

# [Precipitation, is precipitation. rainfall remains at the](https://assignbuster.com/precipitation-is-precipitation-rainfall-remains-at-the/)

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Precipitation, which may be in a solid or liquid stateis derived from the atmosphere. It results from the condensation of moisture inthe atmosphere due to the cooling of a parcel of air. The most common cause ofcooling is dynamic or adiabatic lifting of the air. This occurs when a givenportion of air is made to rise with the consequent cooling and possiblecondensation into very small cloud droplets. When they are of sufficient sizeto overcome the air resistance, the resultant is precipitation.

Rainfallremains at the land surface as depression storage and either evaporates, infiltrates or is discharged as overland flow (USDOT, 2002)However, of these, the principalconcern in highway design, is the surface runoff. The most important stepcommencing the hydraulic design of a highway drainage structure regardless ofits size or cost is the determination of the maximum runoff that the highwaydrainage structure is anticipated to carry or control (AASHTO, 1999). 1. 1. 1       Catchment Runoff GenerationPrecipitation is the most essential process for thegeneration of runoff at a catchment scale. The distribution of precipitationvaries spatially and temporally in nature. Precipitation can be in the form ofsnow, hail, dew, rain and rime.

In this study precipitation is considered inthe form of rain only (USDOT, 2002). When a storm occurs, a portion ofrainfall infiltrates into the ground and some portion may evaporate. The restflows as a thin sheet of water over the land surface which is termed as overlandflow. If there is a relatively impermeable stratum in the subsoil, theinfiltrating water moves laterally in the surface soil and joins the streamflow, which is termed as underflow (subsurface flow) or interflow. If there isno impeding layer in the subsoil the infiltrating water percolates into theground as deep seepage and builds up the ground water table (GWT or phreaticsurface). The ground water may also contribute to the stream flow, if the GWTis higher than the water surface level of the stream, creating a hydraulicgradient towards the stream.

Low soil permeability favours overland flow. Whileall the three types of flow contribute to the stream flow, it is the overlandflow, which reaches first the stream channel, the interflow being slower reachesafter a few hours and the ground water flow being the slowest reaches thestream channel after some days. The term direct runoff is used to include theoverland flow and the interflow (Raghunath, 2006). Rainfall travels in a catchment in different directions. Due to vegetation, part of rainfall is intercepted by vegetation canopy.

Interception is known as a loss function to catchment runoff depending onvegetation type and density. The rest of rainfall moves down the vegetation asstem flow, drip off the leaves, or directly falls to the ground as throughfall(USDOT, 2002). Rainfall remains on the land surface as depressionstorage and either evaporates, infiltrates or is discharged as overland flow. Based on the time delay between the precipitation andthe runoff, the runoff is categorized in to two categories; as (1) Directrunoff, and (2) Base flow. Direct runoff: it is thatpart of runoff which enters the stream immediately after the rain fall. Itincludes surface runoff, prompt interflow and rainfall on the surface of thestream. In case of snow melt the resulting flow entering the stream is also adirect runoff.