VEGETATION INFLUENCE ON PRECIPITATION

Theories:

In 1826 a Frenchman. Moreau de Jonnes wrote, “In order to increase the ppt of a country, it is only necessary to afforest hill and mountains, and can reduce ppt by deforestation”.

1. In 1912 Zon an American forester was convinced that extensive forest increases both amount and frequency of local rainfall. In his opinion forest land have up to 25 % more ppt than the adjacent areas/ lands.
2. Moore, a meteorologist, was opposed to the above theories based on his analysis of metrological data he found no support for the positive or negative influence of forest on ppt. (The dispute is still on nowadays)

The theory of positive forest effects on ppt is explained in the following:

Influences:

Evapotranspiration:-

Transpiration and evaporation from vegetation canopies are called Evapotranspiration. So if there is more vegetation there will be more evapotranspiration and increases the quantity of water in the atmosphere. By increasing the quantity of water influence on precipitation.

The cooling effect of vegetation:-

Vegetation not only increase the number of water vapors also there cooling effects decreased the temperature of the hot air and help in the condensation of these water vapors and formation of precipitation

Interception:- (interception loss)

Interception occurs in two strata of vegetation, the canopy and in the litter. The interception is important because,

1. Ppt retarded by the canopy is subjected to evaporation and finally last for stream flow.

2. Ppt without vegetation cover falls freely and covers the soil uniformly.
3. A delay in the time when the rain reaches the ground usually raindrops falling from drip points has a larger size and having more K.E than free-falling rain.
4. Litter on the ground forms also part of the vegetation. It causes interception and losing it again by evaporation. Therefore vegetation increases the interception and decreases the defective ppt.

Redistribution:-

After completing the infiltration decreases by the herbs of shrubs and there are more chances of redistribution of the ppt, back to the atmosphere by vaporization.

Root effects:-

Roots of vegetation increase the infiltrative Capacity of soil and thereby decrease the stream flow and evaporation.

Vegetation and snow:-

Trees influence the snow cover by

1. Falling snow can be intercepted in the crown be subjected to evaporation loss.
2. Falling snow is much more easily transported by wind than rosin since forest modifies the wind conduction and influence the distribution of falling snow.
3. The quality and the melting rate of the snowpack by shading them is also affected by vegetation
4. The snow density (quality) generally decreases somewhat from maximum in the open to a minimum within the dense forest.

Fog ppt and vegetation:-

Fog ppt also known as horizontal ppt or negative of vegetation for liquid water in moving fog or clouds. Droplets filtered out of the fog or clouds are deposited freely evenly over the surface of the vegetation and eventually, water begins to drip off. This process depends on the type of vegetation and the number of fog days experienced.

Dew/Rime and vegetation:-

Dew and rime are the forms of ppt, which do not originate in the atmosphere but on the receiving surface itself through condensation (Dew) or sublimation (rime). While vegetation itself is one of the factors which influences the magnitude of such ppt. It is observed that grass lawns are often found wet from dew in the morning while adjacent land with different vegetation cover or bare soil remains dry having not cooled below the dew point

FACTOR AFFECTING INTERCEPTION:-

The major factors, which affect interception, are:

1. Type & Intensity of ppt:-

Light showers can easily be intercepted completely. Interception losses are high under the conditions where ppt occurs in short showers alternating with periods of sunshine.

The relative interception (expressed as %age of rainfall received) decreases with increasing rainfall intensity.

2. Type & Structure of vegetation:-

Under a single tree, interception is usually highest near the stem and decreases towards the outer part of the crown. Trees with branches oriented upward or downward. Also leaves of large size and numerous in number increase interception as compare to vegetation having leaves of small size and less in number. Deciduous forests have less interception than evergreen forest. In mixed & uneven-aged forest interception increases and vice versa.

3. Density & Age of forest stand:-

In multi-storied and uneven-aged forest interception can be very high because of dense vegetation.

By increasing the stand density, the canopy surface area. Will increase and therefore the interception rate will also increase.

Well-stocked stands with dense crown intercept more rain than open woodlands. Highest interception is expected in a forest stand at the age maximum current increment. (Interception increases with the increase in the age of a stand).

4. Season & General Climatic conditions:-

In winter interception is usually lower than in summer, partly because the deciduous tree is without leaves, partly because of evaporation during the cold season is reduced. For deciduous trees, the variation of interception loss between summer and winter may be as great as 50 % while for evergreen trees the variation is much smaller.

Interception loss is found to be higher under climatic conditions of low air humidity and high evaporation.

5. Wind Condition: –

Under condition of strong wind, interception rate decreases, since parts of the intercepted water are shaken off. So we can also say that if there is high-intensity rainfall accompanied by strong winds interception rate decreases.

6. The form of ppt:-

From of precipitation also affect interception. Interception in liquid form of precipitation is more than perception in solid.

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