PRACTICES IN CAPACITY AND WEIGHT MEASUREMENTS IN RURAL TAMIL NADU: IMPLICATIONS FOR ADULT EDUCATION PROGRAMMES

Measurements are useful in comparing or describing objects. Objects are compared and described with other objects which are continuous (the capacity of one vessel is seen in terms of the capacity of other vessels) or discrete (iterative or using a unit several times such as the capacity of the pot is about 10 tumblers of water). A standard measure or standard unit of measure is a quantity agreed upon by a group of people to which other quantities can be compared or described.

Looking at objects in terms of their volume (capacity) or weight, evolving a system of units of capacity or weight measurements and applying the system of units to describe and compare objects are all learned through experiences. These are some of the basic skills required in understanding and utilising objects.

A study of the modes of describing the capacity and/or weight of objects in rural Tamil Nadu was made as a part of the study of existing practices regarding counting and measurements in day to day life. The purpose was to understand the implications of these practices for an approach to teaching and learning capacity/weight measurements in Adult Education Programmes.

Data regarding the following were collected: General modes of describing capacity or weight measures of 18 different items generally found in village homes/shops: ability of the people to estimate capacity or weight of certain selected objects and to explain the bases for their estimation; ability of the people to recognize the tools of standard measures of metric units such as litre measures and kilogram measures.

The questions asked were open ended. The free responses were recorded. The items for which the respondents were asked to describe the units of capacity or weight were clustered and presented as follows: Volume or weight measures (dry): Seeds or grains produced or obtained as coolie; provisions generally used at home (cereals, pulses, oil seeds, flours, spices (whole and powdered); inputs in agriculture such as manures and fertilisers; animal fodders such as oil cake, paddy/pulse husks and hay; Volume measures (liquids); milk, curd, butter milk; oils, kerosene; coffee/Tea.

The collected data were analysed by counting frequencies and computing percentages of responses according to the types of units reported to be used by the respondents for each of the items or a cluster of items. This was done with reference to capacity/weight measures in homes and in shops.

The data analysed are presented in the following tables. Table 1 presents the average of percentages of villages according to the units used in measuring the capacity or weights of various items of objects at home. Table 2 presents the same data in shops.

The data reveal that in rural Tamil Nadu

- People used a variety of units to describe the capacity of volume measures.

- Weight measures especially metric measures were not common in home measures but quite common in shop measures.

- The units used for any one item or a cluster of items varied in their specificity. They were either vague or non-specific or specific but different in the type of unit base which was either hand measure or container measures available at home or traditional standards of coordinated, interrelated volume measures or metric measures.

- The units used at home/farm for dry volume/weight measures were metric units such as kilogram or litre; traditional, coordinated, interrelated units such as an ollock (1/8 measure), (uzhakku ¼ measure), araipadi (½ measure) and padi (one measure) and larger measures like marakkal, kuruni, vallam, mootai (one bag); container units of cart, baskets, buckets, winnower, small bags, tumblers, ladles, spoons, vessels of varying sizes; body units of one handful, one pinch or provisions in terms of money spent and measure of produce in terms of the land area. The metric measures were more found to be in vogue in shops than at home.

- The units used for liquid items were metric units of millilitres and litres; traditional units of ollock, padi; container units in terms of the articles in which the oil is held such as lamps or stoves, vessels, tumblers, ladles and spoons; money unit or the amount spent on the item. Metric measures were in use more in shops than at homes.

- The practices in volume/weight measure (dry or liquids) were item specific and situation specific.

- The most common units of capacity measures (dry) were traditional measures: mootai, kalam, marakkal, pakka padi, litre padi, uzhakku, ollock. They are coordinated, interrelated measures.

Table 1: Average of percentages of villagers according to units used in measuring the capacity/weight of various items at home

Sl. No	Items	Metric	Traditional Measures	Containers	Ladles/ Spoons	Hand	Non-specific	Not known	Total
1.	Seeds and grains produced	9.5	28.0	6.9	-	3.3	0.6	51.7	100.00
2.	Rice, ragi, dhal, kambu, groundnut	16.1	72.7	3.6	-	1.7	0.3	5.6	100.00
3.	Flours	3.0	21.3	5.3	30.2	22.4	5.6	12.2	100.00
4.	Spices (dry) whole & Powder	2.0	2.0	45.3	-	29.0	13.0	8.7	100.00
5.	Manures and Fertilizers	5.3	10.5	26.6	-	1.6	7.6	48.4	100.00
6.	Oil cake, husks of paddy, pulses	8.9	11.8	5.3	-	5.6	5.9	62.5	100.00
7.	Hay	-	22.7	-	-	7.9	9.2	60.2	100.00
8.	Milk, curd and butter milk	6.9	10.9	42.8	5.9	-	12.5	21.0	100.00
9.	Oils	5.9	-	41.8	35.2	-	4.0	13.1	100.00
10.	Kerosene	7.6	-	75.3	2.0	-	2.0	13.1	100.00
11.	Coffee/Tea	4.6	-	73.7	1.3	-	1.3	19.1	100.00

Table 2: Average of percentages of villagers according to units used in measuring the capacity/weight of various items in shops

Sl. No.	Items	Metric	Traditional Measures	Containers/ Vandi	Money	Non-specific	Not known	Total
1.	Seeds and grains produced	31.6	9.4	8.6	0.7	-	49.7	100.00
2.	Rice, ragi, dhal, kambu, groundnut	72.7	6.2	5.9	7.9	-	7.3	100.00
3.	Flours	63.8	2.0	-	18.4	-	15.8	100.00
4.	Spices (dry) whole & Powder	56.6	1.5	-	34.4	2.6	4.9	100.00
5.	Manures and Fertilizers	15.4	4.0	11.5 24.7	2.6	-	41.8	100.00
6.	Oil cake, husks of paddy, pulses	26.6	17.8	4.0 0.3	1.3	-	50.0	100.00
7.	Hay	0.7	50.3	- 2.0	-	-	47.0	100.00
8.	Milk, curd and butter milk	43.4	19.7	10.2	-	4.3	22.4	100.00
9.	Oils	84.9	0.3	1.0	-	9.2	4.6	100.00
10.	Kerosene	84.9	0.3	2.0	-	2.3	10.5	100.00
11.	Coffee/Tea	14.2	0.6	12.8 23.4	-	2.3	46.7	100.00

- The traditional capacity measures varied in volume among the villages though the names remained the same. The names of the **granaries** and their holding capacities varied; Pathayam (20 mootais or quintals); Ser, Thombai (10 mootais or quintals); Kengu (8 mootais or quintals); Podi,Mithi(2 mootais/6 muda/60 vallam); Putti40 marakkals).

  Mootai or Quintal varied in their capacities in different villages. Each mootai was reported to contain 16 marakkals or 64 padis; 2, 4, 6 para; 3, 4, Muda or 30 to 40 Vallams; 24 kalams. It was also reported as 100 Kgs. Sometimes it could be 45, 75, 80 Kgs.

  Kalam a larger traditional capacity measure also varied in its capacity from village to village: 24 or 12 marakkals; 12 or 16 small marakkals or vallams: 72 litres.

  Koni (bag) was 12, 14, 16 marakkals; **Urai** was 14 marakkals; Muda was 10 vallams

  Marakkal or **kuruni's** capacity were 4 to 8 padis or 32 ollocks; 4 or 6 padis; 4 padis; 2 to 6 padis; 4 kacha padis or 1½ to 1¼ peria padi; 2 vallams; peria marakkal or big marakkal consisted of 3 or 4 peria padis (big padis).

  Vallam : 1, 4, 6 padis; 4, 5, 6 coolie padis; 2, 2½, 3 litre padis. Pakka, Magani, peria padi, coolie padi were the names used for similar kinds of traditional measures (2 padis, 3 kacha padi, 2 arai or half padis, 4 kal or quarter padis, and 8 Araikkal or one eighth padis; 2 to 2½ coolie padis and one peria (big) padi). Generally in many villages the produce was measured in a bigger measure and grains given as coolie was measured in a smaller measure. Though the same name is used for the two, the peasants differentiate between the padi and coolie padi as the quantity varied.

  - Litre padi, the metric measure was seen in terms of traditional measures in vogue- 5 ollooks or 1¼ padis.
  - Uzhakku or ser was ¼ padi, two araikkal padi or one eighth measure
  - Ollock was one eighth padi, one tumbler, 200 gms.

- **Container measures** - one ladle was considered to hold 10 spoons or 50 to 150 gms; one load jelly was 40 baskets.

- **Body measures** - kai or sarangai or one handful was considered to hold ½ ollock or 100 gms; sittigai or one pinch was equivalent to 5-10 gms.

- **The 'non-specific' units** were mainly the participants' responses which were vague, examples, 'as much as', as needed or required.

The people in rural Tamil Nadu seemed to have had their own equivalences of home capacity/weight measures for the shop capacity or weight measures as these differed. They were as follow:

- The rice and other grains bought in shops in kilograms were measured in traditional measures of padi and/or ollocks or container measures at home. Generally one kilogram of rice was considered equivalent to 5 ollocks or a can or tin of a specific size. The equivalence of larger measures of 2.5.10 kgs of rice and other grains were in terms of containers of tins or pots.

- Equivalences of less than a kilogram were in terms of specific containers for specific items such as bottles and vessels and also were in terms of hand measure.

- Half a kilogram of oil was quickly reported to fill a 500 gms. horlicks bottle.

- Equivalences of litre measures of milk or butter milk were in terms of specific containers.

Tables 3 and 4 present the modes of describing capacity measures at home and in shops according to sex groups. The results show that there was only very slight variation between the responses of men and women in describing the capacity measures of both solid and liquid items. Tables 5 and 6 present the modes of describing capacity measures at home and in shops according to caste groups. The results indicated that

-there was some variation in the responses of scheduled castes/ scheduled tribes and other castes in describing capacity measures at home. A higher percentage of other castes than SC/STs reported metric measures especially for items of grains, provisions such as ragi,

rice, kambu, dhal and groundnuts. In all the other items variations among castes were negligible.

Table 3: Sex-wise average of percentages of villagers according to units used for measuring capacity of various items at home

Sl. No.	Items	Metric		Traditional		Containers		Lades/ spoons		Hand		Non-specific		Not Known		Total M/W
		M	W	M	W	M	W	M	W	M	W	M	W	M	W	
1.	Seeds and grains produced	9.5	9.6	24.3	31.3	7.4	6.1	-	-	3.7	2.6	1.1	0.9	54.0	49.6	100.00
2.	Rice, ragi, dhal, kambu, groundnut	18.0	13.1	72.5	73.1	2.1	6.1	-	-	1.6	1.7	-	0.9	5.8	5.2	100.00
3.	Flours	3.7	1.7	22.8	19.1	4.2	6.9	31.2	28.7	21.2	24.4	5.3	6.1	11.6	13.1	100.00
4.	Spices dry whole & Powder	2.6	1.6	2.6	0.9	46.0	44.4	-	-	24.9	35.7	13.8	11.3	10.1	6.1	100.00
5.	Manures and Fertilisers	5.8	4.4	10.1	11.3	27.5	25.3	-	-	-	4.3	9.5	4.3	47.1	50.4	100.00
6.	Oil cake, husks of paddy, pulses	10.1	7.0	9.0	16.5	6.9	2.6	-	-	4.7	7.0	6.9	4.3	62.4	62.6	100.00
7.	Hay	-	-	23.3	21.8	-	-	-	-	6.3	10.4	10.0	7.8	60.4	60.0	100.00
8.	Milk, curd and Butter-milk	6.8	7.0	12.7	7.8	39.7	47.8	4.8	7.8	-	-	12.7	12.2	23.3	17.4	100.00
9.	Oils	5.8	6.1	-	-	41.8	41.7	32.8	39.1	-	-	3.7	4.4	15.9	8.7	100.00
10.	Kerosene	10.5	2.6	-	-	72.0	80.9	1.1	3.5	-	-	2.1	1.7	14.3	11.3	100.00
11.	Coffee/Tea	6.4	1.7	-	-	74.6	72.2	-	3.5	-	-	2.1	-	16.9	22.6	100.00

Table 4: Sex-wise average of percentages of villagers according to the units used for measuring capacity/weight of various items in shops.

Sl. No.	Items	Metric		Traditional		Containers		Hand		Money		Non-specific		Not Known		Total M/W
		M	W	M	W	M	W	M	W	M	W	M	W	M	W	
1.	Seeds and grains produced	33.8	27.8	6.9	13.9	9.5	6.1	1.6	-	1.1	-	-	-	47.1	52.2	100.00
2.	Rice, ragi, dhal, kambu, groundnut	74.1	70.4	6.3	6.1	6.9	2.6	1.1	-	6.9	9.5	-	-	4.7	11.4	100.00
3.	Flours	68.8	55.7	2.1	1.7	-	-	-	-	14.8	24.3	-	-	14.3	18.3	100.00
4.	Spices dry whole & Powder	56.6	53.1	1.1	1.7	1.1	1.7	-	-	32.8	37.4	-	-	8.4	6.1	100.00
5.	Manures and Fertilisers	15.9	14.8	3.2	5.2	29.1 11.1	17.4 12.2	-	-	2.6	2.6	-	-	38.1	47.8	100.00
6.	Oil cake, husks of paddy, pulses	25.4	28.7	20.1	13.9	5.3	2.6	-	-	2.1	-	-	-	47.1	54.8	100.00
7.	Hay	1.1	0.9	54.5	43.5	1.6	2.6	-	-	-	-	-	-	42.9	53.9	100.00
8.	Milk, curd and Butter-milk	46.6	38.2	20.1	19.1	9.5	11.3	-	-	-	-	2.6	7.0	21.2	24.4	100.00

9.	Oils	83.6	87.0	-	0.8	1.1	0.8	-	-	-	-	10.6	7.0	4.7	4.4	100.00
10.	Kerosene	83.1	87.8	0.5	-	2.1	1.7	-	-	-	-	1.6	3.5	12.7	7.0	100.00
11.	Coffee/Tea	13.2	15.7	1.1	-	32.3	42.6	-	-	-	-	2.1	2.6	51.3	39.1	100.00

Table 5: Average of percentages of villagers caste-wise according to the units used for measuring capacity/weight of various items of objects at home.

Sl. No.	Items	Metric		Traditional		Containers		Ladles spoons		Hand		Non-specific		Not Known		Total SC/ST /OC
		SC /ST	OC	SC /ST	OC	SC /ST	OC	SC /ST	OC	SC /ST	OC	SC /ST	OC	SC /ST	OC	
1.	Seeds and grains produced	3.8	15.3	29.9	25.3	9.1	4.7	-	-	2.6	4.0	-	1.3	54.5	49.4	100.00
2.	Rice, ragi, dhal, kambu, groundnut	7.8	24.5	79.2	66.0	3.9	3.4	-	-	0.7	2.7	0.7	-	7.7	3.4	100.00
3.	Flours	2.6	3.3	20.1	22.7	7.2	3.3	29.8	30.7	17.5	27.3	7.2	4.0	15.6	8.7	100.00
4.	Spices dry whole & Powder	3.2	0.7	3.9	2.0	-	-	48.1	42.7	16.9	40.0	14.9	10.6	13.0	4.0	100.00
5.	Manures and Fertilisers	3.3	7.3	4.5	16.7	27.9	24.6	-	-	2.6	0.7	7.2	8.0	54.5	42.7	100.00
6.	Oil cake, husks of	4.6	13.3	5.8	18.0	5.8	4.7	-	-	3.9	7.3	3.9	8.0	76.0	48.7	100.00

	paddy, pulses															
7.	Hay	-	-	16.2	29.4	-	-	-	-	5.8	10.0	7.1	11.3	70.9	49.3	100.00
8.	Milk, curd and Butter-milk	5.2	8.7	9.7	12.0	46.1	39.3	7.2	4.7	-	-	9.1	16.0	22.7	19.3	100.00
9.	Oils	7.8	2.6	-	-	33.1	50.7	39.0	31.3	-	-	3.2	4.7	16.9	10.7	100.00
10.	Kerosene	7.8	7.3	-	-	72.7	78.0	1.3	2.7	-	-	1.3	2.7	16.9	9.3	100.00
11.	Coffee/Tea	3.2	6.0	-	-	75.3	72.0	0.7	2.0	-	-	-	2.7	20.8	17.3	100.00

Table 6: Average of percentages of villagers caste-wise according to the units used for measuring capacity/weight of various items of objects at home.

Sl. No.	Items	Metric		Traditional		Containers		Hand		Money		Non-specific		Not Known		Total M/W
		SC/ST	OC	SC/ST	OC	SC/ST	OC	SC/ST	OC	SC/ST	OC	SC/ST	OC	SC/ST	OC	
1.	Seeds and grains produced	22.1	42.0	10.4	8.7	8.4	8.7	1.3	0.6	0.6	1.3	-	-	57.2	38.7	100.00
2.	Rice, ragi, dhal, kambu, groundnut	74.0	71.3	5.8	6.7	2.6	8.0	1.3	-	7.8	8.0	-	-	8.5	6.0	100.00
3.	Flours	55.8	72.0	2.0	2.0	-	-	-	-	19.5	17.3	-	-	22.7	8.7	100.00
4.	Spices dry whole & Powder	57.1	56.0	2.0	1.3	1.3	1.3	-	-	33.1	35.4	-	-	6.5	6.0	100.00
5.	Manures and Fertilisers	14.4	16.0	0.6	7.3	35.0	37.4	-	-	1.9	3.3	-	-	48.1	36.0	100.00
6.	Oil cake, husks of paddy, pulses	22.2	31.3	9.7	26.0	4.5	4.0	-	-	0.6	2.0	-	-	63.0	36.7	100.00
7.	Hay	-	2.0	44.8	56.0	0.6	3.5	-	-	-	-	-	-	54.6	38.5	100.00
8.	Milk, curd and Butter-milk	29.2	58.0	24.0	15.4	13.0	7.3	-	-	7.2	1.3	-	-	26.6	18.0	100.00
9.	Oils	78.6	91.3	0.6	-	1.3	0.7	-	-	11.7	6.7	-	-	7.8	1.3	100.00

10.	Kerosene	85.7	84.0	0.6	-	1.3	2.7	-	-	2.0	2.7	-	-	10.4	10.6	100.00
11.	Coffee/Tea	6.5	22.0	-	-	27.4	38.0	-	-	3.2	1.3	-	-	62.9	38.7	100.00

Estimation of capacity weights

The interviewees were shown three items, namely oil (70 gms. in a small bottle), Tuar dhal packet (100 gms). and Ragi packet (500 gms), one by one and they were asked to estimate their weights. The responses were recorded and analysed according to sex and caste groups. The results are presented in Table 7. The data reveal the following:

- The estimations of volume and weights were quite common in rural Tamil Nadu.
- Majority could estimate the weight.
- The number who guessed accurately the weights of the items shown were less than those whose guesses or estimations were inaccurate.
- In case of Tuar dhal and Ragi, a large number either estimated it right or less than the actual weight.
- In the case of oil, a large number either estimated it right or more than the actual weight.
- The estimations done by men or women did not vary much for all the three items. Women tend to estimate less than the actual than men.
- The estimations done by SC/STs and other castes varied. A larger percentage of other castes estimated it more accurately than the SC/STs, for the items of oil and tuar dhal. In the case of Ragi, the estimations by the SC/STs and other castes were more or less the same. Probably Ragi is something that they used more than the other items.
- Majority of those who were interviewed explained the basis of estimation as their experience in estimating. They could not specifically state the bases. A few said that they mentally saw the items in terms of the house measure and estimated the weight.
- The estimated weights when they were estimated more or less than the actual they were mostly 25 to 50% of the actual weights.

Table 7: Estimation of weight measures: Sex-wise, caste - wise distribution of villagers according to differences in the estimated and actual weights of different food items.

S. No.	Items	Difference in estimated	M	W	T	SC/ST	Other castes

		and actual weight					
1.	Oil (70 gms)	No difference	46 (24.3)	25 (21.7)	71 (23.4)	26 (16.9)	45 (30.0)
		Less than the actual	46 (24.3)	25 (21.7)	71 (23.4)	34 (22.1)	37 (24.6)
		More than the actual	92 (48.7)	59 (51.3)	151 (49.6)	86 (55.8)	65 (43.4)
		Don't know	5 (2.7)	6 (5.2)	11 (3.6)	8 (5.2)	3 (2.0)
		Total	189 (100.00)	115 (100.00)	304 (100.00)	154 (100.00)	150 (100.00)
2.	Tuar Dnal (100 gms)	No difference	89 (47.1)	56 (48.7)	145 (47.7)	69 (44.8)	76 (50.7)
		Less than the actual	65 (34.4)	47 (40.9)	112 (36.8)	60 (39.0)	52 (34.7)
		More than the actual	23 (12.2)	10 (8.7)	33 (10.9)	20 (13.0)	13 (8.6)
		Don't know	12 (6.3)	2 (1.7)	14 (4.6)	5 (3.2)	9 (6.0)
		Total	189 (100.00)	115 (100.00)	304 (100.00)	154 (100.00)	150 (100.00)
3.	Ragi (500 gms)	No difference	72 (40.2)	39 (38.2)	111 (39.5)	53 (40.4)	58 (38.7)
		Less than the actual	79 (44.1)	53 (52.0)	132 (47.0)	58 (44.3)	74 (49.3)
		More than the actual	20 (11.2)	5 (4.9)	25 (8.9)	14 (10.7)	11 (7.3)
		Don't know	8 (4.5)	5 (4.9)	13 (4.6)	6 (4.6)	7 (4.7)
		Total	179 (100.00)	102 (100.00)	281 (100.00)	131 (100.00)	150 (100.00)

Identification of common standard tools of volume (capacity) or weight measurement

The common standard tools for volume (capacity) and weight measurement, namely, standard volume measures of one litre, half a litre, 200 ml. and 100 ml and standard weight measures of one kilogram, half a kilogram, 200gms., 100 gms and 50 gms. were shown to the

interviewees for identification. The results are presented in Table 8. The data reveal the following:

- The common standard tools of volume and weight measures mentioned above were commonly recognised by a majority of the people in rural Tamil Nadu.

- A large number of men were able to identify these measures than women.

- The variations among castes in identifying volume and weight measures were negligible.

Table 8: Sex-wise, Caste-wise distribution of Villagers according to their ability to identify standard units of volume (capacity) and weight measures.

S. No.	Items	Ability to identify	M (189)	W (115)	T (304)	SC/ST (154)	Other castes (150)
1.	Standard volume or capacity measures	Can identify	183 (96.8)	79 (68.7)	262 (86.2)	131 (85.1)	131 (87.3)
		Can't identify	6 (3.2)	36 (31.3)	42 (13.8)	23 (14.9)	19 (12.7)
2.	Standard weight measures	Can identify	183 (96.8)	81 (70.4)	264 (86.8)	133 (86.4)	131 (87.3)
		Can't identify	6 (3.2)	34 (29.6)	40 (13.2)	21 (13.6)	19 (12.7)

Implications of the study for adult education

The process of learning to describe any object/item in terms of its volume/weight measure is essentially a process of moving from

Stage 1: Recognition of the dimension of holding capacities or weights of items Examples could be:

This granary holds large quantity of grains.
This pot holds small quantity of rice.

This bag of grain is heavy.
This packet of grain is lighter.

Stage 2: Measuring the holding capacity or weight of items of objects by choosing any unit of continuous measure such as other familiar containers in the environment (vessels of varying sizes); body measures such as handfuls; granite or any brick stones etc.,

Stage 3: Recognition of the need for and use of standard units which could be iterated for a fairly accurate descriptions of objects - traditional coordinated interrelated units as well as metric units. As it is more practical to use the traditional measures at home, recognizing the relationship of traditional and metric measures becomes important.

The demands for the descriptions of volume/weight measures in life situations are such that any individuals or group could be at any of these stages with reference to any item at any time. Better understanding of the volume or weight measures results not from merely moving from stage 1 to stage 3 but from an understanding of the inter relatedness of these stages and skill in using them with ease in tune with the demands of the life situations.

The people in rural Tamil Nadu in general were at different stages, depending upon the items being measured or the situation in which the item is measured. The evolution of the process in measurement in the different stages outlined, when understood could help anyone to be at any stage and yet be aware of the volume or weight measure and its place in understanding objects for utilising the same.

The educational programmes for adults in rural Tamil Nadu should help the learners understand the process of evolution in volume or weight measurement and thus the interrelatedness of stages. This will naturally help the learners to use the standard tools of measure wherever necessary.

This, is practical terms, would mean the following steps:

- Sharing of experiences of the learners in measuring volume or weight measures of different items (objects) in their own life situations:

- Helping the learners to systematise these experiences in measuring volumes or weights:

- Organising activities to recognise the process of evolution of volume or weight measures and the system of relationships of diverse ways of measuring volume or weights:

- Recognising through discussions the basis of the diverse ways of measuring capacities or weights of objects in real life situations;

- Looking at the day to day life situation, problems involving measurements in the light of the underlying patterns of relationships in the existing diverse measuring practices. This would help in recognising the need for common units of measures.