IAMJ

INTERNATIONAL AYURVEDIC MEDICAL JOURNAL

Review Article ISSN: 2320-5091 Impact Factor: 6.719

CONCEPT OF DESHA IN AYURVEDIC CLASSICAL TEXTS: AN EFFORTS TO GEO-GRAPHICAL MAPPING USING MODERN TECHNIQUES AND DATA

Richa Ojha[1], **Ashutosh Kumar Yadav**[2], **Bikash Kumar Pandey**[3]

[1]Asst. Professor, Deptt. of Rasa Shastra &Bhaishjya Kalpna, COER Ayurvedic Medical College & Hospital, Haridwar Road, Roorkee.
[2]Associate Professor, Deptt. of Rachana Sharir, All India Institute of Ayurveda, Sarita Vihar, New Delhi.
[3]Ph. D. in Geography, Geography Department, J. P. University, Chhapara, Bihar.

Corresponding Author:nirjara.richa@gmail.com

https://doi.org/10.46607/iamj1512022024

(Published Online: February 2024)

Article Received:13/01/2024 - **Peer Reviewed:** 06/02/2024 - **Accepted for Publication:** 13/02/2024.

Check for updates

ABSTRACT

Objectives: This study aims to map each census district of India using the concept and classification of Desha available in classical Ayurvedic text using modern techniques and tools. **Method**: Rainfall, as well as Potential Evapotranspiration data obtained from WRIS (IMD Grid), was mapped using GIS software, and the district wise average was calculated for the value of the Raster layer obtained by IWD Interpolation and Moisture Index with the formulae of Thornthwaite and Mather and simplified by Venkat Raman & Krishnan was calculated. Every district was assigned to a particular class based upon the analogy of Aridity they had using a classification proposed by Reddy & Reddy in 1973. **Result & Conclusions**: The overall average Moisture Index for India is -3.43, which placed the country into the class of *Anupa Sadharan Desha*. At the same time, it has been observed that approximately 59% of the total geographic areas fall under the class of *Jangal* and *Jangal Sadharan Desha*. The western coastal area, north-eastern states, Suderban and Kaveri Delta, as well as the Himalayan Biosphere region, form part of *Anupa Desha*, while Rajasthan to Kutchh falls under the category of *Jangal Desha*.

Keywords: *Desha, Climatic Division, Ayurveda, Concept of Desha*

INTRODUCTION

The word "*Desha*" is defined as a geographical extent under which a phenomenon described in the classical text, e.g. in *Kalpsthanam* of *Charaksamhita*, has some degree of uniformities and shares some of the uniform features, as the availability of surplus water, etc.

Desha in Ayurveda is an important aspect while concluding drug administration regime and suggesting diet plans, as it is among four *Satmyata*. *Desha* is also included in tenfold examination parameters while examining patients, as *Desha* is described as *Adhikarana* of disease by *Acharya Charaka*. *Acharya Charaka* while describing importance of *Desha* in diagnosis as well as treatment plans, insisted that body as well as land from where patients belong both are known as the *Desha* , which implicates the coherence between land and body. *Charaka* elaborated that examination of the land and environments as whole are important for the complete knowledge of the patients, as well as drugs to be administered. The process of examination involved where the patients were born, where they have grown up, where they are living and what are the environmental factors which are affecting their well-being. These all aspect basically provides a complete basis to evaluate and to prescribe the dietary chart as well as to suggest routine to the patients to obtain a complete possible coherence between body and Land. [1] *Acharya Charaka* and other *Acharya's* as well attributed some of the basic *Doshas* in accordance with the types of *Desha* and have also suggested some of the dietary and other coherence to be obtained.

Concept of *Desha* is ascribed mainly by *Charaka*, *Shushruta* and *Vagbhat* and broad categorizations of Desha are as follow:

1. ***Jangal Desha*** :- According to the *Charaka* main characteristics of the *Jangaldesha* is there open and clear sky, visualization of mirage on the surface, and dry, rough and sandy appearance of the soil surfaces.
2. ***Anup Desha*** :- The rivers originated from this country are flows to the ocean, presence of the fresh wind is the main characteristics of this *Desha*. This is super rich *Desha* in terms of the biological diversity.
3. ***JangalSadharan Desha*** :- Having attributes of *Jangal* as well as *Anupa Desha* while oriented primarily towards the attributes of *Jangal Desha*.
4. ***Anupa Sadharana Desha***: Having attributes of *Jangal* as well as *Anupa Desha* while oriented primarily towards the attributes of *Anupa Desha.*

The concepts and geographic attributes of the *Jangal*, *Anup* and *Jangal Sadharan*& *Anupa Sadharan Desha* are being tabulated in Table-1.

Table-1

Sr.No.	Name of the *Desha*	As Per Charaka[2]	As Per Shushruta[3]	Ashtang Sangraha [4]
1.	Jangal Desha	Open Sky, Forest have trees like Kadar, Khadira, Asana, Ashwakarna, Dhava, Tinisha, Shalaki, Shami, Amla etc, Dry wind, Soil with Sands, gravels are present.	Low level of rainfall, thorny plants and trees, less water and forest, clear sky etc.	Land with Sands and Gravels, dry and scarce land, land with less availability of water, deep ground water table etc.
2.	JangalSadharan Desha	Described as Sadharana Desha, having Creepers, Vanaspati, Vanaspatya, Birds and Animals like both Desha.	Having mixed features of both Desha.	Having mixed features of both Desha while primary attributes are oriented towards Jangal Desha.
3.	Anupa Sadharan Desha			Having mixed features of both Desha while primary attributes are oriented to-

				wards Anupa Desha.
4.	Anupa Desha	Having Dense Forest of Trees like *Hintal, Tamala, Narikela, Kadali* etc, rivers flow up to oceans, cold wind, birds like *Hamsa, Chakravaka, Balaka, Nandimukha, Paundrika* are present here.	Have plenty of water, river as well as rainfall is abundant, breeze is soft and cold, Big Mountains and trees, ground water aquifer is rich etc.	Cold breeze, mountains, abundance of rivers and ponds, green grasses and aquatic fauna/flora are present, etc.

This study is intended to map various type of *Desha* and attribute each Census District of India to a particular class based on the hypothesis that the concept of *Desha* could be interlinked with the climatic region of India. India climatic division has been made on several approaches and models. But one which suited more for the above is climatic categorization based on the Thornthwaite approach, which used the Aridity Index/Moisture Index as the base of classification. Since concept of the *Desha* are also more or less primarily relied on the availability of water surplus on that particular geographical extent and reflects states of Aridity. Apart from the above Moisture Index also reflects types of Flora/Fauna prevalent in that area.

Material & Methods: Annual average Moisture Index of a place could be ascertained using the formulae given by Thornthwaite and Mather and simplified by Venkat Raman & Krishnan [5]:

$$MI = \frac{P-PE}{PE} * 100$$

Where MI = Moisture Index

P = Annual Average Rainfall

PE = Potential evapotranspiration

The moisture Index of a place corresponds to the humidity or aridity in that area. Positive values implicate availability of water surplus or humidity while negative values implicate degrees of aridity that particular area or geographic extent have[6].

Accordingly, climatic condition in the geographic extent during the time span from which set of values used in calculation pertains was classified by Reddy & Reddy in 1973 as follow[7] (Table-2):

	Table-2	
Value of MI	Climatic Zone	
<-90	Hyper Arid	
-90 - -80	Arid	
-79 - -56	Dry	Semi-Arid
-55 - -26	Wet	
-25 - 0	Dry	Sub Humid
0 – 20	Wet	
21 - 50	Humid	
>50	Very Humid	

Clearly, it may be deduced on above analogy that MI value less than (-)55 implicates non availability of moisture, while MI value more than 20 implicates availability of surplus moisture.

This may easily be correlated with the Concept of *Desha* as like availability of the surplus water is attributes of *Anupa Desha*, while scarcity is the attributes of *Jangala Desha*. A number of literary reviews describe *Jangala Desha* as Arid land while *Anupa Desha* as Marshy/Humid land.[8],[9],[10],[11]

Accordingly, keeping in view the above attributes of the different types of *Desha* following classification is proposed (Table-3).

Table-3

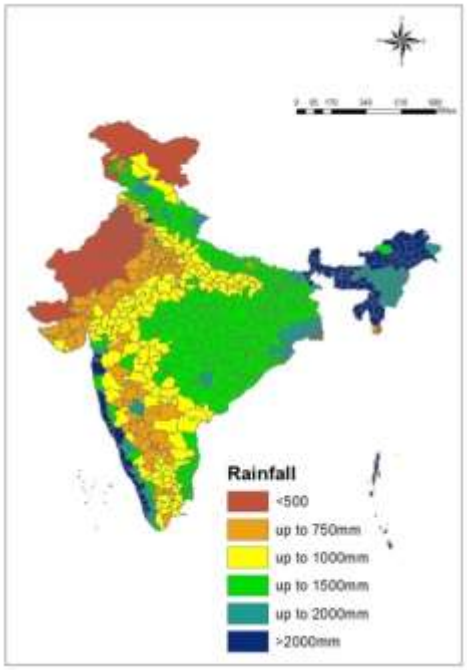
Value of MI	*Desha* Classifications	*Remarks*
<-55	*Jangal Desha (Hyper Arid/Arid Area/Dry Semi-Arid)*	*Since Aridity is the primary attributes of the Jangal Desha, and relative degree of MI implicates non availability of water in Soils.*
-55 - -26	*Jangal Pradhan Sadharan Desha (Wet Semi-Arid Area)*	*This range however has Aridity in great extent, but some degree of Moisture is available with higher degree of seasonal variability. In normal Sense it would be a Sadharan Desha, with attributes of Jangal Desha as primary components.*
-25 - 20	*AnupPradhanSadharan Desha (Dry/Wet Sub-Humid)*	*Having Mixture of attributes while a good degree of humidity surplus is available.*
>20	*Anupa Desha (Humid/Very Humid)*	*Humidity surplus is available.*

In an effort to Map above classification Potential Evapotranspiration (PE) of 1961-1995 with respect to 194 points located across the geographical extent and well distributed throughout Country are taken from the Sarma et al.[12] and directly brought to the Administrative Shape files of India, downloaded from Diva GIS, using Arc GIS 10.8 and Google Earth Pro in WGS 84 co-ordinate system and value of MI was placed in the corresponding attribute of the point features. The data obtained was interpolated using Spatial Analyst Interpolation tool, with Inverse Distance weighted average method as PE Data have less geographical variability. District wise mean PE values were also tabulated using Raster to Table conversion tool of Arc Map 10.8. Distribution of Mean PE interpolated value is mapped as reflected in Map-1.

Map-1: PE: District wise Mean Value.(Data Source Sarma et al.)[11.]

Rainfall data for the period of 1961-1995 is downloaded from the Water Resource of India (WRIS) web repository keeping IMD Grid data as data source for all states and District and average annual rainfall was calculated for the whole-time span.

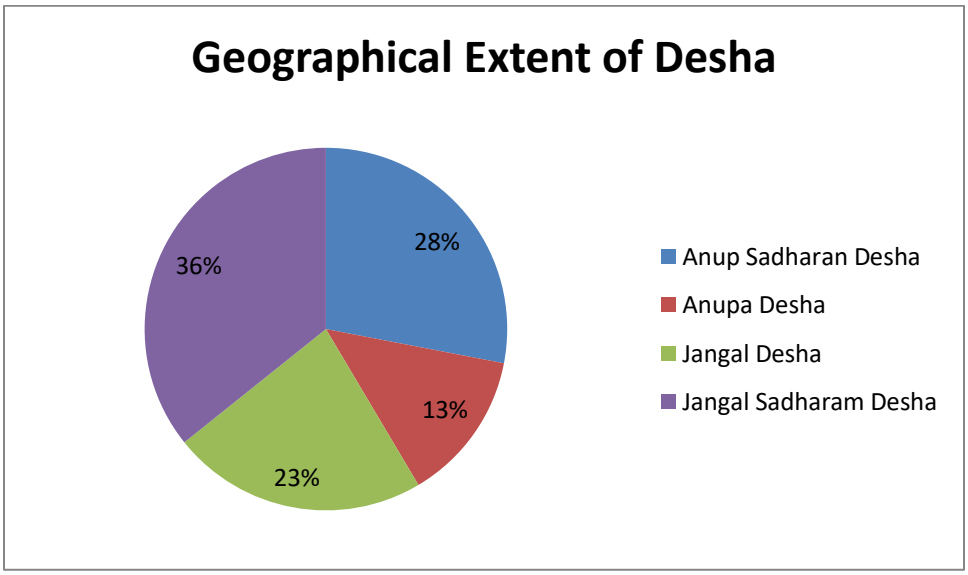
Rainfall data obtained was imported into the GIS and linked with PE data table with district polygon features. Based upon the available feature data, the Moisture Index for the period for all administrative districts was calculated. District wise Rainfall data obtained is mapped as Map-2 .



Map-2: District wise Average Rainfall in mm.
Data Source WRIS (IMD Grid Data 1961-1995)

Moisture Index values obtained so is used in classification of Desha. Each and every District of 2011 Census is placed in a group according to the classification proposed above using Arc Map 10.8.

Result & Discussion: Based upon the analysis made with above data it has been observed that more than half of the area of geographical extent of the Country falls under the category of *Jangal/jangalSadharan Desha*. Geographical pie shares of the different types of *Desha* may be visualized from the graph No.1.



Graph: 1

The average of Moisture Index for the whole country is (-) 3.43 which broadly reflect that if whole of the country is presumed to be a single unit, then it falls in the class of *Anup Sadharan Desha*. But keeping in the view the vast geographical extent of the Country this might be a generic term.

However, it might be a generalization to place whole administrative boundary at any extent under a single class, but efforts has been made to attribute Census Districts under a particular group keeping in the mind that availability of scientifically analysed data for Census Districts for the Concept of *Desha* may help *Ayurvedic* Practitioner and scholars while determining and assessing *Tridosha* and other aspect ascribed in *Ayurvedic* Texts.

Category wise and State wise count of the district falls under different *Desha* types are being placed in Table-4.

Table-4

Type of Desha	State Name	TotalDistrict
Anup Sadharan Desha	Arunanchal Pradesh	1
	Bihar	25
	Chandigarh	1
	Chhattisgarh	17
	Daman & Diu	1
	Gujarat	3
	Haryana	3
	Himachal Pradesh	9
	Jammu & Kashmir	7
	Jharkhand	23
	Karnataka	3
	Kerala	3
	Lakshadweep	1
	Madhya Pradesh	19
	Maharashtra	6
	NCT of Delhi	2
	Odisha	30
	Puducherry	4
	Punjab	4
	Tamil Nadu	7
	Uttar Pradesh	17
	Uttarakhand	4
	West Bengal	12
Anup Sadharan Desha Total		202
Anupa Desha	Andaman & Nicobar Island	3
	Arunanchal Pradesh	15
	Assam	27
	Bihar	2
	Dadara& Nagar Havelli	1
	Goa	2
	Gujarat	1
	Haryana	1
	Himachal Pradesh	3
	Jammu & Kashmir	5
	Karnataka	4
	Kerala	11
	Maharashtra	5
	Manipur	9

	Meghalaya	7
	Mizoram	6
	Nagaland	11
	NCT of Delhi	4
	Sikkim	4
	Tamil Nadu	1
	Tripura	4
	Uttarakhand	9
	West Bengal	7
Anupa Desha Total		142
Jangal Desha	Andhra Pradesh	2
	Daman & Diu	1
	Gujarat	13
	Haryana	15
	Jammu & Kashmir	7
	Karnataka	10
	Madhya Pradesh	1
	Maharashtra	6
	Mizoram	1
	NCT of Delhi	1
	Punjab	8
	Rajasthan	21
	Tamil Nadu	2
	Uttar Pradesh	2
Jangal Desha Total		90
JangalSadharam Desha	Andhra Pradesh	21
	Bihar	11
	Chhattisgarh	1
	Gujarat	9
	Haryana	2
	Jammu & Kashmir	4
	Jharkhand	1
	Karnataka	13
	Madhya Pradesh	30
	Maharashtra	18
	Mizoram	1
	NCT of Delhi	2
	Punjab	8
	Rajasthan	12
	Tamil Nadu	22
	Uttar Pradesh	52
JangalSadharam Desha Total		207

District wise categorization was extracted from the data output and being placed below in Table-5:

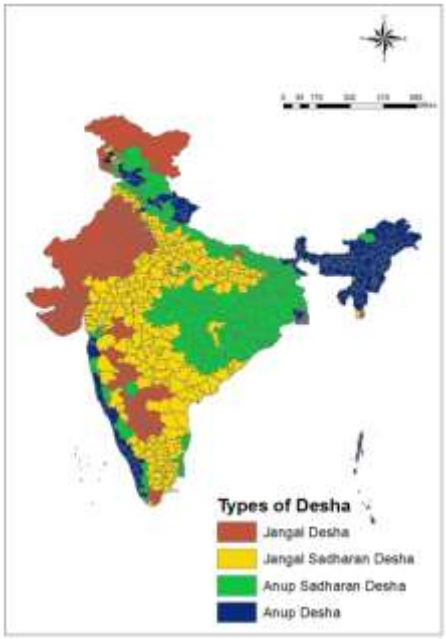
Table-5

Type of *Desha*	Name of District
Jangal Desha	Ahmadabad, Ahmadnagar, Ajmer, Alwar, Amreli, Anantapur, Bagalkot, Banas Kantha, Bandipore, Barmer, Barnala, Barwani, Bathinda, Bellary, Bharatpur, Bhavnagar, Bhilwara, Bhiwani, Bikaner, Bundi, Chikkaballapura, Chitradurga,

	Churu, Dausa, Davanagere, Dhule, Diu, Faridabad, Faridkot, Fatehabad, Firozpur, Gadag, Ganderbal, Gandhinagar, Ganganagar, Gurgaon, Hanumangarh, Hisar, Jaipur, Jaisalmer, Jalgaon, Jalor, Jamnagar, Jhajjar, Jhunjhunun, Jind, Jodhpur, Junagadh, Kachchh, Kaithal, Koppal, Kushinagar, Leh, Mahbubnagar, Mahendragarh, Mahesana, Mansa, Mathura, Mewat, Moga, Muktsar, Nagaur, North East, Osmanabad, Pali, Palwal, Patan, Porbandar, Pulwama, Raichur, Rajkot, Rajouri, Rajsamand, Rewari, Rohtak, Saiha, Samba, Sangli, Sangrur, Shupiyan, Sikar, Sirsa, Solapur, Sonipat, Surendranagar, Thoothukkudi, Tirunelveli, Tonk, Tumkur, Yadgir.
JangalSadharan Desha	Adilabad, Agra, Akola, Aligarh, Alirajpur, Allahabad, Ambedkar Nagar, Amravati, Amritsar, Anand, Ariyalur, Arwal, Ashoknagar, Auraiya, Aurangabad, Azamgarh, Badgam, Baghpat, Ballia, Banda, Bangalore, Bangalore Rural, Banswara, Bara Banki, Baran, Bareilly, Belgaum, Bharuch, Bhind, Bhojpur, Bhopal, Bid, Bidar, Budaun, Bulandshahr, Buldana, Burhanpur, Buxar, Chamrajnagar, Chandauli, Chhatarpur, Chitrakoot, Chittaurgarh, Chittoor, Datia, Deoria, Dewas, Dhar, Dharmapuri, Dharwad, Dhaulpur, Dindigul, Dohad, Dungarpur, East Godavari, East Nimar, Erode, Etah, Etawah, Farrukhabad, Fatehgarh Sahib, Fatehpur, Firozabad, Gautam Buddha Nagar, Gaya, Ghaziabad, Ghazipur, Gulbarga, Guna, Guntur, Gwalior, Hardoi, Hassan, Haveri, Hingoli, Hyderabad, Indore, Jalandhar, Jalaun, Jalna, Jaunpur, Jehanabad, Jhabua, Jhalawar, Jhansi, Jyotiba Phule Nagar, Kaimur (bhabua), Kannauj, Kanniyakumari, Kanpur Dehat, Kanpur Nagar, Kansiram Nagar, Kapurthala, Karauli, Karimnagar, Karnal, Karur, Kaushambi, Khammam, Kheda, Kolar, Kota, Krishna, Krishnagiri, Kulgam, Kupwara, Kurnool, Lalitpur, Latur, Lawangtlai, Lucknow, Ludhiana, Madurai, Mahamaya Nagar, Mahoba, Mainpuri, Mandsaur, Mandya, Mau, Medak, Meerut, Mirzapur, Morena, Muzaffarnagar, Mysore, Nagpur, Nalanda, Nalgonda, Namakkal, Nanded, Nandurbar, Narmada, Nashik, Neemuch, Nizamabad, North West, Palamu, Panch Mahals, Panipat, Parbhani, Patiala, Patna, Perambalur, Prakasam, Pratapgarh, Pudukkottai, Pune, Rae Bareli, Raipur, Rajgarh, Ramanagara, Ramanathapuram, Rangareddy, Ratlam, Rewa, Rohtas, Sabar Kantha, Salem, Sant Ravi Das Nagar(bhadohi), Satara, Satna, Sawai Madhopur, Sehore, Shahid Bhagat Singh Nagar, Shahjahanpur, Shajapur, Sheikhpura, Sheopur, Shivpuri, Singrauli, Sirohi, Sitapur, Sivaganga, Sonbhadra, South West, Sri Potti Sriramulu Nellore, Srikakulam, Sultanpur, Surat, Tarn Taran, Thanjavur, Theni, Tikamgarh, Tiruchirappalli, Tiruppur, Tiruvannamalai, Udaipur, Ujjain, Unnao, Vadodara, Varanasi, Vellore, Vidisha, Viluppuram, Virudunagar, Visakhapatnam, Vizianagaram, Warangal, Wardha, Washim, West Godavari, West Nimar, Y.s.r., Yavatmal
Anup Sadharan Desha	Ambala, Anantnag, Anugul, Anuppur, Bahraich, Balaghat, Balangir, Baleshwar, Balrampur, Banka, Bankura, Barddhaman, Bargarh, Bastar, Basti, Bauda, Begusarai, Betul, Bhadrak, Bhagalpur, Bhandara, Bijapur, Bijnor, Bilaspur, Birbhum, Bokaro, Central, Chandigarh, Chandrapur, Chatra, Chennai, Chhindwara, Chikmagalur, Coimbatore, Cuddalore, Cuttack, Dakshin Bastar Dantewada, Daman, Damoh, Darbhanga, Debagarh, Deoghar, Dhamtari, Dhanbad, Dhenkanal, Dindori, Doda, Dumka, Durg, Faizabad, Gajapati, Ganjam, Garhchiroli, Garhwa, Garhwal, Giridih, Godda, Gonda, Gondiya, Gopalganj, Gorakhpur, Gumla, Gurdaspur, Hamirpur, Harda, Hardwar, Hazaribagh, Hoshangabad, Hoshiarpur, Hugli, Idukki, Jabalpur, Jagatsinghapur, Jajapur, Jammu, Jamtara, Jamui, Janjgir-champa, Jashpur, Jharsuguda, Kabeerdham, Kalahandi, Kancheepuram, Kandhamal, Karaikal, Kargil, Katihar, Katni, Kendrapara, Kendujhar, Khagaria, Kheri, Khordha, Khunti, Kinnaur, Kishtwar, Kodarma, Kolhapur, Kolkata, Koraput, Korba, Koriya, Kullu, KurungKumey, Lahul &Spiti, Lakhisarai, Lakshadweep, Latehar, Lohardaga, Madhepura, Madhubani, Maharajganj, Mahasamund, Mahe, Maldah, Malkangiri, Mandi, Mandla, Mayurbhanj, Moradabad, Munger, Murshidabad, Muzaffarpur, Nabarangapur, Nadia, Nagappattinam, Narayanpur, Narsimhapur, Navsari, Nawada,

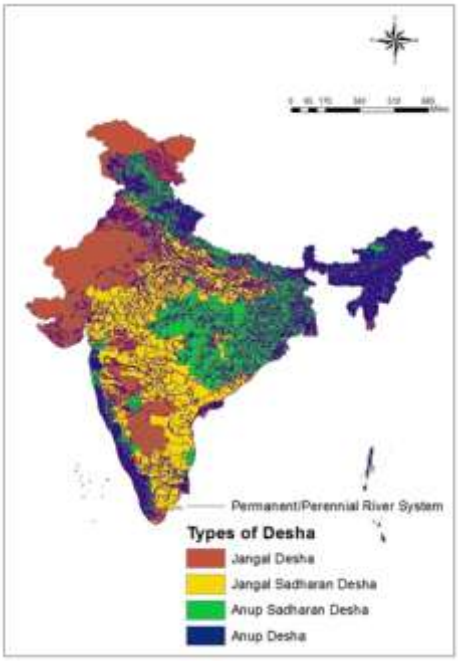
	Nayagarh, New Delhi, North 24 Parganas, Nuapada, Pakur, Panchkula, Panna, PashchimChamparan, Pashchim Medinipur, PashchimiSinghbhum, Pathanamthitta, Pilibhit, Puducherry, PurbaChamparan, Purba Medinipur, PurbiSinghbhum, Puri, Purnia, Puruliya, Raigarh, Raisen, Rajnandgaon, Ramgarh, Rampur, Ranchi, Rayagada, Reasi, Rupnagar, Sagar, Saharanpur, Saharsa, Sahibganj, Sahibzada Ajit Singh Nagar, Samastipur, Sambalpur, Sant Kabir Nagar, Saraikela-kharsawan, Saran (chhapra), Seoni, Shahdol, Sheohar, Shimla, Shimoga, Shrawasti, Siddharth Nagar, Sidhi, Simdega, Sitamarhi, Siwan, Solan, Srinagar, Subarnapur, Sundargarh, Supaul, Surguja, Tapi, Tehri Garhwal, The Dangs, Thiruvallur, Thiruvananthapuram, Thiruvarur, Udham Singh Nagar, Umaria, Una, Uttar Bastar Kanker, Vaishali, Yamunanagar, Yanam
Anup Desha	Mon, Aizawl, Alappuzha, Almora, Anjaw, Araria, Bageshwar, Baksa, Baramula, Barpeta, Bishnupur, Bongaigaon, Cachar, Chamba, Chamoli, Champawat, Champhai, Chandel, Changlang,Chirang, Churachandpur ,Dadra & Nagar Haveli,Dakshin Dinajpur, Dakshina Kannada, Darjiling, Darrang, Dehradun, Dhalai, Dhemaji, Dhubri, Dibang Valley, Dibrugarh, Dima Hasao, Dimapur, East, East Garo Hills, East Kameng, East Khasi Hills, East Siang, Ernakulam, Goalpara, Golaghat, Hailakandi, Haora, Imphal East, Imphal West, Jaintia Hills, Jalpaiguri, Jorhat, Kamrup, Kamrup Metropolitan, Kangra, Kannur, Karbi Anglong, Karimganj, Kasaragod, Kathua, Kiphire, Kishanganj, Koch Bihar, Kodagu, Kohima, Kokrajhar, Kolasib, Kollam, Kottayam, Kozhikode, Kurukshetra, Lakhimpur, Lohit, Longleng, Lower Dibang Valley, Lower Subansiri, Lunglei, Malappuram, Mamit, Marigaon, Mokokchung, Mumbai, Mumbai Suburban, Nagaon, Nainital, Nalbari, Nicobar, North, North & Middle, Andaman, North Goa, North Tripura, Palakkad, Papum Pare, Peren, Phek, Pithoragarh, Punch, Ramban, Ratnagiri, Ri Bhoi, Rudraprayag, Senapati, Serchhip, Sindhudurg, Sirmaur, Sivasagar, Sonitpur, South, South 24 Parganas, South Andaman, South Garo Hills, South Goa, South Tripura, Tamenglong, Tawang, Thane, The Nilgiris, Thoubal, Thrissur, Tinsukia, Tirap, Tuensang, Udalguri, Udhampur, Udupi, Ukhrul, Upper Siang, Upper Subansiri, Uttar Dinajpur, Uttara Kannada, Uttarkashi, Valsad, Wayanad, West, West Garo Hills, West Kameng, West Khasi Hills, West Siang, West Tripura, Wokha, Zunheboto.

While the Map showing distributions of different class of *Desha* are being placed in Map-3.



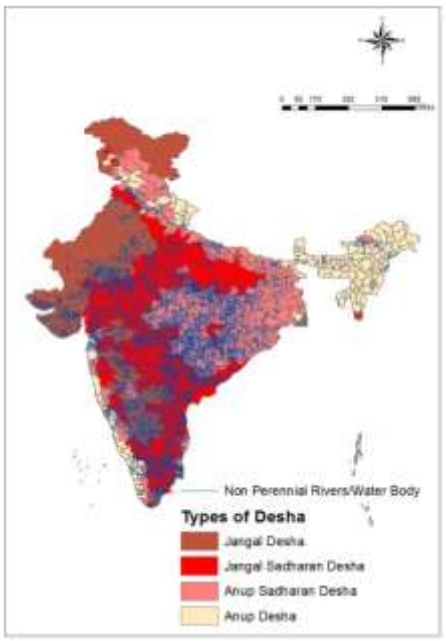
Map-3: *Types of Desha.*

Abundance of Water Source was ascribed as the main characteristics of *Anupa Desha* by *Acharya Sushruta*, while lack of water resources is ascribed as primary attributes of *Jangal Desha*[3]. *Acharya Charaka* while describing *Anupa Desha* has ascribed that rivers of the *Anupa Desha* are generally flow down to the oceans [2]. Accordingly, layers of Perennial and non-Perennial rivers are placed above the Map-3 to visualise the river and water sources and their characteristic.(Map-4 &5)



Map-4: Map Showing Perennial River System over Type of Desha.

Map-4 implicates that perennial river system however have a dense distribution among *Anupa* and *Anupa Sadharan Desha* but distribution in *Jangala Dseha* mapped with present hypothesis absent in general.



Map-5: Non-Perennial Rivers over Types of Desha.

It may easily be visualized from Map-5 that non perennial rivers are absent from the *Anupa Desha* and Marked a dense presence in the *Jangal Desha, and JangalSadharan Desha.* In a study of Konkan region of Maharashtra State Ratnagiri, Sindhudurg, Thane was assigned to the category of *Anupa Desha* based upon the rainfall and other physiographic features [13].In another effort to classify different states based upon the concept of *Desha*, the whole of Assam, Arunanchal Pradesh, and West to the category of *Anupa Desha*.[11] Present study has a great degree of coherence with the finding of the different research articles available in the public domain, and has an advantage of scientific tools and data used in classifications. Bhavana, K.R. et al to map the medical geography of *Charaka Samhita* have placed some similarities between modern geographic parameters used by geographers and as ascribed by the Sage *Charaka* (Table-6)[14].

Table-6

Ayurveda	Contemporary View	Rainfall in Cm	Temperature	Region
Anupa Desha	Tropical Rainforest Tropical Savanna	>200 76-152	18.2^{0}C-29^{0}C Above 18.2^{0}C	Western Coastal Region and parts of northeastern India. Peninsular plateau except for the semi-Arid Zone of east Sahyadri's.
Jangala Desha	Tropical Semi-Arid steppe Tropical Desert Climate	38.1-72.2 <30.5	20^{0}C-28.8^{0}C in December 32.8^{0}C in May Above 34.5^{0}C	Rain Shadow belt from Central Maharashtra to Tamil Nadu. Rajasthan and part of Rann of Kutch
Sadharan Desha	Tropical and sub-tropical steppe	30.5-63.5	12^{0}C-35^{0}C	Punjab to Kutch

While comparing the outcome of present study with the similarities proposed by Bhavana et. al., it may be observed that outcome of present study has similar outcome in terms of placing western coastal areas, northeastern India as *Anupa Desha*, while Rajsthan to Kutchh in the class of *Jangal Desha*. However present study has different outcome than what is proposed in the above cited study, but the differences may be assigned to the reason that since present study has used advance analysis tools and real dataset than any proposition it reflects reality to a greater degree than the study cited.

CONCLUSION

Modern techniques and tools could be used in exploring the ideas presented in classical texts. India as a geographical entity could be placed into *Anupa Sadharan Desha*, while there is great degree of variability, due to geographical extent of the country, is observed. However present study has assigned each Census District-2011 to a class of *Desha* in accordance to *Ayurvedic Text*, but it have overlooked the micro level variation in rainfall data. And same might be a limitation to the study. This study has deduced that whole of the north-eastern India, Himalayan Biosphere Zone, Western Coastal areas, Sundarban and Kaveri Delta regions forms part of the *Anupa Desha* in India. While Rajsthan, Leh and parts of the Gujarat form parts of *Jangal Desha*. There was rain shadow area to Western Ghat which is also falls under the category of *Jangal Desha*. While state like Bengal, Bihar, Odisha might be well placed into *Anupa Sadharan Desha*. Outcome of this study may be used to further deep classification and categorization at micro level administrative boundaries.

REFERENCES

1. Shastri Pt Kashinath, Chaturvedi Dr. Gorakh Nath, Charak Samhita, Vimanasthanam, Reprint Edition, Chaukhambha Bharati Academy, Varanasi 2013, Chapter 8 Verse 76-94 Pg no 767-771.
2. Shastri Pt Kashinath, Chaturvedi Dr. Gorakh Nath, Charak Samhita, Kalpsthanam, Reprint Edition, Chaukhambha Bharati Academy, Varanasi 2013 Chapter 1 Verse 7-8 Pg no 863.
3. Shastri Kaviraja Ambikadutta, Shushruta Samhita, Sutrasthanam, Edited with Ayurveda-Tattva-Sandipika, Reprint-2070, Chaukhambha Sanskrit Sansthan, Varanasi, Chapter 35, Verse 49-50 Pg no 175-176.
4. Gupt Kaviraja Atridev, Ashtang Sangraha, Sutra-Sharir-Nidansthanatmak Bhag, NirnaySagar Prakashan, Mumbai, 1959, Sutrasthan, Chapter 18 Verse 29-31 Pg no 150.
5. Raju, B. M. K., et al. "Revisiting Climatic Classification in India: a District-Level Analysis." *Current Science*, vol. 105, no. 4, 2013, pp. 492–495. *JSTOR*, www.jstor.org/stable/24098002. Accessed 21 Mar. 2021
6. Kawadia, Ganesh; Tiwari Era; Adaptation Measure to Combat Climate Change Impact on Agriculture: An Empirical Investigation in Chambal Basin; Ecology, Economy and Society – the INSEE Journal 3(1):69-98,January 2020.
7. Reddy, S.J.; Reddy, R.S.; A New Method of Estimation of Water Balance, Int. Symp. On Tropical Meteorol. Meeting Amer. Met. Soc., Nairobi, Kenya, 1973, PP277-280.
8. Reddy, P. Sudhakar, Beena; An Insight to Desha (Geographical area/Land) in relation to promotion of Health-An Ayurvedic perspective; JETIR, Volume-9, Issue-9 2022.
9. Hajare, Priyanka; Bhati, Ravindra; Applied Approach and Importance of Knowledge of Desha, International Journal of Recent Scientific Research, Vol-11, Issue 09(A), PP 39720-39723, September 2020.
10. Amrut, Asmita; Kewat, Sheela Rajaram; Pandey, Rekha; Vyas Mahesh; Desh Viruddha in Different Region of India; Int. J. Ayur. Pharma Research; 2014; 2(3):17-21.
11. Meena Dinesh K, Singh Rani, Critical Review of Concept of Desha With Special reference to Health and desease, Int j. Res. Ayurveda Pharm 6(5), Sep-Oct 2015.
12. Sarma, A.A.L.N.; Bhaskar, V Vijaya; Sastry, C.M.; Potential Evapotranspiration over India- An estimate of Green water flow; MAUSAM, 65, 3(July 2014), 365-378, 551.573(540).
13. Nagdeve P.A., Golghate R.K., Critical Study of Konkan Territory of Maharashtra State w.s.r. to the Concept of Desha in Ayurveda, IJ-RIM, Oct-Dec-2021, Vol-5th : Issue 4th.
14. Bhavna K. R., Shreevathsa, Medical Geography in Charaka Samhita, Ayu 2014 Oct-Dec; 35(4): 371-377; DoI: 10.4103/0974-8520.158984.

Source of Support: Nil

Conflict of Interest: None Declared

How to cite this URL: Richa Ojha et al: Concept of desha in ayurvedic classical texts: an efforts to geographical mapping using modern techniques and data . International Ayurvedic Medical Journal {online} 2024 {cited February2024} Available from: http://www.iamj.in/posts/images/upload/408_420.pdf