# Proposal to encode JIHVAMULIYA and UPADHMANIYA for Soyombo

Anshuman Pandey
Department of Linguistics
University of California, Berkeley
Berkeley, California, U.S.A.
anshuman.pandey@berkeley.edu

December 3, 2015

1 Introduction

The Soyombo script was proposed for encoding in N4655 L2/15-004. The following two characters were requested by Mongolian experts during a meeting in Tokyo, October 15–16, 2015:

Glyph	Code	Character name
⊠	11A84	SOYOMBO SIGN JIHVAMULIYA
ന	11A85	SOYOMBO SIGN UPADHMANIYA

The code points reflect approved changes made to the Soyombo block (see L2/15-247).

2 Description

The letters ⊠ SOYOMBO SIGN JIHVAMULIYA and ന SOYOMBO SIGN UPADHMANIYA represent contextual pronunciations of Sanskrit *visarga*, or post-vocalic aspiration. This sound is represented as ◌ꮝ U+11A95 SOYOMBO SIGN VISARGA. It corresponds to ◌ꮝ U+0F7F TIBETAN SIGN RNAM BCAD.

When *visarga* occurs before the unvoiced velar letters *ka* and *kha* it is realized as a voiceless velar fricative /x/. This sound is called *jihvāmūlīya* "from the base of the tongue" (guttural) and it is often transliterated as *ẖ*. It is represented in Soyombo as ⊠, which corresponds to ⊠ U+0F88 TIBETAN SIGN LCE TSA CAN.

Similarly, when *visarga* occurs before the unvoiced labial letters *pa* and *pha*, it is realized as a voiceless bilabial fricative /ɸ/ This sound is called *upadhmānīya* "blowing" (fricative) and it is often transliterated as *ḫ*. It is represented in Soyombo as ന, which corresponds to ന U+0F88 TIBETAN SIGN MCHU CAN.

3   Encoding model

While the sign VISARGA combines with a preceding character and is written linearly, the signs JIHVAMULIYA and UPADHMANIYA are stacked above the following consonant. While these characters may conceptually 'combine' with a letter, the Unicode model does not allow for prepending combining signs. Therefore, these characters are given the properties of a letter. They appear only in stacked conjuncts without the use of ⍛ SOYOMBO SUBJOINER. This behavior is modelled upon corresponding characters in Sharada (see Unicode standard, § 15.3 'Sharada', p. 572). The characters are placed within a dashed box in the code chart to indicate that they have special rendering behaviors.

ḫka	ꮶ	<⊠ SOYOMBO SIGN JIHVAMULIYA, ꭖ SOYOMBO LETTER KA>
ḫkha	ꮷ	<⊠ SOYOMBO SIGN JIHVAMULIYA, ꭗ SOYOMBO LETTER KHA>
ḫpa	ꮸ	<⊡ SOYOMBO SIGN UPADHMANIYA, ꭳ SOYOMBO LETTER PA>
ḫpha	ꮹ	<⊡ SOYOMBO SIGN UPADHMANIYA, ꭴ SOYOMBO LETTER PHA>

In order to accommodate the glyph height of surrounding letters, the base consonant may be vertically compressed so that the *jihvamuliya* and *upadhmaniya* fit within the height:

kaḫkaka	ꭖꮶꭖ	< ꭖ SOYOMBO LETTER KA
		⊠ SOYOMBO SIGN JIHVAMULIYA
		ꭖ SOYOMBO LETTER KA
		ꭖ SOYOMBO LETTER KA>
paḫpapa	ꭳꮸꭳ	<ꭳ SOYOMBO LETTER PA
		⊡ SOYOMBO SIGN UPADHMANIYA
		ꭳ SOYOMBO LETTER PA
		ꭳ SOYOMBO LETTER PA>

4   Character Data

Character properties   In the format of `UnicodeData.txt`:

```
11A84;SOYOMBO SIGN JIHVAMULIYA;Lo;0;L;;;;;N;;;;;
11A85;SOYOMBO SIGN UPADHMANIYA;Lo;0;L;;;;;N;;;;;
```

Linebreaking   In the format of `LineBreak.txt`:

```
11A84..11A85;AL      # Lo     [2] SOYOMBO SIGN JIHVAMULIYA..SOYOMBO SIGN UPADHMANIYA
```

Syllabic categories   In the format of `IndicSyllabicCategory.txt`:

```
# Indic_Syllabic_Category=Consonant_With_Stacker

11A84..11A85  ; Consonant_With_Stacker # Lo   [2] SOYOMBO SIGN JIHVAMULIYA ..
                                              SOYOMBO SIGN UPADHMANIYA
```
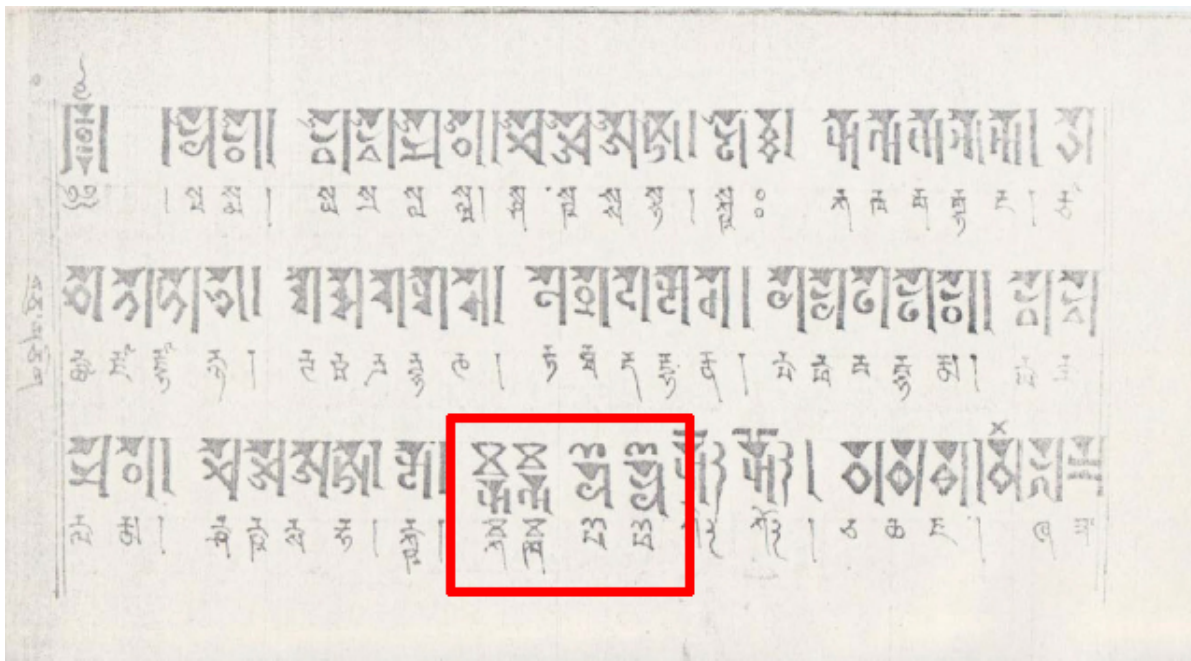
Figure 1: A manuscript folio showing examples of Soyombo with Tibetan transliterations. The ⊠ SOYOMBO SIGN JIHVAMULIYA is shown stacked above क SOYOMBO LETTER KA and ख SOYOMBO LETTER KHA. The ⊡ SOYOMBO SIGN JIHVAMULIYA is stacked above प SOYOMBO LETTER PA and फ SOYOMBO LETTER PHA.

	11A5	11A6	11A7	11A8	11A9	11AA
0	11A50	11A60	11A70	11A80	11A90	11AA0
1	11A51	11A61	11A71	11A81	11A91	11AA1
2	11A52	11A62	11A72	11A82	11A92	11AA2
3	11A53	11A63	11A73	11A83	11A93	
4	11A54	11A64	11A74	11A84	11A94	
5	11A55	11A65	11A75	11A85	11A95	
6	11A56	11A66	11A76	11A86	11A96	
7	11A57	11A67	11A77	11A87	11A97	
8	11A58	11A68	11A78	11A88	11A98	
9	11A59	11A69	11A79	11A89	11A99	
A	11A5A	11A6A	11A7A	11A8A	11A9A	
B	11A5B	11A6B	11A7B	11A8B	11A9B	
C	11A5C	11A6C	11A7C	11A8C	11A9C	
D	11A5D	11A6D	11A7D	11A8D		
E	11A5E	11A6E	11A7E	11A8E	11A9E	
F	11A5F	11A6F	11A7F	11A8F	11A9F	

Vowel carrier

11A50 ॳ SOYOMBO LETTER A

Vowel signs

11A51 ◌ SOYOMBO VOWEL SIGN I
11A52 ◌ SOYOMBO VOWEL SIGN UE
11A53 ◌ SOYOMBO VOWEL SIGN U
11A54 ◌ SOYOMBO VOWEL SIGN E
11A55 ◌ SOYOMBO VOWEL SIGN O
11A56 ◌ SOYOMBO VOWEL SIGN OE
11A57 ◌ SOYOMBO VOWEL SIGN AI
11A58 ◌ SOYOMBO VOWEL SIGN AU
11A59 ◌ SOYOMBO VOWEL SIGN VOCALIC R
11A5A ◌ SOYOMBO VOWEL SIGN VOCALIC L

Vowel length mark

11A5B ◌ SOYOMBO VOWEL LENGTH MARK

Consonants

11A5C ꤜ SOYOMBO LETTER KA
    • Mongolian g
11A5D ꤝ SOYOMBO LETTER KHA
    • Mongolian k
11A5E ꤞ SOYOMBO LETTER GA
11A5F ꤟ SOYOMBO LETTER GHA
11A60 ꤠ SOYOMBO LETTER NGA
11A61 ꤡ SOYOMBO LETTER CA
    • Mongolian j
11A62 ꤢ SOYOMBO LETTER CHA
    • Mongolian c
11A63 ꤣ SOYOMBO LETTER JA
11A64 ꤤ SOYOMBO LETTER JHA
11A65 ꤥ SOYOMBO LETTER NYA
11A66 ꤦ SOYOMBO LETTER TTA
11A67 ꤧ SOYOMBO LETTER TTHA
11A68 ꤨ SOYOMBO LETTER DDA
11A69 ꤩ SOYOMBO LETTER DDHA
11A6A ꤪ SOYOMBO LETTER NNA
11A6B ꤫ SOYOMBO LETTER TA
    • Mongolian d
11A6C ꤬ SOYOMBO LETTER THA
    • Mongolian t
11A6D ꤭ SOYOMBO LETTER DA
11A6E ꤮ SOYOMBO LETTER DHA
11A6F ꤯ SOYOMBO LETTER NA
11A70 ꤰ SOYOMBO LETTER PA
    • Mongolian b
11A71 ꤱ SOYOMBO LETTER PHA
    • Mongolian p
11A72 ꤲ SOYOMBO LETTER BA
11A73 ꤳ SOYOMBO LETTER BHA
11A74 ꤴ SOYOMBO LETTER MA
11A75 ꤵ SOYOMBO LETTER TSA
11A76 ꤶ SOYOMBO LETTER TSHA
11A77 ꤷ SOYOMBO LETTER DZA
11A78 ꤸ SOYOMBO LETTER ZHA
11A79 ꤹ SOYOMBO LETTER ZA
11A7A ꤺ SOYOMBO LETTER -A
11A7B ꤻ SOYOMBO LETTER YA
11A7C ꤼ SOYOMBO LETTER RA
11A7D ꤽ SOYOMBO LETTER LA
11A7E ꤾ SOYOMBO LETTER VA
11A7F ꤿ SOYOMBO LETTER SHA
11A80 ꥀ SOYOMBO LETTER SSA
11A81 ꥁ SOYOMBO LETTER SA
11A82 ꥂ SOYOMBO LETTER HA

11A83 ꥃ SOYOMBO LETTER KSSA

Visarga alternates

11A84 ◌ SOYOMBO JIHVAMULIYA
11A85 ◌ SOYOMBO UPADHMANIYA

Cluster-initial letters

11A86 ◌ SOYOMBO CLUSTER-INITIAL LETTER RA
11A87 ◌ SOYOMBO CLUSTER-INITIAL LETTER LA
11A88 ◌ SOYOMBO CLUSTER-INITIAL LETTER SHA
11A89 ◌ SOYOMBO CLUSTER-INITIAL LETTER SA

Final consonant signs

11A8A ◌ SOYOMBO FINAL CONSONANT SIGN G
11A8B ◌ SOYOMBO FINAL CONSONANT SIGN K
11A8C ◌ SOYOMBO FINAL CONSONANT SIGN NG
11A8D ◌ SOYOMBO FINAL CONSONANT SIGN D
11A8E ◌ SOYOMBO FINAL CONSONANT SIGN N
11A8F ◌ SOYOMBO FINAL CONSONANT SIGN B
11A90 ◌ SOYOMBO FINAL CONSONANT SIGN M
11A91 ◌ SOYOMBO FINAL CONSONANT SIGN R
11A92 ◌ SOYOMBO FINAL CONSONANT SIGN L
11A93 ◌ SOYOMBO FINAL CONSONANT SIGN SH
11A94 ◌ SOYOMBO FINAL CONSONANT SIGN S
11A95 ◌ SOYOMBO FINAL CONSONANT SIGN -A
    • Mongolian aang
    • Tibetan a-chung
    → 0F60 ཀ tibetan letter -a

Various signs

11A96 ◌ SOYOMBO SIGN ANUSVARA
11A97 ◌ SOYOMBO SIGN VISARGA

Gemination mark

11A98 ◌ SOYOMBO GEMINATION MARK

Subjoiner

11A99 ◌ SOYOMBO SUBJOINER
    • used for producing conjunct stacks

Punctuation

11A9A ◌ SOYOMBO TSHEG
11A9B | SOYOMBO SHAD
11A9C ‖ SOYOMBO DOUBLE SHAD

Head marks

11A9E ▓ SOYOMBO HEAD MARK WITH MOON AND SUN AND TRIPLE FLAME
    • used for the national symbol of Mongolia
11A9F ▓ SOYOMBO HEAD MARK WITH MOON AND SUN AND FLAME
11AA0 ▓ SOYOMBO HEAD MARK WITH MOON AND SUN

Terminal Marks

11AA1 ▓ SOYOMBO TERMINAL MARK-1
11AA2 ▓ SOYOMBO TERMINAL MARK-2
    = cintamani, candamani