



EIA Autumn Irrigation Forum

24 November 2023

**TOGETHER FOR SUSTAINABLE
IRRIGATION**

THE HOUSEKEEPING RULES FOR A SMOOTH FORUM

- The event is recorded and will be shared
- Please present your full name and your organisation properly
- Please mute your microphones while you not participating
- Please use the chat box for questions and comments
- If you can, turn on your camera on so we can see each other

THE HOUSEKEEPING RULES EIA CODE OF CONDUCT

- EIA believes it is important that its activities are at all times carried out in accordance with the applicable law, especially competition law.
- EIA believes that business shall be conducted in an atmosphere of free competition, i.e. based on price and quality.
- The Code of Conduct aims at providing clear rules to EIA's members, thus reducing the risk of improper conduct and consequently of fines being imposed.
- This Code of Conduct shall be binding on all members as well as all other participants when taking part in EIA activities.

Agenda for this forum

14:00 -14:20	Opening Introduction The EU taxonomy for sustainable activities	Moshi Berenstein/ EIA President Bruno Molle / EIA Executive Advisor
14:20 -14:30	Welcome & introduction of New Members	Fleur Martin/ EIA Communication Officer
14:30 -15:00	Guest speaker “Water use efficiency of Irrigation Systems”	Claire Serra Wittling, Inrae
15:00 -15:30	Innovation and Technology session « When and How much to water? New tools for multilevel probes data interpretation ».	Paolo Antini, Sentek
15:30 - 15:40	Open session for Q&A	



Paving the way to Sustainability for the Irrigation sector

Joining efforts in promoting sustainable irrigation and efficient water usage is crucial for the future of our industry
Moshy Berenstein, President of EIA

Sustainability in the Irrigation Sector



- Why addressing Sustainability?
 - No more doubts: The climate change is effective
 - The sector needs to align on Paris Agreement Objectives
 - Respecting the UN-SDG - <https://sdgs.un.org/goals>
- What are the references?
 - Certifications?
 - European Taxonomy - <https://finance.ec.europa.eu/sustainable-finance>
 - Classification of economic activities according to their impact on 6 objectives
 - Climate objectives: Mitigation, Adaptation
 - Environmental objectives: Water resources, Pollution, Circular economy, Biodiversity
 - Obligation of CSRD: Corporate Sustainability Report Disclosure
 - EIA launched a project to evaluate how to address this new policy in 2023



Leveraging EU Taxonomy: challenge and goal

PROJECT CHALLENGE

The irrigation sector plays a central role in the sustainable transition of the markets it serves. Despite this, today **the irrigation sector is only partially included in the EU Taxonomy**.

This marginal and unrepresentative inclusion of the irrigation sector and of its actual sustainability may constitute a **relevant limitation for companies in competing on the market and, above all, in accessing capital made available by Sustainable Finance today and in the coming years**.

PROJECT GOAL

The project, designed to have both a technical and a strategic dimension for the future development of the sector, will allow EIA and its member companies to:

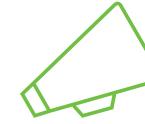


identify the key messages for a **structured communication and advocacy** held by the Association towards Institutions and other stakeholder categories;

develop a **future-proof process guideline for the EU Taxonomy application**, to the benefit of all EIA's companies that, beyond regulatory requirements, will be interested in measuring themselves against the Regulation.

The EC opened the opportunity to amend existing Taxonomy or propose new domains not yet addressed – Dec 15th
[Link : EU Taxonomy Stakeholder Request Mechanism](#)

The main project phases and expected results



1. IRRIGATION vs TAXONOMY: THE STATE OF THE ART

Measure to what extent the economic activities of EIA's companies are eligible to the current EU Taxonomy and how challenging meeting the relative technical screening criteria is.

May '23 – June '23

2. SUSTAINABLE IRRIGATION: ACTIVITIES AND CRITERIA

With the support of the Working Group and the Advisory Board, we will identify the activities and technical criteria that, according to the EIA, will be necessary to define sustainable irrigation.

July '23 – October '23

3. VOICE OF THE INDUSTRY: POSITION & ADVOCACY PAPER

Elaborate a Paper synthesizing the key aspects between the EU Taxonomy and irrigation industry. To serve the EIA for the long-term both internally and externally in advocacy terms.

September '23 – December '23

APPLICATION OF THE TAXONOMY: ACTION ON INDIVIDUAL COMPANIES

Individual application of the EU Taxonomy to all the member companies that, voluntarily or in response to regulatory requirements, are interested in applying the Regulation to seize the derived opportunities.

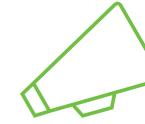
For the future

Economic Activities in the Sector of Irrigation

- Manufacturing and/or distribution of irrigation systems and components
 - 1. pumping systems for irrigation
 - 2. equipment for water storage, treatment, and filtration
 - 3. main line/tubing components for irrigation systems and their fittings
 - 4. hydrants and valves for irrigation systems
 - 5. water application systems and technologies in irrigation
 - 6. fertilising machines for irrigation systems
 - 7. monitoring and management systems for irrigation systems
- Irrigation systems design, installation, and end of life
 - 8. Irrigation systems design
 - 9. Irrigation systems installation and maintenance
 - 10. Promotion and/or distribution of circular solutions and services for irrigation components end of life
- Consulting, training and communication
 - 11. Consulting services on irrigation management
 - 12. Professional training on irrigation systems and water management
 - 13. Media communication on sustainable irrigation
- Technical and scientific research on irrigation
 - 14. Technical and scientific research for sustainable irrigation systems



The main project phases and expected results



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For the future

3 key priorities guiding our project on EU Taxonomy



Seizing a significant opportunity for the competitiveness of the sector and its companies

The goal is to achieve the inclusion of the irrigation industry within the tool that investors and Member States use to integrate sustainability into decision-making processes.

A failure to recognize the sector's sustainability profile can be a major constraint to future business growth.



The true essence of products and their role in the sustainability transition

Irrigation is more than only water supply: the Position Paper will seek to change this perception of the irrigation industry by highlighting the strategic role of its products in the sustainability transition of the agri-irrigation sector and landscape management.



Creating a common vocabulary for the industry, finance and policymakers

The inclusion of the sector within the European Taxonomy will be the opportunity to define a common ground to describe the irrigation industry and to measure its sustainability profile, useful for the dialogue both within the sector but also with investors and regulators.

See you in December...



The image shows the front cover of a document. At the top left is the logo for the European Irrigation Association (EIA) with the text "Quality Irrigation Water Savings" and "EUROPEAN IRRIGATION ASSOCIATION". Below the logo, the text "WORKING GROUP SUSTAINABILITY" is visible. In the center, the title "SUSTAINABLE IRRIGATION" is prominently displayed above the subtitle "FOCUS ON THE FRAMEWORK OF THE EUROPEAN TAXONOMY". At the bottom left, the text "WORK IN PROGRESS" is written in a white box. On the right side, the words "POSITION PAPER" and "DRAFT" are printed vertically.

EIA will suggest a definition of Sustainability, activities and technical criteria necessary to define and measure sustainable irrigation.

DRAFT

*«**Sustainable irrigation** is the fair technology and practice for the increasingly optimized use of water, energy, fertilizers and other resources for agriculture, landscape and ornamentals so that the natural resources are not compromised, for the welfare needs of the present and future generations' prosperity.»*



Welcome new members

- We are very pleased to welcome 8 new members in the association since our latest forum, in March
- We now have 85 members

DVS Berechnung

Tübingen Germany



Plug&Rain®

...the modular Plug&Rain® system with pre-assembled modules.

The number of necessary individual parts is reduced and the irrigation system becomes clearer at all levels.



DVS Irrigation Planner

... a digital planning office for garden irrigation!

A free software with which you can plan your irrigation system step by step independently and individually for your garden.



Best advice

... all the information about irrigation in your garden free and transparent through planning manuals and catalogs.

In addition, we are available via e-mail support with well-founded expert advice.



Fast logistics

... fast delivery of your components and assemblies in just a few days - our logistics team will do everything to ensure that you receive your order by mail as quickly as possible.



DVS Berechnung - New products

Online Planning Software

DVS Beregnungsplaner

The software for easy irrigation planning, from drawing irrigated areas to bill of material.



Soil Moisture Sensor

Hardware + Software

The software visualizes the soil moisture and temperature values to the user. The user can use this information to control the irrigation.



GARDENA is the brand for residential gardeners



Realise Gardening Dreams

- ✓ The **sustainable** choice in the minds of passionate gardeners
- ✓ Premium **quality** for demanding consumers
- ✓ Driving **innovation** in the gardening market
- ✓ The **passionate** brand driving engagement with consumers and employees alike.

Residential gardening & irrigation fields



Focus is on efficient irrigation solutions



Eng. Hanan Itzkovitch B.Sc. (cum Laude) ,MBA

Senior Business Development Consultant



Hanan Itzkovitch
Business & Innovation Consultant



- ❖ Accomplished Business Development Consultant with 35+ years' experience in international Business Development, marketing and sales for industrial companies.
- ❖ Specialize in Irrigation, Water technologies, Precision Agriculture and Environment sectors.
- ❖ Vast experience in European, the USA, Australia and South East Asia markets.
- ❖ Specialize in Startups and introducing them to large scale companies and to the market.
- ❖ An EU business Coach assisting companies to receive grants from the EU (EIC accelerator, Bi - lateral programs etc.

- ◆ EU innovation PROGRAMS and EIC accelerator coach
- ◆ International Business Development ◆ Business & Strategic Planning
- ◆ Market Penetration ◆ Strategic Alliances ◆ Cross-Functional Leadership
- ◆ Market Expansion ◆ Entrepreneurship & Startups ◆ Project & Sales Management



<https://www.linkedin.com/in/hanan-itzkovitch-33a10915/>

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Dream Big – Work Hard

hanan.consulting1@gmail.com

IDBD sas is an independant irrigation consultant

This engineering company provides services in the following areas.

Audit

Design and site supervision of irrigation systems

Education.

WATER MANAGEMENT

IDBD provides these services in french english and spanish.

The company is run by 2 individuals :

Felipe Mendieta is a civil engineer major in hydrology, urban water works, irrigation



Elie Desrues is a long time expert in turf irrigation: DISTRIBUTION design, education and CEN standardization



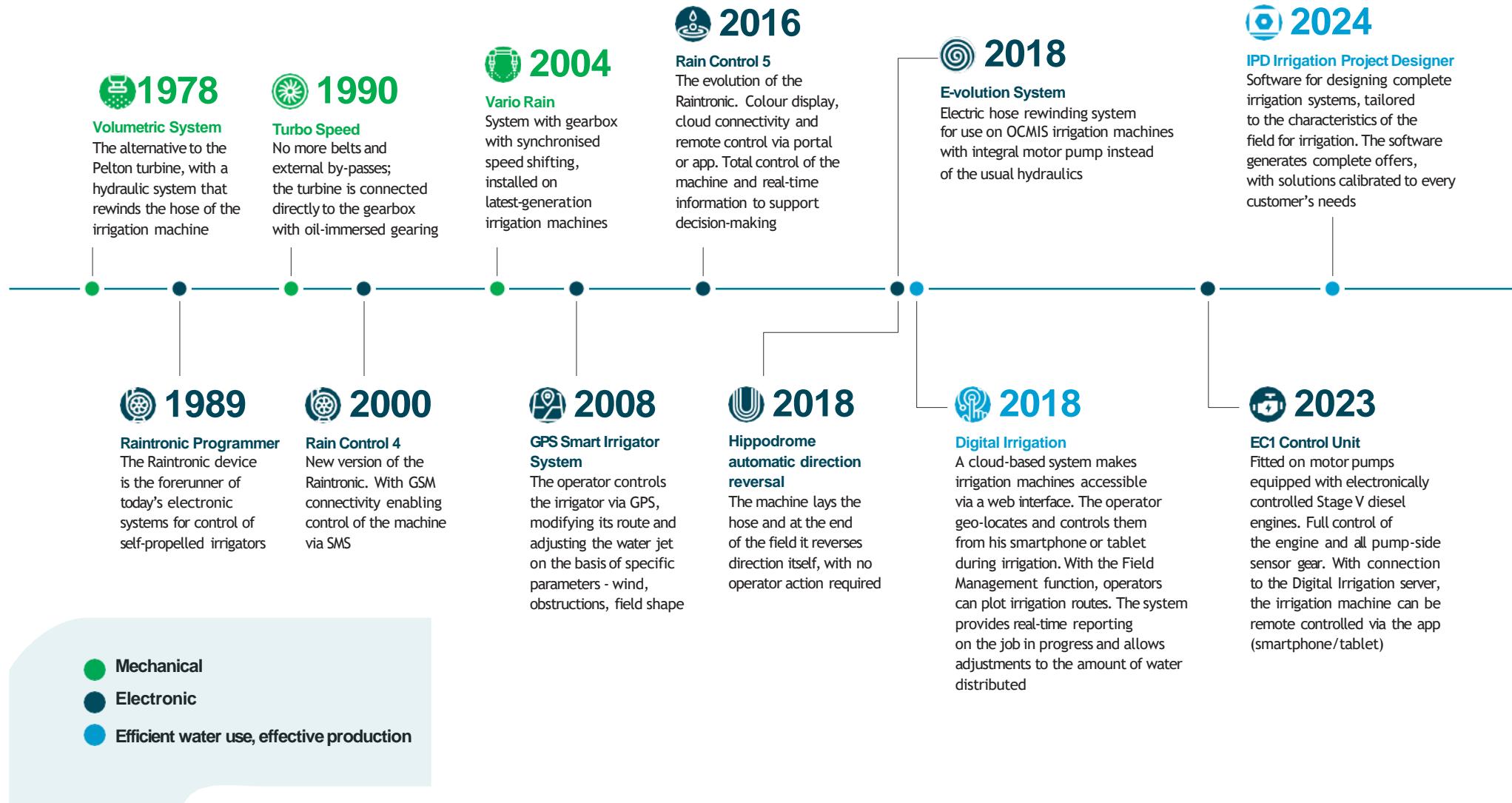
IDBD has accepted to be part of the EIA Working Group 4 and is also willing to participate in the WG5 and WG2





**WHY IT'S BETTER
TO WORK
TOGETHER**

A STORY OF INNOVATION in the irrigation sector



PRODUCTION AND SALES facility

3
production facilities

90+
mln Euros of turnover

250+
employees

350+
Dealers worldwide

96+
Countries covered by our sales network

Our market TODAY

3200+
hose reels sold per year
OUTLOOK FOR 2024 +11%

250
Pivot systems per year
OUTLOOK FOR 2024 +49%

850
motor pumps per year
OUTLOOK FOR 2024 +12%

Research & DEVELOPMENT

5%
of annual turnover reinvested
in Research & Development

We invest
for a better
future for all.

Our VALUE PROPOSITION as producers



RESEARCH AND DEVELOPMENT

We focus on the engineering and design of innovative irrigation systems, constantly working to develop technologies that improve their performance.



PROCUREMENT

The OCMIS procurement system is extremely efficient, a powerful motor silently generating value in every phase of the chain.



PRODUCTION AND LOGISTICS

We manage every phase with precision, guaranteeing optimised times, constant quality and responsiveness to the market's demands. A new vertical warehouse ensures optimised management of resources and faster, more reliable shipping to our customers.



DISTRIBUTION

OCMIS irrigation systems are distributed globally through a vast network of distributors.



INSTALLATION AND AFTER-SALES

We offer customer relationship management, technical consulting, a parts and accessories portal and after-sales service.



LEADER IN IRRIGATION

 www.ocmis-irrigazione.it

Follow us on





Precision Irrigation

23 24.11.2023

PIPELIFE 
always part of your life

Pipelife: Company Profile

PIPELIFE is a leading international manufacturer of sustainable piping solutions that connect people and communities with water, energy and data.

- Headquarters: **Vienna, Austria**
- R&D Center: **Einkhuizen, Netherlands**
- Irrigation Operations/Plants: **Istanbul / Nidge, Turkey, Botevgrad / Bulgaria**

Based in 24 countries with over 2,700 employees and exporting our solutions to countries around the world.



Pipelife: Drip Irrigation- Product variety



FDL - Micro Thinwall applications

FDL - MIDI Medium and Thinwall applications

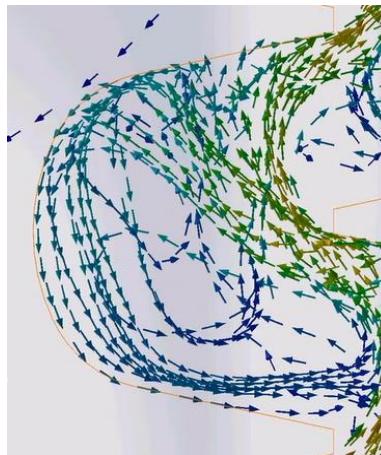
PDT - Premium Drip Tape Thinwall applications

FlatPC – Medium and Heavy wall applications

Sprinkler systems

Emphasize in:

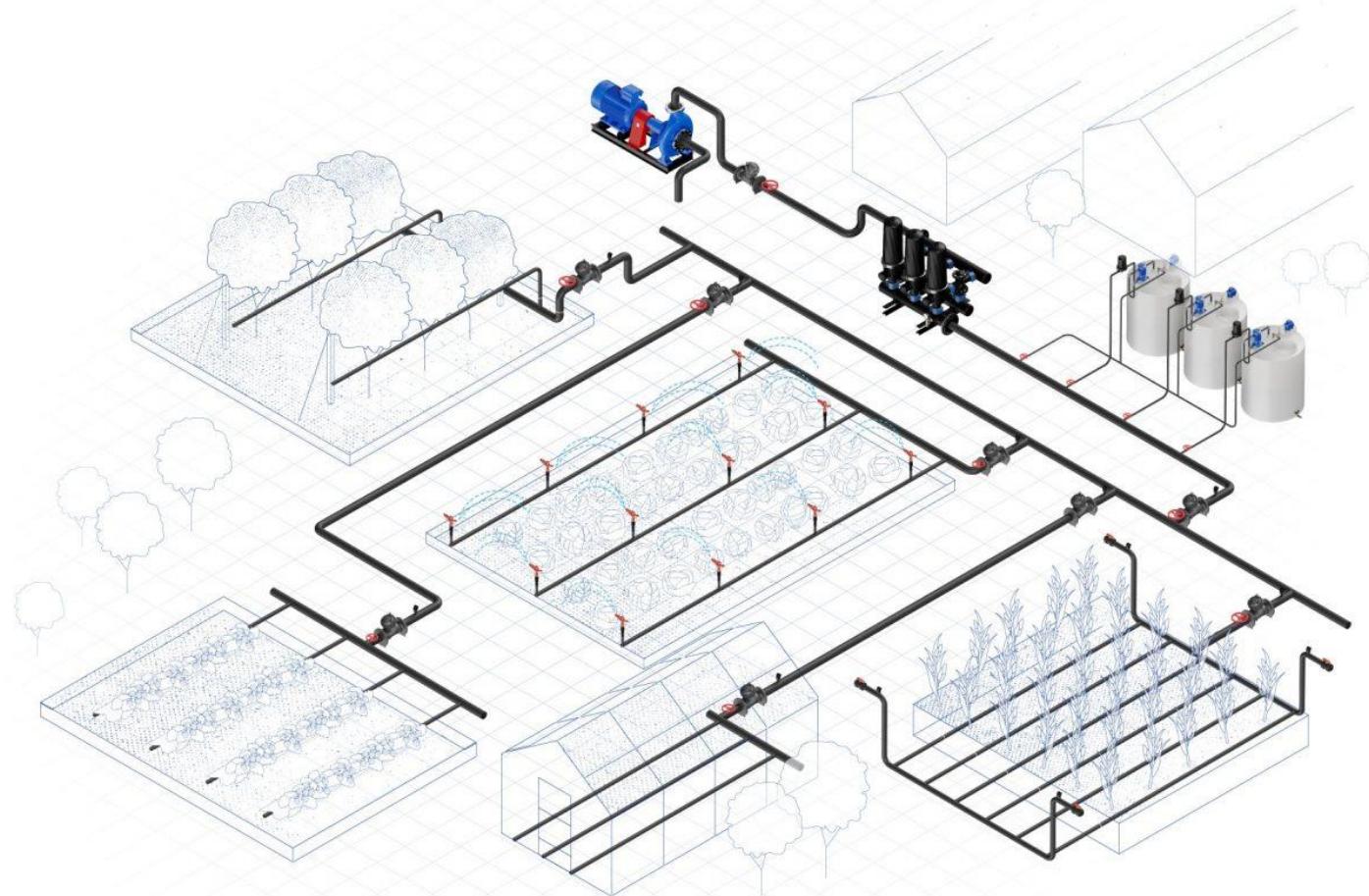
- Clogging resistance and durability
- Uniformity (<3%)
- Recyclability



Pipelife: One-stop irrigation solution

**ONE-STOP IRRIGATION
SOLUTIONS TAILEDRED
TO YOUR NEEDS**

- Drip irrigation
- Sprinkler
- Fittings
- Filters
- Fertigation
- Automation
- Pumps





We are a world brand in our sector



- **POELSAN** is the first company in Turkey that produced and marketed compression fittings for PE pipes at its own plant in 1994.
- Our products as compression fittings, clamps saddles, ball valves, drip irrigation pipes fittings and accessories can be used safely in the areas of agricultural irrigation, water networks, landscaping and greenhouses projects.



600+ Employees



67.880m²
Indoor Space



Export to 75
Countries



500+ Distributors



80 Injection
machines



33,000 Tons of annual
plastic processing
capacity

Products Groups



BLUE SERIES FITTINGS

INSTALLATION AREAS

- Urban Potable Water Networks
- Landscaping Systems
- Agricultural Irrigation
- Greenhouses



GREEN SERIES FITTINGS

INSTALLATION AREAS

- Landscaping Systems
- Agricultural Irrigation
- Greenhouses



CLAMP SADDLES

INSTALLATION AREAS

- Urban Potable Water Networks
- Landscaping Systems
- Agricultural Irrigation
- Greenhouses



AUTOMATIC IRRIGATION PRODUCTS

INSTALLATION AREAS

- Landscaping Systems
- Agricultural Irrigation
- Greenhouses



LAYFLAT FITTINGS

INSTALLATION AREAS

- Agricultural Irrigation Systems
- Drip Irrigation Systems
- Sprinkler Irrigation Systems
- Drainage Systems
- Open Field Irrigation Systems
- Mining Sector
- Construction Sector



BLUE SERIES BALL VALVES

INSTALLATION AREAS

- Landscaping Systems
- Agricultural Irrigation



GREEN SERIES BALL VALVES

INSTALLATION AREAS

- Landscaping Systems
- Agricultural Irrigation



VALVE BOXES

INSTALLATION AREAS

- Landscaping Systems
- Agricultural Irrigation
- Construction

Other Products Groups

INSTALLATION AREAS

- Landscaping Systems
- Agricultural Irrigation
- Greenhouses
- Flower and Vegetable Gardens
- Plantations
- Fruit Trees
- Garden Irrigations
- Pot Irrigations



Our Certificates and Documents



Loading..

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- + TS ISO 17885 Turkish Standards Compliance Certificate
- + TS EN ISO 9001: 2015 Quality Management System Certificate
- + TS EN ISO 14001: 2015 Environmental Management System Certificate
- + Utility Model Registration – Flexible Pipe Holders
- + KIWA Certificate
- + TS ISO 9261 Turkish Standards Certificate
- + New Blue Series – Design Registration Compliance Certificate
- + New Green Series – Design Registration Compliance Certificate

- + TS ISO 45001: 2018 Occupational Health and Safety System Certificate
- + TS ISO 9911 Valves Certificate of Conformity to Turkish Standards Criteria
- + TS 13716 Valve Boxes Certificate of Conformity to Turkish Standards
- + TS 13716 Valve Boxes Certificate of Conformity to Turkish Standards
- + POELSAN Trademark Registration Certificate
- + Clamp Saddles – Design Registration Certificate
- + New Blue Series – USA Design Registration Certificate
- + TSE Covid -19 Safe Production Certificate



Our Fair Participations



Nature is our priority



The protection and sustainability of our water resources is our priority.

- On average, 75% of the water resources in Turkey are used in agricultural activities. The rate of losses and leaks in water in Turkey is around 50%... • In order to prevent water loss in this area, it should be our priority to choose products that are more durable and take the first place in terms of impermeability.

**The plus of Poelsan is its leakproofness
Let's save our world's water together**



Presentation 2023



IRRIGATE PRECISELY

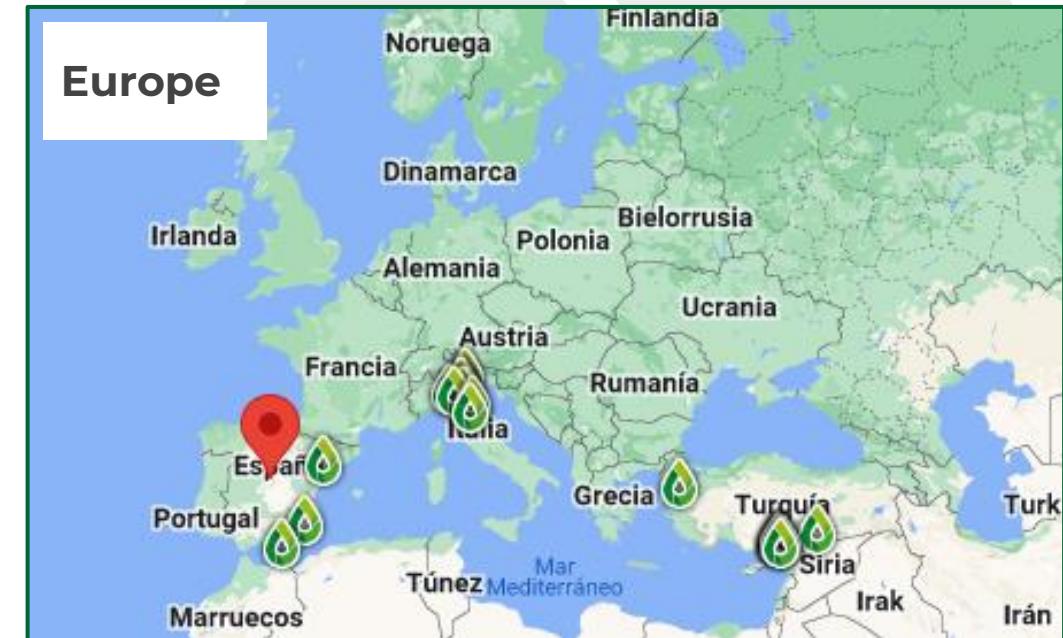
Cristian Duschner. Regional Manager West Europe
cduschner@wiseconn.com / +34 625467855





The company

- 💧 Founded 2006, in Chile.
- 💧 5 main offices in 5 countries
 - USA
 - Chile
 - Spain
 - Australia
- 💧 300k hectares / 12 countries





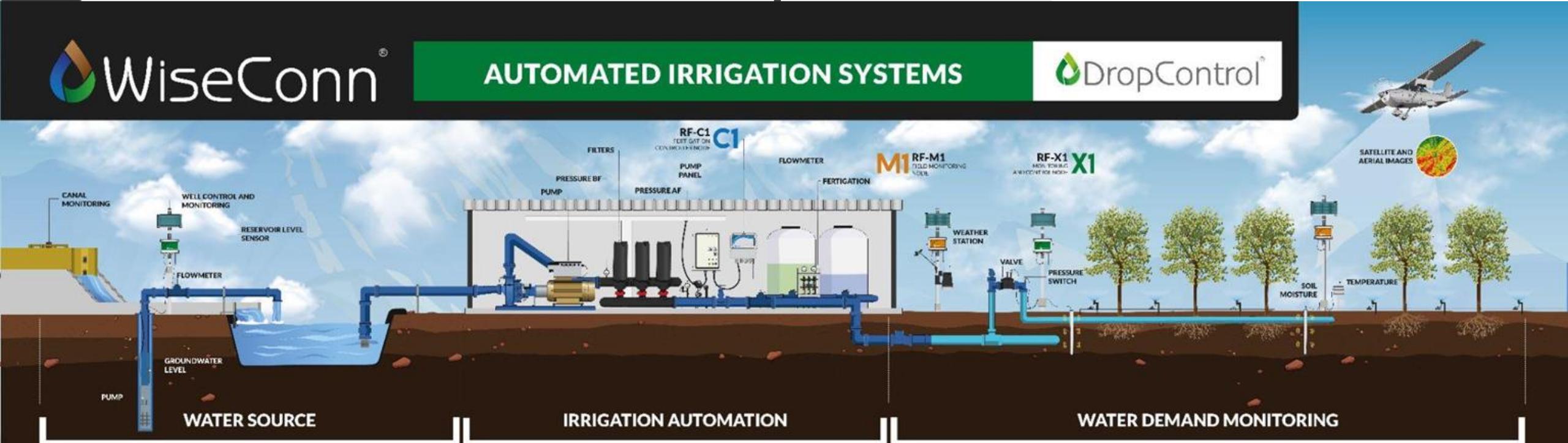
DropControl



WiseConn®

AUTOMATED IRRIGATION SYSTEMS

DropControl



WWW.WISECONN.COM



CONFIDENTIAL@2023 WiseConn®



THANK YOU

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Majed Sabbarini



AGRICULTURAL IRRIGATION | A Hunter Industries Company



University of Ljubljana Biotechnical faculty



[Swiss efficiency.]



Water use efficiency of irrigation systems

What water savings are possible?



ae

INRAe

Claire WITTLING
UMR G-EAU – Montpellier - FRANCE
claire.wittling@inrae.fr

 **G-EAU**
Gestion de l'Eau, Acteurs, Usages
Water matters

Water use efficiency of irrigation systems

What water savings are possible?

- 1. What is irrigation water use efficiency?**
- 2. How to save irrigation water?**
- 3. What irrigation water savings can be expected?**

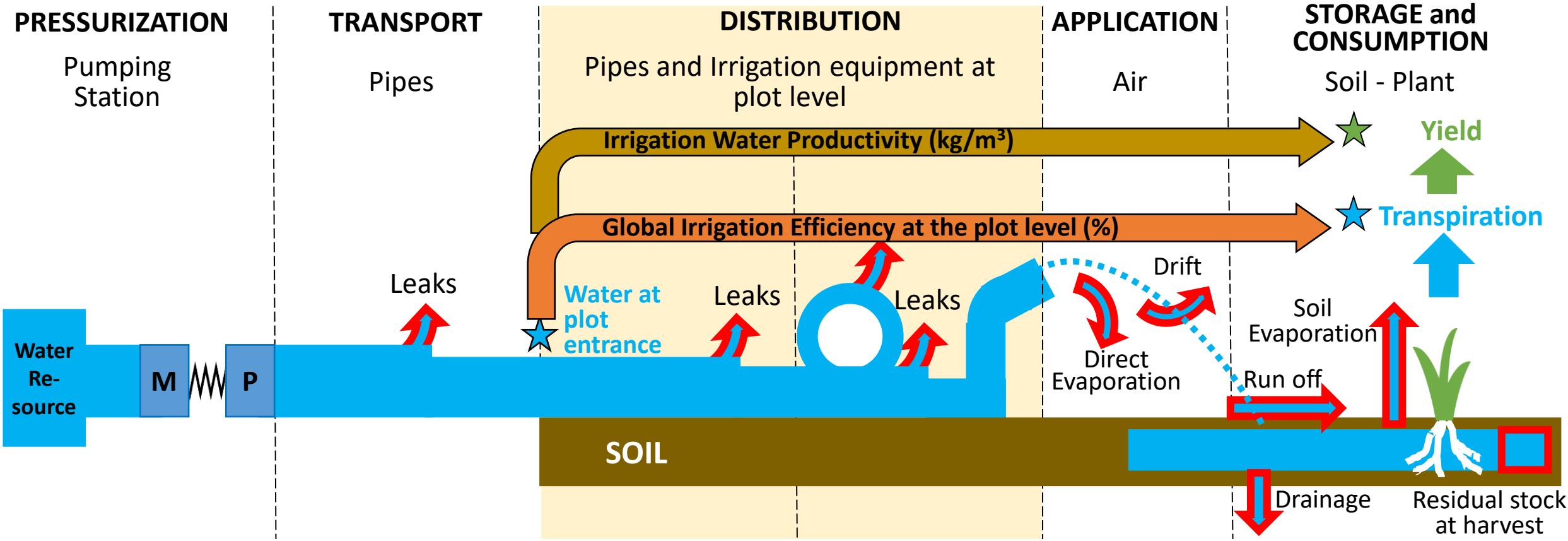


INRAE

Water use efficiency of irrigation systems

EIA WINTER IRRIGATION FORUM - 24/11/2023 – Claire WITTLING

1. What is irrigation water efficiency?



Global Irrigation Efficiency at plot level

$$EI_{glob} = \frac{\text{volume of water that really benefits to the crop}}{\text{volume at plot inlet}}$$

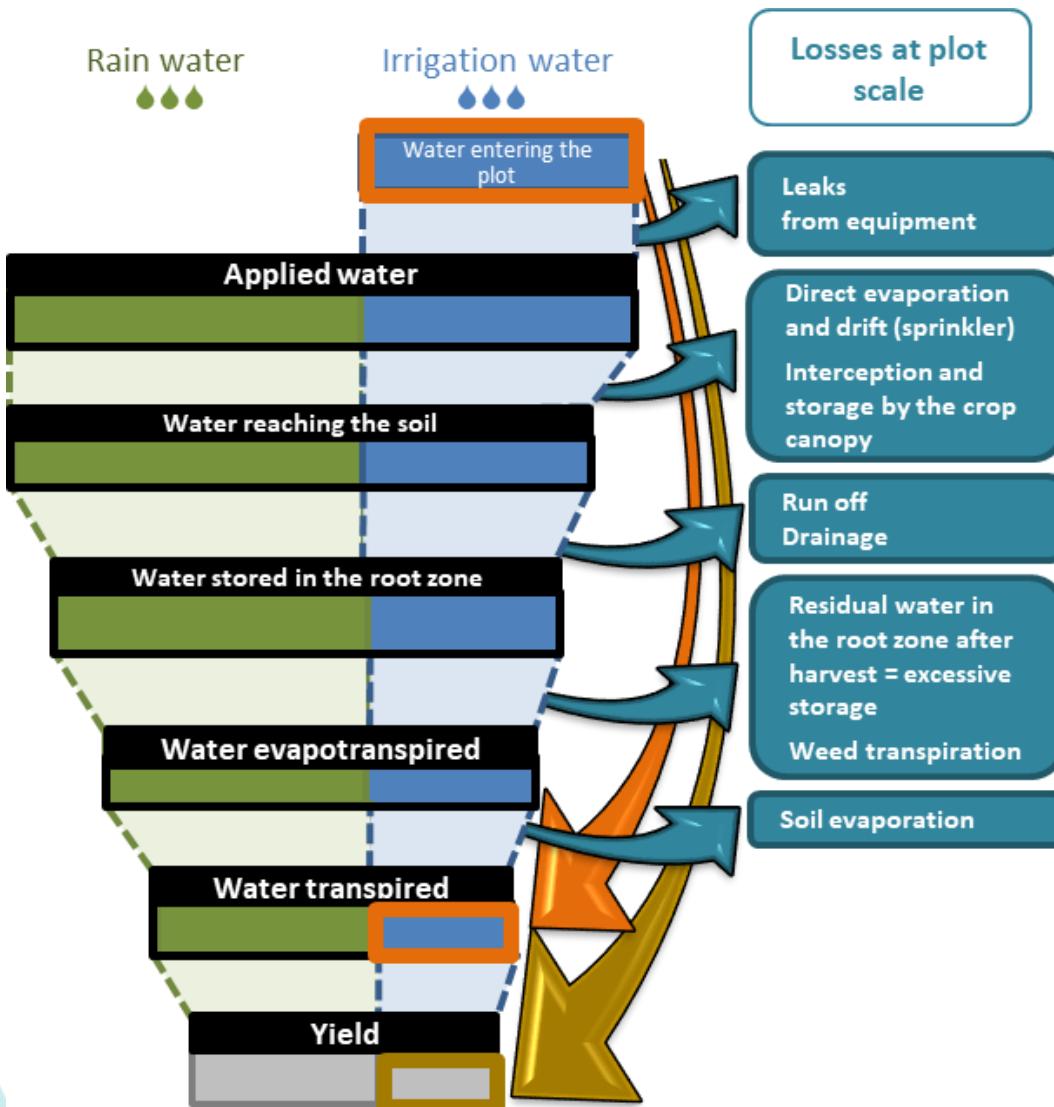
$$EI_{glob} = \frac{\text{Volume of irrigation water transpired}}{\text{Volume of irrigation water entering the plot}}$$

Irrigation Water Productivity at plot level

$$PEI = \frac{\text{Supplemental yield due to irrigation}}{\text{Volume of irrigation water entering the plot}}$$

1. What is irrigation water efficiency?

➤ Irrigation water circulation in the plot



Global Irrigation Efficiency = $\frac{\text{Irrigation water actually transpired}}{\text{Irrigation water entering the plot}}$

Irrigation Water Productivity = $\frac{\text{Supplemental yield due to irrigation}}{\text{Irrigation water entering the plot}}$

Improving efficiency
=

Reducing irrigation water losses
=

Saving water

2. How to save irrigation water?

2.1. Agronomic levers

2.2. Technological levers

- Irrigation equipment

2.3. Irrigation scheduling levers

- Information systems
- Scheduling tools



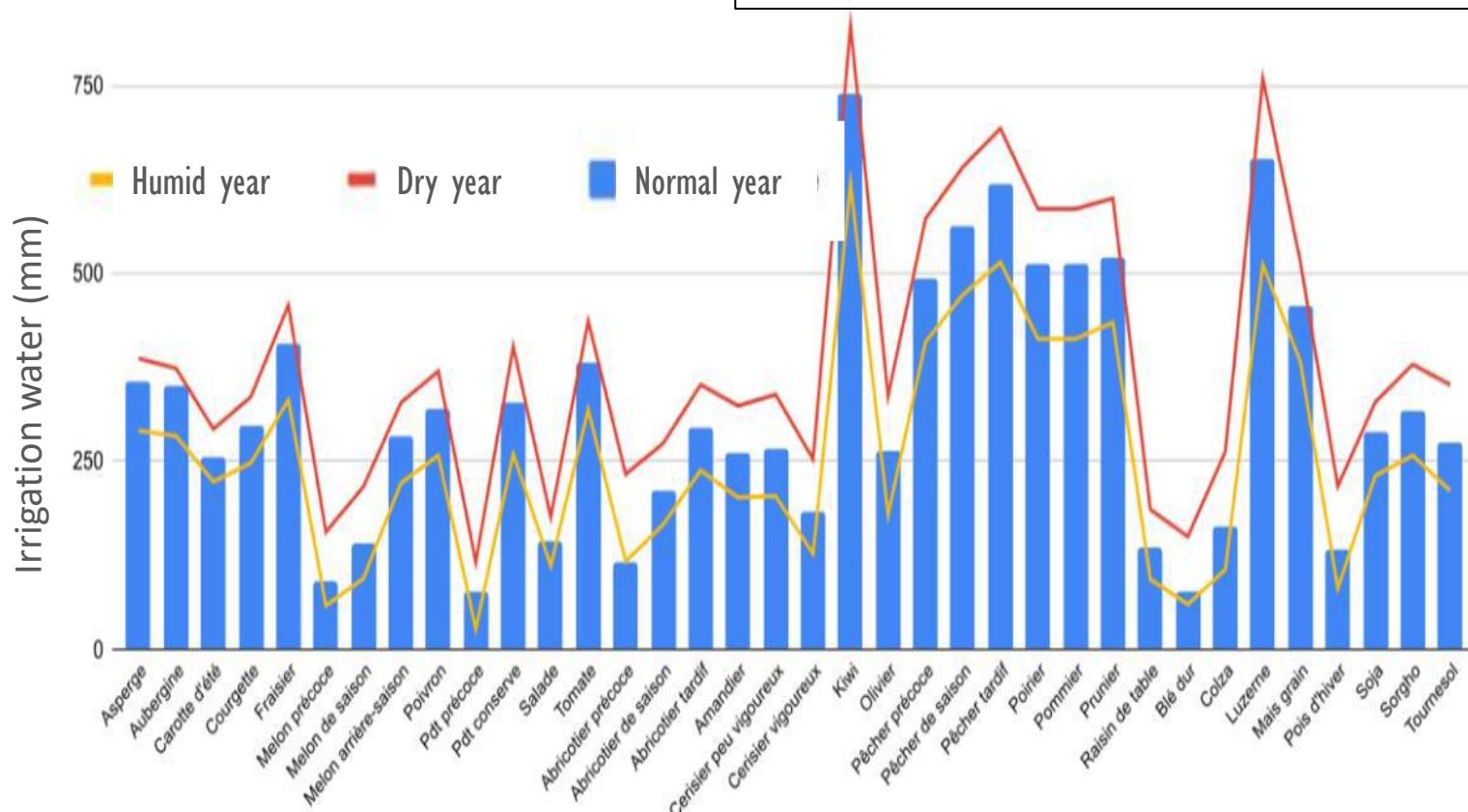
Presentation of
some examples

2. How to save irrigation water?

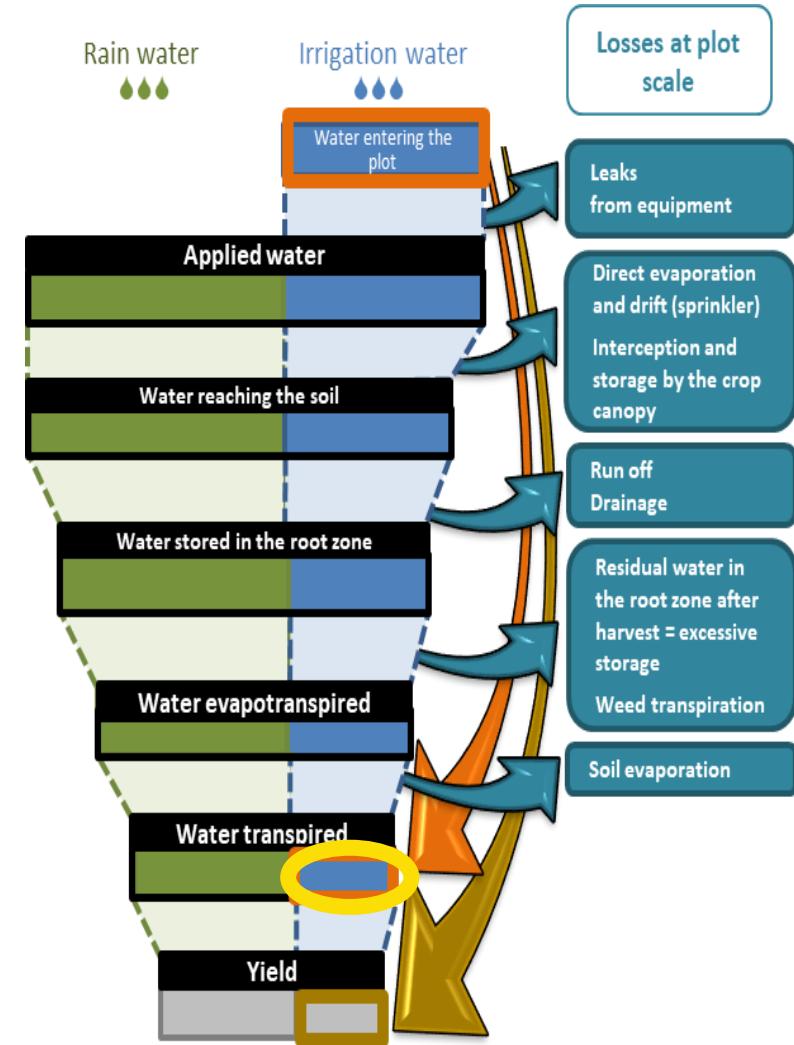
2.1. Agronomic levers

➤ Choosing species and varieties

- ⇒ Kiwifruit, alfalfa, peach, pear, apple, plum = high irrigation water requirement
- ⇒ Early varieties = lower water consumption
- **Irrigation requirements**
(≠ from efficiency improvement)



Irrigation water requirements in Alès region (Southern France) - 1998-2017 (Memento BRL, 2018)



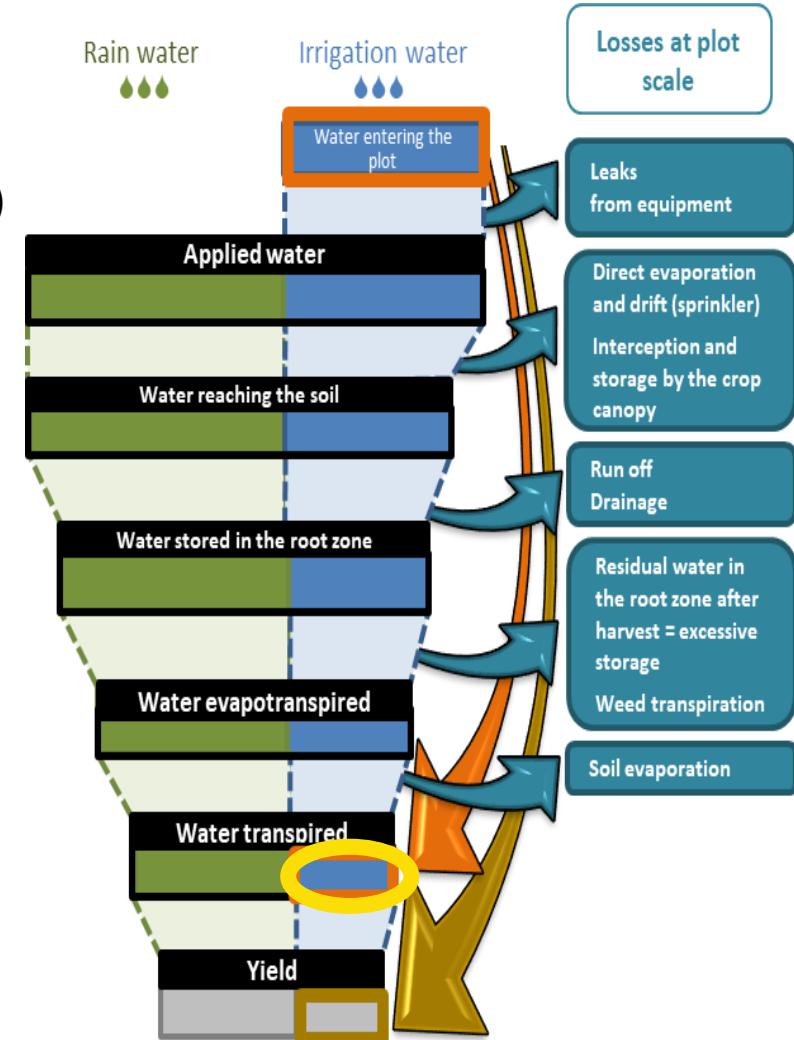
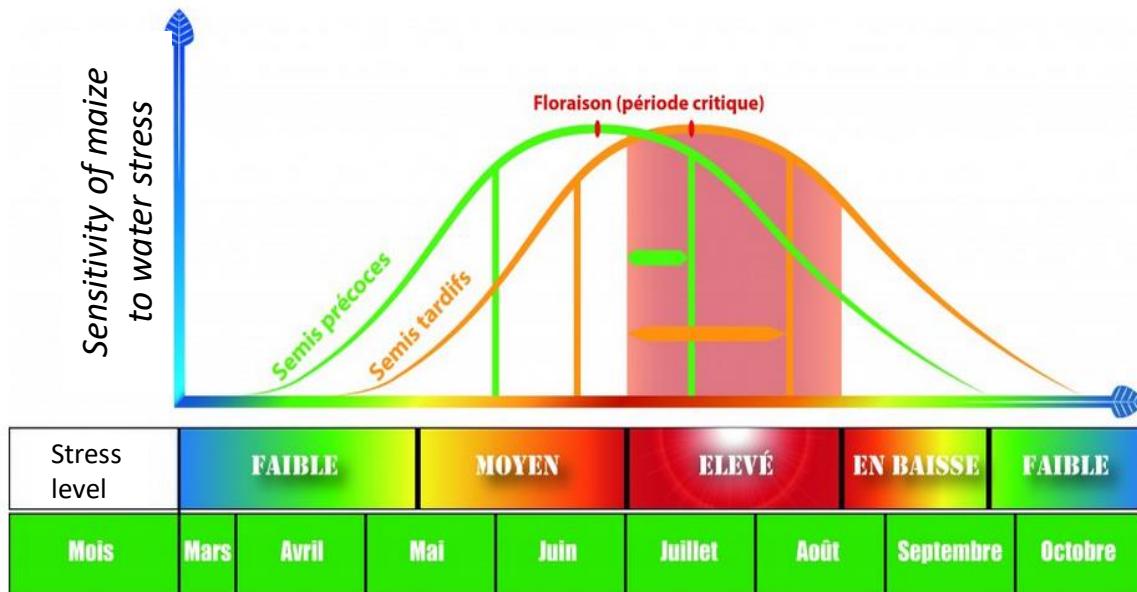
2. How to save irrigation water?

2.1. Agronomic levers

➤ Avoidance strategy

- = reducing vulnerability to water shortage, avoiding drought periods
- = shifting the phenological stages that are most sensitive to stress (e.g. flowering of maize)
- = choosing early sowing dates

⇒ **High water needs outside the drought period**



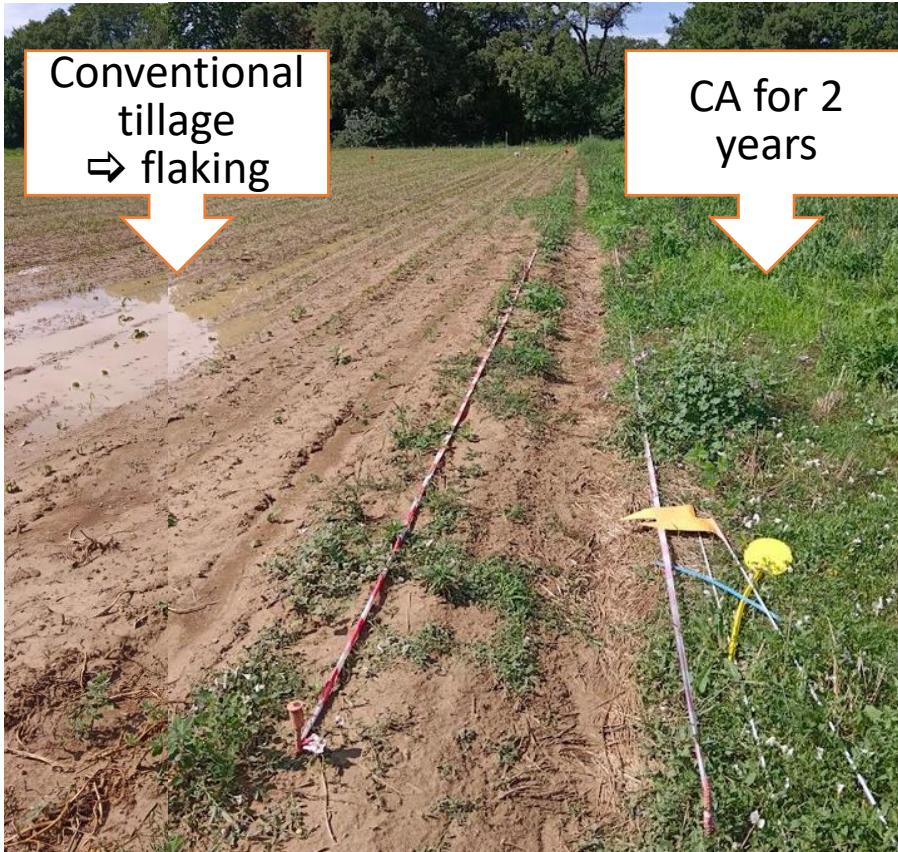
2. How to save irrigation water?

2.1. Agronomic levers

- Soil management : conservation agriculture (CA)
- ↗ infiltration = ↗ water volume penetrating the soil = ↘ run-off



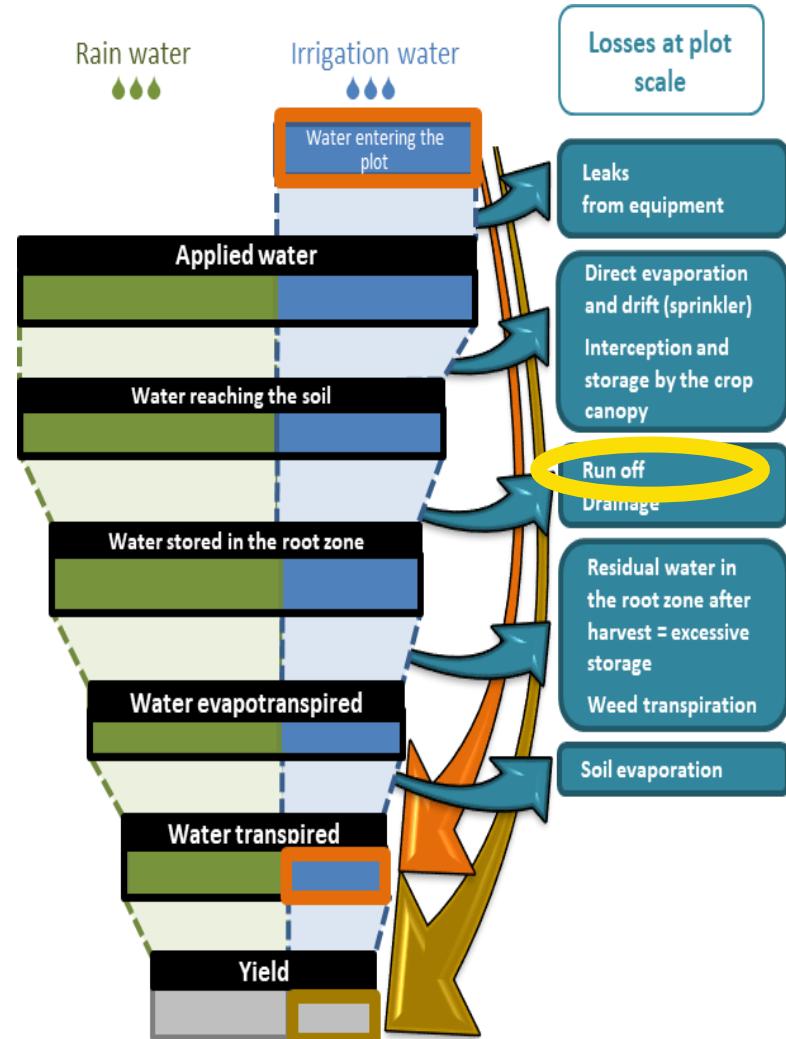
CA = No tillage
+ Permanent soil cover
(intermediate cover crops)
+ Long crop rotation



Conventional tillage
⇒ flaking

CA for 2 years

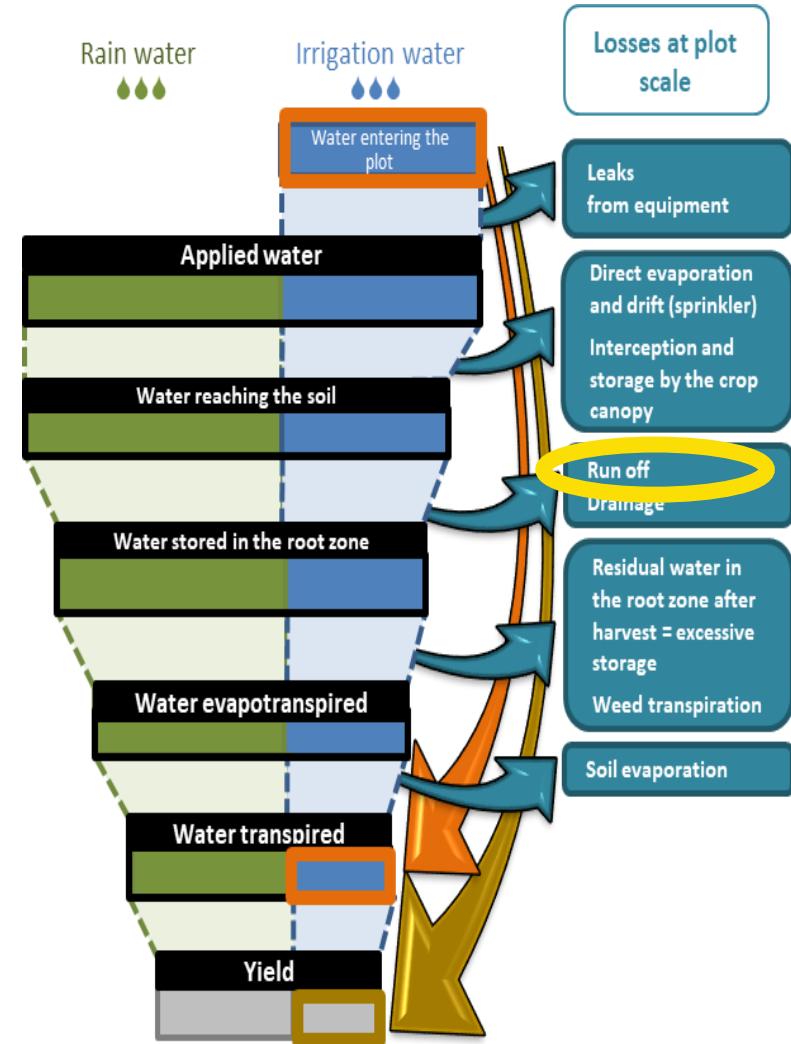
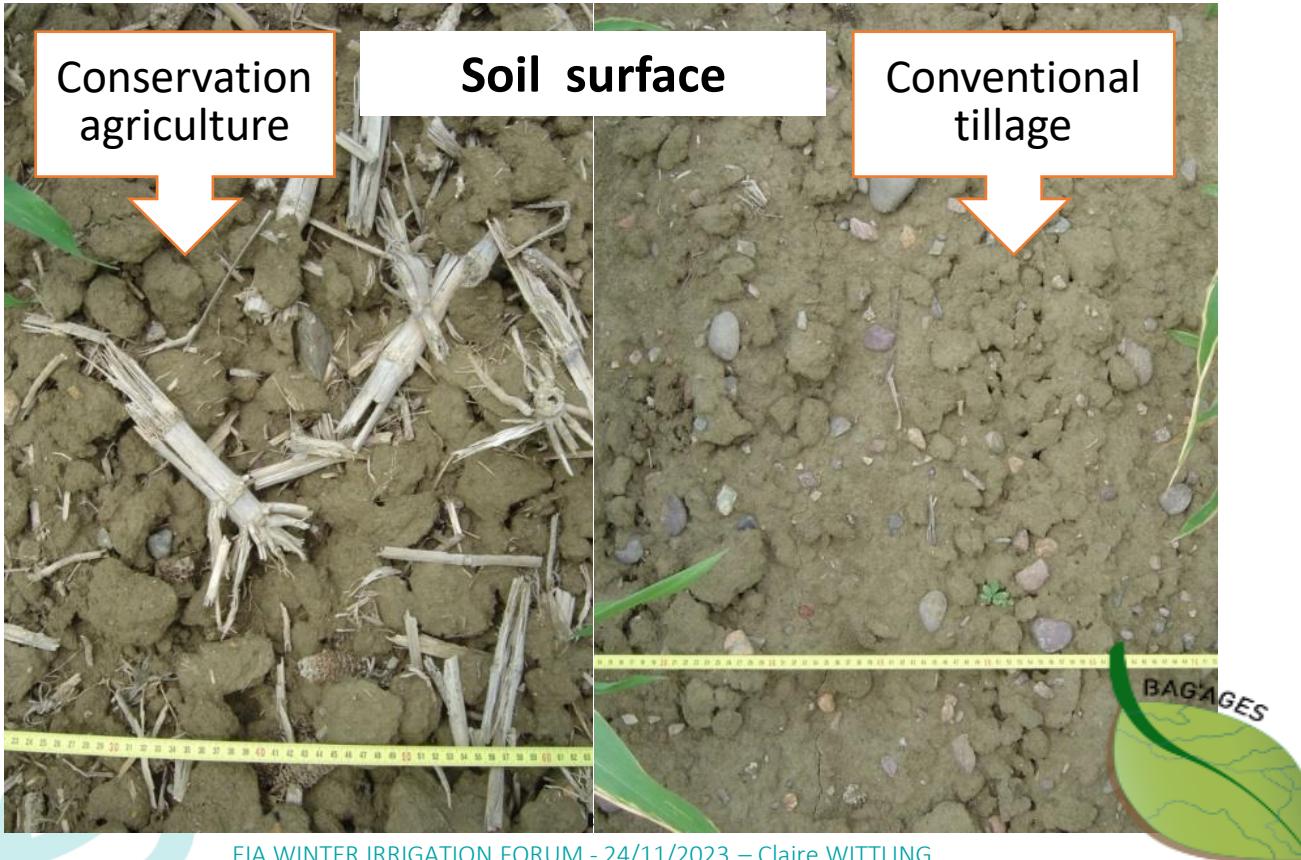
Lavalette-Montpellier. 22 June 2023. After a 28 mm-rainfall



2. How to save irrigation water?

2.1. Agronomic levers

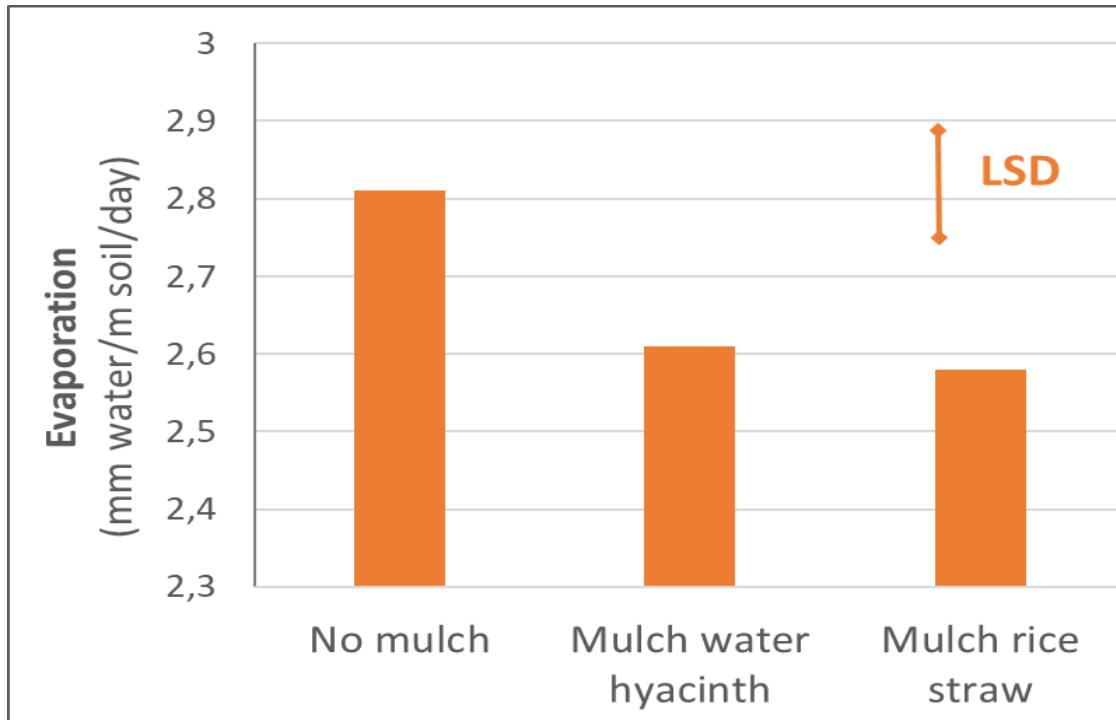
- Soil management : conservation agriculture (CA)
- ↗ soil roughness ⇔ ↗ infiltration ⇔ ↘ run off
- ↗ aggregate stability ⇔ ↘ soil sealing ⇔ ↗ infiltration ⇔ ↘ run off



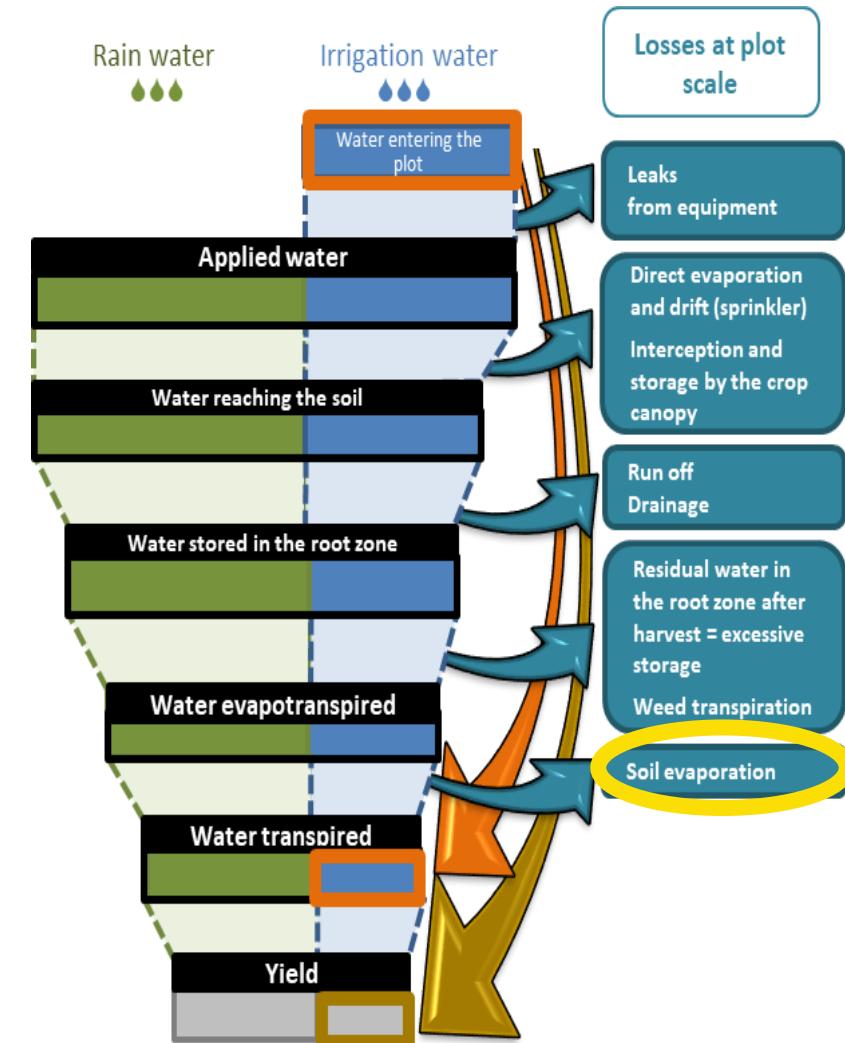
2. How to save irrigation water?

2.1. Agronomic levers

- Soil management : conservation agriculture (CA)
- Crop residues on soil surface (mulch effect)
 - ⇒ ↓ soil evaporation



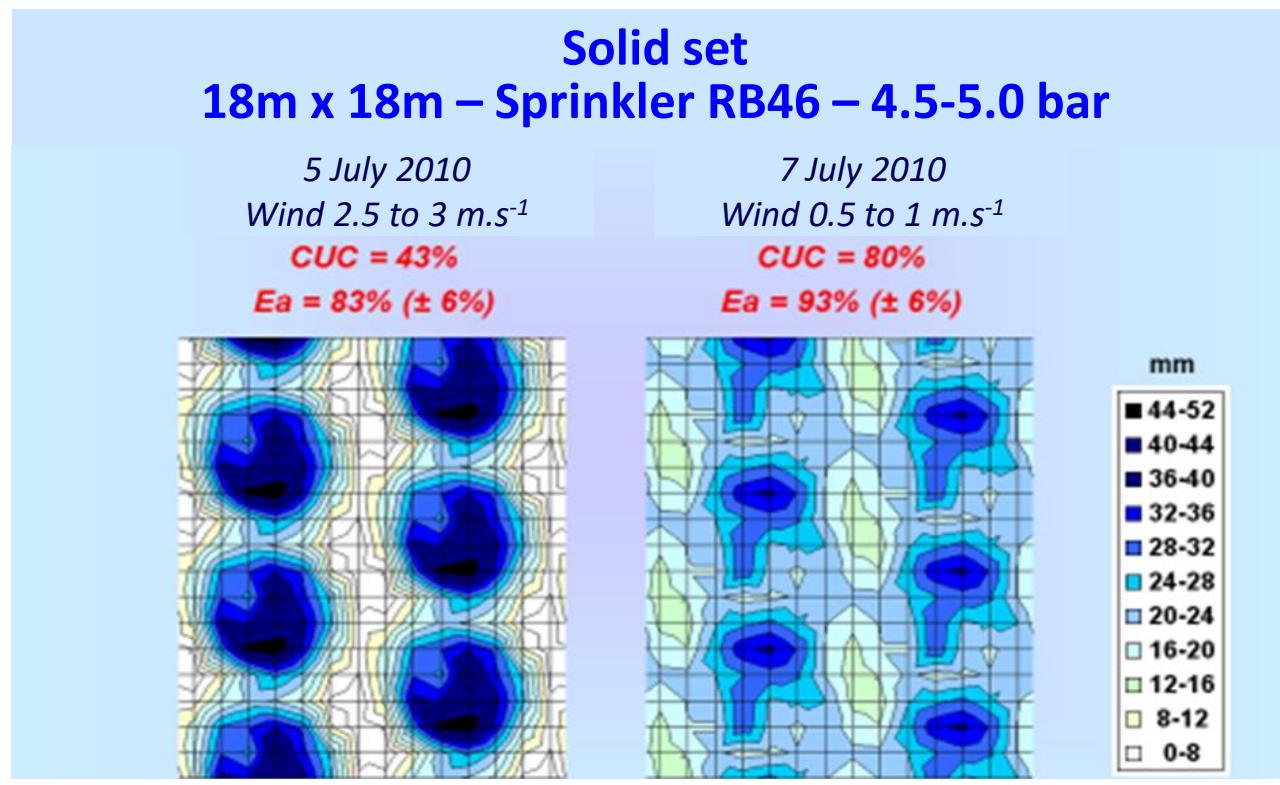
Influence of mulch on soil evaporation rate
(surface horizon, 0-15 cm). Sarkar et al (2007)



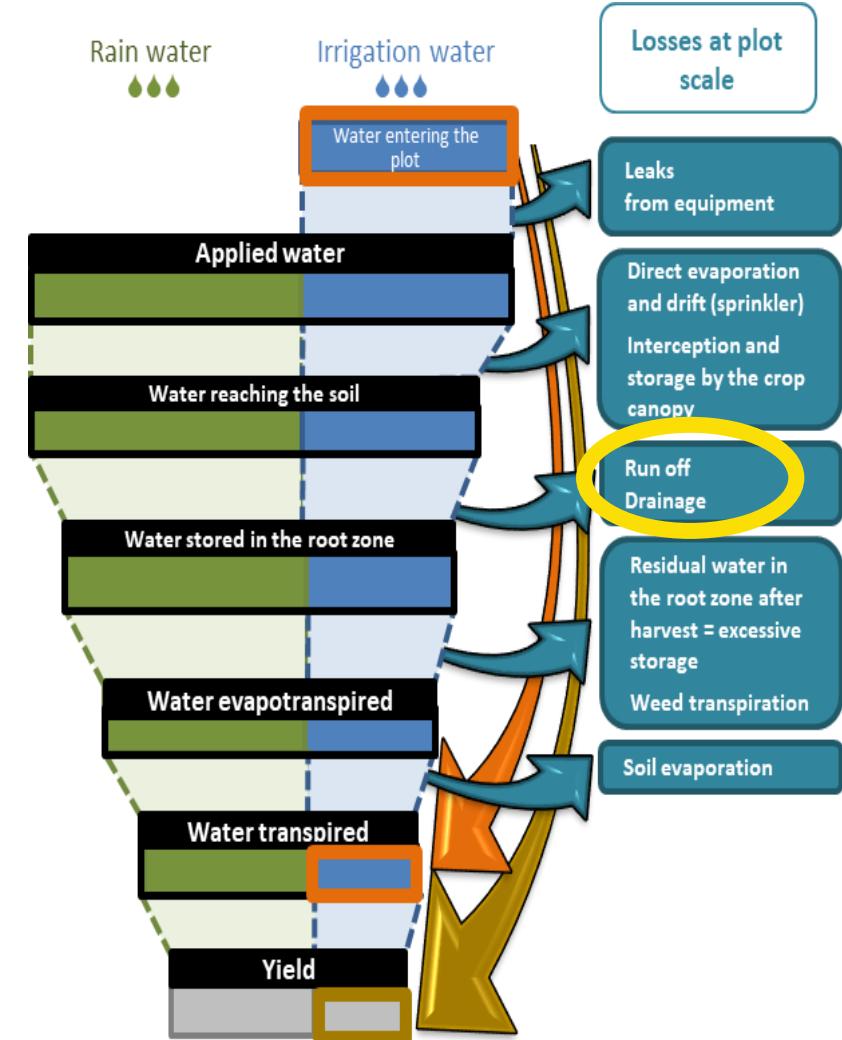
2. How to save irrigation water?

2.2. Technological levers (irrigation equipment)

- Improving application uniformity
- ↓ over- and under-irrigated zones in the plot
⇒ ↓ localized run-off and drainage losses



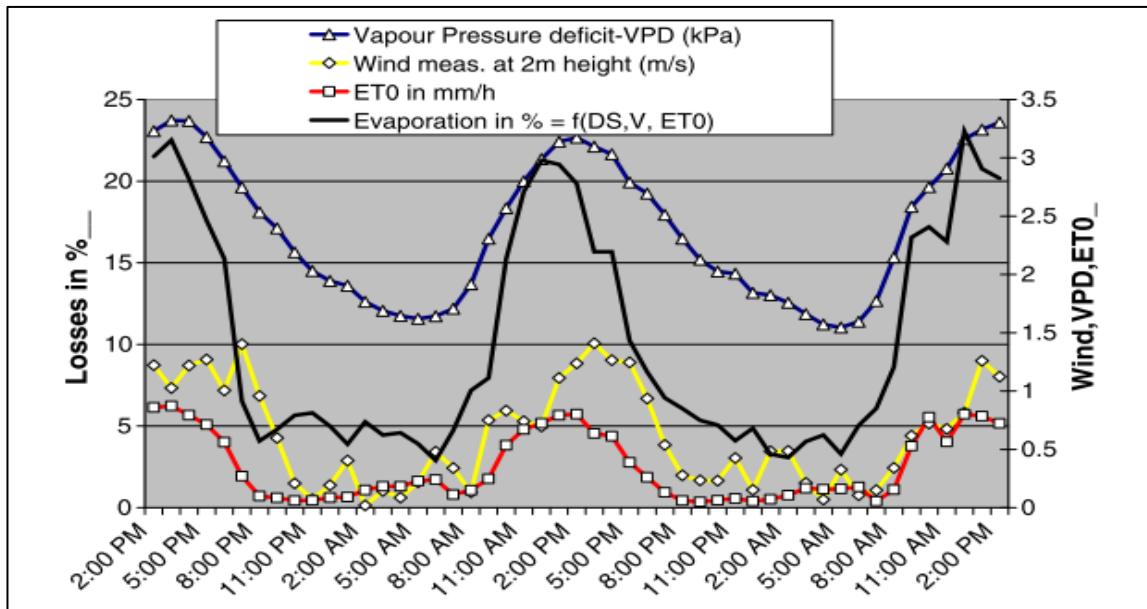
Wind influence on application uniformity with sprinkler irrigation (Christiansen uniformity coefficient CUC; application efficiency Ea). CASDAR project Eau Midi-Pyrénées (2007-2010)



2. How to save irrigation water?

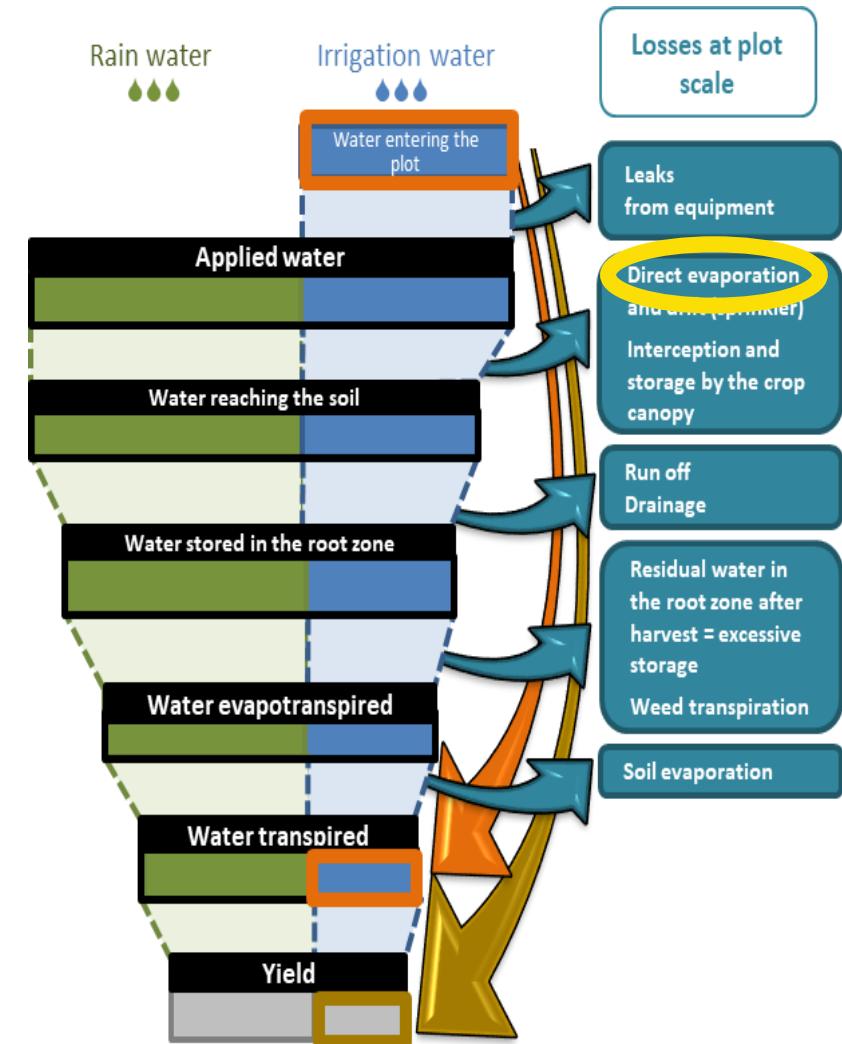
2.2. Technological levers (irrigation equipment)

- Choosing application time
- Direct evaporation losses with sprinkler irrigation



Evaporation losses on two summer days in 2005 in Southern France with a solid set system (3,5 bar) (Molle et al, 2012)

- ⇒ Losses occasionally > 20% ; losses over 24h < 9%
- ⇒ Avoid irrigating between 11 a.m. and 3 p.m. (high temperatures and radiation)

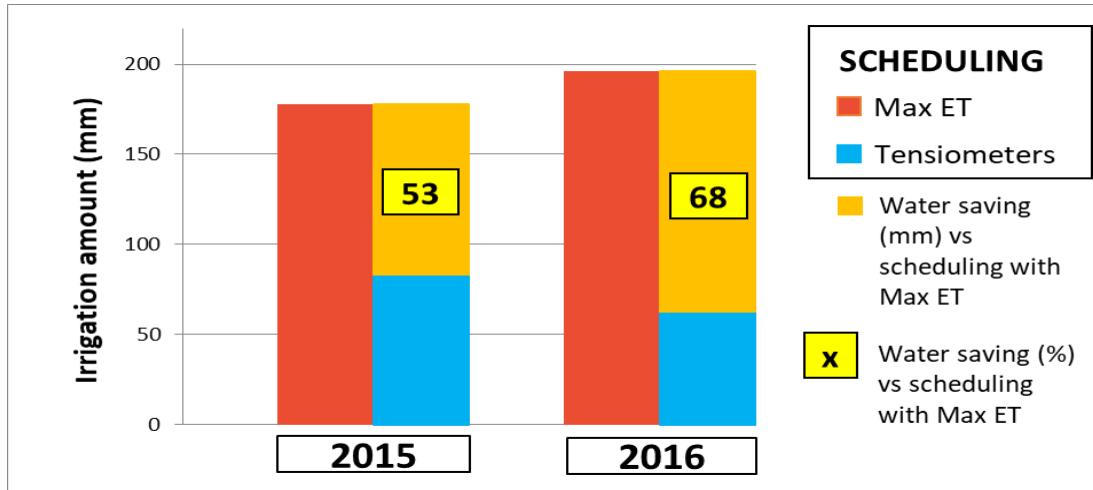


2. How to save irrigation water?

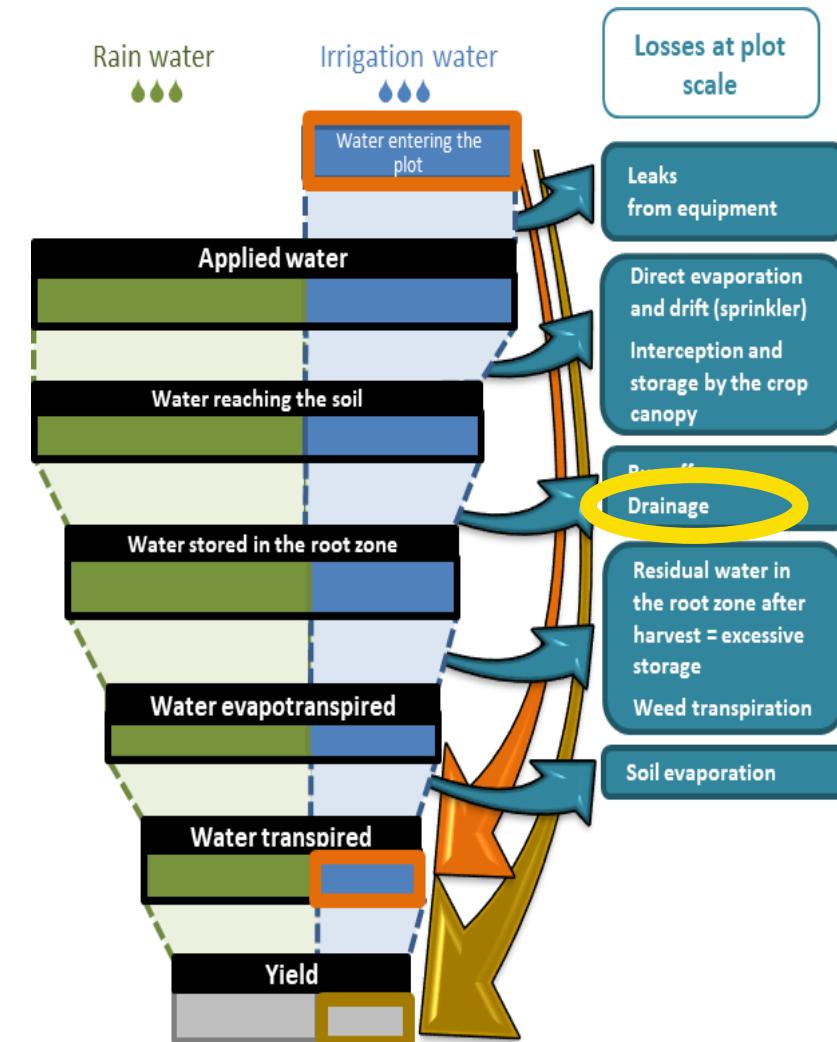
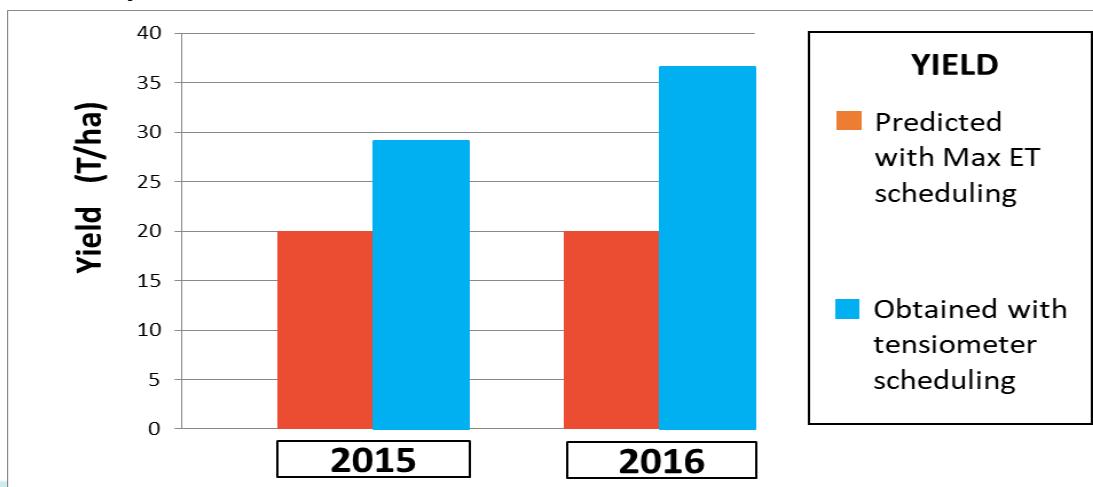
2.3. Irrigation scheduling levers ➤ Drainage losses (over-irrigation)

Field trial – Zucchini – Gard department

Irrigation water amount under various scheduling methods



Zucchini yield



3. What irrigation water savings can be expected?

3.1. Agronomic levers

- Still too few references of achieved water savings!
- BAG'AGES project (South-West of France)
 - CA farmers irrigate in the same way as conventional farmers
 - ⇒ Do not take advantage of the new soil properties in CA
 - ⇒ Urgent need to acquire references on irrigation water requirements for CA

3. What irrigation water savings can be expected?

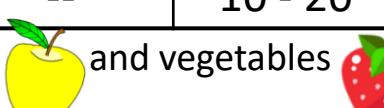
3.2. Technological levers

➤ Opting for a more efficient irrigation system

CORN and other FIELD CROPS

Achievable water saving (%) ➡	System 2					
System 1	Spray gun	Solid set	Low pressure center pivot or lateral move	Surface drip	Subsurface drip	
Spray gun	10	10	5 - 20*	10 - 20*	15 - 35*	
Solid set	--	10	5 - 20*	15 - 25*	20 - 25*	
Low pressure center pivot or lateral move	--	--	5 - 10	5 - 15	10 - 25	
Surface drip	--	--	--	10 - 20	15 - 20	
Subsurface drip	--	--	--	--	10 - 20	

- The same type of referential could be established for perennial crops



Referential of potentially achievable water savings through the change of irrigation equipment
(Serra-Wittling et Molle, 2017)

3. What irrigation water savings can be expected?

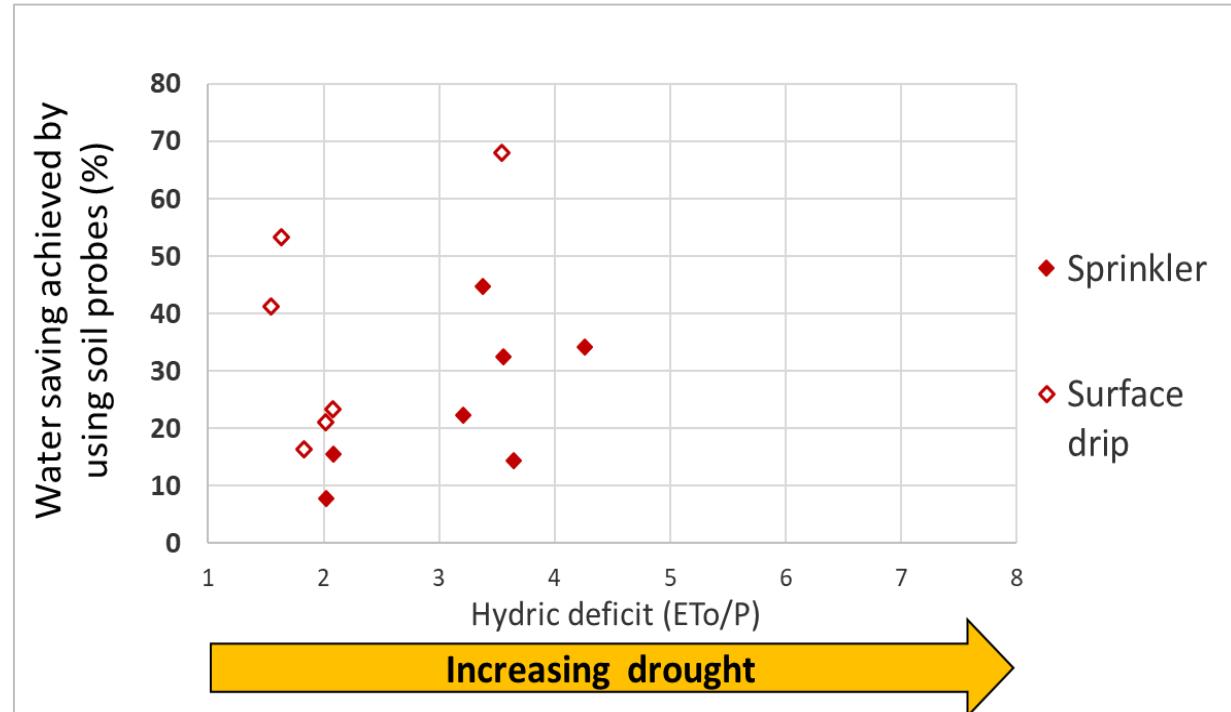
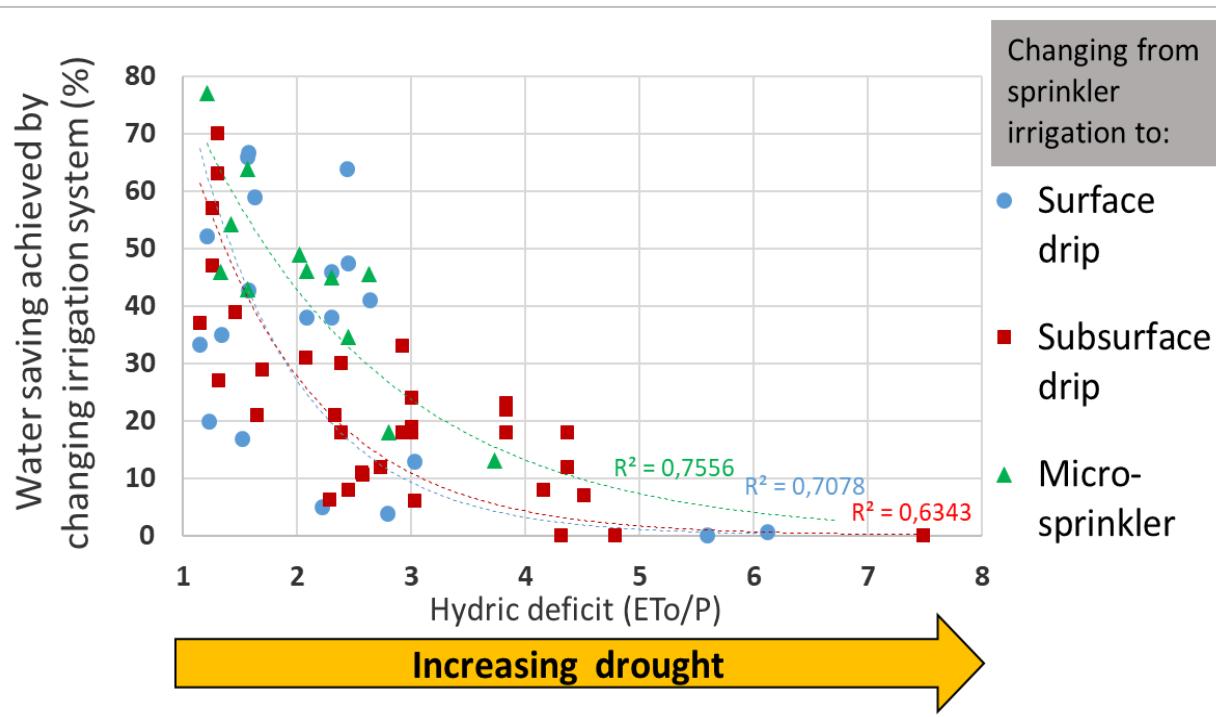
3.3. Scheduling levers

Achievable water saving (%)	Tensiometric or capacitive probes
 FIELD CROPS	15 - 40
 PERENNIAL CROPS	10 - 20
 VEGETABLES	15 - 40

Referential of **potentially achievable water savings** through the use of soil probes for irrigation scheduling (in comparison with irrigation without scheduling tool)
(Serra-Wittling et Molle, 2017)

3. What irrigation water savings can be expected?

3.4. Influence of hydric deficit

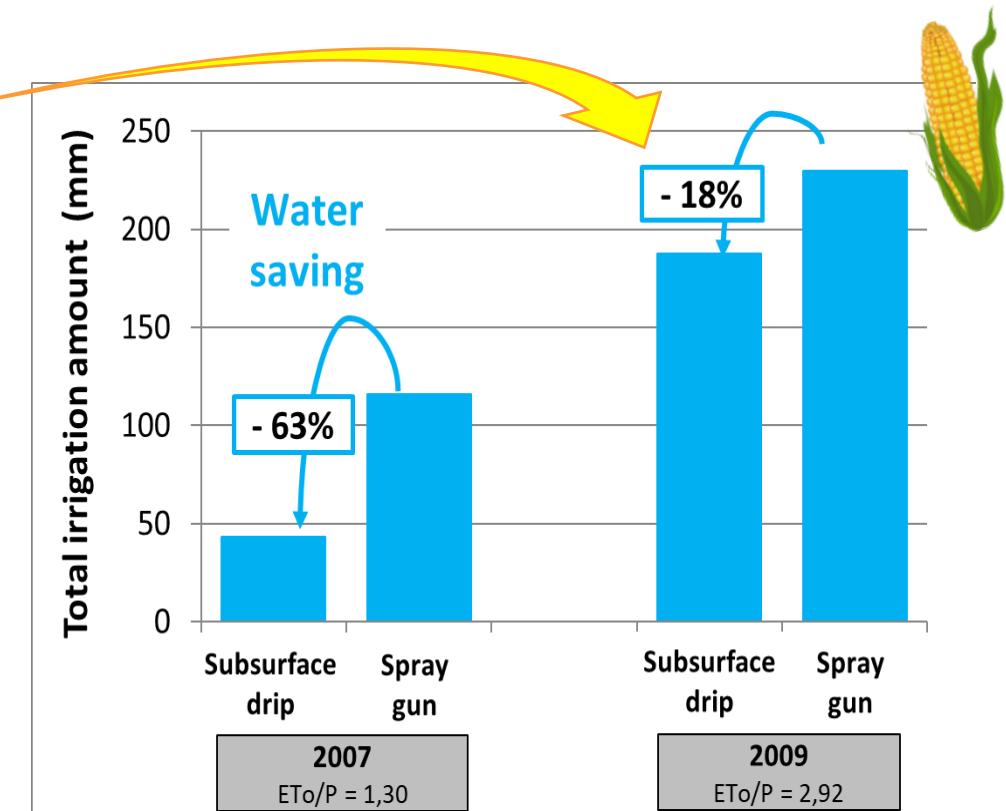
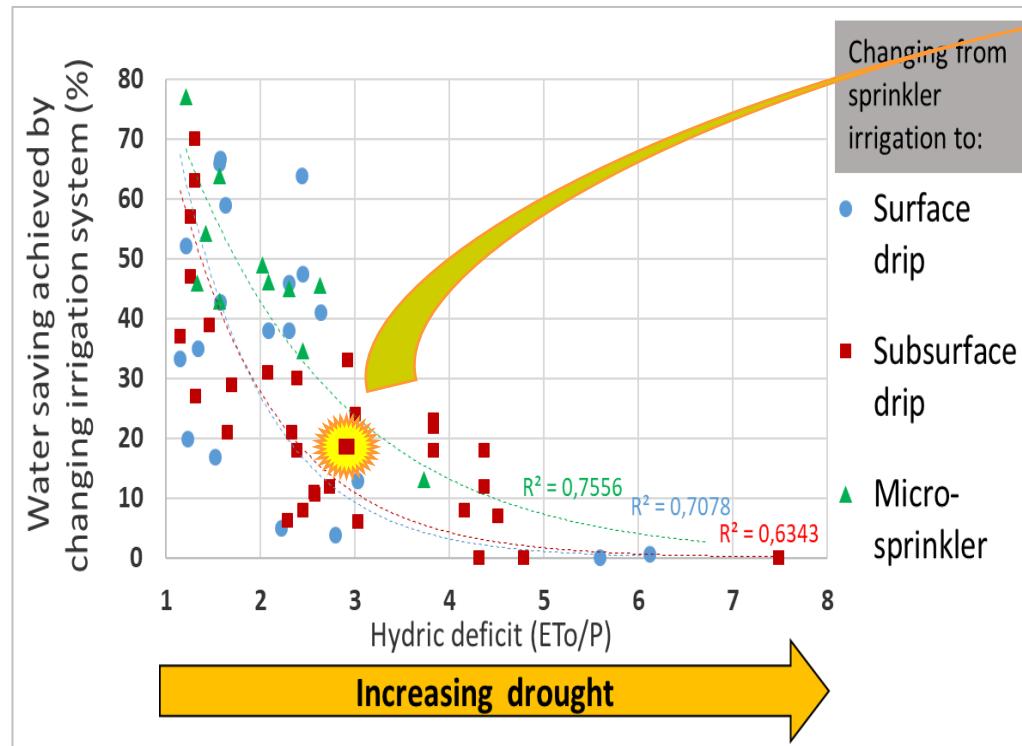


Serra-Wittling C., Molle B., Chevron B. (2019)

- **Water savings achieved with localized irrigation systems** (surface drip, subsurface drip, microsprinkler) vs sprinkler systems: ↘ when the drought level of the cropping season ↗
- On the contrary, **water savings obtained from irrigation scheduling using soil probes**: no influence of the hydric deficit
- **From a climate change perspective: greater potential for water savings by adopting irrigation management tools rather than changing water application technology**

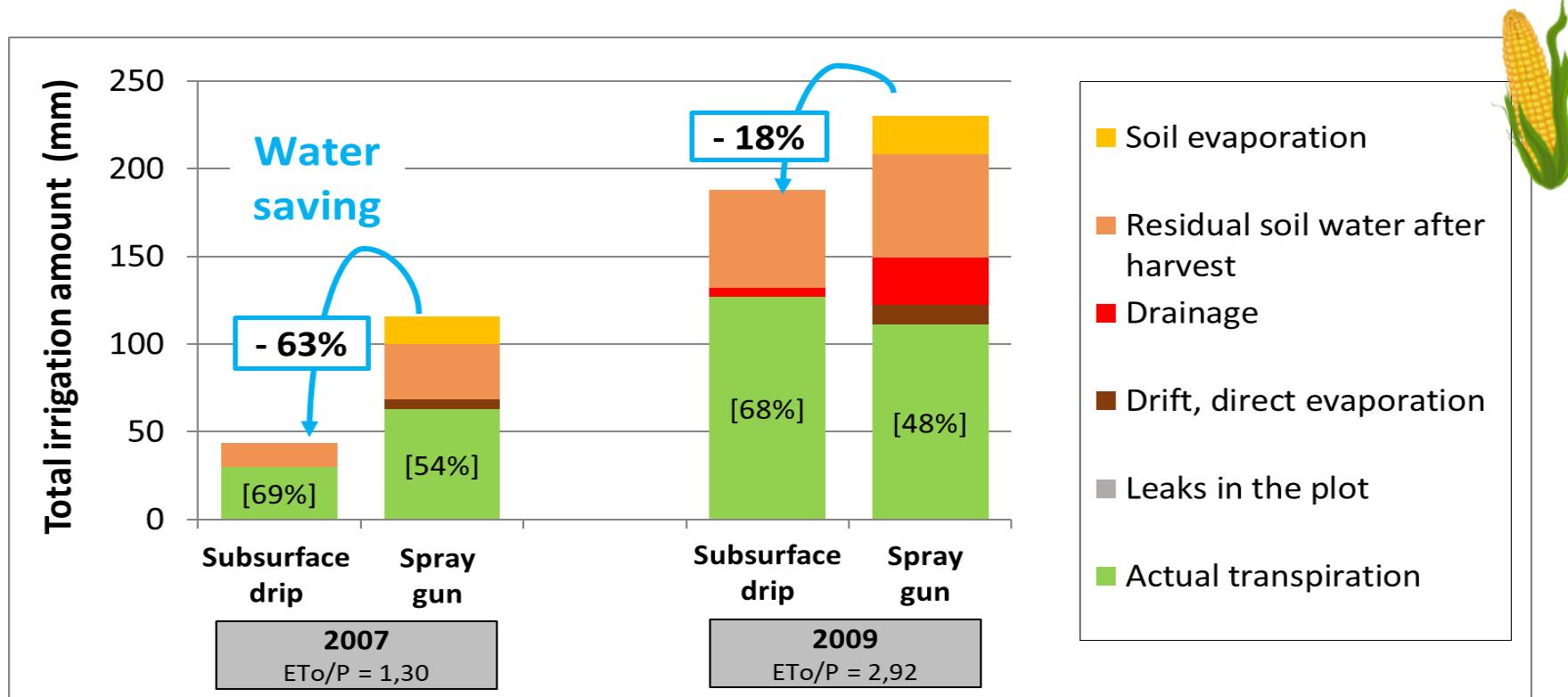
3. What irrigation water savings can be expected?

Modelling irrigation efficiency with the Optirrig crop and irrigation model



3. What irrigation water savings can be expected?

Irrigation water allocation: actual crop transpiration and various losses



- Quantifying water savings originating from the reduction of both
 - **technical losses** (linked with the type of system)
 - and **tactical losses** (linked with irrigation management and scheduling)

Take- home message

- ▶ **Improving plot level efficiency** = reducing irrigation water losses = saving water
- ▶ **How to improve plot level efficiency?**
 - **First** through cropping practices (**agronomic levers**) = make better use of rainwater
(and irrigation water if necessary)

But references on water savings are still lacking or questionable!

- **Then** through modernization of irrigation systems and through irrigation scheduling



Significant progresses already recorded



Tools are still under-used. Large progress to be made

Potential remains low
in dry years

Higher potential
in dry years

- ▶ **To promote water savings at the plot scale, in the context of climate change:**
 - Investments in **water saving equipment**
 - **AND** the improvement of irrigators' practices, in particular **irrigation scheduling tools**
- ▶ **Attention! Saving water at the plot level does not necessarily mean saving water at the territory level.**



Thank you for your attention!



INRAe

EIA WINTER IRRIGATION FORUM - 24/11/2023 – Claire WITTLING

Claire WITTLING
UMR G-EAU – Montpellier - FRANCE
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G-EAU
Gestion de l'Eau, Acteurs, Usages
Water matters



When and How much to water?

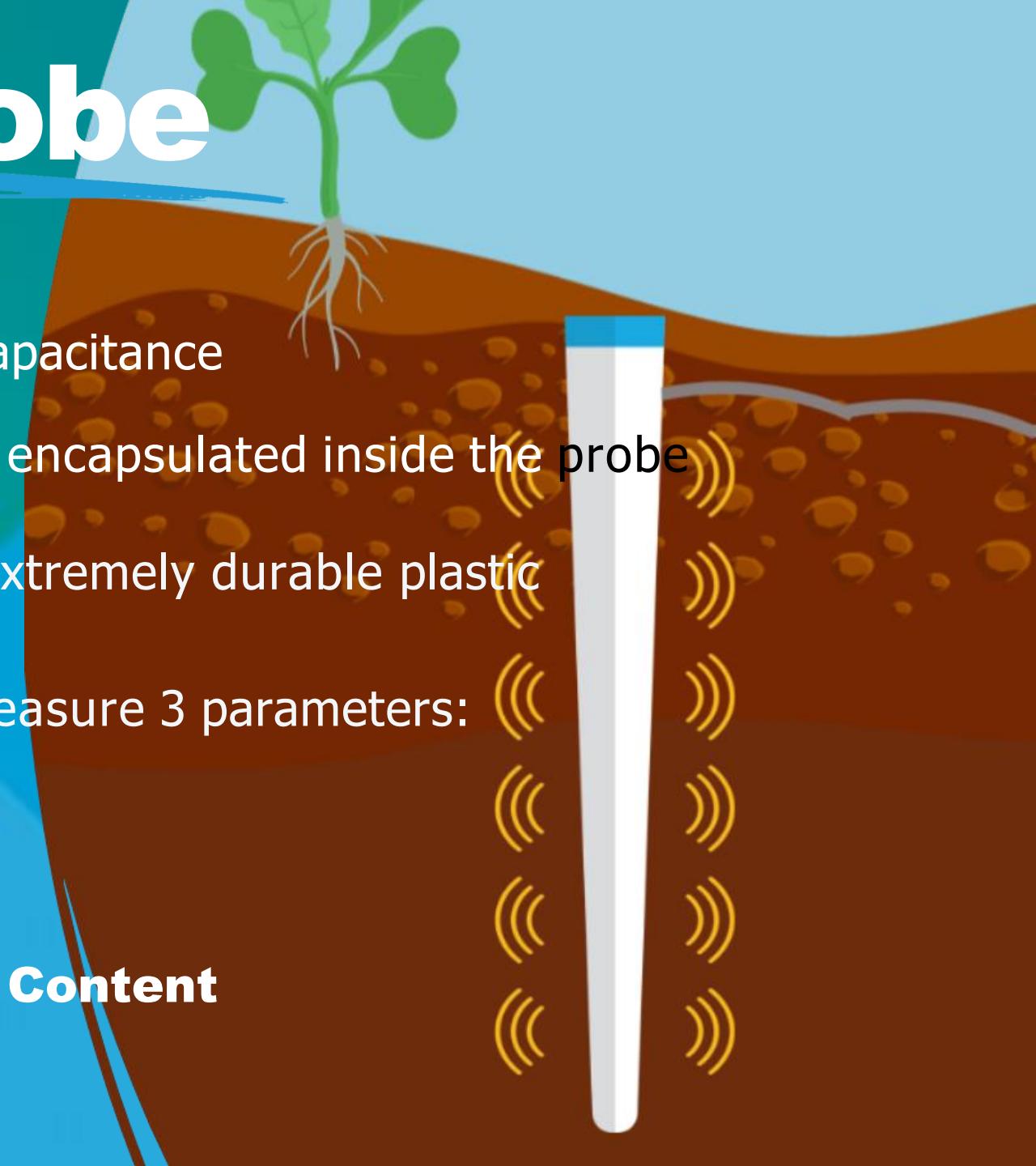
New tools for multilevel probes data interpretation

Drill & Drop probe



Features

- FDR technology > capacitance
- Sensors completely encapsulated inside the probe
- Probe made of an extremely durable plastic
- Every sensor can measure 3 parameters:
 - Humidity**
 - Temperature**
 - Volumetric Ion Content**
- Tapered shape





Sentek Undisturbed Installation



Drill & Drop probe

Irrigation management optimization



How much water?



When to irrigate?



Priority if irrigation among the plots



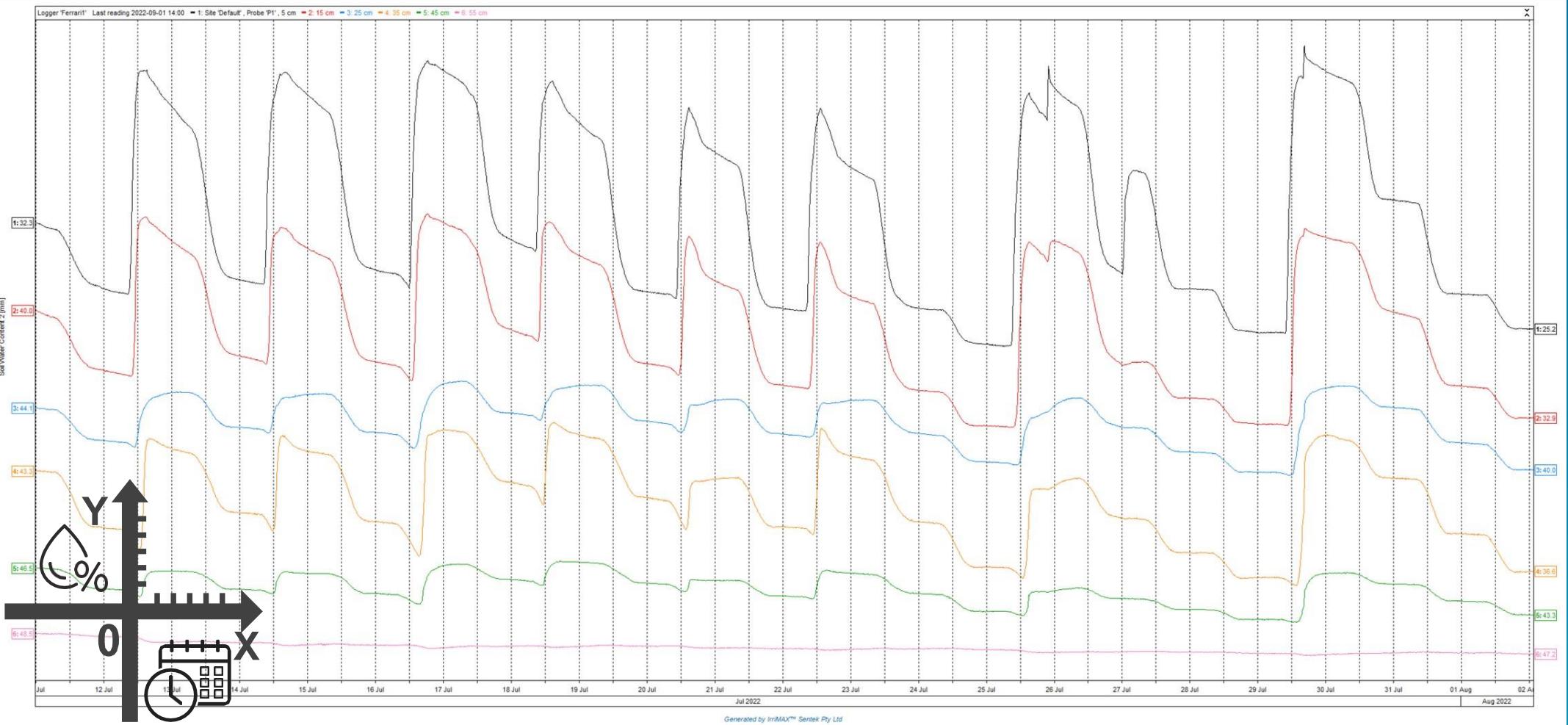
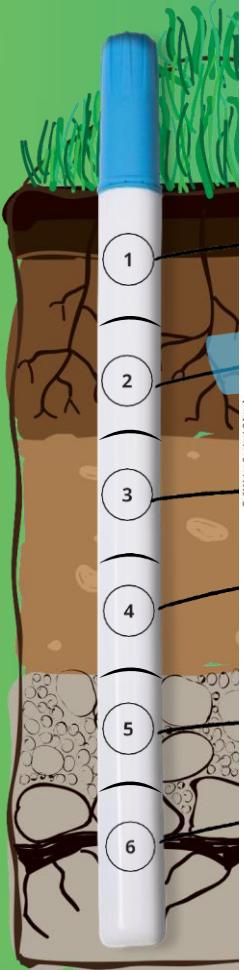
But...

How to start the DATA INTERPRETATION???

...You only need *three graphs*

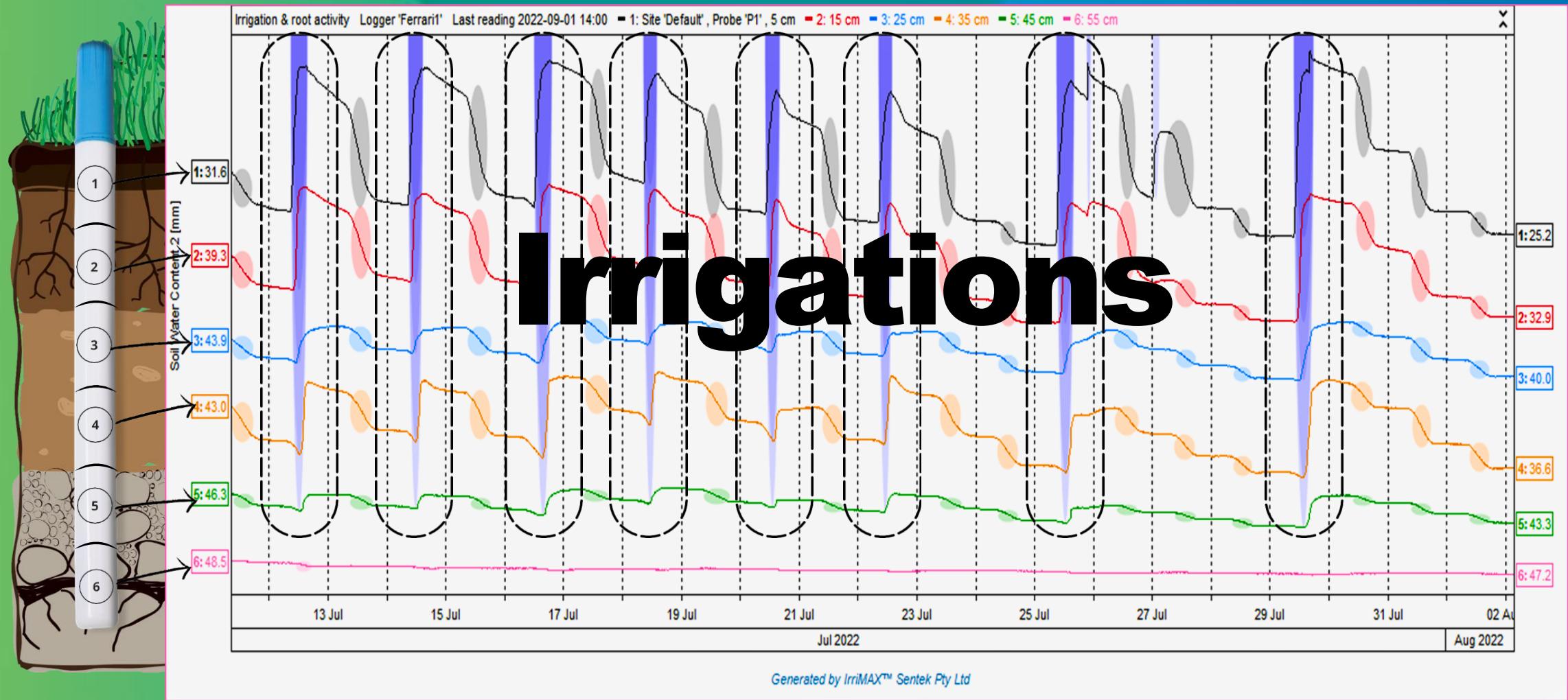
Data interpretation

Stacked Graph > every line has its y_axis



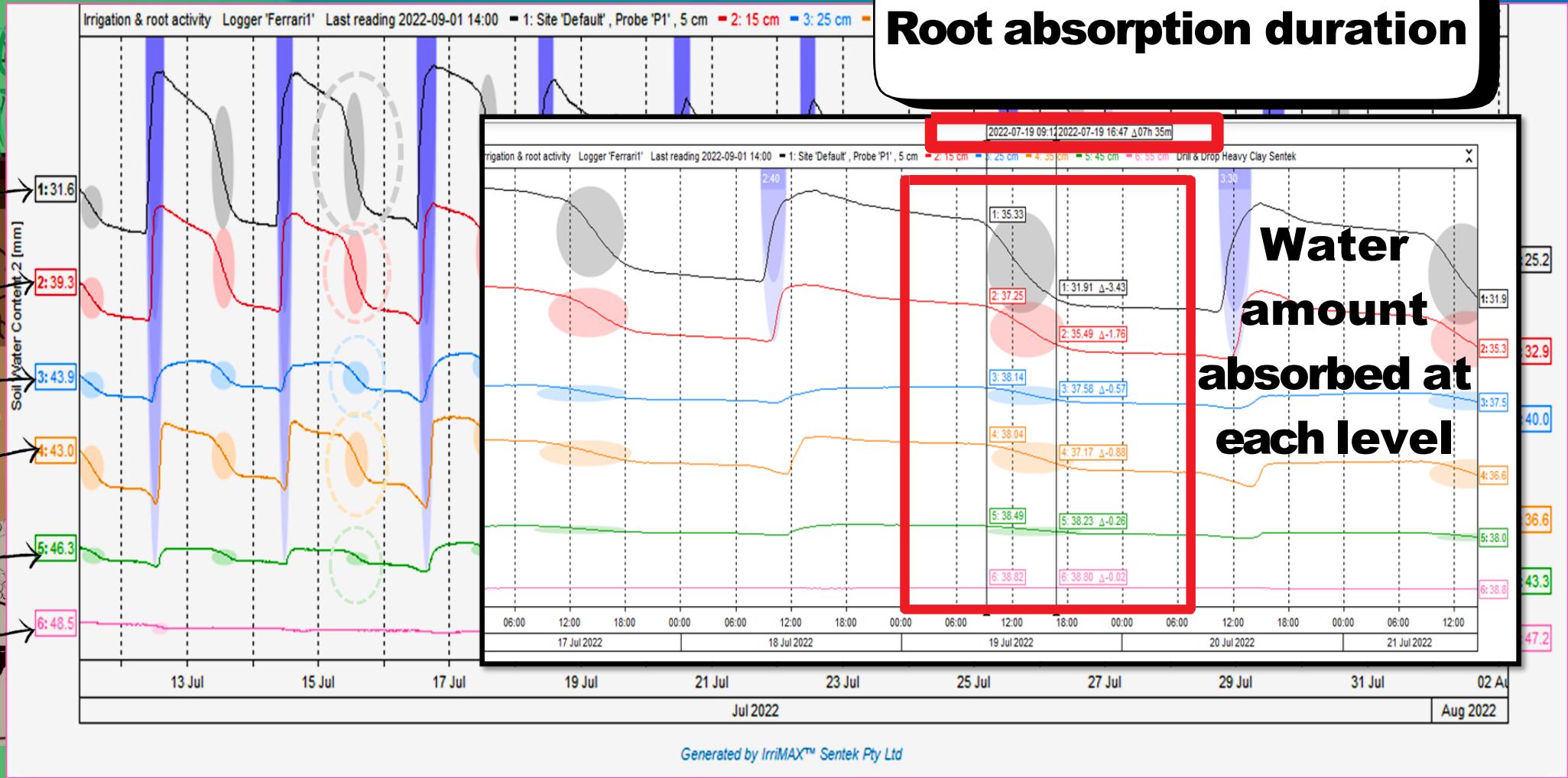
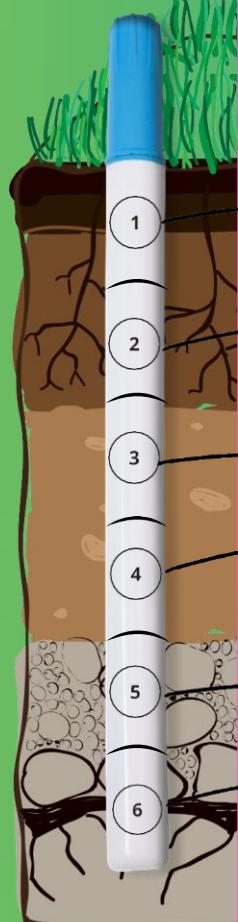
Data interpretation

Irrigation and Root activity



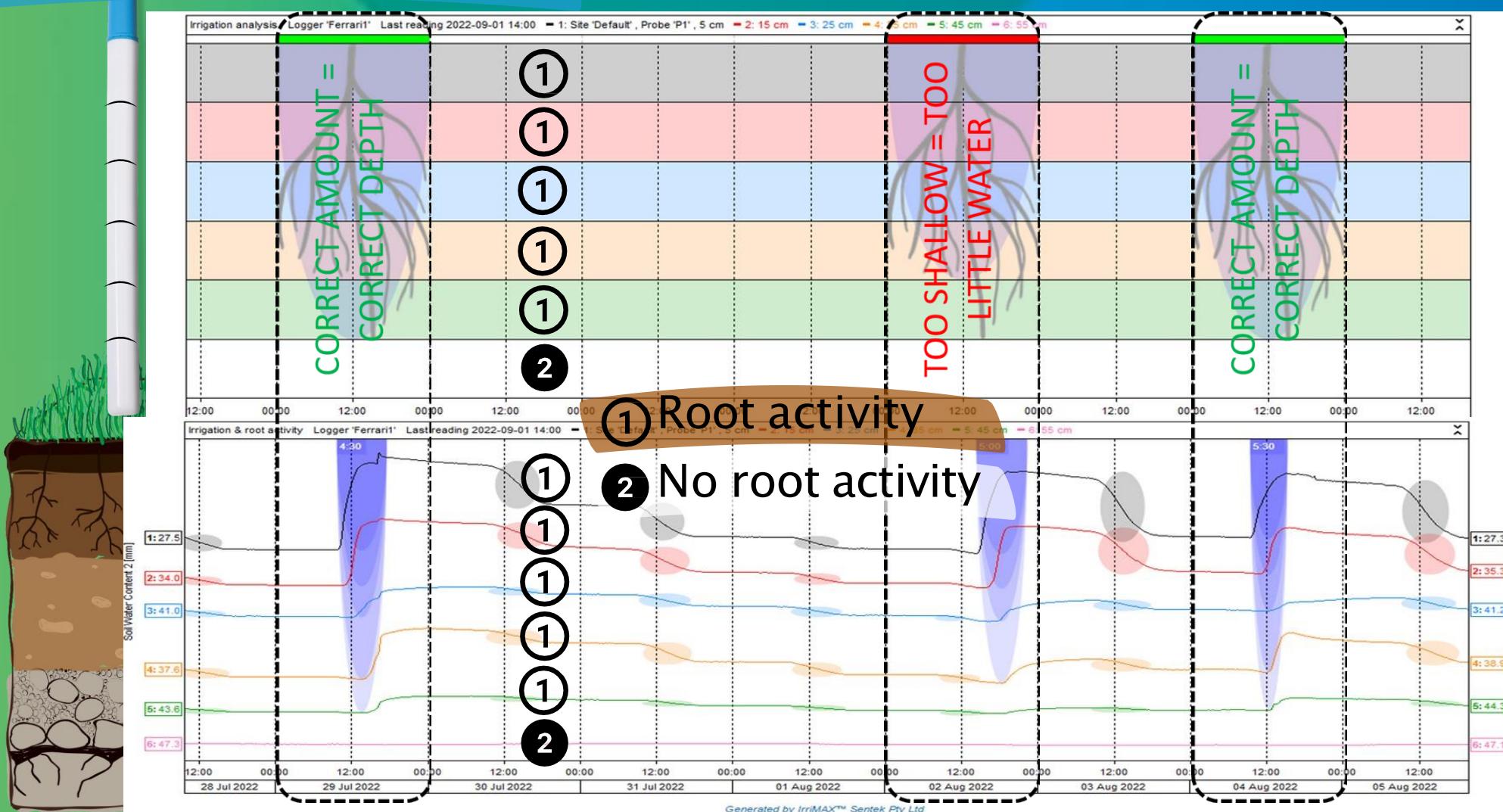
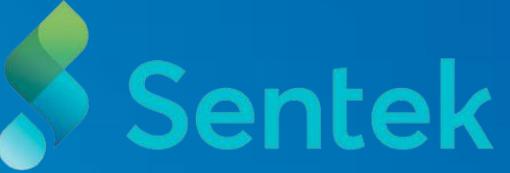
Data interpretation

Irrigation and Root activity



Data interpretation

Irrigation Analysis



Finally...

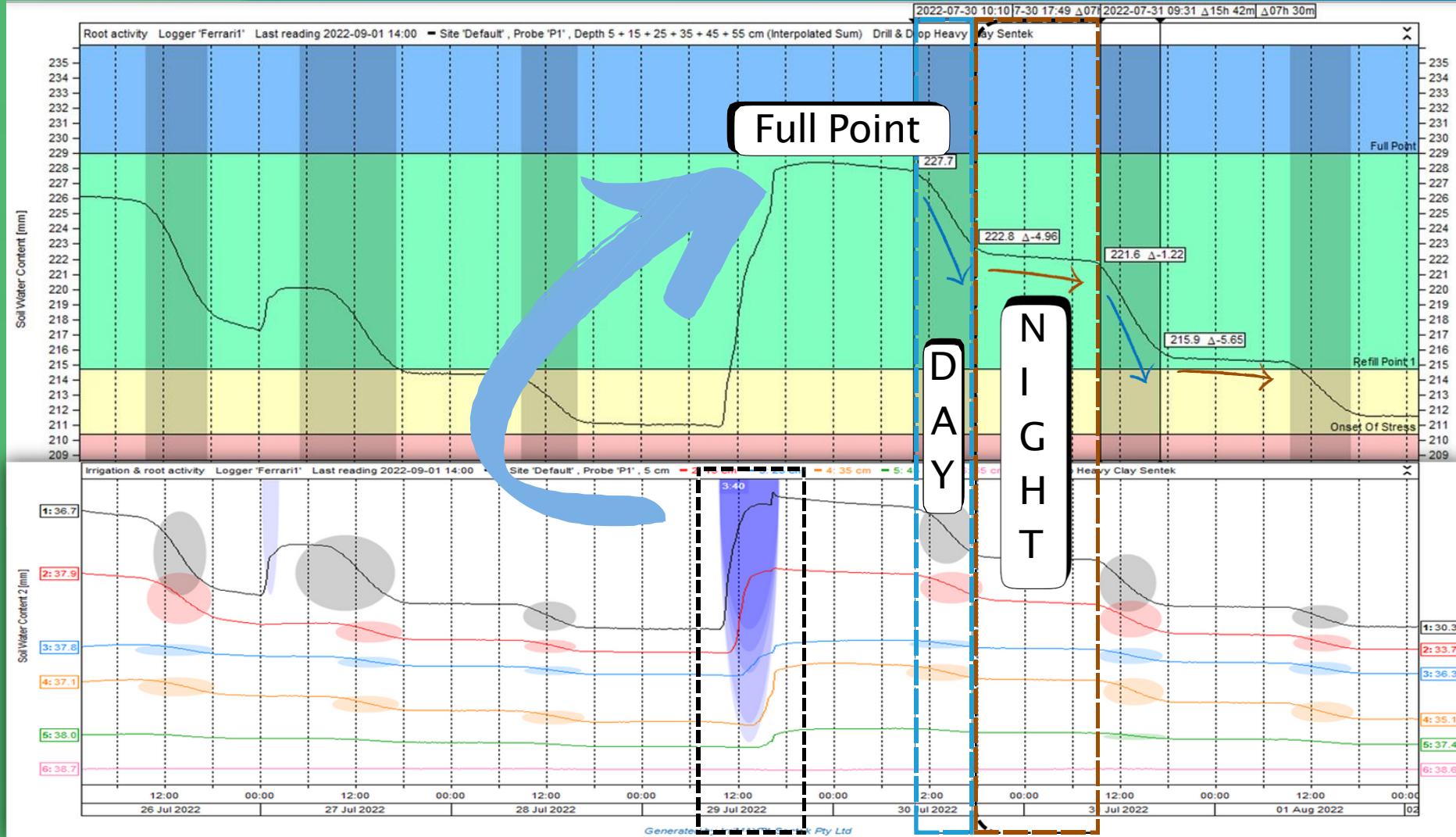
The SUMMED GRAPH ...why SUMMED???

**This graph shows
the total amount
of water
measured by
each sensor**

**We use it to maintain the soil moisture level in a
correct range, so that the plant does not go to the
stress phase**

Data interpretation

Summed graph (**FULL POINT**)

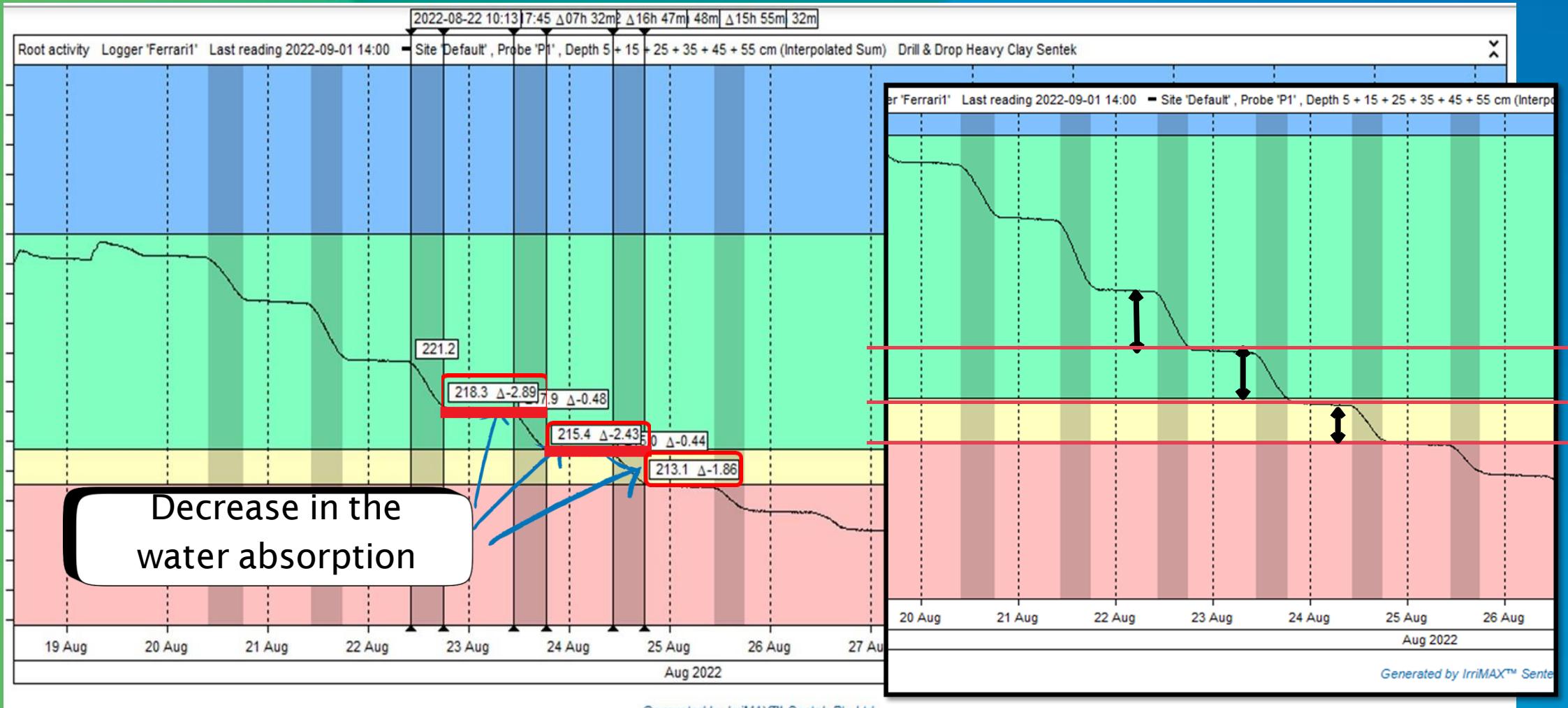




Now...
How to set the
STRESS and
REFILL POINT?!

Data interpretation

Summed graph (**STRESS POINT**)



But...



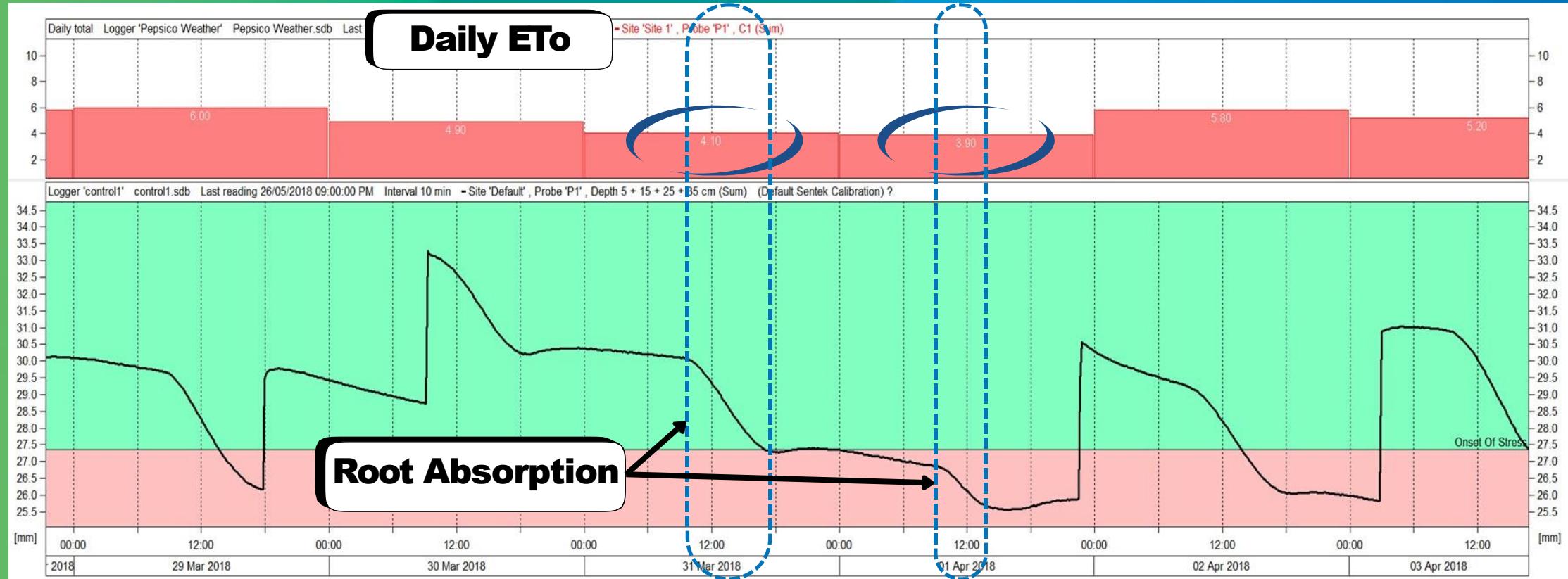
...be careful! The water absorption decrease could be due to TWO factors

- Evapotranspiration decrease > atmosphere water demand decrease > root absorption decrease = **NO REAL STRESS**
- Absorption decrease even with the same ET values = **ONSET OF STRESS.**



Data interpretation

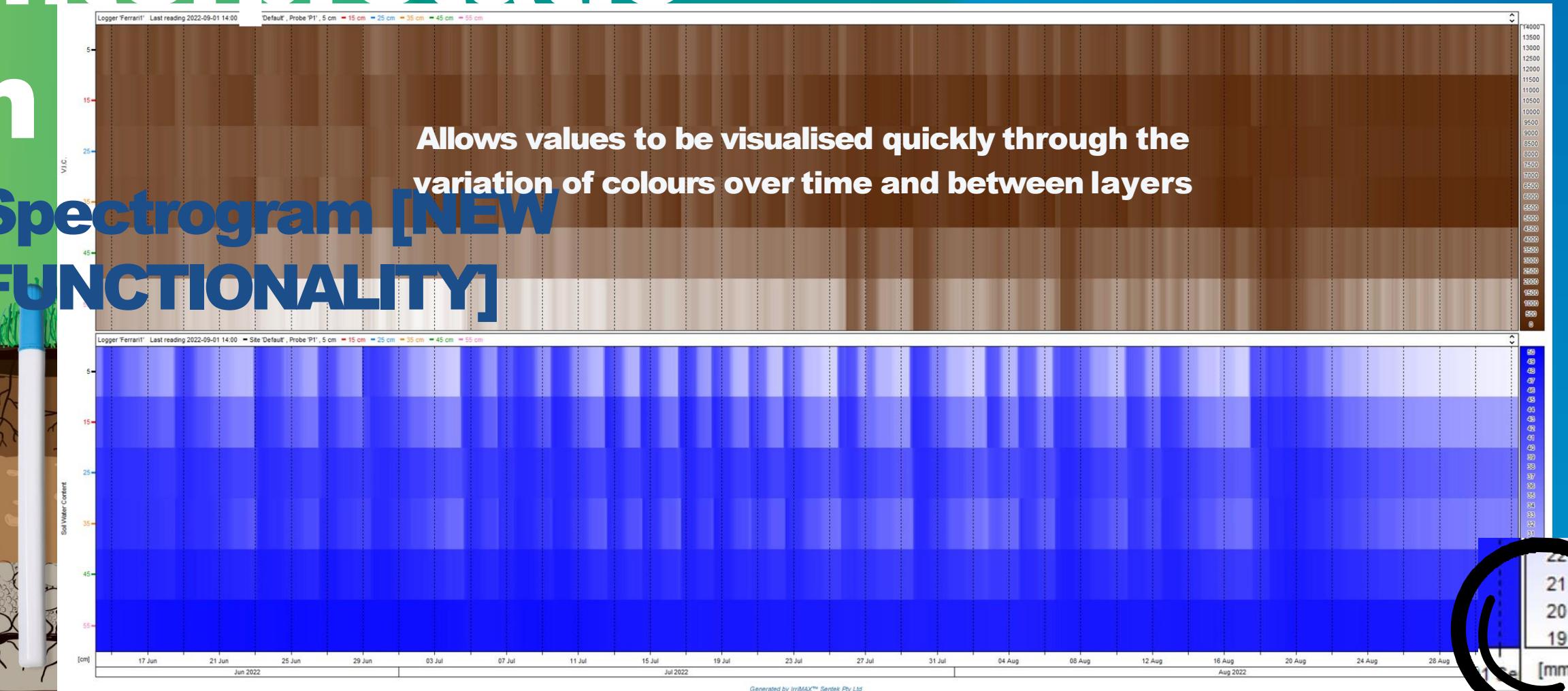
Summed graph (**STRESS POINT**)



Data interpretation



n
**Spectrogram [NEW
FUNCTIONALITY]**





Thanks for the attention