Advanced International Journal for Research (AIJFR)
E-ISSN: 3048-7641 ● Website: www.aijfr.com ● Email: editor@aijfr.com

Qualitative and Quantitative Assessment of Tree Diversity in Government College (A), Anantapur, Andhra Pradesh, India

D. Raghu Ramulu [1], E. Sridevi[1], P. Akbar Basha[1], B. Manohara Reddy[2], P. Amrutha Lakshmi[3], and M. Vishnu Priya[4]

[1,2,3,4]Lecturers in Botany,
[1,2]Government College (A), Anantapur, Andhra Pradesh,
[3]SVGM Government Degree College, Kalyanadurg, Anantapur District, Andhra Pradesh,
[4]Government Degree College, Uravakonda, Anantapur District, Andhra Pradesh

Abstract

Tree diversity contributes to urban biodiversity, environmental quality and ecological sustainability. The present study assessed the qualitative composition and quantitative distribution of tree species in Government College (A), Anantapur, Andhra Pradesh, India (14.67078° N, 77.59969° E), situated at an elevation of approximately 340–350 m above mean sea level. The college campus covers approximately 26 acres and originated in 1916. A systematic inventory conducted from June to October 2026 documented 124 tree species belonging to 92 genera and 38 families. The recorded flora comprised 106 dicotyledonous species, 12 monocotyledonous species and six gymnosperm species. Moraceae was the most species-rich family, with 12 species, followed by Mimosaceae and Bignoniaceae, each represented by eight species. The quantitative inventory recorded 724 individual trees across eight campus sectors. *Azadirachta indica* was the most abundant species (142 individuals), followed by *Pongamia pinnata* (59), *Polyalthia longifolia* (54), *Tectona grandis* (50) and *Peltophorum pterocarpum* (42). Location-wise diversity was further examined using the Shannon–Wiener, Simpson and Berger–Parker indices. The Botanical Garden showed the highest Shannon–Wiener diversity (H′ = 3.787), whereas the Women's Hostel showed the lowest (H′ = 1.509) and the greatest dominance. The inventory provides baseline information for campus biodiversity conservation, future floristic research, environmental education and sustainable landscape management.

Keywords: Tree diversity, floristic composition, qualitative assessment, quantitative assessment, species richness, diversity indices, campus flora, urban biodiversity.

1. Introduction

Government College (A), Anantapur, formerly known as Government Arts College, is popularly referred to as the "Grand Old Lady of Rayalaseema." According to Sahadevudu et al. (2015), the institution originated as Ceded Districts College in 1916 and was subsequently renamed Government Arts College in 1947. As one of the oldest government educational institutions in the Rayalaseema region, it has made significant contributions to higher education. Having originated in 1916, the college marked 110 years of

its institutional history in 2026. The campus covers approximately 26 acres and supports a diverse assemblage of tree species with substantial canopy cover. Situated in the heart of Anantapur city, the campus and its playground attract residents for morning and evening walks. The tree cover provides shade, contributes to local environmental quality, and creates a pleasant environment for students, staff, and visitors.

Urban trees and green spaces are essential components of sustainable urban ecosystems because they improve environmental quality and provide multiple ecosystem services, including carbon storage, removal of air pollutants, stormwater management and regulation of the local microclimate (Bolund and Hunhammar, 1999; Livesley et al., 2016, Wang et al.,2021). By providing shade and cooling the surrounding environment through evapotranspiration, trees help reduce surface temperatures and mitigate the urban heat-island effect (Bowler et al., 2010; Yin et al., 2024). They also support urban biodiversity by providing food, shelter, nesting sites and habitats for plants, birds, insects and other organisms, thereby sustaining ecological interactions within urban landscapes (Alvey, 2006; Aronson et al., 2017). In addition, urban trees enhance the aesthetic quality of cities and provide spaces for walking, relaxation, recreation and social interaction, contributing to human health and psychological well-being (Chiesura, 2004; Jorgensen and Gobster, 2010; Tzoulas et al., 2007).

College and university campuses form an important part of urban green infrastructure and can support biodiversity conservation, botanical research, environmental education and field-based learning. A global review by Liu et al. (2021) highlighted the value of university campuses for biodiversity research, conservation and education. Trees on educational campuses function as living laboratories for practical learning in plant taxonomy, morphology, reproductive biology, ecology and phenology. Systematic floristic and tree inventories document species richness, taxonomic composition, abundance and distribution, provide baseline data for comparative biodiversity assessments, and help identify species that may require conservation attention (Nowak et al., 2013; Liu et al., 2021). Such inventories also create opportunities for student participation in field research and long-term environmental monitoring.

Floristic studies of college and university campuses have addressed several aspects of plant diversity, including tree diversity (Kavi Malar et al. 2022, Nandal et al., 2023, Nayak and Patra 2025), medicinal flora (Rekha et al., 2014; Mohanty and Sahoo, 2025; Nayak and Patra, 2015), exotic flora (Singh, 2021) and ornamental plant diversity (Kensa et al., 2016). Raghu Ramulu et al. (2026) reviewed floristic studies of Indian universities and colleges and reported 46 research publications across the Indian subcontinent.

In this context, a systematic assessment of tree diversity at Government College (A), Anantapur, is important for documenting its floristic composition, evaluating the abundance and distribution of tree species, and establishing a scientific baseline for future research and conservation. The present study therefore combines qualitative documentation (species identification and taxonomic composition) with quantitative assessment (individual abundance, sector-wise distribution and diversity indices). It also highlights the role of the college campus as an urban green space and a living resource for botanical education and biodiversity conservation.

2. Materials and Methods

The study was conducted on the approximately 26-acre campus of Government College (A), Anantapur, Andhra Pradesh, India. For the inventory, the campus was divided into eight sectors: Botanical Garden

(BG), College Campus (CC), Men's Hostel (MH), Playground (PG), Rock Garden (RCG), Rare, Endemic and Threatened (RET) Garden (RG), Sarvepalli Radhakrishna Garden (SRG), and Women's Hostel (WH). Field surveys were carried out from June to October 2026. Tree individuals in each sector were recorded and the observations were consolidated in Table 1. Students assisted with field observations and tree counts as part of campus-based learning activities. The recorded species were arranged according to the Bentham and Hooker's system of classification, retaining the family names used in the source inventory, including Fabaceae, Mimosaceae and Caesalpiniaceae. The plant species are identified with the standard floras such as flora of Anantapur (Pullaiah and Yashoda, 1989), Foral of Andhra Pradesh, Vol: 1 (Pullaiah and Chennaiah, 1997), Flora of Andhra Pradesh Vol:2, (Pullaiah and Moulali, 1997), Flora of Andhra Pradesh Vol: 3, (Pullaiah, 1997), Trees of Andhra Pradesh (Pullaiah and Sandhya Rani, 1999), The Plant Directory (Rao, 1914), Flora of Anantapuramu City & Sri Krishnadevaraya Universstiy Campus(Rao, 2026). The herbarium specimens were prepared following the standard methods described by Jain and Rao (1977) and deposited in the Departmental Herbarium.

Table 1. Distribution of tree species across different locations of the college.

S. No.	Name of the Species	Family	Location								Total
			BG	CC	MH	PG	RCG	RG	SRG	WH	
1	Dillenia indica	Dilleniaceae						01			01
2	Michelia champaca	Magnoliaceae	01								01
3	Annona reticulata	Annonaceae	01			01					02
5	Annona squamosa	Annonaceae	01								01
6	Polyalthia longifolia	Annonaceae	05	30	16		06		01	01	54
7	Bixa orellana	Bixaceae	01								01
8	Calophyllum inophyllum	Clusiaceae	01								01
9	Adansonia digitata	Malvaceae						01			01
10	Adansonia rubrostipa	Malvaceae						01			01
11	Thespesia populnea	Malvaceae		01							01
12	Hildegardia populifolia	Sterculiaceae	01								01
13	Sterculia urens	Sterculiaceae						02			02
14	Sterculia alata	Sterculiaceae						01			01
15	Elaeocarpus ganitrus	Tiliaceae						01			01
16	Muntingia calabura	Tiliaceae				01				01	02

17	Guaiacum officinale	Zygophyllaceae		01							01
18	Bunchosia glandulifera	Malpighiaceae	01								01
19	Aegle marmelos	Rutaceae	01	01							02
20	Chloroxylon swietenia	Rutaceae						01			01
21	Citrus arietinum	Rutaceae	01								01
22	Citrus medica	Rutaceae						01			01
23	Murraya koenigii	Rutaceae	01							01	02
24	Murraya paniculata	Rutaceae		03							03
25	Commiphora wightii	Burseraceae						02			02
26	Bursera hindsiana	Burseraceae						01			01
27	Azadirachta indica	Meliaceae		28	08	62			03	41	142
28	Chukrasia tabularis	Meliaceae		01							01
29	Swietenia mahagoni	Meliaceae	01								01
30	Litchi chinensis	Sapindaceae	01								01
31	Sapindus emarginatus	Sapindaceae		03					01		04
31	Mangifera indica	Anacardiaceae		01							01
32	Lannea coromandelica	Anacardiaceae		01	01						02
33	Alangium salvifolium	Alangiaceae						01			01
34	Moringa oleifera	Moringaceae		02							02
35	Bauhinia purpurea	Fabaceae	01		02						03
36	Bauhinia racemosa	Fabaceae			01						01
37	Butea monosperma	Fabaceae	01								01
38	Dalbergia latifolia	Fabaceae	01								01
39	Pongamia pinnata	Fabaceae		13	07	04		01	11	23	59
40	Pterocarpus santalinus	Fabaceae	03	01				05			09
41	Pterocarpus marsupium	Fabaceae						01			01
42	Cassia fistula	Caesalpiniaceae	02								02

43	Delonix elata	Caesalpiniaceae						01			01
44	Delonix regia	Caesalpiniaceae		03	03	22			01	01	30
45	Peltophorum pterocarpum	Caesalpiniaceae	01	22	05	10			04		42
46	Saraca Ashoka	Caesalpiniaceae						02			02
47	Senna montana	Caesalpiniaceae		02							02
48	Tamarindus indica	Caesalpiniaceae		07		01	01		02		11
49	Albizia lebbeck	Mimosaceae		08	01	02			01		12
50	Calliandra haematocephala	Mimosaceae	01								01
51	Leucaena leucocephala	Mimosaceae				05			02	02	09
52	Parkia biglandulosa	Mimosaceae		03							03
53	Pithecellobium dulce	Mimosaceae		01		01				01	03
54	Prosopis cineraria	Mimosaceae		01	01						02
55	Prosopis juliflora	Mimosaceae		02							02
56	Samanea saman	Mimosaceae		04		05				03	12
57	Psidium guajava	Myrtaceae		03	01						04
58	Syzygium cumini	Myrtaceae	01	07	05	07			01	02	23
59	Syzygium jambos	Myrtaceae	01								01
60	Eucalyptus grandis	Myrtaceae		03							03
61	Conocarpus erectus	Combretaceae		03							03
62	Terminalia arjuna	Combretaceae			01						01
63	Terminalia catappa	Combretaceae		07	11	01				01	20
64	Terminalia mantaly	Combretaceae	01	03	01						05
65	Lagerstroemia parviflora	Lythraceae						01			01
66	Punica granatum	Lythraceae		01							01
67	Coffea arabica	Rubiaceae	02								02
68	Madhuca longifolia	Sapotaceae						01			01
69	Manilkara hexandra	Sapotaceae		01							01
70	Manilkara zapota	Sapotaceae	01		02						03
71	Mimusops elengi	Sapotaceae		01					02		03

72	Nyctanthes arbortristis	Oleaceae		01							01
73	Alstonia scholaris	Apocynaceae			01						01
74	Carissa spinarum	Apocynaceae					01				01
75	Cascabela thevetia	Apocynaceae	01								01
76	Plumeria alba	Apocynaceae					01				01
77	Plumeria pudica	Apocynaceae	02								02
78	Plumeria rubra	Apocynaceae		03			03				06
79	Jacaranda mimosifolia	Bignoniaceae			01				01		02
80	Kigelia Africana	Bignoniaceae	02	02	05	02			05		16
81	Millingtonia hortensis	Bignoniaceae		01							01
82	Spathodea campanulate	Bignoniaceae		01	02					03	06
83	Tabebuia rosea	Bignoniaceae			01				01		02
84	Tecoma capensis	Bignoniaceae	01					01			02
85	Tecoma fulva	Bignoniaceae						01			01
86	Tecoma stans	Bignoniaceae	01	02							03
87	Tectona grandis	Verbenaceae	02	03	43	02					50
88	Vitex negundo	Verbenaceae						01			01
89	Persea americana	Lauraceae	01								01
90	Santalum album	Santalaceae						05			05
91	Holoptelea integrifolia	Ulmaceae		03	01			01			05
92	Euphorbia antiquorum	Euphorbiaceae					01				01
93	Phyllanthus acidus	Euphorbiaceae	01						01		02
94	Phyllanthus emblica	Euphorbiaceae		03							03
95	Artocarpus heterophyllus	Moraceae	01	02							03
96	Ficus benghalensis	Moraceae			01		01				02
97	Ficus benjamina	Moraceae	01	02	01						04
98	Ficus carica	Moraceae	01								01
99	Ficus macrocarpa	Moraceae	01								01
100	Ficus microphylla	Moraceae		01							01
101	Ficus nuda	Moraceae	01								01
102	Ficus religiosa	Moraceae		01	01	09				01	12

103	Ficus racemose	Moraceae	01	01	02						04
104	Ficus rumphii	Moraceae	01								01
105	Ficus virens	Moraceae	01								01
106	Morus alba	Moraceae	02								02
MONOCOTYLEDONS											
107	Areca catechu	Arecaceae	01								01
108	Bismarkia nobilis	Arecaceae	01								01
109	Caryota urens	Arecaceae	01	02							03
110	Cocos nucifera	Arecaceae		11	03						14
111	Dypsis lutescens	Arecaceae	02	02							04
112	Hyophorbe lagenicaulis	Arecaceae		03							03
113	Phoenix sylvestris	Arecaceae	01				02				05
114	Bambusa membranacea	Poaceae						01			01
115	Bambusa polymorpha	Poaceae						01			01
116	Bambusa tulda	Poaceae						01			01
117	Dendrocalamus brandisii	Poaceae						01			01
118	Dendrocalamus strictus	Poaceae						01			01
GYMNOSPERMS											
119	Cycas circinalis	Cycadaceae	01	01							02
120	Cycas revoluta	Cycadaceae	04	03							07
121	Cycas spicata	Cycadaceae						01			01
122	Araucaria heterophylla	Pinaceae		02							02
123	Cedrus deodara	Pinaceae		02							02
124	Thuja occidentalis	Pinaceae	02								02
TOTAL NUMBER OF TREES			67	220	128	135	16	40	37	81	724

3. Results and Discussion

3.1. Qualitative floristic composition and dominant families

The inventory documented 124 tree species belonging to 92 genera and 38 families on the college campus. The recorded taxa comprised 106 dicotyledonous species, 12 monocotyledonous species and six gymnosperm species. Moraceae was the most species-rich family, represented by 12 species, followed by Mimosaceae and Bignoniaceae, with eight species each. The representation of several *Ficus species*, including *Ficus benghalensis, F. religiosa, F. racemosa and F. benjamina*, contributed to the richness of Moraceae. The inventory includes native, cultivated, ornamental and avenue trees, demonstrating the varied floristic character of the campus. The statistical data is represented as a graph below (Fig.1).

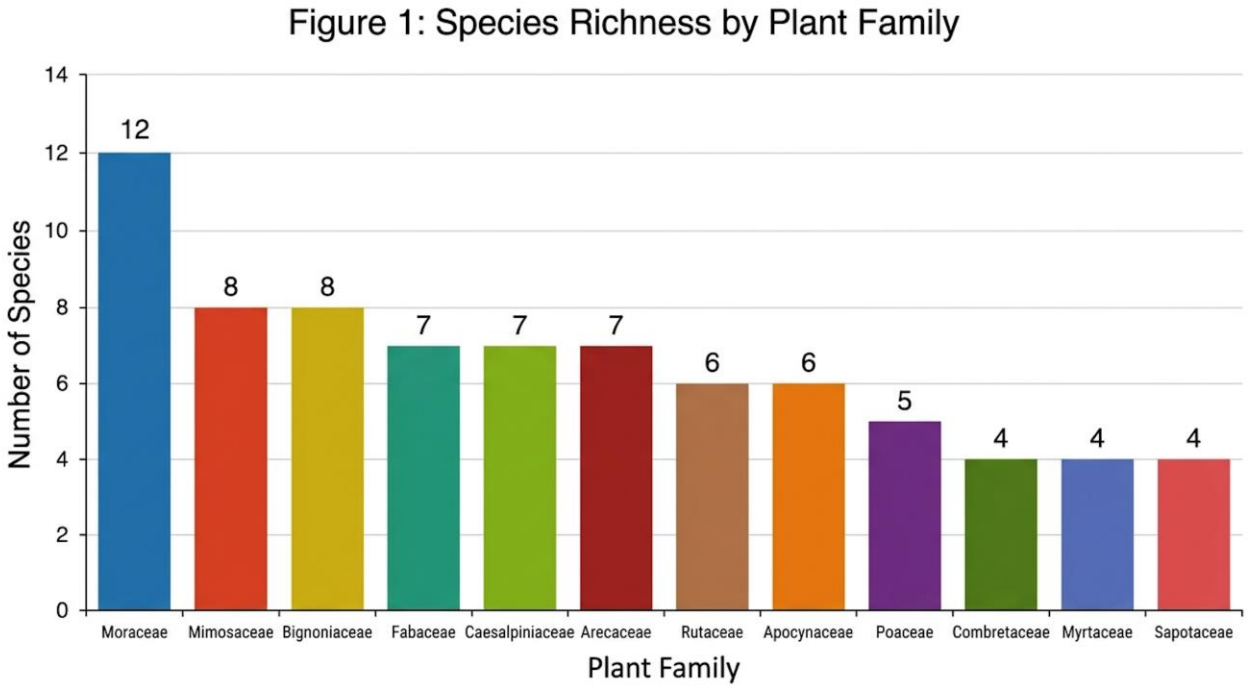


Fig. 1. Species richness of the twelve most species-rich families recorded on the campus.

Moraceae is ecologically important because many *Ficus* species provide food resources for birds, bats and other frugivorous organisms. Mimosaceae, Caesalpiniaceae and Fabaceae also contribute to the structural and functional diversity of the campus vegetation. Bignoniaceae adds flowering and ornamental trees to the campus landscape. The occurrence of several families within a relatively compact educational campus underlines its value as an urban repository of tree diversity and as a resource for botanical teaching and ecological observation.

Family-level species richness describes taxonomic representation but does not, by itself, indicate numerical dominance. Therefore, the abundance of individual trees and their distribution among the eight campus sectors were also examined.

3.2. Quantitative abundance of dominant tree species

The quantitative inventory recorded 724 individual trees representing 124 species across the eight campus sectors. *Azadirachta indica* was the most abundant species, with 142 individuals (approximately 19.6%

of all recorded trees). It was followed by *Pongamia pinnata* (59), *Polyalthia longifolia* (54), *Tectona grandis* (50) and *Peltophorum pterocarpum* (42). Together, these five species accounted for 347 individuals, approximately 47.9% of the recorded tree population.

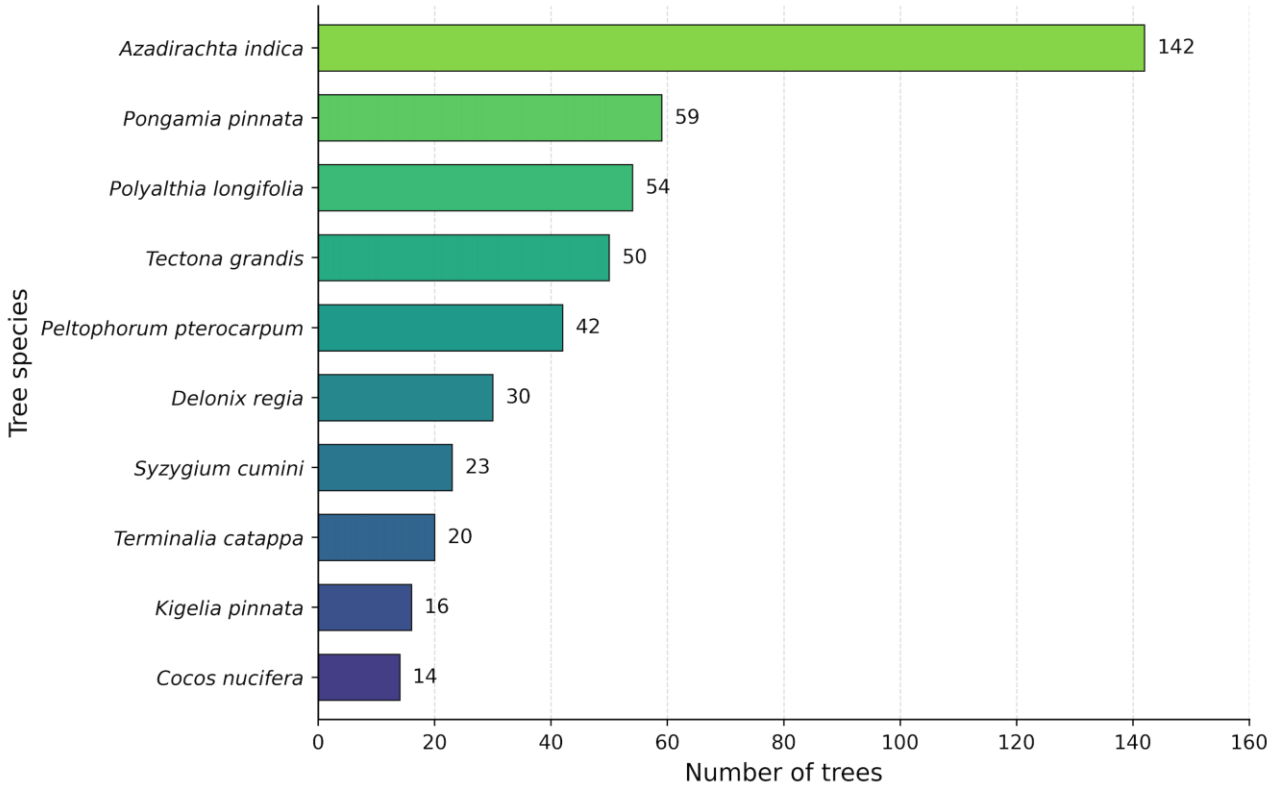


Fig. 2. Distribution and abundance of the ten most frequently recorded tree species.

The high abundance of *Azadirachta indica makes* it a major contributor to campus tree cover. Its presence is relevant to the semi-arid environment of Anantapur, where drought-tolerant trees can help maintain green cover under seasonal water stress. *Polyalthia longifolia* is commonly planted as an avenue and ornamental tree, while *Pongamia pinnata* contributes shade and has nitrogen-fixing potential. *Tectona grandis* and *Peltophorum pterocarpum* add to the structural diversity of the campus. The statistical data is represented as a graph above (Fig.2)

The five most abundant species account for nearly half of the recorded individuals, indicating that the campus tree population is numerically concentrated in a relatively small group of taxa. Retaining healthy mature trees while encouraging suitable native and regionally adapted species would help maintain canopy cover and improve the representation of less abundant taxa.

3.3. Sector-wise distribution of trees

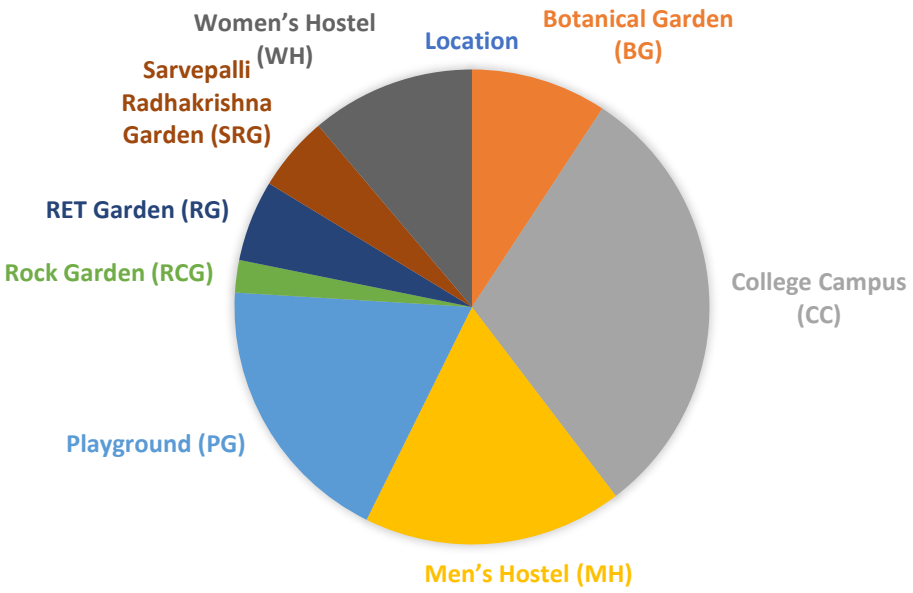
The eight sectors differed in their total tree populations. The College Campus (CC) recorded the highest number of trees (220), followed by the Playground (PG; 135) and Men's Hostel (MH; 128). The Women's Hostel (WH) contained 81 trees, the Botanical Garden (BG) 67, the RET Garden (RG) 40, the Sarvepalli Radhakrishna Garden (SRG) 37 and the Rock Garden (RCG) 16. These sector totals sum to the overall inventory of 724 trees.

The College Campus accounted for approximately 30.4% of all recorded trees, followed by the Playground (18.6%) and Men's Hostel (17.7%). The Rock Garden contributed approximately 2.2% of the total. Differences among sectors may be associated with available planting space, landscape design, sector function and the history of tree establishment. However, the number of individuals alone does not determine the species richness or overall botanical value of a sector. The data is graphically represented in the Fig.-3 and Fig.-4

Several abundant species occur in more than one sector, contributing to shade and green cover across the campus. Botanical and specialized gardens may also support less abundant or taxonomically distinctive species. Consequently, sector-level comparisons should consider both the number of individuals and the number and identity of species present.

A sector containing fewer trees may nevertheless have considerable botanical value if it supports many species or contains uncommon taxa. Campus management should therefore evaluate species richness, abundance and composition together rather than relying only on total tree counts.

FIG- 3. DISTRIBUTION OF TREES IN VARIOUS LOCATIONS OF THE COLLEGE



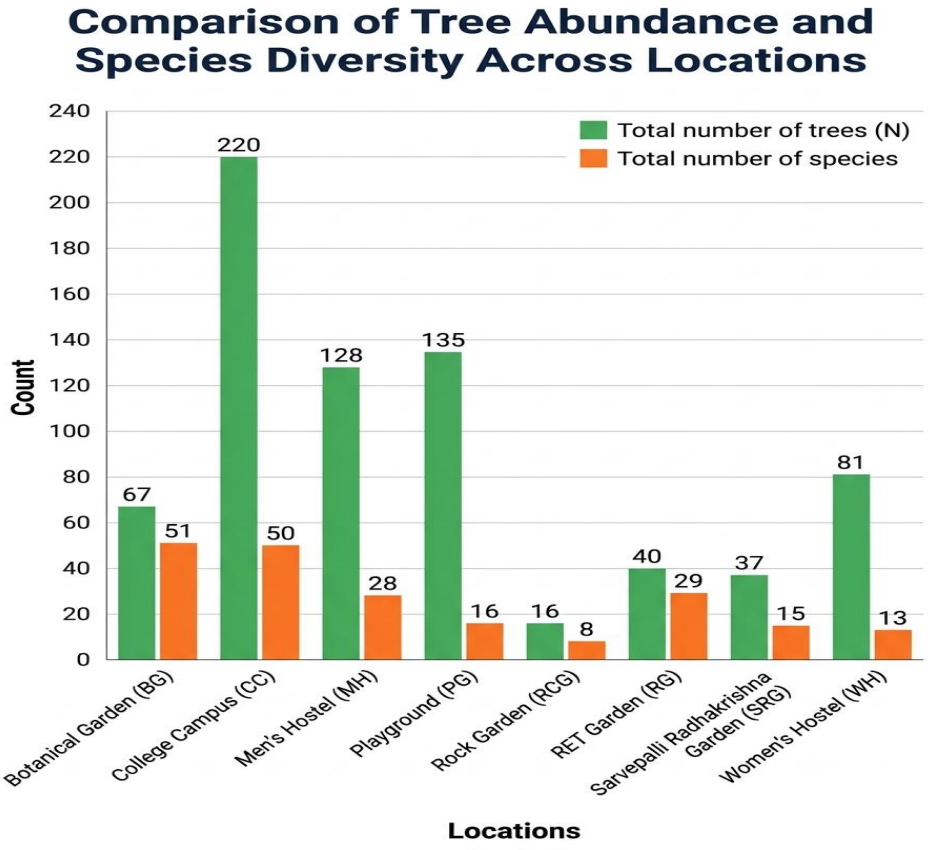


Fig-4. Trees abundance and Species richness across all the locations of the college.

3.4. Ecological significance and implications for campus management

The results demonstrate that Government College (A), Anantapur, supports substantial tree diversity within an urban campus of approximately 26 acres. The inventory of 124 species, 92 genera and 38 families provides baseline information for future floristic and ecological investigations. Urban green spaces contribute to ecosystem services such as microclimate regulation, carbon storage, air-pollution removal and biodiversity support (Bolund & Hunhammar, 1999; Nowak et al., 2013). Tree-rich educational campuses can also support urban biodiversity, environmental education and conservation research (Aronson et al., 2017; Liu et al., 2021).

The inventory can inform a systematic campus tree-management plan. Periodic monitoring of tree survival, regeneration, canopy condition and species distribution would help assess changes in campus vegetation. Future planting programmes may prioritize suitable native and drought-adapted species, while retaining healthy mature trees and protecting species of conservation interest. The RET Garden offers an opportunity to strengthen conservation-oriented planting and botanical documentation.

The documented trees also constitute a practical educational resource for Botany students. They can support field exercises in plant identification, taxonomy, morphology, phenology and urban ecology. Student participation in repeated surveys could facilitate long-term monitoring and strengthen awareness of biodiversity conservation.

3.5. Quantitative diversity indices

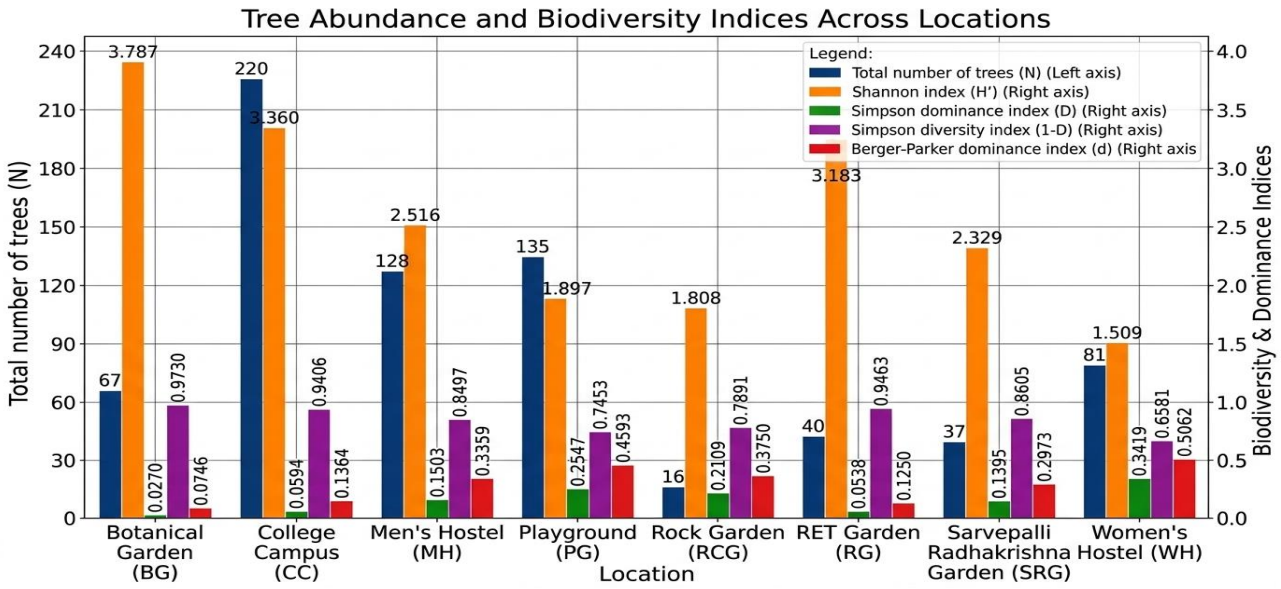
To compare tree diversity and species dominance among the eight campus sectors, the Shannon–Wiener diversity index, Simpson dominance index, Simpson diversity index and Berger–Parker dominance index were calculated from the species-wise abundance data presented in Table 1. The resulting sector-wise values are presented in Table 2.

Table 2. Sector-wise tree abundance and diversity indices.

S. No.	Location	Total number of trees (\(N\))	Total number species	Shannon index (\(H'\))	Simpson dominance index (\(D\))	Simpson diversity index (\(1-D\))	Berger–Parker dominance index (\(d\))
1	Botanical Garden (BG)	67	51	3.787	0.0270	0.9730	0.0746
2	College Campus (CC)	220	50	3.360	0.0594	0.9406	0.1364
3	Men's Hostel (MH)	128	28	2.516	0.1503	0.8497	0.3359
4	Playground (PG)	135	16	1.897	0.2547	0.7453	0.4593
5	Rock Garden (RCG)	16	08	1.808	0.2109	0.7891	0.3750
6	RET Garden (RG)	40	29	3.183	0.0538	0.9463	0.1250
7	Sarvepalli Radhakrishna Garden (SRG)	37	15	2.329	0.1395	0.8605	0.2973
8	Women's Hostel (WH)	81	13	1.509	0.3419	0.6581	0.5062

For the calculations, $p_i = n_i/N$, where n_i is the number of individuals of species i and N is the total number of trees in the sector. Nmax represents the abundance of the most numerous species in that sector. Simpson diversity is expressed as $1 - D$. The statistical analysis is represented as a graph below (Fig-5).

Fig-5. Tree Abundance and Biodiversity Indices across the locations.



3.5.1. Interpretation of diversity indices

The indices indicate variation in tree diversity and dominance among the campus sectors. The Botanical Garden recorded the highest Shannon–Wiener index (H′ = 3.787) and Simpson diversity index (1 − D = 0.9730), indicating comparatively high diversity and a more even distribution of individuals among species. The College Campus also showed relatively high diversity (H′ = 3.360; 1 − D = 0.9406), despite having the largest tree population (220 individuals).

The RET Garden recorded a Shannon–Wiener index of 3.183 and a Simpson diversity index of 0.9463, indicating comparatively high diversity relative to its population of 40 trees. In contrast, the Women's Hostel had the lowest Shannon–Wiener index (H′ = 1.509) and Simpson diversity index (0.6581), together with the highest Simpson dominance (D = 0.3419) and Berger–Parker dominance (d = 0.5062). This indicates that its tree population was comparatively strongly dominated by a small number of species. The Playground also showed relatively low diversity (H′ = 1.897; D = 0.2547; Berger–Parker d = 0.4593).

The Men's Hostel showed intermediate diversity (H′ = 2.516; 1 − D = 0.8497), while the Sarvepalli Radhakrishna Garden recorded H′ = 2.329 and 1 − D = 0.8605. The Rock Garden, with 16 trees, recorded H′ = 1.808 and 1 − D = 0.7891. Its indices should be interpreted in view of its relatively small population. Overall, the results show that tree abundance alone does not determine diversity; the distribution of individuals among species is also important.

4. Conclusion

Taken together, the diversity indices identify the Botanical Garden, RET Garden and College Campus as sectors with comparatively high tree diversity. The Women's Hostel and Playground showed greater species dominance and comparatively lower diversity. These findings support the maintenance of species-rich planting arrangements and the introduction of suitable additional species in sectors where a few taxa dominate.



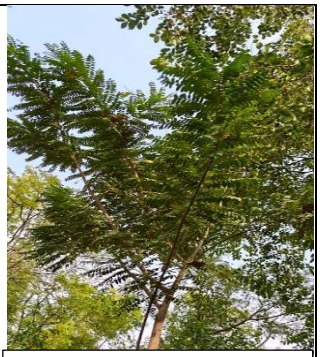
Adansonia digitata



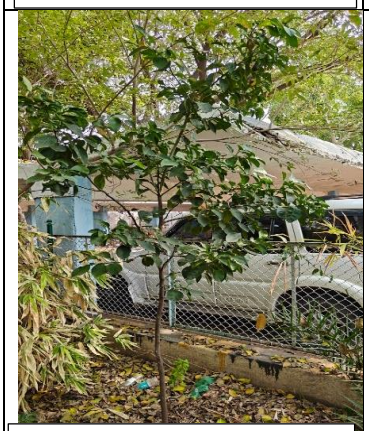
Bixa orellana



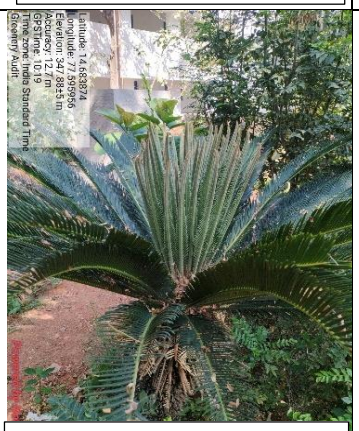
Bursera hindsiana



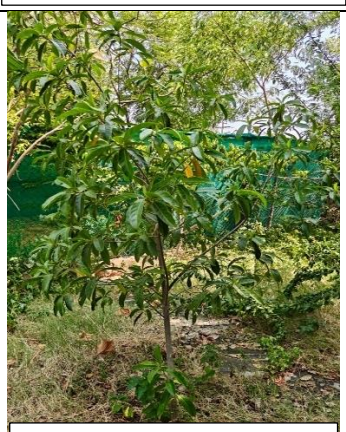
Chloroxylon swietenia



Citrus medica



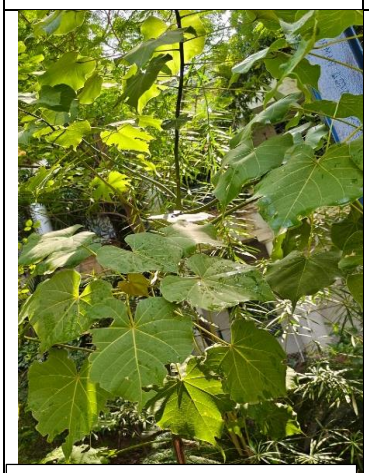
Cycas circinalis



Elaeocarpus ganitrus



Ficus racemosa



Hildegardia populifolia



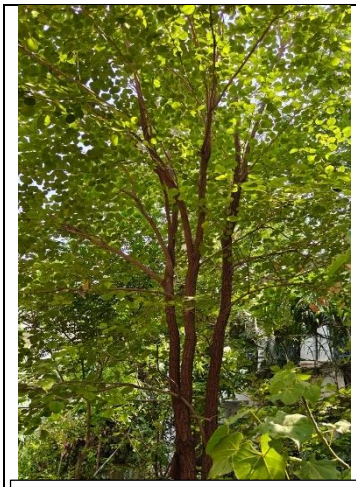
Jacarandra mimosifolia



Kigelia pinnata



Mimusops elengi



Pterocarpus santalinus



Santalum album



Saraca asoca



Tectona grandis

Acknowledgments:

The authors sincerely thank Dr. P. Padmasri, Principal of Government College (A), Anantapur, for granting permission and providing logistical support for conducting the field studies. They also extend their gratitude to the students for their valuable time and assistance during the field survey and tree enumeration

References

1. Alvey, A.A. (2006). Promoting and preserving biodiversity in the urban forest. Urban Forestry & Urban Greening, 5(4), 195–201.
2. Aronson, M.F.J., Lepczyk, C.A., Evans, K.L., Goddard, M.A., Lerman, S.B., MacIvor, J.S., Nilon, C.H. and Vargo, T. (2017). Biodiversity in the city: Key challenges for urban green space management. Frontiers in Ecology and the Environment, 15(4), 189–196.
3. Bolund, P. and Hunhammar, S. (1999). Ecosystem services in urban areas. Ecological Economics, 29(2), 293–301.
4. Bowler, D.E., Buyung-Ali, L., Knight, T.M. and Pullin, A.S. (2010). Urban greening to cool towns and cities: A systematic review of the empirical evidence. Landscape and Urban Planning, 97(3), 147–155.
5. Chiesura, A. (2004). The role of urban parks for the sustainable city. Landscape and Urban Planning, 68(1), 129–138.
6. Jain, S. K and R.R. Rao (1977) Hand Book of Field and Herbarium Methods. Today & Tomorrow Printers and Publishers, New Delhi.
7. Jorgensen, A. and Gobster, P.H. (2010). Shades of green: Measuring the ecology of urban green space in the context of human health and well-being. Nature and Culture, 5(3), 338–363.
8. Kavi Malar, S., Saradha, M. and Vimal Priya, S. (2022). Documentation of arboreal flora of Nirmala College campus, Coimbatore. Kongunadu Research Journal, 9(2), 33–38.
9. Kensa, V.M., Sahaya Anthony Xavier, G., Asha, A., Brintha, B., Pechiammal, M. and Praveena, B. (2016). Exploration of ornamental floras in the campus of S.T. Hindu College, Nagercoil, Kanyakumari District, Tamil Nadu, India. Kongunadu Research Journal, 3(1), 59–64.

10. Liu, J., Zhao, Y., Si, X., Feng, G., Slik, F. and Zhang, J. (2021). University campuses as valuable resources for urban biodiversity research and conservation. Urban Forestry & Urban Greening, 64, 127255.
11. Livesley, S.J., McPherson, E.G. and Calfapietra, C. (2016). The urban forest and ecosystem services: Impacts on urban water, heat, and pollution cycles at the tree, street, and city scale. Journal of Environmental Quality, 45(1), 119–124.
12. Mohanty, A.S. and Sahoo, B. (2025). Floristic diversity of Govt. Women's College Campus, Keonjhar, Odisha: Plants with medicinal value. Journal of Pharmacognosy and Phytochemistry, 14(3), 137–143.
13. Nandal, A., Yadava, S.S., Khuroo, A.A., Rao, A.S., Singha, N. and Chhikara, A. (2023). Assessing diversity and ecosystem services of trees in educational institutions: A case study of a university campus from the Global South. Arboricultural Journal, 45(2), 132–151.
14. Nayak, A.K. and Patra, A.S. (2025). Assessment of floristic diversity of tree species and medicinal value in college campus of Maharaja Purna Chandra Autonomous College, Odisha, India. International Journal of Biology Sciences, 7(6), 1–6.
15. Nowak, D.J., Greenfield, E.J., Hoehn, R.E. and Lapoint, E. (2013). Carbon storage and sequestration by trees in urban and community areas of the United States. Environmental Pollution, 178, 229–236.
16. Pullaiah, T. (1997). Flora of Andhra Pradesh, India. Volume 3: Monocotyledons. Scientific Publishers, Jodhpur
17. Pullaiah, T. and Chennaiah, E. (1997). Flora of Andhra Pradesh, India. Volume 1: Ranunculaceae–Alangiaceae. Scientific Publishers, Jodhpur.
18. Pullaiah, T. and Moulali, D.A. (1997). Flora of Andhra Pradesh, India. Volume 2: Rubiaceae–Ceratophyllaceae. Scientific Publishers, Jodhpur.
19. Pullaiah,t. Sandhya rani, S.(1999). Trees of Andhra Pradesh, India.Regency publications, New Delhi
20. Raghu Ramulu, D., Sri Rama Murthy, K. and Sandhya Rani, S. (2026). Comprehensive review on floristic studies of Indian universities and colleges. International Journal of Scientific Development and Research, 11 (10), 732 – 745.
21. Rao, Ravi Prasad B (2014) The Plant Directory : Anusha Publications, Hyderaabd.
22. Rao, Ravi Prasad B (2026) Flora of Ananthapuramu City & Sri Krishnadevara University Campus. Synto Publishers, New Delhi.
23. Rekha, D., Panneerselvam, A. and Thajuddin, N. (2014). Studies on medicinal plants of A.V.V.M. Sri Pushpam College Campus, Thanjavur District of Tamil Nadu, Southern India. World Journal of Pharmaceutical Research, 3(5), 785–820.
24. Sahadevudu, D., Venkateswarlu, C., Ramachandra Reddy, Y. and Rangaswami, N. (2015). Evolution of Government Arts College, Ananthapuramu in ten decades: A study. International Journal of Social Science and Management, 2(4), 357–361.
25. Singh, A. (2021). Natural floristic composition of Banaras Hindu University, India: An overview. International Journal of Peace and Developmental Studies, 2(4), 119–131.
26. Tzoulas, K., Korpela, K., Venn, S., Yli-Pelkonen, V., Kazmierczak, A., Niemelä, J. and James, P. (2007). Promoting ecosystem and human health in urban areas using green infrastructure: A literature review. Landscape and Urban Planning, 81(3), 167–178.

27. Wang, X., Wang, Y., Qu, X., Huang, B., Li, Z. and Sun, J. (2021). Urban trees in university campus: Structure, function, and ecological values. Environmental Science and Pollution Research, 28, 45183–45198.