PRACTICES IN ENUMERATION BY COUNTING AND COMPUTATION OF SETS OF OBJECTS IN RURAL TAMIL NADU : IMPLICATION FOR ADULT EDUCATION PROGRAMMES

A set is simply a group of things. Number is a property of sets. Exploring the physical (qualitative) attributes of sets helps in exploring number (quantitative) attributes. Sets of objects can be enumerated by counting when the sets are small. When one wishes to find the number of elements in large sets, counting is inefficient. One needs computational procedures for finding sums.

The present study attempted to find out the mode of counting of large sets/small sets in day-to-day transactions in rural Tamil Nadu. The efforts made were as follows :

a) Basic observations about counting and numbers:
b) Enumeration of agricultural, horticultural and other products – special terms used for unit sets of such products and their multiples;
c) Modes of counting of small sets of pebbles or cowrie shells;
d) Recording of counts or cumulative counts;
e) Estimations of small sets of pebbles/cowrie shells and the bases for such estimations.

a) Basic observations about counting and numbers:

1. Number names were used for counting any sets of objects. Number names in Tamil one to ten (*Onru, Irandu, Moonru, Nangu, Eindu, AAru, Ezhu, Ettu, Onpadu, Patthu*) were commonly used. Number names for hundreds and thousands were also used quite commonly.
2. The system of numeration used was decimal system.
3. The number symbols generally used in the villages in Tami Nadu were the Arabic numerals. The traditional Tamil alphabet number symbols were no more in vogue.
4. In a predominantly oral culture in rural Tamil Nadu, number names rather than number symbols were used and communicated. The available literature in folk-lore and the present study indicate that the number names are communicated through songs, games, riddles, stories or combinations of these.

b) Enumeration of agricultural, Horticultural and other products

Special terms used for unit set of such products and their multiples:

Mode of enumeration of some of the products which need to be counted showed that the counting of large sets depended upon

- the kind of objects and their size

- convenient unit sets in which they could be handled easily and hence counted fast
- count of standard number of unit sets for reaching the convenient count of a large set.

The convenient unit sets of products were in terms of

- Five finger counts counted as one hand ('KAI' in Tamil)
- Volume unit sets:
    - a palm/handful – that which could be held within the palm and held tight by the fingers
    - convenient bundles (KATTUS in Tamil)
    - containers (KOODAI, SAKKU etc.,) Basket, Sack etc.,)
    - headloads (SUMAI or SOMAI in Tamil) – the load that could be carried on the head or on the shoulders

ONE HAND (ORU KAI): Count of banana leaves, cowdung cakes – one hand indicates five and 20 such hands make one hundred.

VOLUME UNIT SETS: a handful (KAPPANGU or KAIPPANGU in Tamil)

Betel leaves in large numbers were counted this way. The produced (harvested) betel leaves are arranged in order with all the stems on one side and a handful is picked up with skill and this handful is considered to contain anywhere between 100 and 200 leaves depending upon the size of the leaves. Six such handfuls make one KAULI. This kind of counting was in vogue in one of the villages studied, where betel leaves was one of the main produce. In all the other villages one KAULI is one hundred betel leaves which could be generally picked in the hand. Two such *kaulis* made one KATTU or (bundle) in another village. In a third village one ADUKKU or a set of lined up leaves is 50 and one KAULI is 100. 25 ADUKKUS make one MUTTI and 25 KAULIS make two MUTTIS.

CONVENIENT BUNDLES OR KATTUS

Counting is done through making the products into convenient bundles or *kattus*. Convenience is generally determined by the ease of handling either by the hand or to be carried by the head.

In the case of paddy seedlings, the following mode of counting is used : One PIDI or one handful contain 8 – 10 seedlings. This is also known as one MUDI or knot. Ten such MUDIS make one KALASAM and 100 such MUDIS make a KATTU or bundle.

- In the case of Beedis (indigenous cigarettes), an interesting way of counting was observed. The present study showed that 25 beedis which made a 'KATTU' or a bundle was counted in no time. This was done through arrangement of beedis in a circular form by holding them in the circle made out of the forefinger touching the thumb. The beedis are taken to be 25 in number when three beedis are seen in the centre and two concentric circles around these three beedis. This arrangement ensures automatically 8 beedis around three in the centre and 14 beedis around the 8 beedi circle. Here the shape of the arrangement of the objects tight within a specified space made the counting easy. Counting up to 3 is all that was required. 40 kattus make 1000. 25 kattus make a packing
- In the case of sugarcane and bamboos, convenient headload bundles or kattus are made and counting done through them. 20 sugarcane sticks/bamboos are made into a KATTU or bundle. Five such bundles make 100 and 50 such bundles make 1000. Piling the sugarcane bundles about 5 feet high, 10 feet long and about 3 feet wide makeup approximately one ton of sugarcane. When the harvesting of sugarcane is done, the piling up is done generally in an orderly way.

CONTAINERS

Baskets of specific sizes are used for counting fruits such as Gauvas, mangoes and oranges. Gauvas numbering 300 are held in a basket. Once the specific size basket is full, it is taken that it is 300. Depending upon the size of the fruits, the number varies.

In counting Tea leaves, containers are in use.

- One SIPPAI or KATTU or a bunch consisted of 50 leaves.
- One KOODAI or a basket consisted of 500 leaves.
- One MOOTAI or a sack consisted of 800 leaves.

HEADLOADS (SUMAI OR SOMAI in Tamil)

Different fruits, major products of a particular tribal village were carried on their heads or shoulders in an airy, net-like bags with varying sizes of eyes in the net to suit the varying sizes of the fruits. This net is long enough to hang on either side of the shoulders or the head. Counts of one headload or SUMAI of different fruits are given here :

Limes - 500;

Kolanji (another variety of citrus fruits) – 100 – 200;

Oranges - 100;

Kada Narthangai (another citrus fruit) – 40;

Pineapples - 25; Jack fruit- 4 or 5;

Bananas - 2-6 Thars or bunches on a stem;

Pumpkin - 1.

NATURALLY OCCURRING BUNCHES

Bananas are generally counted in terms of naturally occurring bunches.

One THAR / KOLAI / SADU (bunches on a stem) may contain from 50 – 300 bananas depending on the variety and size of the bananas. On the Thars, the bananas are found in SEEPUS or clusters. One Thar may contain 3-15 seepus. Each seepu may contain 10-20 bananas.

Coconuts are counted in terms of a KOLAI or Bunch which approximately contains 25 coconuts and one ORAI or 4 Kolais is 100 coconuts

PILES: In indoor games, the captured seeds are counted in sets of four called by the names of SUNGU, UDDAI, PASU.

c) Modes of counting of small sets of pebbles / cowrie shells

The study focused on the mode of counting of the respondents by asking as well as observing the interviewees while they counted a set of pebbles or cowrie shells. There were double and triple responses to the question on the mode of counting a set of small objects such as these. Hence the total added up to 364 for 304 respondents. The data collected are presented in Table 1.

Majority of the respondents (70%) counted the presented set of pebbles either individually or in pairs. Counting in pairs was more common than counting individually. About 16% of the responses were in terms of counting in fives. Very few used counts of six and above.

Looking at the data sex-wise, majority of women (81%) counted individually or in pairs. Compared to women percentage of men counting individually and /or in pairs was much less (63%). Counting objects in sets of more than two was more frequently done by men (35%) as compared to women(15%).

Looking at the data caste-wise, there was very little variation in the mode of counting of the present set (of small objects in not so very large numbers) between the SC/STs and other castes.

TABLE 1 : Sex-wise and Caste-wise Distribution of Responses according to the mode of Counting

Mode of counting	Men (189)	Women (115)	Total (304)	SC/STs (154)	Other Castes (150)
Individually (In ones)	52 (22.8%)	46 (33.8%)	98 (26.9%)	57 (31.7%)	41 (22.2%)
In Pairs	91 (39.9%)	64 (47.1%)	155 (42.6%)	73 (40.6%)	82 (44.6%)
In Threes	17 (7.5%)	5 (3.7%)	22 (6.0%)	7 (3.9%)	15 (8.2%)
In Fours	9 (4.0%)	3 (2.2%)	12 (3.3%)	7 (3.9%)	5 (2.7%)
In Fives	46 (20.2%)	13 (9.6%)	59 (16.2%)	30 (16.6%)	29 (15.8%)
Counts above Sixes upto Tens	8 (3.5%)	-	8 (2.2%)	3 (1.6%)	5 (2.7%)
According to need	3 (1.3%)	3 (2.2%)	6 (1.7%)	1 (8.6%)	5 (2.7%)
No response	2 (0.8%)	2 (1.4%)	4 (1.1%)	2 (1.1%)	2 (1.1%)
Total	228 (100.0%)	136 (100.0%)	364 (100.0%)	180 (100.0%)	184 (100.0%)

d) Recording of Counts or Cumulative Counts

The respondents were asked about the quantity of products produced and /or consumed and how they keep a record of milk, egg produced in a day, in a month, the amount of ragi or rice consumed per day, per week, per month. The consumption pattern over a period of time was remembered and reported. The consumption quantity reported per week or per month was not necessarily the specified quantity per day multiplied by seven. Probably the consumptions when considered over a longer duration varied in reality and not mere multiples of that which is consumed per day.

Majority of the respondents (about 52%) reported that the records were kept in mind. A very small percentage (about 18%) could keep a written record and they did whenever required. About 30% said that they did not record anything.

Looking at the data sex-wise, only three women recorded in symbols such as dots. Majority of both men and women either did not keep a record or kept a mental record. Only about 18% men and 16%women could keep a record. Hence there was not much variation between men and women.

Looking at the data caste-wise there was some variation between the castes in the ability to keep records of counts – slightly higher proportion of SC/STs especially from one of the villages reported that they could keep records of counts. Otherwise there was hardly any variation between castes in keeping mental records or not recording.

e) Estimation of small sets of pebbles /cowrie shells

The participants were shown a small pile of pebbles or cowrie shells and were asked to guess the number in the pile approximately without counting. Then they were asked to count. Both the guessed and actual numbers were recorded. The differences in appropriate guess and actual counts were calculated. The data collected are presented in Table 2.

Very few participants (only 5.6%) could guess the number in the pile accurately. In general, majority guessed the number less than the actual (about 51% less than the actual and 43% more than the actual).

Looking at the data sex-wise, majority of men guessed the number less than the actual whereas among women the number guessing less or more were almost equal (46%). Among those who guessed accurately, women and men were almost equal.

Looking at the data caste-wise, there was some variation between the SC/STs and other castes. In general, more percentage of SC/STs (54.6%) guessed less than the actual number when compared to the other castes (about 47%). Among other castes the percent of guessing on the plus or minus side is almost equal.

TABLE 2: Sex-wise and Caste-wise Distribution of Respondents according to the differences in the estimated and actual counts

Differences in the estimated and actual counts	Men (189)	Women (115)	Total (304)	SC/STs (154)	Other Castes (150)
- 11 to –31	30 (15.9%)	18 (15.7%)	48 (15.8%)	29 (18.8%)	19 (12.6%)
- 6 to – 10	28 (14.8%)	15 (13.0%)	43 (14.1%)	24 (15.6%)	19 (12.6%)
- 1 to –5	44 (23.4%)	20 (17.4%)	64 (21.1%)	31 (20.1%)	33 (22.0%)

0	8 (4.2%)	9 (7.8%)	17 (5.6%)	8 (5.2%)	9 (6.0%)
+ 1 to + 5	29 (15.3%)	20 (17.4%)	49 (16.1%)	21 (13.6%)	28 (18.7%)
+6 to + 10	22 (11.6%)	10 (8.7%)	32 (10.5%)	16 (10.4%)	16 (10.7%)
+11 to + 31	22 (11.6%)	19 (16.5%)	41 (13.5%)	19 (12.4%)	22 (14.7%)
No Response	6 (3.2%)	4 (3.5%)	10 (3.3%)	6 (3.9%)	4 (2.7%)
	189 (100.0%)	115 (100.0%)	304 (100.0%)	154 (100.0%)	150 (100.0%)

Bases for Estimations of counts

The study respondents were asked to describe how they guessed the number in a set of pebbles or cowrie shells presented, what were the things they observed for guessing the number. The responses are presented in Table 3.

In general a large number of rural people interviewed (43%) said that they estimated the number of pebbles or cowrie shells by looking at the size of objects. A few (about 6%)said that they looked at the space occupied. About 30% said that they estimated the number out of their experience in estimating. They couldn't specifically identify the elements that helped them estimate the quantity. A large number did not respond.

TABLE 3 : Sex-wise and Caste-wise Distribution of Respondents according to their bases of estimations of the presented set of pebbles/Cowrie shells

Base for Estimation	Men (189)	Women (115)	Total (304)	SC/STs (154)	Other Castes (150)
Size of the object	79 (41.8%)	53 (46.2%)	132 (43.5%)	61 (39.6%)	71 (47.3%)
Space occupied by the objects	12 (6.4%)	6 (5.2%)	18 (5.9%)	6 (3.9%)	12 (8.0%)
Experience	59 (31.2%)	28 (24.3%)	87 (28.6%)	45 (29.2%)	42 (28.0%)
No Response	39 (20.6%)	28 (24.3%)	67 (22.0%)	42 (27.3%)	25 (16.7%)
Total	189 (100 %)	115 (100 %)	304 (100 %)	154 (100 %)	150 (100 %)

Looking at the data sex-wise, the responses of the men and women did not vary much. A slightly higher percentage of women than men reported the basis of estimation of quantity as the size of the objects. A higher percentage of men than women said that they estimated because of their

experience without specifying the elements, such as the size of objects, the space occupied by the objects as well as the closeness of the objects (arrangement of objects tight or loose).

Looking at the data Caste-wise, the responses regarding the basis of estimation again did not vary much between the SC/STs and other castes. Size of the objects was identified as the basis of estimation of the number of objects by about 40% of SC/STs and 47% of other castes. Space occupied by the objects was considered as basis of estimation by about 4 % of SC/STs and 8% of other castes. Experience was cited by almost equal percentage of SC/STs and other castes (29% and 28%). A higher percentage of SC/STs did not give any response (27%) as compared to other castes (17%).

Implications of the study for adult education

The process of learning enumeration by counting and computation seems to be a natural process in the day to day enumeration practices of agricultural produce /other products in the villages in Tamil Nadu. This learning process is essentially a process of moving from

Stage 1: Recognition of unit sets such as one hand, volume unit sets of a handful, convenient bundles, containers, headloads, naturally occurring bunches; recognition of the bases of estimations made;

Stage 2: Computation of unit sets of objects in convenient, easy to remember ways according to the specific produce – various terms used in computation (e.g.) one pidi (mudi) or knot is 10 seedlings; ten such mudis make one kalasam or cone; 100 such mudis make a kattu or bundle;

Stage 3: Introducing numerals for the enumeration practice in day to day life and gradually helping them understand the system of numerals and computations – their signs and symbols – seeing the relevance of these in day to day transactions.

The educational programmes for adults in regard to enumeration by counting and computation of sets of objects, in practical terms would mean

- Sharing of experiences of the learners in counting involved with reference to different kinds of produce and how they make the counting easy;
- helping learners to see the system that is involved in their own practices in enumeration of different objects;
- helping learners recognise through discussions the relationships between the system in practice in day to day life and the system of numerals and computation.