

## 7.1 Glossary

**alluvial:** (soil) developed from recently deposited alluvium; usually too young to show the effects of soil forming processes: any layers in the soil profile are successive deposits rather than soil horizons.

**bypass flow:** the rapid movement of water down macropores ahead of a wetting front. It occurs even though the soil matrix surrounding the macropores is unsaturated (i.e. the water 'bypasses' the soil matrix). The result is that the soil profile is wet from the bottom-up despite the water being applied to the surface. The macropores through which bypass flow occurs include shrinkage cracks, cylindrical pores created by worms or roots and slickensides. It is also called preferential flow.

**crop water use index (CWUI)** is a measure of lint yield per millimetre of water used by a crop.

**cross fall:** lateral fall across the field (that is, across the slope of land, as opposed to down the slope of the furrow)

**cut-out:** when the bolls are consuming all the available energy (carbon) generated through photosynthesis and therefore no new squares are produced.

**deep drainage:** drainage of water below the root zone.

**deficit irrigation:** a strategy whereby the total seasonal irrigation water application is less than the irrigation requirements. In such situations, irrigation applications are usually concentrated during those stages

of growth that most impact on crop yield. At other times, irrigation may be minimal or non-existent.

**deficit (soil moisture):** see soil moisture deficit

**deficit (regulated deficit irrigation):** see regulated deficit irrigation

**dynamic deficit:** a concept in cotton irrigation scheduling whereby the deficit at which irrigation is triggered changes throughout the season based on forecast  $ET_0$ . When forecast  $ET_0$  is high, irrigation is triggered earlier and when forecast  $ET_0$  is low, irrigation may be delayed without influencing yield.

**evapotranspiration (ET):** the sum of direct evaporation from the soil surface and transpiration, by which process plants give off water vapour through their leaves

**exchangeable sodium percentage (ESP):** the number of exchangeable sodium ions as a percentage of all exchangeable cations held by a soil. The critical ESP value above which dispersion occurs ranges from 2 to 15, depending on the amount of electrolyte in soil solution.

**fetch:** the area upwind of a site of interest (e.g. a storage). The characteristics of this area will influence the evaporative potential of the wind.

**freeboard:** height between bank and water surface in the distribution channel or storage.

**gilgai country:** a natural surface feature of humps and depressions found in some types of cracking clay

**global positioning system (GPS):** a network of satellites controlled by the US Department of Defence that is designed to determine a radio receiver's position in latitude, longitude and altitude. Differential GPS (DGPS) improves accuracy of the information via the use of a local base station.

**gross production water use index (GPWUI):** a performance indicator that compares yield to the total amount of water contributed, including irrigation, rainfall and soil moisture. Rainfall may be either total or effective and should be specified as such. GPWUI can be applied at the field or farm scale.

**headworks:** main control structure in an irrigation scheme, that is, at the main dam in a catchment.

**hydraulic conductivity:** the rate of flow of water per unit gradient of hydraulic potential

**indeterminate varieties:** varieties that have no defined growth period, usually perennial species.

**irrigation system efficiency:** compares water input to water output (used). Examples include application efficiency (for fields), storage efficiency (for storages) or farm efficiency (for the whole farm).

**irrigation water use index (IWUI):** a performance indicator that compares yield to the amount of irrigation water contributed. IWUI can be applied at the field or farm scale.

**leaching fraction:** the fraction of infiltrated irrigation water that percolates below a plant root zone. When using this number, you need to specify the time over which the leaching fraction is measured and the depth interval over which it is calculated.

**managed system capacity:** the long run maximum rate of water application by an irrigation system, after application efficiency and typical system down time is taken into account. Also see **system capacity**

**neutron moisture meter:** a radioactive moisture sensor that is lowered down an aluminium access tube. It estimates volumetric soil water content through measurement of neutrons that are scattered by hydrogen atoms in soil water.

**nodes above white flower (NAWF):** the number of nodes (branches) above the most recent white flower on the first fruiting position. Crops with more nodes above white flower generally have more vigour and this can be used to help decide when crops should be watered.

**off-allocation:** water flowing down the river which is available to be pumped without being debited to your water account.

**partial rootzone drying:** the creation of simultaneous wet and dry zones within a crop root zone. The intent is to stimulate plant chemical signals that reduce leaf area and stomatal aperture without decreasing yield.

**plant available water capacity (PAWC):** the maximum amount of water that a soil can hold in the root zone and later release to plant roots. Water held between 'field capacity' and 'refill point' is referred to as being readily available.

**polyacrylamide (PAM):** a settling agent used to flocculate soil particles. It is used to in a wide range of applications including reducing sediment transport and erosion (where it also tends to increase soil infiltration), reducing seepage from channels and storages and potentially decreasing evaporation. Care is required as the results of use may be difficult to accurately predict.

**porosity:** the degree to which a soil is permeated with pores. The term refers not only to the fraction of the soil volume made up of pores, but also to the size and shape of the pores and the degree of connection between them.

**pre-irrigation:** applying an irrigation some time before planting so that the crop is sown into moist soil. The alternative would be to **water up**.

**rilling erosion:** an erosion process on sloping land in which numerous and randomly occurring small channels only several centimetres deep are formed.

**regolith:** the unconsolidated geological material above the base rock which includes the soil profile.

**regulated deficit irrigation (RDI):** an irrigation scheduling strategy that involves regulating the soil moisture deficit between predetermined upper and lower limits. The soil moisture deficit range is chosen to prevent significant drought stress and to avoid excessive vegetative growth that may stem from an abundance of water. Precision irrigation systems such as CPLM or drip are usually required to achieve the desired level of control.

**saturated hydraulic conductivity (Ksat):** the saturated rate of flow of water per unit gradient of hydraulic potential.

**Siemens:** unit of conductivity.

**slaking:** collapse of aggregates in water to form microaggregates, due to the breakage of bonds formed, for example, by organic matter.

**slickenside:** shiny, striated stress surface found on clay-rich aggregates, formed by one mass of soil sliding past another during swelling and shrinking cycles.

**slumping:** collapse (of a furrow hill).

**sodicity:** an excess of exchangeable sodium, causing soil dispersion to occur.

**soilcore:** a sample of soil taken from down the profile.

**squares:** fruiting structures prior to cotton flowering.

**stomate:** a leaf pore.

**'sub-up':** the lateral flow of water from furrows into raised beds or hills.

**system capacity:** the maximum rate at which irrigation water can be applied by an irrigation system, measured in mm per day. Also see **managed system capacity**.

**telemetry:** direct transfer of information via radiowaves from the field to computer.

**vapour pressure deficit:** the differences between the amount of water vapour the air can hold at the current temperature and the amount it does hold. Units are kPa. Vapour pressure deficit is the driving force for evaporation.

**vertisols:** Australian term used to describe a soil which 'turns' (tills) itself (Latin *verto* – to turn). Vertisols have more than 35% clay throughout the profile, cracks greater than 5 mm at some time of the year, and the presence of slickensides. Vertisols lack distinct horizons.

**water budget:** a calculation of current and future water supply and demand, usually calculated for a crop season.

**water use efficiency:** a generic label for any performance indicators used to study water use in crop production. This includes water use indices (such as IWUI and GPWUI), irrigation system efficiencies and economic indices.

**watering up:** planting into dry soil and applying a full irrigation immediately after sowing. The alternative would be to **pre-irrigate**.