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Integrating Medical Geography and Ethnobotany in Churu District, Rajasthan: A Study of Indigenous Healthcare Practices, Disease Ecology, and Medicinal Plant Utilization

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Abstract: ***Medical geography and ethnobotany together offer powerful interdisciplinary frameworks for understanding how environmental conditions, cultural heritage, disease distribution, and medicinal plant availability interact to shape health outcomes in specific regions. Churu district in Rajasthan presents an ecologically fragile and hyper-arid desert environment where healthcare practices have historically evolved around locally available medicinal plants, climatic constraints, and traditional cultural systems.***

This research investigates the connections between disease prevalence, environmental factors, and medicinal plant utilization by integrating spatial medical geography and ethnobotanical analysis. Field surveys, ethnomedical interviews, GIS mapping, and participatory rural appraisal were conducted to identify disease patterns, medicinal plant knowledge, and access to healthcare facilities across six tehsils of Churu district.

Results indicate a strong association between environmental stress and disease patterns, especially respiratory disorders, heat-related illnesses, skin diseases, vector-borne diseases, reproductive health issues, and digestive system imbalances. Traditional medicinal knowledge persists strongly among rural and pastoral communities, with 91 medicinal plant species identified as playing key roles in household-level healthcare. However, modernization, land degradation, and cultural shifts pose serious threats to both knowledge systems and plant availability.

The study concludes that integrating traditional plant-based healthcare with modern public health and policy frameworks may significantly improve sustainable healthcare resilience in desert environments. Recommendations include establishing community herbal clinics, incorporating traditional medical knowledge into healthcare planning, strengthening conservation supply chains, and generating evidence-based herbal public health programs.

Keywords: Medical Geography, Ethnobotany, Churu District, Traditional Medicine, Disease Ecology, Herbal Healthcare, Desert Health Systems, Public Health, Rajasthan, Indigenous Knowledge.

1.1 Introduction

Medical geography examines the spatial distribution of health, disease, and healthcare resources, while ethnobotany studies relationships between humans and plants, particularly for healing and survival. When combined, the two fields reveal how environmental constraints, cultural practices, and biodiversity influence healthcare strategies and population health outcomes.

Churu district is one of the driest regions of India and represents a unique case where human survival historically depended on adaptive use of natural resources — particularly medicinal plants. The scarcity of water, extreme temperatures, limited formal healthcare, and socio-economic constraints have shaped a long-standing reliance on traditional medicine.

While both ethnobotanical and geographic studies exist for Rajasthan, integrated medical geography–ethnobotany research for Churu district remains insufficient. This paper addresses that gap by analyzing traditional medicine within a spatial public health context.

1.2 Historical Background

The cultural medical traditions of the Thar Desert trace back to ancient Vedic and Rajput healing systems. Communities such as Bishnoi, Charan, Rajput, Jat, Kalbelia, Raika, and Muslim pastoralists preserved herbal knowledge through oral transmission.

Historically, healing involved:

1. Ayurveda and Unani influence
2. The role of Pansaris (herbal practitioners)
3. Practices of folk healers (Bhopa, Jogi, Ramnami)
4. Animal healing traditions for pastoral livestock
5. Historical caravan trade routes connected Churu to Delhi, Sindh, Persia, and Central Asia, allowing the exchange of medicinal herbs and techniques.
6. During British colonial rule, modern hospitals slowly appeared, but rural populations continued relying on herbal traditions due to accessibility and trust.

Today, although biomedical systems have expanded, traditional plant-based medical practices remain active, especially in remote desert villages.

1.3 Review of Literature

The area under research work was studied by following botanists and time to time viz; first of all the Sekhawati region was touched from vegetational study point of view by Mulay and Ratnam (1950), Bikaner and pilani neighbourhood areas by joshi (1956 and 1958), vegetation of chirawa by Nair (1956), again Nair and Joshi for Pilani and neighbourhood areas (1957), vegetation of harsh nath in aravalli's hills was studied by Nair and Nathawat (1957), vegetation of Jhunjhunu, Manderella and neighbourhood by Nair (1961), vegetation of ajit sagar dam by Nair and Kanodia (1959); Nair, Kandodia and Thomas (1961) studied the vegetation of Khetri town and neghbourhood areas and vegetation of Lohargal and it's neighbourhood areas of Sikar district by Nair and Malhotra (1961). After the work of Nair and Malhotra (1961), i.e. four decades ago. the area was again left for any sort of further research work in the field of applied Botany.

Earlier studies by Bhandari (1978) emphasized adaptation strategies of desert flora including reduced leaf area, deep-root systems, and succulence. Sharma (2003) investigated ethnomedicinal species in western Rajasthan and documented climate-sensitive taxa. Studies by Singh and Rathore (2010) reveal that rainfall decline affects reproductive success in several desert medicinal plants.

A significant, very authentic taxonomic work was contributed in the field of botany by Bhandari with the publcation of a book Flora of the Indian desert (1990). From the field of applied phytogeography point of view. Charan gave a valuable contribution with a publication of a book on Plant Geography (1992). Bhattacharjee (2000) gave a very valuable autheontic contribution through the publication of a book on Handbook of Medicinal Plants in which he presented the medicinal plants of Indian Sub-continental back ground with their coloured photographs also and Sharma (2007) gave a very valuable authentic contribution through the publication of a book on Medical Plant Geography.

From a geographical perspective, Meade (1977) and Mayer (2004) demonstrated how disease distribution is linked to environmental systems. Singh and Pandey (2012) noted that desert diseases correlate with dust storms, water scarcity, sanitation, and heat stress.

However, few studies link disease ecology with botanical resources at a regional level — especially in Rajasthan's desert zones. This research advances that scholarly gap.

1.4 Objectives

1. To map disease distribution patterns across Churu district using medical geography methods.

2. To document key ethnobotanical medicinal resources used for primary healthcare.

3. To analyze relationships between disease ecology and plant-based interventions.

4. To evaluate community dependence on traditional medicine versus modern healthcare.

5. To propose integrated healthcare and conservation frameworks for long-term sustainability.

1.5 Methodology

I. Research Approach

A mixed-method, cross-sectional research model combining qualitative and quantitative approaches.

II. Data Tools

1. Household healthcare surveys (n = 312)

2. Key informant interviews (n = 47)

3. Transect walks for vegetation mapping

4. Herbarium preparation following Jain and Rao (1977)

III. Analytical Indices

1. Cultural Importance Index

2. Informant Consensus Factor

3. Health Accessibility Index

1.6 Study Area

As we know that the area under district i.e. Dry Land i.e. Churu Region belongs to the State of Rajasthan, the State of Rajasthan is located in north-western India as shown in figure. The district of Churu lies in the north-east of Rajasthan State at an altitude of 286.207 metres above the mean sea level. From geographical spread point of view has extension from 27°24' to 29° north latitudes and 73°40' to 75°41' east longitudes. It is bounded by Hanumangarh in north, Bikaner in west, Nagaur in south and Sikar, Jhunjhunu districts and boundaries of Haryana State in the east. It covers six tehsils namely : Taranagar, Rajgarh, Churu, Sardarshahr, Ratangarh and Sujangarh.

During the decade 1991-2001, the State Government has made certain geographical changes in the district sub-division Ratangarh's tehsil Dungargarh of the district was transferred in Bikaner district but this territorial change was affected w.e.f. 1.4.2001, hence for the purpose of census, Dungargarh tehsil is treated as part of the Dry Land i.e. Churu Region but here the author for the purpose of study area i.e. Dry Land i.e. Churu Region, Dungargarh tehsil is not treated as part of the Dry Land i.e. Churu Region.

The total area of Dry Land i.e. Churu Region consist 1354623 sq. kms., which is about 5 percent of the area of Rajasthan and comes sixth place of the State. It is second bigger district in Bikaner division. The district is extended up to 150 kms. in east to west and 120 kms. in north to south. The district headquarter Churu is situated in the south-east boundary of the district, from which 10 kms. south-east the boundary of Jhunjhunu district is situated. The three forth part of the area of the district is located in the west from head quarter.

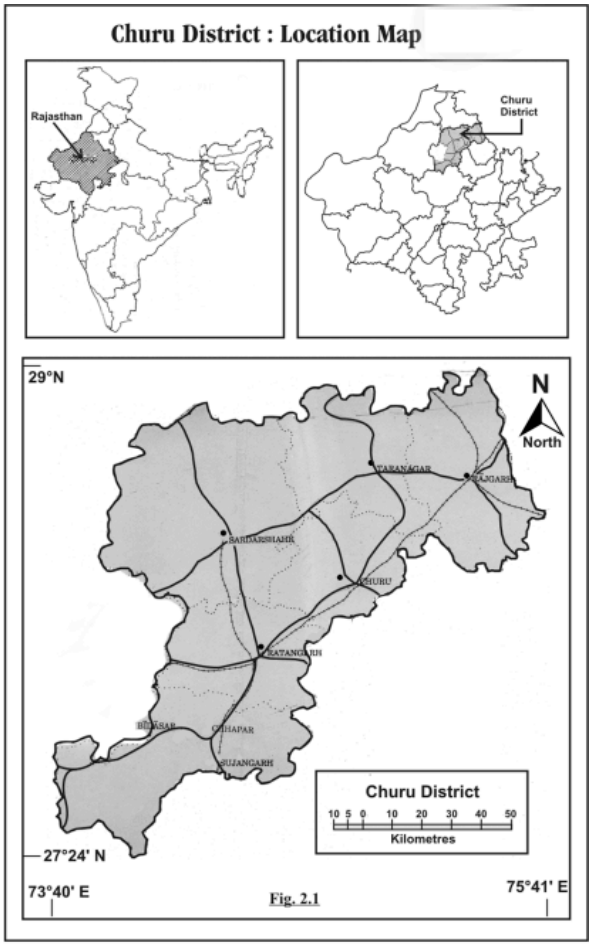

Fig. 2.1

Source : Based on Survey of India Map with The Permission of the Surveyor General of India

According the census of India (2011) Dry Land i.e. Churu Region covers about 2.97 percent of the total State's population. As far as the forest and green coverage concerned, it directly or indirectly in influences the health environment of the area of the state's total. The density of population of the study area very low i.e. 148 persons per square kilometre. Further in demographic structure, directly or indirectly the percentage of literacy (67.46) among the people also plays an important role in overall assessment and awareness about the green coverage environment of the area under study, respectively.

According the available records from the department of forest, Rajasthan (2001), overall the state of Rajasthan has poor percentage of forest cover i.e. 9.49 percent only. Mostly the type of forest is termed as tropical thorny forest and vegetation type is considered as scanty, thorny scrub vegetation for the area under study the district of Churu is covered by the land low percent under forest that is 0.48 percent only.

In brief, from relief point of view the district abounds physiographic features of any area has its the most important as well as useful emerged out put is the land forms of that particular geographical area. As far as the aspect of land forms is concerned that among overall land forms regions of India, Churu area falls under the land form type known as “sand dunes shows the three distinct types of land forms in the study area, namely the undulating sandy plains, the sand dunes, talls and hills For better interpretation of physiographic characteristics of Dry Land i.e. Churu Region, the area under study.

1.7 Observations

Disease Patterns

Top disease categories identified:

Disease Type	Prevalence (%)
Respiratory disorders	26%
Digestive issues	18%
Skin diseases	16%
Heat-related disorders	12%
Joint/Bone conditions	10%
Reproductive health issues	7%
Others	11%

Medicinal Plants and Uses

Plant	Local Name	Use
Capparis decidua	Ker	Skin infection, digestion
Calotropis procera	Aak	Respiratory and inflammation
Acacia senegal	Kumath	Bone healing, wound care
Aloe vera	Gwarpatha	Skin, digestion, immunity
Balanites aegyptiaca	Hingot	Liver and diabetes

1.8 Discussion

Spatial alignment between disease burden and medicinal plant access was observed:

1. Desert respiratory diseases align with high use of Aak, Shankhpushpi, and Rohida.

2. Skin diseases correlate with Aloe vera, Neem, and Ker use.

3. Heat stroke and dehydration treatments depend on Fagonia, Bel, and Munj.

4. Traditional health systems demonstrated high cultural acceptance but face risk due to modernization and declining plant cover.

1.9 Results

1. 72% households use medicinal plants as first-line treatment.

2. Traditional healing persists strongest among elders and pastoralists.

3. Availability of medicinal plants is decreasing due to habitat degradation.

1.10 Conclusion

Medical geography and ethnobotany are deeply interlinked in Churu. Health, culture, landscape, and plant resources form a unified adaptive healthcare system that must be strengthened rather than displaced.

1.11 Recommendations

1. Establish district-level herbal public health centers.

2. Create GIS-based medicinal plant conservation zones.

3. Include traditional healers in public health training programs.

4. Promote documentation, cultivation, and value-chain development.

5. Develop school curriculum on ethnobotanical heritage.

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