

Statistical Analysis of the Pending Cases at the Lower Courts in India

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Overview of the Indian Judicial System

Multi-Tiered Structure

The Indian judicial system follows a multi-tiered structure, with the Supreme Court at the apex, followed by High Courts at the state level, and a network of District and Taluk Courts at the local level.

Hierarchical Jurisdiction

The courts have a hierarchical jurisdiction, with the Supreme Court exercising appellate and advisory jurisdiction over the lower courts, ensuring a unified and consistent application of the law.

Specialized Tribunals

In addition to the traditional court system, India also has several specialized tribunals that handle specific types of cases, such as administrative, taxation, labor disputes etc.

Role of Judiciary

The Indian judiciary plays a critical role in upholding the Constitution, protecting individual rights, and maintaining the rule of law, ensuring a balance of power between the executive, legislative, and judicial branches.

Objectives of the Project



Judiciary is the backbone of any democratic machinery.

This analysis delves into the pressing issue of the **growing backlog of pending cases in the district and taluk courts** across India.

By examining the current state of affairs, we aim to uncover insights that can drive **meaningful reforms and improve access to timely justice** for all.

Data Collection



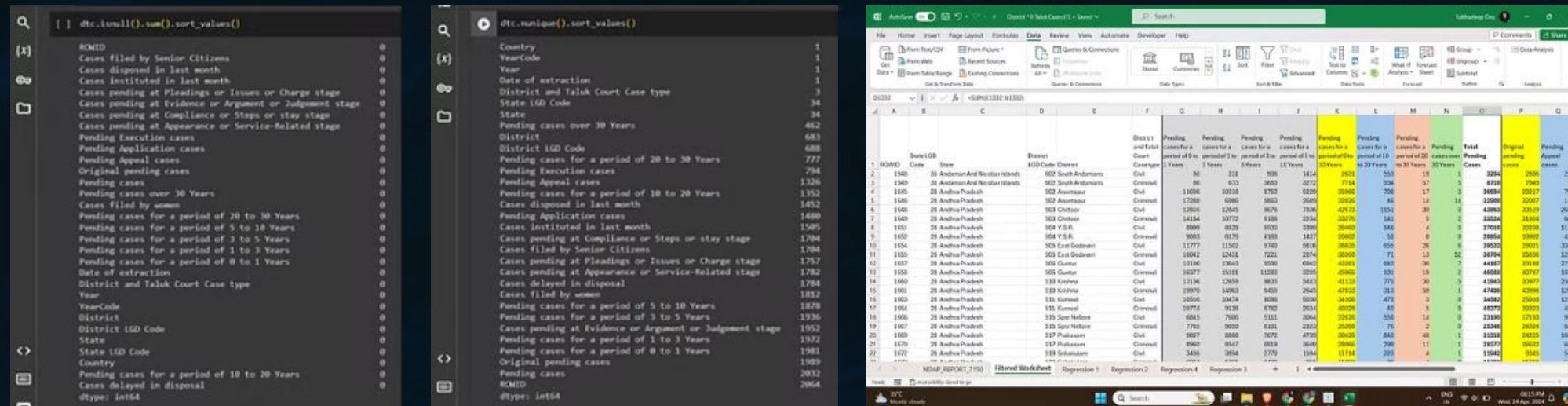
सत्यमेव जयते

NITI Aayog

The dataset has been collected from the **National Data and Analysis Platform (NDAP)** which is a website having countless governmental data vis-a-vis the Government of India.

This web platform is maintained by the **National Institution for Transforming India Aayog (NITI Aayog)**, an extra-constitutional body of the Government of India.

Data Preprocessing



1. We imported the data in python through pandas and checked whether there are null values, and if any what are their contributions in the entire dataset. Also we checked the number of unique values in each column.
2. After that we have deleted all the unnecessary columns from the dataset so that it becomes crisp and clear for doing the statistical analysis.

Methodology 1 (Hypothesis Testing: t-test)

Finding the disparity in resolving of cases between Civil and Criminal cases amongst the **marginalized section** of the society i.e. Women and Senior Citizens.

With that purpose we have conducted two t-tests.

1. A t-test for analyzing the means of the pending cases filed by senior citizens and filed by women in the district and taluk **civil** courts.
2. Another t-test for analyzing the means of the pending cases filed by senior citizens and filed by women in the district and taluk **criminal** courts.



The First t-test

H0: Cases filed by Women in civil courts take equal or more time than that of the Senior Citizens.

H1: Cases filed by Senior Citizen in civil courts take more time.

The Second t-test

H0: Cases filed by Senior Citizen in criminal courts take equal or more time than that of Women.

H1: Cases filed by Women in criminal courts take more time.

Results of the t-tests

t-Test: for Civil Court(Two-Sample Assuming Unequal Variances)			
	Pending Cases Filed By Senior Citizens in Civil Court		Pending Cases Filed By Women in Civil Court
Mean	2974.773256		2520.543605
Variance	13590588.16		10383732.26
Observations	688		688
Hypothesized Mean Difference	0		
df	1350		
t Stat	2.433304992		
P(T<=t) one-tail	0.007545385		h1:ACCEPTED
t Critical one-tail	1.645983124		
P(T<=t) two-tail	0.015090771		
t Critical two-tail	1.961722772		

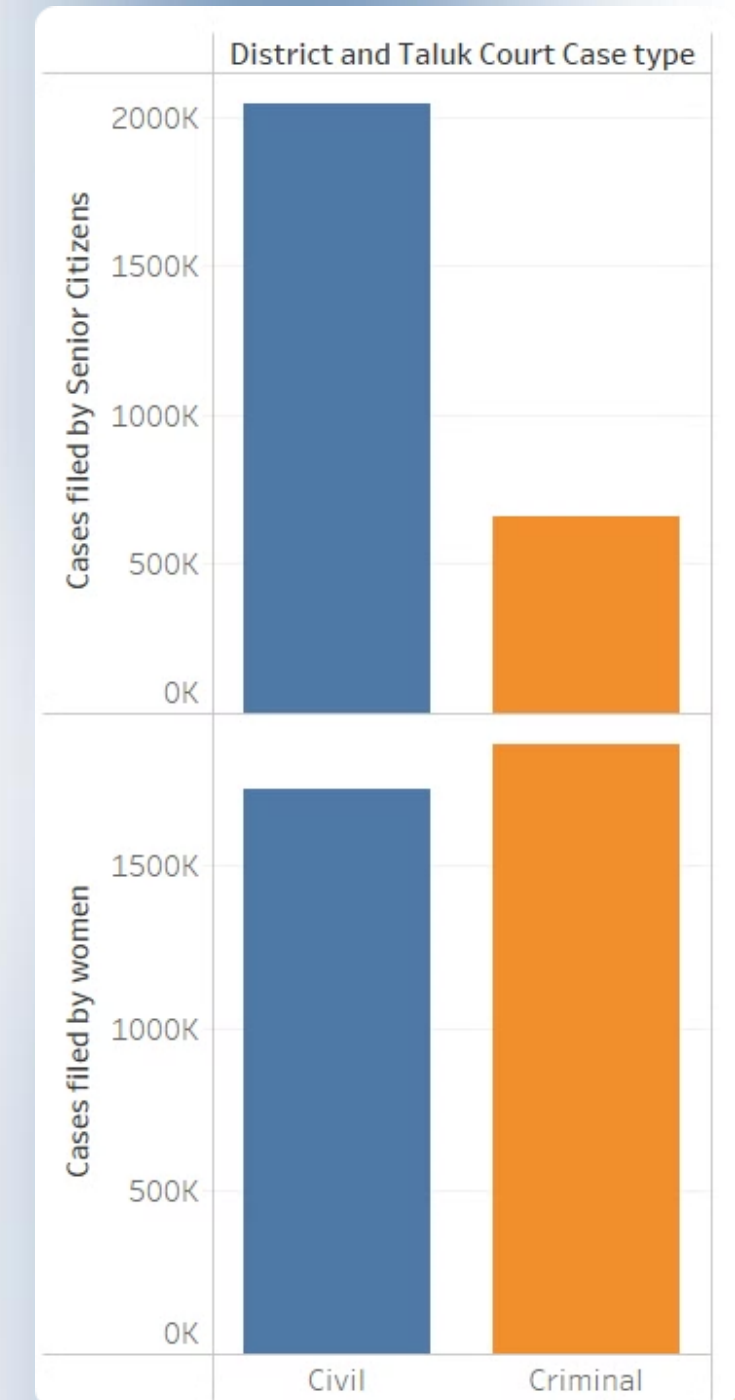
t-Test: Two-Sample Assuming Unequal Variances			
	Pending Cases Filed By Senior Citizens in Criminal Court		Pending Cases Filed By Women in Criminal Court
Mean	955.1235465		2720.527616
Variance	7599376.459		14923257.67
Observations	688		688
Hypothesized Mean Difference	0		
df	1243		
t Stat	-9.757279633		
P(T<=t) one-tail	5.04846E-22		h1:ACCEPTED
t Critical one-tail	1.646080427		
P(T<=t) two-tail	1.00969E-21		
t Critical two-tail	1.961874317		

Interpretation of the Result of First t-test

1. With the P-value of 0.0075 (which is <0.05), we can firmly say that our alternative hypothesis stands true. In other words, the cases filed by senior citizens in civil courts take more time than that of the women.
2. The mean value of the pending cases filed by senior citizen in civil courts (=2974.773) is greater than that of women (=2520.543).

Interpretation of the Result of Second t-test

1. With the P-value of $5.048 * E-22$ (which is $<<0.05$), we can firmly say that our alternative hypothesis stands true. In other words, the cases filed by women in criminal courts take more time than that of the senior citizens.
2. The mean value of the pending cases filed by women in criminal courts (=2720.527) is greater than that of senior citizens (=955.123).



Methodology 1 (Hypothesis Testing: ANOVA)

In order to find the disparity in resolving of cases between Civil and Criminal cases across the country.

With that purpose we have conducted two ANOVA-tests.

1. The groups are formed based on duration of resolving with a gap of 10 years, i.e. 0 to 10 years, 10 to 20 years, 20 to 30 years, more than 30 years.
2. With the same groups we have conducted two ANOVA-tests, one for civil cases and another for the criminal cases.



Results of the ANOVA-tests

Anova: Single Factor(CIVIL COURT)							
SUMMARY							
Groups	Count	Sum	Average	Variance			
Pending Cases For A Period of 0 To 10 Years	688	10121546	14711.54942	350295616.1			
Pending Cases For A Period Of 10 To 20 Years	688	710042	1032.037791	5350189.703			
Pending Cases For A Period Of 20 To 30 Years	688	118124	171.6918605	348486.2392	h1:ACCEPTED		
Pending Cases Over 30 Years	688	36137	52.5247093	40380.29493			
		10985849					
ANOVA							
Source of Variation	SS	df	MS	F	P-value	F crit	
Between Groups	1.05804E+11	3	35267874356	396.2296608	7.2568E-214	2.608141676	
Within Groups	2.44596E+11	2748	89008668.08				
Total	3.50399E+11	2751					
Anova: Single Factor							

Anova: Single Factor (CRIMINAL COURT)										
SUMMARY										
Groups	Count	Sum	Average	Variance						
Pending Cases For A Period of 0 To 10 Years	688	28934500	42055.9593	3818451040						
Pending Cases For A Period Of 10 To 20 Years	688	2791497	4057.40843	114761551.5						
Pending Cases For A Period Of 20 To 30 Years	688	442494	643.1598837	3010294.258	h1:ACCEPTED					
Pending Cases Over 30 Years	688	79238	115.1715116	243023.3635						
		32247729								
ANOVA										
Source of Variation	SS	df	MS	F	P-value	F crit				
Between Groups	8.50612E+11	3	2.83537E+11	288.1134754	1.3148E-162	2.608141676				
Within Groups	2.70435E+12	2748	984116477.3							
Total	3.55496E+12	2751								

Interpretation of the Result of First ANOVA-test

1. With the P-value of $7.3 * E-214$ (which is $\ll 0.05$), we can firmly say that our alternative hypothesis stands true. In other words, the at least one of the averages will not be equal.
2. The average pending cases within **0-10 years** for **civil cases** per district (or taluk) is **14,711.55**
The average pending cases within **10-20 years** for **civil cases** per district (or taluk) is **1,032.038**
3. Total civil cases pending at district and taluk courts is **1,09,85,849**.

Interpretation of the Result of Second ANOVA-test

1. With the P-value of $1.3 * E-162$ (which is $\ll 0.05$), we can firmly say that our alternative hypothesis stands true. In other words, the at least one of the averages will not be equal.
2. The average pending cases within **0-10 years** for **criminal cases** per district (or taluk) is **42,055.96**
The average pending cases within **10-20 years** for **criminal cases** per district (or taluk) is **4,057.41**
3. Total criminal cases pending at district and taluk courts is **3,22,47,729**.

The total number of cases pending only at district and taluk courts is **4,32,33,578**.

Methodology 2 (Multivariate Regression)

In order to examine the **factors behind the increasing backlog of the pending cases** in the Indian judiciary system, we have conducted a **multivariate regression** taking the **total number of pending cases** as the **dependent variable** (or Y).



Result & Interpretation of the First Regression

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.982242732							
R Square	0.964800784							
Adjusted R Square	0.964698087							
Standard Error	10277.12937							
Observations	1376							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	4	3.96904E+12	9.92261E+11	9394.682719	0			
Residual	1371	1.44804E+11	105619388.1					
Total	1375	4.11385E+12						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	30.58396609	332.9853794	0.091847775	0.926832404	-622.6320571	683.7999892	-622.6320571	683.7999892
Cases pending at Appearance or Service-Related stage	1.169792941	0.011785813	99.25432949	0	1.146672761	1.19291312	1.146672761	1.19291312
Cases pending at Compliance or Steps or stay stage	1.045851489	0.023430372	44.63657142	1.8934E-269	0.999888226	1.091814753	0.999888226	1.091814753
Cases pending at Evidence or Argument or Judgement stage	0.996779947	0.023799658	41.88211167	1.4702E-247	0.950092257	1.043467637	0.950092257	1.043467637
Cases pending at Pleadings or Issues or Charge stage	0.979110077	0.043760023	22.37453292	8.97091E-95	0.893266223	1.06495393	0.893266223	1.06495393

1. With an **adjusted R2 value of 0.964** that indicates that approximately 96.4% of the variance in dependent variable (Total pending cases) can be explained by the 4 independent variables present in this model.
2. The P-values of all 4 independent variables are significant (<0.05) and thereby implying that all 4 of them have a significant effect on the total pending cases.

Result & Interpretation of the Second Regression

SUMMARY OUTPUT		After interpreting the output, i.e. the adjusted R Square value of 0.8970 suggests that the independent variables are independent of each other and 89.7% of variability is explained by these 2 variables						
<i>Regression Statistics</i>								
Multiple R	0.947225018							
R Square	0.897235235							
Adjusted R Square	0.897085541							
Standard Error	17547.32428							
Observations	1376							
ANOVA								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	2	3.69109E+12	1.84554E+12	5993.805265	0			
Residual	1373	4.22758E+11	307908589.3					
Total	1375	4.11385E+12						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	1761.890301	563.1929919	3.128395286	0.001794601	657.0783911	2866.702211	657.0783911	2866.702211
Cases pending at Evidence or Argument or Judgement stage	1.410420097	0.036871739	38.25206354	1.518E-218	1.338089055	1.48275114	1.338089055	1.48275114
Cases pending at Appearance or Service-Related stage	1.178610372	0.02011755	58.5861795	0	1.13914591	1.218074834	1.13914591	1.218074834

1. With an **adjusted R2 value of 0.897**, that indicates that approximately 90% of the variance in dependent variable (Total pending cases) can be explained by the 2 independent variables present in this model.
2. The P-values of all 2 independent variables are significant (<0.05) and thereby implying that all 2 of them have a significant effect on the total pending cases.

Result & Interpretation of the Third Regression

SUMMARY OUTPUT		With an adjusted R square value of 0.3706 this indicates approximately 37.06% of the variance in the dependent variable is explained by the two independent variable and the two p-values suggest that the coefficients associated with the independent variables are statistically significant							
<i>Regression Statistics</i>									
Multiple R	0.609531725								
R Square	0.371528924								
Adjusted R Square	0.370613453								
Standard Error	43394.17468								
Observations	1376								
ANOVA									
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>				
Regression	2	1.52841E+12	7.64207E+11	405.8334843	3.3332E-139				
Residual	1373	2.58543E+12	1883054397						
Total	1375	4.11385E+12							
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>	
Intercept	16643.63501	1290.322655	12.89881639	5.14741E-36	14112.41772	19174.85229	14112.41772	19174.85229	
Cases pending at Compliance or Steps or stay stage	1.691218263	0.096477964	17.52958083	3.06028E-62	1.50195809	1.880478437	1.50195809	1.880478437	
Cases pending at Pleadings or Issues or Charge stage	3.136846626	0.166146761	18.87997457	7.2636E-71	2.81091764	3.462775611	2.81091764	3.462775611	

1. With an **adjusted R2 value of 0.37**, that indicates that approximately **only 37%** of the variance in dependent variable (Total pending cases) can be explained by the 2 independent variables present in this model, which is not considered good enough. It also signifies that **there can be other factors** also which will affect the dependent variable.
2. The P-values of all 2 independent variables are significant (<0.05) and thereby implying that all 2 of them have a significant effect on the total pending cases.

Reasons behind the Pending Cases at the District & Taluk Court Level

1 Understaffed & Overburdened Police Force

As per the Supreme Court of India, the police force is heavily overburdened while performing the dual duty of maintaining the law-and-order along with the investigations of the cases.

3 Delays and Backlogs

Lengthy delays in case adjudication and a growing backlog of pending cases have become the norm in many district courts, negatively affecting in an exponential manner the timely delivery of justice.

1

2

Lack of Court Rooms

Adequacy of the judicial infrastructure is a prerequisite for the reduction of pendency and backlog of cases at the lower courts of India, unfortunately which is not the case in India considering the present scenario.

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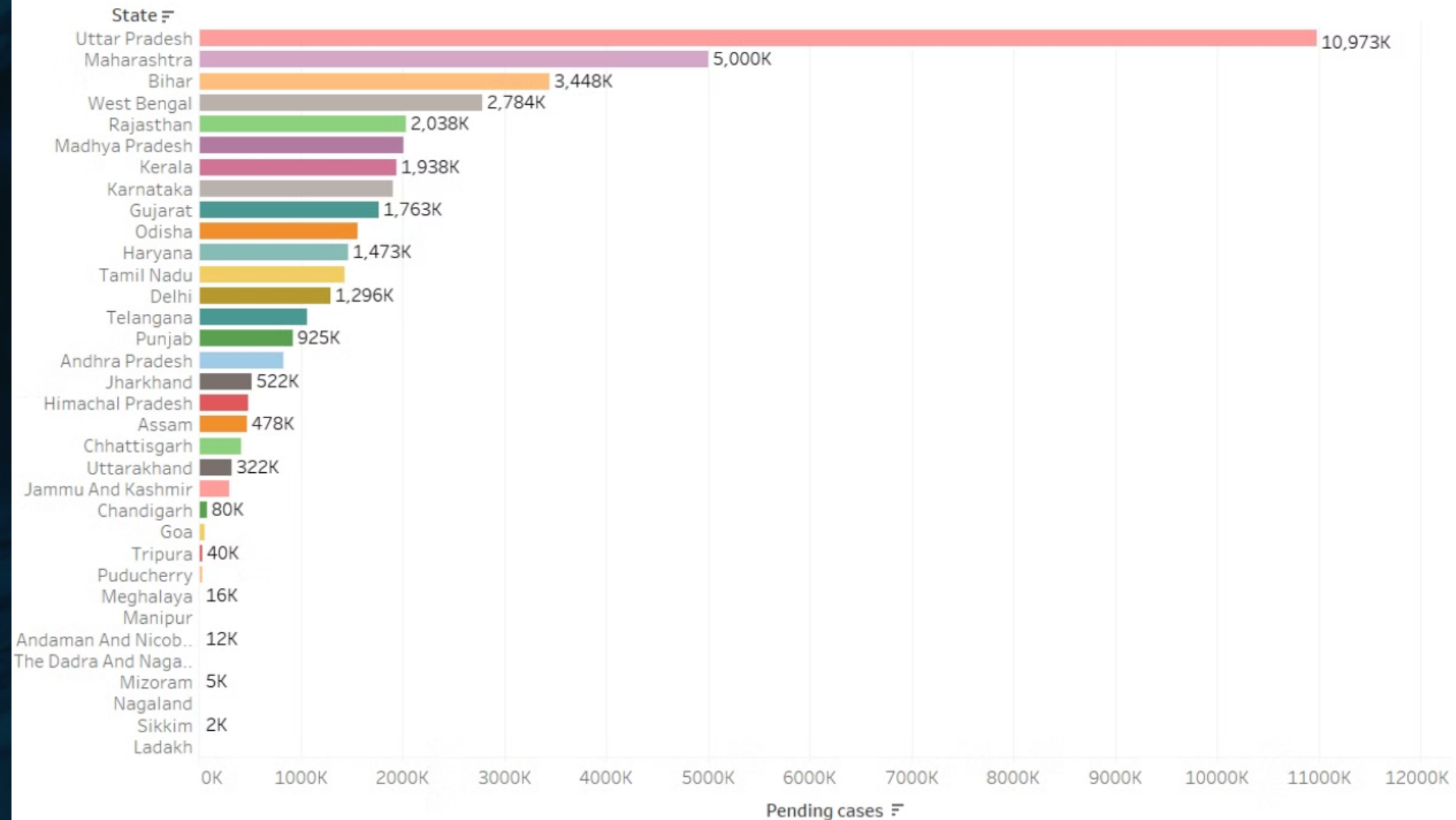
Some Interesting Insights from the Data



Kaun Hain Ye Log? Kahan Se Aate Hain Ye?

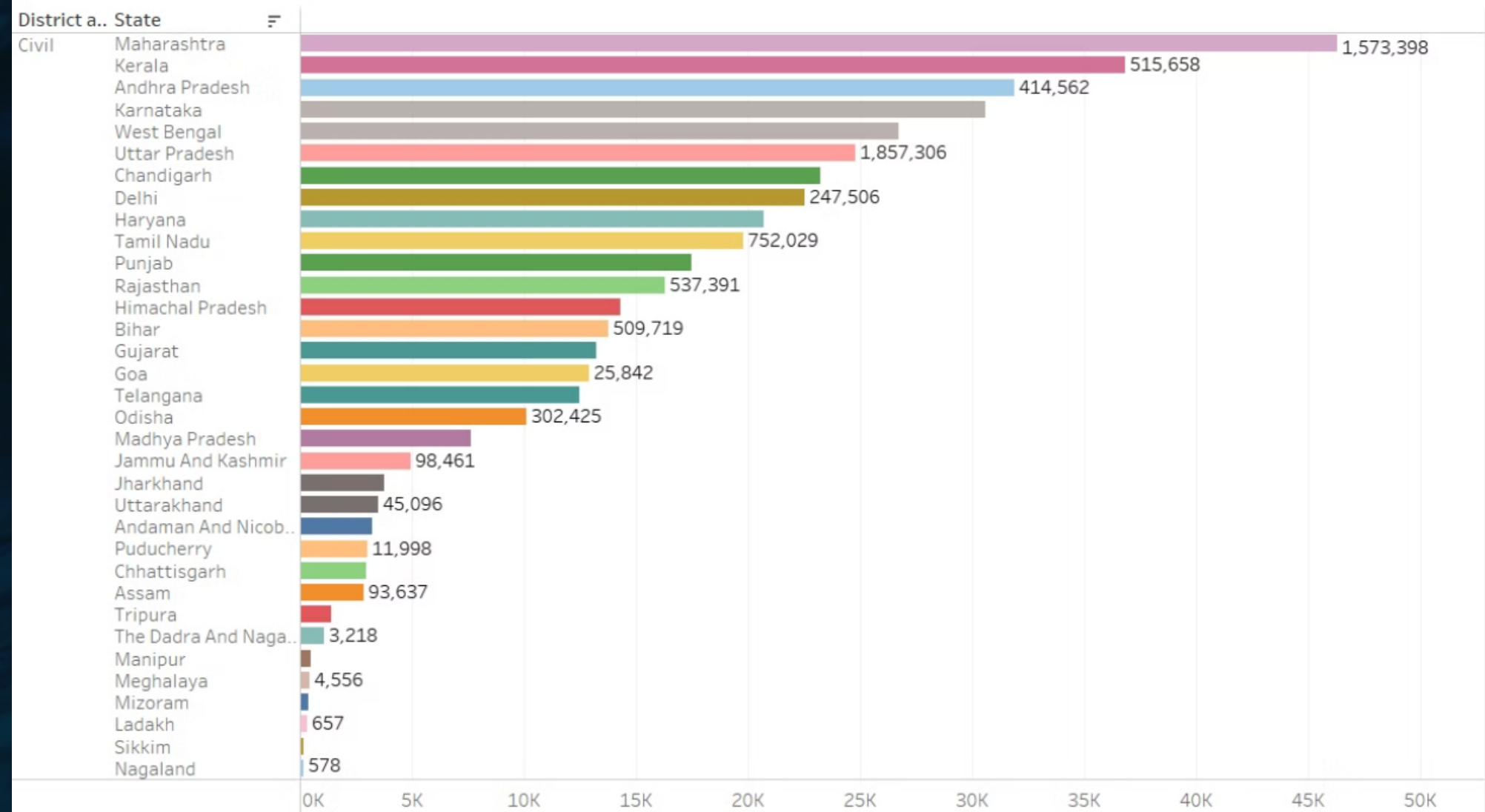
Total Pending Cases by States

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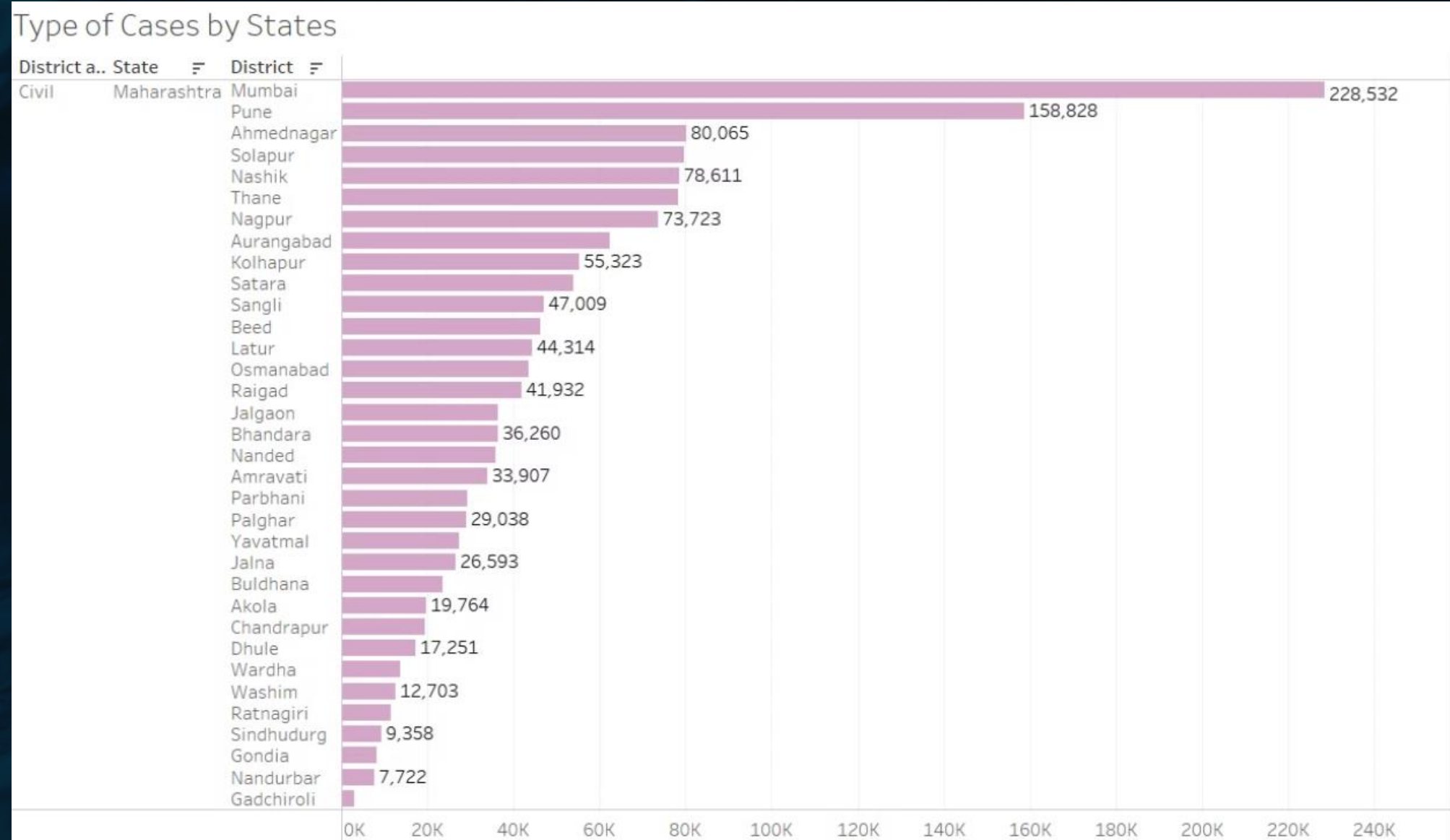


Total Pending Civil Cases by States

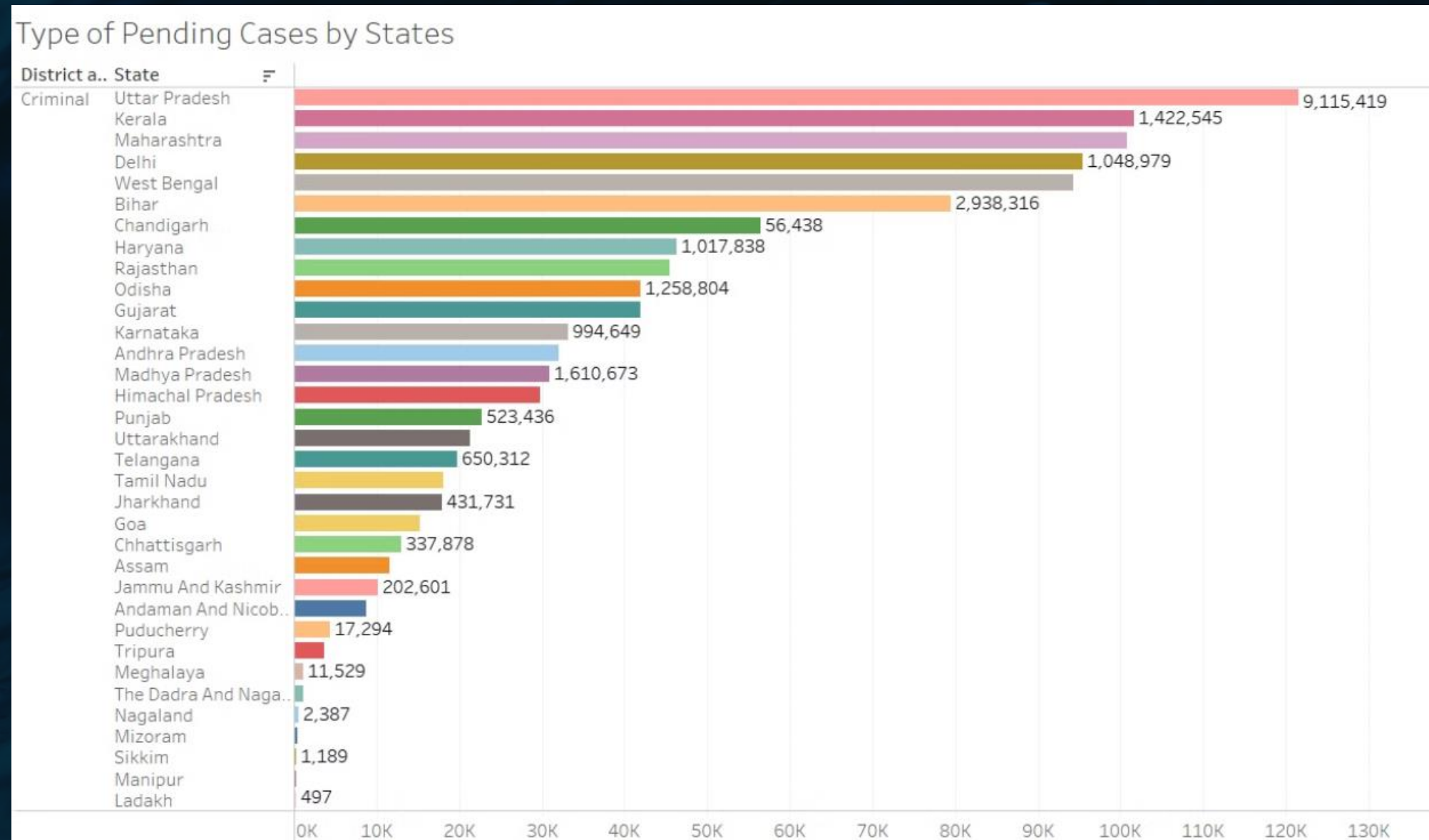
Type of Cases by States



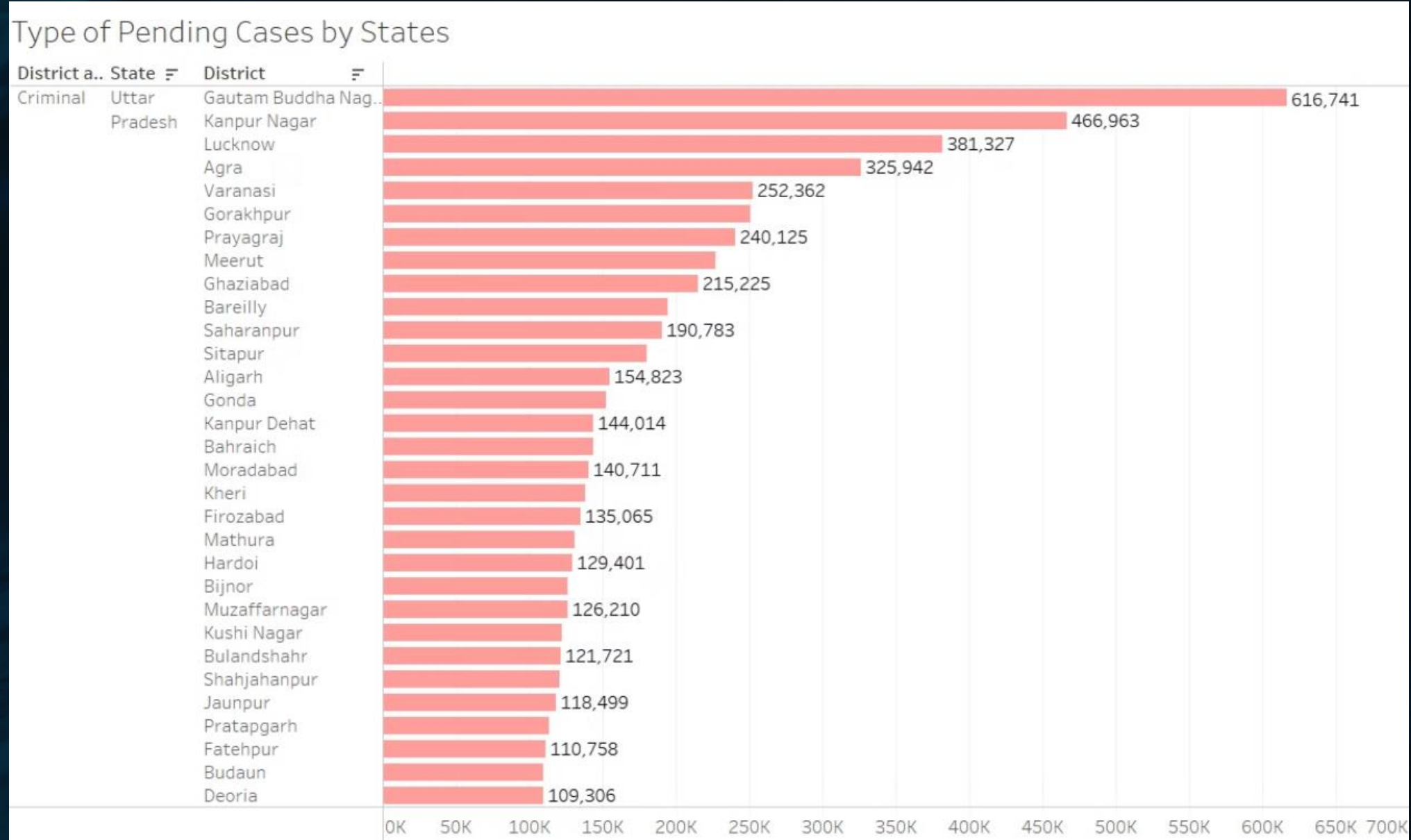
Total Pending Civil Cases by Districts in Maharashtra



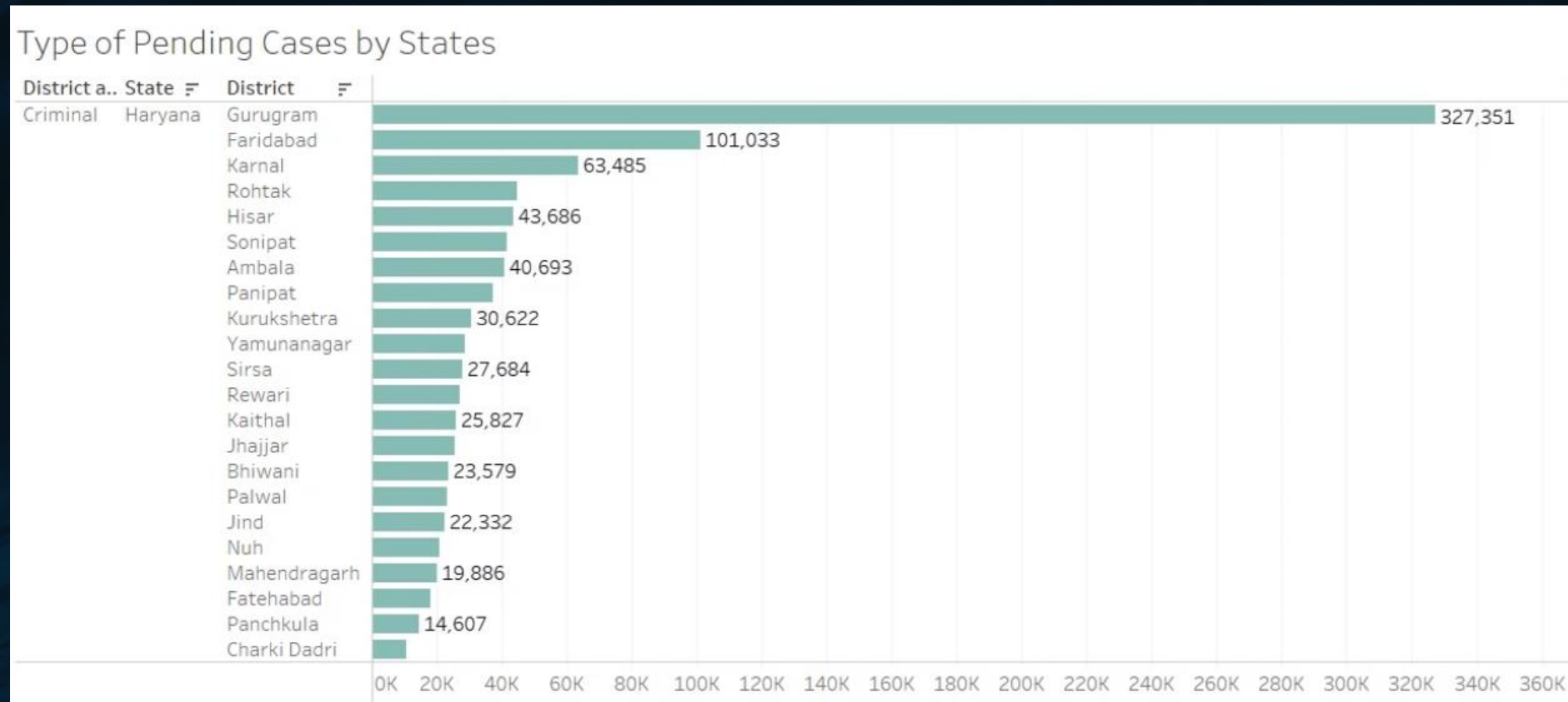
Total Pending Criminal Cases by States



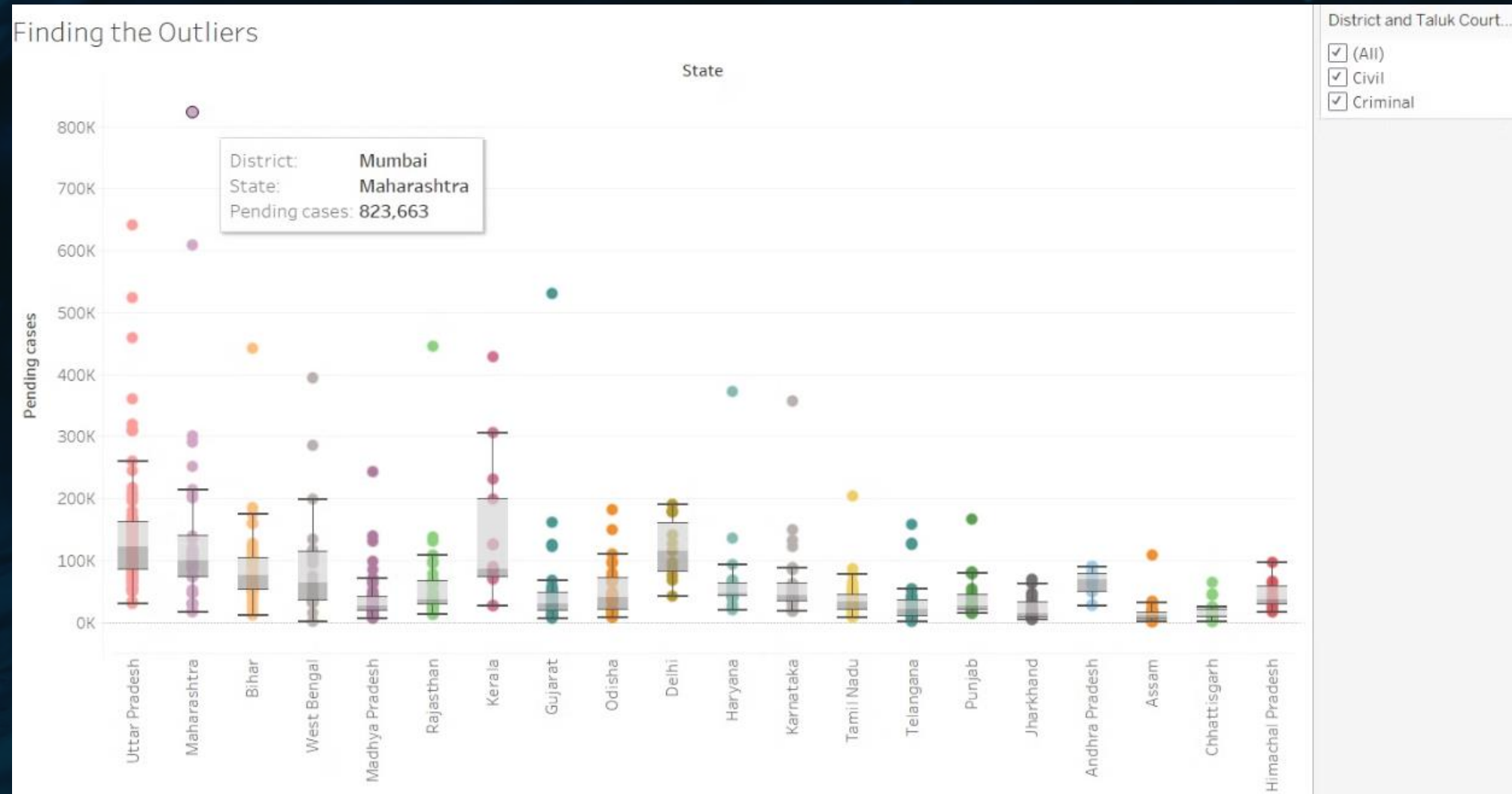
Total Pending Criminal Cases by Districts in Uttar Pradesh



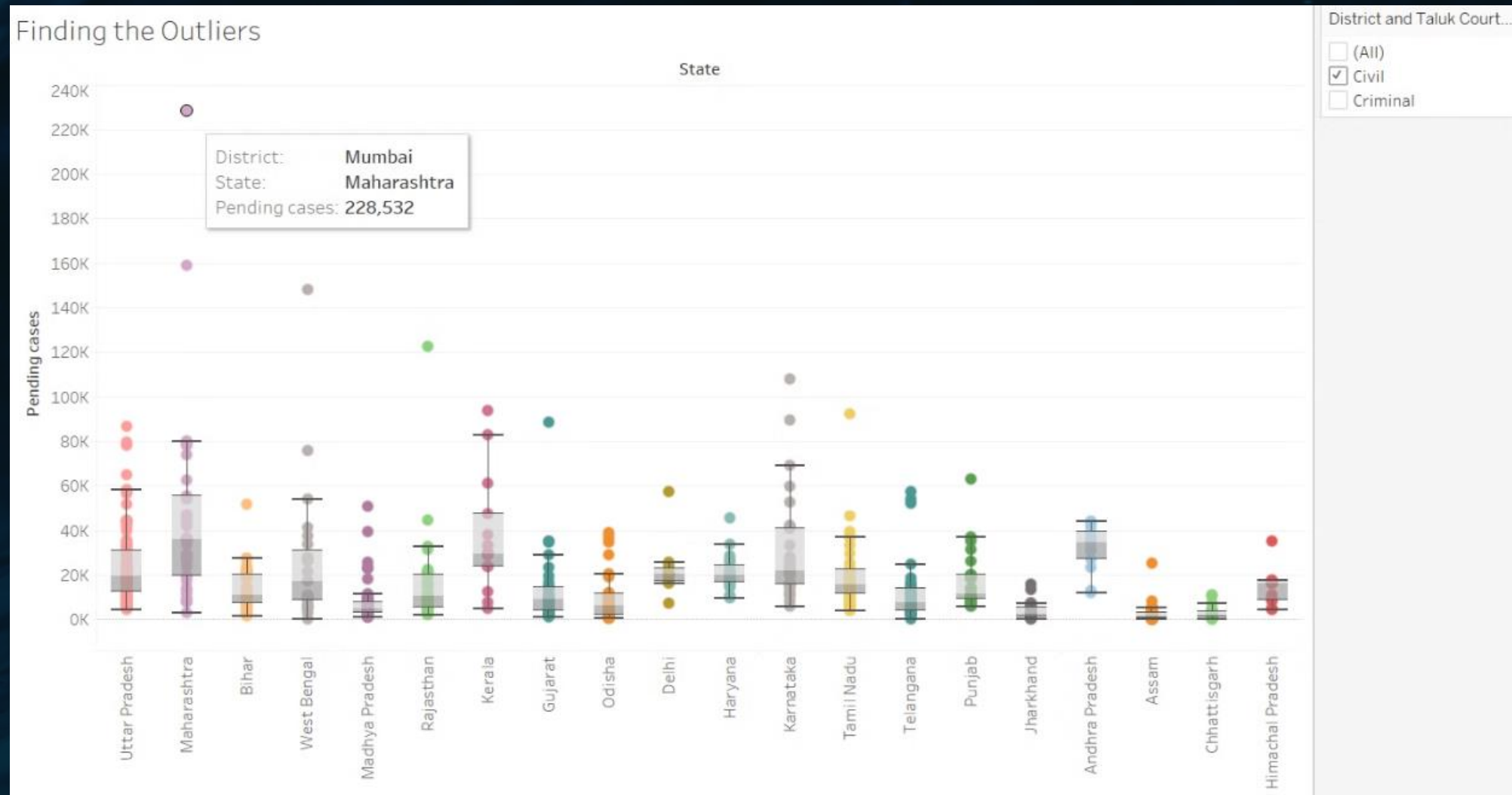
Total Pending Criminal Cases by Districts in Haryana



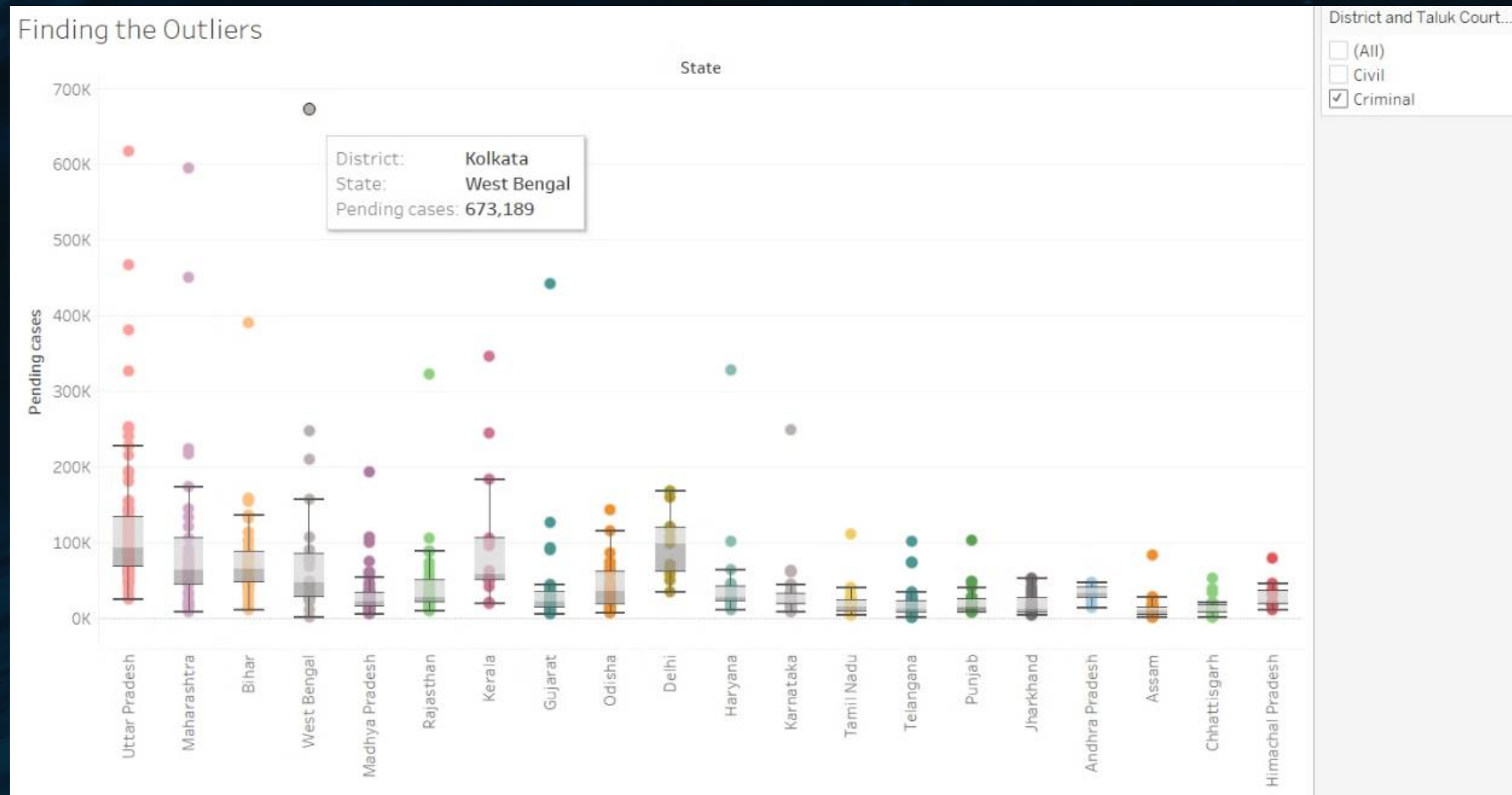
The Total Outliers



The Civil Outliers



The Criminal Outliers



Impact of Pending Cases on the Delivery of Justice

1 Delays in Trials and Sentencing

The growing backlog of pending cases leads to lengthy delays in court proceedings, with trials and sentencing being significantly delayed, denying timely justice to litigants.

2 Overcrowding in Prisons

The slow pace of the judicial process results in an increased number of undertrials in prisons, leading to overcrowding and poor living conditions for inmates.

3 Erosion of Public Confidence

The lack of timely justice and the growing backlog of cases erodes public confidence in the judicial system, undermining its credibility and legitimacy.

4 Impediments to Economic Growth

The inefficiency of the courts and the delays in dispute resolution can have adverse impacts on economic development and investment, hampering overall economic growth.

Recommendations for Improving Court Efficiency



Judicial Reforms

Implement comprehensive judicial reforms, including increasing judgeships, streamlining case management, and leveraging technology to enhance efficiency.



Stakeholder Engagement

Foster collaboration between the judiciary, government, and legal community to develop and execute a holistic strategy to address the backlog.



Time-Bound Goals

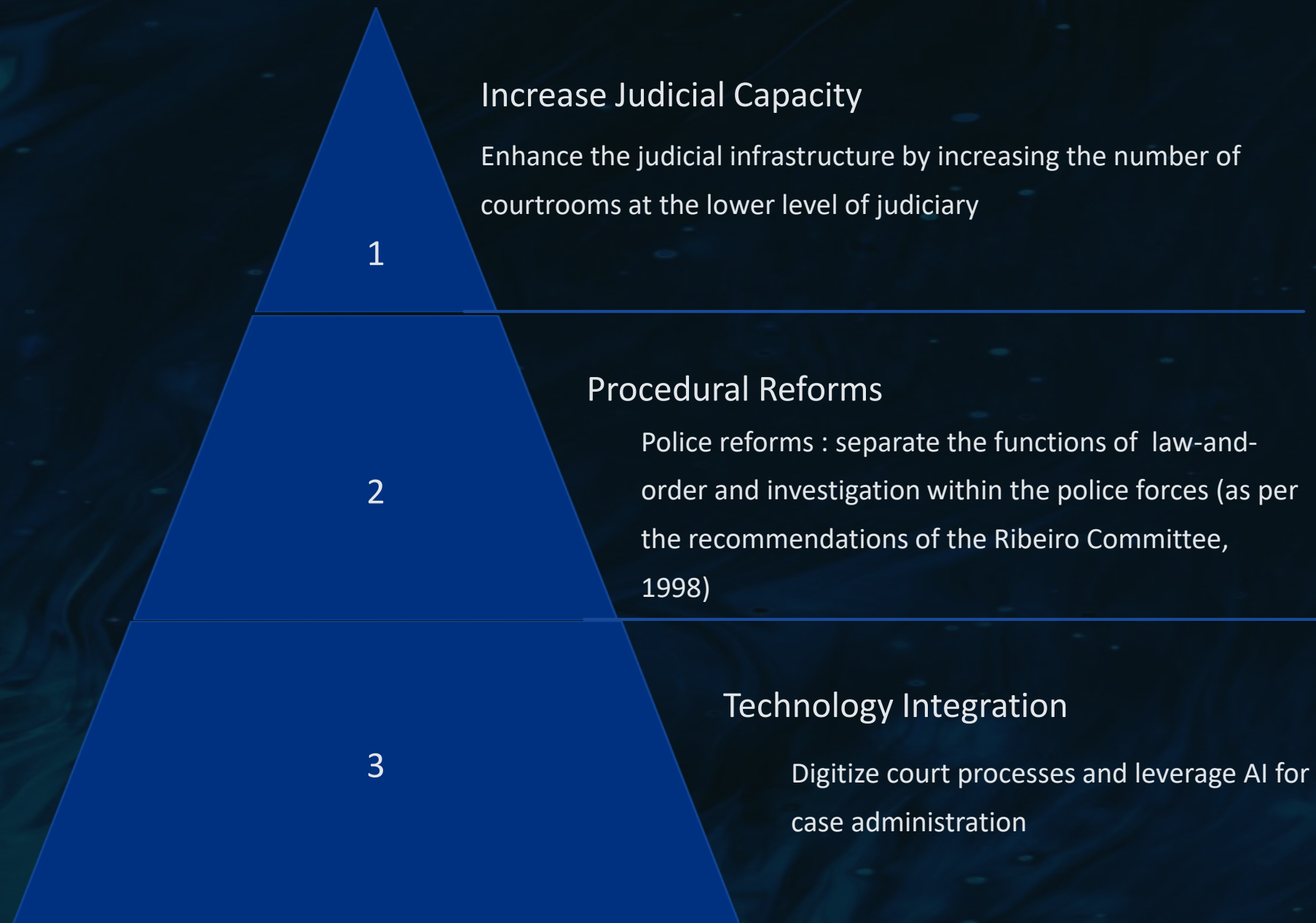
Establish clear, time-bound targets for reducing pending cases and regularly monitor progress to ensure accountability.



Capacity Building

Invest in training and professional development for judges and court staff to improve case management and dispute resolution skills.

Conclusion



To address the backlog of pending cases, more women centric courts are needed at the lower level of judiciary for speedy trial of the cases filed by them.

The background is a dark blue, almost black, marbled pattern. The marbling consists of intricate, swirling, and wavy lines in various shades of blue and teal, creating a textured, liquid-like appearance. The overall tone is deep and moody.

Thank You