Dr. Devendar Veeramalla, 2025, 13:6
ISSN (Online): 2348-4098
ISSN (Print): 2395-4752

International Journal of Science, Engineering and Technology
An Open Access Journal

Depletion of Leguminous Medicinal Plants in Erstwhile Adilabad District, Telangana: A Conservation Imperative

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Abstract- Adilabad district in Telangana is a biodiversity hotspot and is particularly rich in leguminous medicinal plants, which are crucial for the traditional healthcare of tribal communities like the Gonds, Kolams, Pradhans and Naikpods. This study investigates the primary drivers of decline in these plant populations, including forest encroachment, unsustainable harvesting, habitat degradation, climate change, causes of depletion, and conservation needs of leguminous medicinal flora in the region. Field surveys, ethnobotanical documentation, and interviews with local tribal healers (Gonds, Kolams, Naikpods and Pradhans) were conducted across key forest zones. Results reveal a sharp decline in species such as Albizia lebbeck, Clitoria ternatea, Cassia fistula, and Abrus precatorius etc. Field surveys and interviews with local traditional healers and forest officials were conducted to assess the species status, exploitation patterns, and conservation challenges. The research highlights the critical need for a conservation strategy that integrates in-situ and ex-situ methods with community-based management. This approach is essential for preserving both the plant species and the associated traditional knowledge.

Keywords: Leguminous plants, Medicinal flora, Adilabad district, Conservation, In-situ and ex-situ, Ethnobotany.

I. INTRODUCTION

Context and significance

The Leguminosae (Fabaceae) family represents one of the largest plant families with high medicinal, ecological, and economic value. In India, around 1,300 leguminous species are known, many of which are used in Ayurveda, Siddha, and tribal medicine. Telangana, especially Adilabad district, harbors rich biodiversity supported by the Deccan plateau and tropical dry deciduous forests. However, anthropogenic pressures have led to habitat fragmentation and depletion of several leguminous medicinal species. The Leguminosae family is globally recognized for its significant contribution to medicinal practices, and the Adilabad forests host several endemic and important leguminous species. With a high concentration of tribal communities that rely on these plants for sustenance and healthcare, documenting and preserving this biodiversity is crucial. This paper explores the extent of depletion, its causes, and strategies for conservation. Over-exploitation of medicinal plants, driven by increasing commercial demand, poses a significant threat to the survival of high-value species.

Study area

Adilabad District, located in northern Telangana, lies between 18°40′N and 19°56′N latitudes and 77°47′E and 80°00′E longitudes. The district is characterized by undulating terrain, mixed deciduous forests, and a predominantly tribal population dependent on forest resources. Major forest divisions include Utnoor, Kagaznagar, Jannaram, and Nirmal. Rainfall averages 1,000–1,200 mm annually, supporting diverse flora including medicinally important legumes.

Problem statement and objectives

Forest encroachment for agriculture (podu cultivation) and illegal timber extraction are rampant in Telangana, directly destroying the habitat of medicinal plants. Unsustainable harvesting further pressures wild populations, impacting regeneration.

This paper aims to:

- Identify the major leguminous medicinal plant species in Adilabad.
- Assess the current status and intensity of threats to these species.

- Analyze the socioeconomic and ecological drivers of depletion.
- Propose an integrated, community-centered conservation plan.

II. MATERIALS AND METHODS

Ethnobotanical field surveys

A two-year field study involved exploratory surveys with the help of traditional healers and local community members. Data was collected using structured interviews, focus group discussions, and direct observations in selected villages and forest patches.

Vegetation and ecological assessment

Vegetation surveys were conducted using transects and quadrates to assess the density, frequency, and regeneration status of key leguminous species. This included documenting the habitat of the plants and mapping areas impacted by anthropogenic disturbances, like encroachment and grazing.

Threat analysis

The study analyzed threats to leguminous species by observing practices such as over-harvesting, non-selective harvesting, and the impact of livestock grazing. Additionally, remote sensing data and forest department records were used to assess the scale of forest encroachment over time.

III. RESULTS

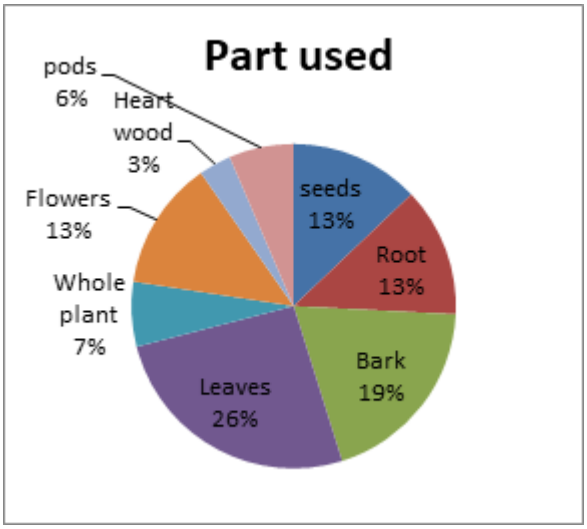
Documented leguminous species

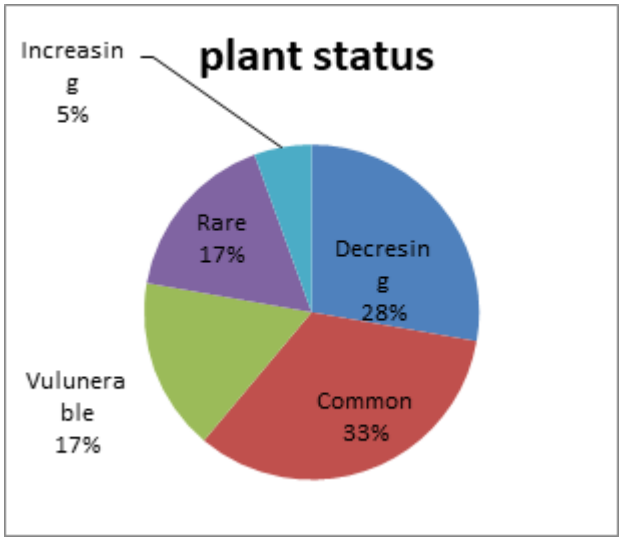
A total of 18 leguminous medicinal plant species were identified in the study area. Several species, including Butea monosperma, Abrus precatorius, and Pterocarpus marsupium, were noted for their high medicinal and ethnobotanical significance. Species were categorized based on their growth form (tree, shrub, climber, etc.).

Major Leguminous Medicinal Plants Identified

S.No	Scientific Name	Common Name	Parts Used	Medicinal Uses	Status
1	*Albizia lebbeck*	Siris	Bark, Seeds	Asthma, cough, skin diseases	Decreasing
2	*Clitoria ternatea*	Aparajita	Whole plant	Memory enhancer, wound healing	Common
3	*Cassia fistula*	Amaltas	Pods, Leaves	Purgative, skin ailments	Vulnerable
4	*Abrus precatorius*	Gunj	Seeds, Leaves	Antidote, cough	Decreasing
5	*Tephrosia purpurea*	Wild indigo	Root	Liver disorders	Rare
6	*Butea monosperma*	Palash	Bark, Flowers	Antifungal, fertility disorders	Decreasing
7	*Pterocarpus marsupium*	Indian Kino	Heartwood, Bark	Diabetes, skin diseases, wound healing	Rare
8	*Mimosa pudica*	Touch-me-not	Whole plant	Anti-inflammatory, piles, urinary problems	Common
9	*Desmodium gangeticum*	Shalaparni	Root	Fever, digestive disorders, rejuvenating tonic	Rare
10	*Crotalaria verrucosa*	Blue Rattlepod	Root, Leaves	Used for ulcers, wounds, anti-venom	Common
11	*Indigofera tinctoria*	True Indigo	Leaves, Roots	Anti-inflammatory, detoxifying agent	Decreasing
12	*Sesbania grandiflora*	Agathi	Leaves, Flowers	Cough, night blindness, anthelmintic	Common
13	*Alysicarpus vaginalis*	Alyce Clover	Whole plant	Fever, dysentery, digestive ailments	Common
14	*Cassia tora*	Chakramarda	Seeds, Leaves	Skin disorders, ringworm, constipation	Common
15	*Bauhinia purpurea*	Kanchan	Bark, Flowers	Goiter, ulcers, and swelling	Decreasing

16	*Pongamia pinnata*	Karanj	Seeds, Leaves	Skin diseases, rheumatism, antiseptic	Vulnerable
17	*Dalbergia sissoo*	Indian Rosewood	Bark, Leaves	Dysentery, inflammation, diabetes	Decreasing
18	*Prosopis juliflora*	Vilayati Babool	Bark, Pods	Wound healing, antiseptic, antimicrobial	Increasing (invasive)





Status and vulnerability

The study found that a significant proportion of the documented species are under threat, with several showing low regeneration rates or restricted availability. Herbaceous and shrub species were particularly vulnerable due to grazing, while commercially exploited tree species showed signs of over-harvesting.

Drivers of depletion

- **Forest encroachment:** Agricultural expansion, particularly podu cultivation, was identified as the most significant threat, leading to direct habitat loss and fragmentation.
- **Unsustainable harvesting:** The collection of entire plants or specific parts (e.g., bark and roots) for market demand and traditional use significantly reduces populations.
- **Lack of awareness:** Insufficient knowledge of sustainable practices among collectors and the younger generation is a contributing factor to depletion and the loss of traditional knowledge.
- **Inadequate policy enforcement:** While policies exist, the inability of the Forest Department to effectively manage and protect these resources exacerbates the problem.

IV. DISCUSSION

The observed depletion reflects a combination of anthropogenic pressure and neglect of traditional knowledge. Restoration of degraded habitats, inclusion of leguminous species in eco-restoration programs, and integration with rural livelihood schemes (e.g., Telangana Harithaharam, BMC Programs) can aid recovery. The nitrogen-fixing ability of legumes also supports soil health, suggesting dual benefits in ecological restoration and sustainable agriculture.

Interpretation of findings

The study confirms that the decline of leguminous medicinal plants in Adilabad is driven by a complex interplay of ecological and socioeconomic factors. The vulnerability of specific plant parts, such as roots and bark, to damage during harvesting points to a critical need for education on sustainable collection methods. The loss of associated traditional knowledge among younger generations further jeopardizes long-term conservation efforts.

Linking local ecology to broader context

The situation in Adilabad is representative of a wider national and global issue, where biodiversity hotspots and traditional medicinal knowledge systems are threatened by deforestation, commercial demand, and a breakdown of traditional conservation practices.

V. CONSERVATION STRATEGIES

Integrated conservation approach

A comprehensive conservation strategy is required, combining in-situ (within natural habitat) and ex-situ (off-site, e.g., seed banks) methods.

Community-based conservation

The success of conservation hinges on the active participation of local communities. This can involve:

- Establishing Medicinal Plant Conservation Areas (MPCAs) managed by community committees.
- Training traditional healers and collectors in sustainable harvesting techniques.
- Promoting the cultivation of high-demand leguminous species in home gardens or village nurseries.

Policy and livelihood interventions

- Partner with government bodies like the Telangana State Medicinal Plants Board and the Ministry of Ayush to leverage existing schemes for cultivation and sustainable management.
- Strengthen Joint Forest Management (JFM) initiatives and engage communities in forest protection.
- Implement alternative livelihood programs to reduce dependence on unsustainable wild plant collection.

VI. CONCLUSION

The depletion of leguminous medicinal plants in Adilabad is an urgent issue demanding a multi-pronged approach. The conservation measures proposed, which blend modern scientific and traditional community-led practices, offer a viable path to preserving both the biodiversity and the invaluable indigenous knowledge of the region. This is not merely an ecological imperative but also a matter of safeguarding the cultural heritage and healthcare of tribal communities.

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