

# Drive Support System (DSS) for water management in Emilia Romagna Region (Italy)

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# Schedule of presentation

- Irrigation and Irrigated area in Italy
- Emilia Romagna Region as case study
- The use of a drive support system (DSS) for water management
- IRRINET-IRRIFRAME Project
- Results (*Preliminary results from RDP 2007-2013 and RDP 2014-2020*)
- Conclusions

# Irrigation and Irrigated area in Italy



Regions	CENSUS 2010		FSS 2013		% Irrigated UAA
	N. Farms	Irrigated UAA	N. Farms	Irrigated UAA	
<b>Piemonte</b>	<b>44.855</b>	<b>368.892</b>	<b>44.037</b>	<b>386.810</b>	<b>13,26</b>
Valle d'Aosta	3.239	15.353	2.664	9.918	0,34
Liguria	15.805	6.877	15.431	10.961	0,38
<b>Lombardia</b>	<b>33.611</b>	<b>586.453</b>	<b>33.907</b>	<b>578.576</b>	<b>19,83</b>
Bolzano	17.244	41.566	17.669	70.757	2,43
Trento	13.265	20.157	13.335	21.442	0,73
<b>Veneto</b>	<b>65.734</b>	<b>247.462</b>	<b>83.736</b>	<b>434.363</b>	<b>14,89</b>
Friuli V. Giulia	12.488	63.443	13.245	107.566	3,69
<b>Emilia Romagna</b>	<b>40.219</b>	<b>260.095</b>	<b>41.011</b>	<b>343.114</b>	<b>11,76</b>
Toscana	31.676	36.038	34.946	51.486	1,76
Umbria	12.925	20.982	15.914	21.170	0,73
Marche	26.201	18.548	27.859	29.827	1,02
Lazio	39.238	82.331	37.814	83.825	2,87
Abruzzo	33.231	32.232	36.859	38.177	1,31
Molise	11.678	11.801	9.078	14.593	0,50
Campania	65.666	94.871	70.535	104.570	3,58
Puglia	86.159	244.270	73.544	265.063	9,08
Basilicata	18.607	35.770	20.696	37.559	1,29
Calabria	43.554	77.280	41.819	83.324	2,86
Sicilia	70.664	160.261	65.548	164.744	5,65
Sardegna	22.390	65.223	20.688	59.804	2,05
<b>Italy</b>	<b>708.449</b>	<b>2.489.914</b>	<b>720.335</b>	<b>2.917.649</b>	<b>100</b>

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# Emilia Romagna Region

The Emilia-Romagna Region is a leader region for the Italian agricultural production with more than 84.000 farms and 1.064.214 hectares invested. Apart from cereals (427.422 Ha) the most important horticultural crops are fruit crops (67.454 ha), grapevine for wine production (55.929 ha) and vegetables for both fresh market and industrial processing (55.626 ha). (Source ERR, 2014).

Agriculture plays an important role in the context of regional production. Agricultural land covers 60% of the entire regional territory. About 33% of the regional farms include irrigated land. The most used irrigation system in the region is sprinkler (59% of the total irrigated area) followed by micro-irrigation (24%), furrow and border irrigation (12%), and submersion irrigation (3%) (ISTAT 2010).

Fresh water is relatively abundant in the Emilia-Romagna region although changes in the geographical distribution of rainfall have caused significant water deficit in some areas and episodes of water shortage are expected to increase in the future. (ARPA 2010)



## Project context

- Regional Managing Authorities have put pressure to improving water efficiency by using innovative techniques and smarter drive support systems. These can help farmers to improve overall economic and sustainable production and using water in a more efficient way.
- This situation has been partly compensated by the construction (started in 1955) of an artificial canal conveying irrigation water called Canale Emiliano Romagnolo (CER).
- A great effort on this matter has been made by **the National Association of Land Reclamation and Irrigation Consortia (ANBI)**, by introducing the use of the **IRRINET**



# IRRINET History

- IRRINET is a scheduling expert water management system produced by **ANBI (National Association of Reclamation and Irrigation)**
- With the scientific and technical coordination and agronomic support of **Canale Emiliano Romagnolo (CER)** (obtained in more than 50 years of research)

# The project context

## Regional Level

- The IRRINET project was supported and co-funded by the Emilia-Romagna Region and ANBI (National Association of Reclamation and Irrigation) with the aim to provide a DSS for:
  - Better use of water source
  - Better water management (with the aim to reduce water use for irrigation)
  - Maintenance/increase the crop productivity level

## National Level

- Tool used at national level (MIPAAF) for the planning of policies for agriculture in response to the Commission's observations about water savings.
- Under the Water Directive Framework and in response to the requirements of the Guidelines for Water Protection.



# IRRINET-IRRIFRAME Today

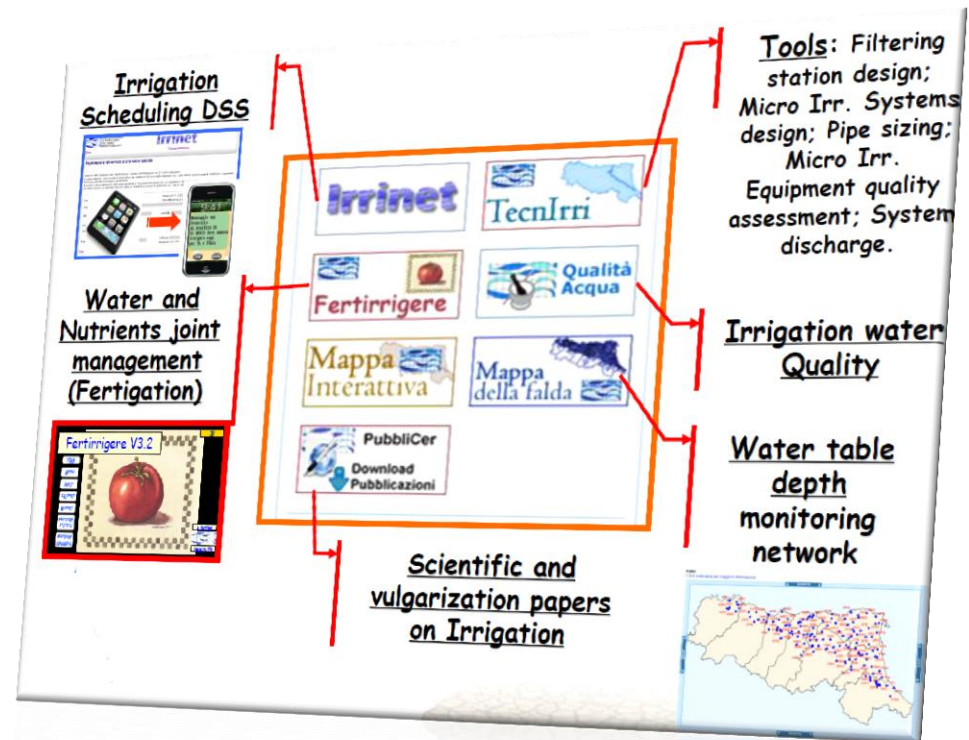


- 14 Italian Regions
- 54 Irrigation Consortia
- 6,8 thousand ha irrigated
- +4.000 farms
- +30.000 users

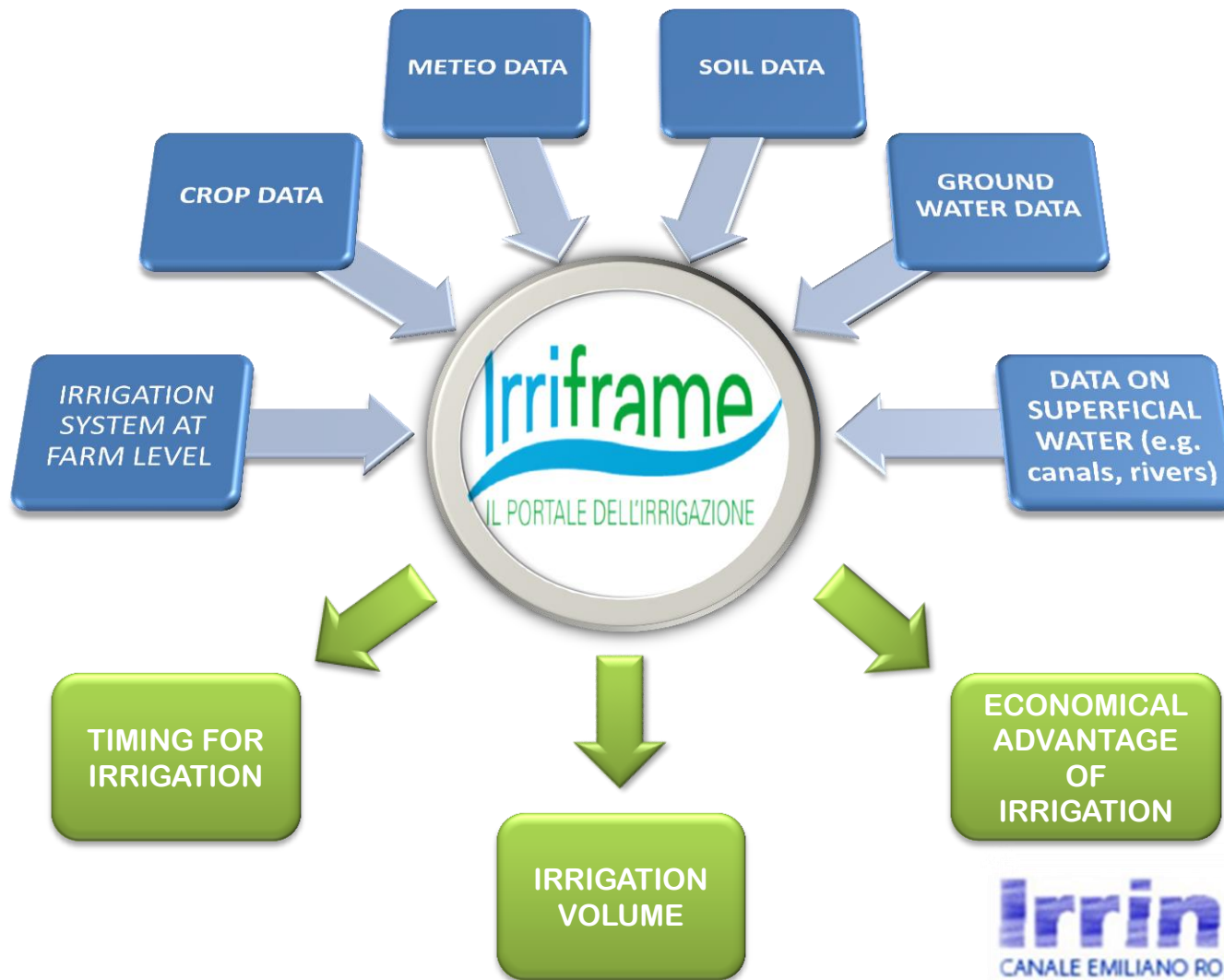
# Multidisciplinary Approach

➤ IRRI has been developed as a set of tools to advise farmers for the best water usage, saving irrigation water without decreasing the quality of crop production. IRRI is defined as an “expert system” because it combines information from different DATA BASES such as SIRIUS, SIGRIAN and WEB GIS.

➤ The IRRINET web service is freely available and provides irrigation advise for the main water demanding crops

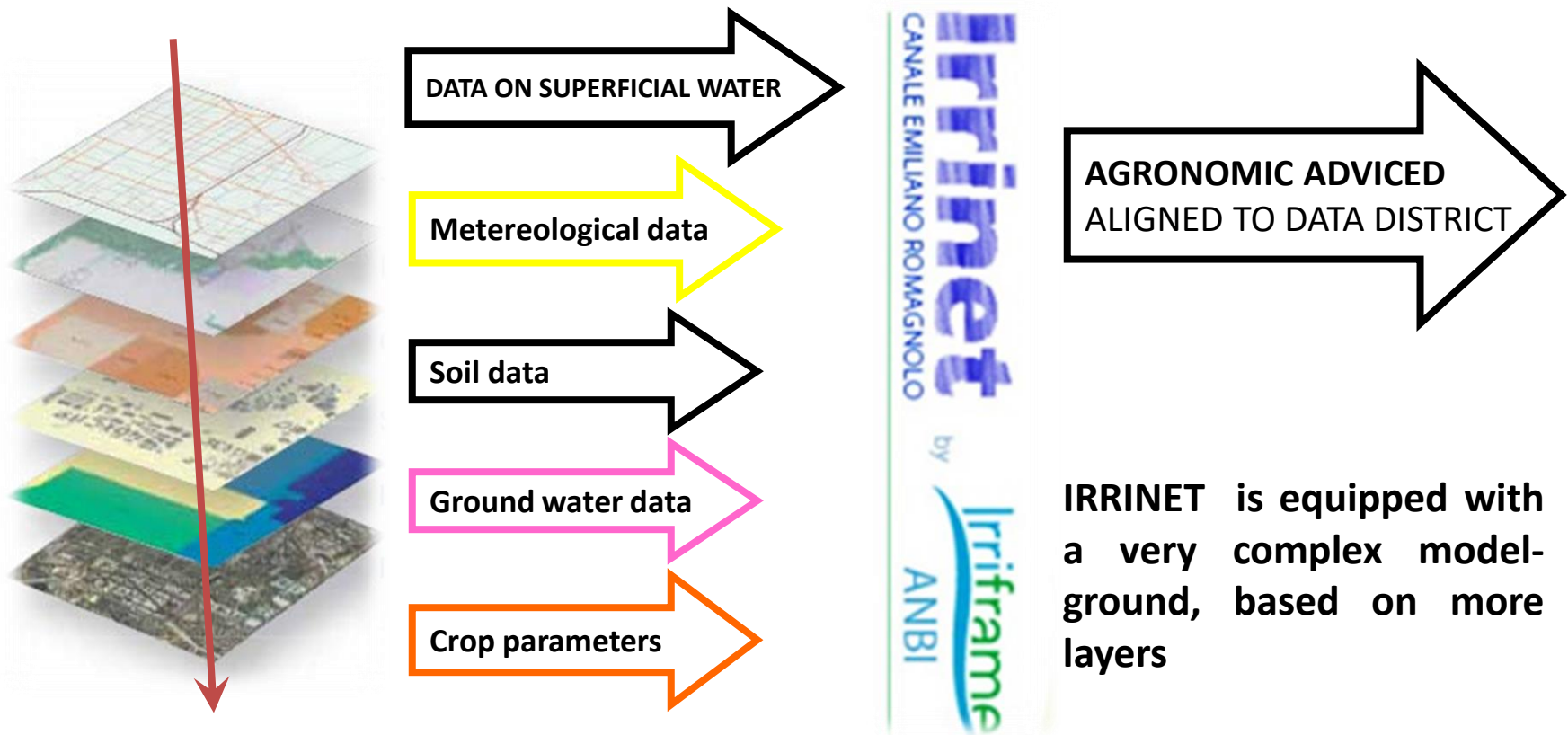


# Input and Output



# GIS approach

Automatic assignment of climate, soil, water table depth data related to the farm. Users are asked to select the crop and the irrigation systems, and to insert input his own data when available.



# FIELD LOCALIZATION ON A GOOGLE MAP

Appezzamento 1 - Cortile > GEOLOCALIZZAZIONE



Completare tutti i passaggi elencati per arrivare a visualizzare l'informazione irrigua nel cruscotto irriguo

- < Localizzazione ✔
- < Dati ambientali ✔
- Impianto irriguo ✘
- Coltura ✘

< Menù appezzamento

Latitudine 44,460047      Longitudine 11,397197  
 UTMX 690703                  UTM Y 4925766

**Dati relativi alla geolocalizzazione corrente**

Consorzio di Bonifica	<b>CONSORZIO BONIFICA RENANA</b>
Stazione meteo	<b>1462 S.LAZZARO</b>
Freatimetro	
Suolo delineazione	<b>CDV1-CDV2</b>
Distretto irriguo	<b>UNICO</b>

IRRINET system automatically assigns weather station, groundwater and reference ground, and also the hydraulic parameters of the irrigation (Pressure district, reach, turn, technical problems, etc.)

# IRRINET WEB



Email  Password

## Il servizio Irrinet/Irriframe

Irrinet è il servizio irrigazione realizzato dal CER, a disposizione di tutte le aziende agricole dell'Emilia Romagna. E' un servizio gratuito che fornisce consigli irrigui sul momento di intervento e sui volumi da impiegare per ottenere un prodotto di qualità risparmiando risorse idriche. Si basa sul metodo del Bilancio Idrico che viene calcolato ogni giorno con:

- i dati meteorologici forniti in tempo reale dall'Arpa-Simc (Servizio IdroMeteoClima)
- i dati pedologici forniti dal Servizio Geologico Sismico e dei Suoli della RER
- i dati di falda della rete di rilievo del Servizio Sviluppo Sistema Agroalimentare della RER elaborati da Iter

Per assistenza su problemi generali e di accesso al sistema [assistenza@irriframe.it](mailto:assistenza@irriframe.it)



SCARICA LA APP DI  
IRRIFRAME!  
IRRIFRAME VOICE  
per telefoni Apple e  
Android  
[Istruzioni e manuale >](#)

[Altre informazioni](#)

**CHOICE OF IRRIGATION SYSTEM  
RAINFALL CALCULATION**

**FIELD LOCALIZATION WITH SOIL  
VARIABLES (MODIFIABLE)  
GIVES CONSTANT HYDROLOGICAL**

## Registrazione

**CHOICE BETWEEN MORE THAN 30  
CROPS**

**ATTRIBUTES:**

**FENOLOGICAL DATA**

**RADICAL DEVELOPMENT**

**GROUND WATER INFLUENCE**

**CULTURAL CROP COEFFICIENT**

**ETC.**

# Scheduling irrigation

## CRUSCOTTO IRRIGUO di IrriFrame

Il cruscotto permette di tenere sotto controllo le esigenze irrigue di tutti gli appezzamenti registrati e di accedere con pochi click alle diverse funzionalità del sistema

Aziende/Appezzamenti [Creazione guidata nuovo appezzamento/coltura >](#)

Localizzazione appezzamenti

**CONSORZIO BONIFICA RENANA** Assistenza >

Az. Agr. Bau >

Clicca sul link per il menù	Descr	consumo oggi (mm)	data prevista irrigazione	volume irriguo (mm)	durata irrigazione (ore:minuti)		
1	ALBICOCCO	Cortile	3,96	Oggi	16,2	2:02	<a href="#">Dettaglio &gt;</a> <a href="#">Ho irrigato &gt;</a>

**CONSORZIO DI BONIFICA ADIGE PO** Assistenza >

Azienda non assegnata

Clicca sul link per il menù	Descr	consumo oggi (mm)	data prevista irrigazione	volume irriguo (mm)	durata irrigazione (ore:minuti)		
2	PATATA	orto	4,06	Oggi	16,3	13:00	<a href="#">Dettaglio &gt;</a> <a href="#">Ho irrigato &gt;</a>



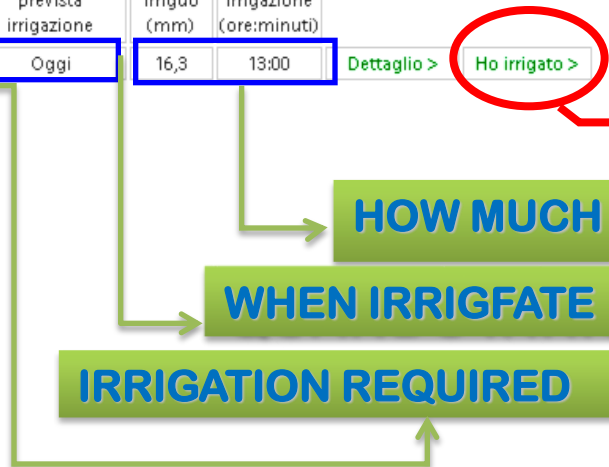
CROP

HOW MUCH IRRIGATE

WHEN IRRIGFATE

IRRIGATION REQUIRED

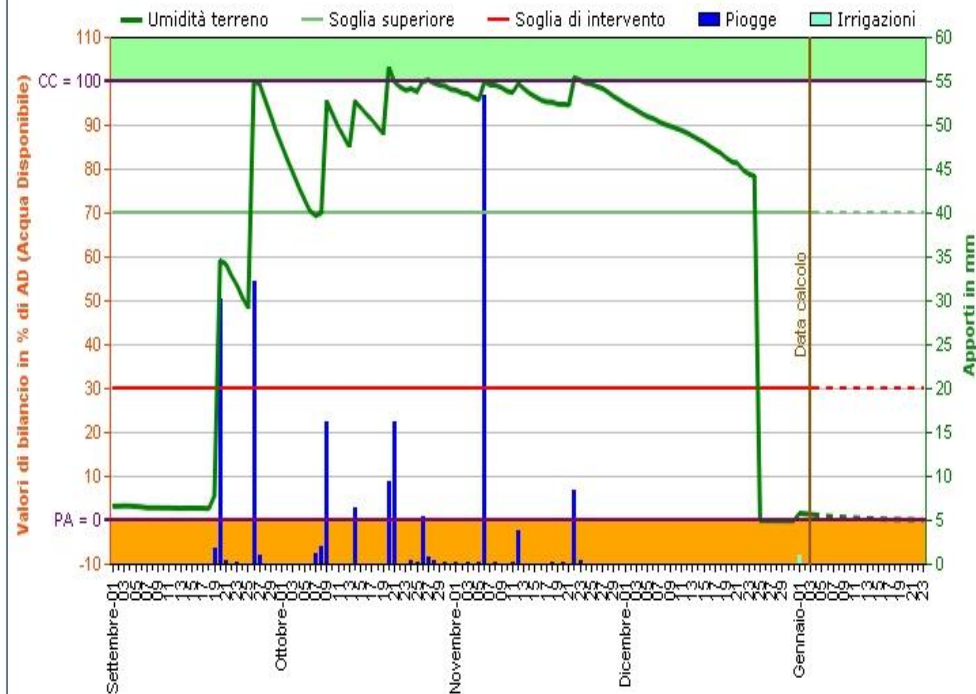
IRRIGATION CONFIRMATION



# Monitoring seasonal trend

## Grafico storico

Mostra l'andamento del bilancio idrico nella presente stagione irrigua



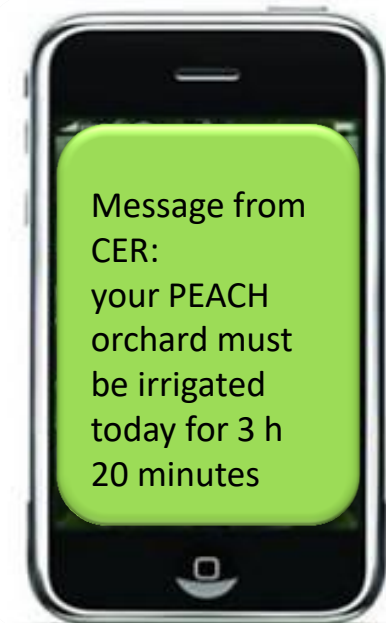
## Qualità del dato

Tipo di dato	Fornitore	Logo	Aggiornamento
Meteo	CB CAPITANATA		27/11/2011
Falda			02/11/2011
Disponibilità irrigue	CB CAPITANATA		13/10/2011
Carta dei suoli			non disponibile

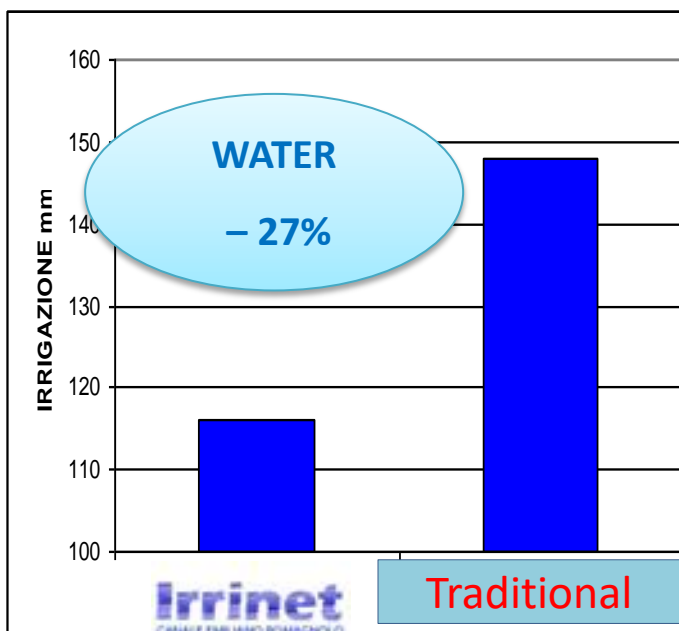
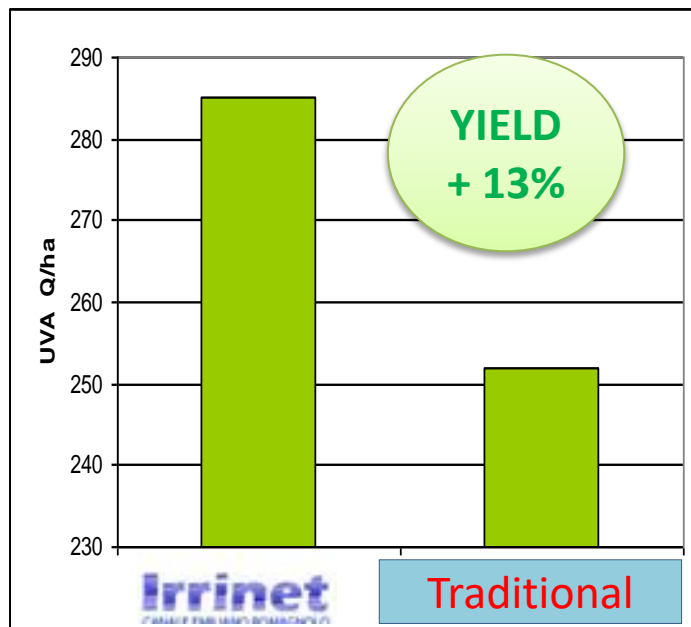


## New tool - IrriSMS

- The sms service uses IRRINET data to send personalized messages.
- Provide a more friendly user interface (new users)
- Allows to reach farmers who are not connected to Internet (new users)
- Allows to receive customized irrigation advise when in the field
- Allows Extension services to manage hundreds of farms



# Results



Water Use Efficiency (WUE):

Usual 17 kg/m<sup>3</sup> **Irrinet** 25 kg/m<sup>3</sup> (+47%)

Result from - CER on Grapewine production

# IRRINET Emilia Romagna RDP

Since 2012 IRRINET has been used in the RDP of Emilia Romagna Region as support tools for farmer water management.

## RDP 2007-2013 (Measure 214 I)

- ✓ >11.000 farms participant
- ✓ 22% irrigated areas
- ✓ 43.000 thousand hectares

IRRINET service application allowed a water saving of 50 millions m<sup>3</sup>. Whereas the reduction of around 25-50% of water distribution

**water saving:** 50 millions m<sup>3</sup>

## RDP 2014-2020 (Measure 10-11)

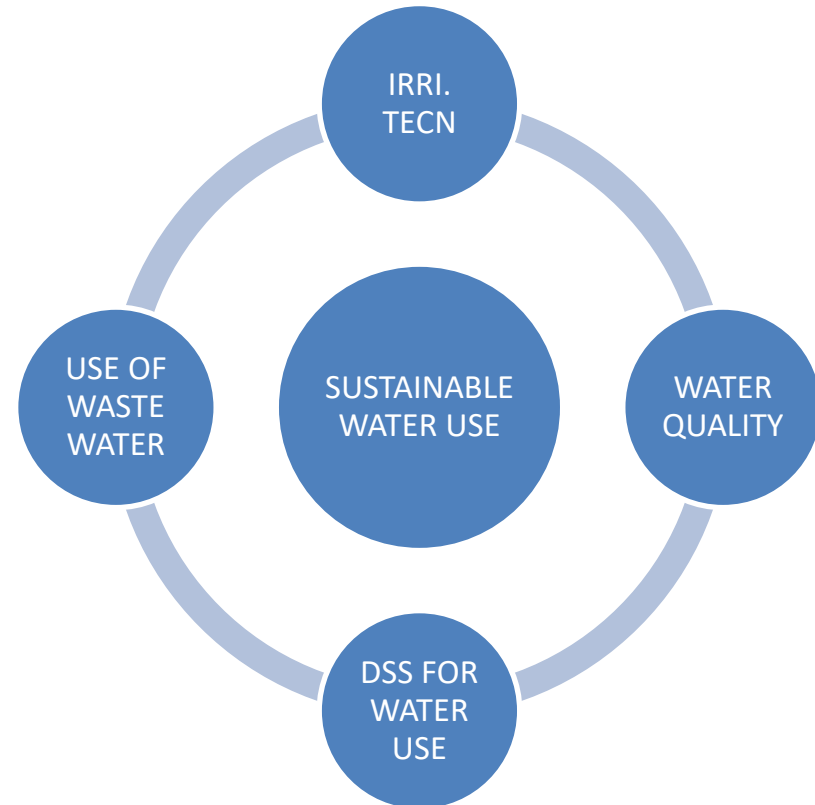
- ✓ 1.930 farm applicants
- ✓ 241 farms (IRRINET)
- ✓ 12 thousand hectares

In the **RDP 2014-20** beside the integrated and organic production additional commitments and ad hoc operations on water management have been integrated in the Measure 10 and 11 (BMPs). The **use of IRRINET** provide to farmers a funding support of **20 euro** ha.

# CONCLUSIONS

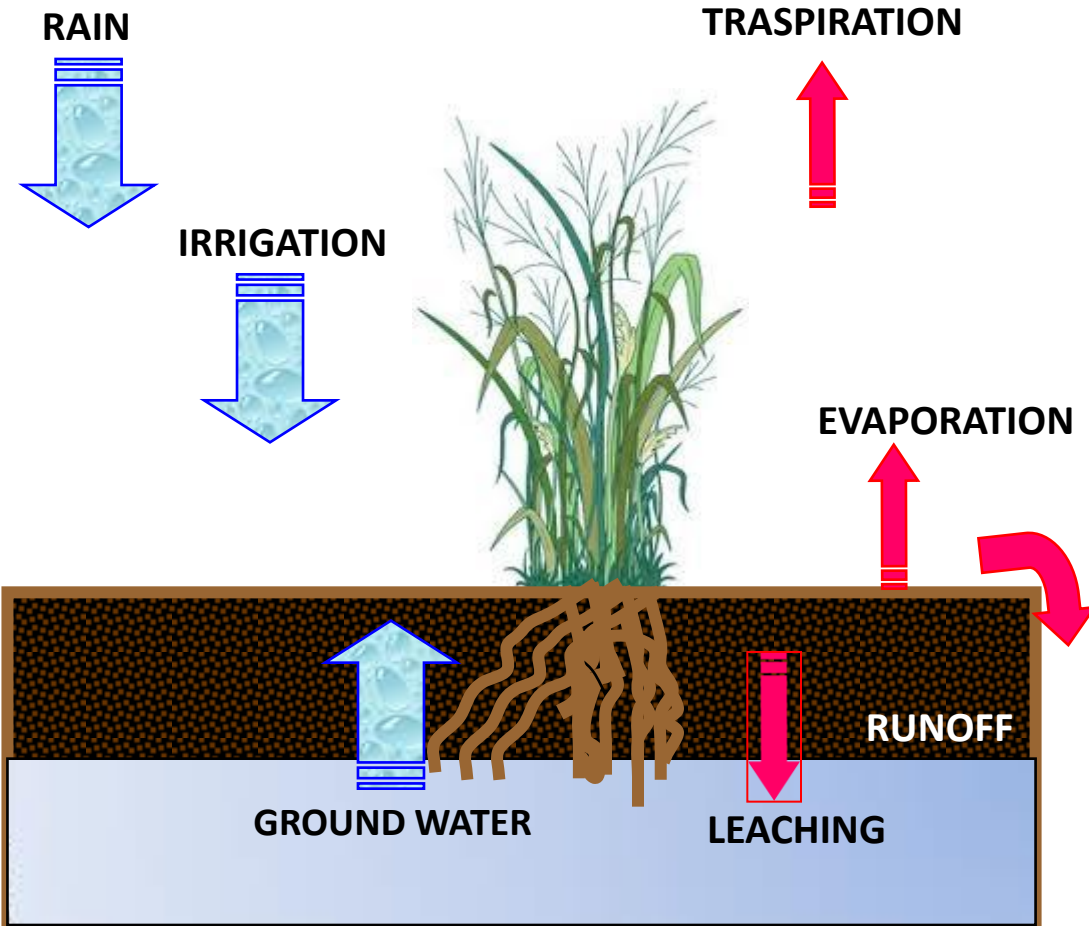
In RDP 2014-2020 relevant governance practices have been applied on irrigation water management. However, the use of DSS such as IRRINET is only one user friendly system that need to be connected with others systems such as:

- water saving irrigation technics
- water reuse
- innovative irrigation technologies under a more sustainable approach.



**Thank you for your  
attention!**

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- IRRINET, calculates water consumption by estimating the crop evapotranspiration based on agro-climatic data with cultural coefficient adjusted and adapted based on FAO data.
- IRRINET contains algorithms of crop development (degree-days) and root growth; estimate the contribution of surface water to satisfy the water requirements of the crop