

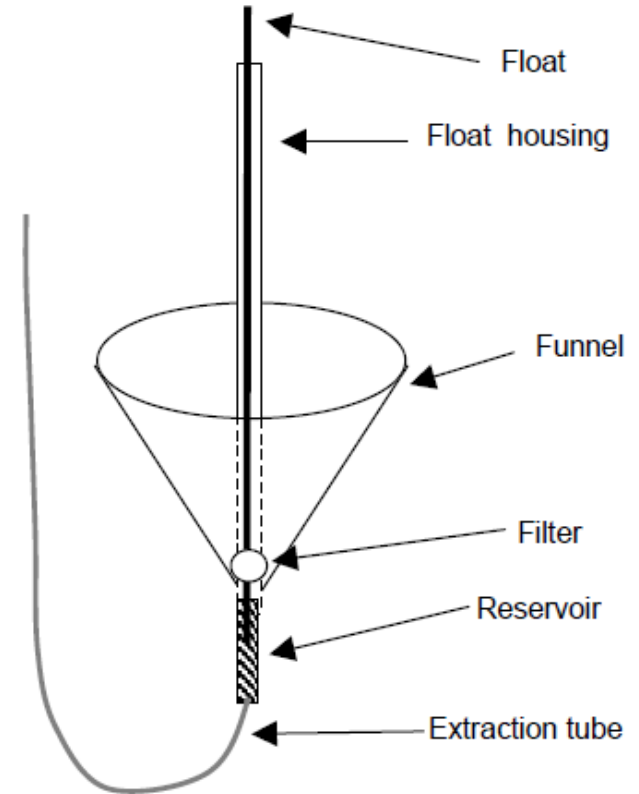
Helping farmers in irrigation scheduling and increasing water productivity



Richard Appoh,
IWMI

WETTING FRONT DETECTOR PRINCIPLE

- A mechanical device to monitor the wetting front as it passes through the soil
- Funnel shaped instrument with a small collection **reservoir** at the bottom to collect soil moisture
- Silica sand (0.2 to 0.4 mm diameter), with 20 to 50 % of the particles in the 200 to 200 micron range)
- Foam inside of the plastic tubes
- Caps with indicator on top



INSTALLATION DEPTH

❑ Irrigation practice

❑ Cultivated crop:

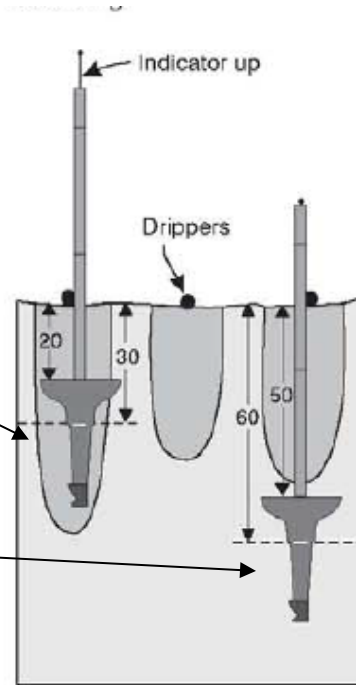
❑ $1/2$ extensive rootzone: yellow indicator

❑ $2/3$ of the extensive rootzone: red indicator

❑ Irrigation interval:

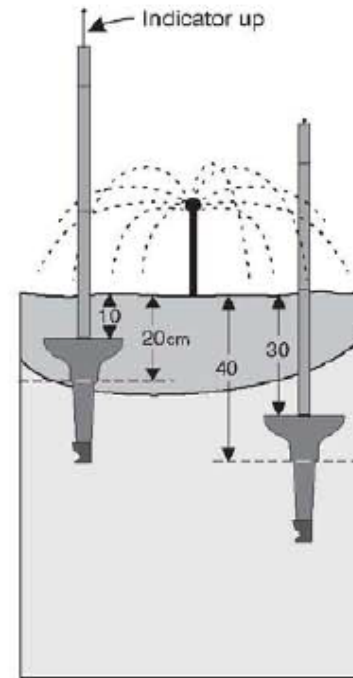
❑ Short= shallow

❑ Long= deep



Drip Irrigation

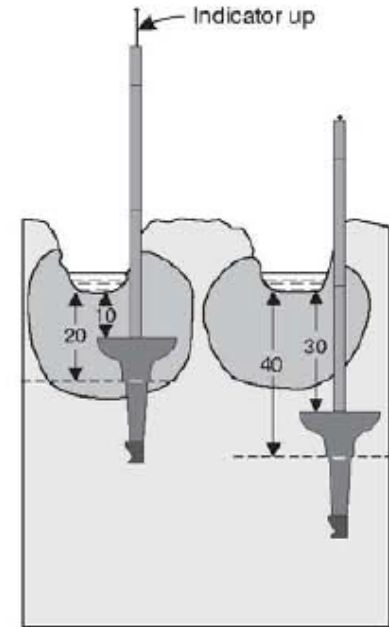
The detector must always be placed directly under a dripper. Wetting patterns from drip irrigation only cover a fraction of the soil surface but tend to go deep. Suggested depth for the shallow detector is 30 cm and for the deep detector is 60 cm. If small amounts of water are given frequently, detectors could be buried shallower.



Sprinkler Irrigation

Wetting patterns tend to be shallower under sprinkler irrigation than drip irrigation. Suggested depth for the shallow detector is 20 cm and for the deep detector is 40 cm.

For centre pivot irrigation it is common to apply small amounts of water at frequent intervals, so depths of 15 cm and 30 cm may be suitable (5 and 20 cm to the rim).

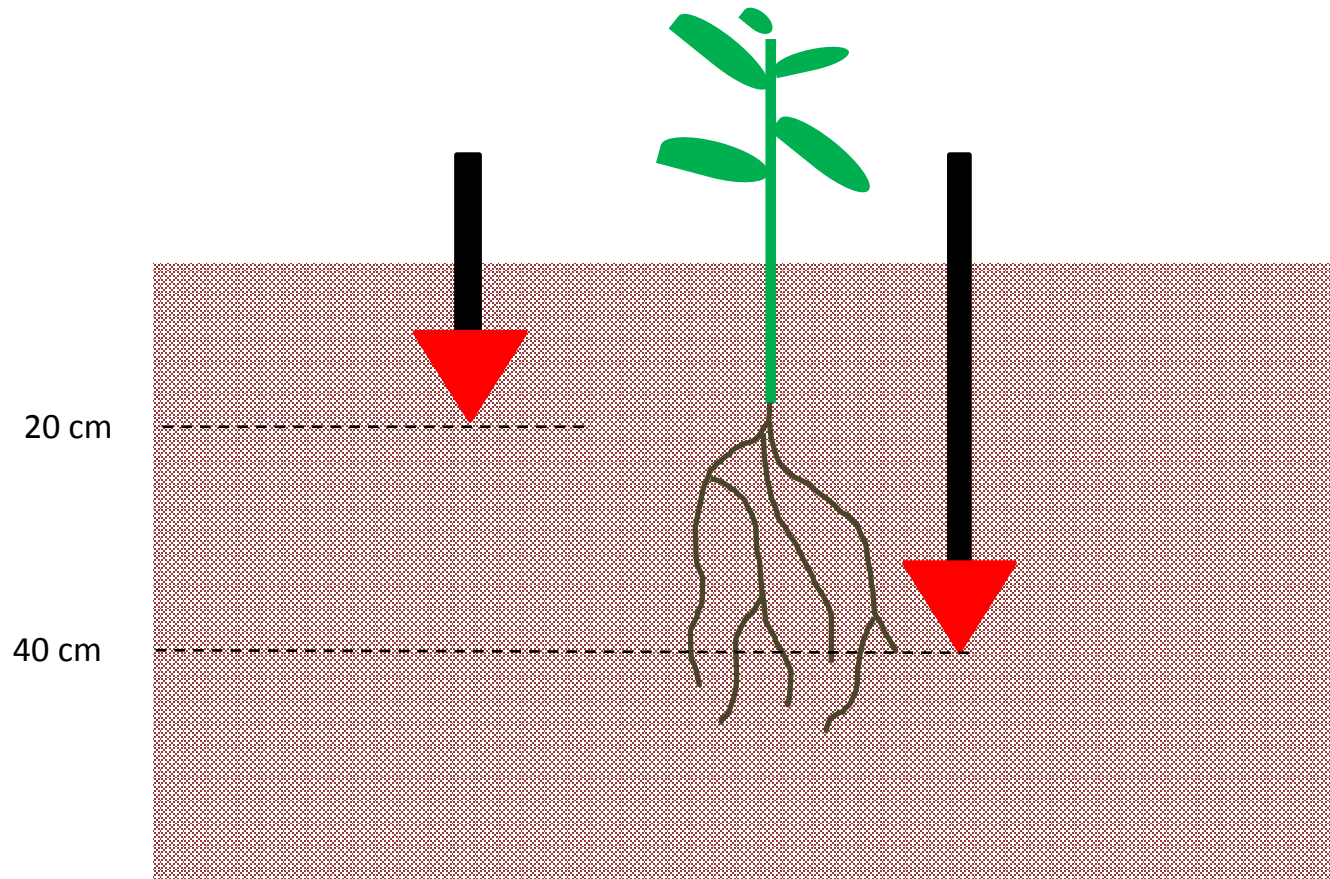


Furrow Irrigation

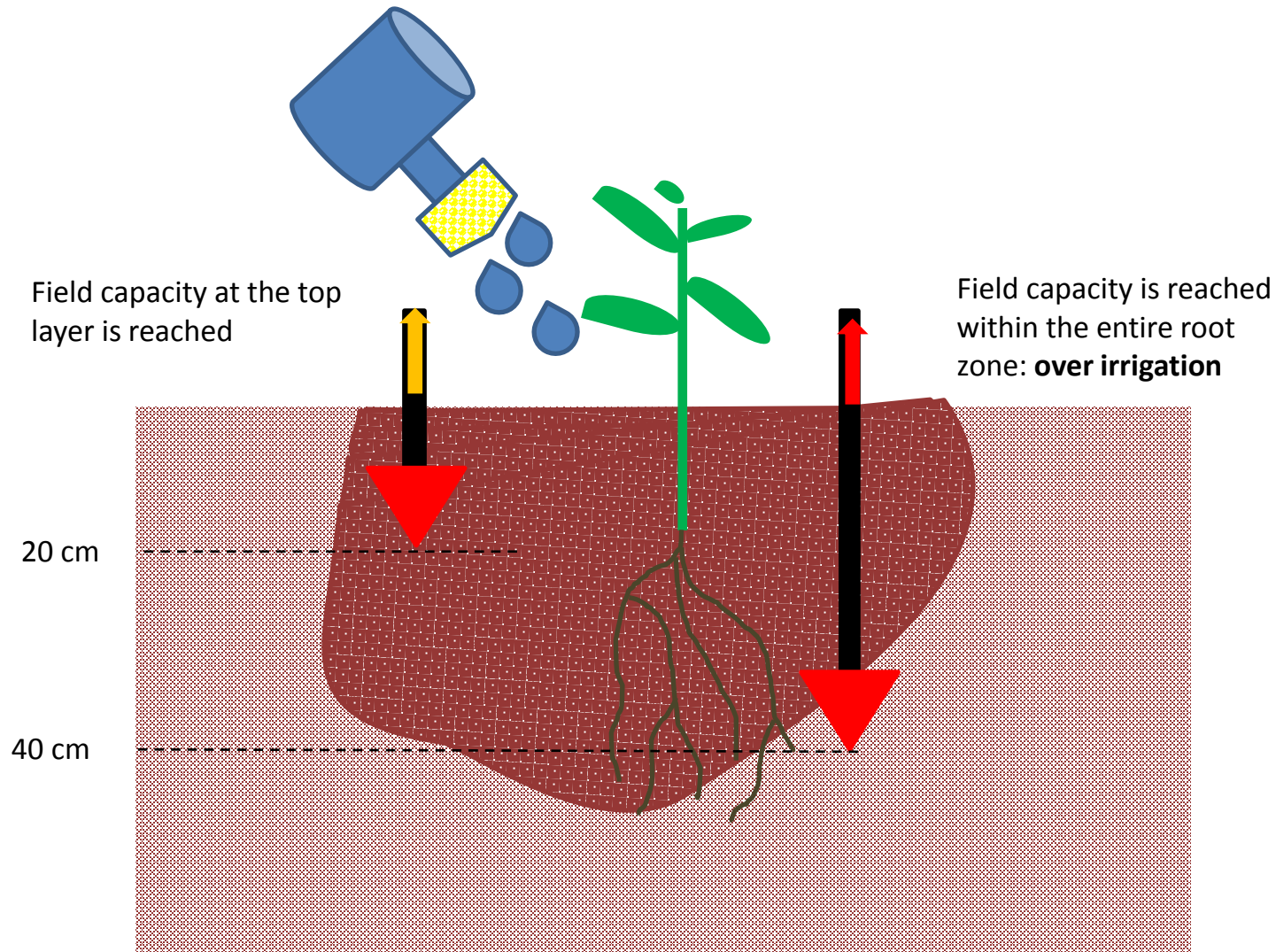
The detectors have not been extensively tested for furrow irrigation. We suggest that the detectors should be positioned half under the furrow and half under the bed with the extension tube rising through the shoulder of the bed. Suggested depth for the shallow detector is 20 cm and 40 cm for the deep detector (from base of furrow).

(Stirzaker, WRC project report 288, 2004)









OVERHEAD IRRIGATION OF ONION



OVERHEAD IRRIGATION OF ONION



RESPONSE OF THE DETECTOR

Shallow WFD	Deep WFD	What it means	What you should do
		Not enough water for established crops.	Apply more water at one time or shorten the interval between two irrigations. May be the desired result for young crops or when trying to minimize leaching of nutrients.
		Wetting front has penetrated into the lower part of the root zone.	Much of the time this is the desired result. However during hot weather or when the crop is at a sensitive growth stage irrigation should be increased. The deep detector should respond from time to time, showing that the entire root zone is wet.
		The wetting front has moved to the bottom or below the root zone.	Both detectors should respond when irrigating to satisfy high demand for water. However if this happens on a regular basis over-watering is likely. Reduce irrigation amounts or increase the time interval between irrigations.
		Soil or irrigation is not uniform or the soil surface is uneven.	Ensure the soil is level over the detectors and water is not running towards or away from the installation site. Check uniformity of irrigation or location of drippers.

FURROW IRRIGATION OF WHEAT



Thank you! Questions?



**Dr. Petra Schmitter
IWMI**