The International Commission on Irrigation and Drainage, ICID: 72 years of Dedication to Enhancing Agricultural Water Management

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Improving the Performance of Canals with Geosynthetics, IGS Technical Committee on Hydraulics November 15-17, 2021

UK Centre for Ecology & Hydrology

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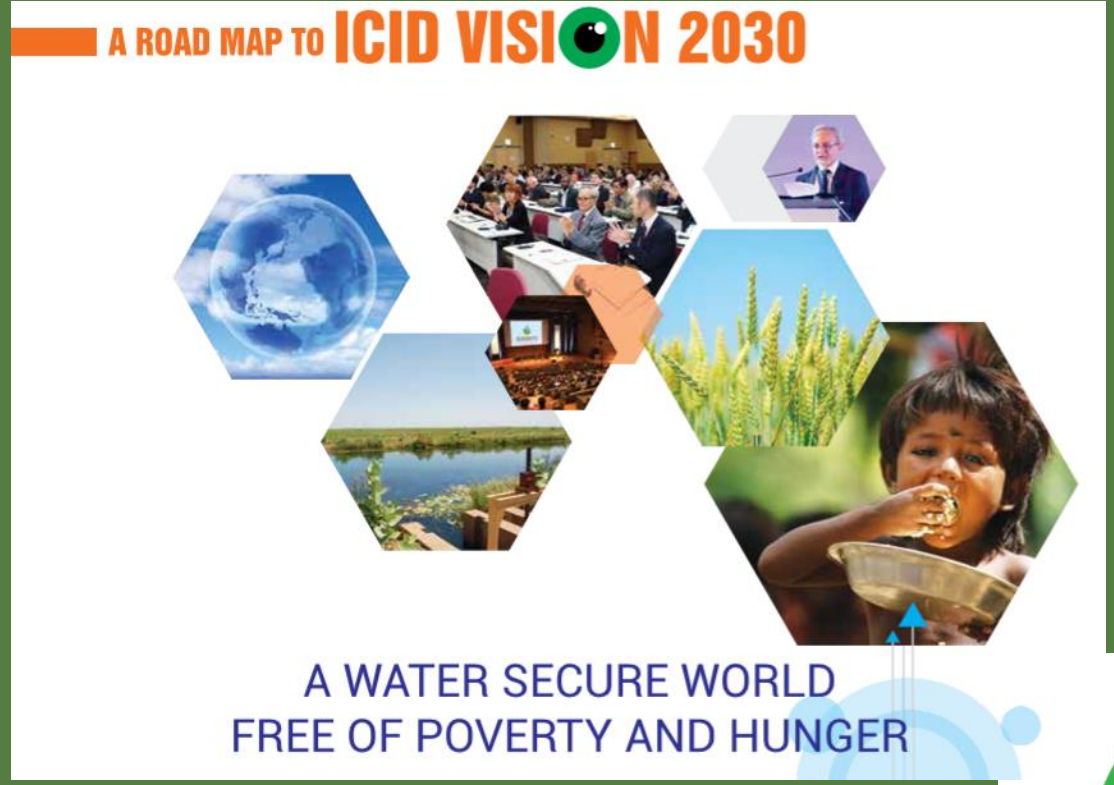
ICID, the International Commission of Irrigation and Drainage

- ICID, the International Commission on Irrigation and Drainage was established in 1950 and was at the forefront of the green revolution after World War II.
- The (ICID) is a leading scientific, technical, and professional not-for-profit international organization working in the field of irrigation, drainage, and flood management to promote and achieve 'sustainable agricultural water management' including rain-fed agriculture, supplemental irrigation, deficit irrigation and full irrigation.
- ICID other core activities focus on the management of extreme climate events such as flood and droughts as well as the Water-Food-Energy nexus.



ICID "Vision 2030: Water secure world free of poverty and hunger through sustainable rural development".

ICID produced a plan on how to implement this vision through several activities.

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Source: Tsugihiro Watanabe, ICID WG-Climate

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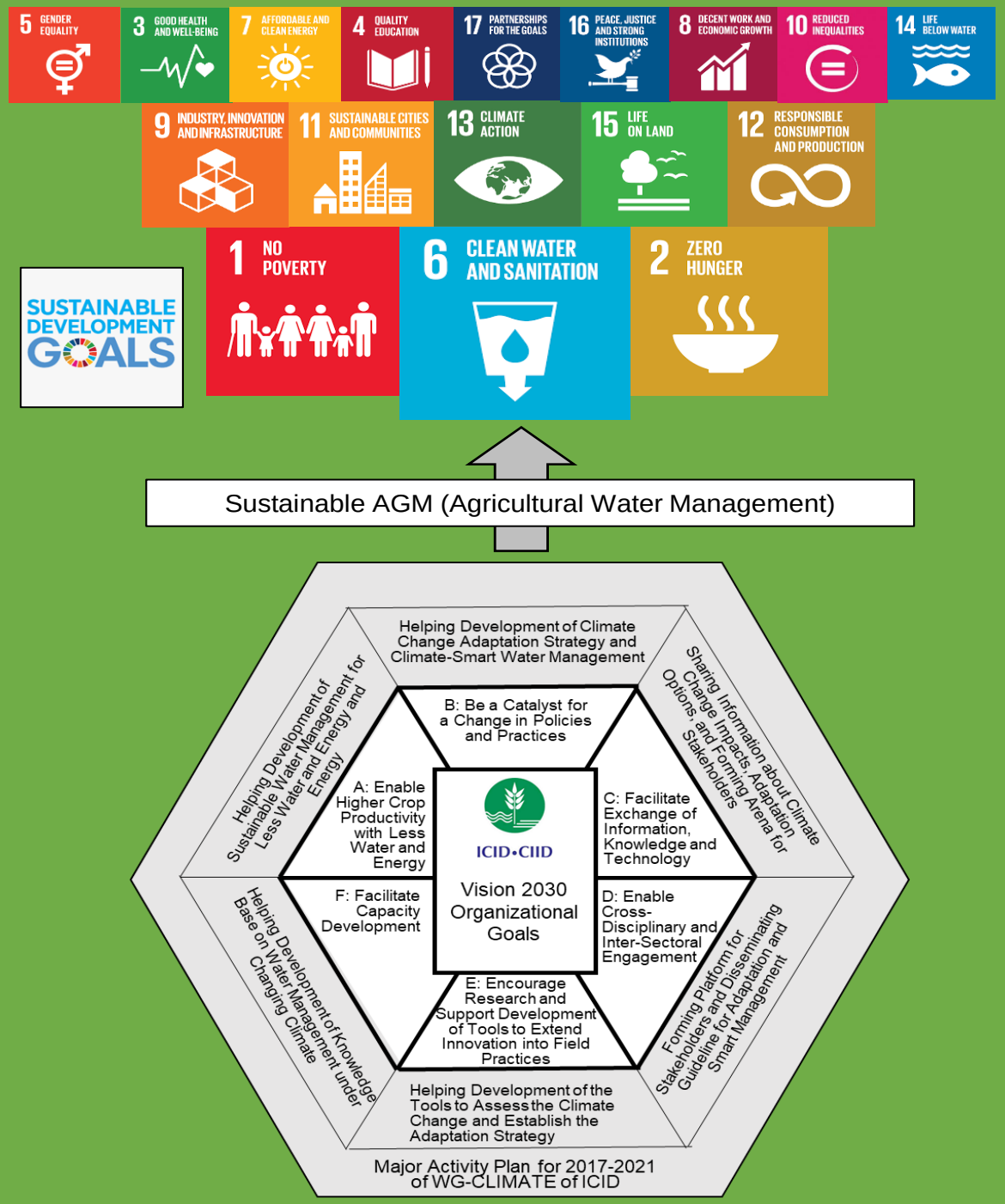

The frame for establishing sustainable AWM and challenges to climate change issues under ICID Vison 2030 with the UN-SDGs as the common goals of the international society can be summarized and depicted as in Figure.

SDGs, 6 Organizational Goals of the ICID Vision 2030, and Activity Plan of WG-CLIMATE

Source: Tsugihiro Watanabe 2020

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Some of the ICID achievements

- ICID presently has 120 member countries and represents 90% of the irrigated area of the world.
- It covers 18 wide areas of technical activities ranging from irrigation & drainage to climate change and Water-Food-Energy Nexus. For each activity, there is a working Group to plan and deliver on the activities.
- Established awarding system to acknowledge the individual achievements.
- Established internationally well known peer reviewed Journal (irrigation & Drainage with Wiley, USA Publisher).
- Established regional groups for the world continents.
- Established an excellent dissemination of Knowledge system online and web-based.

ICID membership

Country based membership consists of National Committees of each country generally include multi-disciplinary professionals such as planners and policymakers; water managers; irrigation and agriculture engineers; research scientists and educationists working in the related areas.

Companies, institutions, and individuals can also participate in ICID activities through their respective NCs or as Direct Members (DM).

ICID is dedicated towards improving the status of agricultural water management practices including rain-fed agriculture, supplemental irrigation, deficit irrigation and full irrigation.

Improving Water Use Efficiency

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Efficiencies from Storage to the field

Dam

70%

Channel

50%

Farm

35%

Plant

Dam to Farm

- Operating Spills
- Poor Measurement
- Leaks
- Seepage
- Evaporation

Supply to Crop

- Poor Service
- Slow Delivery
- Varying Flows
- Poor Control

Use by Plant

- Imprecise Timing
- No measurement of Crop Needs

Rainfall – Runoff Harvesting into surface reservoirs

Check Dams

Field Bunds

Rural and Urban Tanks

Example for Rainfall harvest into mountain lakes/reservoirs, Tunisia - EU- HYDROMED Project

Reducing water losses by evaporation

Reservoirs and lakes can offer floating solar space, reducing Evaporation losses and saving lands

Farm lakes and irrigation reservoirs could host renewable electricity generation, according to Berkshire farmer and energy entrepreneur Mark Bennett who has just built the UK's first floating solar farm on a new 60m litre irrigation reservoir at his Sheeplands Farm near Wargrave.

A. Improving Efficiency

Improved Water Use Efficiency

Improved Infrastructure

- Improved storage, diversion, distribution & on-farm water use
- Efficiency 43% in developing countries
- Canal linings, pipeline conveyance & increased supplies to tail end.

Water Storage

Canal Lining

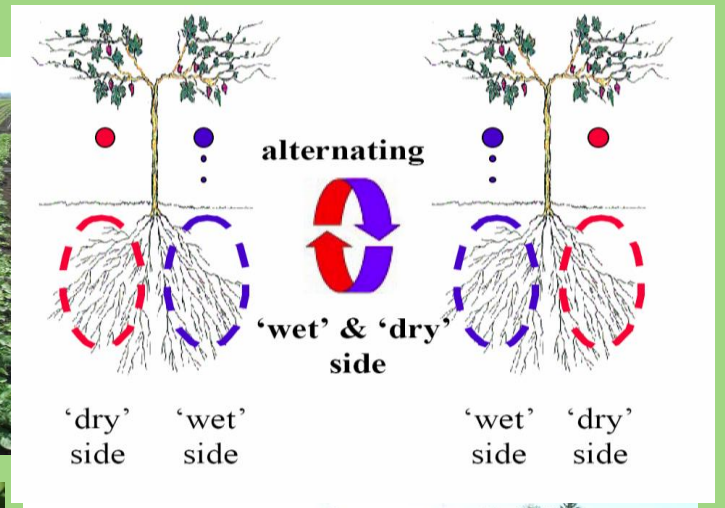
Pipeline

Addressing Water use efficiency

Today we use 30% less water to grow a crop than we did 25 years ago. (Alta.Ag)

Partial Root Drying , PRD

The results of Italy on tomato: PRD would allow water saving of 26% and 44% if used instead of normal drip & sprinkler systems, respectively.



Food security requires production of more crop per water drop. Water saving through irrigation with drip subsurface irrigation system and PRD technique (only one half of the vertical root zone is irrigated at a time then alternate irrigation with the dry half). Saving in water is significant ~ 40% which means 40 % more food can be produced.

PRODUCTIVITY UNDER DRIP FERTIGATION

UDUMALPET, TAMIL NADU (2008)

Method	Yield (t/ac)	Water use (million liter/ac)	Power Use (units/ac)
Flood	3.1	9.5	467
Drip	3.8	3.2	226
Difference%	22.5	66.3	52

More Crop Per Drop

17

Jain Irrigation Systems Ltd.

Rice with Drip

- Once adopted the technology would benefit several million farmers globally.
- Rice yield increased up to 40 %
- Water saved up to 70%
- Energy conservation up to 60 %
- Increased efficiency of water & fertiliser usage to up to 80%
- Reduced skin, respiratory and mosquito related diseases
- No or low methane emission
- Reduced amount of nitrate leaching into water bodies
- Soil health protection leading to consistent crop production

Source: Dr.P.Soman
Chief Agronomist, (Global)
JAIN IRRIGATION SYSTEMS LTD.

Meryam El Ouafi, co-founder of the GEMS company, is taking the gamble Meryam is based in Agadir, in the Souss region. She is a recipient of EU co funding.

Enhancing the Efficiency in Irrigation Systems

INNOVATION
ULTRA LOW DRIP IRRIGATION

ULDI :

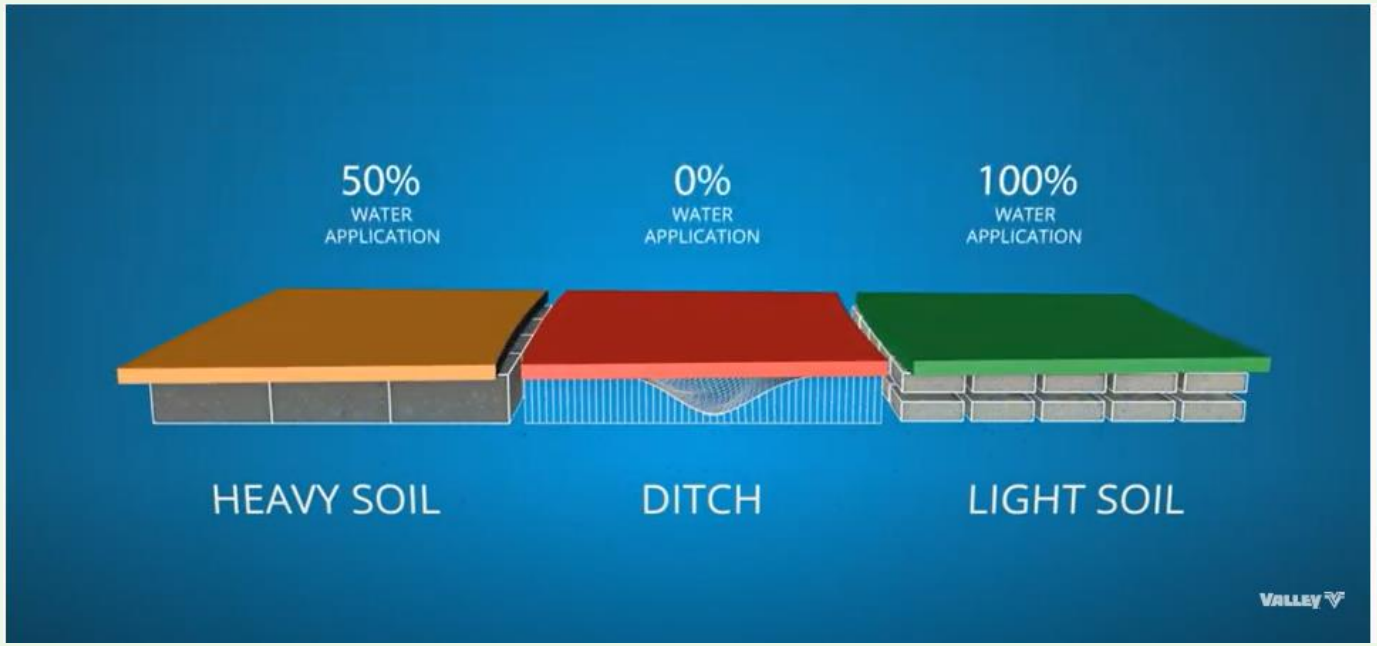
- Flow 0.1 to 0.3 l/h
- Longer period of water release
- Higher use efficiency
- Low water tension in the soil
- No percolation
- Excellent water saving (~30%)

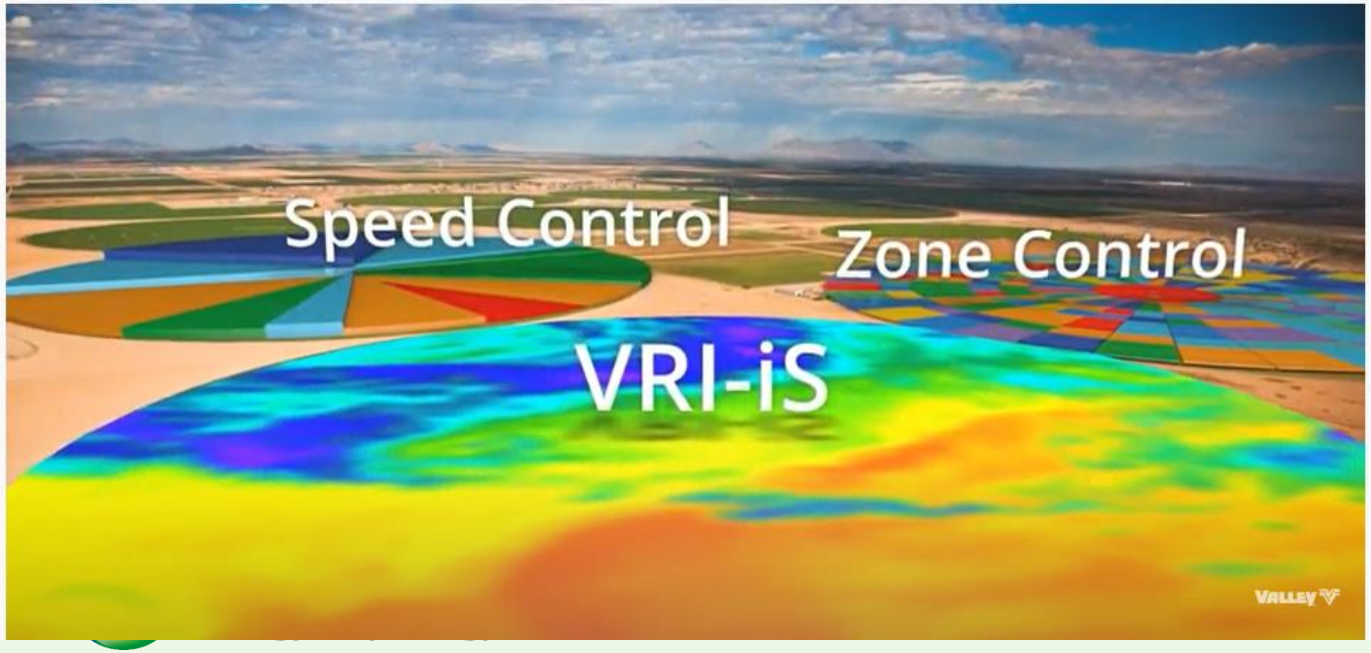
Traditional Micro Irrigation:

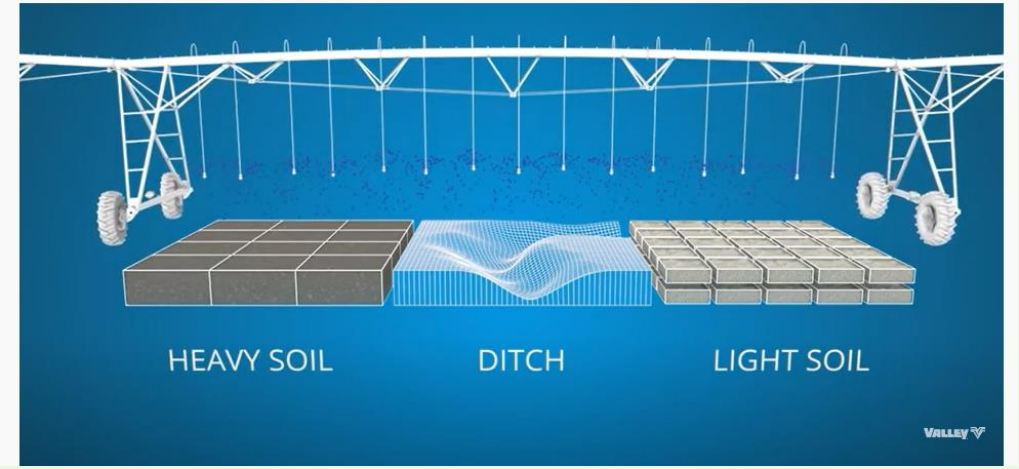
Ultra Low Drip Irrigation:

Source: Marco Arcieri , VP-ICID

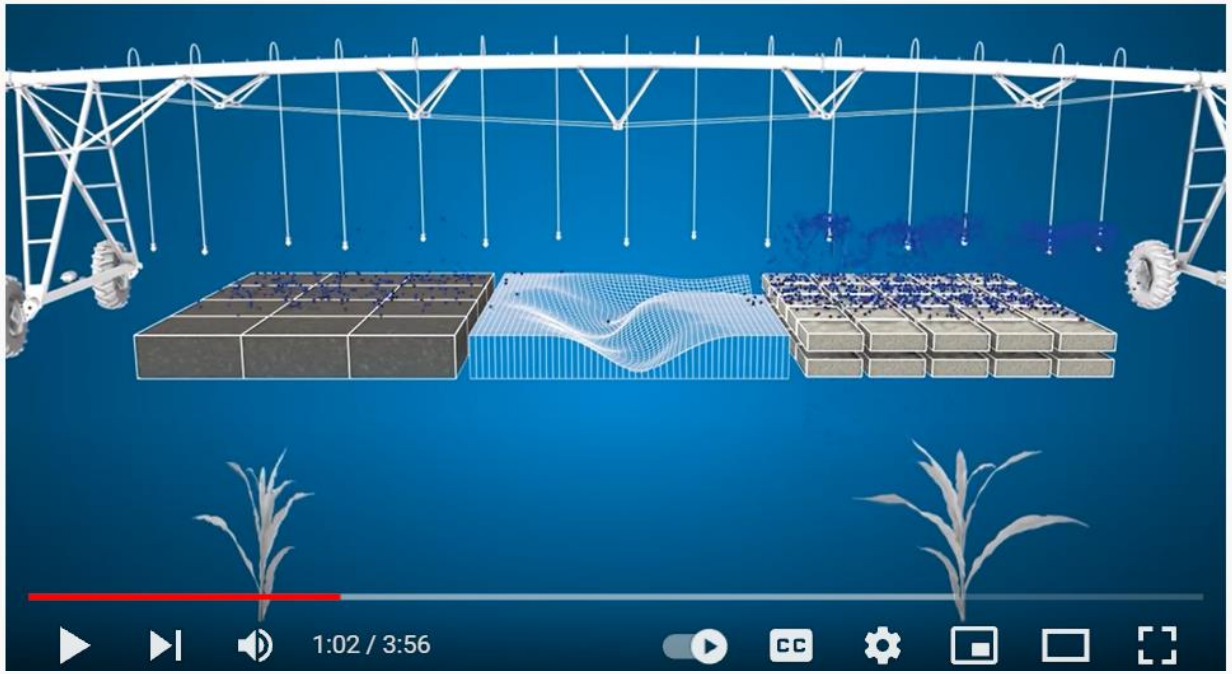
Varying Irrigation Rate VRI technology works by applying water at a variable rate along the centre pivot rather than one uniform rate along the entire length of the system. VRI uses Global Positioning System (GPS) and Geographic Information System (GIS) technology to prescribe a specific amount of water for certain areas of the field.







https://www.valleyirrigation.com/



Valley - Variable Rate Irrigation (VRI) systems

Water Saving : Accurate estimation of crop water requirement using new technologies

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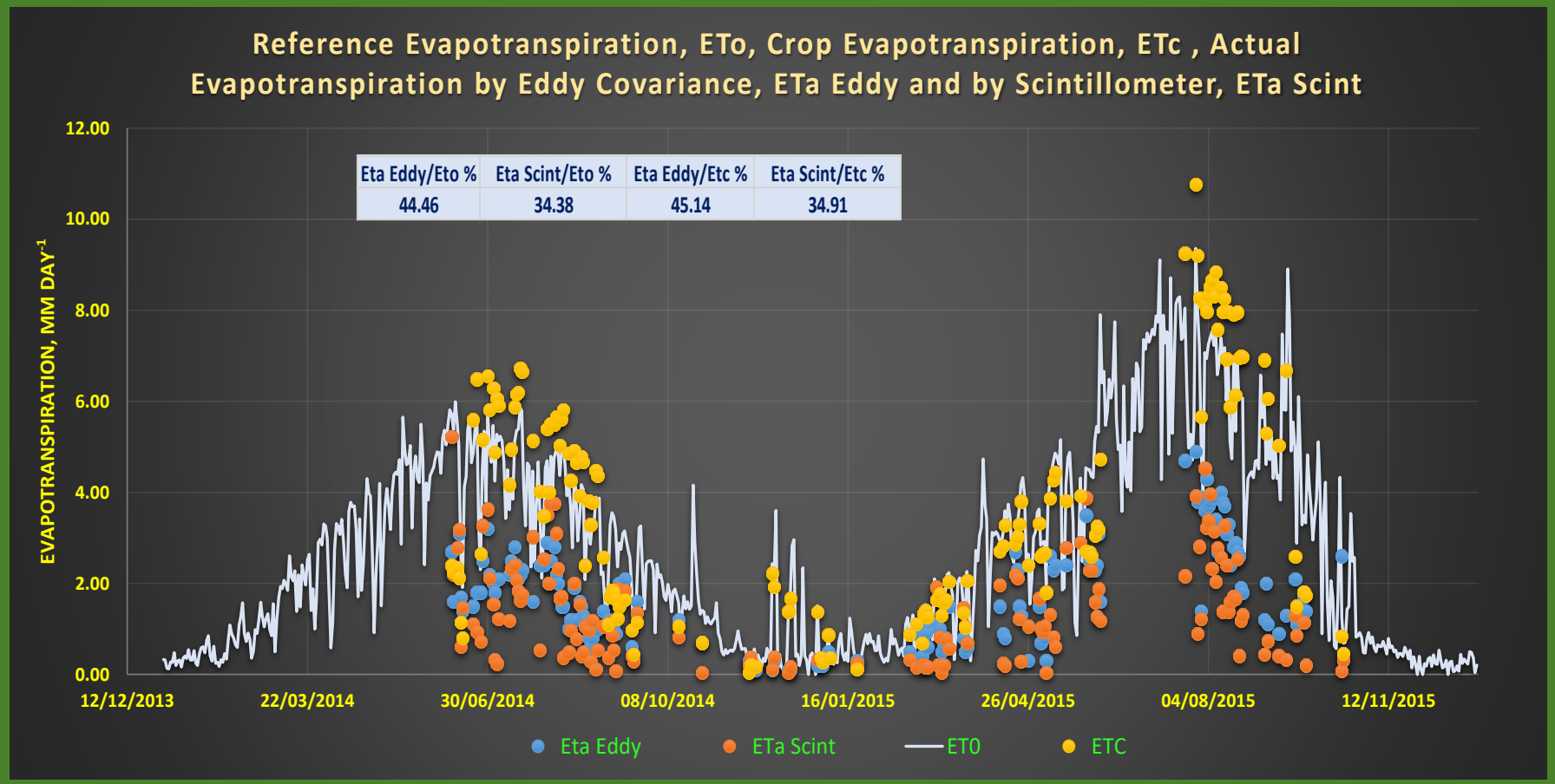
Field Instrumentation-accurate estimation of crop water requirement

COSMOS

Scintillometer

Eddy Covariance



Comparison between actual evapotranspiration measured by Eddy Covariance and Scintillometer, reference evapotranspiration estimated from Penman-Monteith equation and crop evapotranspiration calculated from ETo and the weighted mean of the crop coefficient Kc.

COSMOS soil moisture sensors, “Area based”

Large scale: 300-700 m radius of sensitivity

Non-invasive, completely passive

Uses background fast neutrons generated by Cosmic rays, which are scattered (slowed) by H atoms.

Gives more representative soil moisture based on area not on a single point. More accurate SMD to better estimate irrigation water requirement.

http://cosmos.ceh.ac.uk/data

CEH Intranet - Welcome — CE... | COSMOS-UK | cosmos.ceh.ac.uk

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Google Suggested Sites (2) Yahoo! UK & Ireland ragabpersonal - Yahoo! M... Environment Agency - W... Web Slice Gallery

Data

Home

Warning: data currently displayed is provisional only, and has not yet undergone quality assurance

- Layers
- Legend
- Site Details
- COSMOS-UK Soil Moisture or Neutron Counts
- Precipitation
- Air Temperature
- Help

This map shows active and probable sites of the COSMOS-UK Project.

Click on an active station in the map or in the table below to retrieve additional information and measurements.

You can turn on/off different backdrop maps in the Layers panel. Drag the Opacity handle to adjust opacity of the backdrop layers.

To find out what different colours and symbols in your map mean, switch to the Legend panel.

CEH | CEH, NRFA, Ordnance Survey

Site name	Land cover	Soil type	Altitude	Start date	Calib.

http://cosmos.ceh.ac.uk/

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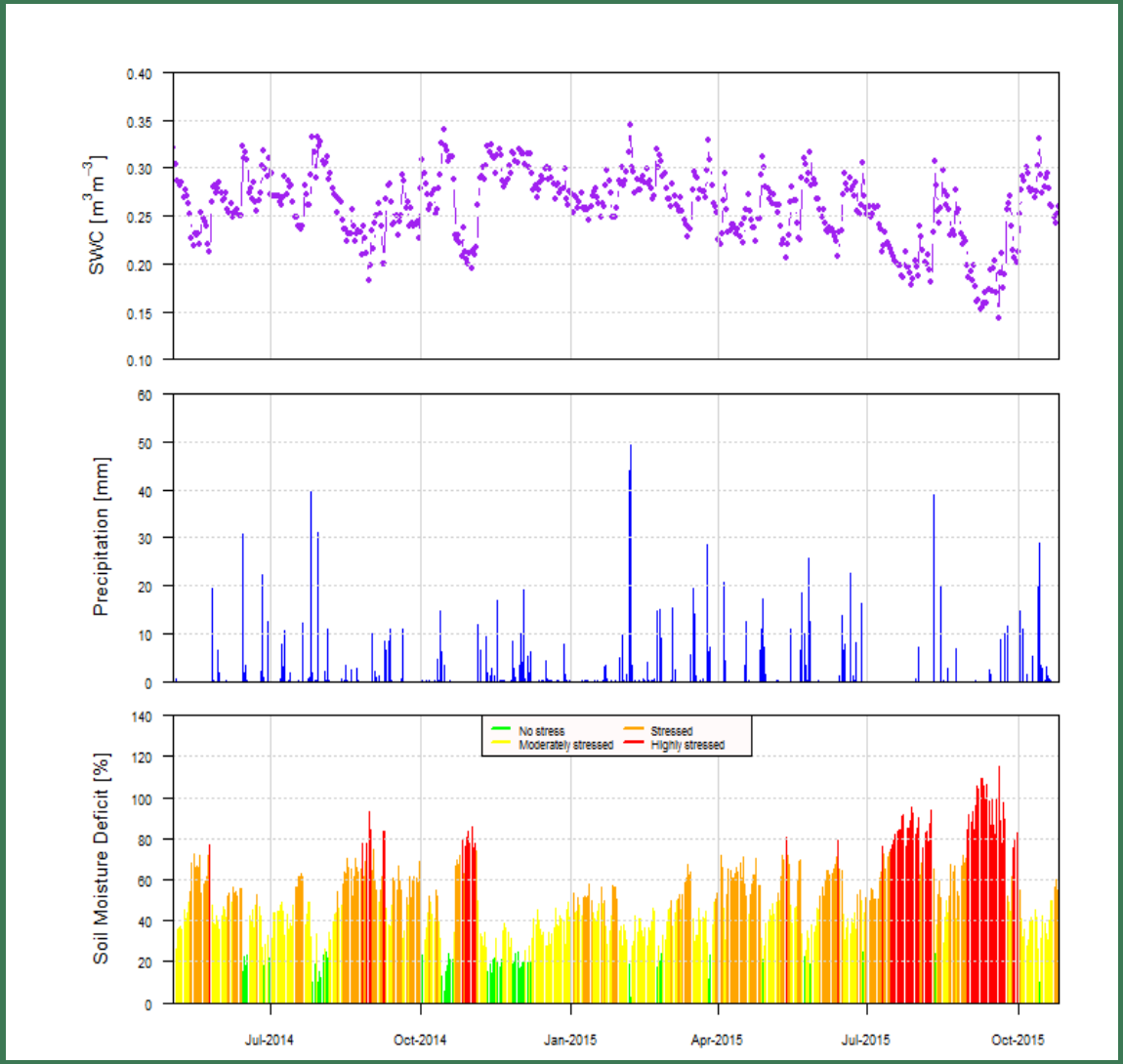

COSMOS soil moisture

Water content adjusted for biomass for 60 cm effective depth as verified and tested by field measurements.

ICID Next Events

The 5th African Regional Conference on Irrigation and Drainage & the 72nd International Executive Council: Theme - Sustainable Management of Irrigation for an Improved Resilience of Agriculture in Africa, Marrakesh , Morocco, November 24-30, 2021.

The 24th International Congress on Irrigation and Drainage and 73rd IEC Meeting, 3-10 October 2022, Adelaide, Australia. Congress Theme: Innovation and Research in Agricultural Water Management to Achieve Sustainable Development Goals.

Thank You!

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