

Forest Governance and Land-Use Change in Haryana

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ABSTRACT

This paper examines the temporal evolution and spatial distribution of forest cover in the state of Haryana, India, drawing on official statistical data spanning five decades from 1966–67 to 2016–17. Using district-level and state-level forest area data disaggregated by classification type — reserved, protected, unclassified, and closed forests — the study documents significant shifts in forest governance, land-use patterns, and per capita forest availability. The primary data source is the Statistical Abstract of Haryana 2016–17, published by the Department of Economic and Statistical Analysis, Government of Haryana (2018). Haryana's total forest area has grown from 1,362 sq km in 1966–67 to 1,747 sq km in 2016–17, representing a net increase of approximately 28%. However, the percentage of forest area relative to the state's total geographical area remains critically low at 3.95%, far below India's national target of 33%. Forest cover is highly uneven across districts, with Panchkula accounting for the largest share at 42.54% of its geographic area, while districts like Sirsa and Hisar record less than 2%. The study highlights structural transitions in forest classification, a decline in per capita forest availability from 17.94 sq km per lakh population in 1966–67 to 6.89 sq km by 2016–17, and the urgent need for targeted afforestation in forest-scarce districts.

Keywords: *Forest governance, reserved forests, protected forests, afforestation, per capita forest area, land-use change, environmental policy.*

INTRODUCTION

Forests are among the most vital ecological assets of any region, providing essential ecosystem services including carbon sequestration, biodiversity conservation, watershed protection, and climate regulation (Champion & Seth, 1968). The National Forest Policy of India (1988) recommends that at least one-third of the country's geographic area be under forest or tree cover, recognising forests as a cornerstone of sustainable development and environmental stability.² Haryana, a relatively small state in northern India covering approximately 44,212 sq km, presents a particularly compelling case study in forest governance and land-use transition. Carved out of the erstwhile Punjab state in November 1966, the state is predominantly agricultural, with its economy and land use historically dominated by cereal cultivation under the Green Revolution framework (Tiwari, 2000).⁴ The state's forest cover, though modest, plays a critical ecological role — particularly the Shivalik hill forests in the north-east and the Aravalli scrub forests in the south, which together form the principal natural forest belts of the region (Rawat, 2016).⁵ Rapid urbanisation in districts adjacent to the National Capital Region (NCR), such as Gurugram and Faridabad, has further intensified pressure on existing forest land (Singh & Sharma, 2019).⁶

The present study draws its primary data from the Statistical Abstract of Haryana 2016–17, published by the Department of Economic and Statistical Analysis, Government of Haryana (2018).¹ This official compendium provides time-series forest statistics from 1966–67 to 2016–17 alongside district-wise breakdowns, offering one of the most comprehensive government-level datasets on Haryana's forest sector. The Abstract documents forest area by classification type (reserved, protected, unclassified, and closed), the ratio of forest to geographic area, and per capita forest availability — metrics that together enable a multi-dimensional assessment of the state's forest cover trajectory.

This paper undertakes a systematic analysis of Haryana's forest statistics across five decades. It examines: (a) the temporal trends in total forest area and its compositional shifts; (b) the changing ratio of forest area to geographic area; (c) per capita forest availability as a function of population growth; and (d) the spatial distribution of forests across the state's 21 districts.

By doing so, the study aims to provide an evidence-based foundation for forest policy discussions in Haryana, with particular attention to the governance transitions and spatial inequities revealed by the data.

DATA AND METHODOLOGY

The analysis is based entirely on secondary data drawn from the Statistical Abstract of Haryana 2016–17, issued by the Department of Economic and Statistical Analysis, Government of Haryana (2018). Two primary datasets from this publication are employed: (1) time-series data covering the period 1966–67 to 2016–17 (provisional), recording total forest area disaggregated by classification category, the percentage of state forests relative to total forests, the ratio of forest area to total geographical area, and per capita forest availability; and (2) district-wise cross-sectional data providing forest area, geographical area, the percentage of forest area relative to district geographical area, and forest area per lakh of population for all 21 districts of Haryana.

The forest classifications used in the official data are defined as follows: Reserved Forests are areas declared under the Indian Forest Act, 1927, offering the highest degree of protection; Protected Forests are those over which the government has certain rights but less stringent protection compared to reserved forests; Unclassified Forests include all other forested lands not falling under reserved or protected categories; and Closed Forests refer to areas closed under the Indian Forest Act or the Land Preservation Act to allow natural regeneration. The total forest area is the aggregate of all these categories.

Descriptive statistical methods are used throughout. Trend analysis is conducted by examining absolute values and percentage changes across time periods. District-level analysis focuses on identifying outliers and classifying districts by forest density.

Temporal Trends in Forest Cover (1966–67 to 2016–17)

Table 1 presents the complete time-series of Haryana's forest area from 1966–67 to 2016–17. The state's total forest area stood at 1,362 sq km in 1966–67, rose unevenly over the subsequent decades, and reached 1,747 sq km in 2016–17— a net increase of approximately 385 sq km or 28.3% over 50 years.

As illustrated in Figure 1, the growth trajectory was not linear. Forest area increased steadily through the 1970s and 1980s, reaching a peak of 1,702 sq km in 1990–91. It then declined sharply to 1,547 sq km in 1995–96, likely reflecting denotification or reclassification of certain forest lands. A gradual recovery followed, with the area crossing the 1,700 sq km mark again by 2015–16.

Table 1: Temporal Trends in Haryana's Forest Area (1966–67 to 2016–17)

Year	Reserved (sq km)	Protected (sq km)	Unclassified (sq km)	Closed-IFA (sq km)	Closed-LPA (sq km)	Total (sq km)	% of State Forests
1966–67	187	413	13	110	639	1,362	45.01
1970–71	160	485	106	74	653	1,478	50.81
1975–76	212	695	39	30	439	1,415	66.86
1980–81	224	1,022	38	42	336	1,662	77.26
1985–86	229	1,087	72	32	265	1,685	82.37
1990–91	247	1,080	89	23	263	1,702	83.20
1995–96	247	1,104	70	11	115	1,547	91.86
2000–01	249	1,154	21	4	125	1,553	91.69
2005–06	249	1,158	19	10	123	1,559	91.47
2010–11	249	1,166	17	11	241	1,684	85.04
2015–16	250	1,187	10	14	287	1,748	82.78
2016–17	250	1,187	10	14	286	1,747	82.83

Source: Statistical Abstract of Haryana 2016–17, Dept. of Economic & Statistical Analysis, Govt. of Haryana (2018). IFA = Indian Forest Act; LPA = Land Preservation Act.

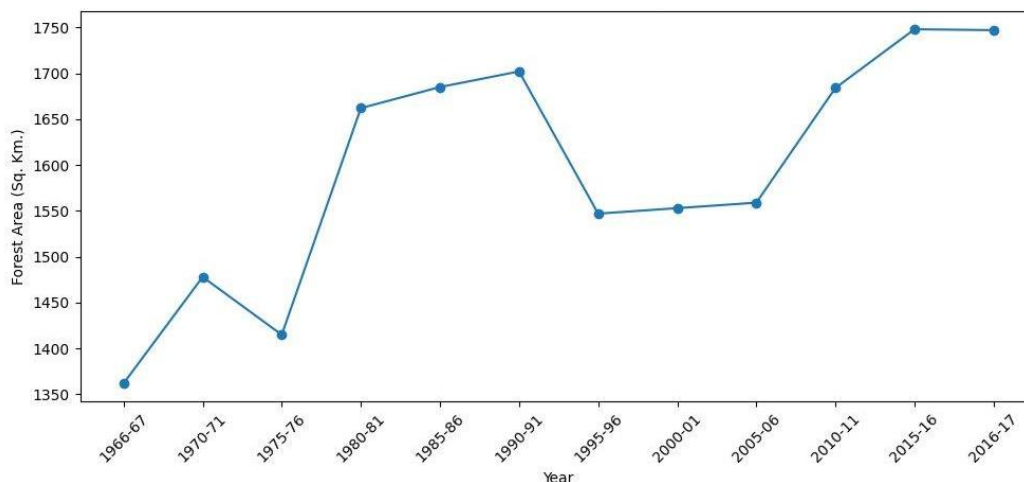


Figure 1: Trend of Total Forest Area in Haryana (1966–67 to 2016–17)
Source: Statistical Abstract of Haryana 2018

Forest Classification Dynamics

One of the most striking findings from the temporal data is the dramatic restructuring of forest classification over five decades. In 1966–67, Closed Forests under the Land Preservation Act (LPA) constituted by far the largest category at 639 sq km, representing 46.9% of the total forest area. By 2016–17, this category had declined to 286 sq km — a reduction of 55.2%. In contrast, Protected Forests grew from 413 sq km in 1966–67 to 1,187 sq km in 2016–17, an increase of 187.4%, making them the dominant forest category.

Reserved Forests exhibited modest but steady growth, rising from 187 sq km to 250 sq km over the same period (an increase of 33.7%). The percentage of state forests relative to total forests rose sharply from 45.01% in 1966–67 to a peak of 91.86% in 1995–96, before moderating to 82.83% by 2016–17. This shift reflects a decades-long policy thrust toward bringing forests under formal state control and protection mechanisms.

Forest Area as Percentage of Geographical Area

Despite the absolute increase in forest area, Haryana's forests as a share of its geographical area remain critically low. As shown in Table 2, this share ranged between 3.09% (1966–67) and 3.95% (2015–16 and 2016–17). These figures are far below the national policy target of 33%, placing Haryana among the least forested states in India.

The highest ratio recorded was 3.95% in 2015–16 and 2016–17. Even accounting for the predominantly agrarian nature of the state and the dominance of alluvial plains unsuitable for natural forest regeneration, this figure underscores the magnitude of the afforestation challenge facing Haryana.

Table 2: Forest Area Relative to Geography and Population (1966–67 to 2016–17)

Year	Total Forest Area (sq km)	Geographical Area (sq km)	% of Geog. Area	Forest Area per Lakh Population (sq km)
1966–67	1,362	44,056	3.09	17.94
1970–71	1,478	44,056	3.35	14.73
1975–76	1,415	44,222	3.20	14.10
1980–81	1,662	44,212	3.76	12.86
1985–86	1,685	44,212	3.81	13.04
1990–91	1,702	44,212	3.85	10.34
1995–96	1,547	44,212	3.50	9.40
2000–01	1,553	44,212	3.51	9.43
2005–06	1,559	44,212	3.53	7.37
2010–11	1,684	44,212	3.81	6.64
2015–16	1,748	44,212	3.95	6.90
2016–17	1,747	44,212	3.95	6.89

Source: Statistical Abstract of Haryana 2016–17, Govt. of Haryana (2018).

Per Capita Forest Availability

The sharpest and most concerning trend in the temporal data is the collapse of per capita forest availability. In 1966–67, Haryana had 17.94 sq km of forest per lakh of population. By 2016–17, this figure had fallen to just 6.89 sq km — a decline of 61.6% in 50 years. As shown in Figure 2, the most precipitous drop occurred between 1966–67 and 1990–91, when per capita availability fell from 17.94 to 10.34 sq km. The decline continued, albeit more gradually, in subsequent decades as population growth outpaced forest area gains.

This trend has direct implications for the ecological services available to Haryana's growing population. Urban residents, in particular, face a widening deficit in access to green spaces and the attendant health, recreational, and environmental benefits.

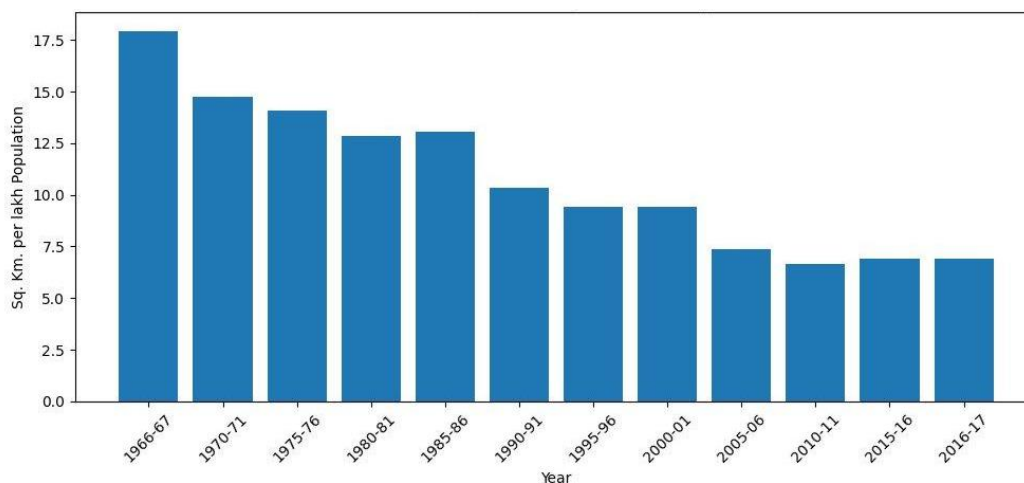


Figure 2: Forest Area per Lakh Population in Haryana (1966–67 to 2016–17)

Source: Statistical Abstract of Haryana, 2018

Spatial Distribution: District-wise Forest Analysis

The district-wise data reveal extreme spatial heterogeneity in Haryana's forest cover. Table 3 presents the forest statistics for all 21 districts as reported in the Statistical Abstract of Haryana 2016–17. The total state forest area of approximately 1,747 sq km is distributed very unevenly, with a handful of districts accounting for a disproportionate share of the forested land. Figure 3 illustrates this disparity visually, ranking all districts by forest cover percentage in descending order.

Panchkula stands out as the most heavily forested district in Haryana by a wide margin. With 382 sq km of forest within a geographic area of just 898 sq km, Panchkula records a forest-to-geographic-area ratio of 42.54% — the only district in the state approaching national forest policy targets. This is primarily because Panchkula encompasses the foothills of the Shivalik range, where natural forest cover is both denser and better preserved. The district also records the highest per capita forest availability at 68.06 sq km per lakh population.

Yamunanagar follows at 12.27%, with 217 sq km of forest — the second-highest absolute area. This district, also situated near the Shivalik foothills and the Yamuna river basin, hosts significant forest tracts including the Kaesar National Park. Faridabad (9.45%) and Gurugram (7.07%), despite being the most urbanised districts in the state and among the fastest-growing cities in India, record relatively higher forest-to-geography ratios, likely due to the Aravalli hill ranges that traverse their southern portions.

At the other extreme, the western and south-western districts of Haryana are severely forest-deficient. Sirsa records the lowest ratio at just 1.12%, with only 48 sq km of forest in a geographic area of 4,277 sq km. Hisar (1.58%) and Bhiwani (1.90%) are also among the most forest-scarce, with Bhiwani covering the largest geographic area in the state (4,778 sq km) but only 91 sq km of forest. These districts are characterised by arid and semi-arid landscapes dominated by agricultural fields and sandy terrain.

Table 3: District-wise Forest Statistics, Haryana (2016-17)

District	Forest Area (sq km)	Geog. Area (sq km)	% Forest to Geog. Area	Forest Area per Lakh Population
Ambala	53	1,574	3.37	4.70

Panchkula	382	898	42.54	68.06
Yamunanagar	217	1,768	12.27	17.87
Kurukshetra	45	1,530	2.94	4.66
Kaithal	72	2,317	3.11	6.70
Karnal	76	2,520	3.02	5.05
Panipat	42	1,268	3.31	3.48
Sonipat	74	2,122	3.49	5.10
Rohtak	46	1,745	2.64	4.33
Jhajjar	40	1,834	2.18	4.17
Faridabad	70	741	9.45	3.87
Palwal	29	1,359	2.13	2.78
Gurugram	89	1,258	7.07	5.88
Nuh	79	1,507	5.24	7.25
Rewari	49	1,594	3.07	5.44
Mahendragarh	57	1,899	3.00	6.18
Bhiwani	91	4,778	1.90	5.57
Jind	69	2,702	2.55	5.17
Hisar	63	3,983	1.58	3.61
Fatehabad	56	2,538	2.21	5.94
Sirsa	48	4,277	1.12	3.71

Source: Statistical Abstract of Haryana 2016–17, DESA, Govt. of Haryana (2018).

Palwal (2.13%) and Jhajjar (2.18%) in the central region also record low ratios, though their absolute forest areas (29 sq km and 40 sq km respectively) reflect their smaller geographic size. Rohtak district, which is the administrative centre of the region and home to significant urban and industrial activity, has a forest-to-geography ratio of just 2.64% with 46 sq km of forest.

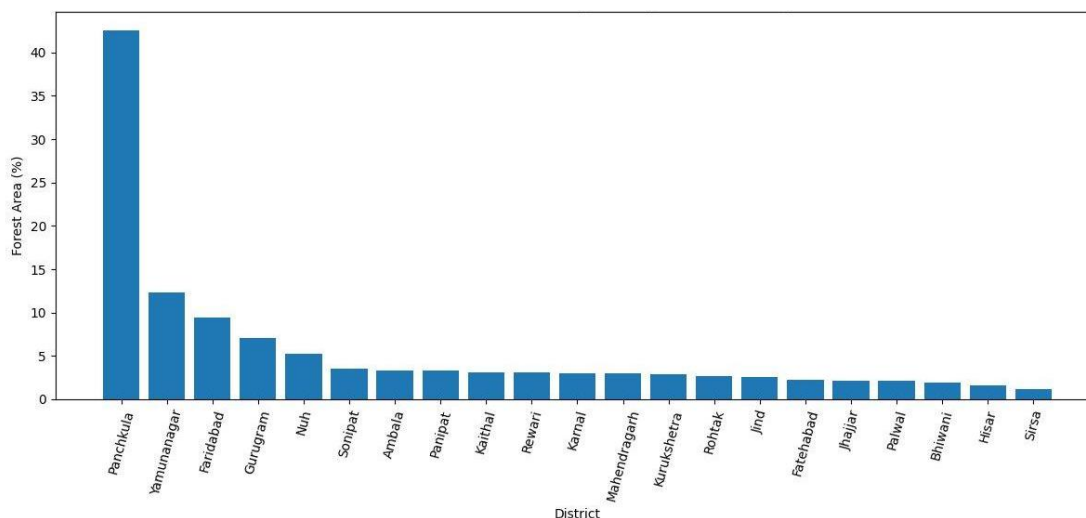


Figure 3: District-wise Forest Cover Percentage in Haryana

Source: Statistical Abstract of Haryana, 2018

State Forest Ownership by District

The district-wise data also reports the proportion of forests under state ownership. Several districts — Kurukshetra, Kaithal, Sonipat, Palwal, Jind, Hisar, Fatehabad, and Sirsa — record 100% of their forests as state-managed, indicating complete government control with no private or community-held forest land. At the other end, Nuh has only 15.19% of its forest under state ownership, followed by Gurugram (20.22%) and Faridabad (21.43%). Karnal is notable for recording 0% state forest ownership, suggesting that all forested land in the district is classified outside state control — an anomaly that warrants further investigation.

Structural Transitions in Forest Governance

The shift from Closed Forests (particularly LPA-governed areas) to Protected and Reserved Forests represents a fundamental transformation in how Haryana's forests are governed. The LPA closures, which dominated the forest landscape in 1966–67, were temporary management tools for land stabilisation. Their progressive replacement by formally classified Protected Forests suggests a more permanent institutionalisation of forest governance. This transition has increased the proportion of forests under sustained legal protection, which is a positive development for long-term conservation.

However, the near-disappearance of Unclassified Forests — down from 106 sq km in 1970–71 to just 10 sq km by 2015–16 — may reflect either successful classification (a positive outcome) or the conversion of ambiguously-classified forest land to non-forest use (a negative outcome). Distinguishing between these interpretations requires ground-truth verification beyond what the statistical data alone can provide.

The Per Capita Forest Deficit

The 61.6% decline in per capita forest availability between 1966–67 and 2016–17 is driven by a combination of modest forest area growth and rapid population expansion. Haryana's population grew from approximately 7.6 million at the time of state formation to over 25 million by 2011. Unless forest area growth dramatically outpaces population growth — which has not been the case — this per capita deficit will continue to widen.

This deficit has particular implications for urban populations in the NCR corridor. Districts like Gurugram, Faridabad, and Sonapat, which together form part of one of the most densely urbanised regions in Asia, record among the lowest per capita forest availabilities (5.88, 3.87, and 5.10 sq km per lakh respectively). Urban forestry and green infrastructure planning must therefore be central to any credible environmental strategy for this corridor.

Geomorphic Determinants of Forest Distribution

The spatial pattern of forest distribution in Haryana is strongly shaped by physiography. The Shivalik hills in the north-east, covering districts such as Panchkula, Yamunanagar, and parts of Ambala, account for the bulk of the state's natural forest cover. The Aravalli range in the south provides a secondary belt of forest cover through Gurugram, Faridabad, Nuh, and Mahendragarh. The vast alluvial plains that dominate central and western Haryana are intrinsically unsuited to dense natural forest cover, making plantation-based approaches essential for improving forest metrics in these districts.

Policy Implications

The data point to several clear policy directions. First, targeted plantation drives in forest-scarce districts of western Haryana (Sirsa, Hisar, Bhiwani, Fatehabad) should be prioritised, with drought-resistant species appropriate to the semi-arid climate. Second, the anomalous districts — Karnal with 0% state forest ownership and Nuh with only 15.19% — require specific governance interventions to clarify land tenure and strengthen forest protection. Third, the districts of the NCR corridor must integrate urban forest policies into municipal master plans to address the widening per capita forest deficit. Fourth, the forests of Panchkula and Yamunanagar, which represent the ecological crown of the state, must be safeguarded against encroachment and illegal felling through strengthened enforcement.

CONCLUSION

This study has examined five decades of forest data from Haryana — revealing a complex picture of modest absolute gains in forest area alongside structural reclassification, persistent spatial inequality, and a sharply declining per capita forest endowment. While the state has successfully expanded formal forest governance — transitioning from temporary LPA closures to more permanent Protected Forest classifications — the overall forest area at 3.95% of geographical extent remains critically inadequate.

The district-level analysis underscores the extraordinary concentration of forest cover in the Shivalik foothill districts of Panchkula and Yamunanagar, and the severe deficits across the arid western plains. With Haryana's population and economy continuing to grow, particularly in the NCR corridor, the challenge of providing equitable access to forest ecosystem services will intensify.

Meeting even a modest revised state target of 10% forest cover — a more realistic goal given Haryana's geography — would require bringing an additional 2,674 sq km under sustained forest cover, more than doubling the current extent. This ambition demands long-term political commitment, cross-departmental coordination, community participation, and adequate budgetary allocation for afforestation and forest protection. The statistical baseline established in this paper can serve as a reference point for monitoring progress toward such targets.

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