



Sophie GENDRE  
[s.gendre@arvalis.fr](mailto:s.gendre@arvalis.fr)

**Irré-LIS®**

**a decision support tool for irrigation**

**ARVALIS**  
Institut du végétal



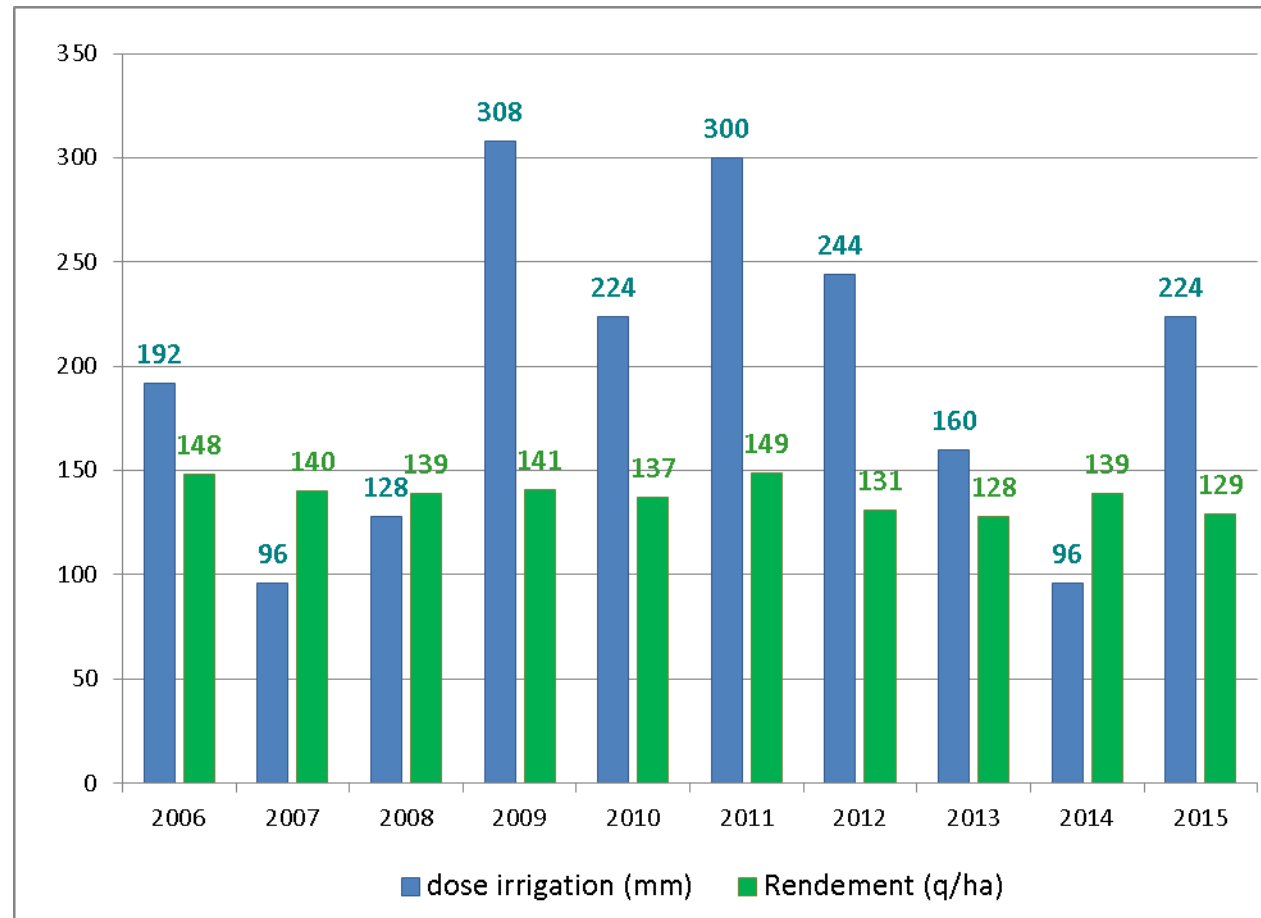
# Context

- 1.5 million hectare irrigated in France
- 88% cash crops (cereals, oil seeds, protein crops)
- Irrigation represents 5% of total french farmed lands
- Water consumption of 3 billions of m<sup>3</sup>
- Increase in pressure on water resources for agriculture



# What is at stake ?

A better adaptation of irrigation to climatic year



Maize irrigation (late variety – single crop farming observatory)

Arvalis – Lyon St Exupery (69 – France)



# Different stakes according to the types

Type	Water saving	Yield	Quality	Arbitration between fields
Maize	+++	++	∅	+
Seed maize	+++	++	∅	∅
Wheat	+	++	+	++
Durum wheat	+	++	++	++
Spring barley	+	++	+++	++
Pea	+	+++	+	++



# Methods to estimate water evolution in soil

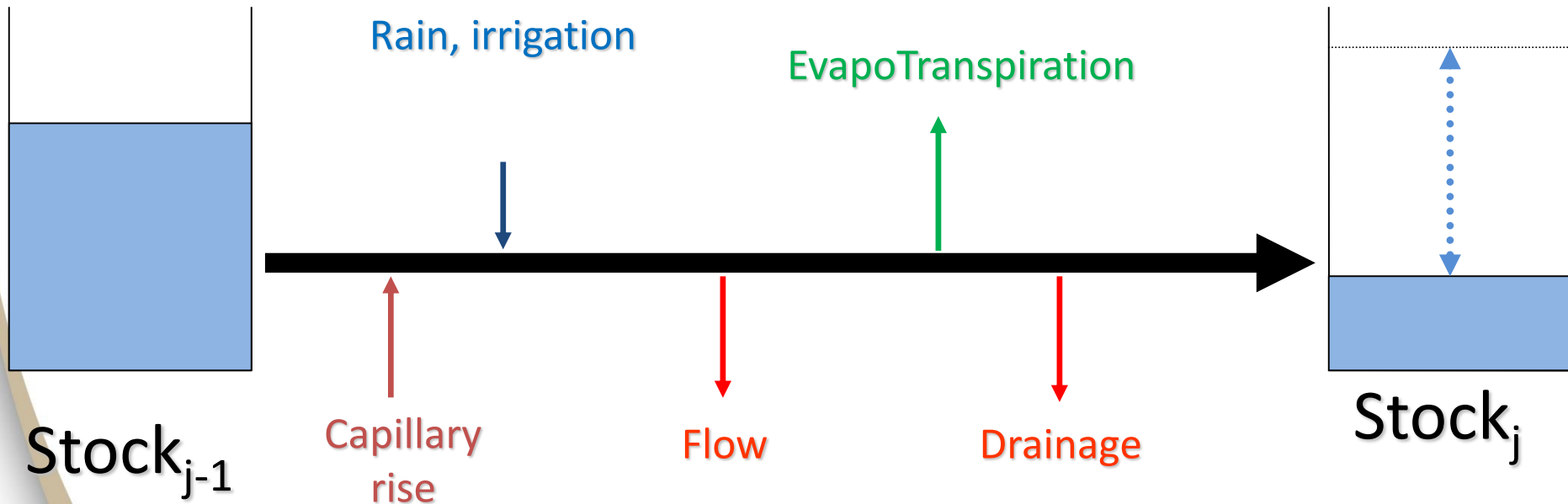
Two different approaches which can complement one other :

- Water balance : water evolution in soil model (for example Irré-LIS<sup>®</sup>)
- Measures with soil sensors (like capacitive sensors) associated with decision rules



# Water balance

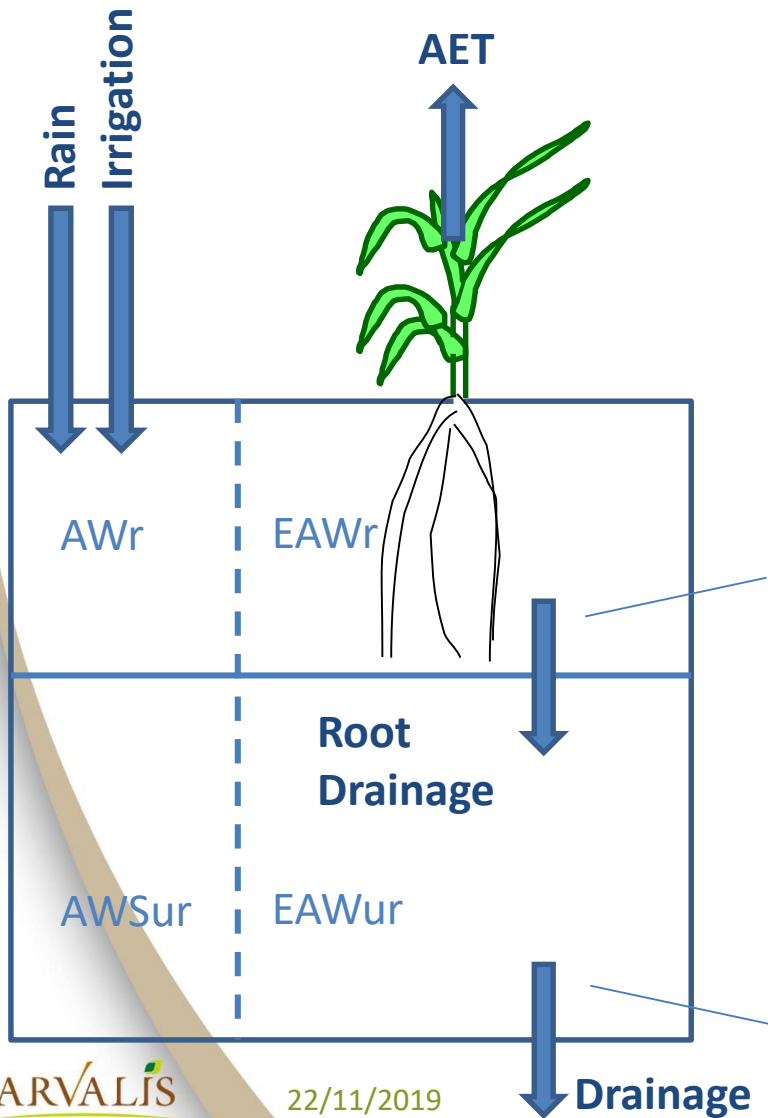
Objective : determine at a given moment the soil water state



**No sensor, no measure !**



# What's Irré-LIS® ?

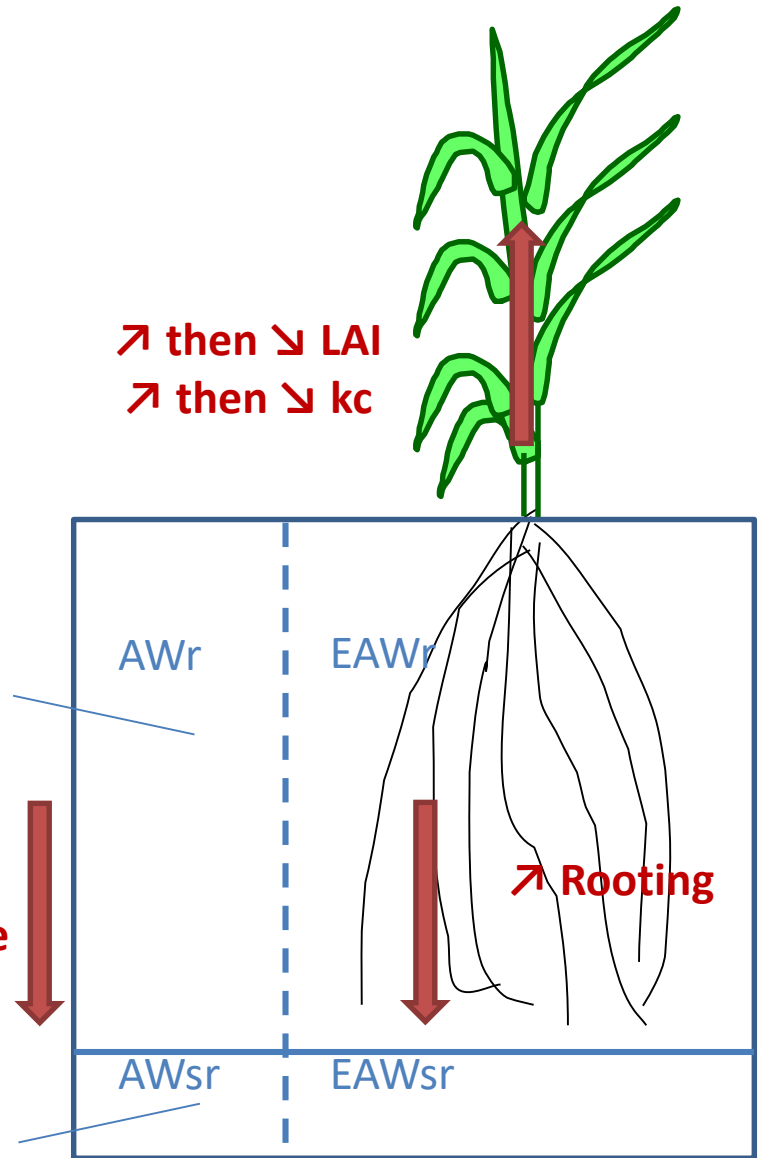


Root TAW

↗ RU racinaire

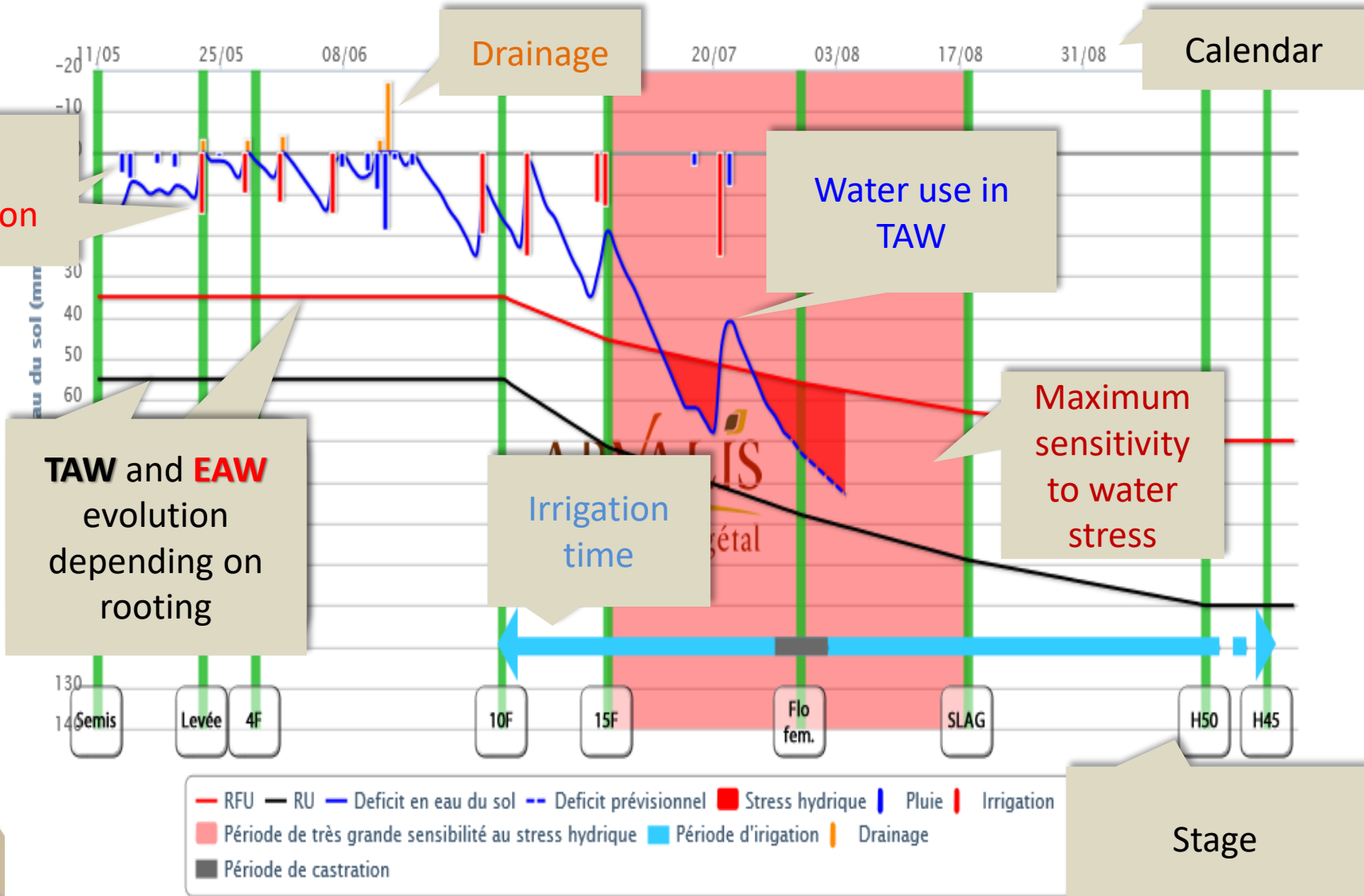
RU sous racinaire

↗ then ↘ LAI  
↗ then ↘ kc



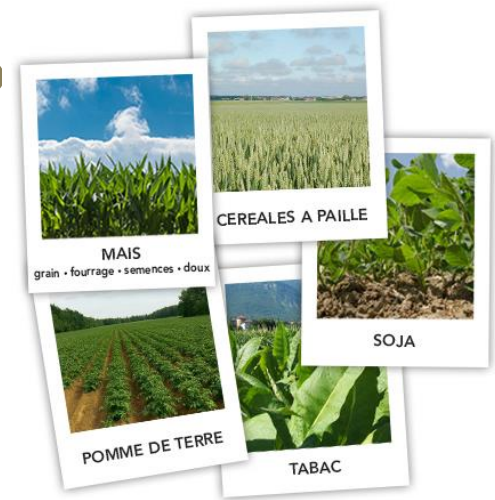


Rain Irrigation





# Who is using the tool ?

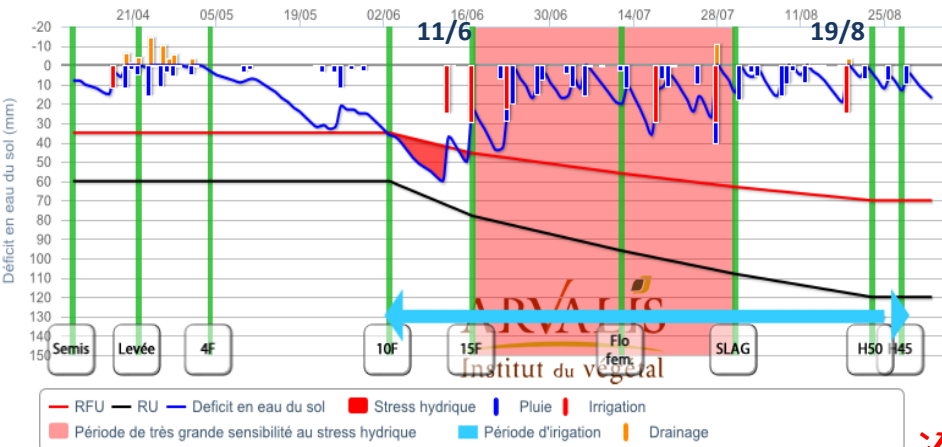


Soybean developed with Terres Inovia

- Around 2 500 fields managed with Irré-LIS®
- 35 000 ha in 2019
- Available on potatoe, maize, seed maize, wheat, durum wheat, spring barley, soybean and tobacco

## Irré-LIS (163mm)

Bilan hydrique

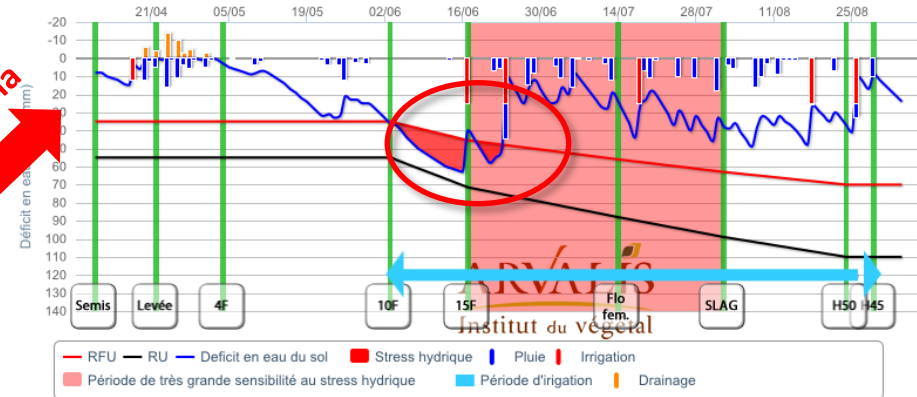


Hyb DKC ... = 136 q/ha

Late start (5 days) : -12 q/ha  
 Very late start (21 days) : -19 q/ha

## Early water stress (125mm)

Bilan hydrique

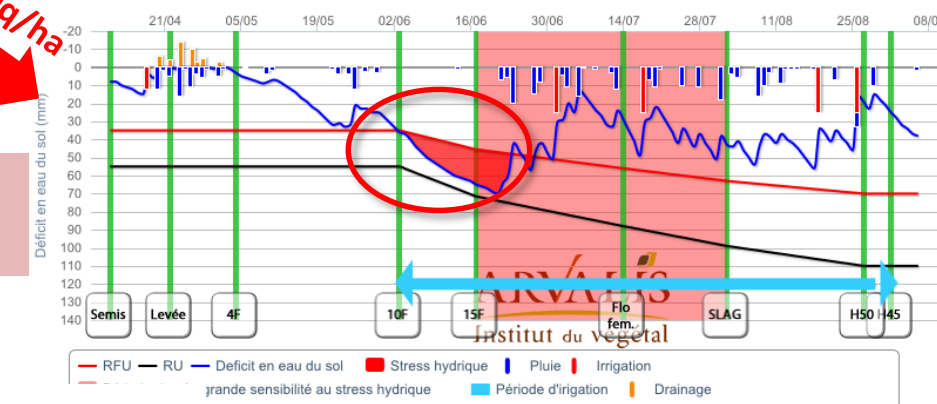


Hyb DKC .... = 124 q/ha

-7q/ha

## Severe early water stress (100mm)

Bilan hydrique



Loamy soil



# Irré-LIS advantage

- French soil database
- Variety database
- Spatialized weather data

**Type de sol** >>> [Filtrer la liste des sols](#)

**Mon sol**

**Profondeur de blocage à la tarière** ⓘ

Superficiel  
 Moyen  
 Profond

**Pierrosité** ⓘ

Non caillouteux  
 Peu caillouteux  
 Caillouteux

**Hydromorphie** ⓘ

Non hydromorphe  
 Hydromorphe

**Texture** ⓘ

Argileux  
 Limono-argileux  
 Limoneux  
 Limono-sableux  
 Sablo-limoneux  
 Sableux

**Présence de calcaire** ⓘ

Non calcaire  
 Calcaire

24 sol(s) au choix

Boulbènes superficielles

RU Max proposée (mm) 90

RFU Max proposée (mm) 60

RU Max modifiée (mm) 90

RFU Max modifiée (mm) 60

Recalculer

**Type de culture**

Ma culture Mais

Ma variété AAPOTHEOZ

Date sem./pl.

Mon précédent

**Culture in**

Espèce ⓘ

Date d'implantation

Date de levée

Date de destruction

Etat de développement

**Type**

Mon sol Boulbènes superficielles

RU Max proposée (mm)

RFU Max proposée (mm)

RU Max modifiée (mm)

RFU Max modifiée (mm)

<<< Retour

Suivant >>>

DEMI-PRECOCE C1 CORNEE DENTEE  
DEMI-PRECOCE C2 DENTEE  
DEMI-TARDIF  
MAÏS G INCONNU  
PRECOCE  
TARDIF  
TRES PRECOCE  
TRES TARDIF  
AABSOLUT  
AACIENDA  
AALLEXIA  
AAMIDON  
AAPOSITO  
AAPOTHEOZ  
AAPPLE  
AARLEY  
ABONI  
ACROPOLE  
ADEVEY  
ADREXXO



## Conclusion

- Irré-LIS is one existing tool to help French farmers for irrigation
- Many others exist : Field Net Advisor, Irrinet, all the solutions with sensors...
- Main goal is that farmers manage their irrigation whether they use models or sensors