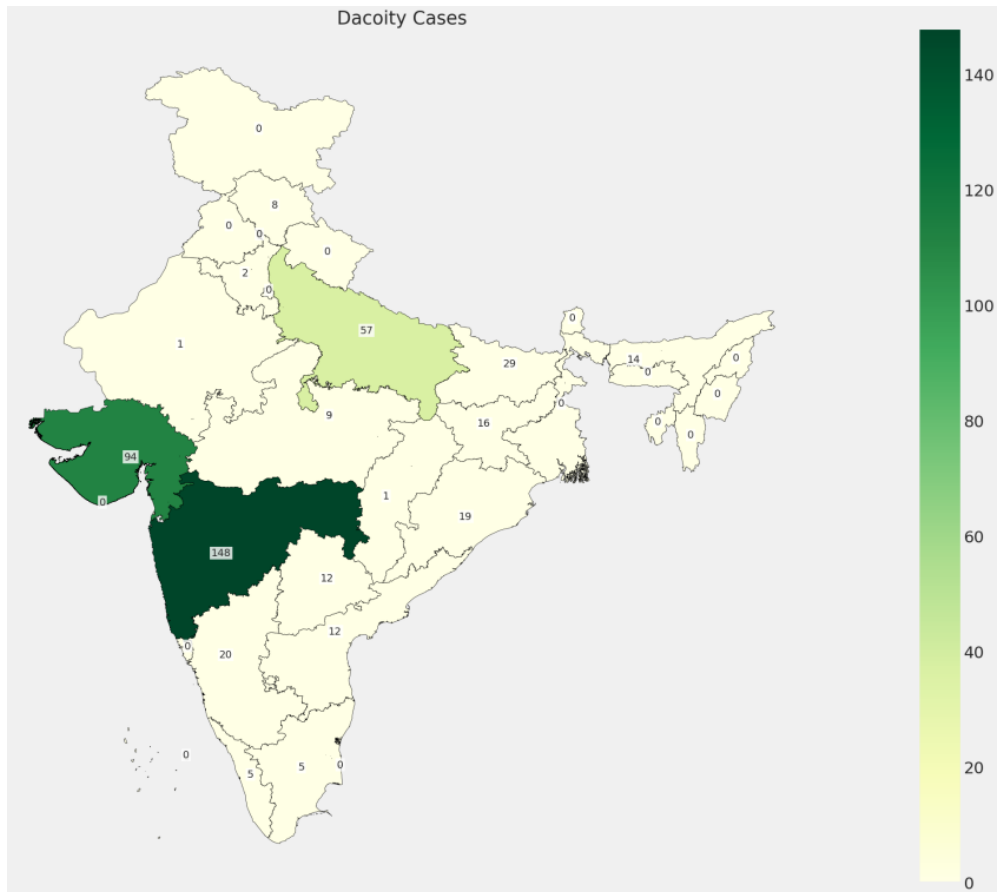


Fig. 28: Map showing state-wise distribution of SC dacoity cases between 2001 and 2013

Most cases of Dacoity against SCs were from Maharashtra(148) and Gujarat(94). Most of the cases are from the western part of the country(fig.28).

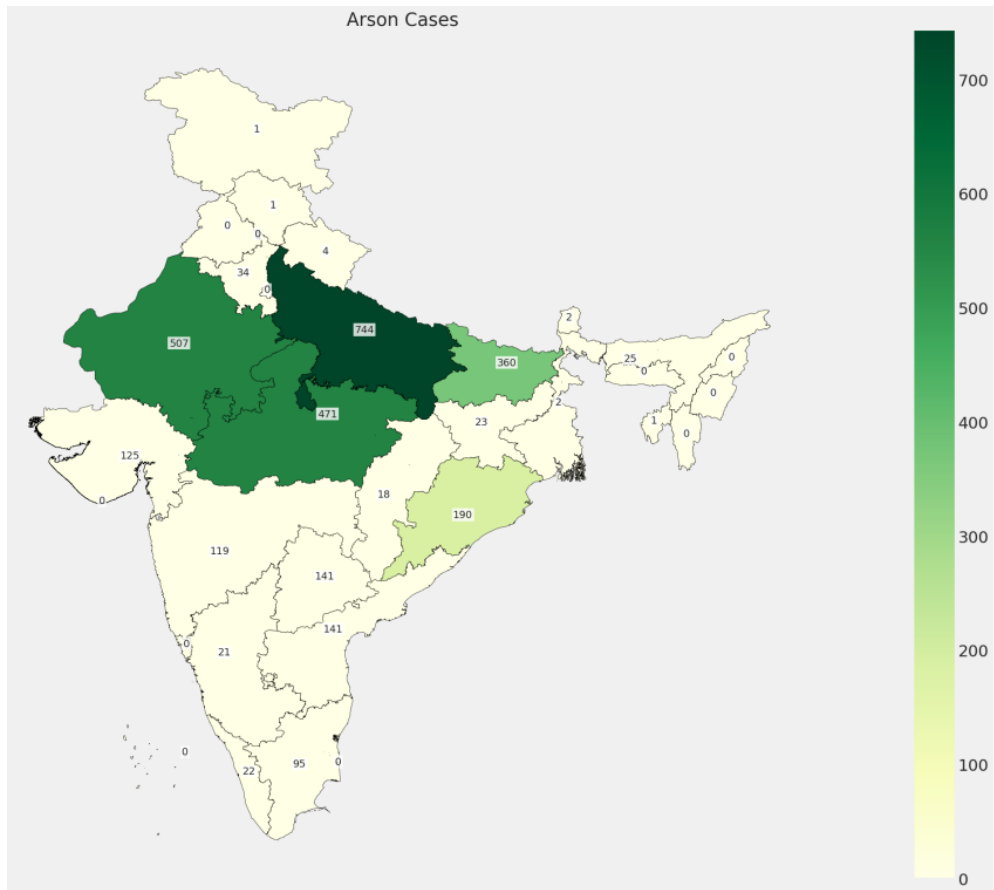


Fig. 30: Map showing state-wise distribution of SC arson cases between 2001 and 2013

Arson cases against Scs were highest in the northern-central part of the country(fig.30) with Uttar Pradesh seeing the most cases(744) followed by Rajasthan(507) and Madhya Pradesh(471).

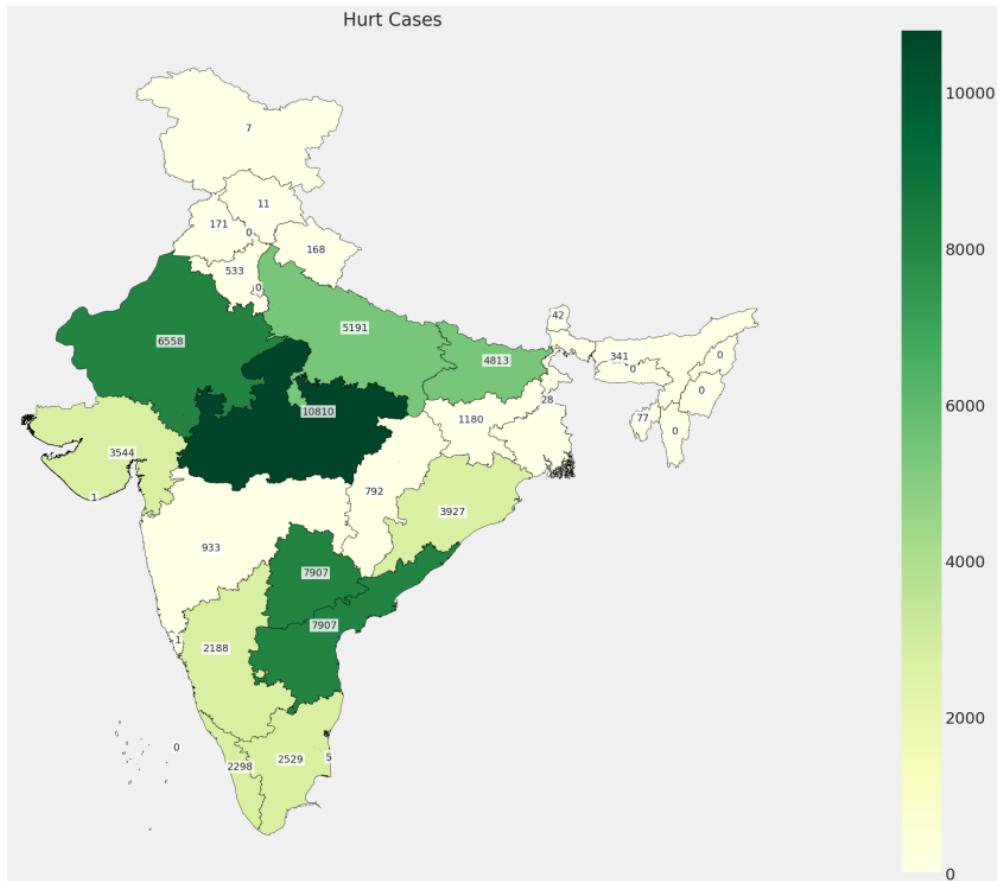


Fig. 31: Map showing state-wise distribution of SC hurt cases between 2001 and 2013

Hurt cases against SCs were highest in the northern-central and Southern part of India(fig.31). Madhya Pradesh had the highest number of cases(10810) with the undivided state of Andhra Pradesh in seconf(7907) and Rajasthan in third(6558).

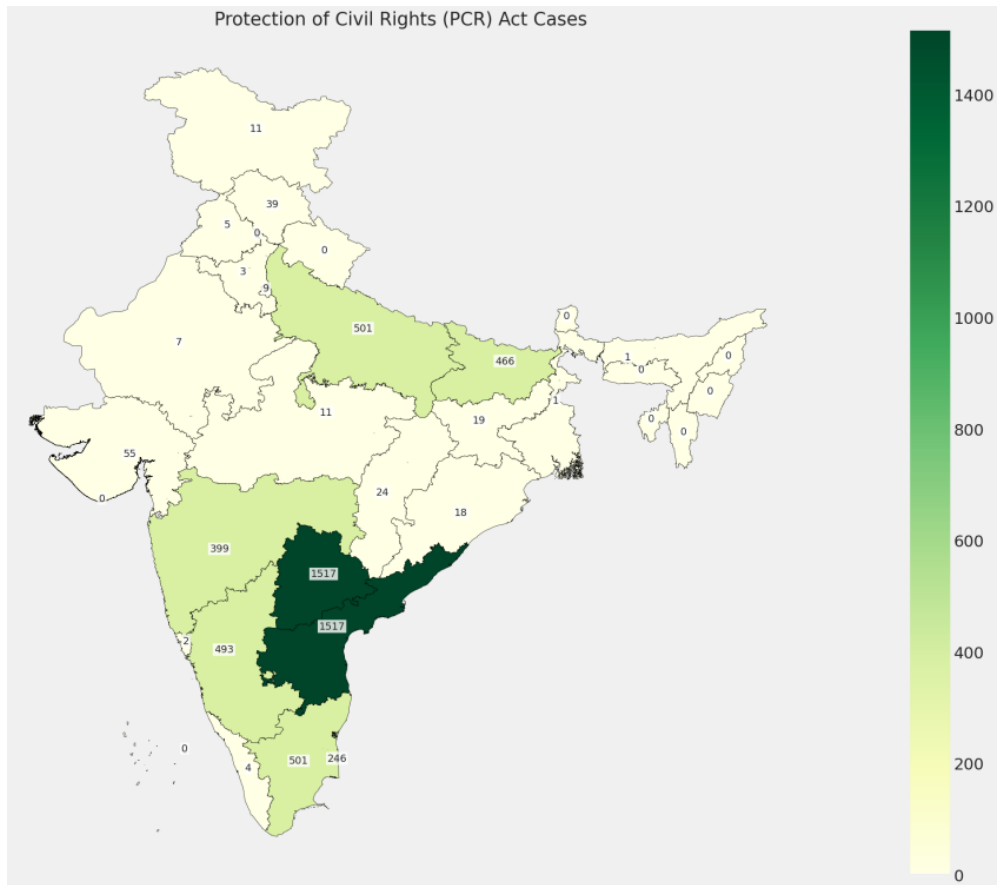


Fig. 32: Map showing state-wise distribution of Protection of Civil Rights (PCR) Act cases between 2001 and 2013

Most of the Protection of Civil Rights(PCR) Act cases were from the Southern part of the country(fig.32). Top 3 were- Undivided Andhra Pradesh(1517), Tamil Nadu and Uttar Pradesh(both 501).

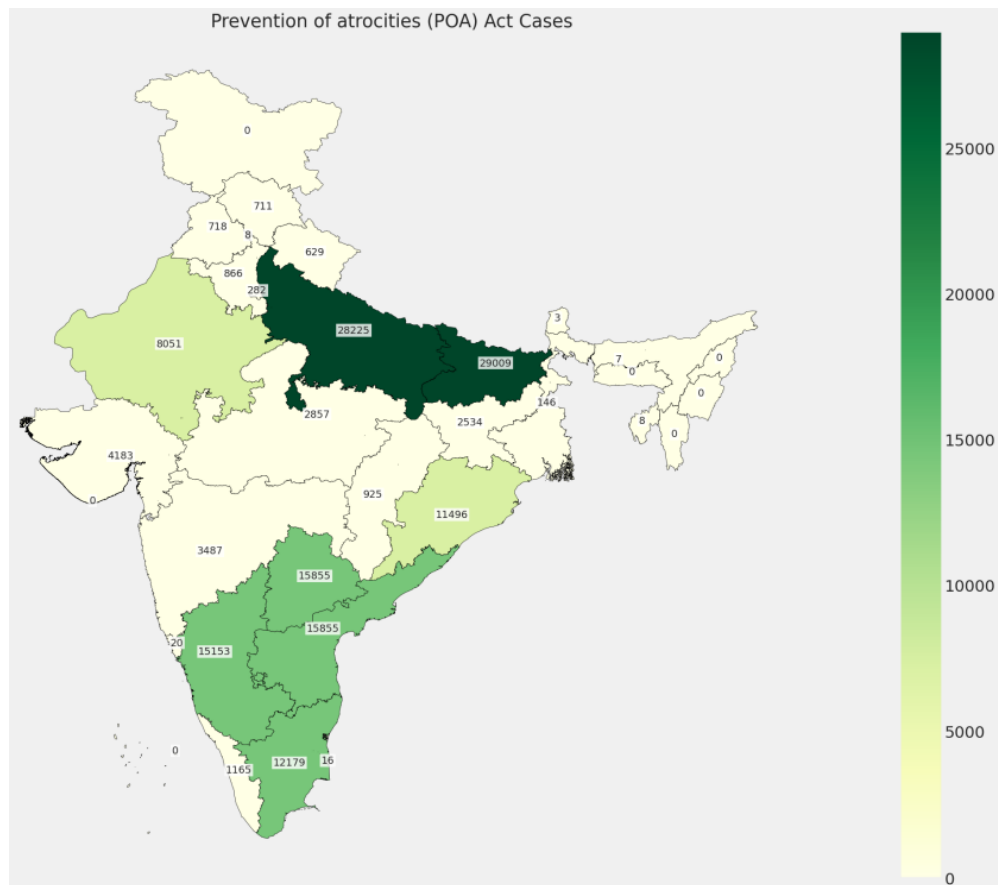


Fig. 33: Map showing state-wise distribution of Prevention of Atrocities(PoA) cases between 2001 and 2013

PoA cases were highest in Bihar(29009), Uttar Pradesh(28225) and Andhra Pradesh(15885). Cases were concentrated in the northern states of UP, Rajasthan and Bihar along with the southern states(fig.33).

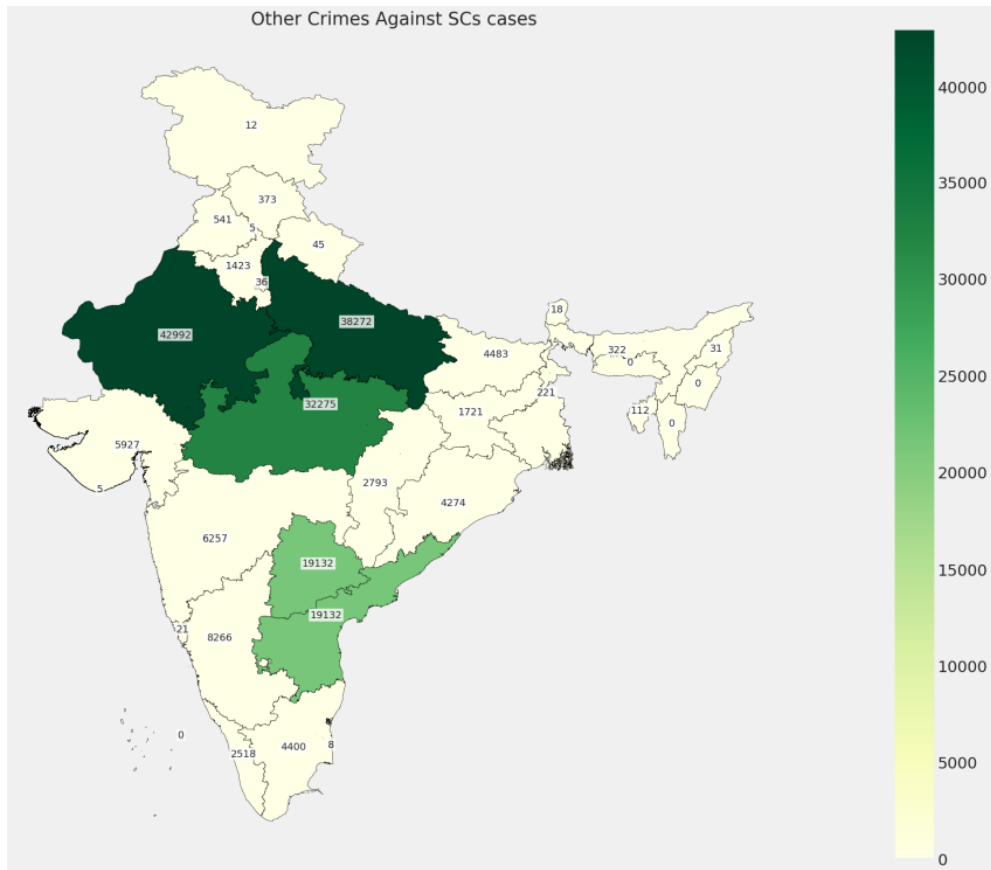


Fig. 34: Map showing state-wise distribution of other crimes against SCs between 2001 and 2013

Crimes that do not constitute the previous sub-categories are combined under other crimes. Top 3 states were Rajasthan(42992), Uttar Pradesh(38272) and Madhya Pradesh(32275)(fig.34).

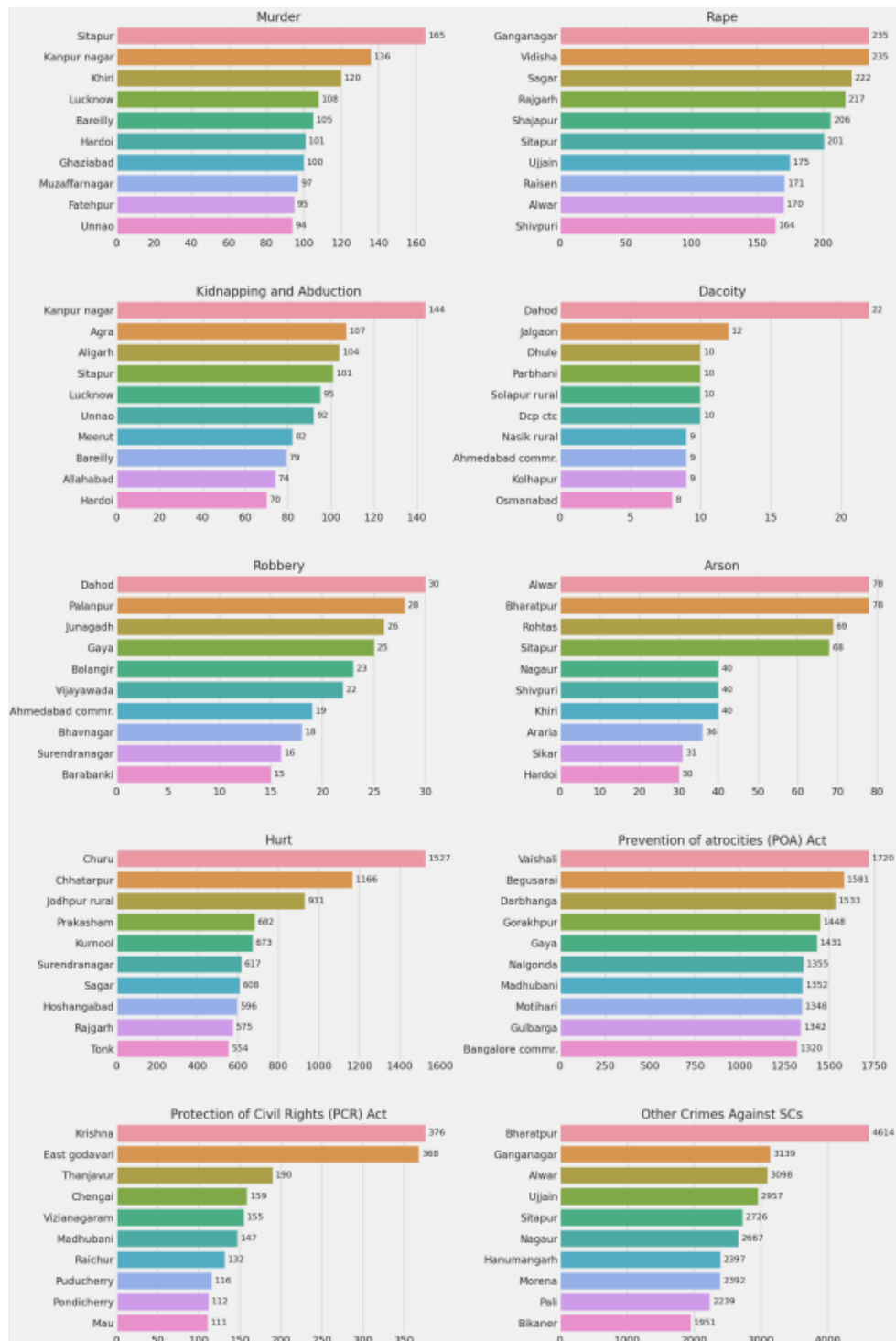


Fig. 35: Bar graphs showing top districts of different crimes against SCs between 2001 and 2013

Crime category and its top districts can be seen in fig.35

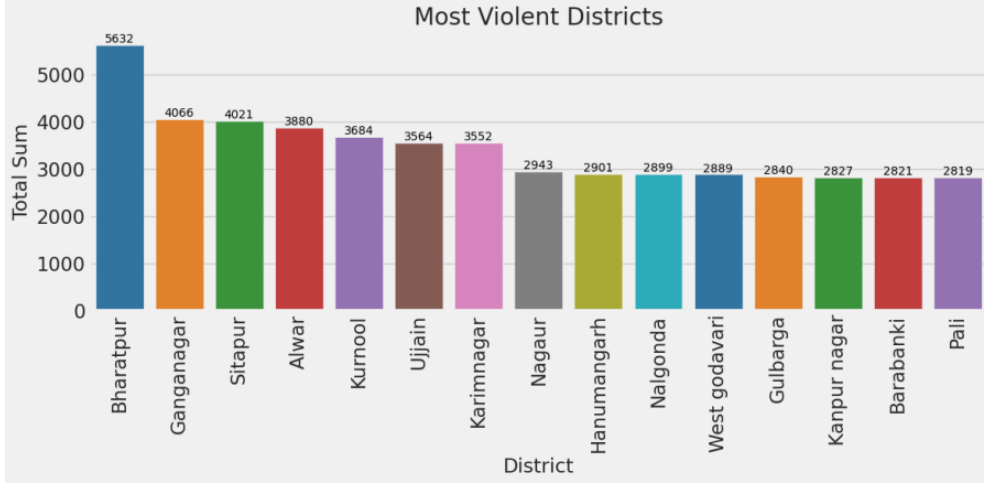


Fig. 36: Plot showing top districts with most crimes against SCs between 2001 and 2013

Most violent district where most crimes against SCs took place was Bharatpur(5632) in Rajasthan. It was followed by Ganganagar(4066) district which is also in Rajasthan and Sitapur(4021) district in Uttar Pradesh. 6 of the top 15 districts belong to Rajasthan(Bharatpur, Ganganagar, Alwar, Nagaur, Hanumangarh and Pali)(fig.36).

5 Conclusion

The broad motive of this study was to gain insights that have depth in order to better understand the heterogeneity of crime in India. These findings contribute to the existing body of literature in the field of crime analytics.

Segregating the findings into concrete components helped display which areas need tightening of law enforcement and awareness regarding selected crimes i.e hate crimes against Scheduled Castes. This information is very important since it is vital in assessing the deficiencies relating to socio-economic, demographic, local, and educational variables. Bar graphs pertaining to rape cases through the years show an increasing trend; with the highest number of cases being reported in 2010. Similar trend was observed in Auto-theft cases. While crime on a global scale has undergone a decline; in India the cases seems to be otherwise.

There is a pressing need to understand the cause of the increasing crime cases: which might be attributed by the increasing population, clemency of police forces, lack of sound education, and bigoted upbringing. Overall, this paper aims to provide

an exhaustive analysis of the multi-facets of Indian Crime that use a data-driven approach to uncover insights, and provide a lens for it.

6 Scope For Future Work

Further research can be build upon this existing literature by expanding our dataset with data from the last decade: 2010 onwards. The research done at present is limited, and does not incorporate any clustering algorithms. Including clustering algorithms like K-Means and DBSCAN may help in identifying crime hotspots, grouping similar types of crime together, and identifying anomalous crime patterns, that may aid in catching new emerging crime trends early on. Cluster analysis would also help in the curation of crime typologies—grouping crimes with similar characteristics together, thus helping decode the modus operandi of criminals. Use of weighted attributes may also aid in refining the accuracy of the analysis. Weighted Attributes involve multiplying attributes with "weights" signifying their priority in the analysis. This will help in mitigating bias such as demographic factors which may be overrepresented or underrepresented. Weighted Attributes also help highlight factors which may be more important in the understanding of crime patterns. An example could be assigning higher weights to unemployed/low-income level attributes in property crimes and assessing the correlation between them. The integration of advanced data-analytic tools can lead to predictive policing, better decision making, and increased resource optimization for law-enforcement.