Rotation

- Period of years that elapses between the formation of a forest and the time when it is finally cut and regenerated.

Kinds of rotation

- **Physical**
  - Rotation that coincides with the natural lease of life of the tree.

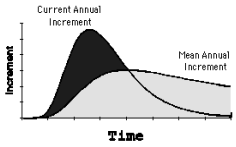
    eg. Parks, garden and protection forest
    Sandal
- **Silvicultural**
  - The species retains the max. vigour of growth and reproduction on a given site.
  - *It can neither be lower than the age at which trees start producing fertile seed in sufficient quantity, nor beyond the age when they stop doing so.*

- **Technical**

  - A species yields max. material of a specified size

  eg. pulpwood
- **R of max vol production**

  - R that yields max. annual quantity of material
  - Where MAI = CAI



Rotation of Highest Income

- The rotation which yields the highest average annual gross or net revenue irrespective of the capital value of the forests.
- *Calculated without interest and irrespective of the times when the items of income or expenditure occur.*
- Mean annual net revenue per unit area

$$= \frac{Y_r + \Sigma T_r - C - \Sigma e}{R}$$

Y_r – Value of the final felling (final yield) per unit area
T_r – Value of all thinnings during rotation period R per unit area
C – Cost of formation of stand per unit area
E – Annual cost of administration/ maintenance per unit area
R – Rotation (years)

Financial Rotation

- The rotation which yields the highest net return on the invested capital.
- *All items of revenue and expenditure are calculated with compound interest at an assumed rate, usually at the rate at which the Govt. is able to borrow money.*
- The rotation which is most profitable.
- The rotation which gives the highest net return on capital value i.e. under which **Soil Expectation Value** calculated with a given rate of interest is the maximum.

Basis 1: Soil Expectation Value

$$SEV = \frac{Y_r + T_a(1.0p)^{r-a} + \ldots T_q(1.0p)^{r-q} - C(1.0p)^r - E}{(1.0p)^r - 1}$$

$$E = \Sigma e / 0.0p;$$

S_e of land, *i.e.* value based on the *net income which it is expected to yield*, and calculated at selected rate of interest, at different rotations.

(***Faustmann's*** Formula)

Y_r – the net value of final felling made in the year r at the end of rotation
T_a …. T_q – the net values of the several thinning made in the years r-a, …., r-q
C – the cost of raising the plantation at the beginning of the rotation
P- the selected rate of interest
E – e/0.0p, where e is the sum of all annual expenses.

Basis 2: Mean Annual Forest Percent (MAF%)

- Based on the financial yield, i.e. *the rate of interest which the forest enterprise yields on investment.*
- **MAF% is merely a financial equivalent of MAI** and used the same way as MAI is used to determine rotation of maximum volume production.

Length of Rotation

- Rate of growth *(sp., site fertitlity, intensity of thinnings, etc.)*
- Silvicultural characteristics of species
  (natural span of life, age of fertile seed prodn., age at which rate of growth culminates, age at which quality of timber is most desirable or begins to fall, etc)
- Response of soil
- Economic considerations
- Social considerations
  (Socio-economic and employment policy of the state)

Yield regulation….