

INTERCEPTION AND INFILTRATION

In the hydrology cycle, water from the oceans and various surface bodies on the land evaporates and becomes part of the atmosphere. The evaporated moisture is lifted and dispersed in the atmosphere until it precipitates on the land or in the ocean. The precipitated water may be intercepted and used in transpiration of the plants or may run over the ground.

Some references of interception are found intermixed with other topics in ancient literature, such as explaining the effect of forests and vegetation on rainfall, cloud formation and environmental purification, Taithiriya Sanhita mentions the effect of forests on causation of rainfall (TS.II,4.9.3)

सौम्यैवाहृत्या दिवो वृष्टिमेव रूधे मधुषा सं यौत्यपां
वा एष ओषधीनां रसो यन्मध्वमद्य एवौषधीभ्यो वर्षत्यथो
अद्यमय एवौषधीभ्यो वृष्टिं नि नयति ॥ TS,II,4.9.3 ॥

Verses (184.15-17) of Mahabharata state that the plants drink water through their roots. The mechanism of water uptake by plants is explained by the example of water rise through a pipe. It is said that the water uptake process is facilitated by the conjunction of air. This clearly reveals the knowledge of capillary action of soil in movement of water up and down, viz.

पादैः सलिलपानाच्च व्याधीनां चापि दर्शनात् ।
व्याधिप्रतिक्रियत्वाच्च विघते रसनं द्रुमे ॥ MB,XII,184.15 ॥

वक्त्रेणोत्पलनात्नेन यथोर्ध्वं जलमाद्देत् ।
तथा पवनसंयुक्तः पादैः पिवति पादपः ॥ MB,XII,184.16 ॥

As far as infiltration is concerned Varahamihira clearly reveals in opening shloka of the Urahatsanhita Verse I tells us

that at some places water table is higher and at others it is lower, viz.

पुंसां यथाङ्गेन शिरास्तथैवं क्षितावपि प्रोन्नतनिम्नसंस्थाः (Ur.S,54.1)

It implies that the water veins beneath the earth are like veins in the human body, some higher and some lower. Verse 2 reads like this.

एतेन वर्णेन रसेन चाम्भश्च्युतं नभस्तो वसुधाविशेषात् ।
ननारसत्वं बहुवर्णतां च गतं परीदयं क्षितितुल्यमेव ॥ Ur.S.,54.2 ॥

It says that the water falling from sky assumes various colours and tastes from differences in the nature of earth. Thus it directly imply that the infiltration of rainwater is the source of groundwater. the ground water is a complex function of rainwater. Rainwater originally has the same colour etc., but assumes different colour & taste after coming down on the surface of the earth and after percolation.

Three verses quoted by Bapudeva Sastri (in Sindhanta Siromani by Bhaskaracharya, Part II, Goladhayaya, Tripathi, 1969) belonging to an era prior to 1200 A.D., provide scientific details of the phenomena of fog or mist (for which the term रजः संहति has been used). The verses purport to say that at the end of rainy season dissipated clouds (moisture) hang near to the surface of the earth and eclipse mountains, trees, vegetation cover or gardens and disappear through the activity of air and heat from these surfaces. This clearly reveals the fact of interception by earthy materials, vegetation etc. and its disappearance with time by the activity of air and heat.

Thus it can be said that the concepts of interception and infiltration were well conceived in ancient India. The interception of water by vegetation and hanging of water particles near the surface of earth on other materials was also observed, which disappear through the activities of wind and heat. The modern soil science tells us that the soil is composed of interconnected pore spaces. This was clearly

realised by ancient Indians and was compared with the veins in the human body, through which infiltration takes place which is the source of ground water. Plants drink up water through roots which is facilitated by the conjunction of air is alluded to in Mahabharata which fully corroborates the modern concept of capillarity in soil, water and plant relationship.