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MATHEMATICS

DETAILED DISCRIPTION ON VELI, KULI AND MA – AREA MEASUREMENTS FROM EPIGRAPHS

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Abstract: The paper intends to calculate the veli which is an area measurement using different measuring rods that are termed as kol in the inscriptions of Tamil nadu. Here we have also discussed about the number of kuli that constitute a ma in different periods of time.

Key words : Veli, Ma, kani, madakku, kil, taram etc.,

Introduction

Area measure is expressed in terms of several units which gives an idea about the land survey undertaken. The area measure not only gives an idea about the extent of area of land donated but also the land brought under cultivation as well the lands irrigated. While assessing the extent of land, the area measures come to our rescue to solve the boundary disputes. It is possible to know the distortion in the boundary on account of natural calamities like flood, etc.,. The area survey is invariably undertaken under the orders of the king to asses the extent of land that suffered from breeches that took place and the reclamation of land that has been done. The ploughing capacity of the land can also be worked out, with the knowledge of area measure. The area measure reveals the survey undertaken by the kings to the minutest fraction.

kuḻi- an area measurement[i]

From among area measurements *kuḻi* is the basic unit of area measure. It is one square rod. A square rod means an area measuring with one rod in length and one rod in breadth, the same came to be called a *kuḻi*.

Area measurement for a rectangular plot land

The modern formula for calculating the area of a rectangle is length X breadth. This was vogue in 13th century also. It is revealed from an inscription of Jaṭāvarman Sundara Pāṇḍya III dated in his 9thregnal year (1311-12 A.D.), hailing from Śrīraṅgam temple. It states that 3645 *kuḻi* of temple land was made over towards sites for the formation of a colony. The measurement of the place is mentioned as

njd;tly; nfhy; ehw;gj;ije;Jf;F
fPo;nky; nfhy; vz;gj;njhd;dhy;
Fop 3645…

…. Theṉvaṭal kōl 45kku kīḻmēl kōl 81nāl kuḻi 3645…[ii]

It means that in the north-south direction (Theṉvaṭal) it measures 45 *kōl* and in the east-west direction (*kīḻmēl*) it measures 81 *kōl* , then the area is 3645 *kuḻi* (without considering the length of the *kōl*).

Area of a rectangle = length X breadth square units.
= 45 X 81 square *kōl*

= 3645 square *kōl*

We know that, 1 square *kōl* = 1 *kuḻi*

Therefore, 3645 square *kōl* = 3645 *kuḻi*

The same can also be verified from another inscription at Uttaravedisvarā temple in Kuttālam dated in the reign period of Tribh. Rājēndra Chōḻa III in his 15th regnal year (1260 A.D.) which is still earlier than the inscription mentioned above. It registers a sale of 2 adjacent house sites measuring 3 *kōl* and 9 *kōl* east-west with depth of 14 *kōl* on the north-south direction which is a rectangle with 3+9 = 12 *kōl* as length and 14 *kōl* as breadth.[iii] Hence the area would be as follows.

Area = length x breadth square units

= 12 x 14 square *kōl*

= 168 square *kōl*

Also we know 1 square *kōl* = 1 *kuḻi*

168 square *kōl* = 168 *kuḻi*

It matches exactly the area mentioned in the inscription.

An inscription from Uttaramerūr, dated 923 A.D., which gives the extent of many plots, refers to a plot of 28 *kuḻi* as measuring 2 rods east west and 14 rods north south.[iv] If then, one square rod makes a *kuḻi*; the extent of *kuḻi* will naturally vary according to the length of the particular rod used. For example a *kuḻi* by 16-span rod will not be equal to a *kuḻi* by 12- span rod.

***Mā* - an area measūrment**

In general, hundred *kuḻi*s make one *mā*. Number of *kuḻis* that made up a *mā* varies from king to king and from period to period. Though the above values are generalized, the evidences from the inscriptions are being tabulated below.

Length of the rod and number of *kuḻi* to 1 *m*ā

S.No.	Length of the measuring rod (in *aḍi* units)	No of *kuḻi* to 1 *m*ā	Place	Date (in A.D)
1	NM^{*1}	128[v]	Vasishthēśvara temple, Tañjāvūr dt.	1012
2	NM^{*}	100[vi]	Uttaravēdīśvara temple, Kuttālam, Tañjāvūr dt.	1020
3	NM^{*}	100[vii]	Naṭarāja temple, Chidambaram, South Ārcot dt.	1070
4	NM^{*}	128[viii]	Naṭarāja temple, Chidambaram.	1075
5	12	729[ix]	Kailāśanātha temple, Ālambākam,Trichy dt.	1084
6	16	128[x]	Āpatsahāyēśvara temple,	1105

[1] NM*- means that the length of the rod is not mentioned in the inscription.

			Ālangudi, Tañjāvūr dt.	
7	12	100[xi]	Mahālingaśvāmi temple Kumbakōṇam tk, Tañjāvūr dt.	1122
8	*NM**	100[xii]	Umāmahēśvara temple, Tañjāvūr dt.	1117
9	*NM**	520[xiii]	Vrishabhapurīśvara temple, South Ārcot dt.	1175
10	*NM**	24.19[xiv]	Vēdāraṇyēśvara temple, Tañjāvūr dt.	1177
11	*NM**	100[xv]	Amirataghastēśvara temple, Tirukkadaiyūr, Tañjāvūr dt	1159
12	*NM**	600[xvi]	Brahmapurīśvara temple, Tirumayanam, Tañjāvūr dt	1186
13	*NM**	512[xvii]	Agastēśvara temple, Tañjāvūr dt.	1220
14	*12*	50[xviii]	Parasurāmēśvara temple, North Ārcot, dt	1220
15	*9 (12 san)*	160[xix]	Viraṭṭānsēśvara shrine, Kīḻūr, South Ārcot dt.	1243
16	16	512[xx]	Trivikrama temple, South Ārcot, dt	1252
17	*12*	100[xxi]	Virattanēsvarā temple, South Ārcot dt.	1267
18	18	256[xxii]	Nellaiyappar temple, Tirunelvēli dt.	13th cen
19	*NM**	100[xxiii]	Nedungalanātha śvāmin temple, Trichy dt.	14th cen
20	*NM**	6[xxiv]	Amritaghatēśvara temple, Tañjāvūr dt	
21	12	522[xxv]	Ruined Perumāḷ temple, Kadavampaṭṭi.	1307
22	16	256[xxvi]	Pudukōṭṭai	1253
23	*NM**	256[xxvii]	Kailāśanātha temple, Sendamaṅglam , Tirunelvēli dt	12th cen
24	16	256[xxviii]	Siganāthaśvāmin temple, Kuḍumiyāṉ malai, Kulattūr tk.	1271
25	16	256[xxix]	Viraṭṭaṉēśvara temple, kīḻūr, South Ārcot dt.	1018
26	18	522[xxx]	Kalyāṇa prasaṉṉā Veṅkaṭāchalapathi temple, Tiruvetpūr, Ālanguḍi tk. Pudukōṭṭai dt	1252
27	18	512[xxxi]	Karṇēśwarar temple, Tirukōkarnam, Alanguḍi tk.	1266

28	18	256[xxxii]	Ēśwaran temple, Perumanāḍu, Kuḷatūr tk. Pudukōṭṭai dt	1230
29	*NM**	150[xxxiii]	Śivapurīśvara temple, Śivayam, Kuḷitalai tk, Trichy dt. Pudukōṭṭai dt	1200
30	9	256[xxxiv]	Pudukōṭṭai	1217
31	24	522[xxxv]	Ēśwaran Temple. Perumenāḍu, Kuḷatūr tk. Pudukōṭṭai dt	1258
32	24	256[xxxvi]	Tiruthoṇḍīśvaram temple, Erode.	1504
33	*Nilamalavu kōl*	100[xxxvii]	Amiritaghatēśvara temple, Tirukkadaiyūr, Tañjāvūr dt.	1159
34	*NM**	100[xxxviii]	Uttamanāthaśvāmin temple. Kiranūr. Pudukōṭṭai dt	1310
35	*Tirumaiyathu kōl*	256[xxxix]	Naganātha śvāmin temple, Peraiyūr, Tirumaiyam. Pudukōṭṭai dt	1300
36	22	256[xl]	Naganātha śvāmin temple, Peraiyūr, Tirumaiyam. Pudukōṭṭai dt	1290
37	16	256[xli]	Varahnīśvarar temple, Olimaṅglam , Tirumiyam tk. Pudukōṭṭai dt	1261

The above table gives us an idea about the nature of the measuring rod and the number of *kuḻi* that is made up into 1 *mā*. The length of the measuring rod from Kailāśanātha śvāmi temple, Ālambākam, in Trichy district gives an equivalent of 729 *kuḻi* for 1 *mā* while in the case of Mahālingēśvara temple in Kumbakōnam taluk it gives 100 *kuḻi* = 1 *mā*. In the case of Viraṭṭaṉēśvara temple, the number of *kuḻi* did change making 160 *kuḻi* for 1 *mā*. Sometimes for different rods the basic number of *kuḻi* did not change. This can be seen from the equivalence seen from 128 *kuḻi* that made up 1 *mā* as in the Vasiśhthēśvara temple in Tañjāvūr district and Naṭarāja temple at Chidambaram. This enables us to infer that each area adopted a basic linear measure. Perhaps in the fertile areas, the length of the measuring rod was reduced to increase the area of the land. The least unit of measure is 24.19 *kuḻi* that made up 1 *mā.* In this case the length of the measuring rod is not mentioned. This has been calculated from the total number of *kuḻi*s and its equivalents given. This was endowed free from taxes fixed by Rājaniyōgam, *nāṭṭuvivattai* (*Vyavasthai*), *ūrvivattai* etc., as *Tirunadaviḷakkupuṟam* by Paṅgaṉavāyudaiyaṉ of Kiliyūr for burning a perpetual lamp to the deity Tirumaṟaikkāḍuḍaiyār in Umbalanāḍu. Tirumaṟaikāḍu is the Tamilised form of Sānskrit word the Vēdāraṇyam. The land endowed comes to 1 ½ *vēli* and 1 *mā.*

This has been arrived by calculating

1 ½ *vēli* = 30 *mā* + 1 *mā* (given)

= 31 *mā*

750 *kuḻi* = 31 *mā* (given)

Therefore, 1 *mā* = 750/31 *kuḻi*

= 24.19 *kuḻi*

The frequency table for the above data could be a follows.

Frequency table for no. of *kuḻi* to 1 *mā*

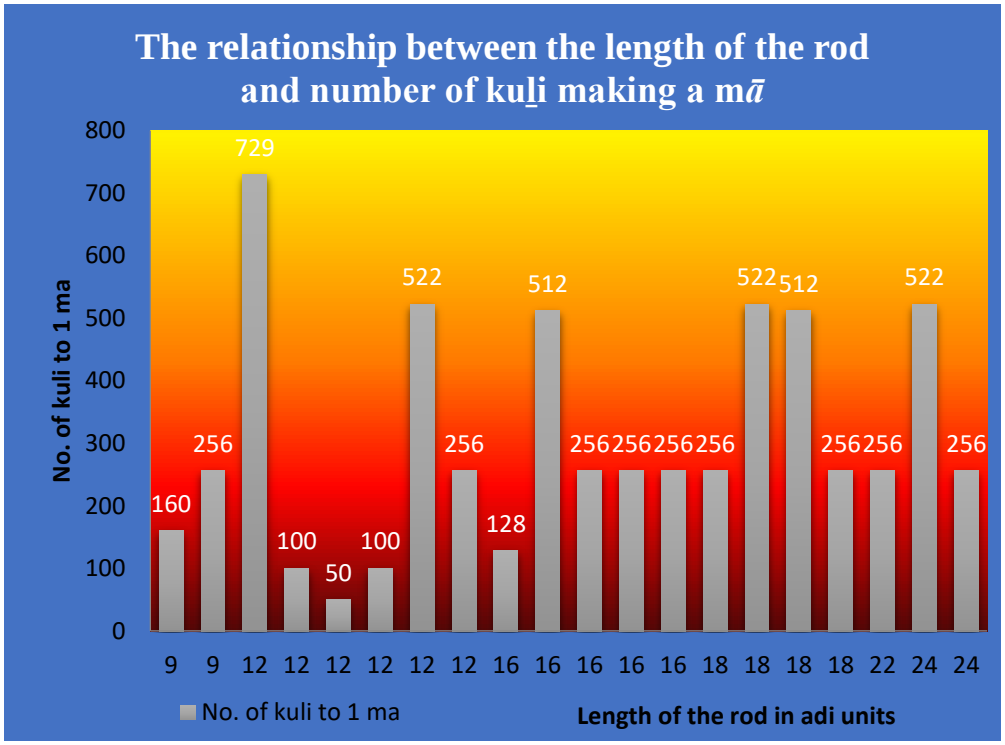
S.No.	No. of *kuḻi* to 1 *mā*	Frequency
1	24.19	1
2	50	1
3	100	9
4	128	3
5	150	1
6	160	1
7	256	11
8	512	3
9	520	1
10	522	3
11	600	1
12	729	1

Now, we find that 100 *kuḻi* making a *mā* and 256 *kuḻi* making a *mā* have the highest frequency. Hence these two values becomes our prime concern for further analysis. Therefore, the area of a *kuḻi* and area of *mā* for the different lengths of the rods are being calculated and tabulated.

Area of a *kuḻi* and a *mā* for different length of the rods

S.No.	Length of the rod	No. of *kuḻi* to 1 *mā*	Area of 1 *kuḻi* (in sq. *aḍi*)	Area of *mā* (in sq. *aḍi*)
1	12	100	144	14400
2	12	256	144	36864
3	16	256	256	65536
4	18	256	324	82944
5	24	256	576	147456
6	32	256	1024	262144

We can find the range the area of *mā* variying from 14,400 sq. *aḍi* to 2,62,144 sq. *aḍi*. Also, we could find that the variation in the area of a *mā* is wider. It means that the area measure depends largely on the linear measure that is the length of the rod and number of *kuḻi*s constituting a *mā*. Therefore, area measure is a dependent variable of linear measure. It is also directly propotional to the linear measure. The area increases as the length of the rod increases. The bar diagram below gives an idea about the relationship between *kuḻi* and *mā* for different length of the measuring rod.



From the above discussion and the bar diagram we find that 100 and 256 *kuḻi*s making a *mā* need to be addressed to. Also, we can infer that 256 *kuḻi* making a *mā* is found throughout the country. But we could also find that 100 *kuḻi* making a *mā* using 12 *aḍi* rod is found in Chōḻa country at large. In otherwords this was in practise in the areas which are fertile and also in the areas irrigated by river Kāveri. We could find that 256 *kuḻi* making a *mā* is being practised mainly in the dry areas like Pudukōṭṭai, South Ārcot, Erode districts. It means that the availability of water, fertility of the soil, rainfall etc., contributes to the assesment of the value of the land. It is also noteworthy that 100 which is square of 10 and 256 which is square of 16 plays a significant role in the Tamil mathematics. This implies that the decimal and hexadecimal system was found to be vogue many centuries ago.

Calculation of area of *mā*

After arriving at the conclusion that 100 *kuḻi* makes a *mā* and the length of the rod being 12 *aḍi*, the area of one *mā* is (12 X 12) X 100 sq. *aḍi* ie., 14,400 sq. *aḍi*. We shall suggest a method of measuring the land whose area is 14,400 sq. *aḍi* using 12 *aḍi* scale. The various combinations of factors of 14400 are considered.

12 *aḍi* rod can be used for measuring both length and the breadth of the above said rectangle. It needs to be measured 10 times on both the ways. It is to be noted that this process may not always result in squares but it may result in rectangles as given below also.

12 *aḍi* rod can be used for measuring both length and the breadth of the above said rectangle. It takes 20 times to measure the length and 5 times to measure the breadth. The other possible combinations of (L,B) would be (600,24), (160,90), (225,64), (180,80), (12, 1200) for which either 12 *aḍi* rod or 16 *aḍi* rod can be used to measure. There are also combinations of rectangles which cannot be measured using any of the standard rod used for measuring the length and breadth. Those combinations are as follows: (360,40), (480,30), (720,20), (1440,10), (320,45).

Similarly, the same area of 1 *mā* can be measured using 16 *sān kōl*. The conversion is as follows,

(12 X12) X 100 sq.*aḍi* = 14400 sq. *aḍi*

=14400X$(4/3)^2$ sq. *sān*
= 25600 sq. *sān*.
= (16 X 16) X 100 sq. *sān*

The other possible combinations of (L,B) would be (320,80), (1600,16), (800, 32), (128, 200), (256, 100). These rectangles can be measured using16 *sān* rod. The prime factorization of this number also leads to some combination of rectangles which can be again measured using the standard rod ie., 16 *sān kōl* which is again 12 *aḍi* in length.

Next,

The area of 256 *kuḻi* using 12 *aḍi* rod = (12 X12) X 256 square *aḍi*
= 36864 sq. *aḍi*
= (16 X 16) X 144 sq.*aḍi*
= 144 *kuḻi* using 16 *aḍi* rod

Hence from the above we find 1). For measuring an area of 14,400 sq. *aḍi* either 12 *aḍi* rod or 16 *sān* rod can be used. The number of *kuḻi* that is 100 remains the same. 2). Also, the area obtained by measuring 256 *kuḻi* using 12 *aḍi* rod is equal to the area of 144 *kuḻi* measured using 16 *aḍi* rod.

So inorder to measure a *mā* of 100 *kuḻi* using 12 *aḍi* rod one can measure 256 *kuḻi* using 16 *sān* rod. At this stage we shall define the basic length (BL) of the rod as 12 *aḍi* or 16 *sān*. And the basic *kuḻi* (BK) as 100 *kuḻi* whose basic area (BM) is 14,400 sq. *aḍi*.

Now consider 160 *kuḻi* making a *mā*. (Refer table 3.1 row 15.) Convertion to basic *kuḻi* and finding the breadth of a *kuḻi* is as follows.

Standaradisation and calculation of the breadth of a *kuḻi*

L= 12 *sān* = 9 *aḍi*, *kuḻi / mā* (KM) = 160 BK = 100 sq. *aḍi*, BL= 12 *aḍi*

Breadth $= \frac{BK\ X\ BL\ X\ BL}{L\ X\ KM}$ units

$= \frac{12\ X\ 12\ X\ 100}{9\ X\ 160}$ *aḍi*

$= \frac{14400}{1440}$ *adi*

= 10 *aḍi*

Area of 1 *kuḻi* = (9X 10) sq. *aḍi*
= 90 sq. *aḍi*

Area of 160 *kuḻi* (9 *aḍi*) = (160 X 90) sq. *aḍi*
= 14400 sq. *aḍi*
= Area of 100 BK
= Area of 1 BM

Hence, converting to BK we obtain a *kuḻi* is a rectangle of dimension (10 X 9) sq. *aḍi*. Now consider 512 *kuḻi* making a *mā*. (Refer table 3.1 row 27). Convertion to basic *kuḻi* is as follows.

L= 18 *aḍi kuḻi/ mā* (KM) = 512 BK = 100 sq. *aḍi* , BL= 12 *aḍi*

Breadth $= \frac{BK\ X\ BL\ X\ BL}{L\ X\ KM}$ units

$= \frac{12\ X\ 12\ X\ 100}{18\ X\ 512}$ *aḍi*

$= \frac{14400}{9216}$ *aḍi*

= 1.5625 *aḍi*

Area of 1 *kuḻi* = (18 X 1.5625) sq. *aḍi*
= 28.125 sq. *aḍi*

Area of 512 *kuḻi* (18 *aḍi*) = (28.125 X 512) sq. *aḍi*
= 14400 sq. *aḍi*

= Area of 100 BK
= Area of 1 BM

Hence, converting to BK we obtain a *kuḻi* a rectangle with dimension (18 X 1.5625) sq. *aḍi*. Or (24 X 2.08) sq. *sān*.

Now, consider 256 *kuḻi* making a *mā*. (Refer table 3.1 row 28). Convertion to basic *kuḻi* is as follows.

L = 18 *aḍi*, *kuḻi/ mā* (KM) = 256 BK = 100 BL= 12

$$\text{Breadth} = \frac{BK\ X\ BL\ X\ BL}{L\ X\ KM} \text{ units}$$

$$= \frac{12\ X\ 12\ X\ 100}{18\ X\ 256}\ aḍi$$

$$= \frac{14400}{4608}\ adi$$

= 3.125 *aḍi*

Area of 1 *kuḻi* = (18 X 3.125) sq. *aḍi*
= 56.25 sq. *aḍi*
Area of 256 *kuḻi* (18 *aḍi*) = (56.25 X 256) sq. *aḍi*
= 14400 sq. *aḍi*
= Area of 100 BK
= Area of 1 BM

Hence, converting to BK we obtain a *kuḻi* is a rectangle of dimension (18 X 3.125) sq. *aḍi* or (24 X 4.1666) sq. *sān*.

Here the area of 256 *kuḻi* = (12 X 12) sq. *aḍi* X 256 *kuḻi*.

L= 12 *aḍi*, *kuḻi/ mā* (KM) = 256 BK = 100 sq *aḍi* BL= 12 *aḍi*

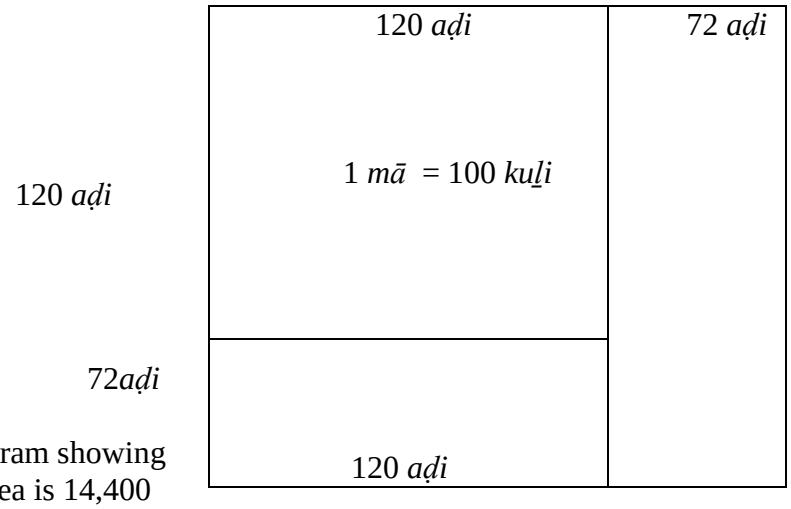
$$\text{Breadth} = \frac{BK\ X\ BL\ X\ BL}{L\ X\ KM} \text{ units}$$

$$= \frac{12\ X\ 12\ X\ 100}{12\ X\ 256}\ aḍi$$

= 4.6875*aḍi*

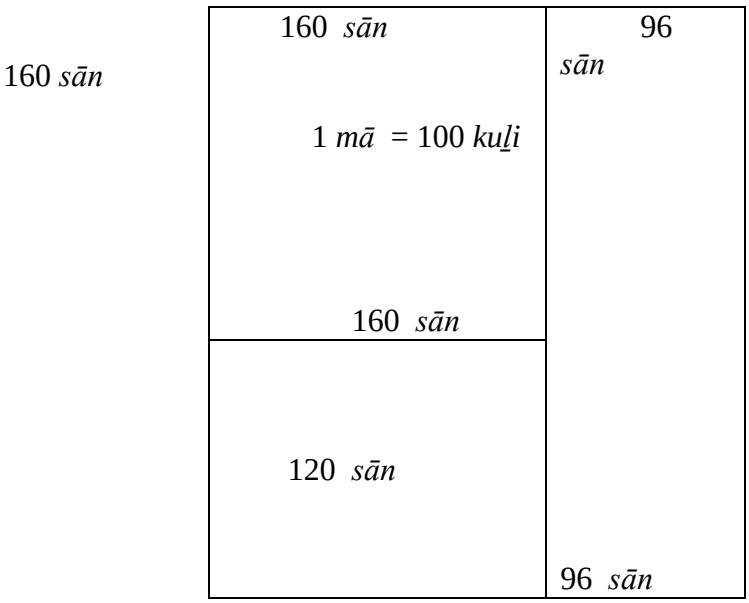
Area of 1 *kuḻi* = (12 X 4.6875) sq. *aḍi*
= 56.25 sq. *aḍi*
Area of 256 *kuḻi* (12 *aḍi*) = (56.25 X 256) sq. *aḍi*
= 14400 sq. *aḍi*
= Area of 100 BK
= Area of 1 BM

The following diagram shows that 100 *kuḻi* whose area is 14400 sq. *aḍi* measured using 12 *aḍi* rod.



The diagram showing the total to 256 *kuḻi* whose area is 14,400 sq.*aḍi* measured using

16 *sān* scale. Here the area of 256 *kuḻi* = (16 X 16) sq. *aḍi* X 256 *kuḻi*



The same area is measured by rods of different length for the length and the breadth. Hence, the area of a *mā* can be interepreted as 100 *kuḻi* using 12 *aḍi* rod is equal to 100 *kuḻi* using 16 *sān* rod.

The following table is obtained while standardizing the breadth by assuming the following values of BK, BL.
Breadth1: BK=100; BL= 12;
Breadth2: BK=100; BL= 16
Breadth3: BK=256; BL= 12;
Breadth4: BK=256; BL= 16

Breadths for different length of the rod and the corresponding No. of *kuḻi* to a ma

No. of *kuḻi*	Length (*aḍi*)	Breadth1 (*aḍi*)	Breadth2 (*aḍi*)	Breadth3(*aḍi*)	Breadth4(*aḍi*)
100	12	12	16	30.72	54.61333
256	12	4.6875	6.25	12	21.33333
729	12	1.64609053	2.194787	4.213992	7.491541
50	12	24	32	61.44	109.2267
522	12	2.29885057	3.065134	5.885057	10.46232
256	16	3.5156255	6.25	9	16
128	16	7.03125	12.5	18	32
512	16	1.7578125	3.125	4.5	8
256	18	3.125	6.25	8	14.22222
522	18	1.53256705	3.065134	3.923372	6.974883
512	18	1.5625	3.125	4	7.111111
256	22	2.55681818	6.25	6.545455	11.63636
256	24	2.34375	6.25	6	10.66667

522	24	1.14942529	3.065134	2.942529	5.231162
256	32	1.7578125	6.25	4.5	8
160	9	10	10	25.6	45.51111
160	12	7.5	10	19.2	34.13333

The fractions of the breadth can be measured by multiplying it with suitable numbers in order to measure a *mā*. For example,

Consider the *kuḻi* with length = 12, breadth= 1.64, No. of *kuḻi*=729

To measure 729 *kuḻi* (ie., a *mā*), one has to break up 729 *kuḻi* as 7 hundreds 30 tens

(12 X 1.64) X 729 = (12 X 16.4) X 27 X 27

= (12 X 1195.56)

= (12 X 1) X (12 X 99.63)

= (12 X 1) X (12 X 100) app.

Therefore, measuring 1 time the length and 100 times the breadth using 12 *aḍi* rod gives the result. Similarly, other rectangular *kuḻi*s can be measured.

Next, let us consider 18 as 24 san. Hence,

Area of 512 *kuḻi* using 18 *aḍi* rod = (8 X 8 X 8) X 24 X24 sq. *san*

Breadth of 1 kuli = $\frac{8\ X\ 8\ X\ 8\ X\ 3}{8\ X\ 3\ X\ 4}$ *san*

= 16 *san*

Next, let us consider 729 *kuḻi* as 24 adi. Hence,

Area of 729 *kuḻi* using 12 *aḍi* rod = (9 X 9 X 9) X 12 X 12 sq. *san*

Breadth of 1 kuli = $\frac{9\ X\ 9\ X\ 9\ X\ 4}{12\ X\ 3}$ *san*

= 81 *san*

From the above table, we also find that in every row there is atleast one value of the breadth which is a whole number. This particular length and breadth can be used as the dimension of one *kuḻi* and other standardizations can be neglected. For example, consider the second row, number of *kuḻi* is 256, the length and the breadth3 is 12 *aḍi*.

Also, a *kuḻi kōl* which is in the shape of the wedge can be employed to measure the *kuḻi* directly. It is enough to measure the diagonal using *kuḻi kōl* and thereafter the area of the land can be calculated.

Conclusion: Thus we find that kuli and ma play a major role in the calculation of veli. There seems to be different number of kuli and ma making a veli. There is variations in this number in different period of time and during different parts of the country. This depends on the nature of the land whether it is or wet.

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[vii]*Ibid.*, Vol.XXVIII,No.135
[viii]*Ibid.*, Vol. IV, No.226
[ix]*Ibid.*, Vol. XXVI, No. 776
[x]*Ibid.,* Vol.VI, No.440

[xi]*Ibid.*, Vol. V, No.702
[xii]*Ibid.*, Vol.XXVI, No.700
[xiii]*Ibid.*, Vol.XVII, No. 244
[xiv]*Ibid.*, Vol.XVII, No. 540
[xv]*SII.,* Vol.22, PART I, No.41

[xvi]*Ibid.,* Vol.XXII, PART I, No.63

[xvii]*Ibid.,* Vol.VIII, No.204

[xviii]*Ibid.*, Vol.VIII, No.512
[xix]*Ibid.*, Vol.VII, No. 863
[xx]*Ibid.*, Vol.VII, No.947
[xxi]*Ibid.*, Vol.VIII, No.316
[xxii]*Ibid.*, Vol.V, No.411
[xxiii]*Ibid.*, Vol.XXVI, No.716
[xxiv]*Ibid.,*Vol..XXII, PART I, No.18

[xxv] *Inscriptions of Pudukottai State*, No. 544
[xxvi] *Inscriptions of Pudukottai State*, No.345
[xxvii]*SII.,*, Vol. XIV, No.232
[xxviii] *Inscriptions of Pudukottai State*, No. 383
[xxix]*SII.,*, Vol.VII, No. 889
[xxx] *Inscriptions of Pudukottai State*, No. 475
[xxxi]*Inscriptionsof Pudukottai State*, No. 590
[xxxii] *Inscriptionsof Pudukottai State*, No.525
[xxxiii]*SII.,*, Vol.XXVIII, No. 45
[xxxiv] *Inscriptions of Pudukottai State*, No.175
[xxxv] *Inscriptions of Pudukottai State*, No. 359
[xxxvi] *Erode district inscriptions*, 1009/2003
[xxxvii]*SII.,,* Vol.XXII, PART I, No.41

[xxxviii] *Inscriptions of Pudukottai State*, No. 546
[xxxix] *Insriptions of Pudukottai State*, No.412
[xl] *Inscriptions of Pudukottai State*, No.403

[xli] *Inscriptions of Pudukottai State*, No.349