

**Proposal for
Generation Panel for Neo-Brāhmī Scripts
Label Generation Ruleset for the Root Zone**

Contents

1. General Information	3
2. Principal Neo-Brāhmī Languages	5
2.1 Scripts of India:	5
2.2 Central Asian Scripts	6
2.3 Southeast Asian Scripts.....	6
3. Target Scripts for the Proposed Generation Panel	9
3.1 Principal Languages using the Script.....	9
3.2 Countries with Significant User Communities for the Scripts.....	11
4. Proposed Initial Composition of the Panel	15
4.1 Panel Chair and Members (with Expertise)	15
4.2 Panel Diversity	21
5. Work Plan.....	21
5.1 Suggested Timeline with Significant Milestones	21
5.2 Proposed Schedule of Meeting and Teleconferences	24
5.3 Sources of Funding for Travel and Logistics.....	24
5.4 Need for ICANN Provided Advisors.....	24
6. REFERENCES.....	25

1. General Information¹

The Brāhmī script has been the progenitor of all scripts used to write Modern Indo-Aryan languages, Dravidian and to a lesser extent scripts of the Tibeto-Burman and Munda families. It was also adopted by a large number of cultures in Southeast Asia to transcribe their languages: Burmese, Thai, Lao, Khmer and other Central Asian scripts, some of which are no longer in use but attest to the spread of Brāhmī. Like Arabic and Latin scripts, it thus constitutes a rich matricial script. The Neo-Brāhmī group is so named to cover all such scripts used today and which are based on Brāhmī.

The origin of Brāhmī is a debatable question. Some scholars treat it as based on the Semitic writing system: Phoenician or Aramaic. Others view it as an indigenous Indian invention, often associated with the Indus Valley script.

Brāhmī is written from left to right (though several specimens running from right to left have been found) and has an angular shape. As it evolved this angular feature was gradually replaced by rounded shapes in cultures where palm leaves were used as a medium of written communication. The main feature of Brāhmī is the written syllable or akṣara. The akṣara system is based on the concept of admitting a full Consonant or Vowel as a node. Vowels can admit Vowel Modifiers such as nasals or vowel lengtheners. Consonants at times modified by the “vowel-killer” termed as the Halanta admit a set of modifiers such as the Vowel Sign to which in turn can be adjuncted as in the case of the Vowel by Vowel Modifiers such as the nasals or lengtheners. The adjuncts to the Vowel or Consonant nodes are appended in a strict rule-order. This feature has been remarkably stable over the evolution of Brāhmī and has been followed by all the later Indic and Southeast scripts derived from the script.

Brāhmī evolved around the 3rd Century BC. 6 centuries later i.e. around the 3rd Century AD, Brāhmī script in India had already divided itself into two main styles commonly termed as Northern and Southern. It is around the 12th Century AD, under the influence and growth of vernacularisation (Bhakti movement) that the need was felt to transcribe texts in the vernacular, giving impetus to the growth of native scripts.

The Northern Branch of Brāhmī gave rise to what is termed as the Indo-Aryan family. Bengali and Odia constituted one branch, whereas Devanāgarī (which later split into Gujarati and Devanāgarī script), constituted the other. These developed in succeeding centuries into sub-varieties which can be broadly divided into Western and Eastern varieties in the north and into Deccan and Peninsular varieties in the south. Other branches of this family include the scripts of the western Himalayan regions, of which the modern Gurmukhi or Punjabi script is the only important modern survivor. The Śāradā script of Kashmir also belongs to this group.

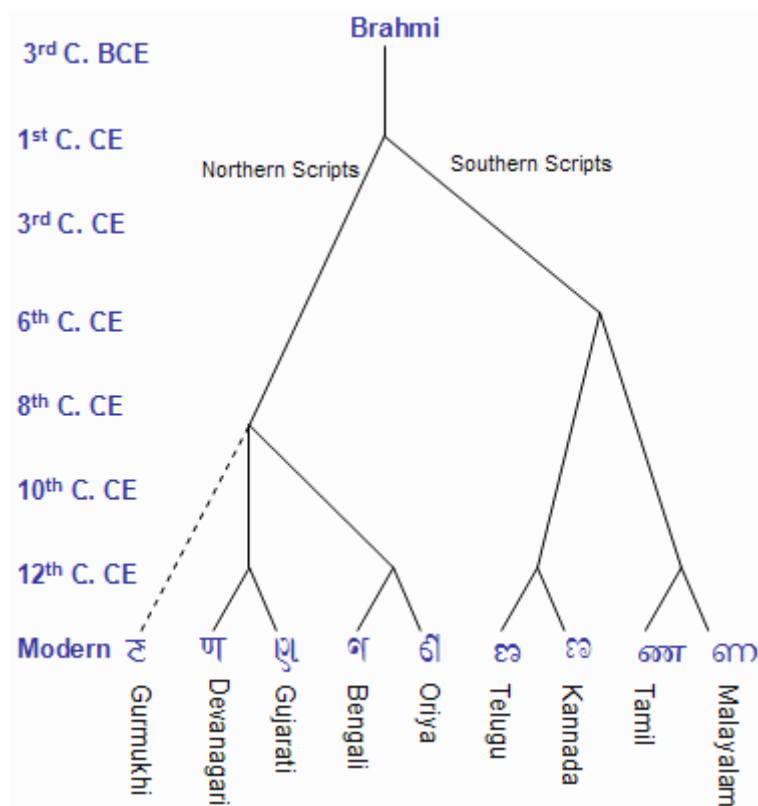
¹ The information provided is based on the detailed bibliography on Writing Systems provided in this document and especially on Daniels and Bright. 1996. *The World's Writing Systems*. Oxford, Oxford University Press.

The Southern Branch is characterized by the Dravidian family. Although the evolution itself started around the 3rd Century C.E., by the 12th Century the Southern branch of Brāhmī had already split into smaller script families: Two large families evolved which one gave rise to Telugu and Kannada and the other to Tamil and Malayalam.

The Sinhala script was imported from North India but was influenced at various stages of its development by south Indian scripts.

The distinct forms of modern scripts of India derived from Brāhmī took a stable form between the tenth and fifteenth centuries.

The diagram below (excerpted and adapted from Daniels and Bright, *The World's Writing Systems*. Oxford, Oxford University Press, 1996, p. 380) shows the evolution of the retroflex nasal: *ṇa* from Brāhmī to the neo-Brāhmī scripts.



2. Principal Neo-Brāhmī Languages²

In what follows a short overview of the scripts derived from Brāhmī is given. This section is divided into two parts: Scripts of India and those of South-East Asia

2.1 Scripts of India³:

Devanāgarī: The script called Nāgarīor Devanāgarīis written from left to right. Historically it derives from the Brāhmī alphabet of the Ashokan inscriptions. Devanāgarī is currently used for 11 official languages of India (Boro/Bodo, Dogri, Hindi, Kashmiri, Konkani, Maithili, Marathi, Nepali, Sanskrit, Santhali and Sindhi) and around 45 other languages especially the related Indo-Aryan languages: Bagheli, Bhili, Bhojpuri, Himachali dialects, Magahi, Newari and Rajasthani and its dialects: Marwari, Mewati, Shekhawati, Bagri, Dhundhari, Harauti and Wagri. Closely associated with Sanskrit and Prakrit, it is an alternative script for KashmiriandSindhi. It is growing popular in use by speakers of tribal languages of Arunachal Pradesh, Bihar and Andaman & Nicobar Islands. The script is also used in Fiji to represent Fiji Hindi. Hindi is also used in Mauritius, Malaysia, England, Canada, South Africa, Indonesia as well as emigrant communities around the world.

Gujarati: Used for writing Gujarati and Kacchi, it is a variant of Devanāgarīthe main difference being the absence of the shirorekha or the line above the character and also more rounded shapes. Written from left to right, the script is organized in terms of the akṣara 'syllable'. Since initially it was used for commercial ends, it has been referred to as śarāphi(banker's) ormahājani(trader's) script. Gujarati is extensively spoken in large parts of Africa, Madagascar, UK and the USA as well as by emigrant communities around the world.

Gurmukhi which evolved separately in the Northern family, is used to write the Punjabi languagein the Indian state of Punjab and elsewhere in India.Gurmukhi whichliterally means 'from the mouth of the Guru' stabilised around the 16th century when it was used to transcribe the holy Granth Sahib.Like all Brāhmībased scripts, Gurmukhi is written from left to right and is an alphasyllabary with the akṣara as its node.

Bengali: Often Termed as Bangla by linguists and grammarians is historically related and similar in design to the Devanāgarī script and with one or two exceptions has the same consonant and vowel set.Like Devanāgarī, Bengali is used to transcribe quite a few languages of which the most prominent are Assamese and Manipuri. The former differs from Bengali in a few consonant characters.The same is the case with Manipuri which today is also written in Meitei Mayek.

² In what follows we have restricted ourselves to living languages with an EGIDS scale of 1-4 and have not taken into account languages based on Brāhmī which have died out such as Sharada, Tirhuta, Kaithi, Mahajani, Modi and some which are used for ritual purposes such as Grantha, Avestan (in Gujarati script); nor does this list take into account new emerging scripts which have yet to be “mandated” such as TaniLipi. A rather exhaustive list of such scripts is to be found on Anshuman Pandey’s website <http://www-personal.umich.edu/~pandey/#papers>. A rather detailed bibliography provides references to materials which can be used for reference. This is in conformity with the guide-lines laid down by MSR 1

³Unicode prefers the term **South Asian Scripts** cf. <http://www.unicode.org/charts/>

Oriya [Odia] can be traced back to the Ashokan inscriptions: 3rd century B.C.E. . The earliest inscription in Oriya is in Kalinga script, from which modern Oriya script has evolved. Like all scripts derived from Brāhmī, Odias based on the akṣara and is written from left to right. Because of the prevalence of a large number of tribal languages belonging to the Munda and Dravidian families in the state of Odisha (Orissa) the Oriya script is used in writing these languages.

Sinhala used for writing Sinhala language and at times also Pali, derived from Brāhmī as early as the third-second century B.C.E. Although it belongs historically to the Northern family, it has been considerably influenced by the early Grantha script of South India.

Kannada and *Telugu* are closely related scripts used to write two Dravidian languages: Kannada in the state of Karnataka, and Telugu in Telangana and Andhra. They are written from left to right and derive from the Brāhmī script of the Ashokan inscriptions. Over the centuries, Brāhmī evolved with marked characteristics in the south. Around the tenth century, these crystallised into the Old Kannada script, used where both Kannada and Telugu are now spoken. By around 1500, this script divided into Kannada and Telugu. As a result, there are very few differences between these two scripts.

Malayalam like all Brāhmī-based scripts, is written from left to right. Subject to reforms, modern Malayalam has introduced alphabetic writing into the script, although the main structure of Malayalam still adheres to the akṣara.

Tamil is derived from the southern branch of Ashokan Brāhmī. More than any other script derived from Brāhmī, it is highly alphabetical in nature and admits no ligatures with the exception of two consonant conjuncts. Apart from being the official language of Tamil Nadu; Tamil is also an official and national language of Sri Lanka and one of the official languages of Singapore. It is also one of the languages of medium of education in Malaysia along with English, Malay and Mandarin. It is spoken in the states of Kerala, Karnataka, Andhra Pradesh and Andaman and Nicobar Islands as one of the secondary languages. Tamil is also spoken by significant minorities in Malaysia, England, Mauritius, Canada, South Africa, Fiji, Indonesia, as well as emigrant communities around the world.

2.2 Central Asian Scripts⁴

Due to societal and liturgical reasons, Brāhmī influenced the writing systems of the Himalayan region and *Tibetan* and *Dzongkha* are among the languages of the Himalayan region whose scripts are based on Brāhmī.

2.3 Southeast Asian Scripts⁵

The spread of Brāhmī in Southeast Asia originates from the Southern family, especially the influence of the Pallava script named after the dynasty of the Pallavas. In the initial phase, this was restricted to writing Indian languages in these scripts. Subsequently this gave rise to adaptation of the scripts to the requirements of the local languages (use of tone marker in

⁴Cf. footnote 2 supra

⁵Cf. footnote 2 supra

Thai for example). Thus by the late eighth century; the scripts began to acquire separate identities.

Brāhmī-based scripts are used to write languages of several different families in South-East Asia: Mon (Burma), Khmer (of Cambodia); Thai, Lao, Shan; Karen (Burma) and Burmese Javanese and other languages of Indonesia and the Philippines. Some of the major South-East languages using these scripts belong to the Austronesian (Jawi, Cham), Tai (Thai) and Tibeto-Burman (Karen, Mon, Shan, Burmese) families

The *Thai* alphabet is derived from the Old Khmer script derived from Pallava (ปัลลวะ).⁶

The *Lao* alphabet, Akson Lao (Lao: ອັກສອນລາວ), is the main script used to write the Lao language and other minority languages in Laos. It is of Indic origin and is traditionally written from left to right⁷.

The *Shan* alphabet based on Southern Brāhmī is the native language of Shan people and spoken mostly in Shan State, Burma. It is also used in pockets of Kachin State in Burma, in northern Thailand, and decreasingly in Assam.

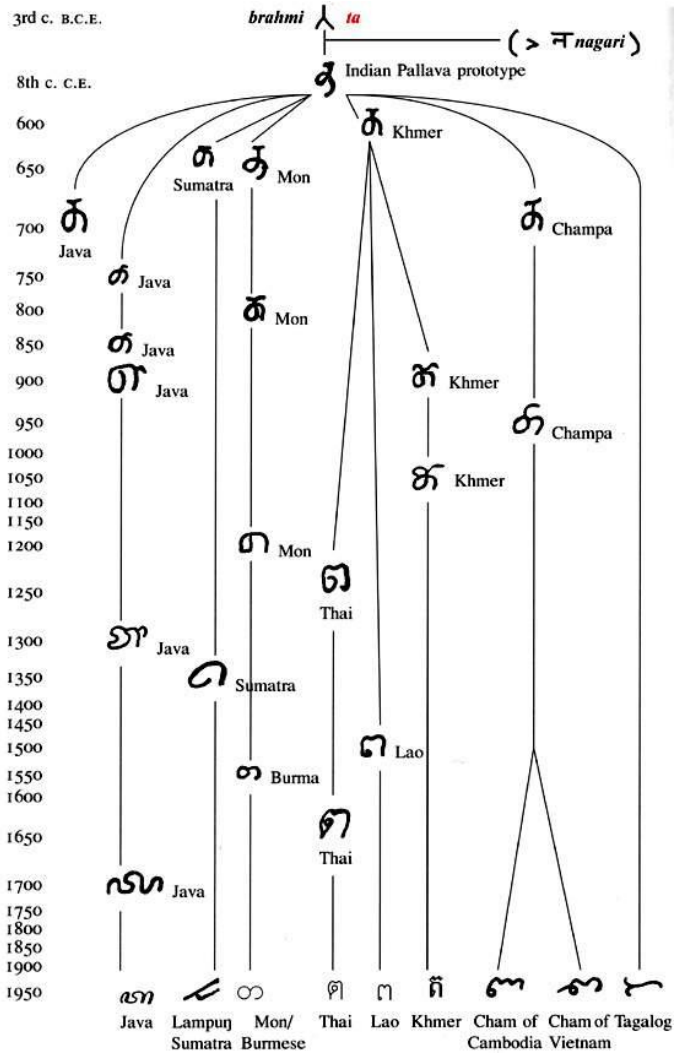
The *Burmese* script is an abugida based on the Brāhmī family and is used for writing Burmese. It is an adaptation of the Old Mon or the Pyu script. In recent decades, other alphabets using the Mon script, including Shan and Mon itself, have been restructured according to the standard of the now-dominant Burmese alphabet. Besides the Burmese language, the Burmese alphabet is also used for the liturgical languages of Pali and Sanskrit⁸.

The figure below shows the evolution of the akṣara "ta" in major Southeast scripts influenced by Brāhmī. (Adapted from *The World's Writing System*, edited by Peter T. Daniels and William Bright, New York - Oxford, Oxford University Press, 1996, p. 448.)

⁶http://en.wikipedia.org/wiki/Thai_alphabet

⁷Modified from the article on Lao: http://en.wikipedia.org/wiki/Lao_alphabet

⁸Modified from the article on Burmese alphabet with references to Mon
http://en.wikipedia.org/wiki/Burmese_alphabet



3. Target Scripts for the Proposed Generation Panel

It is anticipated that the work of Neo-Brahmi Generation Panel will take place in phases, given the large number of scripts/languages under its ambit. In the first phase, the Neo-Brāhmī group restricts itself to six South Asian Scripts comprising Scripts of India and shared by its near neighbours: People’s Republic of Nepal, People’s Republic of Bangladesh, Kingdom of Bhutan, Republic of Singapore and in addition additional countries languages/scripts are used as official or in a semi-official capacity. These six scripts are Bengali, Devanagari, Gujarati, Gurmukhi, Tamil and Telugu. The phase two will involve scripts Kannada, Malayalam and Oriya.

3.1 Principal Languages using the Script

The table given below provides a list of major Neo-Brāhmī based Languages. The languages chosen are represented majorly in the scripts which are part of MSR1 and belong to the EGIDS scale of 1 to 4. Languages which are mainly from the South-East Asian and Central-Asian: Tibeto-Burman Families will not be covered in this first phase of the LGR for Neo-Brāhmī and may be covered eventually depending on availability of experts.

Script	Language
Indic Family/ South Asian Scripts⁹	
Bengali	Assamese – অসমীয়া
Bengali	Bengali – বাংলা
Bengali	Meitei – মনিপুরি, মৈতৈলোল, মৈতৈলোন, মৈথে
Bengali	Sylheti – ছিলটি, সিলেটা
Devanāgarī	Bhojpuri – भोजपुरी
Devanāgarī	Bodo – বড়ো
Devanāgarī	Chhattisgarhi – छत्तीसगढ़ी
Devanāgarī	Fiji Hindi – फिजीबात or Fiji Baat
Devanāgarī	Hindi – हिन्दी
Devanāgarī	Kashmiri – कॉशुर, Kāśur, Koshur
Devanāgarī	Konkani – कोंकणी,
Devanāgarī	Magahi – मगही
Devanāgarī	Maithili – मैथिली, मैथिली
Devanāgarī	Marathi – मराठी
Devanāgarī	Nepal Bhasa – नेपालभाषा
Devanāgarī	Nepali – नेपाली
Devanāgarī	Rajasthani – राजस्थानी

⁹The Nomenclature used to define the Scripts are based on the terminology used by Unicode.
<http://www.unicode.org/charts/>

Devanāgarī	Sanskrit – संस्कृतम्, संस्कृतावाक्
Devanāgarī	Santali/Santhali – संथाली
Devanāgarī	Sindhi – سِيंधِي
Devanāgarī	Tamang (tāmāng) – तामाङ;
Gujarati	Gujarati – ગુજરાતી
Gurmukhi	Punjabi – ਪੰਜਾਬੀ
Kannada	Kannada – ಕನ್ನಡ
Malayalam	Malayalam – മലയാളം
Odia	Odia – ଓଡ଼ିଆ
Tamil	Tamil – தமிழ், Tamizh
Telugu	Telugu – తెలుగు
Central Asian Scripts	
Tibetan	Tibetan – བོད་སྐད་
Tibetan based Róng/Lepcha script	Lepcha
Tibetan/Devanāgarī	Limbu – ལུམ་བོ་
Devanāgarī	Gurung – तमुक्यी
South-East Asian Languages	
Thai	Thai – อักษรไทย
Lao	Lao – ອັກສອນລາວ
Burmese	Burmese – မာအာကုဒရာ
Sinhala	Sinhala – සිංහල
Dzongkha	Dzongkha – ལྷོང་ཁ་

3.2 Countries with Significant User Communities for the Scripts¹⁰

As mentioned above the Neo-Brāhmī group restricts itself to Scripts of India and its near neighbours: People’s Republic of Nepal, People’s Republic of Bangladesh, Kingdom of Bhutan. Hence languages belonging to the Central-Asian/Tibeto-Burman (Tibetan, Burmese), South-East Asian: Tai (Thai) and the Austronesian (Jawi, Cham) families do not figure here, nor does Sinhala. These may be taken up in the next phase of the LGR process. The table given below provides a broad over-view of Neo-Brāhmī based languages. Major languages are listed here. The table divides the languages as per their status in India (Official/Non-Official languages¹¹) and if used outside India whether they are Official languages of the Sovereign Nation or are spoken/written in that country because of the Indian diaspora.

Language	India		International	
	Official	Non-Official	Official	Non-Official
Assamese – অসমীয়া	State of Assam			Kingdom of Bhutan; People's Republic of Bangladesh
Bengali – বাংলা	State of West Bengal		People's Republic of Bangladesh	
Bhojpuri – भोजपुरी	State of Bihar State of Jharkhand State of Uttar Pradesh			Co-operative Republic of Guyana ; Republic of Mauritius ; Democratic Republic of Nepal ; Republic of Suriname; Republic of Trinidad and Tobago
Bodo – बड़ो	State of Assam			Democratic Republic of Nepal
Chhattisgarhi – छत्तीसगढ़ी		Chattisgarh		
Fiji Hindi – फिजीबात or Fiji Baat			Fiji	
Gujarati – ગુજરાતી	Indian union territories of Dadra and Nagar Haveli and Daman and Diu, and State			Extensively spoken in large parts of Africa, Madagascar, UK and the USA as well as by

¹⁰This list is based on wiki http://en.wikipedia.org/wiki/Languages_of_South_Asia with modifications and additional inputs.

¹¹ Cf. article on Official Languages of India in Wiki:

http://en.wikipedia.org/wiki/Languages_with_official_status_in_India

	ofGujarat.			emigrant communities around the world.
Hindi – हिन्दी	States of Bihar, Chhattisgarh, Haryana, Himachal Pradesh, Jharkhand, Madhya Pradesh, Rajasthan, Uttar Pradesh, and Uttarakhand. Union Territories: Andaman & Nicobar Islands, Chandigarh, Dadra & Nagar Haveli, Daman & Diu, Federal district of Delhi.		Hindi is also an official language in Fiji. The dialect of Hindi spoken there is known as 'Fiji Baat' or Fiji Hindi.	Hindi is also used in Mauritius, Malaysia, England, Canada, South Africa, Indonesia as well as emigrant communities around the world.
Kannada – ಕನ್ನಡ	State ofKarnataka			
Kashmiri – कॉश्मुर, Kāṣṣur, Koshur		Jammu and Kashmir and large parts of India		
Konkani – कॉकणी,	State ofGoa			
Magahi – मगही		India		Democratic Republic of Nepal
Maithili – मैथिली, मैथिली	State ofBihar		Democratic Republic of Nepal	
Malayalam – മലയാളം	State ofKerala Union territories of Lakshadweep and Puducherry			
Marathi – मराठी	State ofMaharashtra Union territories of Daman and Diu and Dadra and Nagar Haveli			
Meitei – मनिपूरि, मैतेिलोन्, मैतेिलोन्, मैथै	State ofManipur			
Nepal Bhasa – नेपालभाषा	State ofSikkim		Democratic Republic of	

			Nepal	
Nepali – नेपाली	Indian district of Darjeeling State of Sikkim		Democratic Republic of Nepal	
Odia – ଓଡ଼ିଆ	State of Jharkhand State of Odisha			
Punjabi – ਪੰਜਾਬੀ	Federal district of Delhi; State of Haryana, State of Himachal Pradesh, State of Punjab, and State of West Bengal			
Rajasthani – राजस्थानी		Rajasthan		
Santhali/Santali ¹² – संथाली		Jharkhand, Assam, Bihar, Odisha, Tripura, and West Bengal		
Sanskrit – संस्कृतम्, संस्कृतावाक्		Pan-Indian		
Sindhi – सिंधी		Pan-Indian	Pakistani province of Sindh	
Sinhala – සිංහල			Sri Lanka	
Sylheti – ছিলটি, সিলেটি		Barak Valley, Cachar, Hailakandi, and Karimganj in Assam; and the Indian state of Tripura		Bangladeshi division of Greater Sylhet
Tamang – तामाङ; tāmāng		Sikkim, West Bengal		Nepal
Tamil – தமிழ், Tamizh	State of Tamil Nadu Union territories of Puducherry and Andaman and Nicobar Islands.	States of Kerala, Karnataka, Andhra Pradesh and Andaman and Nicobar Islands as	Sri Lanka. One of the official languages of Singapore. One of the languages of medium of education in	Significant minorities in Malaysia, England, Mauritius, Canada, South Africa, Fiji, Indonesia as well as emigrant communities

¹²Santhali admits OIciki as an alternate script.

		one of the secondary languages.	Malaysia.	around the world.
Telugu – తెలుగు	State of Telangana State of Andhra Pradesh.	Andaman and Nicobar as well as significant minorities in the states of Chhattisgarh, Karnataka, Maharashtra, Odisha, Tamil Nadu, the union territory Puducherry.		Sri Lankan Gypsy people

4. Proposed Initial Composition of the Panel

The initial contribution of the Neo-Brāhmī group was towards the development of the Devanāgarī VIP report (q.v.) which catered to the problems and issues of implementing Devanāgarī script driven language gTLD's. Presentations and discussions at meetings and workshop conducted by ICANN as well as by the Indian Ministry of Communications and Information Technology have proved useful and have made (we hope) a fruitful contribution to ICANN.

With this as a background, the panel is widening its ambit in two major areas.

In the first place, more scripts/languages are being added to the fold. This will ensure that scripts derived from classical Brāhmī and which are widely used in India as well as in South-East Asia and some other countries where the scripts/languages spread owing to societal reasons will eventually get recognition at the international level and will permit users of these scripts to have ccTLD's (in some cases) and gTLD's in their native scripts.

The second area on which focus is being laid comprises technical issues which will define the problems and provide solutions for secure and easy use of Neo-Brāhmī based IDN's for this large community.

These are in common with the other panels and include the following:

- Neo-Brāhmī based Script Label Generation Ruleset (LGR) for the Root Zone
- Second level LGRs for the Neo-Brāhmī based Script.
- Evaluating the MSR report and identifying valid Neo-Brāhmī script characters.
- Technical challenges around registration of Neo-Brāhmī based Script IDNs and variants

4.1 Panel Chair and Members (with Expertise)

Below is the composition of the Neo-Brahmi Scripts Generation Panel (NBSGP).

Sr. No.	Name	Initials	Organization	Country /Region	Language Expertise
1	Anupam Agrawal	Mr.	Tata Consultancy Service	India	Hindi, Bengali
2	Akshat S. Joshi	Mr.	C-DAC	India	Hindi, Marathi
3	Abhijit Dutta	Mr.	Wikimedia	India	Bengali, Hindi
4	Mahesh D. Kulkarni	Mr.	C-DAC	India	Marathi, Hindi
5	Neha Gupta	Ms.	C-DAC	India	Hindi
6	Nishit Jain	Mr.	C-DAC	India	Hindi
7	Prabhakar Pandey	Mr.	C-DAC	India	Hindi
8	Raiomond Doctor	Dr.	C-DAC	India	English, Hindi, Marathi, Gujarati
9	Udaya Narayana Singh	Dr.	Holder of Professorial Chair, Rabindra Bhavana (June 11, 2009 to August 19, 2010 and again June 16, 2012 onwards,	India	Bengali, Maithili, Hindi, English

			continuing) which is a substantive position in Visva-Bharati, Santiniketan, West Bengal		
10	N. DeivaSundaram	Mr.	NDS Lingsoft Solutions Pvt Ltd	India	Tamil
11	Shantaram S. Warde Walawalikar	Mr.	Independent Researcher	India	Konkani
12	Bal Krishna Bal	Mr.	Kathmandu University	Nepal	Nepali
13	Ganesh Murmu	Mr.	Ranchi University	India	Santali
14	Balaram Prasain	Mr.	Tribhuvan University	Nepal	Nepali
15	Rajib Chakraborty	Mr.	Society for Natural Language Technology Research	India	Bangla (Bengali)
16	Gurpreet Singh Lehal	Dr.	Punjabi University Patiala	India	Panjabi
17	Saroja Bhate	Mr.	University of Pune	India	Sanskrit
18	Shambhu Kumar Singh	Mr.	National Translation Misson, Mysore	India	Maithili
19	SwarnaPrabha Chainary	Mrs.	Guwahati University	India	Bodo
20	Ghanashyam Nepal	Mr.	Benares Hindu University& University of North Bengal	India	Nepali
21	Kalyan Vasudeo Kale	Mr.	Formerly affiliated with University of Pune	India	Marathi
22	Shashi Pathania	Prof.	P.G.D. of Dogri, University of Jammu	India	Dogri

The members fill the following relevant slots, as designated by the call for Generation Panels.

No.	Name	Role	Relevant Experience
1	Anupam Agrawal	Community Representative	<ul style="list-style-type: none"> Part of various working groups of Govt. of India Member, ISOC Kolkata Chapter ICANN fellow at ICANN 40 Active participation in ICANN forums. Native Bengali language speaker
2	Akshat S. Joshi	IDNA/Unicode Expert, Policy Expert	<ul style="list-style-type: none"> Working on Indian language computing since last 6 years Part of India's National initiative on IDNs Speaker at various National & International conferences on Indian IDN implementation Part of ICANNs Devanagari VIP team Part of ICANNs Integrated Issues Report project Part of RootLGR Procedure drafting team
3	Abhijit Dutta	Community Representative	<ul style="list-style-type: none"> Representative in IBM for South Asian Languages (including Urdu and Sinhala) Part of Government Of India (GoI) committees

			forming e-Governance standards
4	Mahesh D. Kulkarni	Linguistics cum Unicode Expert	<ul style="list-style-type: none"> Specializing in hardware & electronics as well as in software and team management. Has too his credit large number of publications and patents in the areas of computing. Provides expertise in the area of standardization specially dealing with Indian language Member of committee and organizations both in India and at international level Awardee of various honours at the national level. Country manager of W3C India Has successfully transformed C-DAC GIST into a multinational company.
5	Neha Gupta	IDNA/Unicode Expert, Policy Expert	<ul style="list-style-type: none"> Working on Indian language computing since last 7 years Part of India's National initiative on IDNs Speaker at various National & International conferences on Indian IDN implementation Part of ICANNs Devanagari VIP team Part of ICANNs Integrated Issues Report project Part of RootLGR Procedure drafting team
6	Nishit Jain	IDNA/Unicode Expert, Policy Expert	<ul style="list-style-type: none"> Working on Indian language computing since last 3 years Part of India's National initiative on IDNs Speaker at various National & International conferences on Indian IDN implementation Part of ICANN Whois IRD Expert WG
7	Prabhakar Pandey	Linguistic Expert	<ul style="list-style-type: none"> Hindi Officer at C-DAC Pune Worked in Wordnet and other NLP projects in IIT Bombay as a Research Associate
8	Raiomond Doctor	Linguistic cum Unicode Expert	<ul style="list-style-type: none"> Specialising in Linguistics and trained in Germany and France, Raiomond Doctor has lectured extensively in Europe and was Directeur d'Etudes at the Ecole des Hautes Etudes en Sciences Sociales, Paris and also Maître de Conférences at the prestigious Collège de France. Has six books and over a hundred papers dealing with various aspects of language and computational linguistics to his credit. Has been an advisor to UNESCO on Information Technology and also to the prestigious BULAC in Paris for adopting ISO for their library content as well as their meta-data. Involved with the development of ISCII, he has been closely associated with Unicode and ISO both for neo-Brahmi scripts and Urdu. He has been also associated with the Government of India's IDN project since its inception and has worked extensively on the framework of the policy for Indian Languages.

			<ul style="list-style-type: none"> • His main area of expertise is d Natural Language processing with a strong bent towards Morphology and Syntax and also String Theory and Chaos Maths in their application to Linguistic theories.
9	Udaya Narayana Singh	Chair	<ul style="list-style-type: none"> • Specializes in Linguistics, Translation Studies, Creative Writing, Culture Studies, Lexicography & ELT • Professor, Rabindra Bhavana (since June 2009) & Chair-person, Centre for Endangered Languages, Visva-Bharati • He has been the first Pro-Vice-Chancellor of Visva-Bharati between Aug 20, 2010 and June 15, 2012. • He was earlier the Director of Central Institute of Indian Languages (CIIL), Ministry of HRD, Govt. of India (GOI) • As a poet, playwright, essayist and editor in Maithili and Bangla and as a Linguist, he has 49 books to his credit, and has over 180 papers published in National and International journals. • Lectured and taught at Universities and Institutions both in India and all over the world. • Was the Chief Editor of Indian Linguistics, 1988-1990, Editor (with P.P.Giridhar as Co-Editor) of Translation Today, and a Visiting Professor at the IAS-Shimla (1989), besides being the Series Editor of eight books under Language and Development (LAD) under Sage • Has been the General Editor of Longman-CIIL Series of eleven Bilingual Dictionaries. Co-Editor of International Journal of Inter-Cultural Relations; 2008-onwards, plus a Member of the Editorial Board of the Brill's series titled Studies in South and Southwest Asian Languages. • Was the Founder-Director, Study India Program (SIP), University of Hyderabad (1995-2000) & Chief Coordinator, Centre for Distance Education there • Founder-Head, Centre for Applied Linguistics & Translation Studies (CALTS), University of Hyderabad (1989-1994) • Chief Editor, Mithila Darshan (Bi-monthly), the largest circulating literary magazine in Maithili
10	N. DeivaSundaram	Linguistic Expert	<ul style="list-style-type: none"> • Retired Professor, University of Madras • MD, NDS Lingsoft Solutions Pvt Ltd. • Holds a doctorate in Linguistics and Masters in Tamil language
11	Shantaram S. Warde Walawalikar	Linguistic Expert	<ul style="list-style-type: none"> • Expert on Konkani language • Part of various Gol initiatives on Indian languages as Konkani expert • Member, Official Language Terminology, Govt. of Goa

12	Bal Krishna Bal	Linguistic Expert	<ul style="list-style-type: none"> • Specialization and Expertise: Software Localization and Natural Language Processing, Unicode, CLDR, Standardisation etc. • Currently , Assistant Professor and Team Lead, Information and Language Processing Research Lab, Department of Computer Science and Engineering, Kathmandu University • Chief Technical Officer – Language Technology Kendra, Lalitpur, PatanDhoka, Nepal. • Project Manager and Team Leader, PAN Localization Project, Nepal Country Component (2004-2009)
13	Ganesh Murmu	Linguistic Expert	<ul style="list-style-type: none"> • Works at the Department of Tribal and Regional Languages, University of Ranchi in Jharkhand, India. • Expert in the tribal languages of Jharkhand and in particular a tireless advocate and activist for his native Santali language • Has worked on the Documentation of Koro Aka Project, on the poorly known Koro Aka language of Arunachal Pradesh, northeastern India, and on three Enduring Voices trips to Arunachal Pradesh. • In addition to Koro Aka, Ganesh served as primary or secondary eliciting linguist in the recordings Living Tongues has made of numerous languages of the region, including Hruso Aka, Miji, Apatani, Hill Miri and Nishi. • He also serves as the Local Project Coordinator and liaison for Living Tongues Institute for Endangered Languages in Jharkhand State, India.
14	Balaram Prasad	Linguistic Expert	<ul style="list-style-type: none"> • Member, Language Technology Kendra • Lecturer, Central Department of Linguistics, Tribhuvan University, Kathmandu, Nepal
15	Rajib Chakraborty	Community Representative	<ul style="list-style-type: none"> • Working as a Linguist at the Society for Natural Language Technology Research, Kolkata (a Society under the aegis of Ministry of Information Technology, Govt. of West Bengal). • Presently working on Digitization of Bangla literary texts for online preservation, designing • Training a UNICODE-compliant Bangla Spell Checker system for Windows and Linux • Editing an International Journal on Linguistics & Language Technology (BhashaBijnan O Prayukti)
16	Gurpreet Singh Lehal	Linguistic Expert	<ul style="list-style-type: none"> • Chief Coordinator of Indo-UK joint project “Enhancing Communication and Co-operation across South Asia: An ICT Solution to Script Barriers” with University of Manchester, UK during 2014-2015 • Indo-US collaborative project, “Transliteration of Punjabi words in the English-Punjabi Dictionary from the AP2171 Romanization into the modified

			<p>Perso-Arabic script”, with University of Maryland, Maryland, USA (2012-2013)</p> <ul style="list-style-type: none"> • Chief Coordinator of Indo-UK joint project “Web based Transliteration and Translation System between Urdu and Hindi Languages” with University of Manchester, UK during 2009-2010. Project sponsored under ISIF grants, Australia • Chief Coordinator of Indo-UK joint project “Shahmukhi to Gurmukhi Transliteration Solution for Networking” with University of Manchester, UK during 2006-2008. Project sponsored under Pan-Asia grants, Singapore • Working in Consortium mode with 15 premier institutes in India, • Chief coordinator of project “Punjabi Text to Speech Help for people with cognitive disabilities” in collaboration with IIT Delhi and GNEC Ludhiana during 2011-2013 • Worked in Consortium mode with 11 national Institutions for Development of Indic Script Optical Character Recognition Systems during 2006-2009
17	Saroja Bhate	Linguistic Expert	<ul style="list-style-type: none"> • M.A. Ph.D. in Sanskrit Grammar • Hon. Secretary, Bhandarkar Oriental Research Institute Pune, 2005-08 & 2008-10
18	Shambhu Kumar Singh	Linguistic Expert	<ul style="list-style-type: none"> • Working as a Consultant (Academic-Maithili) in National Translation Mission (NTM) of Central Institute of Indian Languages, since July 01, 2008 to till date. • Worked as an Associate Editor for Pearson Longman’s Basic English-English-Maithili dictionary under NTM. • Associated with ‘Certification of Translators Programme’ of NTM.
19	Swarna Prabha Chainary	Linguistic Expert	<ul style="list-style-type: none"> • Working as Language Expert for Bodo association with LANGUAGE TECHNOLOGY DEVELOPMENT PROJECT (LTDP) • Member, LIS Project for Bodo • Authored one Bodo grammar for Under Graduate & Post Graduate classes in Bodo, one school grammar for classes from VI-VIII, three volumes of article collection book on language in Bodo. • Presented Tibeto-Burman language papers in different symposiums and seminars in India and abroad.
20	Ghanashyam Nepal	Linguistic Expert	<ul style="list-style-type: none"> • Assistant Professor of Nepali, University of North Bengal from April 1983 to October 1990 • Associate Professor of Nepali, Department of Indian Languages, Banaras Hindu University from November 1990 to December 1999 • Professor of Nepali, Department of Nepali, University of North Bengal, Darjeeling from

			January 2000 till date.
21	Kalyan Vasudeo Kale	Linguistic Expert	<ul style="list-style-type: none"> • M.A. Sanskrit Linguistics • M.A. Marathi Ardhamaghdhi • Ph. D. Marathi Literature • Reader, Department of Marathi, University of Pune 1981-97
22	Shashi Pathania	Linguistic Expert	<ul style="list-style-type: none"> • Has two books and 95 research papers and publications to her credit • Has done Localization of software tools in Dogri. • Worked on various research projects. • Currently working on Shallow Parser Tool for Dogri language

4.2 Panel Diversity

The Generation Panel (GP) for the Neo-BrāhmīScripts LGR gathers experts from a variety of backgrounds including language experts/epigraphers/linguists those who have vast expertise in the scripts of their domain. As is the case with Neo-Brāhmī scripts, some of the experts are polyglots and have expertise in more than one script.

In addition to linguistic expertise, the Generation panel comprises experts from other domains: community experts, policy designers, Experts with a deep knowledge of the Akṣara formalism and also the technical community directly working with the DNS (e.g. registries) and security. Members of academia round up the list.

5. Work Plan

5.1 Suggested Timeline with Significant Milestones

The Generation Panel for Neo-Brāhmī intends to divide the work on LGR for the Root zone into four phases. These are logically ordered as under:

1. Finalization of Code Points
2. Finalization of Variants
3. Finalization of Whole Label Evaluation Rules (WLEs)
4. Finalization of LGR Documents for Neo-Brāhmī scripts and Submission to ICANN

Each of these phases will have three sub-phases.

Phase I: Defining and determining the general principles which in turn will act as a framework, on which further decisions will be based. This underlies all four phases

Phase II: Once the principles are determined, in this phase the data (character repertoire, variants, and labels) will be analyzed.

Phase III comprises outreach where the data analysed and arrived at will be released to the wider community ICANN as well as the user community of the given script.

At all levels feedback from community will be solicited.

Time-Line

Given the complexity of languages subsumed under the Neo-BrāhmīGP, the time-frame required for the above will take at least eight months starting from December 2014. (This is with the assumption that the process of formation of the GP will be complete before December '14)

A tentative work plan of Phase 1 is presented in the chart below:

Broad timeline	
No. of days	368
Start Date	22-01-2015
End Date	25-01-2016

Detailed timeline			
Task	Duration	Start Date	End Date
Formation of Generation Panel	12	22-01-2015	02-02-2015
Introduce Members			
Discussion and Finalization of Proposal			
Application to ICANN for formation of Neo-Brahmi GP for creation of Neo-Brahmi LGR for Root Zone			
Interaction within Neo-Brahmi GP	26	03-02-2015	28-02-2015
Meeting with Chair			
Meeting for Devanagari, Gujarati, Punjabi script members			
Meeting for Bengali script members			
Meeting for Tamil, Telugu script members			
Character Set			
Definition of General principles	15	01-03-2015	15-03-2015
- For inclusion			
- For Exclusion			
- For Deferral			
Interaction with IG for Feedback	10	16-03-2015	25-03-2015

Finalization of character sets	30	26-03-2015	24-04-2015
- Included in Neo-Brahmi Scripts IDNs			
- Excluded from Neo-Brahmi Scripts IDNs			
- Interaction with IG for feedback			
- Documenting Character Set on MSR			
Release for Public Comments:	30	25-04-2015	24-05-2015
Character sets for Neo-Brahmi Scripts LGR	5	25-05-2015	29-05-2015
Variants			
Definition of General principles	20	30-05-2015	18-06-2015
- Variant qualification			
- Typology of Variants			
Interaction with IG for Feedback	5	19-06-2015	23-06-2015
Analysis of Data	30	24-06-2015	23-07-2015
- Variants identification			
- Finalization of Variants with disposition			
- Documenting Variants on MSR			
Release for Public Comment	30	24-07-2015	22-08-2015
Incorporation of Comments by Public and IG	5	23-08-2015	27-08-2015
Whole Label Rules			
Definition of General principles	20	29-08-2015	17-09-2015
- Finalization of guiding principles			
- Interaction with IG for Feedback			
Finalization of Rules	60	18-09-2015	16-11-2015
- Initial Analysis			
- Second Review of Label Rules			
- Finalization of Whole Label Rules			
- Documenting Whole Label Rules			

Release for Public Comment:	30	17-11-2015	16-12-2015
Incorporation of Comments by Public and IG	10	17-12-2015	26-12-2015
Finalizing LGR Document	30	27-12-2015	25-01-2016
Finalizing document			
Finalizing LGR XML Structure			
Submission to ICANN			

5.2 Proposed Schedule of Meeting and Teleconferences

Given the large number of experts and also their location in distant geographical regions, a large amount of discussions will be carried out by e-mail. As and when needed to ensure the principle of “Get in touch keep in touch” we will try and also have an initial face-to-face meeting, followed up by teleconferences for the period of the work.

5.3 Sources of Funding for Travel and Logistics

Although the members of the Neo-Brāhmīpanel will be volunteers and provide their time and expertise on a purely voluntary basis, issues of logistics such as travel and stay necessitated by members in a face-to-face meeting as well as support for conference calls, posting on the site will require support. ICANN may need to support these logistics of the group to a limited extent. The Group will also try and identify alternate sources of funding.

5.4 Need for ICANN Provided Advisors

Apart from the linguistic and policy level expertise available with the GP, it is anticipated that in some cases there would be need for Advisors from ICANN for some specific areas like DNS and ICANN process imperatives. As and when needed, such help may be sought by the GP.

6. REFERENCES

Given the complexity of NeoBrāhmī Scripts and the complex writing system we have provided a rather “extensive” set of references which cover material used/consulted in compiling this document as well as for those interested in further reading.

ON WRITING

Bernard Comrie ed., *The World's Major Languages*, London: Croom Helm; New York: Oxford University Press.

Cardona, George; Jain, Dhanesh.2003, *The Indo-Aryan Languages*, Philadelphia: Routledge.

Carol, Andrews. 1981, *The Rosetta Stone*, London

Cohen, Marcel.1953, *L'Écriture*. Paris.

Cohen, Marcel. 1958, *La Grande Invention de l'Écriture et son Évolution*, Paris.

Diringer, David. 1962, *Writing*, London

Diringer, David. 1968. *The Alphabet. A Key to the History of Mankind*, 3rd ed. New York: Funk & Wagnalls.

Faulmann, Carl. 1990. *Das Buch der Schrift*. Frankfurt am Main: Eichborn

Haarmann, Harald. 1990. *Die Universalgeschichte der Schrift*. Frankfurt: Campus.

Indian Script Code For Information Interchange- ISCII 13194. 1991. New Delhi

Taylor, Isaac. 1883. *The alphabet: an account of the origin and development of letters*. Vol. 1: Semitic alphabets; Vol. 2: Aryan alphabets. London: Kegan Paul.

Meillet, Antoine and Cohen, Marcel.1952. *Les langues du monde*. Collection linguistique, 16. Paris: Champion.

BRĀHMĪ SCRIPT

Buhler, Georg. 1898. *On the Origin of the Indian Brāhmī Alphabet*, 2nd ed. Strassburg: Truebner.

Dani, Ahmad Hasan. 1963. *Indian Palaeography*. Oxford: Clarendon Press. 2nd ed., Delhi: Munshiram Manoharlal, 1986.

Falk, Harry. 1993. *Schriftmalten Indiens: Ein Forschungsbericht mit Anmerkungen* (Scriptoria 56). Tübingen: Narr.

Sircar, Dinesh Chandra. 1965. *Indian Epigraphy*. Delhi: Motilal Banarsidass.

Weber, Albrecht. 1856. "Über den semitischen Ursprung des indischen Alphabets." *Zeitschrift der Deutschen Morgenländischen Gesellschaft* 10: 389-406.

NEO-BRĀHMĪ SCRIPTS AND LANGUAGES ¹³

BENGALIScript

Bengali/Bangla

Banerji, Rakhil Das. 1919. *The Origin of the Bengali Script*. Calcutta: Calcutta University Press.

Bykova, E.M. 1981. *The Bengali language*. "Nauka" Central Dept. of Oriental Literature. Moscow

Dimock, Edward C.; Suhas Chatterjee; Somdeb Bhattacharji. 1987. *Introduction to Bengali*, Part 2.

Islam, Rafiqul; Pabitra Sarkar; Mahbul Haq; Rajib Chakraborty 2014. *Pramita Bangla Byabharik Byakaran*. Dhaka: Bangla Academy.

Manipuri

Chelliah, Shobhana Lakshmi. 1992. *A study of Manipuri grammar*. Ann Arbor

Assamese

¹³ The references are provided for all the Official Languages of India using the respective scripts and in some instances important dialects of the language.

Kakati, Banikanta;Goswami, Golock Chandra. 1962. *Assamese, its formation and development : a scientific treatise on the history and philology of the Assamese language*.Gauhati, Assam.
Robinson, William Rev.;Goswami, S. N.(ed). 1996. *A grammar of the Assamese language*.
Dibrugarh : Dept. of Assamese, Dibrugarh University.

DEVANĀGARĪ SCRIPT

General Overview

Masica, Colin P. 1991. *The Indo-Aryan Languages*. Cambridge: Cambridge University Press.
Lambert, Hester M. 1953. *Introduction to the Devanāgarī Script*. London: Oxford University Press.

Lambert, Hester M. 1958,*Introduction to the Devanāgarī Script for Students of Sanskrit, Hindi, Marathi, Gujarati and Bengali*. Oxford University Press

Languages

Bhojpuri

Shukla, Shaligram. 1981. *Bhojpuri grammar*. Washington, D.C. : Georgetown University Press.
Tiwari, UdaiNarain. 1960. *The origin and development of Bhojpuri*. Calcutta, India : Asiatic Society, - Asiatic Society monograph series ; v. 10

Boro/Bodo

Baro, Madhu Ram. 2001. *The Boro structure : a phonological and grammatical analysis*.Hajo : Priyadani Publications.

Basumatary, Phukan.2005. *An introduction to the Borolanguage*.New Delhi : Mittal Publications.

Dogri

Gupta, Vina. 1986. *DogriBhashaUdbhavaurVikas*.Jammu and Kashmir Academy of ArtsCultureand Languages. Jammu.

Gupta, Vina. 1995. *Dogrivyakaran*. Jammu and Kashmir Academy of ArtsCultureand Languages. Jammu.

Hindi

Kellogg, S. H. 1938. *A Grammar of the Hindi Language*, 3rd ed. London: Routledge & Kegan Paul.

Kachru, Yamuna.2006.*Hindi*. London Oriental and African Language Library, 12

Koul, Omkar N. 2008. *Modern Hindi Grammar*. Hyattsville, USA: Dunwoody Press.

केंद्रीयहिंदी निदेशालय. 2014.*देवनागरी लिपि तथा हिंदी वर्तनी का मानकीकरण, नई दिल्ली*¹⁴.

Kashmiri in Devanāgarī script

Koul, Omkar N. 1977. *Linguistic Studies in Kashmiri*. New Delhi, India: Bahri Publications Pvt. Ltd.

Koul, Omkar N. 1985. *An Intensive Course in Kashmiri*. Mysore, India: Central Institute of Indian Languages.

Koul, Omkar N. 1996. *Kashmiri: A Cognitive-Descriptive Grammar*. Routledge.

Koul, Omkar N. 2006.*Modern Kashmiri Grammar*. Hyattsville, USA: Dunwoody Press.

Konkani

Borkar, Suresh Jaiwant. 2014. *KonkanniVyakarann*. Konkani Bhasha Mandal. Goa.

Maithili

Yadav, Ramawatar. 1996. *A reference grammar of Maithili*. Mouton de Gruyter. Berlin ; New York.

Jha, Govinda.1974. *Maithili BhashakaVikas*.Patna : Bihar Hindi GranthAkadami.

Jha, Rajeshwar. 1980. *MithilaksharakUdgam o Vikas*. Patna

Marathi

Wali, Kashi. 2005 *Marathi*, München: Lincom Europa. pp. 72

¹⁴Central Hindi Directorate. 2014. *Devanāgarī :Script and Standardisation of Hindi Orthography*. New Delhi.

Dhongade, Ramesh Vaman;Wali,Kashi. 2009. *Marathi*. John Benjamins Publishing Company.

Nepali

Acharya,Jayaraj. 1991.*A Descriptive Grammar of Nepali and an analysed corpus*. Washington. Georgetown University.

Dahal,Ballabh Mani.1974.*A Description of Nepali: Literary and Colloquial*. Ph.D Thesis. University of Pune.

Rajasthani and it dialects

Marwari

LakhanGusain. 2004. *Marwari*. Lincom: Series Languages of the world. Materials ; 427. München

Mewati

LakhanGusain. 2003. *Mewati*. Lincom: Series Languages of the world. Materials ; 386. München

Shekhawati

LakhanGusain. 2001. *Shekhawati*. Lincom: Series Languages of the world. Materials ; 385. München

Bagri

LakhanGusain. 2000. *Bagri*. Lincom: Series Languages of the world. Materials ; 384. München

Dhundhari

Gusain, Lakhan. 2006. *Dhundhari*. München: Lincom Europa: Series Languages of the world. Materials; 433. München

Harauti

Gusain, Lakhan. 2007. *Harauti*. München: Lincom Europa:Series Languages of the world. Materials; 434. München

Wagri

Gusain, Lakhan. 2008. *Wagri*. München: Lincom Europa: Series Languages of the world. Materials;437.München

Sanskrit

Whitney, William Dwight. 1889. *Sanskrit Grammar*. Cambridge: Harvard University Press.

Santhali/Santali

Bodding, P. O. 1952. *A Santali Grammar for Beginners*. Benagaria: Santal Mission of the Northern Churches Santali.

Sindhi in Devanāgarīscript.

Hussain,Fahmida. 2012. *Sindhi boli : mukhtalifulisanipahlu*. Sindhi Language Authority. Hyderabad. Sindh.

Lekhwani, Kanhaiyalal. 1997 *An Intensive Course in Sindhi*, CIIL Intensive Course Series - 11. Mysore, India: Central Institute of Indian Languages.

Yegorova R. P. *The Sindhi language*. 1971. Moscow, Nauka Publishing House. Languages of Asia and Africa.

GUJARATISCRIPIT

Cardona, George and BabuSuthar. "Gujarati" in Cardona and Dhanesh. 2003

Cardona, George. 1965. *A Gujarati Reference Grammar*. Philadelphia: University of Pennsylvania Press.

Doctor,Raimond. *A grammar of Gujarati*. LINCOM EUROPA, 2004

Kothari, Jayant.*Introduction to Language and Structure ofGujaratiLanguage*, Amadawad.University Book Production Board, Gujarat State. 1983

Lambert H.M. *Gujarati Language Course*.Cambridge University press. 1971

GURMUKHISCRIPIT

Bhatia, Tej. 1993 and 2010. *Punjabi : a cognitive-descriptive grammar*. London: Routledge.
Gill H.S. [Harjit Singh]; Gleason, H.A. 1969. *A Reference grammar of Punjabi*. Revised edition. Patiala, Punjab, India: Languages Department, Punjab University.
Shackle, C. 1972. *Punjabi*. London: English Universities Press.
Tolstaya. 1981. *Panjabi Language. A Descriptive Grammar*. Translated by G. L. Campbell. Routledge & Kegan Paul London, Boston and Henley

ODIA SCRIPT

Mahapatra. B. P. 1993. "Oriakṣara." *Jhankara* (Cuttack) 45 (Bishuba issue): 1-6.
Matson, Dan. 1971. *Introduction to Oriya, part 2: Oriya Writing*. East Lansing: Michigan State University, Asian Studies Center.
Tripathi, Kunjabihari. 1962. *The Evolution of Oriya Language and Script*. Cuttack: Utkal University.

DRAVIDIAN FAMILY

GENERAL OVERVIEW

Burnell. A. C. 1878. *Elements of South Indian Palaeography*, 2nd ed. London: Truebner.
Steever, Sanford B. 1987. "Tamil and the Dravidian languages." In *The World's Major Languages*, ed. Bernard Comrie, pp. 725-46. London: Croom Helm; New York: Oxford University Press.

TELUGU SCRIPT

Arden. A. H. 1937. *A Progressive Grammar of the Telugu Language*, 4th ed. Madras: Christian Literature Society.
Krishnamurti, Bh.. & J. P. L. Gwynn. 1985. *A Grammar of Modern Telugu*. Delhi: Oxford University Press.

KANNADA SCRIPT

Kittel, Ferdinand. 1903. *A Grammar of the Kannada Language in English*. Mangalore: Basel Mission Book and Tract Repository.
Spencer, Harold. 1950. *A Kanarese Grammar*, rev. W. Perston. Mysore: Wesley Press.
Sridhar, S.N. 2009. *Modern Kannada Grammar*. Delhi: Manohar.

MALAYALAM SCRIPT

Frohenmeyer, L. J. 1913. *A Progressive Grammar of the Malayalam Language for Europeans*. Mangalore, India: Basel Mission.
Syamala Kumari. B. 1981. *An Intensive Course in Malayalam*. Mysore: Central Institute of Indian Languages.

TAMIL SCRIPT

Arden, A. H. 1942. *A Progressive Grammar of the Tamil Language*, 5th ed. Madras: Christian Literature Society.
Asher, Ronald. 1985. *Tamil*. London: Croom Helm.
Lehmann, Thomas. 1989. *Grammar of Modern Tamil*. Pondicherry: Pondicherry Institute of Linguistics and Culture.

Webography

IndoGermanisch classification of Languages:

<https://homepages.thm.de/~hg8429/sprachen.html#sprachfam2>

ICANN. Devanāgarī VIP Issues Report

<https://en/topics/new-gtlds/Devanāgarī-vip-issues-report-03oct11-en.pdf>

The Unicode Consortium, "Chapter 9: South Asian Scripts. The Unicode Standard, Version "6.0", (MountainView, CA: The Unicode Consortium.

<http://www.unicode.org/versions/Unicode6.1.0/ch09.pdf>

The Unicode Consortium, "The Unicode Standard, Version 7.0", (Mountain View, CA: TheUnicode

Consortium, 2014.<http://www.unicode.org/versions/Unicode7.0.0/>

ISO/IEC, "ISO/IEC 10646:2012. International Standard--Information technology – UniversalMultiple-OctetCoded Character Set (UCS)", 2012.