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Distribution of Medicinal Flora in the Arid Landscapes of Shekhawati Region, Rajasthan

Dr. Mukesh Kumar Sharma [1], Babita [2]

[1] Principal, Ravindra Academy Girls PG College, Chirawa, Jhunjhunu

[2] Research Scholar, Department of Geography, Singhania University, Pacheri Bari, Jhunjhunu

Abstract: **The Shekhawati region of Rajasthan, known for its extreme aridity and rich cultural heritage, is a significant repository of medicinal flora. This paper analyzes the spatial distribution of medicinal plants across the semi-arid and arid landscapes of Shekhawati, with an emphasis on species diversity, ecological associations, and ethnomedicinal usage by local communities during 2013. Through a synthesis of field studies, herbarium records, and literature reviews, the research delineates the key plant species, families, and habitats supporting traditional medicine in Jhunjhunu, Sikar, and Churu districts. The results reveal concentration gradients of species in relation to landforms, soils, water availability, and traditional conservation practices. The study highlights persistent threats, including overgrazing, habitat loss, and erosion of ethnobotanical wisdom, and advocates for integrative strategies bridging conservation and sustainable use.**

Keywords: Medicinal plants, Shekhawati, Rajasthan, arid ecology, ethnobotany, plant distribution, traditional medicine, flora diversity

1. Introduction

Shekhawati Region harbors a wealth of medicinal flora, forming the backbone of indigenous healthcare systems.
Traditional knowledge on plant utility persists among rural and tribal populations, who rely on local flora for remedies, rituals, and veterinary needs. This paper investigates the diversity, distribution patterns, and ecological determinants of medicinal plants in Shekhawati Region, elucidating their role within the region's socio-ecological conditions.

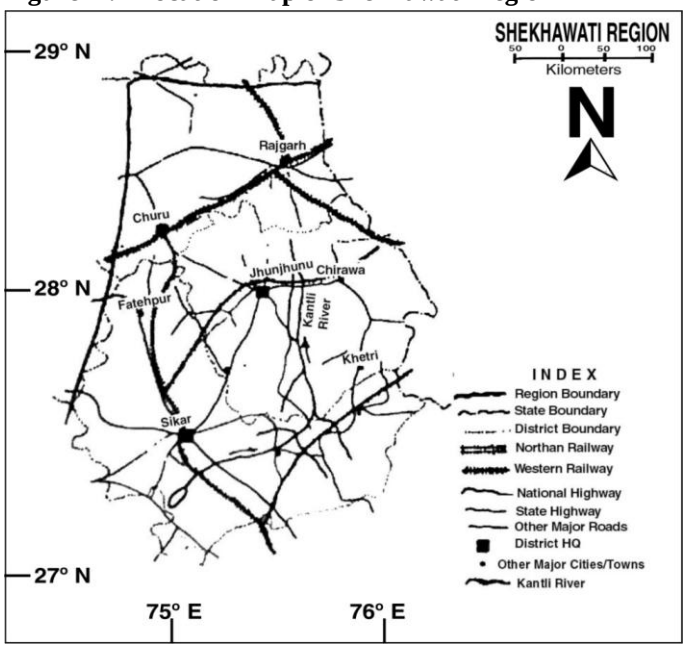
2. Research Methodology

Field survey methods included:
1. Transect walks during winter and monsoon (2008–2013).
2. Collection and identification of specimens at regional herbaria.
3. Interviews with local healers, rural elders, and women practitioners.
4. Review of studies and monographs published prior to 2013.
Data on plant habitats, abundance, traditional usage, and threats were compiled into distribution maps and frequency charts to analyze spatial and ecological patterns.

3. Study Area

Figure-1.1 shows the area under study i.e. Shekhawati region which is located in the north-eastern part of Rajasthan state and the region has geographical extension from 26°26' to 29°20' N latitude and 74° 44' to 76°34' E longitude on the map of Rajasthan. The area under study covers fully or partly three districts, namely Churu, Jhujhunun and Sikar. Churu district's out of 7, only 3 tehsils fall under Shekhawati region (Churu, Rajgarh and Taranagar) whereas Jhunjhunu district as a whole with its six tehsils (Buhana, Chirawa, Khetri, Jhunjhunu, Nawalgarh and Udaipurwati) in which Buhana tehsil emerged out as a new tehsil on the map of Jhunjhunu district (2001), it was no more existence in the year of 1991 and Sikar district also covered fully with it's six tehsils (Data Ramgarh, Fatehpur, Laxmangarh, Neem ka Thana, Sikar and Shri Madhopur).

Figure- 1.1 Location Map of Shekhawati Region



The region has 23 Panchayat Samitis in all. Thus, the region under study has 15 tehsils in total with it's total 15343 sq. km. geographical area which makes 5.6% of the state's total. At the part of district-wise contribution by area point of view in Shekhawati region it is observed that part and portion of Churu

district contributes 29%, Jhunjhunu district contributes 31% and Sikar by 40%, respectively.

Among these tehsils area point of view, the tehsil of Churu is largest one and Buhana smallest, respectively. District-wise area point of view Sikar stands at first position which is followed by Jhunjhunu and lowest contribution is made by Churu i.e. 1683 sq. km. only.

At the part of population, Shekhawati region contributes 8.7 percent of the state's total in which sex-ratio is 948 females per thousand males in Total Population whereas it is very low i.e. 887 in Child Population for the area under study. The region obtains high Literacy rate which is about 10% more than that of the state's average. Among tehsils, Buhana ranks at first position while as Neem ka Thana contributes lowest in this aspect. The region obtains high density (244) i.e. 50 percent more than that of state's average which is 165 persons per sq. area 2001. The region has also Slum population but it is very low or to say negligible i.e. 2.5% only of the urban area's total.

The whole region has distribution of two types of soils; Sandy soil and Red Loamy soil. The former soil type has obvious distribution in Churu district, the areas of sand dunes topography; the later soil group is mostly distributed over the districts of Jhunjhunu and Sikar (classification based on dominancy, availability and agricultural productivity). The distribution of soil type and it's physical as well as chemical nature is a significant aspect from vegetation as well as plant species distribution point of view.

On the basis of another type of soil type classification according Prof. Thorpe and Smith based on the origin of the soil, the observations revealed in this direction that Remosols type of soil has distribution in the areas of sand dunes topography; all three tehsils of Churu districts have, Red sandy soil which is more alkaline in nature. Hilly topography soil and Riverine soil have their distribution according the distribution of habitat of study area.

4. Ecological and Climatic Context

4.1. Climate and Landforms

Shekhawati's climate is typified as arid to semi-arid, with single monsoon rains accounting for the majority of precipitation. The soil profile alternates between deep sands, loamy alluvium in riverine tracts, and stony or gravelly colluvium in uplands.

Vegetation cover varies from sparse xerophytes in dunes to relatively higher plant density in hilly or riparian niches.

4.2. Plant Communities

Vegetation in Shekhawati falls into several broad categories:

1. Herbs: 38% of the medicinal flora, dominating ephemeral riverbeds and open fields (e.g., Achyranthes aspera, Corchorus depressus).

2. Shrubs: Common in dune systems and field margins (e.g., Calotropis procera, Cassia angustifolia).

3. Trees: 24% of medicinal species, often clustered in protected village groves and along field boundaries (e.g., Acacia nilotica, Azadirachta indica).

4. Climbers and grasses: Scattered but significant in mixed stands and disturbed areas (e.g., Cissus quadrangularis, Cymbopogon spp.).

5. Distribution and Diversity of Medicinal Flora

5.1. Dominant Families and Species

Ethnobotanical surveys and published inventories identify the following families as dominant contributors to the medicinal plant pool in Shekhawati:

1. Fabaceae: Extensive both in species number and medicinal usage (e.g., Butea monosperma, Prosopis cineraria).

2. Euphorbiaceae: Rich in bioactive species (e.g., Euphorbia neriifolia, Phyllanthus niruri).

3. Asteraceae: Noted for anti-inflammatory herbs (e.g., Eclipta prostrata).

4. Rhamnaceae: Exemplified by Ziziphus nummularia, a multipurpose arid shrub.

A sample list of ethnomedicinal trees of the region includes Ailanthus excelsa, Albizia lebbeck, Balanites aegyptiaca, Bauhinia variegata, Crataeva nurvala, and Acacia senegal.

5.2. Habitat-Specific Patterns

1. Riverine/Aquatic zones: Host nearly 21% of regional medicinal plant diversity, including rare (e.g., Capparis decidua) and abundant (e.g., Eclipta prostrata) species.

2. Sand dunes and uplands: Home to hardy xerophytes such as Calotropis procera, Cassia angustifolia, and Prosopis cineraria.

3. Hilly tracts (Aravalli outliers): Harbor distinctive floristic elements like Mangifera indica, Acacia tortilis, and Justicia adhatoda.

6. Ethnomedicinal Knowledge and Usage

Communities of Shekhawati demonstrate extensive indigenous knowledge, employing herbs, shrubs, and tree components for the treatment of ailments ranging from fevers and skin diseases to digestive disorders and wound healing.

1. Remedies for **fever, cough, jaundice:** Using Justicia adhatoda, Ocimum sanctum, and Andrographis paniculata.

2. Wound care and infections: Eclipta prostrata, Calotropis procera, and Aloe vera are commonly used.

3. Ethnoveterinary medicine: At least 20 species serve in livestock medication, reflecting the agro-pastoral economy.

Medicinal knowledge is traditionally transmitted orally, primarily through women, healers, and elderly community members.

7. Conservation, Threats, and Management

7.1. Conservation Status

Despite documented diversity, many medicinal plants are now restricted to protected sites—sacred groves, temple lands, and private farms—due to anthropogenic pressure. Some species are locally classified as Rare (R), Frequent (F), Common (C), or Abundant (A), reflecting decline in habitat range (e.g., Capparis decidua—Rare; Eclipta prostrata—Abundant).

7.2. Threats

Key challenges include:

1. Overgrazing by livestock
2. Erosion and desertification
3. Unsustainable fuel and fodder collection
4. Urban expansion and agricultural intensification
5. Loss of traditional knowledge with sociocultural change

7.3. Sustainable Practices

Local conservation occurs through:

1. Designation of sacred groves ("orans")
2. In situ protection in temple lands
3. Community-based restoration projects
4. Revival of indigenous seed banks and transmission of cultural lore

8. Analytical Discussion

8.1. Spatial Trends

Analysis indicates:

1. Higher species concentration in less-disturbed village groves and hilly zones
2. Progressive scarcity in intensively farmed or urbanized areas
3. Seasonal fluctuations in presence/abundance, with many herbs emerging post-monsoon
4. Human-managed groves serve as biodiversity reservoirs

8.2. Ecological Factors

Distribution is modulated by:

1. Soil type (deep sand, shallow gravels)
2. Water availability (proximity to ephemeral streams, "tals")
3. Protection from grazing and fire
4. Altitude and exposure (south-facing slopes tend to be drier and less vegetated)

8.3. Socio-cultural Interactions

Medicinal plant richness is directly related to the strength of local tradition and stewardship. Ritual practices, festivals, and belief in plant spirits often ensure the selective protection of key species.

9. Conclusions and Recommendations

Shekhawati's arid landscapes are a significant reservoir of medicinal flora, embedded within complex ecological and socio-cultural networks. The distribution of such plants is neither random nor uniform but reflects the interplay of environmental gradients, conservation practices, and traditional knowledge systems.

Preservation of this invaluable resource necessitates:

1. Documentation and safeguarding of traditional ethnobotanical knowledge through community-led efforts.
2. Sustainable harvesting strategies and restoration of degraded habitats.
3. Strengthening of protected areas and institutional support for medicinal flora conservation.
4. Inclusion of local stakeholders in biodiversity management at all levels.

The folk wisdom with modern scientific research will ensure the continued viability of Shekhawati's medicinal plant heritage for generations to come.

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