

Point Sampling

Point Sampling

- Sampling unit can be of 2 types :
 1. Plot sampling
 2. Point sampling
 - i. Horizontal sampling
 - ii. Vertical sampling

Point sampling

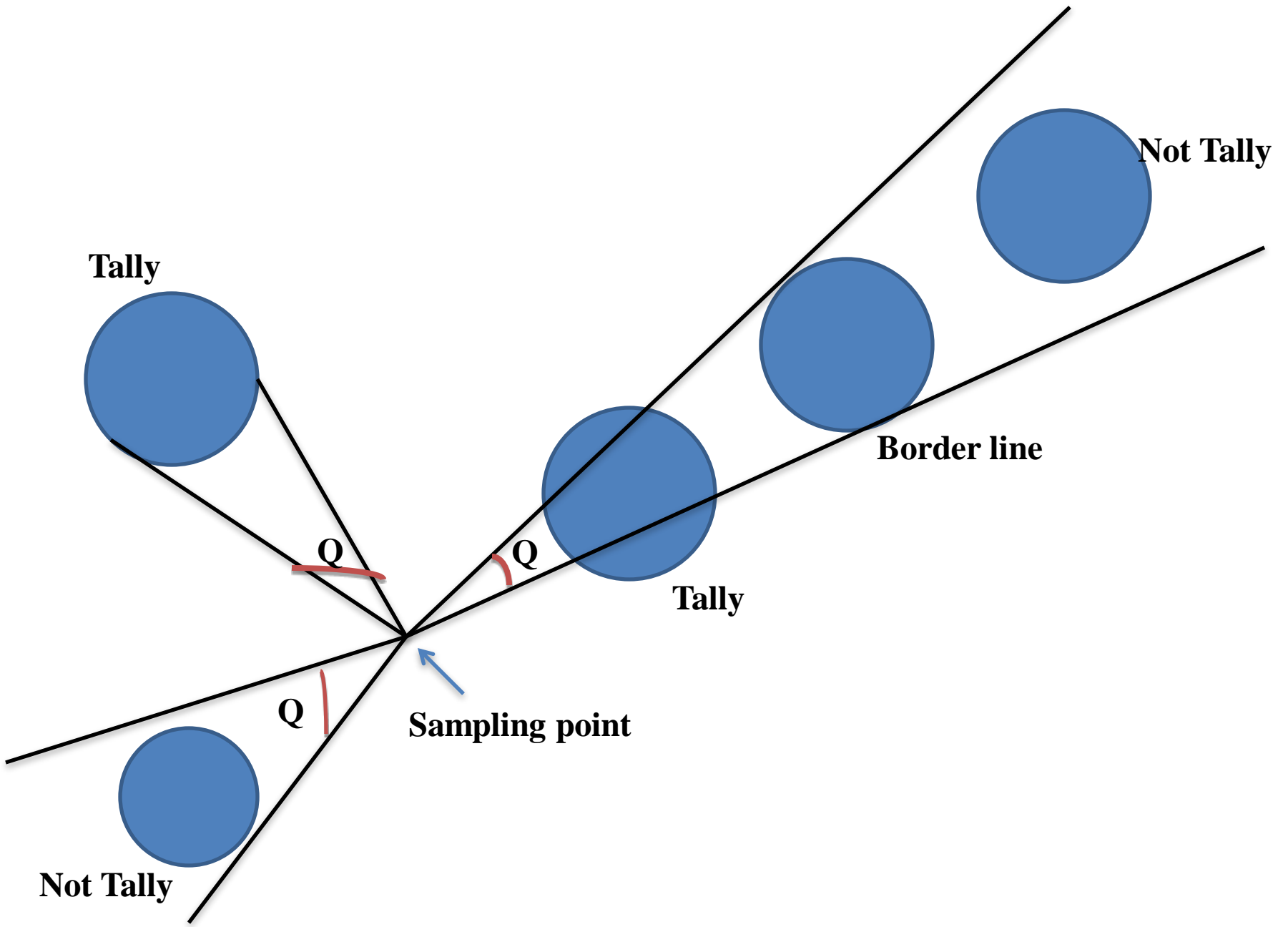
- Basal area expressed in – m^2
- Land area expressed in – Ha
(1 Ha = 10000 m^2)

(Basal area / land area) is dimensionless quantity

- Known as **Basal Area Factor (BAF)**
- **Counting from random point, the no of trees whose breast height X-section exceeds a certain critical angle, when multiplied by a constant factor(BAF) gives an unbiased estimates of basal area per Ha**

Horizontal point sampling

- Series of sampling points are selected either randomly or systematically
- Sampling points distributed over entire area
- Trees around this point are viewed at breast height through any angle gauge
- All trees forming an angle bigger than the critical angle of the instrument are counted



- Inclusion of trees in tally depends upon
 - sizes of trees
 - Distance from the observer or sampling point
- Number of trees counted multiplied by a constant factor which is dependent only on the size of angle, gives basal area per Ha
- It can be used to compute the basal areas, volumes and number of trees per unit area

- Basal area per Ha = no of trees tallied X BAF

(BAF : Basal Area Factor)

- Volume per Ha = Basal area X stand Height

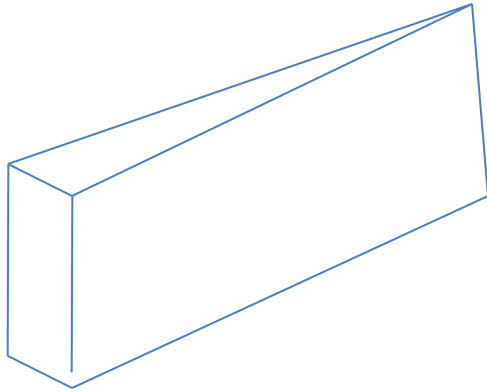
- No of trees per Ha

= BAF / (total basal area of Tally trees)

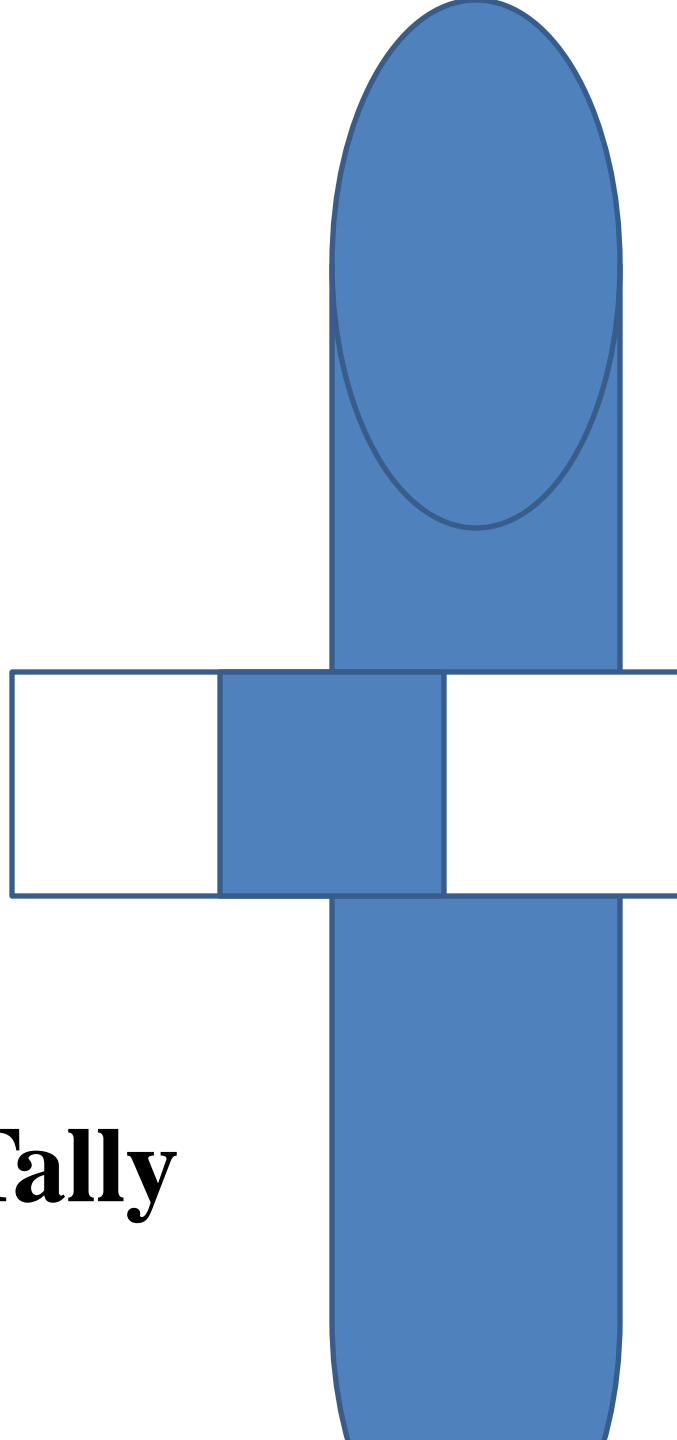
Instrument used in Horizontal Point Sampling

- Wedge Prism
 - Wedge shaped piece of glass
 - Rays of light passing through prism bent depending upon their critical angle
 - while standing , Trees are viewed holding the wedge prism in hand
 - Prism to be kept in vertical position
 - Right angle to the line of sight
 - Breast height is then viewed through prism and directly from above it
 - Distance between the eye and the prism is immaterial

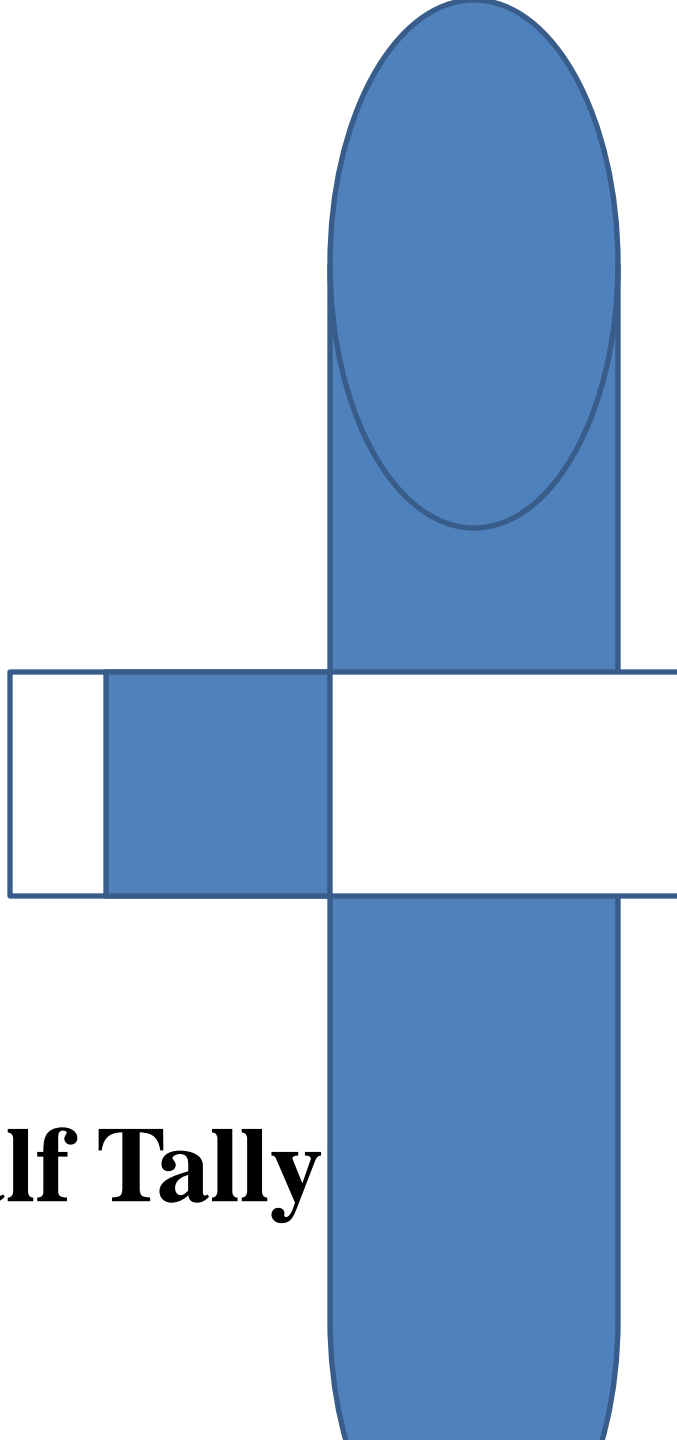
WEDGE PRISM



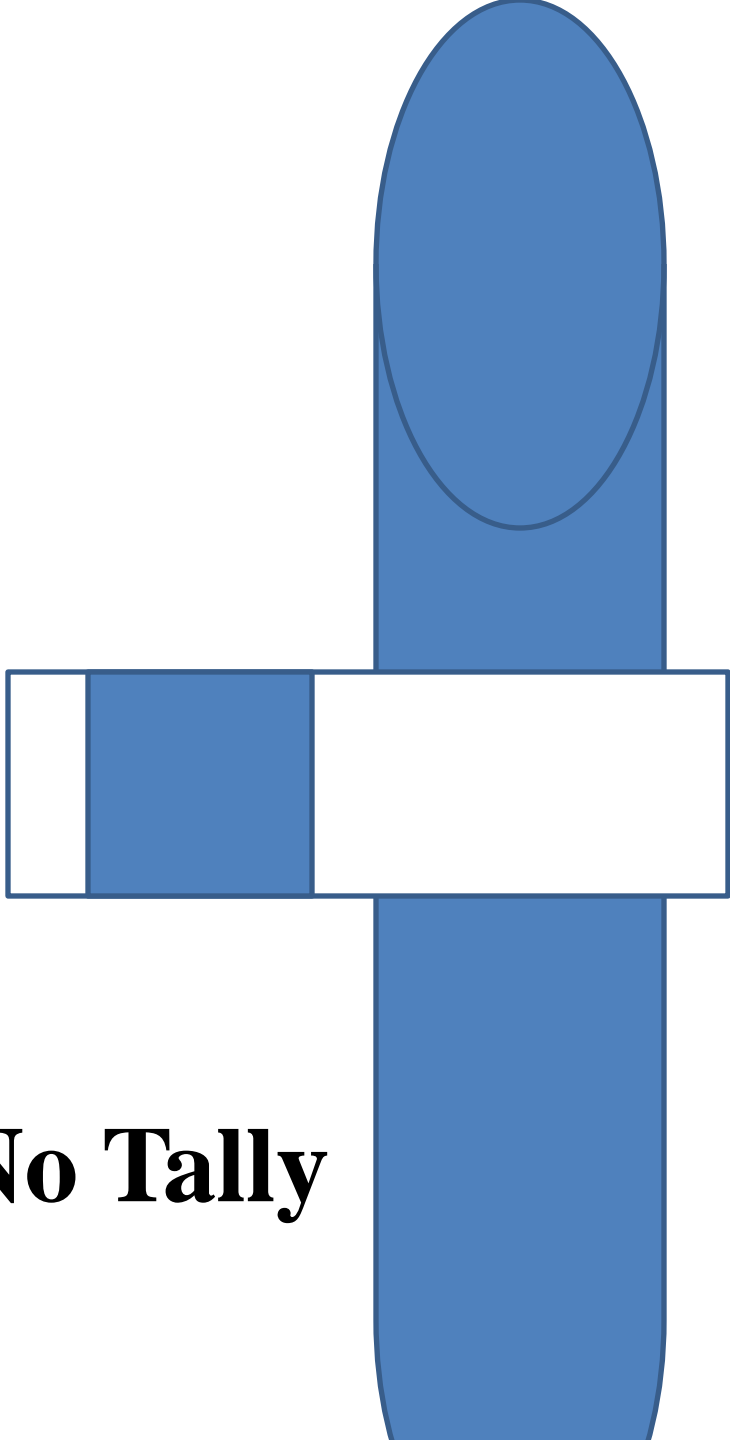
- Image of trees follow following 3 conditions:
 1. Overlap - Full Tally
 2. Just touch - Half Tally
 3. Separated from tree stem - No Tally



Tally



Half Tally



No Tally

- Full sweep of 360° is taken
- Note all full and half Tallies
- Take reading at 2 -3 sample points
- Full tallies then counted as - 1
- Half tallies counted as - 0.5
- Total tallies multiplied with BAF to get BA per Ha

CAUTION

- Prism to be held vertically above the sample point
- Each tree is sighted at the b.h. through the prism
- Line of sight should be perpendicular to the prism
- The distance between the prism and the eye should be convenient
- If the prism is not perpendicular to the line of sight it results in fewer tallies.
- If the prism is tilted in the vertical plane - too many tallies

Factors Affecting Accuracy

- Dense stands
 - Difficult sighting - a place higher than the breast height can be sighted - if it tallies then the tree is taken as tallied.
- Slope correction
 - Up to 15% not necessary
- Trees leaning to left or right - The Wedge Prism should be rotated so that the vertical axis of the prism is parallel to the axis of the leaning tree

DOUBTFUL TREES

- Missing (hidden) trees - The cruiser can sway from side to side.
- Double counting trees - Double counting to be avoided.

Computations from point sampling

1. Basal Area per ha / acre

– No. of full tallying trees = n_1

– No. of half tallying trees = n_2

Therefore no. of tallies, $n = n_1 + (n_2/2)$



B.A. per ha = (n × B.A.F.)

2. No. of trees per ha

a) No of trees (stems) per ha

$$N = \text{BAF} \times (1 / \Sigma(\text{BA})_i)$$

$$= (\text{BAF of the prism} / \text{Total basal area of tally trees})$$

b) No. of trees per ha in a particular dia class

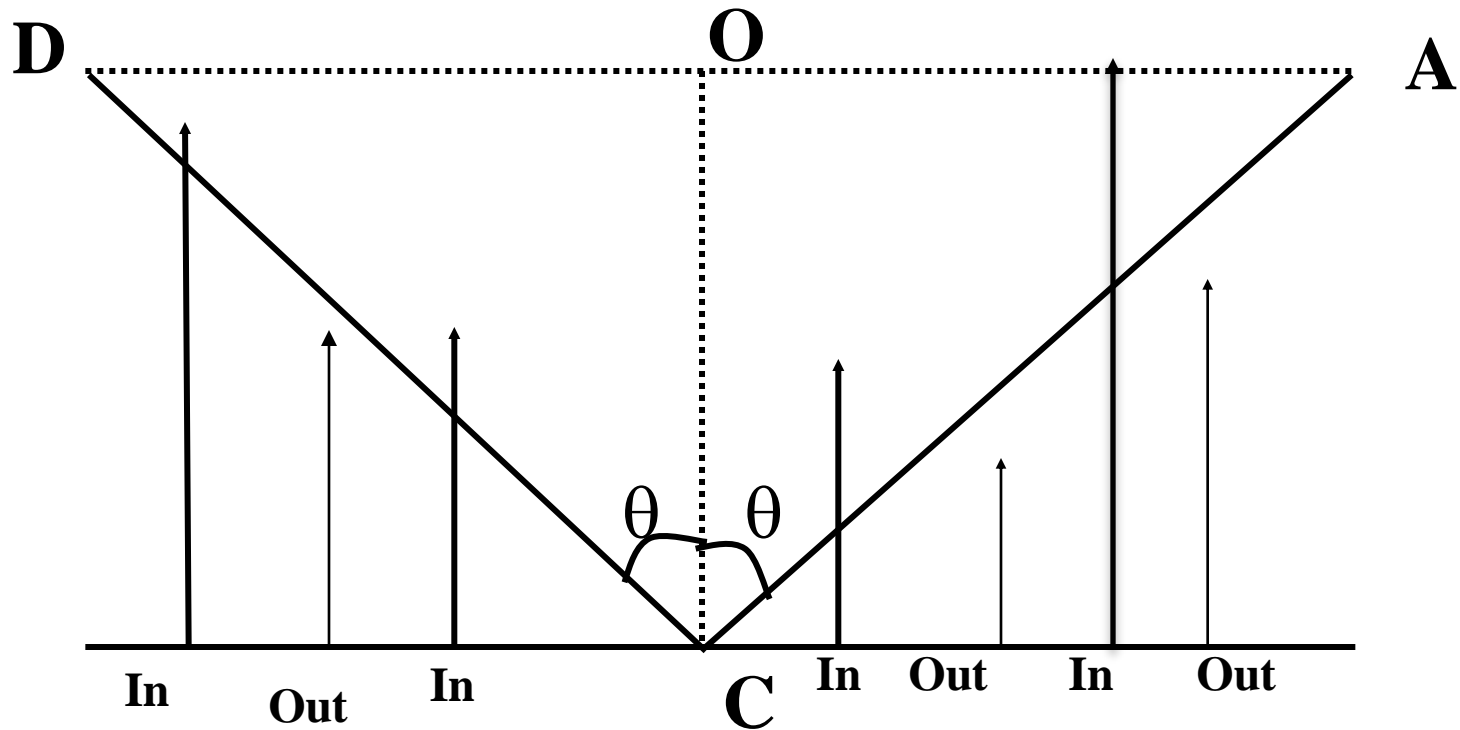
$$= \left[\text{BAF} \times \frac{1}{(\text{no of trees}) \times (\text{Basal area of the mid point of the dia class})} \right]$$

Volume per ha / acre

$$V = (\text{B.A. per ha / acre}) \times (\text{Stand Form Height})$$

Vertical Point Sampling

- Developed by Hirata (Japanese Forester)
- Helps determining the mean stand height



θ : critical angle

Contd.

n : no of trees tallying

N : no of trees per ha

➤ The instrument is called as the **Conimeter**

$$h = 56.4 \sqrt{n/N}$$

– Eye level height is added to the h to get mean stand height

Advantages of Point Sampling

- No need to lay fixed area plots —→ time saved
- High value trees sampled in greater proportions
- Basal area and volume per unit area derived without direct measurement of dia.
- Volume determination made in quick time - ideal for reconnaissance survey

Limitations of Point Sampling

- Difficult to compute sampling intensity
- Heavy undergrowth reduces visibility - unsuitable for dense tropical rain forests
- Skilled crew is required
- Small error in tallying gets magnified
- Slope compensation, edge effect, hidden trees, boundary overlap etc. have to be taken care of

Thank you