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A Methodology for the Determination of the Boundaries of the Micro-Physiographical Geographic Region

Dr. Kuldeep Singh
Associate Professor of Geography, Government College, Hisar, Haryana, India

ABSTRACT
A new school of regional scientists has recently become interested in the precise demarcation of geographical areas. The research methods employed by these indigenous experts are empirical, interdisciplinary, analytical, and quantitative. Similarly, this study has made strides toward its goal of providing a regional theoretical framework that will facilitate the practical search for regional imbalance treatments by its delineation of micro-physiographical zones for the district of Jaisalmer. To that end, this article seeks to chart the ascendancy of the micro-level planning zone idea. Using a superimposed method, the district has been divided into three distinct physiographic zones that can be used as a single research unit to compare and contrast the various stages of economic development in the different parts of the territory.

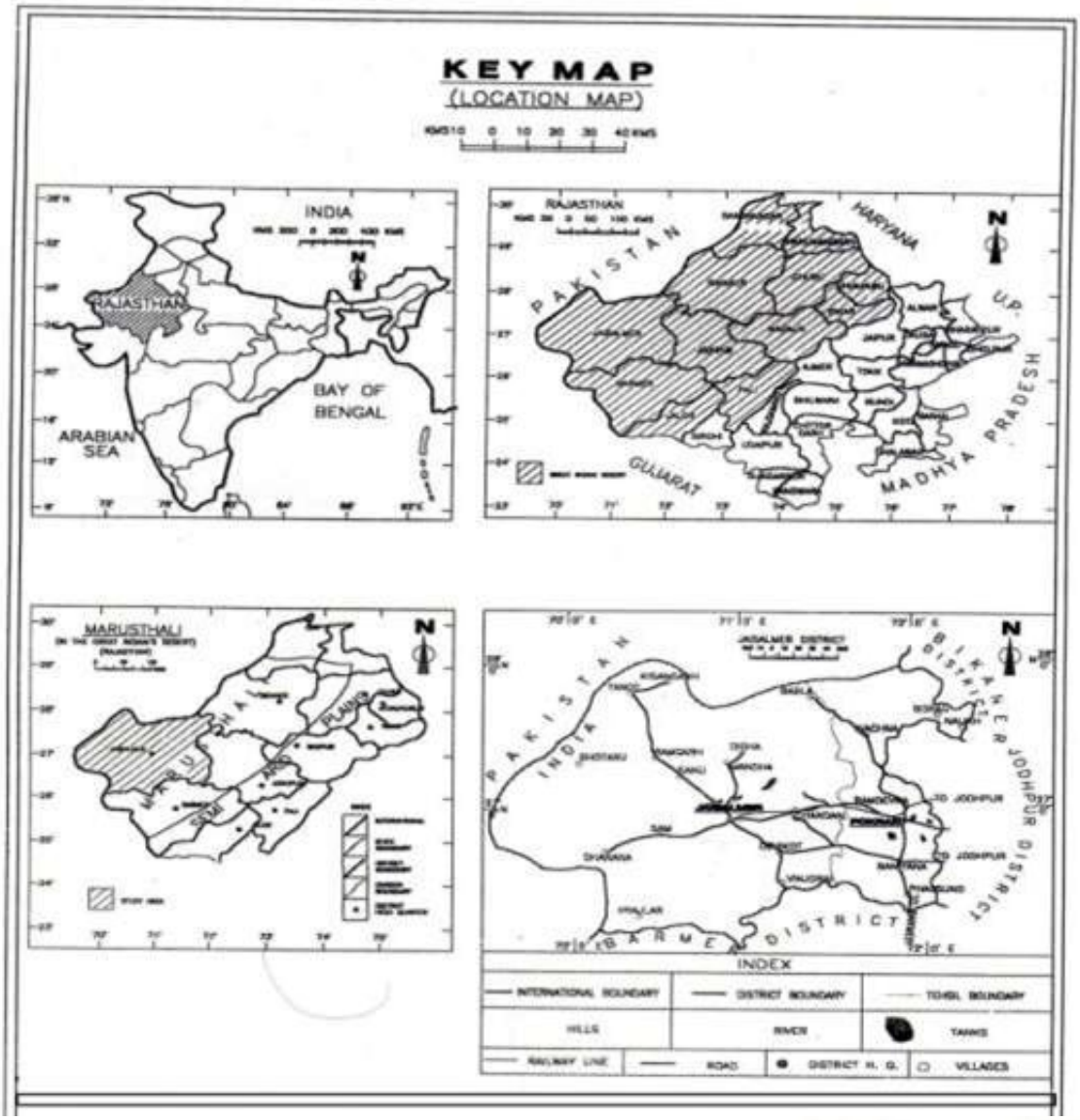
Keywords: *Superimposition Technique, Regional Scientists, Micro-Physiographical Region*

1. INTRODUCTION
Governments and planners are now advocating micro-regionalization as a way to manage local resources, boost economic growth, and share basic infrastructure. To facilitate better regional planning and economic growth, India has defined its regions. Natural regionalization is based on factors such as geology, soil type, climate, and physical geography. The district-level delimitation of micro-physiographical regions aims to establish a plan for micro-level areas according to physiographic features and to maximise the utilisation of local resources. To be more precise, a region is a geographical entity with distinct limits based on the most basic of elements: space. As geo-socio-economic factors are merged and considered at the regional level, micro-geographic regions are formed. Each of these micronations is based on the principle of areal homogeneity.. There are large gaps in development among regions in India. The uneven and unplanned nature of development is largely to blame for these discrepancies. Development should follow a hierarchical structure, beginning at the top and working its way down to the ground. If change reaches the people on the ground, these inequalities can disappear everywhere. Recently, governments have been focusing on the aforementioned topic. Governments are attempting to build micro-regions in order to accomplish this comprehensive growth. Parameters from fields like geomorphology, geology, climate, soil, resources, etc. are used in this endeavour. The construction of these micro-regions is driven by a desire to achieve sustainable and economically stable growth. Improving regional planning methods is also a priority. This study seeks to define a micro-physiographical region in order to facilitate efficient regional planning at the district level. Geography, society, and the economy all play a role in the emergence of these localised ecological niches. Areal homogeneity is a feature shared

STUDY AREA
Jaisalmer is a district in western Rajasthan. The area is located at a longitude of 69°29' east, a latitude of 26°01' north, and a latitude of 28°02' north. It covers 38401 square kilometres, is home to 672008 people (as of the 2011 census), and is divided across 518 separate municipalities. Seventeen persons are concentrated in every square kilometre of this region. In the decade from 2001 and 2011, its population increased by 32.22 percent. There are 849 women for every 1000 men in the district, and the literacy rate is 58.04 percent.

This section of the Great Indian Desert is a sizable part of the so-called "Marusthali." Mostly rocky wasteland and brown sand from the "Thar" desert make up the undulating topography of the district. It is unforgiving to living things due to its sandy, dry, and inadequately irrigated nature. To the west of the sloping plains are the Indus Valley and the Run of Kutch. The landscape is covered by rolling sand dunes. Extreme temperature changes, sporadic precipitation, and a dry climate characterise this region.

RESEARCH ZONE MAP



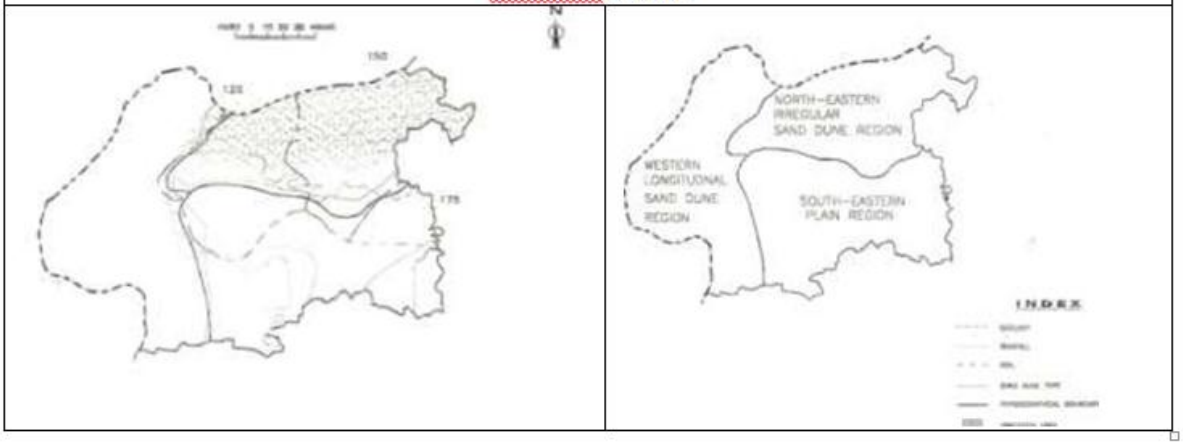
2. DISCUSSION AND THE RESULTS

We identified physiographic units with strikingly comparable distributions of these traits by correlating and analysing data on land quality throughout the area. Each area has its own set of challenges and possibilities due to its own geomorphology, soil, land capacities, vegetation, surface and subsurface water, land uses, and so on.

The region's geological formation is both old and intricate. Before the Eocene epoch, this area was under water. Eocene, Abur, Parihar, Badsar, Baisakhiand, and Lathi horizons make up the geological sequence of the district, as reported by the Geological Survey of India. A blown sand and rocky waste formation predominates throughout the region, with some undulating hills thrown in for good measure. Towards the Indus Valley and the flow of kutch to the west, the district's topography falls. Sand ridges usually go in a direction that's perpendicular to the wind. The soil in this area is extremely diverse given its dry environment. The predominant soil types in the area are orthids, orthids-orthents, psamments, and psamments-orthids. Precipitation declines drastically from the southeast to the northwest, averaging only 14.17 centimetres annually. The tropical thorn forest of which it is a part.

The approach for defining a physical area is based on a concept borrowed from cartography: the superimposition of several girdles that represent distinct physical features. When laid on top of one another, the limits for things like relief, forest, slope, soil, drainages, sand dune type, and rainfall all seem like they make sense.

MAP 2. *Micro- Level Physiographical Regions*



In this area, three distinct physiographic zones have been identified, and their boundaries have been delineated using the superimposition method. The following is an analysis of their qualities and attributes.

1. Western Longitudinal Sand Dune Region
2. North Eastern Irregular Sand Dune Region
3. South Eastern Plain Region

Table1. Micro-Physiographic Regions of Jaisalmer District

Physiographic characteristics	Western Longitudinal Sand Dune Region	North Eastern Irregular Sand Dune Region	South Eastern Plain Region
Geographical area	14856 sq. km.	9931 sq. km.	13624 sq. km.
No. of Villages in the region	124	64	330
Geology	Alluvium and blown sand, Eocene formations, about beds	Alluvian & blown sand	Jurasic formation, malanirhyolite, jalor and siwan aranite, Jaisalmer limestore
Soil	Psamments-orithids, light yellowish brown to reddish brown, coarse textured soil	Orthids and psamments, sandy loam to loam gravelly soils	Psamment-orthids and orthids orthents sandy loam to classy loam medium texture soil.
Drainages on water resource	Almost no potential very high potential	Tanks, nadis. Khadeen and IGNP	Inland drainage channels, kathi bhadasar and pare war aquifers
Rainfall (annual normal in cm.)	0 to 5	12.5 TO 17.5	15 to 20
Population (census 2011)	68896	81364	521748
Density	5	8	38

Western Longitudinal Sand Dune Region

In the northwest of the district is the Western Longitudinal Sand Dune Region and the international border with Pakistan. Sand barchans and sand streaks move through a lengthy, uneven, sandy desert landscape. The underlying geology is an alluvial sand formation that is quite recent or sub-recent in age. Gritty and utterly barren, the soil in such places is unfit for human or animal cultivation. Due to its low precipitation levels (between 0 and 5 cm annually), the region suffers a severe water shortage. Due to its physical condition, the land is not suitable for human

occupancy. It's devoid of a major city and even the locals tend to be on the larger side. There are 124 settlements spread across the 1486 sq. km. at issue here. The population density in this region is 5.0 people per square kilometre, with a total of 688968 residents as of the 2011 census. Villages are typically located in the interdune zones, and the population centres tend to be spread apart. It's generally dry and sandy, therefore there isn't much water there. Because of this, the region's infrastructure, particularly its transportation system, has not progressed as well as it could have. Here you'll find the most southern portion of the Nagaur district. While the Luni River does make its way into a small section of the southern Nagaur region, there are no other perennial rivers in the area. Near the village of Ladpura in Nagaur district, the river's journey begins in the Ajmer hills (Nag Hills); after about 30 kilometres (km), it makes a sharp turn to the south and flows into the Pali district. There are many aquifers beneath the sandy riverbed, which the river takes advantage of when pumping water. The area's drainage is at its densest to the south of the Aravalli Hills in the east, and it thins out gradually to the west.

As you go closer, you can make see the region's a few subtle elevation differences. The geology, soil, water table, flora, and human usage of the land have all changed throughout ages, as has the topography. Fossils discovered at Jaisalmer suggest that the region west of the Aravallis, now a part of Rajasthan, was formerly submerged under an arm of the Arabian Sea (Akal Wood Fossil Park). As a result, it's plausible that the salt lakes in Sambhar and Didwana are the genuine remains of the ancient sea. About half of the total land area of the district may be found in this section. The incline is rather mild and extends from north to south. Eastern areas around Kuchaman, Budsoo, Bhinchawas, and Manana, however, have a slope that ranges from 2 degrees to 5 degrees as a result of sand deposition on the hills and the piedmont plains. From the areas of Mundawa and Kuchera and Nimbri and Patri Jodha and Khajwana, the rest of the continent is one large, flat plain.

Throughout the year, the predominant south-east winds have a straight line of sight to the vast sand expanse to the south-west and north-east. North of the Jodhpur-Phulera train line is where you'll most likely find the Aeolian sand plains.

North Eastern Irregular Sand Dune Region

This part of the district can be found in the northern part of the city. In the north, the area shares a border with Pakistan, while in the east, it is bordered by the districts of Jodhpur and Bikaner. A lot of the landscape is made up of windblown sand and alluvium. Desert sand dunes and rocky terrain characterise this area. Annual precipitation ranges from 112.5 to 17.5 centimetres. Increases in the coefficient of variation are accompanied by decreasing precipitation from east to west. The Indira Gandhi Canal is called the "lifeline" of the area. Presently, irrigation systems cover the vast majority of the area. The majority of the tehsils of Jaisalmer and Pokran are included in this region. The land area of all 64 settlements adds up to 9931 km2. There are 8,1364 residents in the area, giving it a population density of 8.0 people per square kilometre. Ramgarh is an important town since it sits on the main route between Jaisalmer and the nearby city of Mohangarh. Cities like Nachna and others with equal or greater importance. The availability of irrigation facilities from the Indira Gandhi Canal contributes to the area's propensity for rapid economic growth.

South Eastern Plain Region

The district's most important area is the South Eastern Plain. It occupies the southeast corner of the district and borders both Barmer and Jodhpur to the south and east. Jurassic rocks including Jalor and Siwan granite, Jaisalmer limestone, and malani rhyolite may be found in the vicinity. Soil is a mix of sandier loams and clayier loams (psamment-orthids and orthids-orthenls) and has a medium texture. The average annual rainfall in this area varies from 15 to 20 centimetres. Gugri, Sukri, and a number of other seasonal rivers flood this region every rainy season before rapidly disappearing again. Dry saline waste water bodies can also be found in the region's eastern and northern parts. There are 330 populated areas in this area that encompasses the southern tehsils of Pokran and Jaisalmer and has a total area of 13624 square kilometres. There are 521748 residents, making the population density here 38 people per square kilometre. This part of the district is more advanced in terms of transport and communication than others due to the presence of both rail and road infrastructure. Jaisalmer and Pokran are well-connected cities. In close proximity to Jailasmer, the railway comes to a stop, and National Highway 15 then heads south.

3. CONCLUSION

When used at the local level, micro physiographic regionalization may be a powerful tool for advancing regional policy goals. Important in the development of

geographical hierarchy, spatial interactions convey relationships between geographical areas. This research empirically examines the processes that lead to the development of local and sub-regional physiographic regions. As a result of this research, a physiographic regionalization map was produced, and Jaisalmer was divided up into many different micro-physiographic zones. The primary goal of this research is to combine data from the Geological Survey and the Meteorological Department in order to create a super imposed cartographic approach that can be used to demarcate micro- physiographic zones in the Jaisalmer area. Application of a technique for delimiting micro-physiographic zones based on the geographical distribution of different components would provide the theoretical foundation. Finally, an evaluation of the region's demographics and economy must precede the adoption of any boundaries. This will be useful for determining the degree to which different industries have progressed toward improvement. Taking the right strategy also allows for regional-scale integrated area development.

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