5.1 Glossary

5.1.1 Terms and Definitions

Adjusted depth (d_i) Adjusted volume of water caught in each collector in an array of collectors plus the average amount of water that evaporates while the water is in the collector, divided by the area of the collector opening (ISO)

Applied depth (D_{app}) The volume of water applied divided by the wetted area (Aw). On a single plant or emitter scale volume is measured in litres, area in square meters giving applied depth in millimetres (mm)

Block A section of the irrigation system served by a single off-take, and comprising a manifold and its attached laterals. [See also: Station]

Coefficient of variation (C_v) A statistical measure of variation within a sample

Crop Irrigation Demand (CID) The amount of water that would potentially be consumed by the irrigated crop in one week during peak evapo-transpiration conditions (m3/ha/week)

Delivery hose (= FDIS 'Distribution hose', In-field supply hose, Softwall supply hose) Supply line that conveys water along an irrigated strip to a traveller irrigation machine

Delivery tube (= FDIS 'Distribution tube', In-field supply tube, Polyethylene tube) Supply line that conveys water along an irrigated strip to the water distribution system of reel and self-propelled reel machines

Design system capacity (SC_{des}) The flow of water per hectare of irrigated area used in the design of the system.

Discharge coefficient (k_d) A dimensionless measure of the sensitivity of the emitter flow rate to changes in pressure

Discharge exponent (x) A dimensionless measure of the sensitivity of the emitter flow rate to changes in pressure

Distance adjusted lowest quarter determination (D_{ajq}) Lowest quarter of collectors determined by ranking collected volumes and adjusting for distance from the pivot centre

Drive test pressure (P_d) Pressure of a traveller irrigation machine measured at the inlet to the hydro-dynamic drive (FDIS)

Effective length (L_e) Dimension parallel to the pipeline of the area to be irrigated by a linear move irrigation machine, conventionally calculated as the distance between the two most distant sprayers or sprinklers on the pipeline plus 75% of the wetted radius of the terminal sprayers or sprinklers. Where a proportion of the area under the pipeline is used for the water supply system and not crop production, that distance is excluded from the effective length (ISO)

Effective radius (r_e) Radius of the circular field area to be irrigated by a centre pivot, conventionally calculated as the distance from the pivot point to the terminal sprayer or sprinkler on the pipeline plus 75% of the wetted radius of the terminal sprayer or sprinkler (ISO)

Emission uniformity (EU) A measure of variability in flow from emitters that is based on the coefficient of variation. Corresponds mathematically to the Christiansen coefficient

Emitter A device used to control the discharge from a lateral line at discrete or continuous points (ASAE 458).

Emitter emission uniformity (EEU_{lq}) A measure of the variability of flow being received by individual plants. Derived from EU_{man}, EU_{defect} and the number of emitters per plant, equated to a low quarter uniformity equivalent

End-gun Set of one or more sprayer or sprinkler nozzles installed at the distal end(s) of an irrigation machine to increase the irrigated area, and usually operating for only a portion of the time to conform to system boundaries (ISO)

Equivalent applied depth (Dz_{app}) In drip-micro irrigation, the volume applied to a plant, adjusted for the allocated ground area per plant

Inlet test pressure (P_i) Pressure of a traveller irrigation machine measured at the inlet to the machine (FDIS)

Irrigation requirement (IR) Crop water requirement plus any additional beneficial water requirement less received precipitation and stored soil moisture

Irrigation strip (Irrigation set) The portion of a field irrigated by a sprayline or travelling irrigator set up in one location. It typically consists of a rectangle with an effective zone wetted by the water distribution system that significantly exceeds the dimensions of the strip and especially the width. Some overlapping of the wetted patterns of adjacent strips is often required to maintain an acceptable uniformity of water application over the entire field (~FDIS)

Irrigation strip width (E) (Strip spacing, Set spacing) The spacing between strips, i.e. distance between two adjacent travel paths of the gun-cart or between two adjacent sprayline positions (~FDIS).

Lateral An emitting pipe with uniformly decreasing flow supplying water to points of application (~ASAE 458).

In drip-micro systems: The hose or tube, typically made of polyethylene, with emitters integrated or attached.

In spraylines, linear moves and pivots: The pipe, typically made of steel or aluminium, on which sprinklers or sprayers are mounted.

Lateral filter In-line filter or screen fitted at the beginning of each lateral line.

Lateral pressure (P_s) Pressure available at a point in the lateral measured, while the system is in normal operation, using a pitot tube fitted to a gauge.

Line-source emitters Water is discharged from closely spaced perforations, emitters or a porous wall along the lateral (ASAE 405.1).

Low quarter irrigation adequacy (IA_{lq}) The ratio of the mean low quarter depth applied, to the mean target depth required across the field as a whole

Mainline A pipeline that carries treated water from system headworks to off-takes supplying a series of blocks.

Manifold A pipe usually of polyethylene or PVC that carries water from an off-take to a number of laterals.

Manufacturing emission uniformity (EUman) Description of variation in flow resulting from manufacturing variability, determined from physical laboratory measurements at a standard temperature.

Maximum allowable deficit (MAD) The proportion of total available water that can be used by the crop before yield reducing stress is induced. Also called Management allowable depletion (%)

Mean field application depth (D_{mf}) Mean application depth collected along transverse lines after adjustment for evaporation and overlap from adjacent strips (~FDIS)

Micro-irrigation system Physical components required to apply water by micro-irrigation, consisting of a number of low pressure polyethylene laterals connected to manifolds and mainlines, and through which water is applied through point source emitters located along the laterals for further redistribution by the soil medium.

Operating system capacity (SC_{op}) The flow of water per hectare of irrigated area that can be supplied in the time that the system is operating.

Percentage wetted area The area wetted as a percentage of the total crop area (ASAE405)

Point-source emitters Water is discharged from emission points that are individually and widely spaced, usually over 1 metre apart. Multiple-outlet emitters discharge water at two or more emission points (ASAE 405.1).

Potential low quarter application efficiency (PAElq) A single event potential application efficiency estimated from field distribution uniformity and surface losses due to runoff and leakages. The value calculated can be used to determine the scheduling co-efficient.

Pressure regulation point A location at which system pressure is managed to fall within defined parameters, typically through automatic or manually adjusted pressure regulation valves or by pipeline design. A pressure regulation point will normally be a block off-take or inlet to a manifold.

Readily available water (RAW) The amount of water held between field capacity and stress point, available to plants without yield inducing stress.

Reference application rate (R_i) The mean rate of water application to the wetted area calculated from mean application depth, wetted area and irrigation duration (~FDIS)

Required system capacity (SC_{req}) The flow of water per hectare of irrigated area required to replace water used by the crop (plus any additional amounts for other purposes) in the time available.

Return interval (RI) The time period between the beginning of one irrigation event and the next on a crop or area in question (days)

Rotator A sprinkler that distributes water through a jet formed by parts that rotate at controlled speed

Seasonal application efficiency (SAE) The ratio of water retained in the root zone to water applied to the field, over a full irrigation season or year.

Seasonal deep percolation (SDP) Includes all drainage whether from irrigation or precipitation

Seasonal irrigation deep percolation (SDPi) A measure of the amount of irrigation water applied that drains from the soil profile. It is, in effect, seasonal application in-efficiency

Spinner A sprinkler which distributes water, utilising free rotational movement of the sprinkler parts, in the form of a stream that breaks into droplets.

Sprayer A sprinkler which sprays water, without rotational movement of the sprayer parts, in the form of fine jets or in a fan shape (ISO 8026).

Sprinkler Generic label for a device that distributes pressurised water through the air to a surrounding area

Sprinkler package Collection of devices fitted to the outlets of an irrigation machine or system potentially consisting of sprayers or sprinklers and potentially including piping, pressure or flow-control devices and supporting plumbing designed for a specific irrigation machine and set of operating parameters (ISO)

Sprinkler pressure (P_s) Pressure available at an individual sprinkler measured just upstream of the sprinkler or at the outlet, in the centre of the jet and 3mm from the orifice.

Sprinkler pressure (P_S) (Guns) Pressure of a traveller irrigation machine measured at the inlet to the gun or sprinklers of the distribution system (ISO 8026, FDIS)

Station (Subunit) A section of the irrigation system consisting of main, manifold and lateral pipelines which operate simultaneously and have independent flow control. A station is operated as a single unit and potentially comprises a number of blocks. When the system is running, every emitter in the station and no emitter outside the station should be discharging water.

System capacity (SC) The flow of water per hectare of irrigated area required to replace water used by the crop (plus any additional amounts for other purposes) in the time available.

Test pressure (P_t) Pressure of a linear move or centre pivot irrigation machine measured at the first available outlet downstream of the elbow or tee at the top of the inlet structure (ISO)

Total available water (TAW) The amount of water held in the soil between field capacity and permanent wilting point. (mm/100mm or mm)

Travel path Path within a strip along which the delivery tube or cable is laid and the gun-cart travels (~FDIS)

Travel path length (L_t) Distance a traveller irrigation machine moves along its travel path, from starting point to stopping point, being not more than the length of the delivery tube for reel or self propelled reel machines, and not more than twice the delivery hose length of traveller machines (~FDIS)

Wetted area (A_w) The average soil area wetted by a single emitter, estimated in the root zone from the surface to a depth of <50cm (~Cal)

Wetted radius (r_w) Distance measured from the centre line of a sprayer or sprinkler to the furthest point at which the application rate of the individual nozzle declines to approximately 1mm/hour, based on tests conducted when there is no wind (ISO)

Water distribution system Sprinkling and travelling part of a traveller irrigation machine by which water is distributed and applied over a strip (FDIS). (e.g. sprinkler or gun-type sprinkler, combination of sprinklers and guns, boom with a set of sprinklers, sprayers or other kinds of water distribution devices)

Of a solid set or sprayline system: the arrangement of sprinklers used to distribute water across the area to be irrigated.

5.1.2 Abbreviations and Symbols

A	area of the irrigated strip (m^2)
A_{plant}	ground area per plant
ASM	available soil moisture
A_w	Wetted area
A_{wetted}	wetted area per emitter
CU_c	Christiansen coefficient of uniformity
CU_r	Heermann and Hein coefficient of uniformity
C_v	coefficient of variation
Cv_{defect}	coefficient of variation due to emitter blockages, wear and tear
Cv_{man}	coefficient of variation due to manufacturing
Cv_{QPadj}	coefficient of variation of pressure adjusted flows
$\overline{D}$	mean depth of water collected by all collectors used in the data analysis
D_{ajq}	Distance adjusted lowest quarter determination
D_{app}	Applied depth
Dc	critical deficit
d_f	Mean field application depth
d_i	Adjusted depth
D_{inf}	depth water infiltrates
d_{lq}	low quarter applied depth
D_{mf}	mean application depth based on system flow rate (mm)
d_{target}	targeted application depth
D_{wa}	average depth of water applied
D_{wr}	average depth of water retained
D_{Zmean}	mean depth applied to the whole field
Dz_{app}	Equivalent applied depth
D_{Zmin}	minimum depth applied to a zone
DP	deep percolation in periods 1 to n
DU_{lq}	low quarter Distribution uniformity
E	Irrigation strip width
EC_{vol}	volumetric energy consumption
Dz_{app}	Applied Depth in an area
EEU_{lq}	emitter variation factor
$E_{hydraulic}$	hydraulic efficiency
E_{pump}	pump efficiency
ET_{crop}	crop water use by evapo-transpiration
$ET_{limited}$	crop water use by a crop with restricted available soil moisture
EU	statistical emission uniformity
EU_{man}	manufacturer's emission uniformity
F_{dr}	drought response factor (%yield / mm PSMD)
$F_{drainage}$	effect of unequal system drainage
$F_{spacing}$	effect of spacing
F_{runoff}	proportion of water that leaves the field as a result of overland flow
FDU	Field Distribution Uniformity, an overall value incorporating a range of uniformity factors
GDU	Grid Distribution Uniformity, calculated from adjusted depths from a grid of collectors
I_i	Reference application rate
IA_{lq}	low quarter irrigation adequacy
IR	irrigation requirement
K_{lq}	statistical distribution parameter for a normal distribution when low quarter is fraction used

K_d	emitter discharge coefficient
L_e	Effective length
L_t	Travel path length
MAD	management allowed depletion, maximum allowable deficit
n	number of items used in the data analysis
N_e	number of emitters per plant
n_{ER}	percentage of emitters that run after system shut down
OTA	depth equivalent of off-target application (mm)
p	operating pressure
P	precipitation
P_d	Drive test pressure
P_{energy}	price paid for energy ($/kWhr)
P_{field}	mean pressure determined from whole field pressure tests
P_i	Inlet test pressure
P_s	Sprinkler pressure
PAE_{lq}	Potential low quarter application efficiency
PET	Potential evapo-transpiration
PSMD	potential soil moisture deficit (mm)
P_t	Test pressure
P_{test}	pressure at which block was flow tested
P_w	price paid for water ($/m^3)
q	emitter flow rate
Q_{Em}	measured emitter flow
Q_{Padj}	Pressure adjusted emitter flow
Q_m	system flow rate (m^3/h)
Q_x	average flow per emitter
r_e	Effective radius
R_{ir}	reference application rate (Assumed constant)
R_{it}	instantaneous application rate for transect *i* (mm/hr)
r_w	Wetted radius
RI	Return interval
RO	depth equivalent lost through run-off (mm)
RAW	readily available water
s	standard deviation in the sample
SAE	seasonal application efficiency
S_{cc}	spacing between collector columns
SC_{des}	design system capacity
SC_{op}	operating system capacity
SC_{pot}	potential system capacity
SC_{req}	required system capacity
SDP	seasonal deep percolation
SDP_i	seasonal deep percolation from irrigation (mm)
SDU_{lq}	low quarter system distribution uniformity
SMD	soil moisture deficit
T_{ER}	average time for which those emitters run after system shut down
T_{irrig}	duration of an irrigation event
TAW	Total available water
$\overline{V}$	arithmetic average volume (or alternatively mass or depth) of water collected by all collectors used in the data analysis
Va_{lq}	distance adjusted average volume (or alternatively the mass or depth) of water collected in the lowest quarter of the field, calculated

V_i	volume (or alternatively the mass or depth) of water collected in the ith container
V_{ww}	value of wasted water ($/mm/ha)
WHC	soil water holding capacity
WR_b	beneficial water requirement applied by irrigation system
X	emitter discharge exponent
$\bar{x}$	mean value from the sample
YL_{di}	drought induced yield loss
Y_{pot}	Potential Yield (t/ha)