L2/16-039

DEPARTMENT OF INFORMATION TECHNOLOGY
Government of Tamil Nadu, India

ABSTRACT

Tamil Fraction and symbols encoding proposal – Extended feedbacks - Experts from GoTN and user communities involved – Proposal evaluated from the required perspectives – Amendment proposal submitted.

1 Background

1.1 Proposal Reference

1) L2/12-231 - Proposal to encode Tamil fractions and symbols, 17th July 2012, by Dr.Shriramana Sharma – (http://www.unicode.org/L2/L2012/12231-tamil-fractions-symbols-proposal.pdf)

2) L2/12-232 – Letter of Dr.Shriramana Sharma on his proposal 12-231 – (http://www.unicode.org/L2/L2012/12232-tamil-fractions-symbols-proposal-aux-doc.pdf)

3) L2/13-028 - Recommendations to UTC on Script Proposals, 25th January 2013, Deborah Anderson, et al – (http://www.unicode.org/L2/L2013/13028-script-rept.pdf)

4) L2/13-047 - Revised proposal to encode Tamil fractions and symbols, 5th March 2013, by Dr.Shriramana Sharma – (http://www.unicode.org/L2/L2013/13047-tamil-frac-rev.pdf)

5) SC2/WG2 N4462 – Attestations for Tamil fractions and symbols, 12th June 2013, by Dr.Shriramana Sharma - http://std.dkuug.dk/jtc1/sc2/wg2/docs/n4462.pdf)

6) ISO/IEC JTC1 SC2/WG2 N4623 – Response to the ICTA's doc L2/14-048 on Tamil fractions and Symbols – 10th September 2014, by Dr.Shriramana Sharma – (http://std.dkuug.dk/JTC1/SC2/WG2/docs/n4623.pdf)

7) L2/15-078 - Tamil and Tamil Supplement (proposed) Code Charts, Michel Suignard – (http://www.unicode.org/L2/L2015/15078-tamil.pdf)

8) L2/15-079 - Proposed name changes to Tamil Supplement block characters, Roozbeh Pournader, et al – (http://www.unicode.org/L2/L2015/15079-tamil-name-chg.pdf)

9) L2/13051r- Proposal to encode Malayalam minor fractions , 25th April 2013, of Dr.Shriramana Sharma , http://www.unicode.org/L2/L2013/13051r-malayalam-fractions.pdf

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10) L2/14218, Unification of Tamil and Grantha numerals , 11th September 2014, Dr.Shriramana Sharma, http://www.unicode.org/L2/L2014/14218-grantha-tamil-numeral.pdf

1.2 Introduction

Tamil Virtual Academy (TVA) of Government of Tamilnadu (GoTN) along with relevant scholars has reviewed these proposals, documents, and has obtained feedbacks from a variety of user communities. It has been very encouraging and satisfying to see a great participation of users from India and abroad on this proposal as it presents a sizeable number of symbols of interest, from old Tamil documents of various categories. While many feedbacks and communications in this regard are present in the document register of the Unicode consortium (UC), TVA and the Department of Information Technology, GoTN and GoI have also received feedbacks. Some of the feedbacks and discussions that came from the users may not be in the UC's document register but can be found at, http://218.248.16.18/unidoc/index.html, a page of TVA's portal.

Considering the variety of feedbacks and extended observations on the proposal, the Department of Information Technology of GoTN organized an extensive analysis covering the Functional, Language and Technology aspects involved in the proposal. Wherever required the Department of Information Technology of GoTN also consulted the Department of Electronics and Information Technology of GoI.

Inline with the communications of

- GoTN (L2/15-185, http://www.unicode.org/L2/L2015/15185-tamil-letter.html) and
- GoI (L2/15-176, http://www.unicode.org/L2/L2015/15176-goi-tamil-frac.pdf)

to UC, the Department of Information Technology, GoTN, had set up a panel consisting of scholars from different Tamil related fields/functions in order to review the proposal and to obtain feedbacks from Functional, Language and Technology perspectives. Annexure-1 has the details of the panel of subject experts. This panel had evaluated the proposal and feedbacks through Functional perspectives viz.,

- Name of the symbols
- Suitability of the symbols
- Shape-appropriateness of the symbols

- Possible Time variations of the symbols

- Possible Regional variations of the symbols

- Possible Handwriting style variations of the symbols

- Annotations for the symbols

- Historical evolution of the fractions and symbols etc.

From a technical-language perspective, the Unicode committee of TVA, also inspected various transliteration schemes and the issues and feedbacks related to Romanization requirements.

Subsequent to several meetings, the subject expert panel and other committees have submitted their decisions and final recommendations. Based on these recommendations, the Department of Information Technology, GoTN, submits this Amendment (draft) to the Tamil Fractions and Symbols encoding proposals and documents referred to in section 1.1.

1.3 General observation on the proposal L2/12-231

During the evaluation process, various scholars expressed a few common observations that may be of interest to note before proceeding further.

- It was through a collective assessment that encoding of such symbols be guided by a combined evidence of printed publications, estampages, photographs, logic in the derivation of the shapes and sometimes even personal vouching by the learned scholar or expert; and it should be as close to reality as possible.

- In some cases where there are more than one valid symbol for a particular item, the proposals to UC on fractions and symbols seem to have selected one while dropping others. And, there are items that have been incorrectly understood in the proposals to be a symbol or an abbreviation but actually they are neither.

- Considering the possibilities of more encoding needs in the future, it may be a good idea to have standards for naming the codepoints, and annotations.

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2   Summary of Evaluations and Amendments

The evaluations of the subject expert panel has resulted in a number of decisions, recommendations and actions. The various results can be classified as below:

- Symbols accepted as they are

- Symbols accepted but their shapes to be changed with minor variations

- Symbols accepted but their entire shapes have to be changed

- Symbols accepted but their names have to be changed

- Symbols accepted but the annotations on them have to be changed

- Symbols accepted, but adding additional symbols to a particular item

- Symbols dropped from the encoding proposal

- Symbols postponed from encoding for now

- Symbols added that were dropped earlier in L2/13-047, L2/13028

2.1 On the Code Chart L2/15-078 & L2/13-047

Following table summarizes the evaluations and amendments on the 55 symbols as found in the revised proposal L2/13047 and the code chart L2/15078. While the summary addresses the recommendations, the discussions and explanations for the changed or dropped items can be seen in the section-3 of this document.

Subject expert panel of GoTN does not have any comment on the symbols other than the symbols listed in this table.

Srl	Details as per L2/15078			Recommendations of subject expert panel of GoTN	Cross Ref. (click)
	Code Point	Symbol	Name		
1	11FC2	ஜு	TAMIL FRACTION 1/80th	Shape to be altered	3.1.3
2	11FC6	சூ	TAMIL FRACTION 3/80th	Defer to separate proposal	3.1.4
3	11FC8	௶	TAMIL FRACTION 1/16th	Shape to be altered	3.1.2
4			TAMIL FRACTION 1/16th - 2	New Symbol to be added	3.1.2
5	11FCA	௷	TAMIL FRACTION 1/8th	Shape to be altered	3.1.8
6	11FCC	௸	TAMIL FRACTION 3/16th	Shape to be Changed	3.1.1

7			TAMIL FRACTION ½ - 2	New Symbol to be added	3.1.7
8	11FCD		TAMIL FRACTION 1/5th	Shape to be Changed	3.1.9
9	11FC5		TAMIL FRACTION 1/32nd	Shape to be Changed	3.1.10
10	11FC7		TAMIL FRACTION 3/64th	Defer to separate proposal	3.1.11
11	11FD1		TAMIL SIGN NEL	Shape to be changed	3.2.1
12	11FD2		TAMIL SIGN SUVADU	Name to be changed	3.2.2
13	11FD6		TAMIL SIGN PADAKKU	Defer to separate proposal	3.2.5
14	11FD4		TAMIL SIGN URI	No encoding required	3.6.2
15	11FD5		TAMIL SIGN MUUVUZHAKKU	Shape to be altered	3.2.6
16	11FD8		TAMIL SIGN PAISAA	No encoding required	3.6.3
17	11FD9		TAMIL SIGN ANAA	No encoding required	3.6.4
18	11FDB		TAMIL SIGN PANAM	Shape to be changed	3.3.1
19	11FDC		TAMIL SIGN PON	Shape to be changed	3.3.2
20	11FDD		TAMIL SIGN VARAAGAN	Shape to be changed	3.3.3
21	11FDF		TAMIL SIGN GEJAM	No encoding required	3.6.5
22	11FE3		TAMIL DRY CULTIVATION SIGN	Shape to be altered	3.4.1
23	11FE4		TAMIL LAND SIGN	Shape to be changed	3.4.2
24	11FE7		TAMIL FIRST SIGN	Shape to be changed	3.5.1
25	11FEA		TAMIL SIGN CIRANJIIVI	No encoding required	3.6.6
26	11FEB		TAMIL SIGN PILLAI	No encoding required	3.6.7
27	11FEC		TAMIL SIGN RAAJA	No encoding required	3.6.8
28	11FED		TAMIL ABBREVIATION KKU	No encoding required	3.6.9
29	11FEE		TAMIL ABBREVIATION YUM	No encoding required	3.6.9
30	11FEF		TAMIL ABBREVIATION VUM	No encoding required	3.6.9

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2.2 On Reccommendations to UTC L2/13-028 & L2/12-231

The document "Recommendation to UTC" L2/13028 (Item 17) disagreed on 7 symbols proposed through L2/12231 due to a few reasons. Symbols for fractions $1/20^{th}$ and $1/4^{th}$ were considered to be same as alphabetic letters ப and வ respectively. Symbol of UZHAKKU was considered to be same as the one of the fraction $3/4^{th}$.

The subject expert panel of GoTN evaluated these and confirmed that the 4 items listed in the table below have distinct shape and significance and has provided the appropriate symbols for encoding. These are discussed in the sections down below. The other 3 symbols, that are pending for further research, will be handled later by taking them out of this proposal.

Srl	Details as per L2/13028 & L2/12231			Recommendations of subject expert panel of GoTN	Cross Ref. (click)
	Code Point	Symbol	Name		
1		ப	TAMIL FRACTION ONE TWENTIETH	Correct symbol provided for encoding	3.1.6
2		வ	TAMIL FRACTION ONE QUARTER	Correct symbol provided for encoding	3.1.5
3		ஞ	TAMIL SIGN UZHAKKU	Correct symbol provided for encoding	3.2.3
4		ங	TAMIL SIGN KURUNI	Correct symbol provided for encoding	3.2.4

3 Amendment Details

3.1 TAMIL FRACTIONS

FRACTION is to be called as "கீழ்வாய் இலக்கம்" in Tamil.The modern usage has been "பின்னம்".

3.1.1 TAMIL FRACTION THREE SIXTEENTHS

Tamil Code Chart as defined in L2/15078, describes this fraction as below:

11FCC ௬ TAMIL FRACTION THREE SIXTEENTHS
= muuviisam/mummaamukkaani

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Section 4.4 of the proposal L2/12231 is observed to be providing justification for this symbol. According to that proposal, this symbol is derived by fusing two different symbols with an assumption (proposed 11FCB + existing 0BF3) and the derivation provided is quoted below.

$$\text{mūvicam} \quad ^3/_{16} \; = \; \text{mummā} \quad ^3/_{20} \; + \; \text{mukkāṇi} \quad ^3/_{80} \; = \; ௱௯ \; \rightarrow \; ௱ + ல \; = \; ௱௸$$

The subject expert panel of GoTN observed that, "the glyph for 3/16th does not reflect the actual glyph; It is possible that the glyph is handwritten in the attestations to represent this glyph. It is not uncommon for various publications of old inscriptions to use handwritten or near-representative glyph, to denote a particular glyph. This practice may have set precedence for subsequent publications. Unfortunately, such glyphs cannot be used for encoding and only those found in the original root documents are the right candidates."

And thus, the "South Indian Inscriptions (SII)"[1] published by Archaeological Survey of India (http://asi.nic.in/) (ASI), provides evidence for the correct glyph for this fraction that is found in the inscription on the wall of "Ujjivanatha Temple" in the outskirts of Thiruchirapalli city of Tamil Nadu. Following is the picture of the page# 180 from SII-Vol.4 showing the text of Inscription# 542. The lines 2 and 3 round-marked in red shows the symbol for 3/16th (muuviisam).

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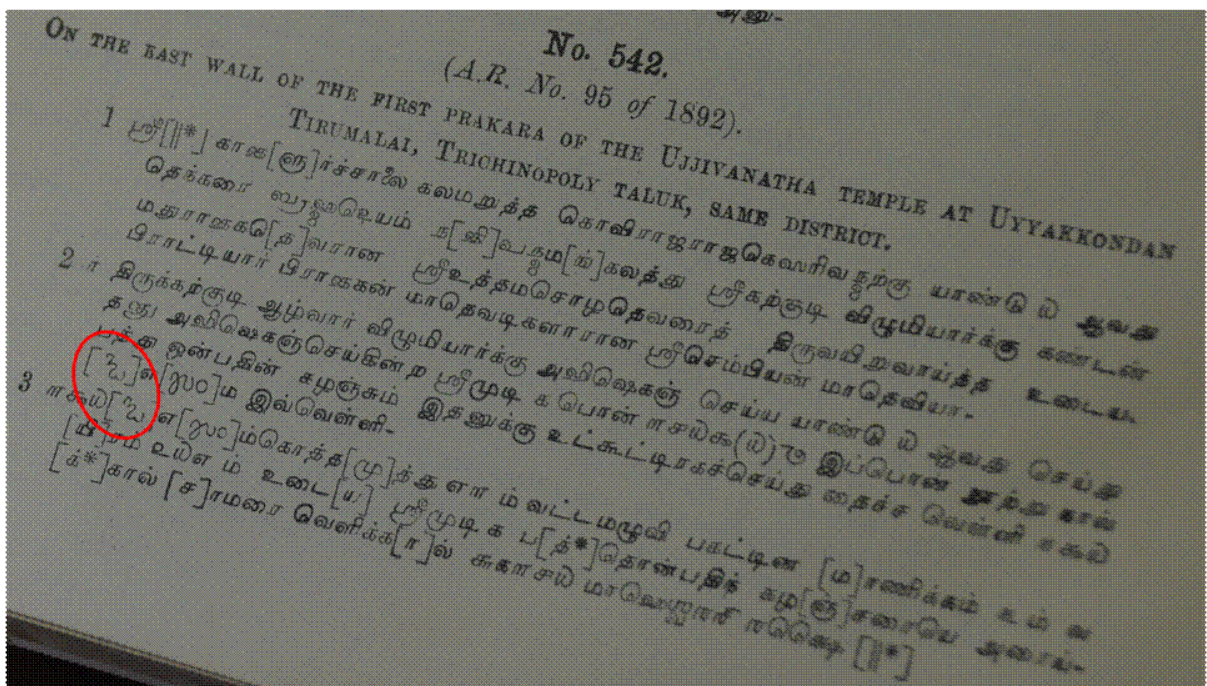
Further, the estampage (ASI-AR 95/1892) of the same inscription is also provided here for easy reference.

Hence, it is recommended that this changed symbol/glyph be encoded for denoting "TAMIL FRACTION THREE SIXTEENTHS" replacing the one proposed in the code chart L2/15078. The picture of the symbol is ⌐ᴖ . In the amended code chart (Annexure-2) this is described at 11FCE. Further the annotation should indicate that it denotes "mummaakani".

3.1.2 TAMIL FRACTION ONE SIXTEENTH

Tamil Code Chart as defined in L2/15078, describes this fraction as below:

11FC8 ᴗᴗ TAMIL FRACTION ONE SIXTEENTH
         = viisam/maakaani

Considering the discussion in 4.4.2 of L2/12231, the expert panel agrees with the glyph selection but recommends a minor change in the shape, and also recommends adding one more symbol to denote 1/16th . The glyph of 1/16th has two components:

MAA (∪) + KAANI (⌒) = MAAKAANI (∪ ⌒). Both these symbols individually are discussed in separate sections 3.1.6 and 3.1.3 respectively).

The variants discussed in the section 4.4.2 of L2/12231 are valid to a larger extent. However, for VIIS(C)AM/MAAKAANI, there are two other usages found normally in the old documents. One is through individual occurrence of MAA and KAANi occurring side-by-side, and another through a ligated form with some other symbol/digit. The symbol for MUUVIISAM recommended in the earlier section 3.1.1 of this document is an example for the ligated form when used with another symbol/digit. In the case of MUUVIISAM, VIISAM is ligated with TAMIL DIGIT THREE (0BE9). (MUUVIISAM = 3 VIISAM, 3 * 1/16th, MUU = THREE). It can be observed from the estampage in the section 3.1.1 that the ligature

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following the TAMIL DIGIT THREE has resemblance to the proposed symbol ᥙᥙ , but not close to it. The orthography is not a proper join of two MAA glyphs, but a form of ∿ . In this glyph, one can observe two arms and a ridge in-between. The height of the ridge is not same as that of the arms. Further the whole shape is slightly tilted anti-clock wise. Similarity of this form can be observed by the attestation from Caa.Ganesan (page 33 of L2/12231).

Therefore, a change in the shape of the glyph to reflect the natural usage of the fraction is recommended. (ᥙᥙ to be changed to ∿).

Now, when VIISAM/MAAKAANI is individually used, it takes the form of ∪ ౭. This is well discussed in the section 4.4.2 of L2/12231(பௐ, பௐ) . Usage of this form can be seen in the documentations in SII. Further, this disjointed form has been approved by GoTN through G.0.29 dated 23 June 2010 (L2/10-318).

SII-Vol.3, Inscription# 514, Page# 149 is shown below for clear evidence; The line 8 shows the evidence of the individual usage of MUUVIISAM/MAAKAANI. This is the same form that was discussed in 4.4.2 of L2/12231.

The estampage below (ASI-AR 67/1892) further makes it evident. The inscription is very long and part of it is shown here.

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For clear readability the 3 symbols/glyphs are focussed closely and the enlarged view is below. This in Tamil is read as "மூன்றரையே மாகாணி" (மூன்று + அரை + மாகாணி). The மாகாணி part is drawn-over in blue.

Therefore, it is recommended that this symbol be added as yet another symbol for VIISAM/MAAKAANI. The glyph is close to the one found in 4.4.2 of L2/12231 (⠀), but needs to change on the square-character of the MAA-part. A proper form is provided.

The panel of GoTN believes that both these forms will be used when dealing with the texts of old documents. Therefore, it is essential that both are encoded rather than replacing one with another leading to wrong recording/reading of old texts. The expert community is cautious that encoding doesn't deviate from history. When the historical records have more than one valid symbols for a particular item, it makes it appropriate to add them rather than replace one of them by another.

Therefore, to sum up, the VIISAM/MAAKAANI can have two symbols.

1) The proposed ⠀ is modified a little to be ⠀ so that it can be used as the ligature while using it with other symbols/digits. In the amended code chart (Annexure-2) this is described at 11FC9.

2) A new symbol ⠀ is added to the chart (the front portion of this symbol should not be square-like. It is more curved.) so that it can be used when the fraction is found individually. In the amended code chart (Annexure-2) this is described at 11FCA.

The former is called as "TAMIL FRACTION VIICAM–1" and the later is called as "TAMIL FRACTION VIICAM–2". Both have annotations "= MAAKAANI" and "= 1/16th".

3.1.3 TAMIL FRACTION ONE EIGHTIETH

Tamil Code Chart as defined in L2/15078, describes this fraction as below:

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11FC2 ௲ TAMIL FRACTION ONE EIGHTIETH
= kaani

Panel of GoTN agrees to this glyph but recommends however a minor change to the shape. It has also carefully considered the discussion found in L2/12231 in this context. The actual glyph widely found in the old documents is ◌. The proposed symbol ௲ (through L2/12231, L2/13047) has a long vertical line stemming up from the bottom causing a deviation to the actual shape. Trimming the vertical line will match it with the actual. This is important because, this symbol/glyph is used alone, and in some cases ligated also with other digits/symbols. So, this error should not get propagated into the future.

Following text is from SII-Vol.24, Inscription 24, Page 92. The third line of the inscription is as below.
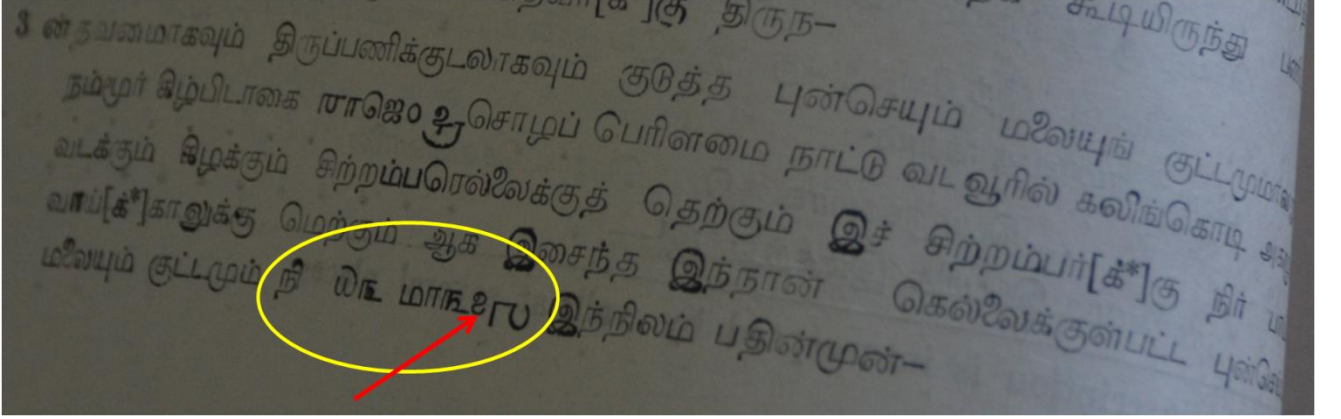
Interesting symbols are here and it is worth noting as how they are written in this printed text. "நிலம் 13 மா முக்காணி அரைக்காணி" is the meaning of the symbols within the yellow-circle. Here, MUKKAANI is printed using separate symbols of TAMIL DIGIT THREE (0BE9) and KAANI. To enable more clarity, the yellow-circled part of the text is enlarged and presented below. This printed text shows correct shape of KAANI.
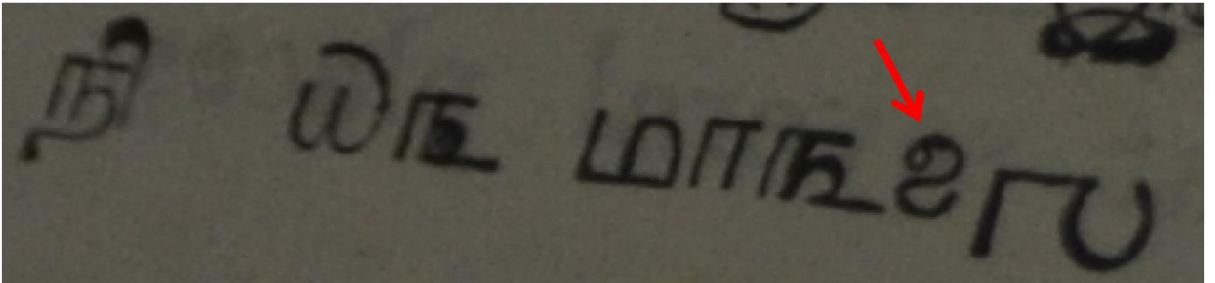
Further, the corresponding estampage from ASI-AR 129/1938-39 is as below.
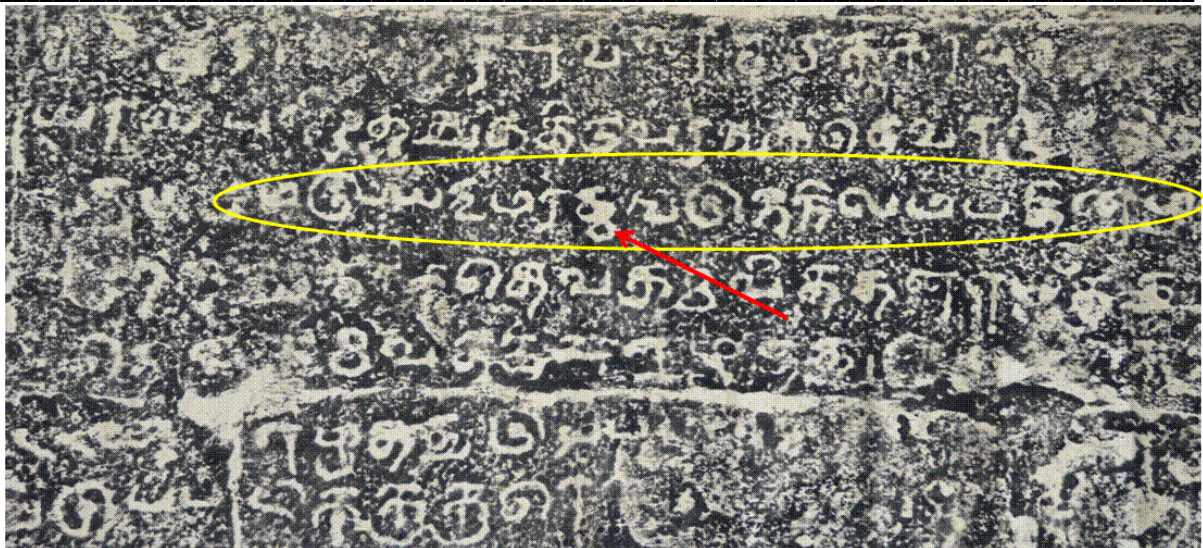
Here it can be observed that MUKKANI is written in the fused form of TAMIL DIGIT THREE and the symbol of KAANI. The arrow line in red colour points to MUKKAANI. The enlarged picture of MUKKANI from the estampage below enables better understanding of KAANI part of the glyph in the MUKKAANI.

The drawn up blue coloured line shows the KAANI part of the MUKKANI. It can be observed that there is no vertical line stemming upwards. This is exactly the symbol of KAANI. (Unfortunately, the blue-line curve is not smooth, as it is hand-drawn over; please bear with it.).

Therefore, it is recommended to alter the symbol of KAANI a little. The correct picture of KAANI is ℰ . In the amended code chart (Annexure-2) this is described at 11FC2.

As said earlier, this will impact other symbols also. In that regard the symbol of MUKKANI will also need the minor alteration, trimming the vertical line of KAANI part.

3.1.4   TAMIL FRACTION THREE EIGHTIETH

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Tamil Code Chart as defined in L2/15078, describes this fraction as below:

11FC6   ௸   TAMIL FRACTION THREE EIGHTIETHS
              = mukkaani

As the shape of the symbol of KAANI is recommended to have minor alteration, this symbol will also be impacted. This has been discussed in the earlier section 3.1.3 as it is a common issue for both the symbols. In this symbol there are two parts, one representing Tamil digit 3 and the next representing KAANI. The first part of the symbol should represent 3 (TAMIL DIGIT THREE, 0BE9) properly. The symbol at 11FC6 of L2/15078 does not represent digit 3 correctly.

The correct symbol for the fraction is ௸. However, in the estampages in the research of the panel were found to have scratches that could not identify correct shape representing digit 3. Therefore, the panel has proposed a wider research for this symbol.

Hence, at this stage, the panel recommends to postpone the encoding of the symbol by removing it from the current proposal. Encoding for this will be proposed through a separate proposal at a later period.

3.1.5   TAMIL FRACTION ONE QUARTER

QUARTER = கால் (KAAL) in Tamil.

L2/12231 proposed this fraction to be encoded. However, the "Recommendation to UTC" document L2/13028 (Item 17) disagreed as the symbol proposed for this fraction was declared to be same as the alphabetic character "TAMIL LETTER VA" (0BB5).

The expert panel evaluated the proposal and this recommendation, and conveys that the glyph of Tamil alphabetic letter **"வ"** ("VA") is slightly different from the glyph of Tamil fraction "கால்" (KAAL). Since the printed texts commonly use the easily available typefaces, they have used the alphabetic **"வ"** and its variants as representative glyph for this fraction instead of making a separate typeface and hence this confusion has occurred.

SII-Vol.3, Inscription# 167, Page 343-344, Line# 4 has a text that uses Tamil fraction KAAL/Quarter.
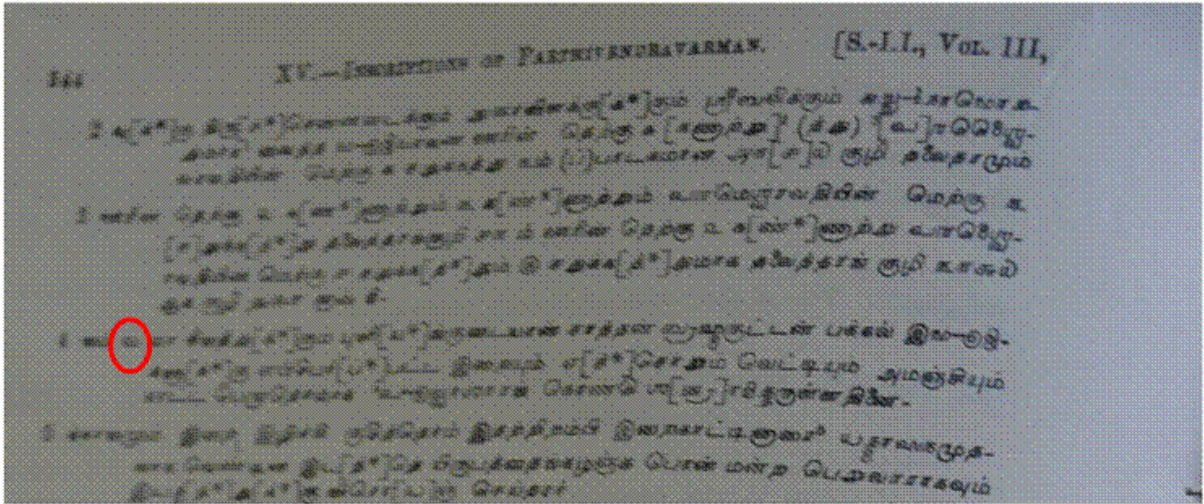
The line 4 should be read as continuation of Line 3 (நிலம் வ மா நிலத்து). While the printed text above shows the symbol for quarter as "வ", the corresponding estampage below shows the actual symbol of Quarter.

It can be observed from this inscription that the symbol of fraction KAAL/Quarter is very different from the alphabetic letter "வ". And hence, it is recommended to add this symbol for TAMIL FRACTION ONE QUARTER. The picture for the symbol is

Besides , the annotations "also denotes the fraction one quarter" and "= kaal" of 0BB5 should be dropped. In the amended code chart (Annexure-2) this is described at 11FD0.

3.1.6 TAMIL FRACTION ONE TWENTIETH

1/20[th] = "மா" (MAA) in Tamil.

L2/12231 proposed this fraction to be encoded. L2/13028 disagreed as the symbol proposed for this fraction was declared to be same as the alphabetic character "TAMIL LETTER PA" (0BAA). The discussions we had above for the fraction "கால்"/Quarter(3.1.5) is

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applicable to this fraction also. Glyph of TAMIL LETTER PA **"ப"** is very different from the actual symbol of the fraction **"மா"**(∪). The alphabet **"ப"** is squared but symbol of **"மா"**(MAA) is more curved at the bottom and one of its arms is a bit more obtuse than the other. This can easily be understood through the earlier estampage in the section 3.1.2. Some of the discussions related to "MAA" there, are also relevant here. Here, the same estampage is reproduced to show the difference between ∪ and alphabet **"ப"**.
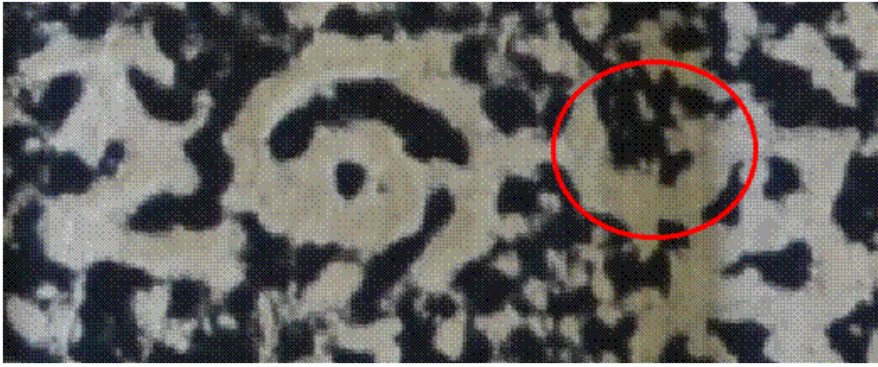
The red-circled symbol is for MAA. The text related to this as shown in 3.1.2 is also reproduced here for reference.
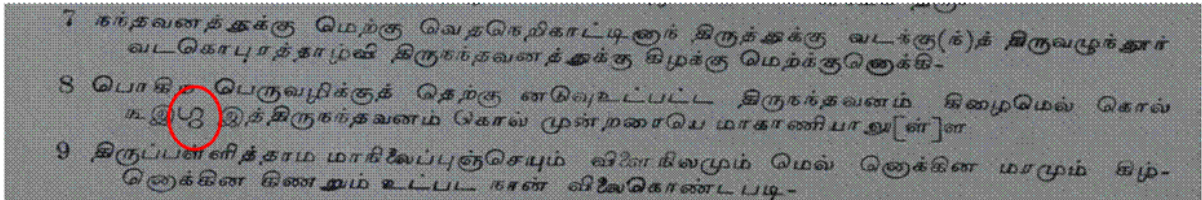
Please note the word "உட்பட்ட" in the same line(8th) of the inscription where "MAA+KAANI" exists. And also note the word "உட்பட" in the 9th line. Both the words in these lines use the letter **"ப"**.

The inscription being very long, the leading part from the MAA symbol (8th line) and the trailing part (of 8th and 9th line) are given below for easier reading. Observe how the letter **"ப"** is written in the word "உட்பட்ட" in the leading part, and the same in the word "உட்பட" in the next part. The symbol representing MAA is red-circled and the **"ப"** is yellow-circled.

It can be observed that in both the places letter **"ப"** is same with its square shape, and different from MAA as it is rounded at the bottom with its arms obtuse. (Please zoom up for more clarity).

Therefore, it is recommended that a separate symbol for the fraction 1/20th be encoded and the shape of the symbol of MAA is ∪. Besides, the annotations " also denotes the fraction one twentieth" and "= maa", given under TAMIL LETTER PA (0BAA) has to be removed. In the amended code chart (Annexure-2) this is described at 11FC8.

3.1.7 TAMIL FRACTION ONE HALF

Tamil Code Chart as defined in L2/15078, describes this fraction as below:

11FCE   ௲   TAMIL FRACTION ONE HALF
= arai

With reference to the discussions in section 4.4.2 of L2/12231, while agreeing to the inclusion of the proposed symbol ௲ for ½ ("அரை" = "ARAI"), the panel recommends to include the symbol ௲ also for encoding. "When more than one valid-symbol exist in the history, it is incorrect to select only one out of many". As long as the symbol is valid and has sizeable formal usage it can be considered for encoding, evaluating various other parameters. It is important to note that in the case of old-texts valid symbols represent various dates or regional differences. In the context of publications and e-textualization, representing one valid symbol with other valid symbol will lead to confusion and distortion

of documents and history. Instead of dropping one valid-symbol for another, encoding should accommodate both so that it truly helps publication and e-textualization. It will be a good practice to identify with care and caution the validity of a symbol through relevant primary sources rather than secondary sources so that the right encoding helps the old documents of different nature. And, it is important to mention that the panel disagrees with the font substitution solution for such valid, significant and important symbols. This discussion is applicable to other symbols that have more than one valid-symbols also (ex. VIISAM).

In the case of "ARAI", a huge volume of old documents exist with the usage of the symbol ⬡. For example, the SII-Vol.24 has the text of Inscription# 31 in the pages 28 to 30 that has occurrences of ARAI with the symbol resembling ⬡. The screen shot of line 7 and 8 are given below. It should be noted that, ARAI/HALF is represented in this print text using the old-alphabetic letter "RAA" (வல்லின றகாரம்).
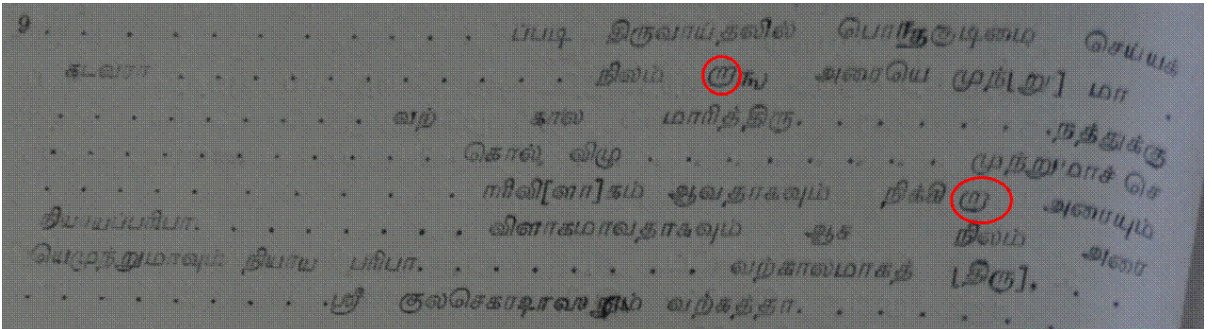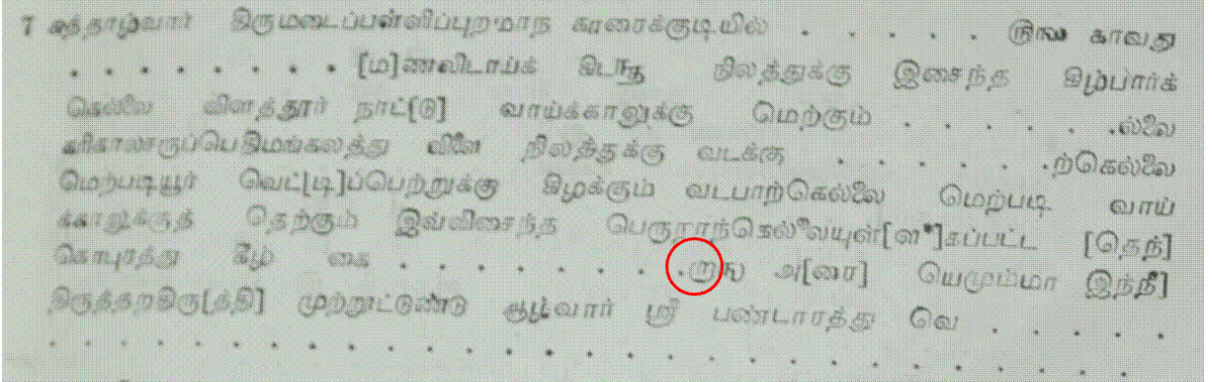
Following is the estampage (ASI- AR 131 of 1947-48) showing a portion of the 9th line where the second occurrence of ARAI/HALF can be seen in the string " நீக்கி ⬡ அரை……".
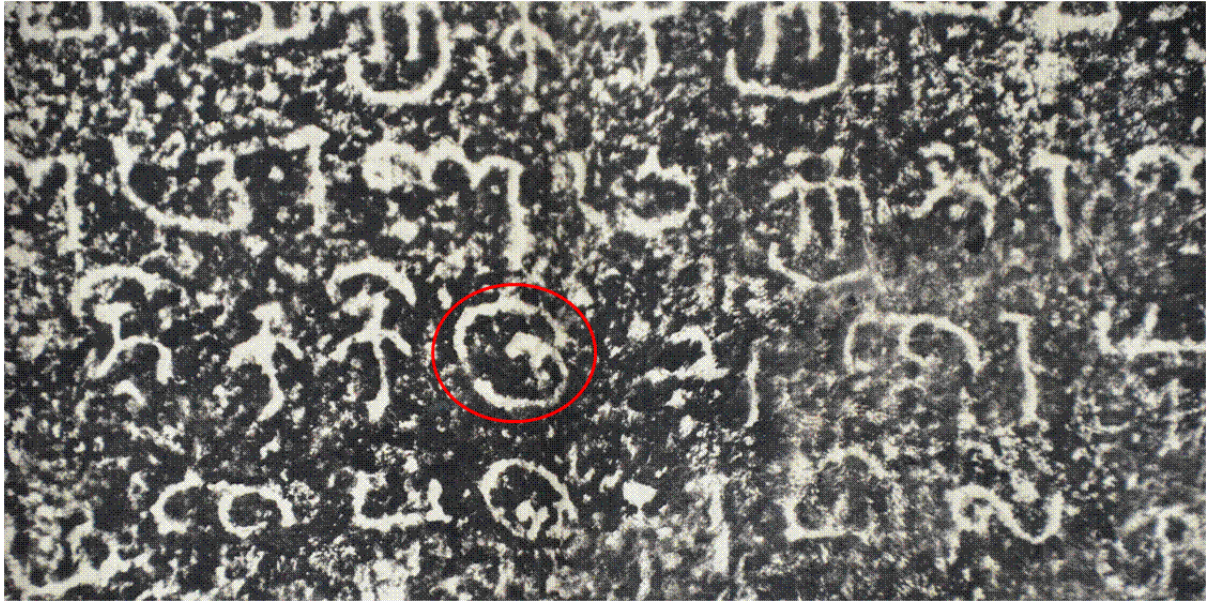
Therefore, this symbol for ARAI/HALF also has to be encoded. As this symbol (⊙) has earlier usage (10-11 Century CE), this can be named "TAMIL FRACTION ARAI–1" and the other symbol (℗) can be "TAMIL FRACTION ARAI–2". In the amended code chart (Annexure-2) these are described at 11FD1 and 11FD2 respectively.

3.1.8 TAMIL FRACTION ONE EIGHTH

Tamil Code Chart as defined in L2/15078, describes this fraction as below:

11FCA வௗௗ TAMIL FRACTION ONE EIGHTH
        = araikkaal

Evaluating the discussion on this symbol in section 4.4.1 of L2/12231, the shape of the glyph is almost correct but needs minor alteration.

The fraction அரைக்கால் = $1/8^{th}$ is = ¼ multiplied by ½ (quarter of half). The following picture is page 169 from the Vijayanagara Inscription part of "Tirumala Tirupati Devasthanam Inscriptions – Vol.1 / 1988"[4]. It presents the Inscription# 181, 182 (#373 & 485-TT). It has occurrences of symbol வௐௗ for $1/8^{th}$.

This symbol is the combination of glyph of ¼ and glyph of ½ . ¼ is represented in the section 3.1.5 as ௮ and ½ is represented in the section 3.1.7 as the TAMIL FRACTION ARAI

_____

– 2(⟨symbol⟩). In both ⟨symbol⟩ as appearing in the Inscription text below and ⟨symbol⟩ as proposed by L2/12231, the second part representing HALF is a deformed symbol of TAMIL FRACTION ARAI–2 ⟨symbol⟩ . Logically it will be correct to alter the symbol a bit to accommodate the shapes of ¼ and ½(2). Hence it is recommended to alter the shape to ⟨symbol⟩ . In the amended code chart (Annexure-2) this is described at 11FCC.

VIJAYANAGARA INSCRIPTIONS

No. 181.

(Nos. 373 and 485—T. T.)

[On the door-jamb wall (front right side) of paḍikāvali-gōpura in Tirumala Temple.]

Text

1. ⟨Tamil text⟩
2. ⟨Tamil text⟩
3. ⟨Tamil text⟩
4. ...⟨Tamil text⟩
5. ⟨Tamil text⟩
6. ⟨Tamil text⟩ (ᵒ) ⟨Tamil text⟩

Translation

1. Hail! In the prosperous year Kilaka⁶...........

2–5. The charity of 28 cows and 1 bull for seven-eighths of a *nandāviḷakku* for Tiruveṅkaṭamuḍaiyān was made by the *Pekkoḍ ṅ* (minister) of Śrī Vīra-Kumāra-Kampaṇa Uḍaiyar entitled *Mahāmaṇḍalīśvara, Arirāya-vibhāḷa* and (*Bhāshaikkuttappuvarāvara)gaṇḍa*.

5–6. This (charity) shall last as long as the moon and the sun endure. May this the Śrīvaishṇavas protect!

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No. 182.

(No. 374—T. T.)

[On the door-jamb wall (front right side) of paḍikāvali-gōpura in Tirumala Temple.]

Text

1. ⟨Tamil text⟩
2. ⟨Tamil text⟩

Translation

One-eighth of a (*nandā-*)viḷakku (oil-lamp) was added in the month of Mārgaḷi⁸ of this year, making a total of one full light.

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NOTE :– The English equivalent date of No. 179 *ante.* is 6th July 1359 A.C.
1. May be read ⟨Tamil text⟩.
2. Read ⟨Tamil text⟩
3 and 4 Read ⟨Tamil text⟩
5. Read ⟨Tamil text⟩ —
6. = Śaka 1290 = 1368 A.C.
7. Read ⟨Tamil text⟩ = ⅛.
8. = December 1368 A.C.

169

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3.1.9   TAMIL FRACTION ONE FIFTH

Tamil Code Chart as defined in L2/15078, describes this fraction as below:

11FCD   ௐ   TAMIL FRACTION ONE FIFTH
= naalumaa
• for one quarter "kaal" use 0BB5 வ
→ 0BB5 வ   tamil letter va

நாலுமா = NAALUMAA = NAALU + MAA = 4 time MAA. According to the panel the symbol ௐ is incorrect . Please refer to the section 3.1.6 for the symbol of MAA as ∪ . NAALUMAA is combination of the ச-like symbol (resembling TAMIL DIGIT FOUR), and the symbol of MAA. So, it is written as ௐ . This can be seen in the 4th line of the text of SII-Vol.12, Inscription# 148, Page 76 shown here. This is the enlarged view of the 4th line.
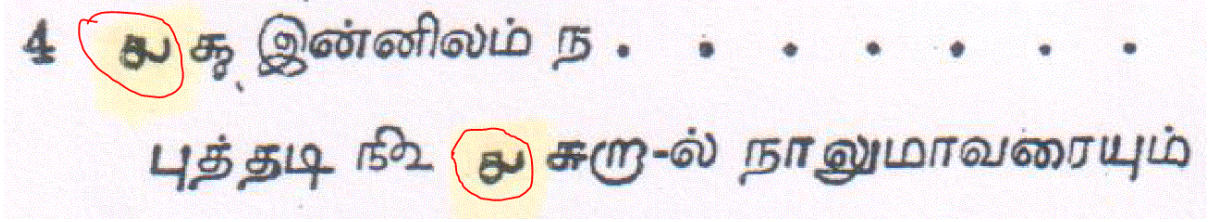
The full page can be seen below. Any symbol other than this could be a possible variation due to hand writing style. (Often enough the symbol for 4 and the symbol for Half are not differentiated; the symbol for four should have a nose whil the symbol for half doesn't have). Hence, the panel recommends to change the symbol to ௐ for NAALUMAA. In the amended code chart (Annexure-2) this is described at 11FCF.

Annexue IV.5

7·6

4 ... [handwritten and Tamil inscription text]

5 ... [Tamil inscription text]

No. 148.

(*A.R. No. 530 of 1922*).

TIRUKKAṆṆAPURAM, NANNILAM TALUK, TANJORE DISTRICT.

ON THE EAST WALL OF THE SECOND PRĀKĀRA IN THE ŚAURIRĀJA-PERUMĀḶ TEMPLE.

This is an incomplete record of Peruñjiṅgadēva dated in the **5th year** and is called a *mūlasādhanam*[1] of the chief. It records a sale of land in Śembiyaṉ Kurudai-yāḍi, situated in Paṉaiyūr-nāḍu, a subdivision of Kulōttuṅgaśōla-vaḷanāḍu, to Udaiyaṉ Tiruñāṉasambandan Aḷagiyāṉ Rājadivākara-Mūvēndiravēḷāṉ of Viḷiyūr in Āvūr-kūṟṟam, a subdivision of Nittavinōda-vaḷanāḍu by **Araiyaṉ Puṟṟiḍaṉkoṇḍāṉ Dēvapperumāḷ**, the headman of Kurudaiyāḍi in Tañjāvūr-kūṟṟam, a subdivision of Pāṇḍikulāśani-vaḷanāḍu. As the record is incomplete further details as to the purpose of the transaction are not clear.

The details of date given in the inscription are not regular.

Text.

1 மூலசாதனம் [l*] ஶ்ரீஶ் . . . . பெருஞ்சிங்கதேவற்கு யாண்டு [ரு-வது] மகரநாயற்று ... [Tamil inscription text]

2 தேவப்பெருமாளே . . . . ன்ற நிலமாவது [‖ *] ... [Tamil inscription text]

3 த்தம் இட உளர் இக்குழி . . . . உநூஎஉ(ரு-க்கு குழி இருநூற்றிருபத்தஞ்சும் ... [Tamil inscription text]

4 ... [Tamil inscription text]

5 புட்பறியல்குட்ட . . . . க்கு விட்டு ... [Tamil inscription text]

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[1] Compare such terms as *sādhanam*, *ōlai*, *tirumandira-ōlai*, *niyōgam*, *tirumugam* or *śrimukha ōṭṭu* and *śattimugam* used in inscriptions.

[2] The inscription stops here.

3.1.10 TAMIL FRACTION ONE THIRTY-SECOND

Tamil Code Chart as defined in L2/15078, describes this fraction as below:

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11FC5   TAMIL FRACTION ONE THIRTY-SECOND
= araiviisam

அரைவீசம் = ARAIVIIS(C)AM = Half of VIISAM/VIICAM.

The derivation found in the Section 4.4 of L2/12231 is un acceptable as it is incorrect.

$$\text{araivīcam} \quad {}^{1}/_{32} \quad = \quad \text{araimā} \quad {}^{1}/_{40} \quad + \quad \text{araikkāṇi} \quad {}^{1}/_{160} \quad = \quad \text{சлர} \quad \rightarrow \quad \text{ச4 + ல} \quad = \quad \text{ச丩}$$

    It looks like that the author of L2/12231 has chosen to derive it this way as there was not any valid symbol could be found in the sources he has referred. It is also observed from the discussion in the section 4.4.3 (Errant attestations) of L2/12231, that, getting proper glyph for this fraction had been a concern. Further, it is observed that the symbol has been forcefully matched with an available collection.

    ARAIVIICAM = ARAI + VIICAM = HALF-**like** symbol + VIICAM symbol. Symbol of VIICAM can be understood from section 3.1.2 of this document. Therefore, the panel is providing the right symbol   by combining Half-like symbol and the proposed symbol of VIICAM(Annexure-2, 11FC9). In the amended code chart (Annexure-2) this is described at 11FC5.

    It can be observed that the VIISAM part of the symbol now has the logical uniformity among VIICAM (1/16th, section 3.1.2), and MUUVIICAM (3/16th, section 3.1.1) as below.

    VIISAM =   , ARAI-VIISAM =   MUU-VIISAM =   ;

3.1.11 TAMIL FRACTION THREE SIXTY-FOURTHS

Tamil Code Chart as defined in L2/15078, describes this fraction as below:

11FC7   TAMIL FRACTION THREE SIXTY-FOURTHS
= mukkaalviisam
• for one twentieth "maa" use 0BAA ப
→ 0BAA ப   tamil letter pa

முக்கால் வீசம் = MUKKAL VIIS(C)AM = ¾ VIIS(C)AM.

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Following two pictures are from the attestations of L2/12231, available at pages 38 and 35 respectively. It can be observed that, a) the symbols in both differ a lot; b) the symbol represents a sequence of symbols .
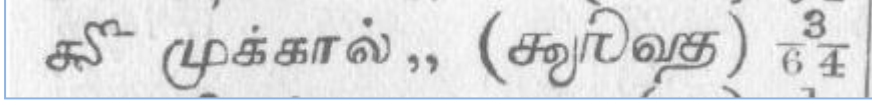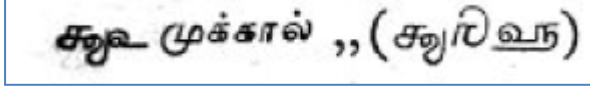
In the actual usage, it is very normal that multiple fractions occur in sequence. But, combining all of them to make another symbol is incorrect. It can be understood that L2/12231 (section 4.4, page 8) derives such a symbol as below through an equation with some assumption. It also looks like matching a symbol in the attestation forcefully.

The panel of GoTN does not suggest this way of creating a symbol. Also, during the research on this symbol, the panel observes various issues related to this symbol. Though, it could find a symbol of the shape (SII-Vol.10, Inscription# 174, Page 102), it also finds differences/variations in the documents. The panel is of the opinion that the lineage and usage of this symbol worth wider research. Hence, at this stage, the panel recommends to postpone the encoding of the symbol by removing it from the current proposal. Encoding for this will be proposed through a separate proposal at a later period.

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3.2 TAMIL MEASURES OF GRAINS

3.2.1 TAMIL SIGN NEL

Tamil Code Chart as defined in L2/15078, describes this measure as below:

11FD1   ஐ   TAMIL SIGN NEL
             • one grain of paddy

Panel of GoTN evaluated the glyph and the discussion on NEL in the section 4.6.1 of L2/12231. It also understands the observations of the author of the proposal L2/12231 mentioning, *"A case, not of proper glyphic variants but of difficulty in identifying the proper glyph, is in the case of nel, one grain, the least measure of volume"*. The panel provides the glyph from the primary sources and recommends to encode it in place of . In the amended code chart (Annexure-2) this is described at 11FD7.

This changed symbol is also indicated in "கணித நூல் Treatise on Mathematics"[6] page 298. The estampage (ASI-AR 129 / 1938-39), corresponding to the SII-Vol.24, Inscription# 81, is given below. The red-circled string "ஆள் 2 க்கு " = "ஆள் 2 க்கு நெல்" (AAL 2 KKU NEL). The NEL symbol is shown by the yellow-arrow. Many occurrences of NEL can be seen in SII-Vol.4.

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Further, the "Inscriptions (texts) of The Pudukkottai State"[2], Inscription# D3655, Sasanam-5, in the page# 7-9 has occurrences of the text NEL. Though it doesn't record the symbol as it is, it leaves a foot note in Tamil meaning "Symbol ௰ is used for NEL". It can be understood that the symbol ௰ has been used very widely in the primary sources. The picture of the page is: (please zoom up for more clarity)
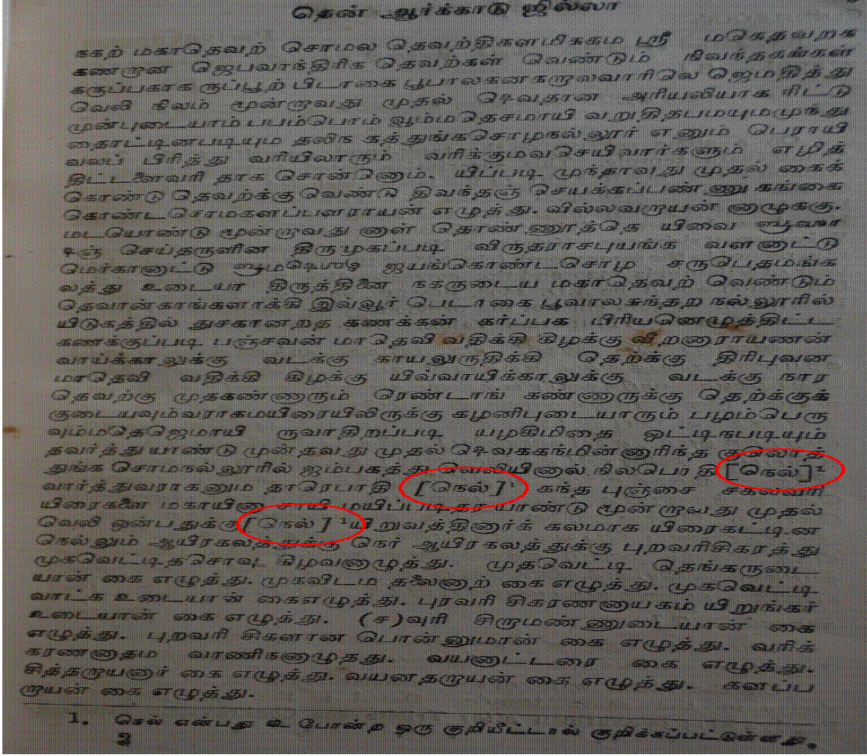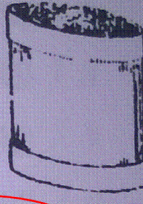
3.2.2 TAMIL SIGN SUVADU

Tamil Code Chart as defined in L2/15078, describes this measure as below:

11FD2 ௳   TAMIL SIGN SUVADU
• equals 360 nel

The name of this measure "SUVADU" is varying over an extended period. The right name of this measure is "CHEVIDU" **(செவிடு).** "Tamil Ennum Eluththum"[3] – a book published by Saraswathi Mahal Library, Thanchavur (pages 72 and 74) provides attestation for this. L2/12231, section 7.2, page 39 also provides an attestation from the book "Kanakkadhikaram (1958)" for CHEVIDU. The Panel recommends to change the name for this measure from SUVADU to **CHEVIDU**. In the amended code chart (Annexure-2) this is described at 11FD8.

பெய்தல் அளவு

360	நெல்	—	1	செவிடு
5	செவிடு	—	1	ஆழாக்கு
2	ஆழாக்கு	—	1	உழக்கு
2	உழக்கு	—	1	உரி
2	உரி	—	1	படி
8	படி	—	1	மரக்கால் (குறுணி)
2	குறுணி	—	1	பதக்கு
2	பதக்கு	—	1	தூணி
5	மரக்கால்	—	1	பறை
80	பறை	—	1	கரிசை
48-96	படி	—	1	கலம்
120	படி	—	1	பொதி

3.2.3   TAMIL SIGN UZHAKKU

L2/12231 (Section 3.2, Item 4, U+11FD6) proposed this measure to be encoded. However, the "Recommendation to UTC" document L2/13028 (Item 17) disagreed as the symbol proposed for this measure was same as the Fraction ¾ (L2/15078, 11FCF, TAMIL FRACTION THREE QUARTERS).

The symbol of fraction ¾ and measure UZHAKKU are different. Tamil Code Chart as defined in L2/15078, describes fraction ¾ as below:

11FCF   ஒ௅   TAMIL FRACTION THREE QUARTERS
                  = mukkaal

The symbol for ¾ shown as ஒ௅ is found to be correct. However, the symbol of UZHAKKU is ௺ . The following picture is page 178 from the Vijayanagara Inscription part of "Tirumala Tirupati Devasthanam Inscriptions – Vol.1 / 1988"[4]. It presents the Inscription# 189 (#52-GT). It has multiple occurrences of symbol ௺�... for MUU-UZHAKKU.

TIRUPATI DEVASTHANAM INSCRIPTIONS:—Vol. 1

11 தொறும் ஸ்ரீபண்டாரத்திலெ இந்த வகைப்படியெ விட்டுப்பொகக்கடவது
    ஆகவும் திருமுன்மேல் அமுதுசெய்தருளின வெருஷாதத்திலெ தம்-
    முடைய பொது-

12 வெருஷாதம் உம்கு உ ¹ங௬ இதில் அரசாணுலயுக் மடத்துக்கு மௌஷ்ம்
    ஆக பெறும் வெருஷாதம் ௲ரு உ ங௬ நிக்கி தாம் தானத்தார்க்கு
    குடுத்த வெருஷாதம் பதி[னெ]ருநாழியும்

13 தானத்தார் திருப்பதி ஸ்ரீவைஷ்ணவர்கள் நிவந்தாழி நாளும் திருச்சுக-
    னூரில் ஸ்வாமியார் நிவந்தாழி மூன்றும் கம்மார் நிவந்தாழி ஒன்-
    றும் கொயில்கெட்கும்

14 ²ஐயர்கள் நிவந்தாழி இரண்டும் கொயிற்கணக்கு திருநின்றணுர்உடையார்-
    கள் நிவந்தாழி இரண்டும் ஆ[க] இந்த பன்னிரண்டு நிவந்தாஹத்-
    திலும் பெறக்கடவர்-

15 களாகவும் ஸ்ரீகொவிந்தப்பெருமாள் அமுதுசெய்தருளின வெருஷாதத்தில்
    தம்முடைய விழுக்காடு வெருஷாதம் ம௱ உ ங௬ இதில் இந்த
    மடத்துக்கு வெருஷாதம் ௲ரு உ ங௬

16 நிக்கி வெருஷாதம் [ம௨] உ ம் இந்த பன்னிரண்டு நிவந்தாஹத்திலும்
    பெறக்கடவதுஆகவும் ³தம்முடைய பரிவாரவாஹனத்துக்கு பின்பும்
    மட-

17 மௌஷவெருஷாதம் இந்த மடம் கைக்கொண்ட ⁴வன்மாமி ஸ்ரீவைஷ்ணவர்
    பெறக்கடவர்ஆகவும் இப்படிக்கு அநுமதித்துவரை நடக்க-

18 க்கடவதுஆகவும் இப்படிக்கு ஸ்ரீவைஷ்ணவர்கள் ⁵பணியால் கொயில்கணக்கு
    திருநின்றணூருடையான் எழுத்து இது

19 ஸ்ரீவைஷ்வாசெஷ உ

Translation

Vide Translation of No. 187 (No. 57–T.T.) of which it is a copy.

No. 190.
(No. 43—T. T.)
[On the west wall of the first prākāra of Tirumala Temple.]

Text

1 ⁶ஸ்வஸ்திஸ்ரீ ¹ஸ்காவழி ஆயிரத்து முன்னூற்று ஒரு பத்து நாலின் மெல்
   செல்லாநின்ற ஆங்கிர⁸ஸ்ந்வற்ஹஸத்து பங்குனி மாதம் [உ ⁹தி]
   நாள் திருமூலயில் ¹⁰தானத்தாரொம்

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1. This figure stands for காழி முவ்-
   வழக்கு.
2. Read ஜீயர்கள்.
3. Read தம்முடைய.
4. Read வனகாகி.
5. Read பணியால்.

6. Read ஸ்வஸ்திஸ்ரீ.
7. Read பாகாவழி.
8. Read—ஸ்வஸ்கஹஸத்து.
9. This figure stands for தேதி.
10. Read ஹூநத்தாரொம்.

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MUU-UZHAKKU means 3 times UZHAKKU. Digit 3 in Tamil is ௩ (TAMIL DIGIT THREE (0BE9)). Therefore, logically, நூத is written combining ௩ (3) and ௸ . It can be observed here that the symbol ௬ of ¾ is not combined with ௩ , and hence as per the expert panel both the symbols are different.

Hence, the panel recommends to include ௸ into encoding and provide separate codepoint for UZHAKKU. In the amended code chart (Annexure-2) this is described at 11FDA.

3.2.4   TAMIL SIGN KURUNI

L2/12231 (Section 3.2, Item 8) proposed this measure to be encoded. However, the "Recommendation to UTC" document L2/13028 (Item 17) disagreed as the symbol proposed for this measure was same as the TAMIL LETTER NGA (L2/15078, 0B99).

0B99   ங   TAMIL LETTER NGA
            • also denotes the measure kuruni/marakkaal
            → 11FD5 ௸ tamil sign muuvuzhakku

But, the symbol of TAMIL LETTER NGA and the symbol of KURUNI are different. Symbol of KURUNI can be seen in the Inscription text in the 9th an 10th lines of Tirumalai Tirupathi Epigraphic Series – Vol.3, No.2, Page 5.

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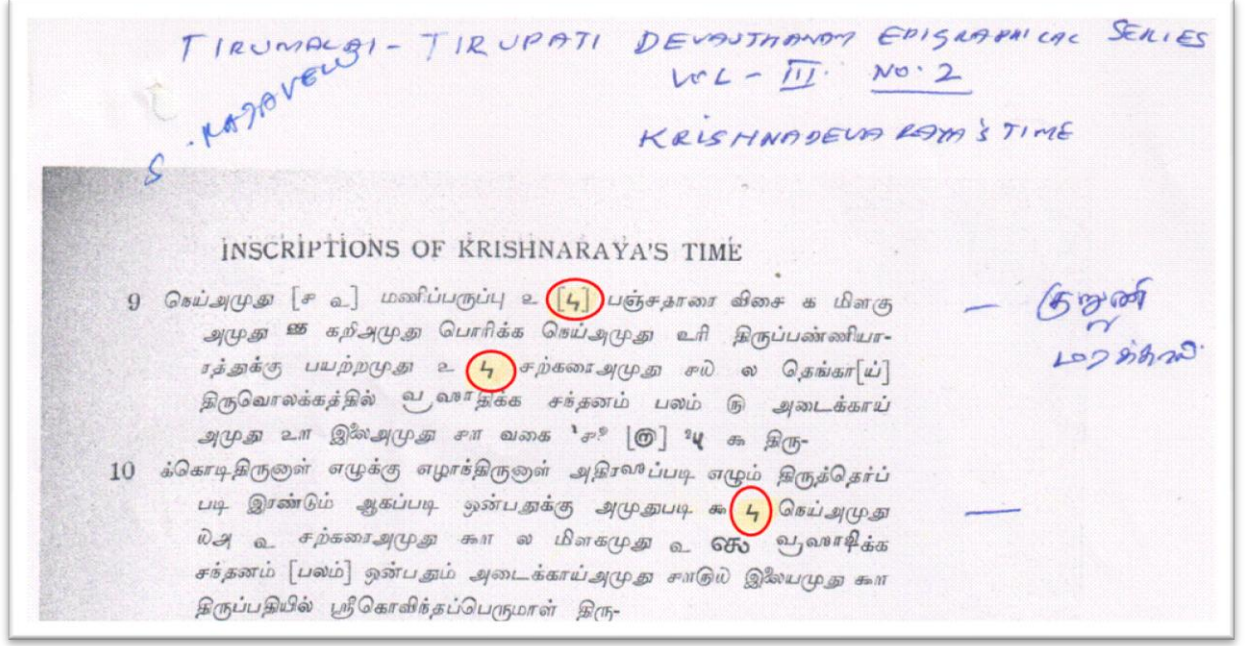
The 9th line occurrences read as "**மணிப்பருப்பு 2 [குறுணி]**" and "**பயற்றமுது 2 குறுணி**", and the 10th line occurrence reads as "**அமுதுபடு 9 [குறுணி]**".

Hence, the panel recommends that the symbol for KURUNI is encoded and the symbol is └┐. In the amended code chart (Annexure-2) this is described at 11FDC.

3.2.5   TAMIL SIGN PADAKKU

Tamil Code Chart as defined in L2/15078, describes this measure as below:

11FD6 வது TAMIL SIGN PADAKKU
• equals 2 kuruni/marakkaal

Though, the printed books show the symbol as , the subject expert panel, in its reserach has observed the occurrences of the symbol in the form of in the primary resources. Also, some research worthy variations observed. Investigating the lineage and the true form has been a bit complex, and hence it requires further research.

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Hence, at this stage, the panel recommends to postpone the encoding of the symbol by removing it from the current proposal. Encoding for this will be proposed through a separate proposal at a later period.

3.2.6 TAMIL SIGN MUUVUZHAKKU

Tamil Code Chart as defined in L2/15078, describes this symbol as below:

11FD5 ௵ TAMIL SIGN MUUVUZHAKKU
 • equals 3 uzhakku
 • for the measure naazhi/padi which equals 2 uri
   or 4 uzhakku, use 0BF3 ௳
 → 0BF3 ௳ tamil day sign
 • for the measure kuruni/marakkaal which equals
   8 naazhi/padi, use 0B99 ங
 → 0B99 ங tamil letter nga

மூ-வுழக்கு = MUU-VUZHAKKU = மூன்று உழக்கு;

The symbol of MUUVUZHAKKU is very close to the actual; but still needs a minor alteration. Here "MUU" means "three". Three is represented as ௩. The first part of symbol of MUUVUZHAKKU should reflect the "three" correctly. It should clearly distinguish it from ங and ந.

Hence, the symbol is modified a bit to the form of �டௐ . The panel recommends this symbol for encoding. In the amended code chart (Annexure-2) this is described at 11FDB.

3.3 TAMIL OLD CURRENCY SYMBOLS

3.3.1 TAMIL SIGN PANAM

Tamil Code Chart as defined in L2/15078, describes this old currency symbol as below:

11FDB ௺ TAMIL SIGN PANAM
        • equals 80 kaasu

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பணம் = PANAM; Its general meaning is "money/currency/coins". In olden days the currencies were made of gold or silver or copper. Normally the metal used in the coin is not mentioned. But many a time, it might have implicitly meant the gold coins.

The following estampage belongs to Tirupathi inscriptions that are available with ASI. It can be observed from the text with yellow-underline that it has the symbol ◡ . This is the symbol for PANAM. The inscription text is **"(ஒ) டுக்கின பணம்[◡] [ஆயிரம்] இப்பணம் ஆயிரத்து...."**.
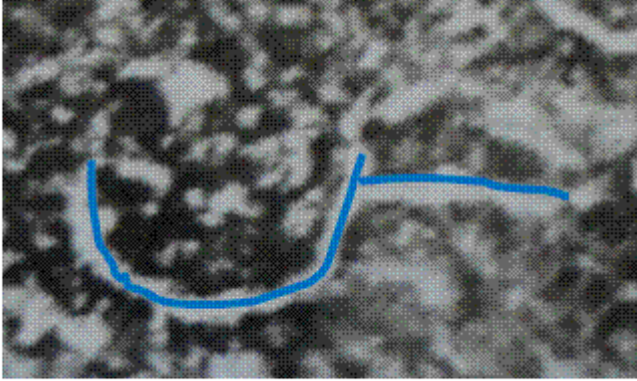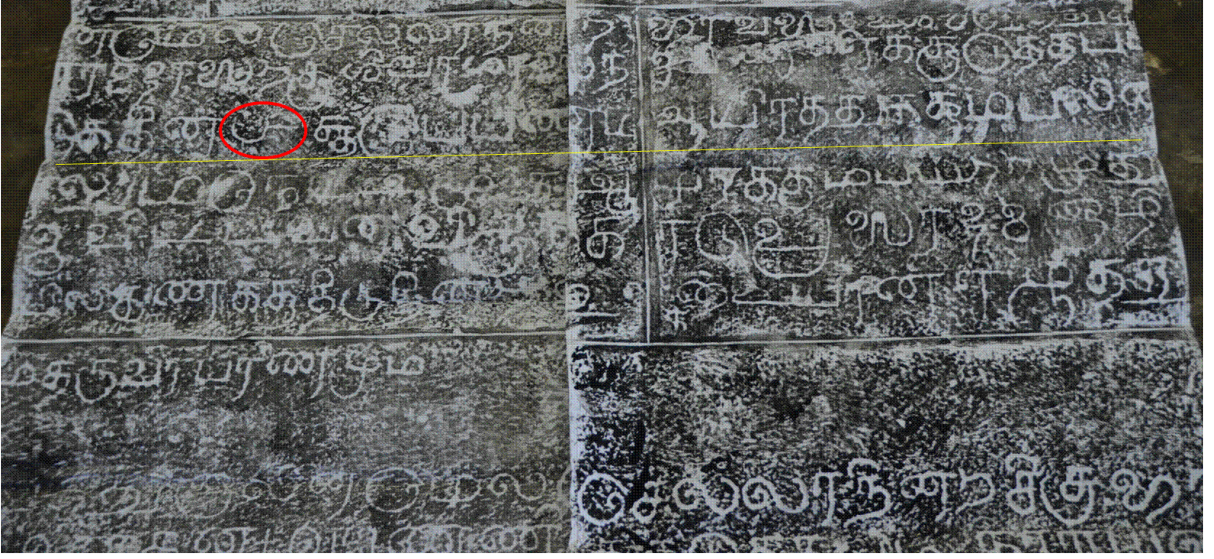
This is the picture enlarging the symbol in the previous estampage. For readability it is drawn-over in blue.

The following estampage is another example for the symbol of PANAM.
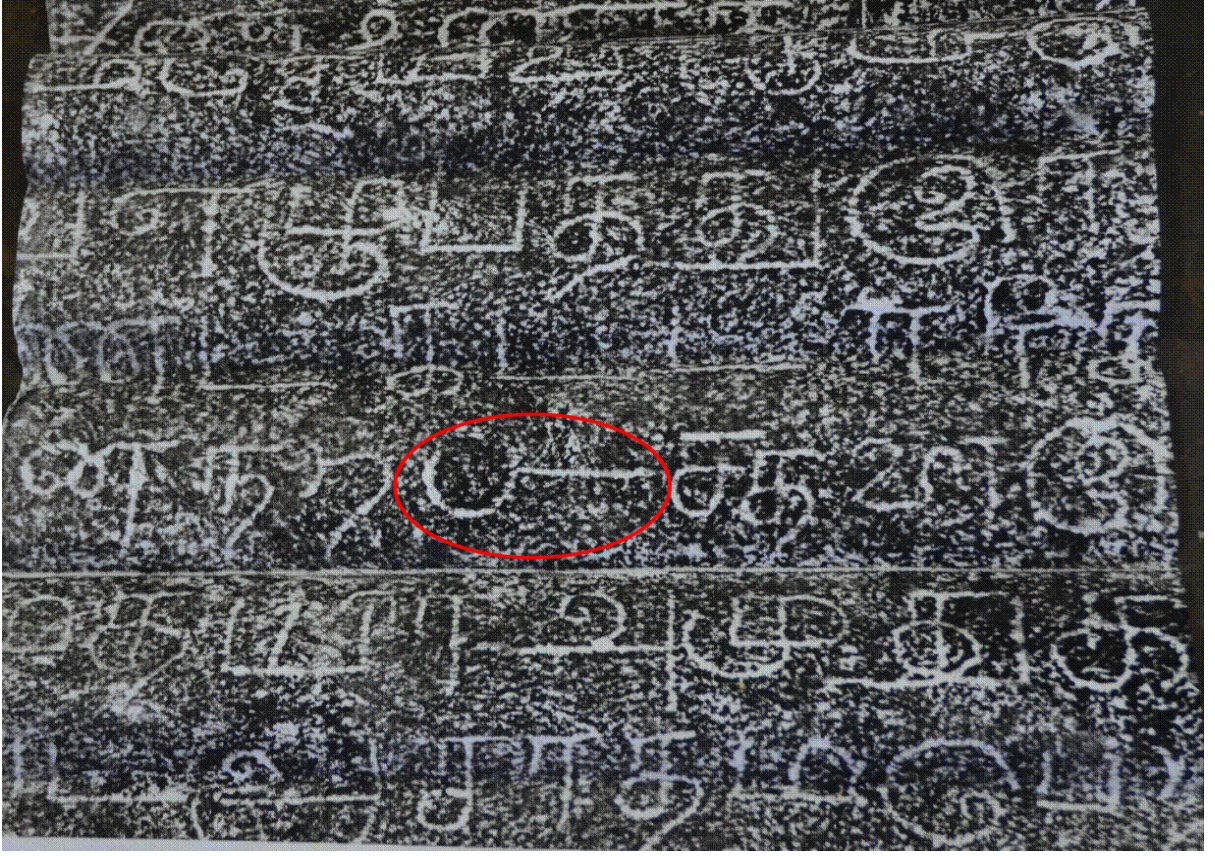
The Inscription# 441 of "Inscriptions (texts) of The Pudukkottai State"[2] also shows the occurrence of the symbol of PANAM. 13th line has the symbol as shown in the picture.

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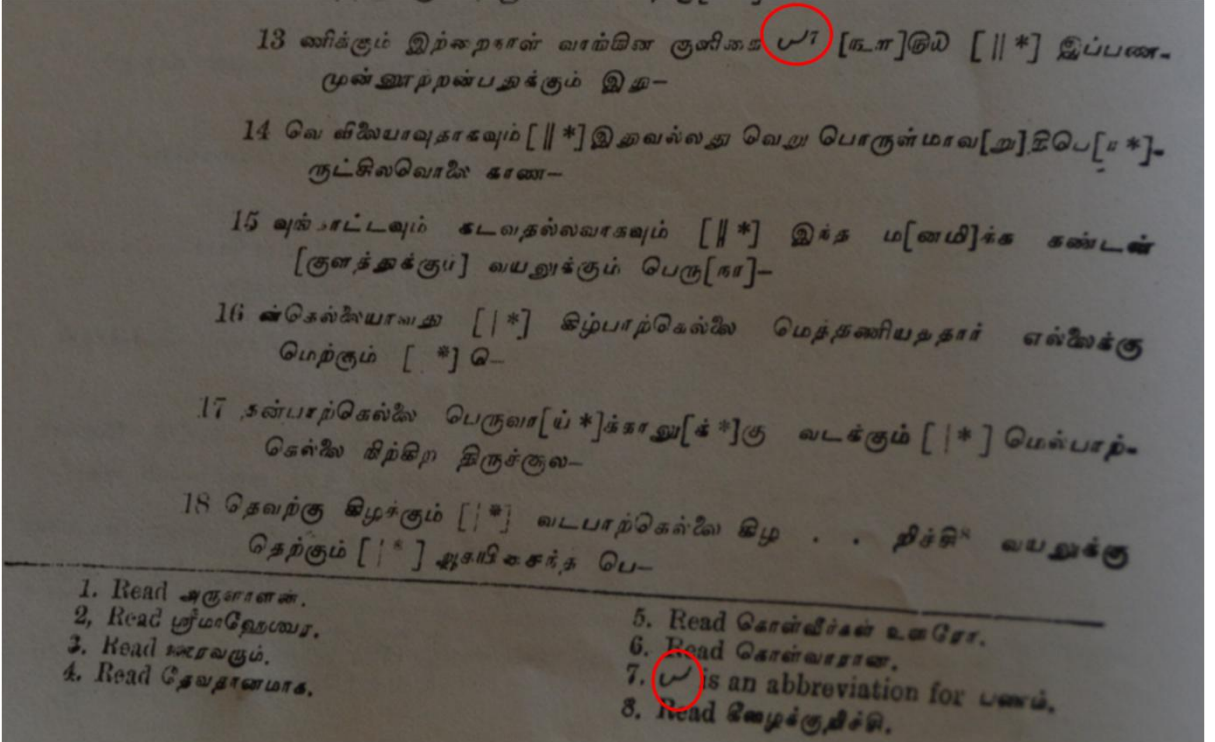
The footnote of this page is worth noting. Footnote# 7 states that the highlighted symbol is an abbreviation for பணம். உ shown in Pudukottai State inscription, and ⌣ shown in Thirupathi inscriptions are same; The only difference is that the horizontal line of the former is shorter and also flagging upwards. This may be due to writing style variation. Hence, the panel recommends the symbol ⌣ be encoded in place of ௴. The glyph ௴ looks like a variation of ⌣ .

Though, it has some presence in the printed texts, encoding based on the symbol ⌣ as seen from the primary sources is recommended.

Further, In L2/15-078, It is mentioned, in the annotation of PANAM, that it is equal to 80 KAASU. This wording may be dispensed with, since a particular value is relevant only to a particular period. For example, in 19th and 20th centuries, a PANAM was referred to be equal to 1/8 of a Rupee. Today such a value is not referred to at all. As mentioned before, during imperial Chola times, the word PANAM was meant to represent gold coins and as mentioned elsewhere, 10 PANAMs were equivalent to 1 PON (பொன்). The weight measure of PANAM was referred to as PANAVEDAI, while the weight measure of 1 PON was usually 1 KALANCHU (கழஞ்சு). Often enough PON and KALANCHU were used in place of one another. A discerned observer would differentiate the money-value part and the weight measure. Wherever coins other than gold were in currency, they were explicitly referred to in the inscriptions. For example, in one of the inscription (S.I.I.. Vol.8, p.148, No.258) occurring in the Parijatavanesvarasvami temple of Tirukkalar, Mannargudi Taluk Tanjavur District, "வெள்ளை ⌣ " is mentioned to denote silver coins. Likewise, "செப்பு ⌣ " also was used in other historical times.

In the amended code chart (Annexure-2) this is described at 11FE1.

3.3.2 TAMIL SIGN PON

Tamil Code Chart as defined in L2/15078, describes this old gold currency symbol as below:

11FDC ௜ TAMIL SIGN PON
• equals 10 panam

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பொன் = PON; The following two pictures are from the text of SII-Vol.24, Inscription# 12 described in the pages 8 and 9.
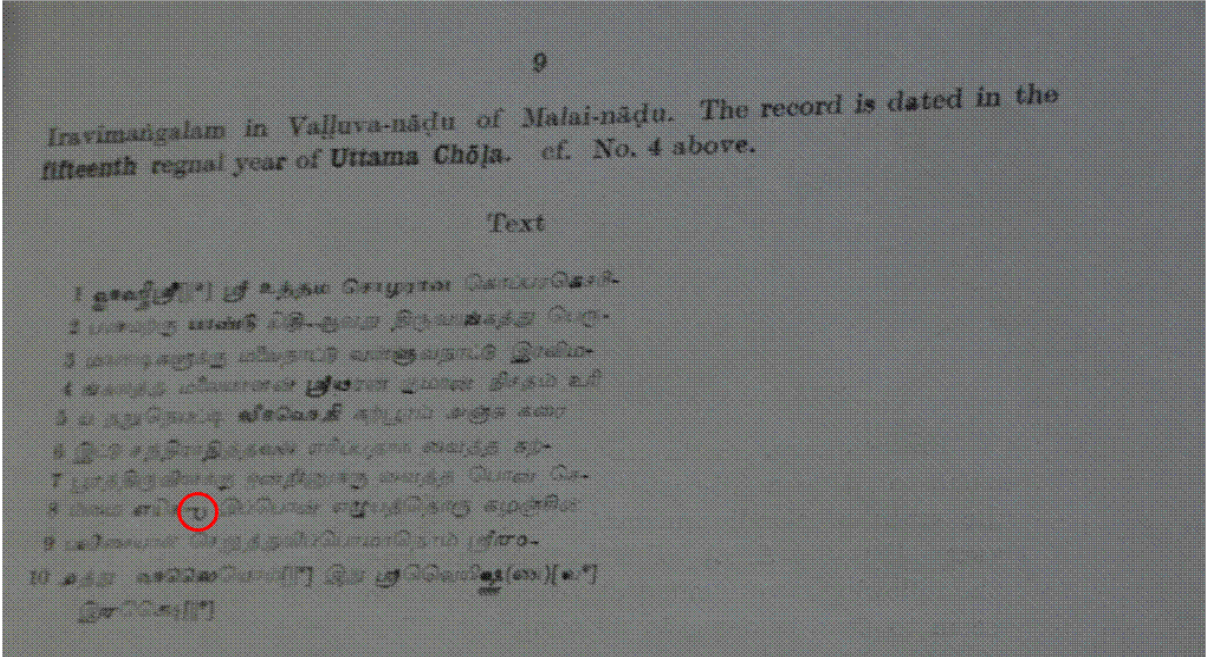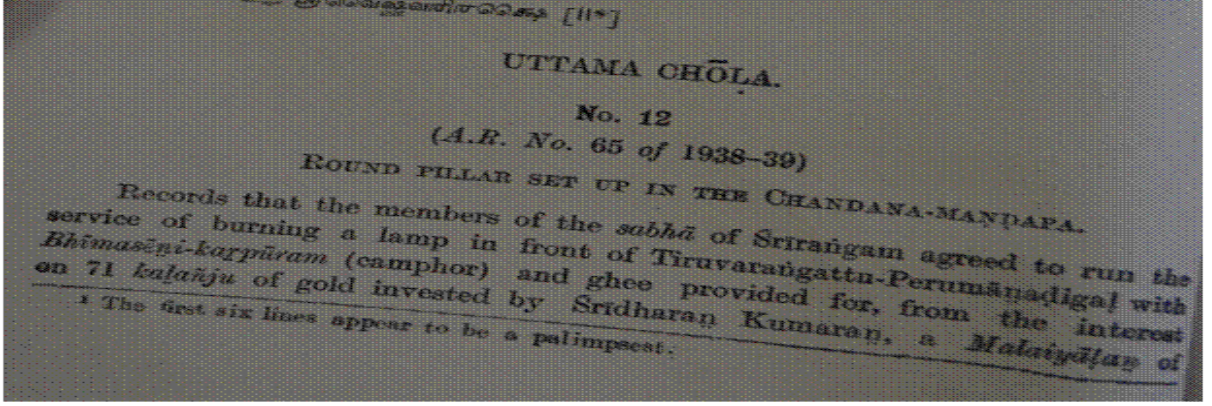
Line 8 of this text shows the symbol of PON. The text reads as **"(செ)... ம்மை 71 பொன் இப்பொன் எழுபத்தொரு கழஞ்சின்"**. In the enlarged picture below,
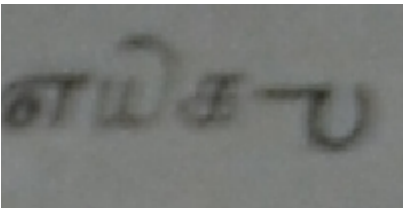
70, 1, PON are the three interpretations from the symbols there. This means 70+1+PON = **"71 PON"**.

The picture of corresponding estampage (ASI-AR 65/ 1938-39) is given below.
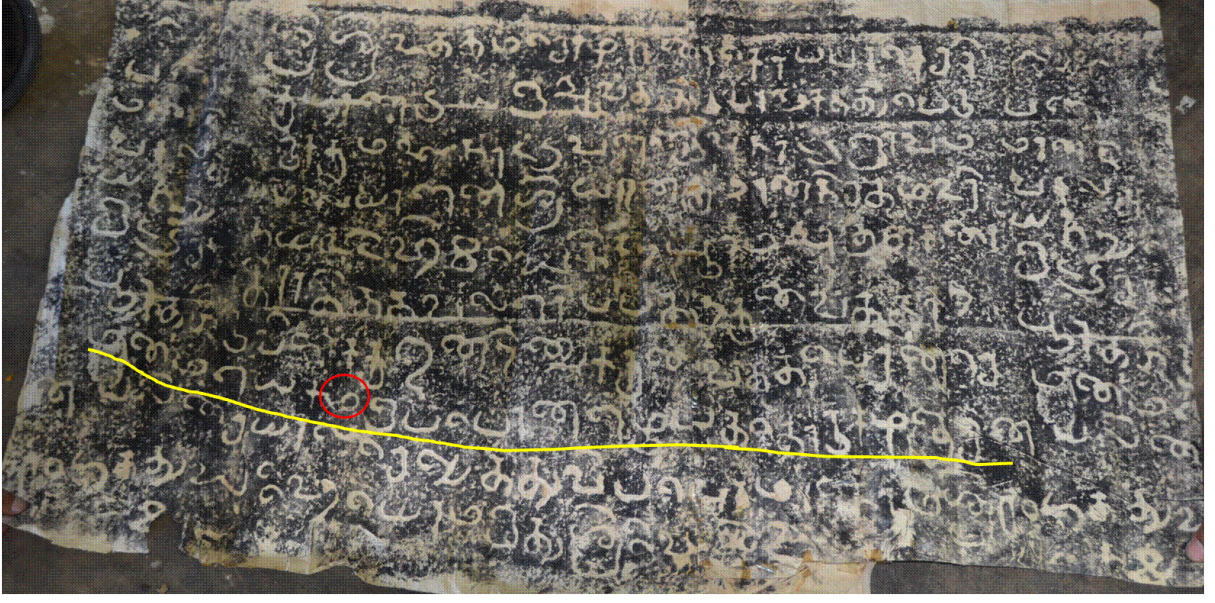
The text **"... ம்மை 71 பொன் இப்பொன் எழுபத்தொரு கழஞ்சின்"** can be seen there yellow-underlined; And the symbol of PON marked in red. It can be observed that the digit one and PON are written in continuation.
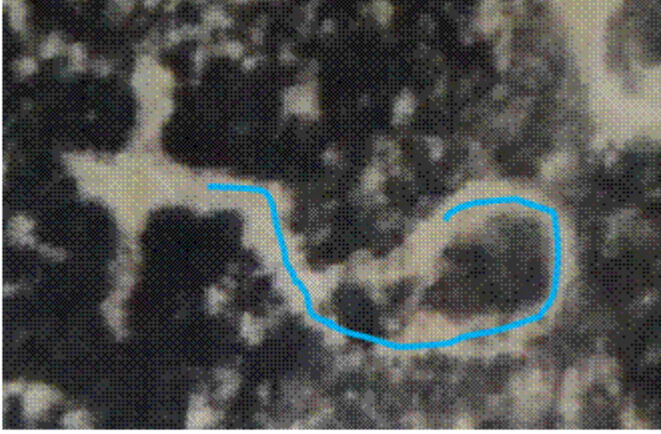
The same is enlarged in this picture and the PON part is illustrated with drawn-over line in blue.

Therefore, the panel of GoTN recommends to encode the glyph in place of the glyph for

PON. As mentioned in the discussion on Panam, the weight unit of 1 Pon was 1 கழஞ்சு (KALANCHU). So the annotation has to refer this equivalence of Pon with Kalanchu.

In the amended code chart (Annexure-2) this is described at 11FE2.

3.3.3 TAMIL SIGN VARAAGAN

Tamil Code Chart as defined in L2/15078, describes this old currency symbol as below:

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11FDD வ TAMIL SIGN VARAAGAN
- equals 42 panam
- equals 3½ rupee, 3¾ as per some

வராகன் = VARAAKAN/VARAAGAN;

The symbol chosen for VARAAKAN is observed to be a bit far away from the actual. Also, there are variations to the symbols of VARAAKAN found. However, the panel of GoTN observes that the one shown by, the SII Vol.8, Inscription# 535, page 271-272 is the right form of the symbol. The line 11 at page 272 of the inscription can be seen in the picture below.
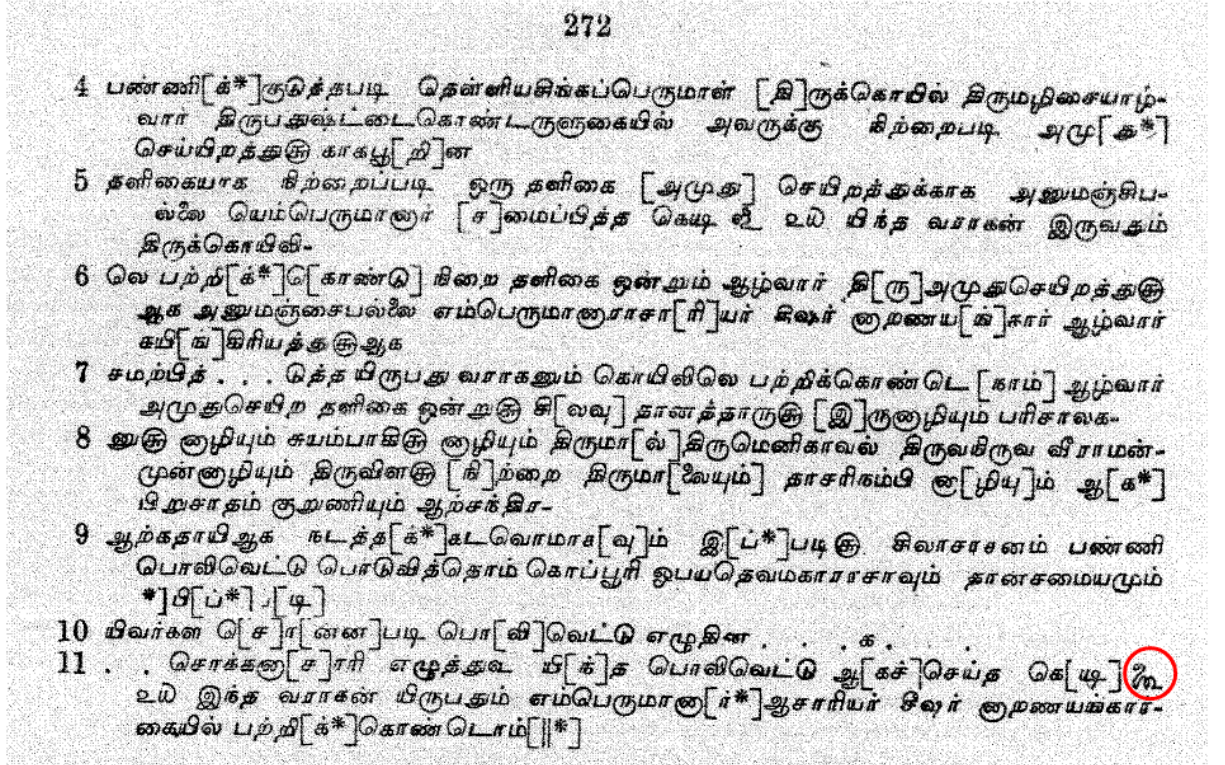
The symbol before the text "[20] இந்த வராகன் யிருபதும்" is . The panel values this as the fitting symbol for VARAAKAN. Hence it is recommended to encode this symbol for VARAAKAN.

Further, VARAAKAN is a cash unit that was mostly prevalent during and after Vijayanagar times. (VARAAKANEDAI had been used as a weight measure which is equivalent to 3 KALANCHU). It became popular during 19th and 20th century. One may refer to Tamil

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Lexican[7], Vol.6, page 3512 to understand the money meaning of Varaagan. It is mentioned as 1 Pagoda, a gold coin, = 3 ½ Rupees, மூன்றரை ரூபாய் மதிப்புள்ளதும் பன்றி முத்திரை கொண்டதுமான ஒருவகைப் பொன் நாணயம். The boar insignia was after Chalukya Emperors in Karnataka and Maharaastra. Vijayanagara Kingdom arose after Chalukya times. Taking the definition of 1 Rupee = 8 panam (Treatise on Mathematics[6] Part I, page 301), a Varaakan will be equal to 28 PANAM, if we consider 1 Varaakan = 3.5 Rupees. It will be equal to 30 panam if a Varaakan equals 3.75 Rupees.   It is not 42 PANAM as mentioned in the annotation (L2/15078). (VARAAKAN is also used as a weight unit). Hence it   is recommended to change the annotation accordingly. In the amended code chart (Annexure-2) this is described at 11FE3.

3.4 TAMIL AGRICULTURAL SYMBOLS

3.4.1   TAMIL DRY CULTIVATION SIGN

Tamil Code Chart as defined in L2/15078, describes this land symbol as below:

11FE3 ௺ TAMIL DRY CULTIVATION SIGN
= punsey

Dry cultivation land = PUNSEY (புன்செய்) = PUNCHAI(புஞ்சை); And the Wet cultivation land = NANSEY(நன்செய்) = NANCHAI(நஞ்சை) is defined as below in L2/15078.

11FE2 ௸ TAMIL WET CULTIVATION SIGN
= nansey

Comparing the symbols of PUNCHAI(௺) and NANCHAI(௸), it can be understood that both the symbols are derived by suffixing ச-like glyph with the letters of ப(PUNCHAI) and ந(NANCHAI) respectively. ச-like glyph stands here for சை(CHAI)/ஞ்சை(NCHAI). In the case of NANCHAI, the symbol ௸ evolves by

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fusing ச-like glyph at the end of "ந" (0BA8). "ந" is the first letter of the word நஞ்சை. (It should be noted that the symbol for NANCHAI is accepted by the panel as it is).

But, in the case of PUNCHAI, instead of using "பு" – the first letter, "ப" is suffixed with ச-like glyph. Hence, the suffix part has risen upwards(பஸ்). This is the problem with the symbol. The correct form can also be seen in the book "Tamil Ennum Eluththum"[3] . The picture of page 82 of the book is below.

82

குறியீடுகள்

வருடம்		வசம்	
வருடம்		லிவு	
வருடம்		ராம	
வருடம்		மாதம் ஒன்றுக்கு	
மாதம்		வரவு	
மாதம்		மாதம் ஒன்றுக்கு	
மாதம்		வரவு	
மாதம்		பற்று	
தேதி		மூணுக்கு	
தேதி		இதுவும்பற்று	
தேதி		நாளதுதேதியில்	
தேதி		முதல்	
நிம்பர்		மேற்படி	
நம்பர்		நாளது	
க்கு பணம்		புஞ்சை	
க்கு பணம்		குழி	
யிந்திரேல்		நிலம்	

The red-boxed area has the text of புஞ்சை and the symbol of it. It can be observed that the suffixing is at the bottom end of the "பு". The same form also is found in the attestations of L2/12231 in the pages 43, 45 and 48. Hence, it is recommended by the panel to change the shape of the symbol of PUNCHAI to the

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glyph which is actually discussed in L2/12231 itself in the section 4.8.2. In the amended code chart (Annexure-2) this is described at 11FED.

3.4.2 <u>TAMIL LAND SIGN</u>

Tamil Code Chart as defined in L2/15078, describes this land symbol as below:

11FE4 நிலம் TAMIL LAND SIGN
= nilam

நிலம் = NILAM; The symbol of 11FE4 above is close to the first letter "நி" in "நிலம்". However, the actual symbol used in the inscriptions is not so. It is actually a ரு-like glyph. The following picture is of the text from SII-Vol.24, Inscription# 92 in pages 109-111. The 13th line has the ரு-like symbol meaning "NILAM".
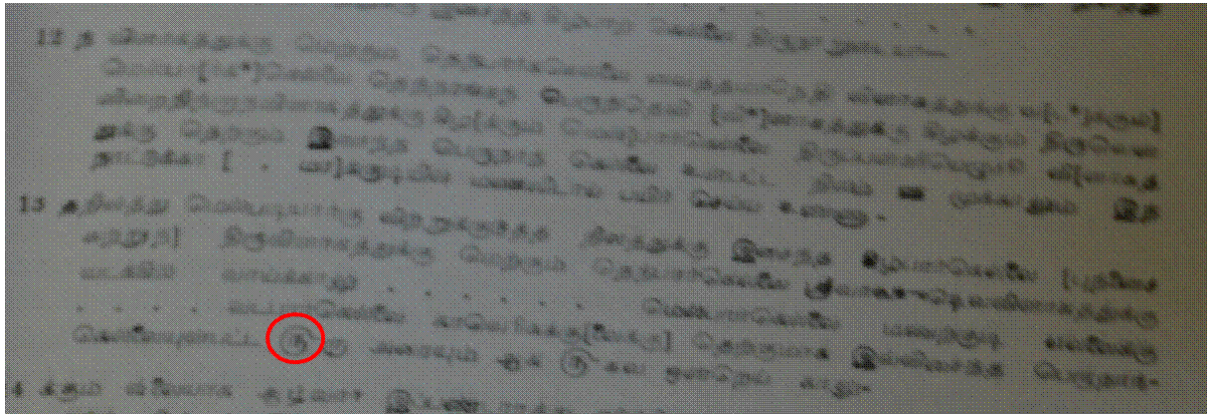
It can be confirmed with the corresponding estampage (ASI-AR 106/1947-48) shown below. The inscription is a long one and hence the relevant part is presented here. The interpretation of the yellow-underlined line is "...யுள்ப்பட்ட [நிலம்] [அரை] அரையும் ஆக...". [நிலம்] and [அரை] are written as symbols. That ரு-like symbol is for NILAM. This inscription has multiple occurrences of NILAM with ரு-like symbol.
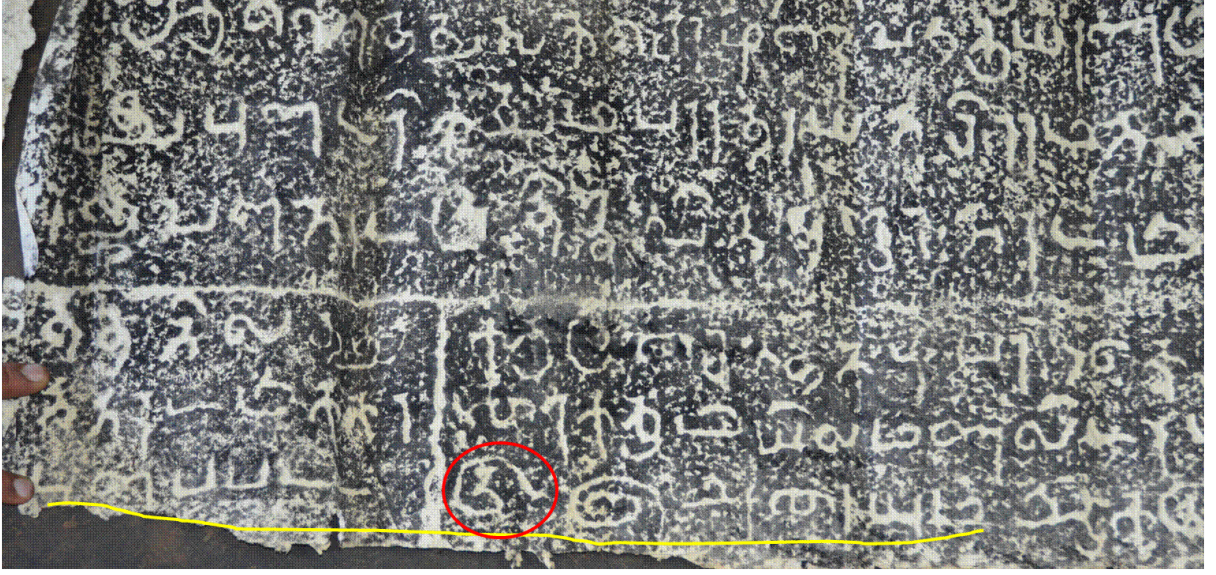
Further, the "Inscriptions (texts) of The Pudukkottai State"[2] provides the text of Inscription# 535. The enlarged view of the 18th line of the text below has the occurrence of ரு-like symbol referring to NILAM. Also, the footnote next to it mentions that ரு-like symbol is for NILAM.
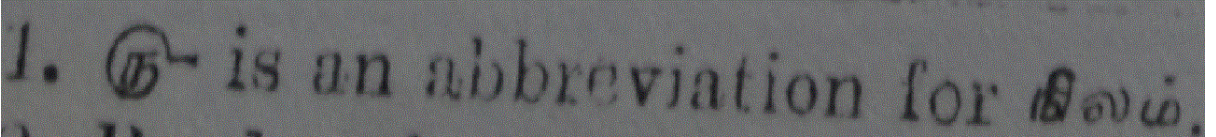
The page# 588 of the book is furnished below.

583

10 த்தாரு அன்னையாவருடை

11 வாக் திருவைவாறுடைய–

12 ன் இடர்இத்தார்[க்*]கு வரிசை

13 கிரசித்த பரிவாவது [*] இக்காய–

14 ஊர் செயதானயால் இவர்கள் தோக்க–

15 ருக்கு குடிங்காத்தெருவதானயாக குடிந்த

16 பலகமேயாதகண்டன் குடுக்காடி புர–

17 வடந்த………………………

18 டு-ாடப [‖ *] இங்கிலம் மூன்று மாவுக்கு–

19 ம் வரிசை காட்சகோலால மாத்–

20 தா . . . [கு] . . மூய்² மாத்[தால்] . .

21 க³ ஒன்றையவும் வெள்ளச்சா–

22 தி விறட்காளி பயிர்பாத்து தெ–

23 எல்ல கடவொமாகவும் [‖ *] குமுன–

24 வ எஎ்கு வாகு நிஉங்கு கால்

25 வியிசை தொண்ளக்கடவொமா–

26 கலும் [‖ *] இப்படிகனிலே இமுத்–

27 து சக்தோத்திதவலாற அ–

28 றபயிக்க கடவரா . . . .

536. மேற்படி தாலுகா, கொடிப்பாளூர், மூசுகுண்டேயநார் கோவிலில் ஊறுமார்கோவிலின்
வடபுறம் சுவரிஉள்ள சாஸனம்,––

1 வூஸ்ரீ [‖ *]கொமாரபன்மர்ரான திருபுவசக்காரவத்திகள் ஸ்ரீகுலசேகா-
தெவறகு

2 யாண்டு டு வது கொனுடான கடலடையாத இலங்கைகொ[ண்*]டசொ–
3 மூவலனுட்டு உறத்தார்க்கூற்றத்து வடகொனுட்டு உடையார் திருமுது–
4 குன்றமுடைய ஐயலுர் திருககோயில் விசையபஞ்சார திருமடைப்பள்–
5 ளி முதுசொல்குழநூட்டு நூட்டவர் தக்மம உ

537. மேற்படி தாலுகா, விரைக்குடி, திருவேடகாதக்கோவிலில் ஒப்பிலாநாயகி அம்மன்
கோவிலின் மூன்மண்டபத்து மேல்புறம் சுவரிஉள்ள சாஸனம்,

1 [வூ*]வூஸ்ரூ சிரி [‖ *] கொடாறுபண்ம[ரான] திரிபு[வ*]னச்சக்காரவத்திகள்
[சிரி] . லசேகாதெவ்

2 கு² யாண்டு டு வது செ[ய*]இங்குலகாலவளநாட்டு வட ..
3 . ்டு சூஃணயக்குடி உடையார் அருமொழிஈசாமுடைய கா .
4 [ண்]டெசுரதெவகன்மி கொயிற்கணக்க[ம்*]கு குளமங்கனாட்டு தெ–
5 ஈகள்ளெனும் பிடிபாடு குடுத்த பரிசாவது இன்னுயலுர் தெவதார்
6 . . செ . . ன் சொக்கலுன . . . . .

538. மேற்படி தாலுகா, பெருமாநாடு, ஈஸரன்கோவிலில் ஊாடிகே•விசின் தென்புறம் சுவசி-
உள்ள சாஸகம்,––

1 வூஸ்ரூ ஸ்ரீ [‖ *] கொமாறுபண்மரான திரிபுவனச்சக்காரவத்திகள் ஸ்ரீகுல-
செகாதெவற்கு யாண்டு

2 [அ]றுவது செயஇங்குலகாலவளநாட்டு பெருவாயில்நாட்டு நாடாய் இசை–
3 ந்த நாட்டொாய் இக்நாட்டித்திருவெங்கைவாயில் திருகாடக [அ]டெம் வல்லகா–

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1. டு-ா is an abbreviation for நிலம்
2. Read probably மாத்தால் தெல்லி கஉமும்.
3. Read காசு.
4. Read கடவராகவும். Rest defaced.
5. Rest missing.
6. Read ஸ்ரீ குலசேகாதேவற்கு.

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As the நி-like glyph is close to the first letter in "நிலம்" , it has been widely used in the printed texts just as a representative symbol but not as the actual symbol. Also same printed text/book shows inconsistencies between estampage and the printed version. The text of SII and estampage were the same earlier in this discussion; however, for another inscription the print-text uses நி-like glyph but actual estampage is of ரு-like symbol. This indicates that the authors or printers of the texts have used different sets of glyphs. For example, SII-Vol.5, Inscription# 707, Page 297 has நி-like glyph in 3rd line as shown below.
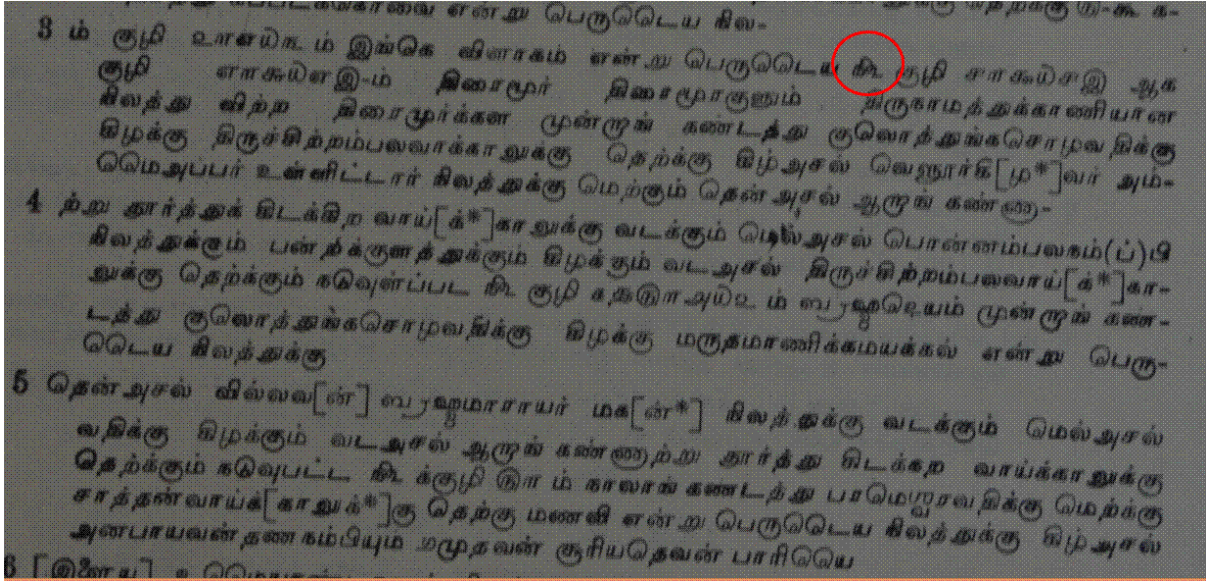
But, the corresponding estampage (ASI-AR 143/1895) has proper ரு-like symbol as shown below. So, in the case of old symbols there exist a lot of differences between publications and actual inscription.

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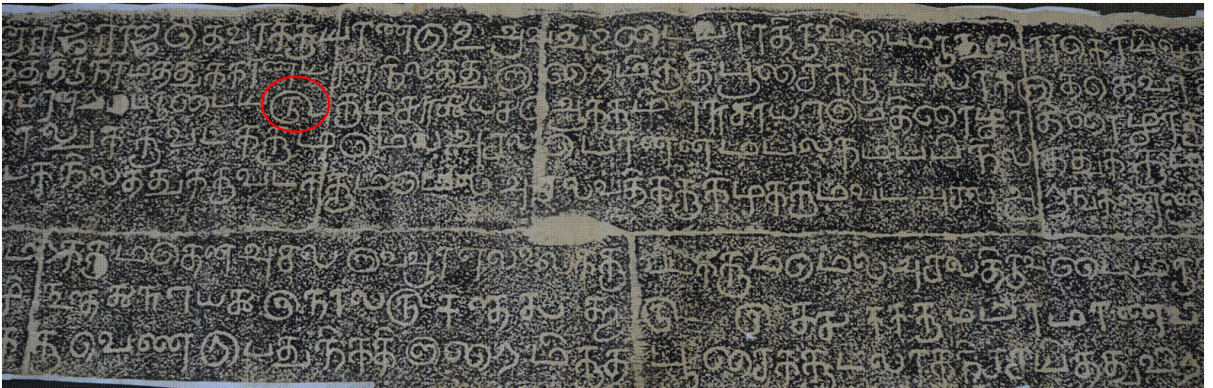
Hence, it is recommended by the panel that the glyph of the form "ⓖ" be encoded for NILAM. Please note that this does not conflict with the TAMIL RUPEE SIGN(0BF9), and both are different. In the amended code chart (Annexure-2) this is described at 11FEB.

3.5 OTHER SYMBOLS AND ABBREVIATIONS

3.5.1 TAMIL FIRST SIGN

Tamil Code Chart as defined in L2/15078, describes this symbol as below:

11FE7 முௌ TAMIL FIRST SIGN
= mudal

முதல் = MUDAL/MUTHAL; The right meaning of this symbol is not FIRST; but it denotes "starting from or commencing from". The picture following this discussion is from page 114 of the Vijayanagara Inscription part of "Tirumala Tirupati Devasthanam Inscriptions – Vol.1 / 1988"[4]. It presents the Inscription# 81 (#170-TT).

The symbol for MUTHAL/MUDAL is recorded in the 6th line of inscription. The glyph 𑿑 as found in the inscription is closer to the first letter in the word "முதல்". This is more relevant than using the other symbol which takes ழ-like form.

Hence, the glyph, name, annotations change for this symbol is recommended. The picture of the symbol is "𑿑". In the amended code chart (Annexure-2) this is described at 11FF1.

TIRUPATI DEVASTHANAM INSCRIPTIONS:—Vol. I

No. 81.

(No. 170—T. T.)

[On the south base (left inner side) of the first or inner gōpura in Tirumala Temple.]

Text

1 ஸ்வஷ்ஷ்ரீ வஸகுஐஹ—வஎ,நஒ எண;இஐிஉகாஸ்ரிய வஎஉஷிணஎடெஐஒஉஐஒஎஒதகஉடஎக.

2 ஞு ஸ்ரீகாஎஹெ[ஷ்ஐ]அஎணாஎவிணஉஎஐ—எஐஒ ஸ்ரீஉஷ்[வெஎடி,மிஸ்ரி]வஎ—எ. வாஐஎக வெஎடிரிவாஐஎக [வெஎகி]-

3 ஏஹஐஎஐாயக விஎஉஐெஷிஎுஎபுவஎவஎபுஹா ஏமாஐஎஎவஸ்ரீஎஉஐல ஐஎஐஎஎவாஐஎ. வஎஎஎவஎஐஎஐஎஐஎ விஐஐஒஐஎஐெஐஎத.

4 ஏ (ஷி) ஏமாவஎகாஎஐஎவஎ—எஉஎஒ வஎிஐஎஉஎஐஎஐாஞாஸ்ரிய அஐஉஎஎஉஐஎதிஐஎக அஎ[ஐஎஎஎஉகூ],காஎஎாயண ஸஎவஸஐஎ,மஎஎஎஉ.

5 வஎஉஎ,மூஎஎ ஏஹாஎஐஎஐாயிஎஐாஎ யாஎவ[எஎ*]ஐ ஸ்ரீஉஷ்ஹஎ—ஐஐஎவஎஉஐ திருக்-காளத்திஎெவஎ(வஎஐி) திருமஎலத்தா-

6 [னத்தா]ர் கண்ட அஶிலஉலி பத்தொன்பதாவது முடஉ¹ வஎஐெயில் தெவதானம் நிக்கிஜி திருவெ-

7 ங்கடமுடையாஎ கொ[யில்காணிநிஎந்தத்து]க்கு குடஉூர் காஎ்பாஎலெஎல்இக்கு உட்பி[ட்*]எ நஞ்சை

8 புஞ்சை நிலமும் [கடமை] ஆயம் பாடிகாவல் [வெட்டிச்சரிஎ]...... கொள்வரி பட்டம்பொன்னும் உஎ-

9 ட்பட்ட பல வரிகளும் பொஎ்வரி காணிக்கையும்......காணிக்கை உட்-படஎ(ஐ) பொற்[கலஎ]களும் திருவெஎ-

10 கடமுடையாஎ கொயிஎுஎ்கு காம் நிஎ்சஎஐித்த நிஎந்தம்.........இப்படிக்கு நிஎஎ்த[த்துக்கு]த்

11 தாஎை வார்த்து(॥) திருவாழிக்கல்இ ஐ்ம்பாஎலெஎல்இயும் காட்டிக்கொள்வ-தாகச் சொஎ்னெ-

12 ம் இப்படி செய்வதெ [॥*]

Translation

Hail! Prosperity! (This is) the arrangement ordered (settled) for the temple of Tiruveṅkaṭamuḍaiyāṉ, on the request of the *Sthānattār* of Tirumala,

by me, Tirukkāḷattidēvan, entitled the sole shelter of the terrestrial globe, the proud cuckoo of the royal park of all learning, the honey-bee (sucking) at the lotus-feet of (God) Śrīkāḷahastīsa, the ruler of the prosperous Vēṇṭagiripura (the city of huntsmen), the chief of huntsmen, the overlord of Vēṅgi, the recipient of the excellent grace obtained from Piṭharadēvī (Piḍāri-

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1. This figure stands for முதல்.

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3.6 SYMBOLS OF NO INTEREST

This section discusses a few symbols that

- can be derived using existing codepoints
- are invalid symbols
- does not merit encoding

3.6.1 <null>

This section is intentionally left blank after removing some contents.

3.6.2 TAMIL SIGN URI

Tamil Code Chart as defined in L2/15078, describes this symbol as below:

11FD4 வரி TAMIL SIGN URI
• equals 2 uzhakku

உரி = **URI.** It is a two letter word in Tamil. The symbol that reads as "**வரி**" is out of the way. It can be written much easier as "உரி" itself using the alphabets உ and ரி. Some attestations showing it as வரி is probably a wrong collection. It may be due to the misunderstanding of the writing styles in old documents.

This is well explained by the attestation from Beschi, available in L2/12231 (page 40) itself. It reads the usage of URI as below.
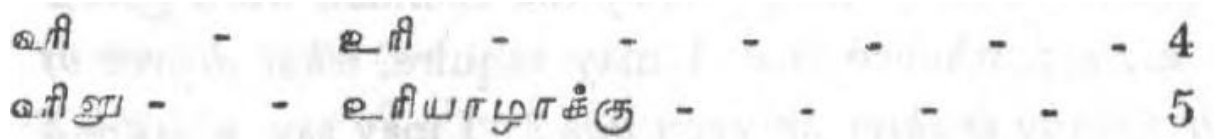
It can be understood from Beschi's two lines above that உரி is written as உரி itself. It is just join-handwriting. Therefore, the panel considers this symbol as Invalid and recommends to drop from encoding.

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3.6.3 TAMIL SIGN PAISAA

Tamil Code Chart as defined in L2/15078, describes this symbol as below:

11FD8 டசு TAMIL SIGN PAISAA
- old paisa equals 3 pai and equals 1/64 of a rupee
- new or naya paisa equals 1/100 of a rupee

பைசா = PAISAA/PAICAA. It is often written as "பை" even in today's context. The justification discussed in the section 4.7 of L2/12231 is not strong enough to encode a symbol. For both the denominations in annotation, பைசா has been the name, and the predominant usage is பை in the past and also now.

For this, L2/12231 considers a symbol from ஈபை , டசு , டஸை , ௴ , found in various publications. But for ஈபை , all others do not represent பைசா. They are probably erroneous collections or interpretations from hand-written documents.

Therefore, the panel is of the opinion that PAISAA does not require encoding and the same can be written using the alphabet "பை"(0BAA+ 0BC8) when required.

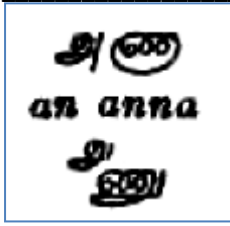### 3.6.4 TAMIL SIGN ANAA

Tamil Code Chart as defined in L2/15078, describes this symbol as below:

11FD9 ஆண TAMIL SIGN ANAA
- equals 4 old paisa

This is another dissatisfying symbol. அணா = ANAA; அணா is a two letter Tamil word. The symbol replaces the second letter ணா(0BA3+0BBE) with ணு(0BA3+0BC1) and combines with அ (0B85) to be a symbol. The letter ணா was written as ௸ (old-ணா) until recent decades.

 The part of the attestation from page 48 of L2/12231 shows how ANAA was written using the old-ஊா. Down below in the picture is the அணாா written in a varying handwriting style. It just alters the a bit to look like ஊ. So, it is just a handwriting variation that cannot be considered as a symbol. For a proper, two-lettered word(அணாா), another improper two-lettered word(அணு) cannot be considered as a symbol worth encoding.

The ANAA has been represented by a simple letter-அ in common usage until few decades ago. If there is a need, letter-அ(0B85) can be used and the panel does not recommend the encoding.

3.6.5 **TAMIL SIGN GEJAM**

Tamil Code Chart as defined in L2/15078, describes this symbol as below:

11FDF &. TAMIL SIGN GEJAM
• approximately equals 3 feet

GEJAM = YARD; Yard is not a unit of Tamil Systems of Measurements. Yard's origin is from western sources. It was part of British Imperial Units of Measurement, and US Customary Systems of Measurement (https://en.wikipedia.org/wiki/Yard). In India it was used due to Persian or Mugal or North Indian practice.

In North Indian Unit of Measure, it is called as GAZ. GAZ in Devanagari/Hindi is Yard. https://en.wikipedia.org/wiki/Indian_weights_and_measures describes the Units of Measures of North India, British Units, and Unit of Measures during the period of Akbar the Great. It can be observed that GAZ (Yard) = 2 Hath = 3 feet in Indian unit of measure, 3 feet in British System, and there were 4 different GAZ(Yard) existed during Akbar and Shah Jahan periods.

As Yard is used with different names in several Indic Languages and as it also exists in the system of measurement of other countries, encoding GEJAM in Tamil Unit of Measure

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will be erroneous. Yard should find proper encoding slot as part of its original system. From the original system, it can be used by Tamil or any other languages.

Though meter/metre is used in Tamil Nadu now, it cannot be the System of Units of Tamil. It has its own original system. The case of Yard/GEJAM is also similar to meter/metre. We cannot be reproducing a whole lot of measures in each and every language block.

Hence the panel of GoTN recommends not to encode GEJAM as part of Tamil encoding; and suggests that relevant original source organizations may identify and encode it as part of their original system.

3.6.6 *TAMIL SIGN CIRANJIIVI*

Tamil Code Chart as defined in L2/15078, describes this symbol as below:

11FEA ௪ TAMIL SIGN CIRANJIIVI
• a polite title for a young person
• not to be confused with the sign for "and odd"

சிரஞ்சீவி **=** CHIRANCHEEVI/CIRANJIIVI; As mentioned it is a title for a young person particularly man. In Tamil community there are many such titles in practice. For example, சௌபாக்யவதி = SOWBHAGYAVATHI is such a title for a woman/girl. It is also written using the first letter "சௌ". Similarly people write the first letter "சி" for சிரஞ்சீவி. What is shown as symbol for CIRANJIIVI is not a symbol but just the first letter of சிரஞ்சீவி with a curl added to it. A curl on top of the letter சி is due to hand-writing style. Assuming it as symbol is incorrect from an encoding perspective.

Like it was said earlier, there are other similar such titles in Tamil language Community. They are **"செல்வன்"** (SELVAN)**, "செல்வி"** (SELVI)**, "குமாரன்"** (KUMAARAN), **"குமாரி"** (KUMAARI), **"திருவளர்ச்செல்வன்"** (THIRUVALARCHELVAN), **"திருவளர்ச்செல்வி"** **(**THIRUVALARCHELVI), மகராசி(MAKARASI) etc. Such titles are used mostly in marriage-invitations or other such invites. Some books also have used this titles. The marriage invite

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of a highly respected Tamil Icon and freedom fighter Mr.V.O.Chidambaram Pillai (https://en.wikipedia.org/wiki/V._O._Chidambaram_Pillai) is presented below. The invitation is of the year 1901 CE.

It can be observed that there are 3 titles out of the titles mentioned above are used in the invite. They are "சிரஞ்சீவி"- the subject of this discussion, "செளபாக்யவதி" and "மகராசி". It should be noted that all these titles including CHIRANCHEEVI are written fully and not with symbols.

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If CIRANJIIVI is encoded, there are several such First-Letter based words and titles which will qualify for encoding. Therefore, the panel is of the opinion that this is just a styled First-Letter and not a valid symbol. And hence it recommends not to encode it. However, the users may use a font solution using the letter-சி (0B9A+ 0BBF) for any specific requirement.

3.6.7 TAMIL SIGN PILLAI

Tamil Code Chart as defined in L2/15078, describes this symbol as below:

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11FEB ௹ **TAMIL SIGN PILLAI**
- not to be confused with the sign for "spent"

பிள்ளை = PILLAI. As described rightly by Wickremasinghe(page 50 of L2/12231), this is a caste title(= சாதிப்பெயர்) representing a part of Tamil Community.

Caste means "சாதி" in Tamil. The Tamil Lexicon[7] describes "சாதி/Caste" as 1. Family, clan, race; குலம். (பிங்.). 2. Hindu caste. http://dsalsrv02.uchicago.edu/cgi-bin/philologic/getobject.pl?c.4:1:4886.tamillex

There are hundreds of castes in Tamil Community. Many of them have such short-forms if not symbols, to represent their castes. For example, "Tamil Ennum Eluththum"[3] lists 6 of the castes namely NAYINAR, NAAYAKKAR, MUDHALI, PILLAI, KAUNDAN, and CHETTI(as part of muththaya chetti) .
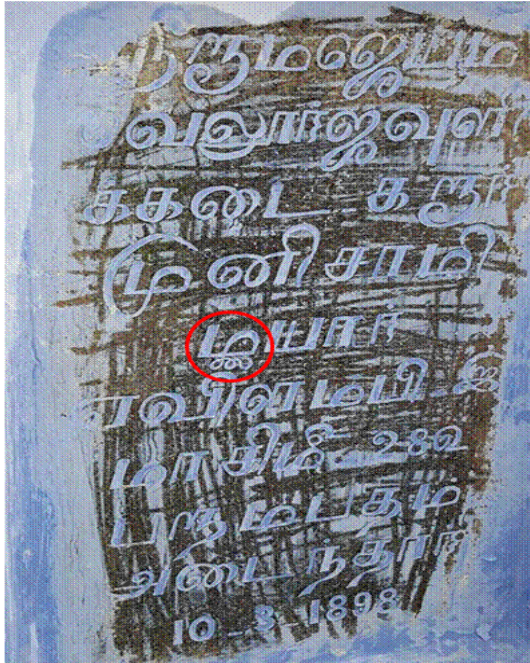
Besides the evidence from the book(s), the caste titles are scribed even on cemeteries. The picture here is an inscription on the cemetery of one Mr.MUNISAMY MUDHALIYAR. It can be observed that a short-form for the caste title MUDHALI is scribed.

However, for several social reasons, the caste titles are discouraged in the Tamil Society. There is a possibility that if one caste title is encoded then some other caste will also demand that its title be encoded. It may be a situation to encode a particular title even if it doesn't have any text related to it. Therefore, apart from the intellectual reasons, there are other priorities for social reasons. Considering the complexities in encoding one particular caste title, the panel of GoTN recommends not to

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encode this title. Should a compelling reason arises to encode this or some or all the available caste titles in the future, GoTN assures that it will be open enough to further research on it and make appropriate decision.

3.6.8   TAMIL SIGN RAAJA

Tamil Code Chart as defined in L2/15078, describes this symbol as below:

11FEC ꟼ   TAMIL SIGN RAAJA
   • in the phrase mahaa raaja raaja shrii
   • 0BF1 ௱ is often used as a substitute
   → 0BF1 ௱ tamil number one hundred

This is another type of title specially for Kings or Royal community of the past times. Technically, looking at the symbol above, the panel observes that the symbol can be derived

by combining ௱ TAMIL NUMBER ONE HUNDRED (0BF1) and ௳ TAMIL DAY SIGN (0BF3).

Alternately, as discussed in the section 4.8.3 of L2/12231, 0BF1 alone can also be made use of to represent RAAJA.

As there is a technical way of deriving the symbol, the panel recommends to go by that strategy and drop this symbol from encoding. Further, on the titles, be it Polite title or Caste Title or Royal Title, the panel of GoTN is a bit conservative on encoding all of them as most of such titles will crowd the coding chart rather than having clear evolution/lineage and usage.

3.6.9   ABBREVIATIONS OF WORD-ENDINGS

This discussion below refers to the following symbols described in L2/15078.

11FED �@   TAMIL ABBREVIATION KKU
   • used especially with numerals for the dative
     suffix
11FEE யு   TAMIL ABBREVIATION YUM
   • and
11FEF வு   TAMIL ABBREVIATION VUM
   • and

க்கு = KKU; யும் = YUM; வும் = VUM;

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Such letters are called double-letters (or compound letters). They are not proper abbreviations or symbols. They are the result of various hand-writing styles or patterns found in the last two or three centuries. There are tens of or even few hundreds of, them are there in Tamil documents.

Following picture of the page 78 of "Tamil Ennum Eluththum"[3] presents a few of such double letters.

It is not just "KKU", it shows KKA, KKI, KKU, KKAI. Not only க/K-series, ட/T-series, த/TH-series, ப/P-series can also be seen that are red-circled (TA, TI, TU, THA, THI, THU, PA, PAA). Existence of a grammar logic can be seen in those.

Further, It is not only, YUM and VUM, THUM, MUM, LUM, NUM also are found within blue-cirlces.

Further, the green-circles show a slightly different pattern - NDHA, NDHIRU, NDHU.

The red-squares have yet another pattern LAM, NNNAM, NNAM. These have to be read along with the AM(அம்), KAM(கம்). Similarly, there are some more in this picture and outside the picture there can be much more. Looking at these patterns, it can be observed that such writings follow a pattern. The pattern evolves from the Tamil grammar rule called MEYMMAYAKKAM. It can be understood referring to Tholkaappiyam, the Tamil Grammar.

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There are 18 consonants in Tamil. MEYMMAYAKKAM-rules talk about the validity of two consonants occurring consecutively. The preliminary research on this shows that there can be 997 valid-combinations of such occurrences. Tamil Grammar scholars may vary on this by some number.

But, the fact relevant to encoding is that, these are mostly the combinations of letters based on the natural alphabet-rules of Tamil. When writing, varying hand-writing styles have produced such double-letter that appear to be symbols but not symbols. The picture above proves the existence and possibility of number of such double letters.

It should be noted that, while the attestation from Pope presented in the page 48 of L2/12231, tablulating these letters under abbreviations/symbols, page 18 of Pope[5] clarifies that these are double-letters. In this page also, it can be observed that, Pope mentions not only "KKU", but also many others as well.
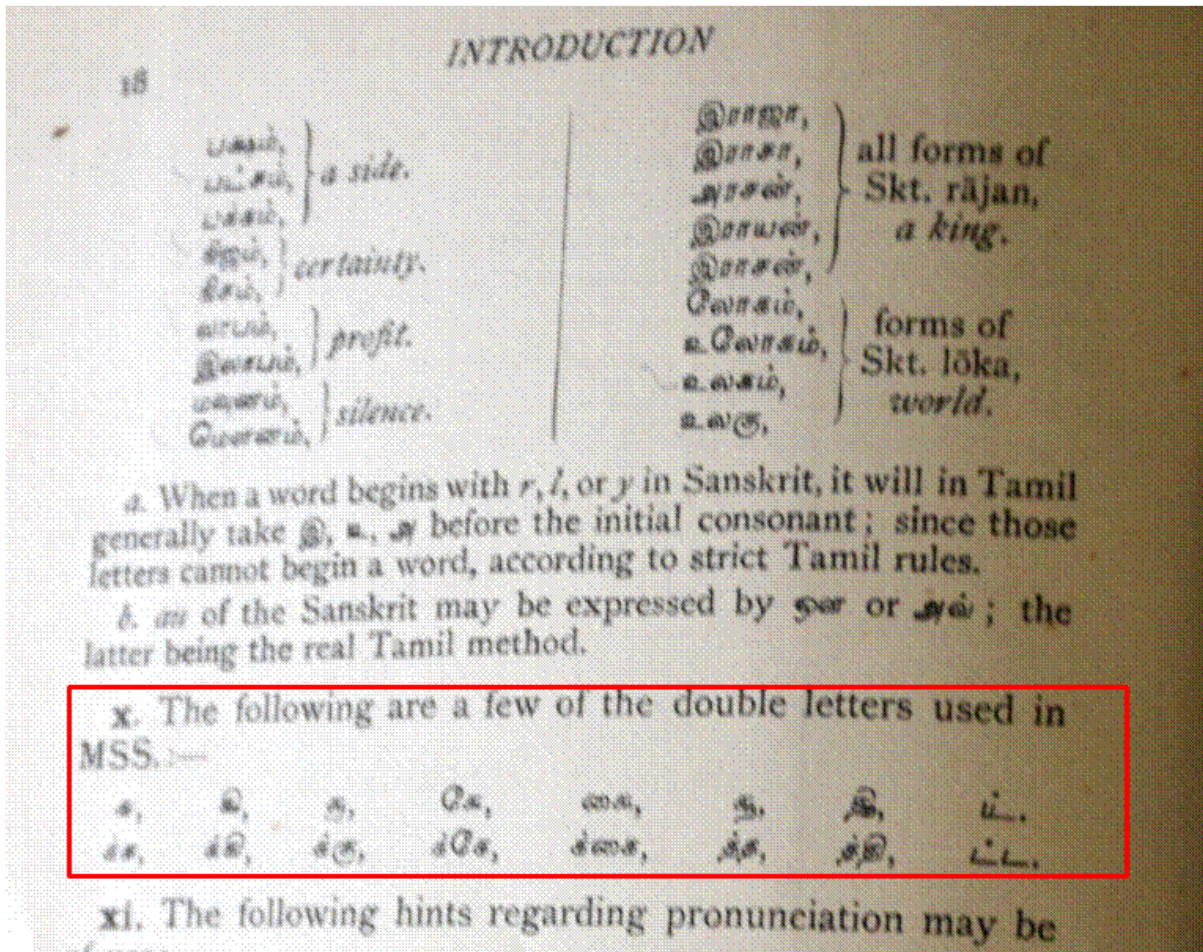
Further, it is not that all such letters occur at the end of the word. Some, for example "KKU" occurs even in the middle of a word. Following picture of the page 79 of "Tamil Ennum Eluththum"**3** presents the usage of such letters.
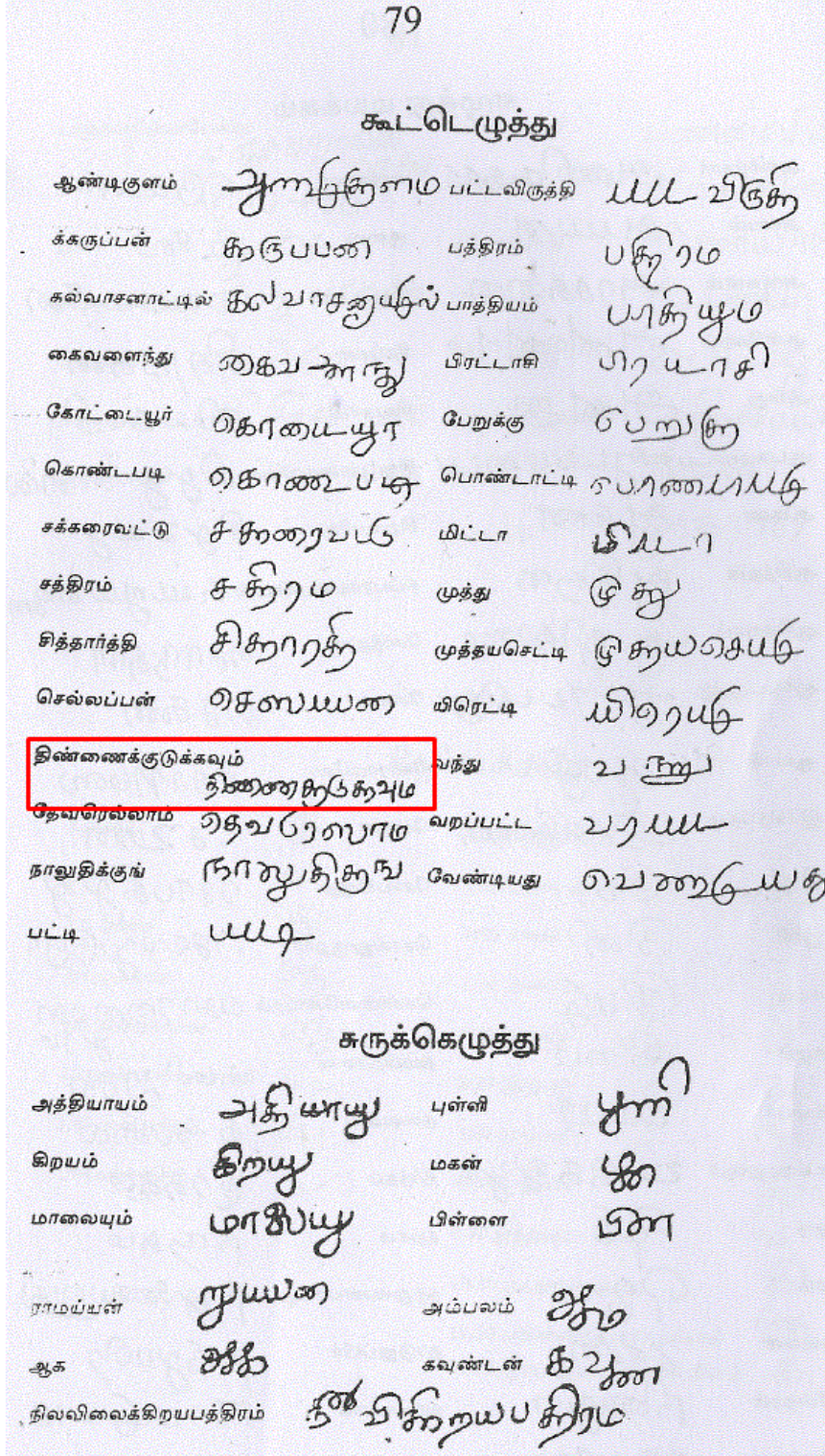
In the picture, the text/word within red-square, *"திண்ணைக்குடுக்கவும்"* has 2 double-letters (KKU, VUM) that are proposed for encoding and one another double letter (KKA) as well. It should be noted that, while KKU is used in the middle of the word, VUM is written in the regular way. Therefore, it should be noted that such letters can occur in any part of the word subject to the Tamil grammar rules; And they can be wrtten in regular way also.

Further, a careful reading of the words in the picture will indicate that many words are more of informal way of writing. For example, the words குடுக்கவும், பொண்டாட்டி,

பிரட்டாசி, கிறயம் are all very informal way of writing and speaking in Tamil. It is possible that such letters are used more in informal writings than the formal one.

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Therefore, if such letters are encoded, there will be no end to encoding and it is possible that these will crowd the coding chart and make it less meaningful. Panel of GoTN does not recommend these 3 symbols for encoding.

4 Others

4.1 CHANGES TO CODEPOINT NAMES

With reference to L2/15078,L2/15079 and L2/13047, subject expert panel of the GoTN observes that the names of the codepoints have different issues.

For example, TAMIL LETTER <u>NA</u> (0BA8) has the structure as [*language*]+[*category*]+[*subject*], where as TAMIL <u>AU</u> LENGTH MARK (0BD7) has the structure as [*language*]+[*subject*]+[*category*]. (*category* is referred here as LETTER, LENGTH MARK, SIGN, SYMBOL etc. and subject is the item in *encoding*). It can be observed that TAMIL OM doesn't have any qualifier.

Though the panel understands that these cannot be changed now, as they are already encoded in BMP, it is a bit concerned that the similar issues are seen in the characters/symbols proposed in the current proposal as well.

For example, in L2/15078, 11FD1 has the name as TAMIL <u>SIGN</u> NEL, where as 11FE4 has the name as TAMIL LAND <u>SIGN</u>. Here the category "SIGN" is at the middle of the name of the former, and at the end of the later. Besides, it appears that SIGN and SYMBOL are different in their meanings and in the case of archaic symbols, naming it as SYMBOL seems to be more appropriate.

Further, the names of the symbols are in English, that does not reflect the actual meaning of the same in Tamil. For example, in the case of TAMIL FIRST SIGN (11FE7), FIRST refers to "starting from or commencing from" in the actual usage. But, calling it as FIRST interprets it differently. In the case of TAMIL CHARGE SIGN(11FE6), also CHARGE does not mean VASAM in Tamil.

Also, in the case of fractions, calling a Tamil Fraction in its own name in the local language gives more comfort in reading and understanding. Though many fractions are archaic in nature, the names like ARAI, KAAL, MUKKAL, ARAIKAAL etc., are still in use at large, and it gives more comfort to the native language users. The professions such as epigraphists also refer them with the Tamil name only.

Besides, in the case of archaic fractions and symbols, there are multiple occurrences exist and are likely to add up in the future also when more researches are done in this area.

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For example, There are two number signs (one already in BMP), two credit signs(one already in BMP), two one-half symbols and two viicam symbols are found,

Considering a) need to name in Tamil b) correct interpretation c) multiple occurrences d) a tentative format for the names, the names of the codepoints have been changed for the symbols in this proposal. The panel believes that it will benefit this set of symbols and also for the future proposals. Further, in order to understand the names in Roman, the names are also written in Tamil as annotation. This will help understanding the name without spelling issues. The code chart in Annexure defines the new names accordingly.

4.2 ANNOTATION CHANGES

In the context of discussions on glyph changes and name changes annotations also have undergone changes. While some of the annotations are retained from L2/13047 and L2/15078, some have undergone changes. In these, some are mentioned in this document, and some are directly included in the code chart (Annexure-2). Significant changes are highlighted.

Here, changes required in the already encoded BMP codepoints are mentioned.

- 0B99 ங TAMIL LETTER NGA – Following two annotations to be removed as, kurunu/marakkal is proposed to have a separate codepoint; and other one is not encoded.

    also denotes the measure kuruni/marakkaal
    →11FD5 ☐ tamil sign muuvuzhakku

- 0BA4 த TAMIL LETTER TA – code point "11FD7" in the annotation is to be changed to "11FDD"

- 0BAA ப TAMIL LETTER PA – the following annotation is to be dropped as the symbol for MAA is proposed throuh this amendment proposal.

    o   also denotes the fraction one twentieth
    o   = maa

- 0BB3 ள TAMIL LETTER LLA - code point "11FD7" in the annotation is to be changed to "11FDD"

- 0BB5 வ TAMIL LETTER VA – the following annotation is to be dropped as the symbol for KAAL is proposed through this amendment proposal.
    o   • also denotes the fraction one quarter
    o   = kaal

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- 0BF3 ௳ TAMIL DAY SIGN – the following annotation is to be dropped as the symbol for URI is recommended to be dropped.
  - → 11FD4 ▢ tamil sign uri

- 0BF7 ௷ TAMIL CREDIT SIGN – the following annotation to be changed.

  "→ 11FF5 ▢ tamil traditional credit sign" to be changed to "→ 11FF2 ▢ tamil traditional credit sign-2"

5 References

1] South India Inscriptions (SII) - Volumes- 1,3,4,5,8,12,24, published by Archaeological Survey of India, (http://asi.nic.in/).

2] Inscriptions (Texts) of The Pudukkottai State-Arranged according to Dynasties, Published by The commisioner of Museums, Government Museum, Chennai-600008, 2012.

3] Tamil Ennum Eluththum – Mani.Maran, Published by Saraswathi Mahal Library, Thanchavur, Tamilnadu, India, 2015.

4] Tirumala Tirupati Devasthanam Inscriptions – Vol.1 / 1988, Part-Vijayanagara Inscriptions.

5] A handbook of the ordinary dialects of the Tamil language, 7th Edition – Rev.G.U.Pope, Oxford University Press, London.

6] Treatise on Mathematics - The Institute of Asian Studies, Chemmancherry, Chennai 600119.

7] Tamil Lexican, University of Madras, 1982.

6 Technical Details

Font set and other technical details will be provided shortly.

7 Code Chart

Coed chart of Supplement block is available in the Annexure-2.

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8   Official Summary form

A. Administrative

1. Title
   Tamil Fractions and Symbols – Amendment Proposal

2. Requester's name
   Department of Information Technology, Government of Tamil Nadu, India

3. Requester type (Member body/Liaison/Individual contribution)
   Institutional Member - Unicode Consortium

4. Submission date
   14th January 2016

5. Requester's reference (if applicable)
   Dr.Lisa Moore requested to send to the UTC, our comments on the proposal L2/12-231,

   L2/13-047 and related other documents, no later than January 15, 2016 to enable the UTC and

   its members to consider our feedback before UTC will need to vote on the addition of the

   characters into ISO/IEC 10646.

6. Choose one of the following: This is a complete proposal (or) More information will be provided later
More information will be provided based on the feedbacks from UTC for this document

B. Technical – General
1. Choose one of the following:
1a. This proposal is for a new script (set of characters), Proposed name of script
No

1b. The proposal is for addition of character(s) to an existing block, Name of the existing block
These characters are additions to the Tamil encoding, but they cannot all be encoded in the existing BMP Tamil block due to lack of space. As a result, a new Tamil Supplement block is requested.

2. Number of characters in proposal
48 (Forty Eight)

3. Proposed category
Category B1, specialized small

4. Is a repertoire including character names provided?
No
4a. If YES, are the names in accordance with the "character naming guidelines" in Annex L of P&P document?

_____

4b. Are the character shapes attached in a legible form suitable for review?
Yes. However, most of them are hand-written; Font set will be provided shortly.

5. Fonts related:
a. Who will provide the appropriate computerized font to the Project Editor of 10646 for publishing the standard?

Tamil Virtual Academy, Chennai, India – http://tamilvu.org – On behalf of department of Information Technolgy, GoTN, India

b. Identify the party granting a license for use of the font by the editors (include address, e-mail etc.)
Department of Information Technology, Government of Tamil Nadu, India

6a. Are references (to other character sets, dictionaries, descriptive texts etc.) provided?
Yes.

6b. Are published examples of use (such as samples from newspapers, magazines, or other sources) of proposed characters attached?
Yes.

7. Does the proposal address other aspects of character data processing (if applicable) such as input, presentation, sorting, searching, indexing, transliteration etc. (if yes please enclose information)?
Will be provided as part of final proposal.

8. Submitters are invited to provide any additional information about properties of the proposed character(s) or script that will assist in correct understanding of and correct linguistic processing of the proposed character(s) or script.
Discussed in detail in the document.

C. Technical – Justification
1. Has this proposal for addition of character(s) been submitted before? If YES, explain.
This document places the amendmendts for L2/12-231, L2/13-047 and L2/13028

2a. Has contact been made to members of the user community (for example: National Body, user groups of the script or characters, other experts, etc.)?
Yes

2b. If YES, with whom?

1. Department of Information Technology, GoTN, Chennai, India - http://www.tn.gov.in/department/17

2. Department of Ancient History & Archaeology, Madras Univesity,Chennai, India, http://www.unom.ac.in/
3. Department of Maritime History and Marine Archaeology, Tamil University, Thanchavur, Tamilnadu, India, http://www.tamiluniversity.ac.in/

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4. Department of Manuscriptology, Tamil University, Thanchavur, Tamilnadu, India, http://www.tamiluniversity.ac.in/

5. Tamilnadu State Department of Archaeology, Chennai, India - http://www.tnarch.gov.in/

6. Tamil Computing specialists of Tamil Virtual Academy – http://tamilvu.org

7. Individual s like Journalists, Tamil Researchers, Engineers, and Software Engineers were also communicated

2c. If YES, available relevant documents.
Discussed through several meetings

3. Information on the user community for the proposed characters (for example: size, demographics, information technology use, or publishing use) is included?
Those who desire to store as digital text of old Tamil manuscripts, inscriptions that involve these characters.

4a. The context of use for the proposed characters (type of use; common or rare)
Rare.

4b. Reference

5a. Are the proposed characters in current use by the user community?
Scholars who work with manuscripts will use these characters.

5b. If YES, where?
Largely in Research institutions, Tamil related Universities, MSS Libraries and Archaeological departments.

6a. After giving due considerations to the principles in the P&P document must the proposed characters be entirely in the BMP?
No

6b. If YES, is a rationale provided?

6c. If YES, reference

7. Should the proposed characters be kept together in a contiguous range (rather than being scattered)?
Yes

8a. Can any of the proposed characters be considered a presentation form of an existing character or character sequence?
No.

8b. If YES, is a rationale for its inclusion provided?

8c. If YES, reference

_____

9a. Can any of the proposed characters be encoded using a composed character sequence of either existing characters or other proposed characters?
No. But, Identified few characters in the proposal L2/15078 that they can be composed of existing characters or other proposed characters.

9b. If YES, is a rationale for its inclusion provided?

9c. If YES, reference

10a. Can any of the proposed character(s) be considered to be similar (in appearance or function) to an existing character?
No. Discussed in detail.

10b. If YES, is a rationale for its inclusion provided?

10c. If YES, reference

11a. Does the proposal include use of combining characters and/or use of composite sequences?
Yes

11b. If YES, is a rationale for such use provided?
Yes

11c. If YES, reference
Discussed in few sub sections of section 3.

11d. Is a list of composite sequences and their corresponding glyph images (graphic symbols) provided?

12a. Does the proposal contain characters with any special properties such as control function or similar semantics?
No.

12b. If YES, describe in detail (include attachment if necessary)

13a. Does the proposal contain any Ideographic compatibility character(s)?
No.

13b. If YES, is the equivalent corresponding unified ideographic character(s) identified?

13c. If YES, reference:

………end of proposal………

DEPARTMENT OF INFORMATION TECHNOLOGY
Government of Tamil Nadu, India

ANNEXURE-1 - Details of Panel of Subject Experts

Department of Information Technology (http://www.tn.gov.in/department/17) constituted the Panel of experts from different fields to evaluate the Tamil Fractions and Symbols proposal and feedbacks, under the joint coordination of Tamil Virtual Academy, http://tamilvu.org/, Chennai, India and University of Madras, http://www.unom.ac.in/ , Chennai, India.

This panel was Chaired by Dr.M.Ponnavaikko , Vice Chancellor of Bharath University and Coordinated by Dr.P.D.Balaji , Head of Department - Ancient History and Archaeology, University of Madras. The details of the panel are as under:

Srl	Name	Expertise / Remarks
1	Dr.M.Ponnavaikko Vice Chancellor, Bharath University, Chennai	Tamil Computing expert , Member-Tamil Computing Standards Committee of TVA , Chair of the Panel.
2	Dr.P.D.Balaji Professor, University of Madras, Chennai	Head of Department - Department of Ancient History & Archaeology, Coordinator of the panel.
3	Dr.S.Rajavelu Professor, Tamil University, Thanjavur	Dean – Faculty of Manuscriptology Head of Department – Maritime History and Marine Archaeology
4	Dr. Natana Kasinathan	Former Director – Tamilnadu State Department of Archaeology, GoTN
5	Mr.Naga.Elangovan	Software Engineer, Member-Tamil Computing Standards Committee of TVA, Tamil Researcher
6	Dr.A.Padmavathy	Former Assistant Superintendent of Epigraphy – State Department of Archaeology , GoTN.
7	Dr.S.Rajagopal	Assistant Director (Former) - Tamilnadu State Department of Archaeology
8	Dr.Krishnan Ramasamy, a.k.a Iraamaki Former Project Director of SPIC Petrochemicals, Chennai	Engineer, Tamil/Historical Researcher, Member-Tamil Computing Standards Committee of TVA
9	Dr.K.Vijaya Venugopal	Former Professor Madurai Kamaraj

|		
		Univeristy, (Tamil department) and Eminent Archaeolgy expert.
10	Dr.R.Vasudevean	Eminent Tamil Literature & Medicinal Literature Scholar, Banker, Founder - Tamizhayam Research Foundation & Data Cure Technologies.
11	Dr.C.Santhalingam	Former Archaeological Officer - State Department of Archaeology, GoTN
12	Dr.T.Kalasridhar Professor, Tamil University, Thanjavur	Head of Department - Manuscripts
13	Dr.Thamizhappan Bangalore	Scholar in Tamil Accounting , Tamil Researcher
14	Dr.C.K.Sivaprakasam	Historian, Former Professor of History, Poondi Pushpam College, Thanchavur
15	Dr.K.Kulandaivel Tamilcholai	Epigraphist, State Department of Archaeology, GOTN
16	Dr.N.Marxia Gandhi	Former Assistant Superintendent of Epigraphy – State Department of Archaeology , GoTN
17	Dr.A.James Assistant Director, Tamil Virtual Academy	Officer - Tamil Computing , Tamil Linguistics
18	Dr.K.Venkatachalam	Engineer, Expert in Measurements of Chozha period
19	Mr.P.Venkatesan	Former Superintendent Archaelogist - Archaeological Survey of India

...end of Annexure-1

**Annexure-2 - Tamil Supplement (Proposed) Code Chart**

	11FC	11FD	11FE	11FF
0	வத	உ	கூ	வூு
1	ஈ	இ	ப	ழூ
2	உ	அ	எ	மூ
3	ஜூ	தெ	கூ	வூல
4	சு	கூ		நூ
5	அல			ஈூ
6			புறு	வூூ
7		எ	குூ	சூ
8	ப	ளூ	ல	ஜூ
9	ய	ளு		அூ
A	ஷ	அ		
B	உ	நூ	ஞ	
C	வசு	டூ	நூ	
D	ஈ	ஈ	புூ	
E	நூ		அ	
F	கு			எ

_____

Fractions

11FC0 ஜ **TAMIL FRACTION MUNTHIRI**

= முந்திரி = 1/320th

11FC1 ௺ **TAMIL FRACTION ARAIKKAANI**

= அரைக்காணி = 1/160th

11FC2 ௨ **TAMIL FRACTION KAANI**

= காணி = 1/80th

11FC3 ௸ **TAMIL FRACTION KAALVIICAM**

= கால்வீசம் = 1/64th

11FC4 ௴ **TAMIL FRACTION ARAIMAA**

= அரைமா = 1/40th

11FC5 ௵ **TAMIL FRACTION ARAIVIICAM**

= அரைவீசம் = 1/32nd

11FC8 ௫ **TAMIL FRACTION MAA**

= மா = 1/20th

11FC9 ௶ **TAMIL FRACTION VIICAM-1**

= வீசம் = 1/16th

= மாகாணி / maakaani

11FCA ௷ **TAMIL FRACTION VIICAM-2**

= வீசம் = 1/16th

= மாகாணி / maakaani

11FCB ௸ **TAMIL FRACTION IRUMAA**

= இருமா = 1/10th

11FCC ௺ **TAMIL FRACTION ARAIKKAAL**

= அரைக்கால் = 1/8th

11FCD ௻ **TAMIL FRACTION MUMMAA**

= மும்மா = 3/20th

11FCE ௼ **TAMIL FRACTION MUUVIICAM**

= மூவீசம் = 3/16th

= மும்மாகாணி / ==mummaakaani==

11FCF ௽ **TAMIL FRACTION NAALUMAA**

= நாலுமா = 1/5th

11FD0 ௾ **TAMIL FRACTION KAAL**

= கால் = ¼

11FD1 ௿ **TAMIL FRACTION ARAI-1**

= அரை = ½

11FD2 ௐ **TAMIL FRACTION ARAI-2**

= அரை = ½

11FD3 ௗ **TAMIL FRACTION MUKKAAL**

= முக்கால் = ¾

11FD4 ௚ **TAMIL FRACTION DOWN SCALING FACTOR KIIZH**

= கீழ்

• when prefixed to a tamil fraction, reduces its value by a factor1/320

Measures

11FD7 ௗ **TAMIL GRAIN SYMBOL NEL**

= நெல்

11FD8 ௘ **TAMIL MEASURE SYMBOL CHEVIDU**

= செவிடு = 360 nel

11FD9 ௙ **TAMIL MEASURE SYMBOL AAZHAAKKU**

= ஆழாக்கு = 5 chevidu

11FDA ௚ **TAMIL MEASURE SYMBOL UZHAKKU**

= உழக்கு = 2 aazhaakku

==• for the measure uri use text உரி which equals 2 uzhakku==

==• for the measure naazhi/padi which equals 2 uri==

→ 0BF3 ௳ tamil day sign

11FDB ௛ **TAMIL MEASURE SYMBOL MUUVUZHAKKU**

= மூவுழக்கு

• equals 3 uzhakku

11FDC ௜ **TAMIL MEASURE SYMBOL KURUNI**

= குறுணி = 8 naazhi/padi

= மரக்கால்

11FDD ௝ **TAMIL MEASURE SYMBOL MUKKURUNI**

= முக்குறுணி = 3 kuruni

Currency symbols

11FE0 ௞ **TAMIL CURRENCY SYMBOL KAACU**

= காசு

11FE1 ௟ **TAMIL CURRENCY SYMBOL PANAM**

= பணம்

==•   also used as a weight unit==

11FE2 ௠ **TAMIL CURRENCY SYMBOL PON**

= பொன்

_____

- 1 pon was equivalent to 1 kalanchu during certain historical period

11FE3 ꩜ **TAMIL CURRENCY SYMBOL VARAAKAN**

= வராகன் = 28 panam
- <mark>also used as a weight unit</mark>
- <mark>1 varaakan = 3 kalanchu in weight unit</mark>

Weight and Area symbols

11FE6 � **TAMIL WEIGHT SYMBOL PAARAM**

= பாரம்
- <mark>approximately equals 500 pounds</mark> <mark>during certain historical period</mark>

11FE7 ꩜ **TAMIL AREA SYMBOL KUZHI**

= குழி
- <mark>equals 1 square thandam</mark>
- <mark>1 thandam equals 16-spans</mark>
- <mark>16-span = 11 feet at most places</mark>

11FE8 ꩜ **TAMIL AREA SYMBOL VELI**

= வேலி
- equals 2000 kuzhi

Land and Agricultural symbols

11FEB ꩜ **TAMIL SYMBOL NILAM**

= நிலம்

11FEC ꩜ **TAMIL LAND SYMBOL NANCEY**

= நன்செய் = cultivable wet land

11FED ꩜ **TAMIL LAND SYMBOL PUNCEY**

= புன்செய் = cultivable dry land

11FEE ꩜ **TAMIL LAND SYMBOL UPPALAM**

= <mark>உப்பளம்</mark> = salt pan

...end of Annexure-2...

Other symbols and abbreviations

11FF0 ꩜ **TAMIL COMMON SYMBOL VACAM**

= வசம் = possession

11FF1 ꩜ **TAMIL COMMON SYMBOL MUTHAL**

= <mark>முதல் = starting from or commencing from</mark>

11FF2 ꩜ **TAMIL COMMON SYMBOL MUTHALIYA**

= முதலிய = et cetera
- indicates items in series

11FF3 ꩜ **TAMIL COMMON SYMBOL VAKAIYARAA**

= வகையறா
- indicates items of a kind

11FF4 ꩜ **TAMIL CLERICAL SYMBOL NAALATHU**

= நாளது

11FF5 ꩜ **TAMIL NUMBER SIGN-2**

= எண் = enn
→ 0BFA ꩜ tamil number sign

11FF6 ꩜ **TAMIL CREDIT SIGN-2**

= வரவு
→ 0BF7 ꩜ tamil credit sign

11FF7 ꩜ **TAMIL ACCOUNTING SYMBOL CHILLARAI**

= சில்லரை = chillarai/chilvaanam
- indicates 'and odd'

11FF8 ꩜ **TAMIL ACCOUNTING SYMBOL POKA**

= போக

11FF9 ꩜ **TAMIL ACCOUNTING SYMBOL AAKA**

= ஆக

Punctuation

11FFF ꩜ **TAMIL PUNCTUATION SYMBOL AVANAMUTRU**

= ஆவணமுற்று
- <mark>end-of-text / end-of-document</mark>