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LABIRINTO D'ACQUE 2018

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The virtuous path

from water scarcity to water efficiency

International conference and exhibit - March 21, 2018

Under the high patronage of the President of the Italian Republic and of the European Parliament

BURANA LAND-RECLAMATION BOARD

- A HISTORY TELLS BETWEEN TWO RIVERS, SECCHIA AND PANARO, TO ENSURE SAFEGUARD OF THE TERRITORY AND PRESERVATION OF WATER RESOURCES FOR IRRIGATION-

CONSORZIO DELLA BONIFICA BURANA

Ing. Fabio Paglione

Technical area
Burana Land-Reclamation Board - Modena

Parma - March, 21 - 2018

BURANA
LAND-RECLAMATION BOARD

Water resources management in the Po river valley

HEADQUARTER
Corso Vittorio Emanuele II, 107 – 41121 Modena
Ph. +39 059 416.511 – e-mail: segreteria@consorzioburana.it

LOCAL OFFICES
Bondeno (Fe) – Mirandola (Mo) – S. Giovanni in Persiceto (Bo)

2018, March 21st

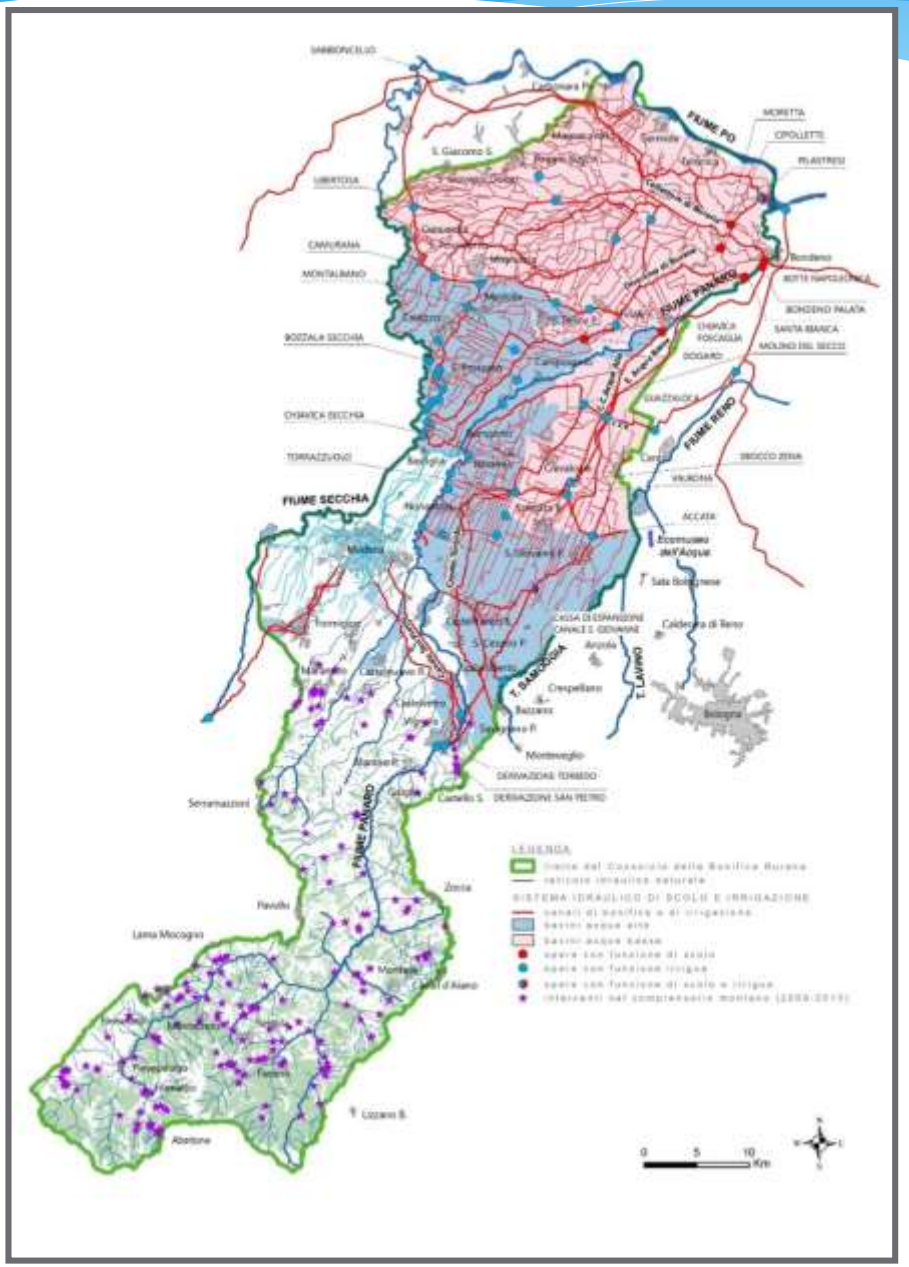
PRESENTATION OF THE BOARD

The main activities of Burana Land-Reclamation Board are in the field of:

- **WATER DRAINAGE;**
- **WATER SUPPLY;**
- **SOIL CONSERVATION.**

Burana Land-Reclamation Board main activities concern the **conservation and safeguard of the territory, with particular attention to water resources and their use, ensuring water drainage from urban centres and farming areas and water supply throughout the area under its management. Moreover it operates to defend the territory against subsidence, landslides and hydrological instability.**

PRESENTATION OF THE BOARD



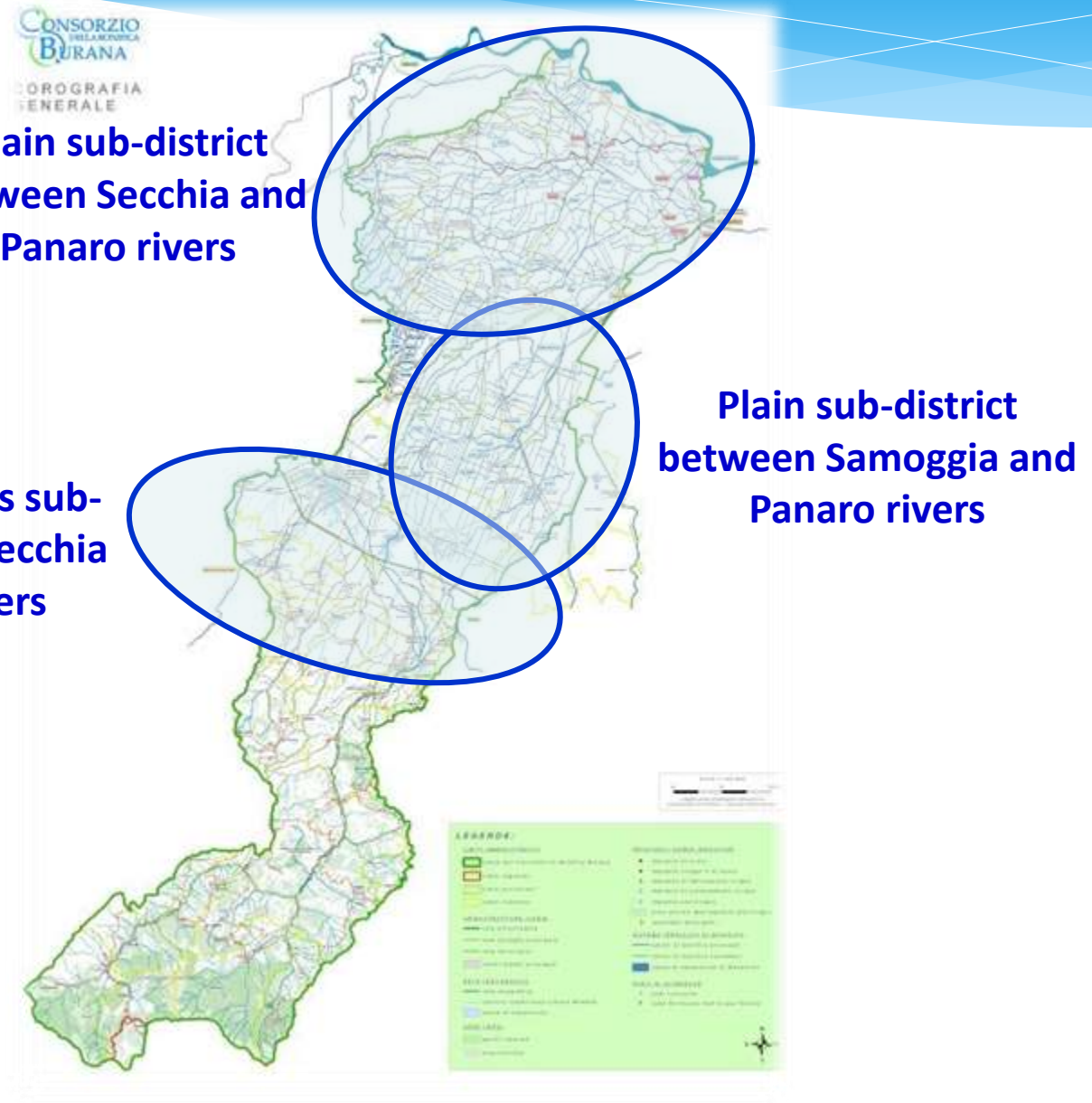
242,521 hectares

- 166,471 in the plain area

- 86,050 in the hill and mountain area

The area, under the Boards's management, is one of the most fertile zones of Po Plain which is characterised by technologically **advanced farming practices and strategic industrial districts**. Furthermore, several environmentally important **wetlands** are located in this district, where many rare species of plants, birds and animals can be found. The **water supply** of these protected areas is guaranteed by Burana Board.

DISTRICTS OF BURANA LAND-RECLAMATION BOARD – IRRIGATED AREAS



SAFEGUARD ACTIVITY

In the plain sub-district drainage canals are the only system able to remove water rainfall.

during a flood wave phenomena…..

Urban areas are exposed to dangerous flash flood. Flash flood are not only caused by excessive rainfall of high intensity but also by melting snow after a «normal» rainfall event.

…..after a flood wave phenomena, embankment stability may decreases

WATER SUPPLY ACTIVITY

water is delivered to agricoltural holdings by a huge canals network

… sometimes canals become the meeting place for fishermen and families

WATER SUPPLY ACTIVITY – *irrigation systems to save water*

drop irrigation system

micro-irrigation system

THE IMPORTANCE OF WATER EFFICIENCY MANAGEMENT

WATER IS RICHNESS AND IN NEXT YEARS IT WILL BE A SCARCE COMODITY

SO WE HAVE TO LEARN USING IT CONSCIOUSLY

At present time Emilia-Romagna is considered one of the richest European regions and the second Italian region by GDP per capita (Istat, 2015 year) with an important balance between agriculture and industry.

Indeed, in spite of the great variety of industrial activities in this region, the importance of agriculture has not been eclipsed and Emilia-Romagna is **among the leading regions in the country**.





DROUGHT

A LAND AFFECTED BY DROUGHT

- Financial losses for agricoltural and livestock holdings;
- Disappearing of river habitats and wetlands;
- Deterioration of terrestrial ecosystems directly linked with wetlands;
- Qualitative deterioration of water resources: drinking and for irrigation;

Regione Emilia Romagna - PLV / beneficio irriguo / % danno per Provincia

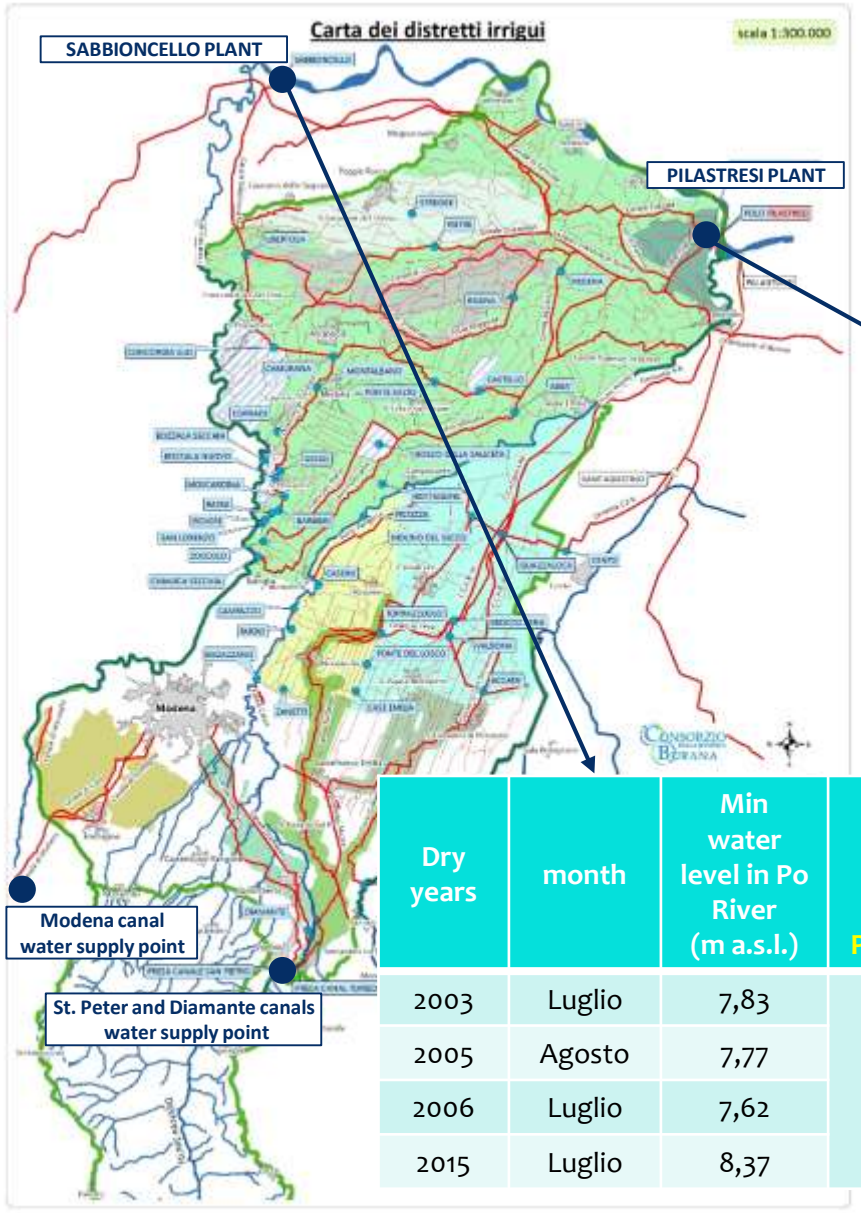
Provincia	PLV Provinc.	beneficio irriguo	% crops damage
PIACENZA	181.740.000	75.733.000	41,67%
PARMA	88.550.000	60.000.000	67,75%
REGGIO EMILIA	131.530.000	60.344.000	45,87%
MODENA	290.030.000	101.685.000	35,06%
BOLOGNA	324.670.000	99.310.000	30,58%
RAVENNA	491.310.000	155.130.000	31,57%
FORLì - CESENA - RIMINI	256.840.000	82.565.000	32,14%
FERRARA	496.570.000	172.547.000	34,74%
REGIONE EMILIA ROMAGNA	2.261.240.000	807.314.000	35,68%

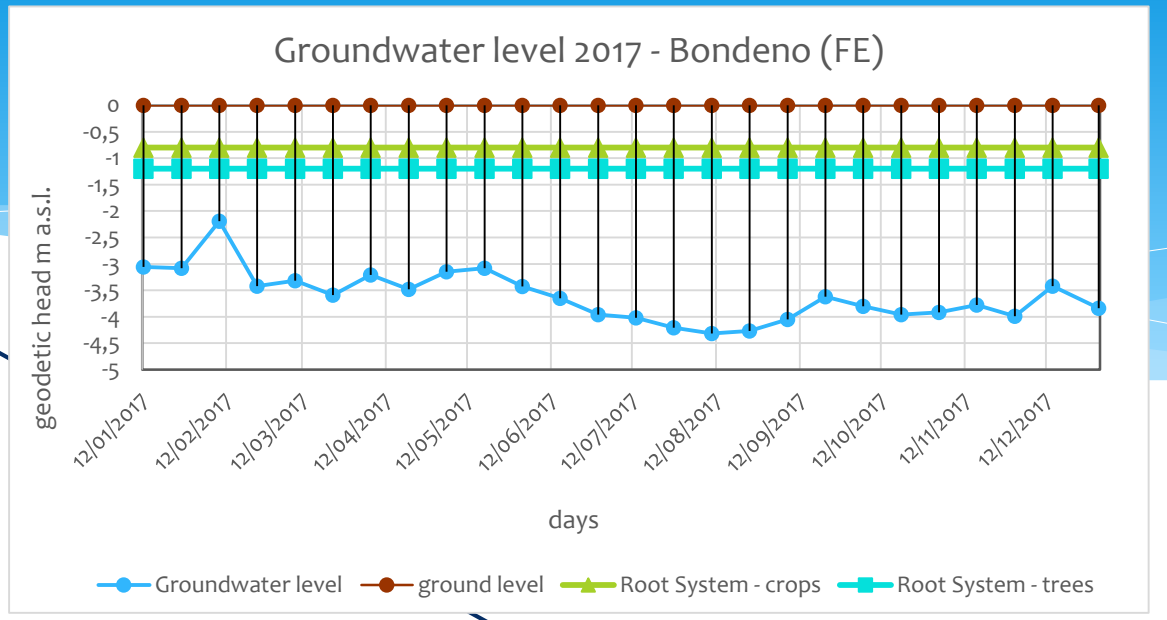
Fonte: dati Regione Emilia Romagna e CER (Consorzio di II grado per il Canale Emiliano Romagnolo)

Water supply in Burana District due to rainfall

subdistrict into Burana Basin	medium rainfall (mm/year)	rainfall due to drought (mm/year)	deltaV (mm/year)
Plain and hill	473	334	-139
Mountain	839	621	-218

DROUGHT





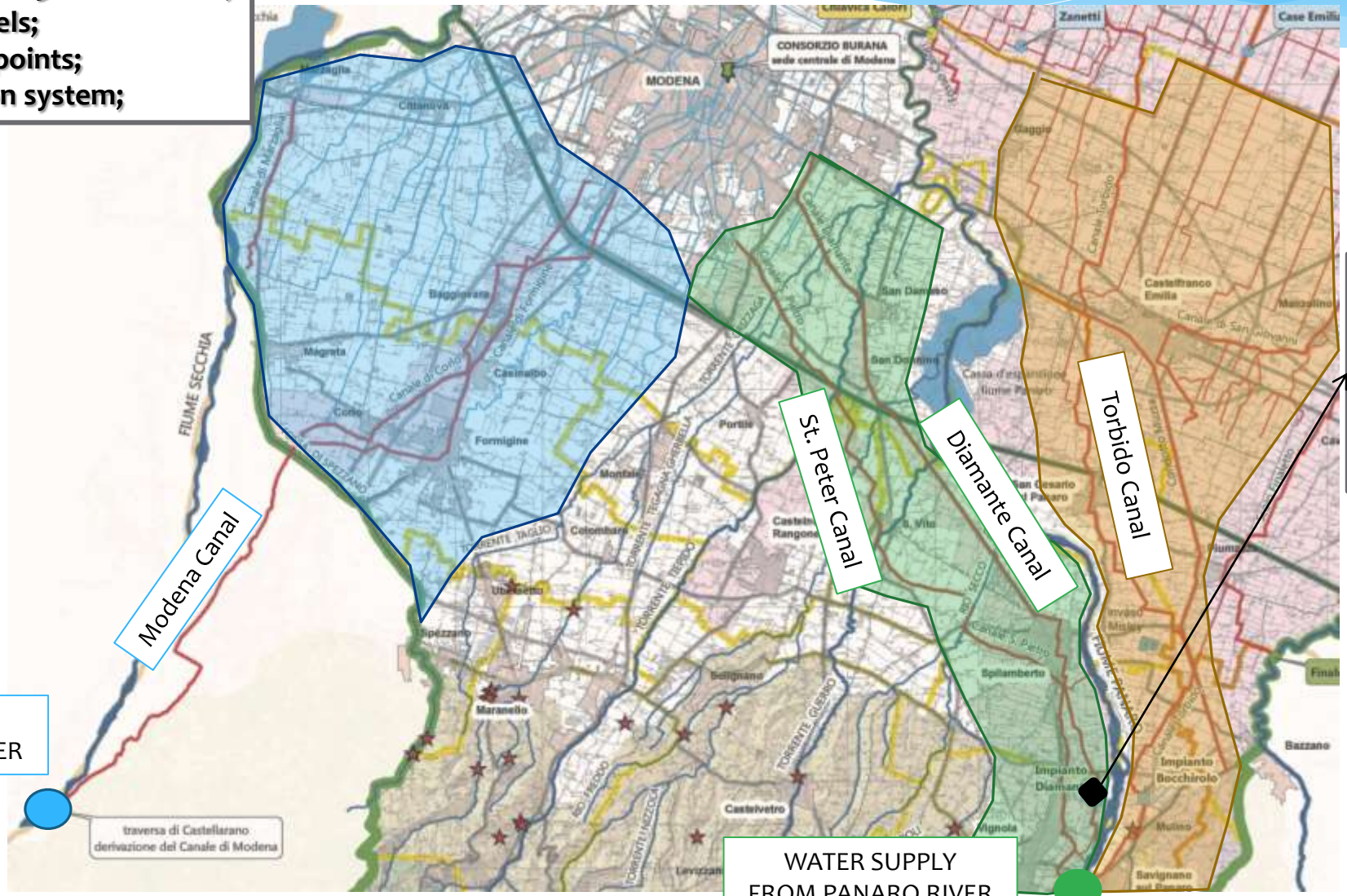
Dry years	month	Min water level in Po River (m a.s.l.)	Min pumping level in Po River – Sabbioncello Plant (m s.l.m.)
2003	Luglio	7,83	7,50
2005	Agosto	7,77	
2006	Luglio	7,62	
2015	Luglio	8,37	

Dry years	month	Min water level in Po River (m a.s.l.)	Min pumping level in Po River – Pilastresi Plant (m s.l.m.)	Min pumping level in Po River – Pilastresi Plant SUBSIDIARY I (m s.l.m.)	Min pumping level in Po River – Pilastresi Plant SUBSIDIARY II (m s.l.m.)
2003	Luglio	2,75	3,2	2,5	2,0
2005	Agosto	2,62			
2006	Luglio	2,68			
2015	Luglio	3,15			

The lack of water during the summer months, due to meteo-climatic changes, resulting from the ever decreasing level of minimum flow of R. Po, has induced Burana to plan a series of interventions concerning both management for the optimization of available resources and adaptation of hydraulic structures in order to meet the new needs of water for irrigation purposes.

IN THE HILLS AND HIGHLANDS SUB-DISTRICT

The Burana Board manages:
- **a drainage area of 3.800 hectares;**
- **80 km of channels;**
- **3 water supply points;**
- **1 micro-irrigation system;**



WATER SUPPLY
FROM SECCHIA RIVER

WATER SUPPLY
FROM PANARO RIVER

Diamante plant

Year of construction 2009;
Area = 35 hectares;
n. Agricoltural holdings = 13;
n. of pumps = 3;
Qtot = 60 l/s;
P = 4 bar.

ST. PETER AND DIAMANTE CANAL GATE ON THE PANARO RIVER - *Water supply point*

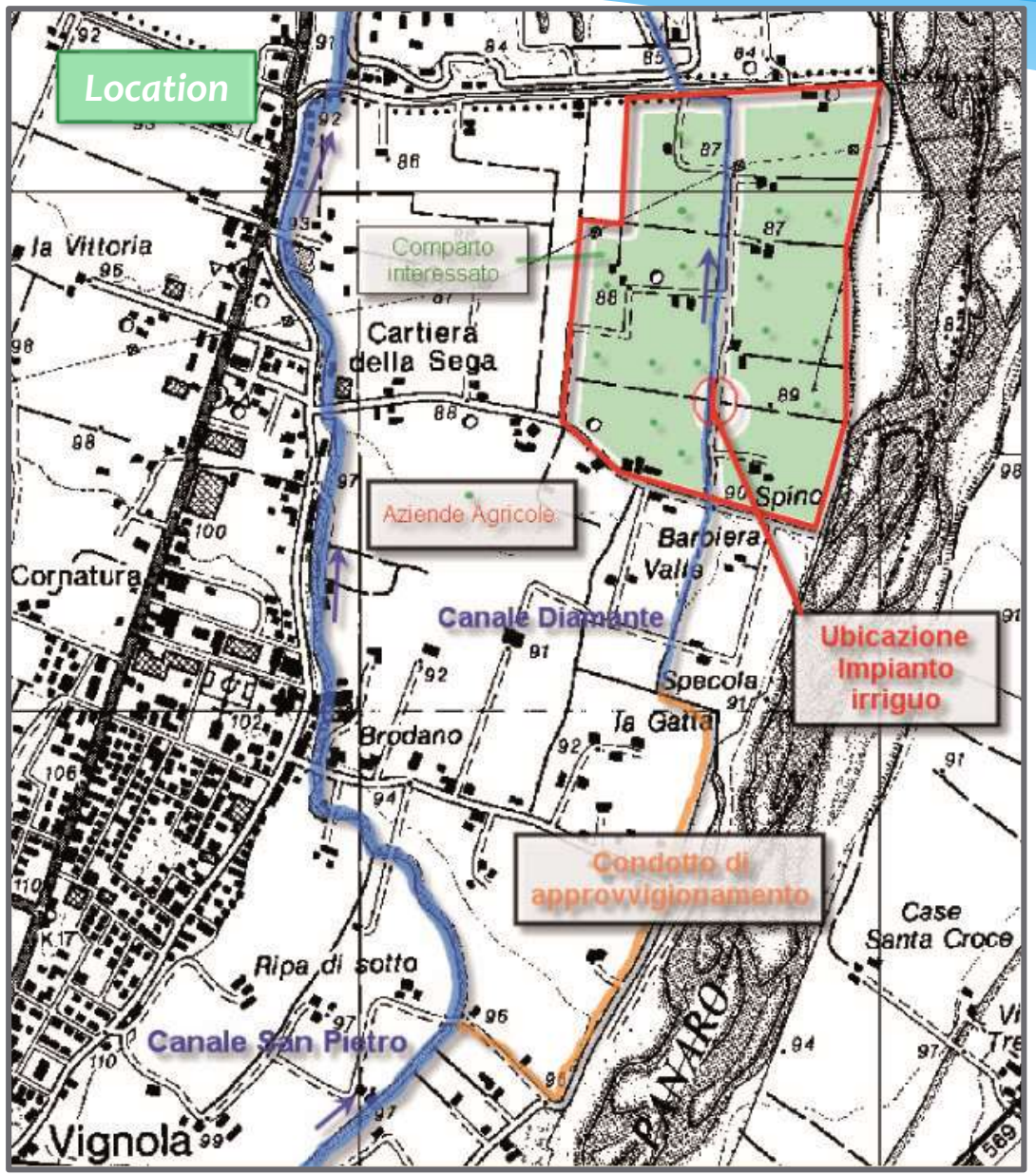
Gravity water supply system
Q = 2,7 m^3/s;
Historical sources talk about this canals network since the roman age.

DIAMANTE CANAL - VIGNOLA (MO)

Diamante is about 22 km long

St. Peter and Diamante canals make possbile the irrigation of 2.734 hectares. This area is caracterized by a high agronomic value, in which there are some of the most preciouses crops such as cerry and vinegards.

MICRO-IRRIGATION SYSTEM ON DIAMANTE CANAL

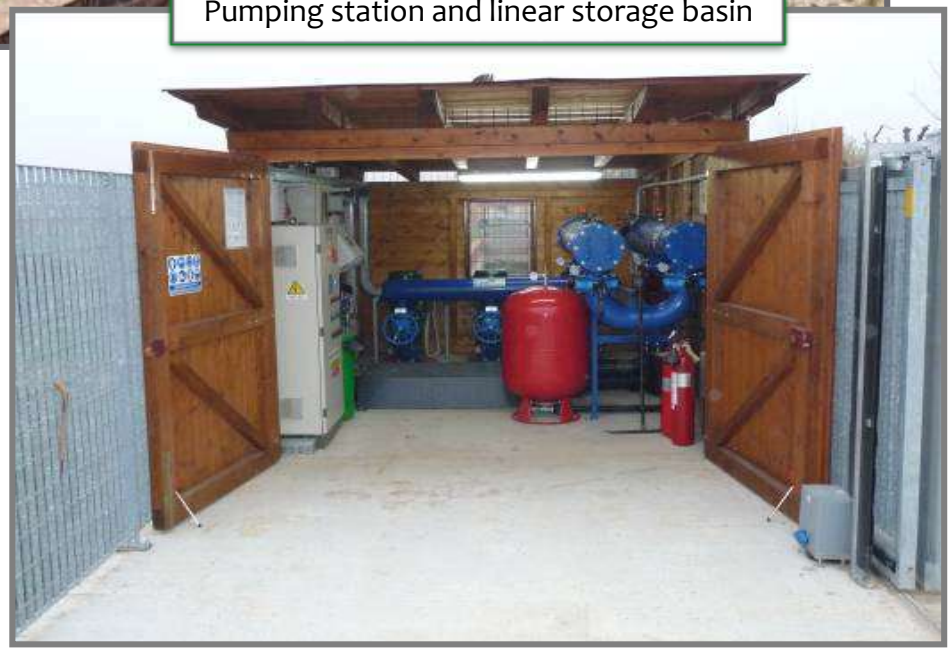


Data

AZIENDE AGRICOLE INTERESSATE	N° 13
SUPERFICIE IRRIGUA COMPLESSIVA	35 Ha.circa
VOLUME UTILE INVASO STAZIONE DI POMPAGGIO	585 mc.
DOTAZIONE MEDIA IDRICA ALL'IDRANTE AZIENDALE:	50 mc/h.
PORTATA MAX. IDRICA DELL'IMPIANTO	60 l/sec.
DOTAZIONE IDRICA COMPLESSIVA	1,7 l/sec./Ha
TURNO IRRIGUO MEDIO	4 gg
TIPOLOGIA DI IMPIANTO	automatico con telecontrollo
TIPOLOGIA DI EROGAZIONE	Programmata e/o manuale
PRESSIONE MEDIA DI ESERCIZIO:	4 bar
TIPOLOGIA DI FILTRAZIONE PRINCIPALE:	autopulente 100 micron
TIPOLOGIA DI FILTRAZIONE SECONDARIA	filtro a rete
STIMA VOLUMI IRRIGUI METODO TRADIZIONALE	8.000 mc/Ha/anno
STIMA VOLUMI IRRIGUI METODO A MICROSPRUZZATORI	3.250 mc/Ha/anno
RISPARMIO IDRICO	oltre 60%
VOLUME MEDIO STAGIONALE CON IRRIGAZIONE A SCORRIMENTO	8.000 mc/Ha/anno circa
VOLUME MEDIO STAGIONALE CON MICROIRRIGAZIONE	3.250 mc/Ha/anno circa

MICRO-IRRIGATION SYSTEM ON DIAMANTE CANAL

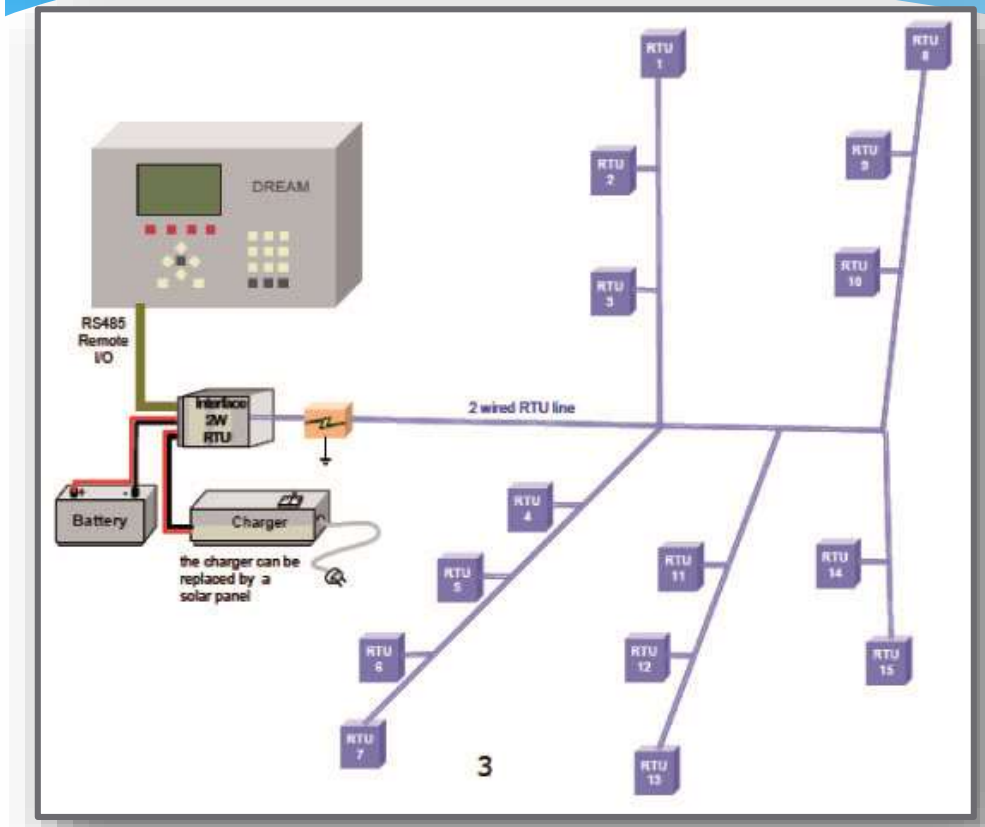
Pumping station and linear storage basin

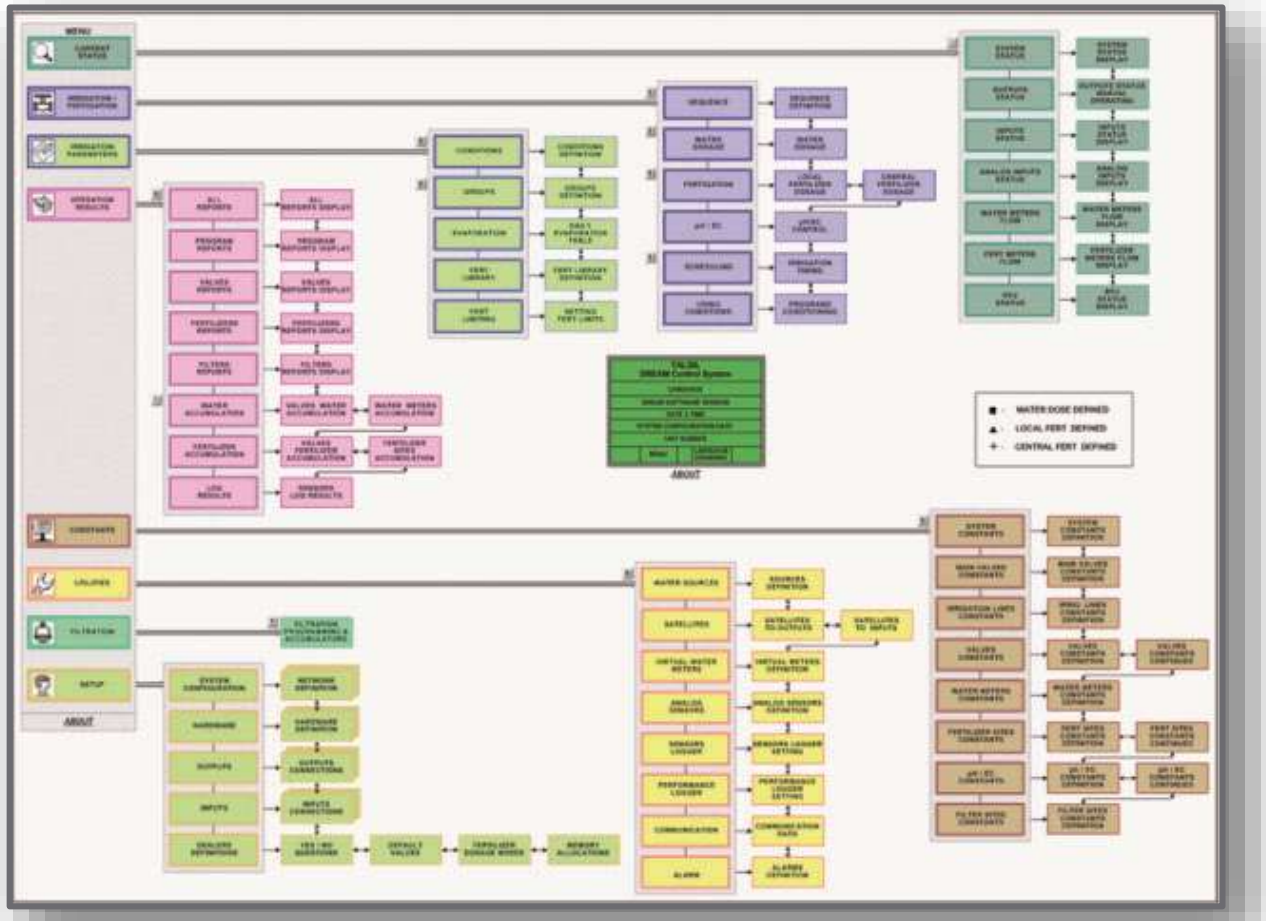


Irrigation hydrant

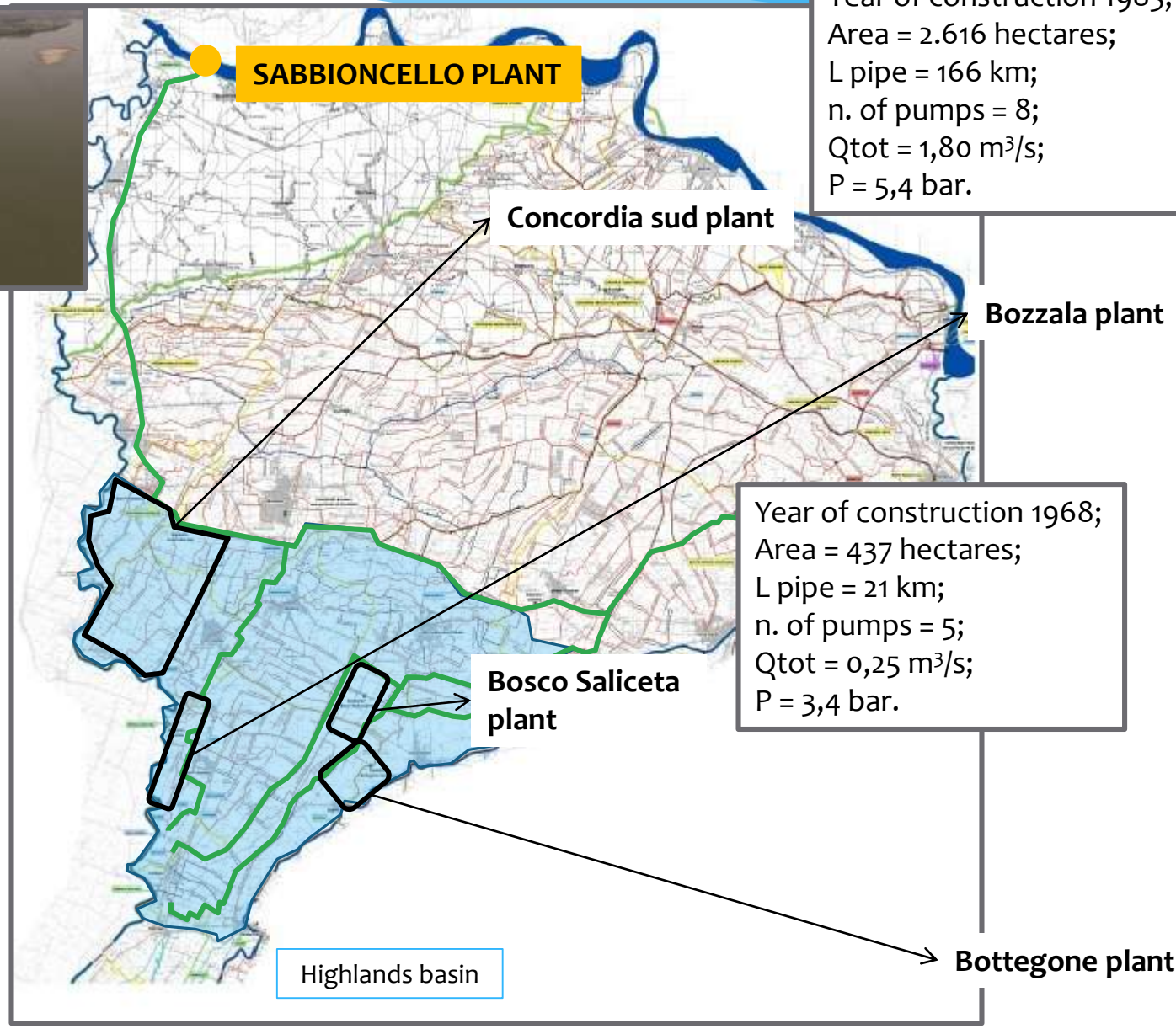
nozzels

MICRO-IRRIGATION SYSTEM ON DIAMANTE CANAL - *Remote control system*





IN THE PLAIN SUB-DISTRICT



Year of construction 1983;
Area = 2.616 hectares;
L pipe = 166 km;
n. of pumps = 8;
Qtot = 1,80 m³/s;
P = 5,4 bar.

Year of construction 1994;
Area = 358 hectares;
L pipe = 30 km;
n. of pumps = 4;
Qtot = 0,32 m³/s;
P = 6,0 bar.

Year of construction 1968;
Area = 437 hectares;
L pipe = 21 km;
n. of pumps = 5;
Qtot = 0,25 m³/s;
P = 3,4 bar.

Year of construction 1967;
Area = 600 hectares;
L pipe = 42 km;
n. of pumps = 4;
Qtot = 0,36 m³/s;
P = 2,8 bar.

PRESSURIZED IRRIGATION SYSTEMS

CONCORDIA SUD PLANT

Pumping station

Pumping by-pass and safety air tank

PRESSURIZED IRRIGATION SYSTEMS

Bottegone plant

Bozzala plant

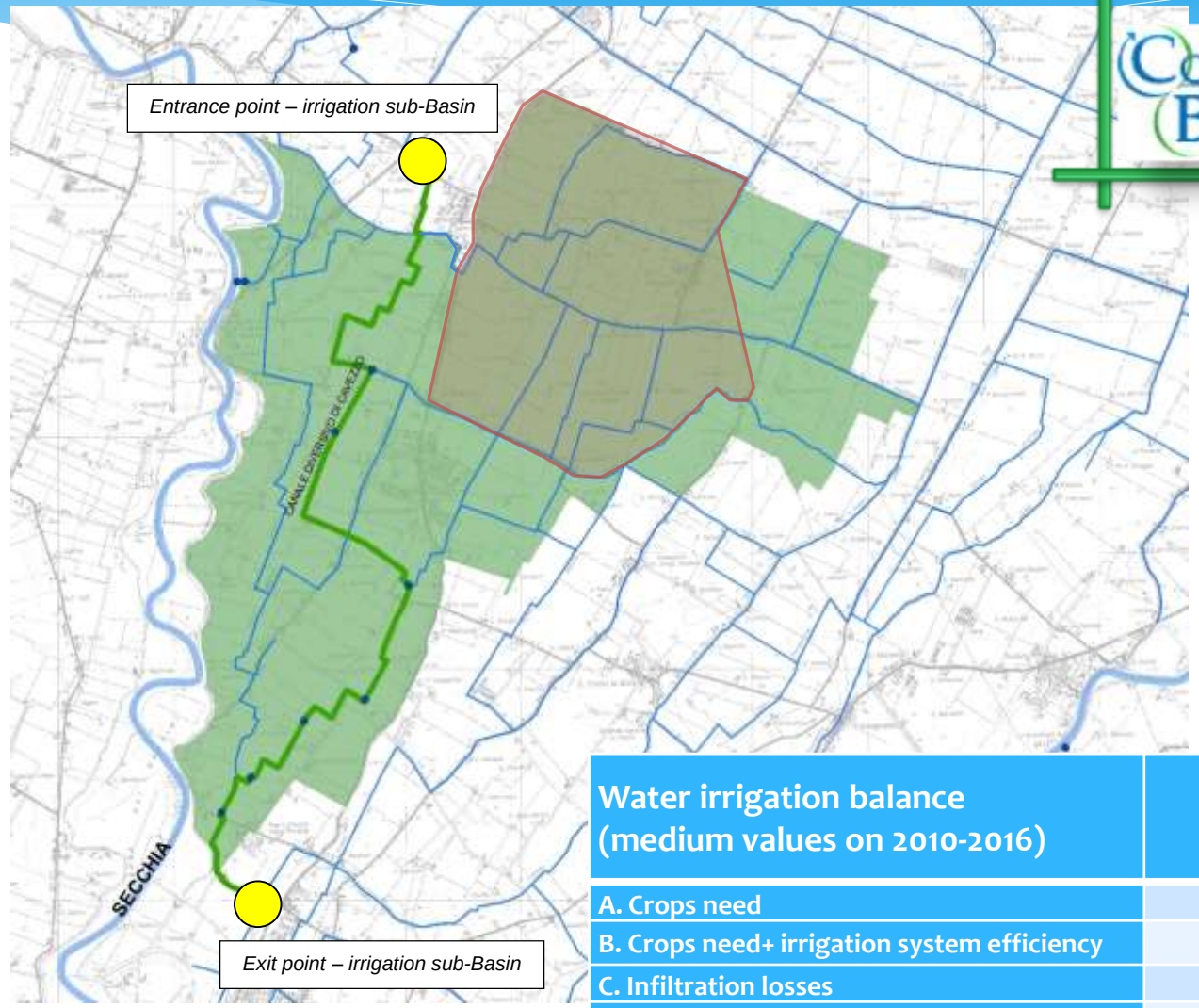
Bosco Saliceta plant

PLANNING INNOVATION FOR WATER EFFICIENCY

Since the beginning of the last century Burana Land-Reclamation Board has planed and designed modern hydraulics works, using innovative techniques, to improve water resources management and to be more mindful of the environment.

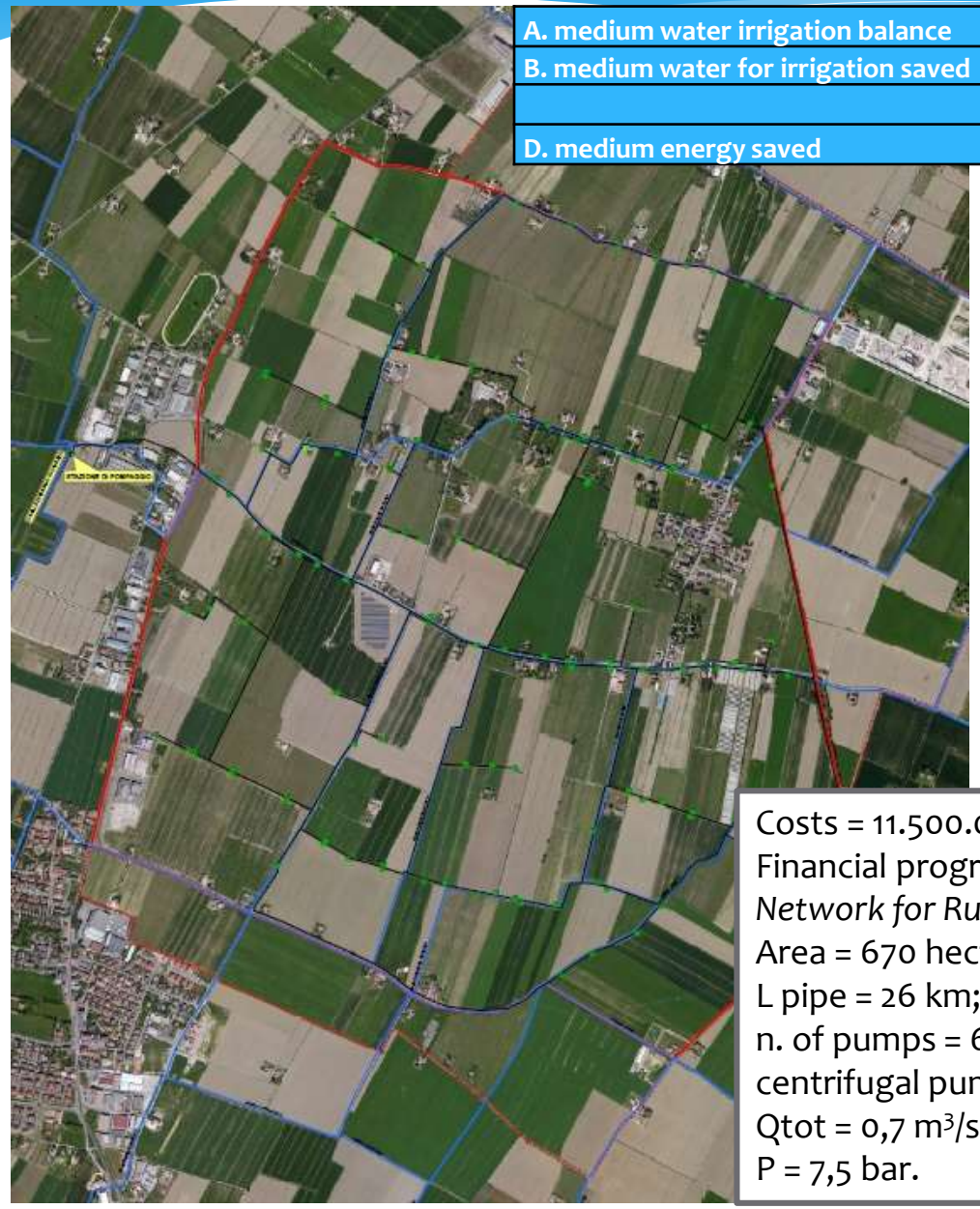
In 2016 the Italian Department of Agricolture has approved a plan in which there are structural monetary funds, coordinated by the Common Strategic Framework (CSF): *European Network for Rural Development.*

Burana Land-Reclamation Board, whose most important goal in these years has been to promote the competitiveness of the agricultural sector, strictly related to the protection and the development of rural areas, has designed a new innovative and technologically advanced irrigation system to save about 40% of total annual water volume needs for the irrigation into an area of 8.000 ectars, caracterized by a high agronomic value, in which there are some of the most precious crops such as pears, vinegards and melons.

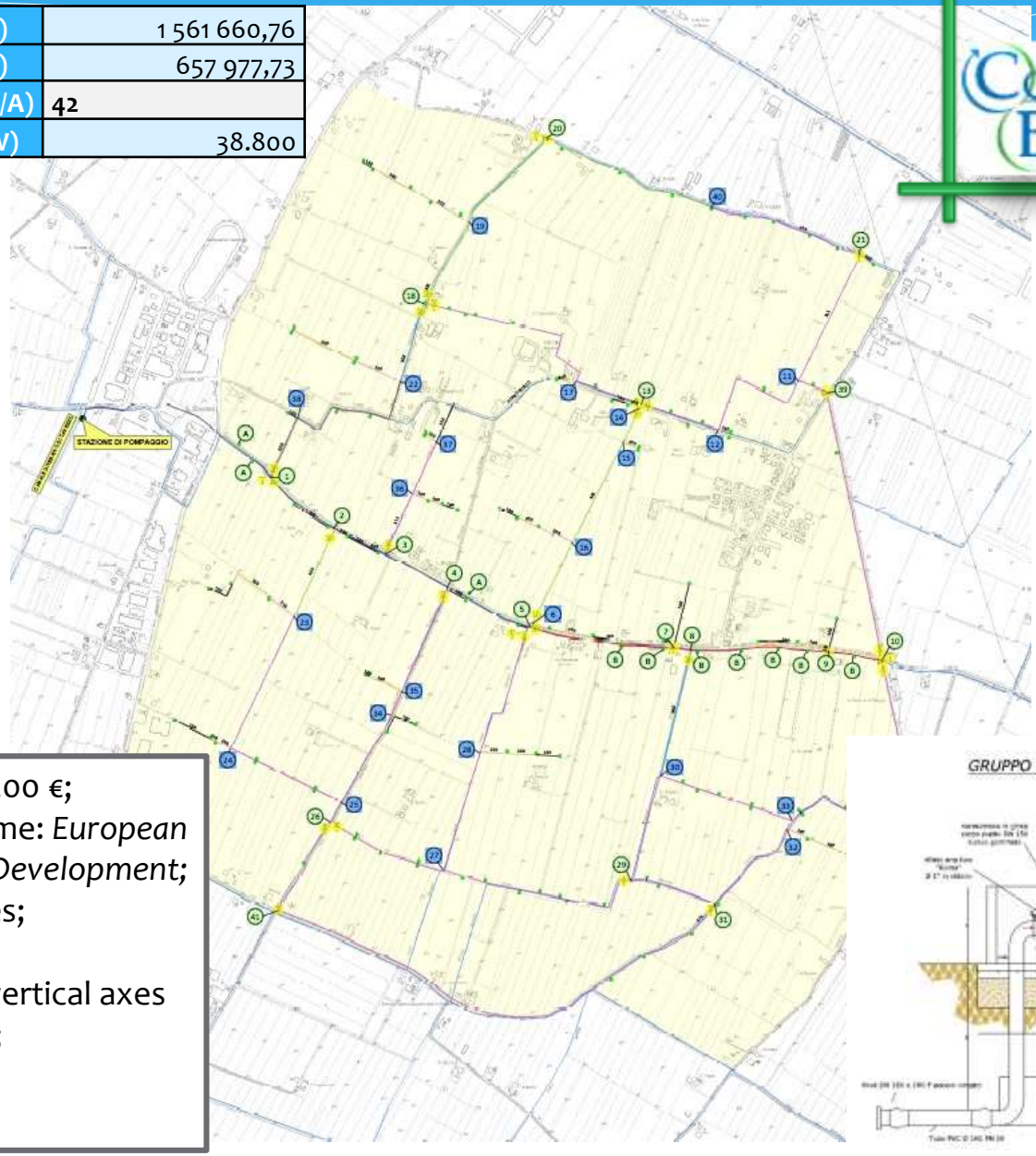


Water irrigation balance (medium values on 2010-2016)	volume (m^3)
A. Crops need	632 578,12
B. Crops need+ irrigation system efficiency	903 683,03
C. Infiltration losses	634 899,00
Total (B+C)	1 538 582,03
D. Evapotraspiration	23 078,73
Total (B+C+D)	1 561 660,76

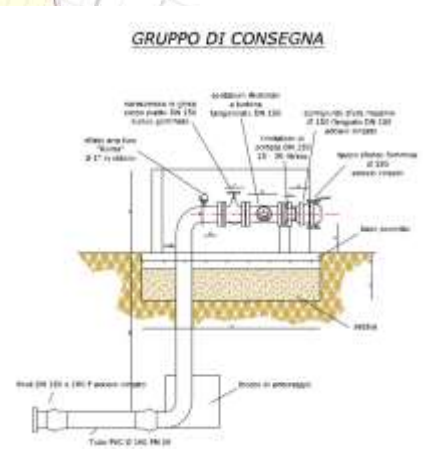
PLANNING INNOVATION FOR WATER EFFICIENCY



A. medium water irrigation balance	(m^3)	1 561 660,76
B. medium water for irrigation saved	(m^3)	657 977,73
	% (B/A)	42
D. medium energy saved	(kW)	38.800

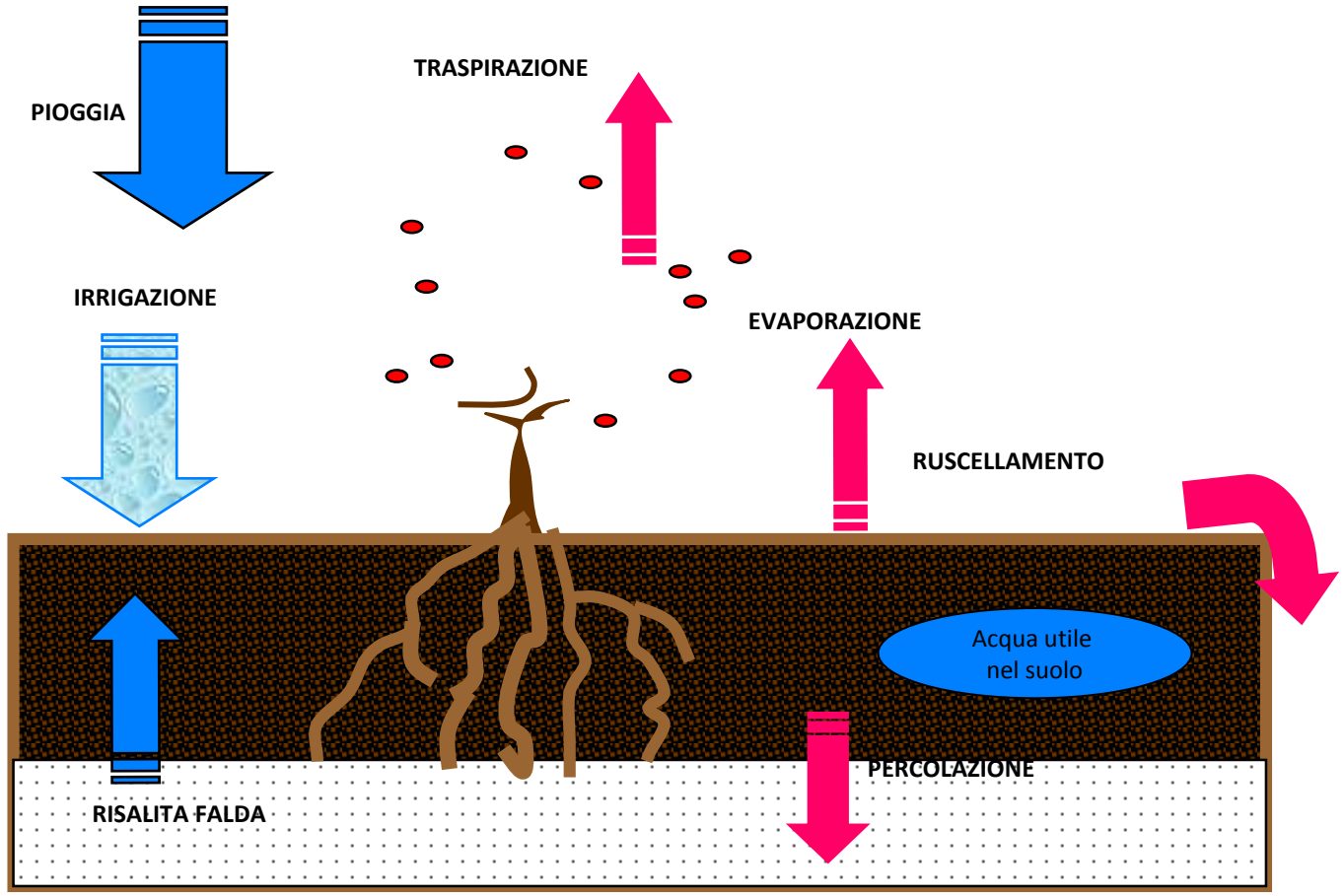


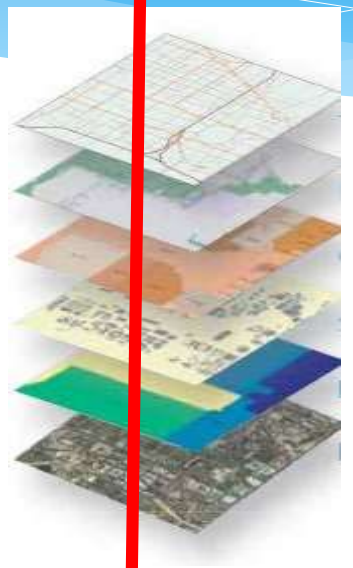
Costs = 11.500.000,00 €;
Financial programme: *European Network for Rural Development;*
Area = 670 hectares;
L pipe = 26 km;
n. of pumps = 6 – vertical axes centrifugal pumps;
Qtot = 0,7 m^3/s;
P = 7,5 bar.



WATER BALANCE

LOSSES | RECHARGES | IRRIGATION





GIS system for agricoltural holdings

Irrigation basin data

FEATURES

- Meterological data
- Soil information
- Groundwater data
- Crops information

Irrigation service device

IRRIGATION SERVICE DEVICE

Irriframe
IL PORTALE DELL'IRRIGAZIONE

ANBI

Utente **paolo mannini** Email **mannini@consorziocer.it** Profilo > | Dashboard | Help | Esci

Dashboard - Cruscotto IrriFrame

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Clicca sul link per il menù		consumo mm	data prevista	volume mm	
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Gestione

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- Nuovo pluviometro >
- Lista appezzamenti >
- Lista aziende >
- Lista pluviometri >

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IRRIGATION SERVICE DEVICE

Irrinet

Farmers can recieve a text on their phone about how much water (mm) they have to use for X days on their crops.

Burana update every year this service with information about crops of its farmers

THANK YOU