



Widespread introduction of constructed wetlands
for a wastewater treatment of Agro Pontino

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CONSORTIUM FOR THE LAND RECLAMATION OF THE "AGRO PONTINO"

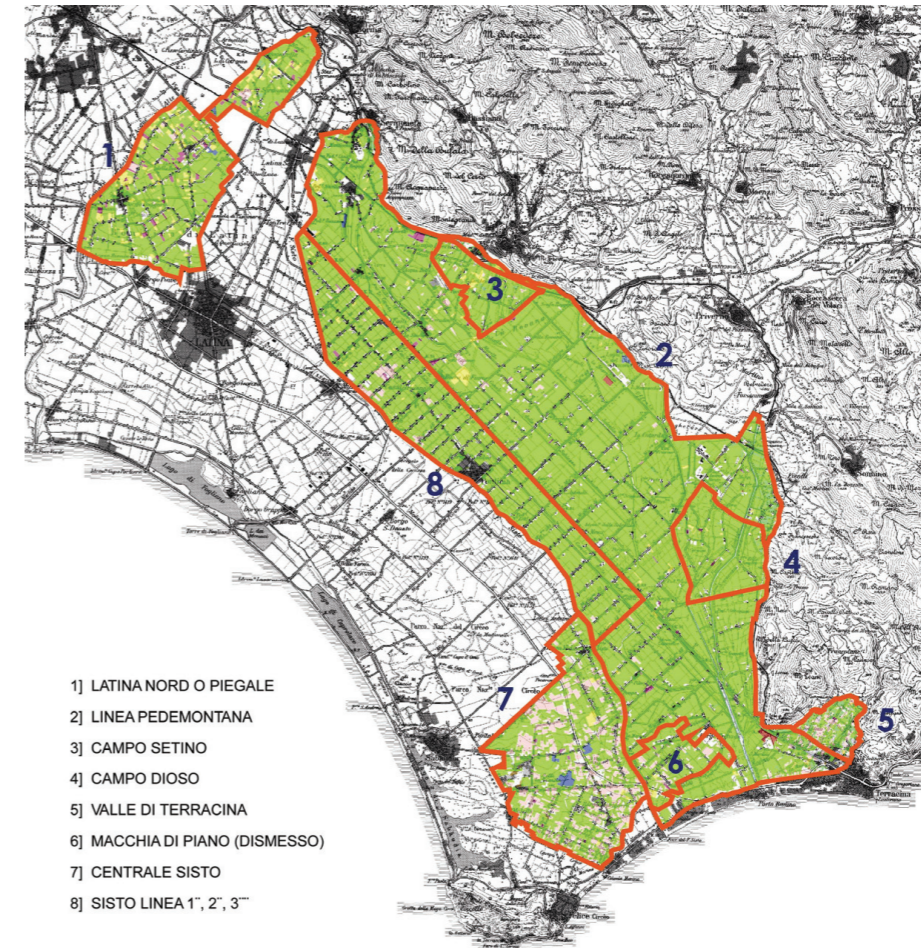
ACTION 4.1

REPORT ON THE USE OF THE WATER RESOURCE FOR AGRICULTURAL PURPOSES

Partner:



REPORT ON THE USE OF THE WATER RESOURCE FOR AGRICULTURAL PURPOSES



General overview

¹This report illustrates the estimates of the most likely irrigation needs, and the consequent uses through withdrawal from the water network of the Consortium.

The irrigation of the Pontine land started with the “great reclamation” of the Thirties, through the first plants which withdrew from the dense network of canals deriving from the springs at the foot of the Lepini and Ausoni Mountains and from the ground waters, in particular the coastal dune groundwater.

After the war, other plants have been realised, and, many years later, the

¹ This document is a summary of the Italian version.

"Cassa per il Mezzogiorno" (the national Fund for the South) financed more modern pressure plants.

Currently the "Consortio di Bonifica dell'Agro Pontino" manages six collective plants (Latina Nord, Campo Setino, Campo Dioso, Valle di Terracina, Centrale Sisto, Sisto Linea), coinciding with homonymous irrigation districts. The Sisto Linea plant is subdivided into three districts (Sisto Linea 1° – Sisto Linea 2° – Sisto Linea 3°).

Besides the above mentioned irrigation districts, there is a wide agricultural area which is served by the so-called "emergency irrigation".

Rather than a real plant, it is a system of drains, dams, sluice gates and pumps installed in various locations.

Within the irrigation districts of the Consortium, the irrigation makes use of the water provided by the Consortium itself, but also of withdrawals from surface and ground waters. In this latter case, the well-known problems are the presence of illegal wells (under the administrative point of view) the salt wedge intrusion and the subsidence (under the environmental point of view).

The following table refers to each single irrigation district, and shows the essential data in terms of authorisations.

	Data about authorisations	Year of authorisation	End of period authorised	Yearly fee	Authorised flow	Source of withdrawal
Irrigation districts	Campo Setino	03/12/1963	02/12/2033	441,19 €	1,00m ³ /sec	Fiume Cavatella
	Campo Dioso			485,30 €	1,10m ³ /sec	Fiume Amaseno
	Valle di Terracina	30/01/1961	29/01/1991	176,47 €	0,40m ³ /sec	Canale Navigazione
	Linea Sisto 1	09/11/1964	08/11/2033	992,66 €	2,25m ³ /sec	Fiume Cavata
	Linea Sisto 2	09/11/1964	08/11/2033	992,66 €	2,25m ³ /sec	Fiume Cavata
	Linea Sisto 3	09/11/1964	08/11/2033	992,66 €	2,25m ³ /sec	Fiume Cavata
	Centrale Sisto	30/06/1954	29/06/2024	882,37 €	2,00m ³ /sec	Canale Linea Pio
	Latina Nord	09/06/1989		1.085,31 €	2,46m ³ /sec	Fiume Ninfa

Studies and sources

The data about water requirements and agricultural uses have been acquired from the recent "Rapporto sullo stato dell'irrigazione nel Lazio" (Report on the state of irrigation in Latium) published in July 2007 by the Istituto Nazionale di Economia Agraria (National Institute of Agrarian Economics) and from the survey on the agricultural systems and water requirements, on the basis of which the report has been elaborated.

The following data have been acquired:

- estimate of the potentially irrigable areas within the boundaries of the irrigation districts;
- identification of cultivations, definition of water requirements for each type of cultivation, and definition of the seasonal volumes needed.

Potentially irrigable areas

- **total surface:**
total surface of the irrigation district;
- **agricultural surface:**
total surface, except for the non-agricultural areas (such as roads, built areas, etc.), as inferred by the Regional Technical Map;
- **estimated irrigated/irrigable SAU (Used Agricultural Surface):**
agricultural surface, except for the non-agricultural farm surface (15%); this surface is considered as potentially irrigable in its entirety.

Main cultivations and seasonal volumes

Horticulture is the most extended cultivation, also increasing compared to arable land for animal husbandry purposes, which is instead decreasing. Kiwi is a very important cultivation, especially in the northern areas.

	Total surface	Agricultural surface	Estimated irrigated/irrigable SAU
Campo Dioso	1.424	1.282	924
Campo Setino	871	708	644
Centrale Sisto	3.800	3.747	2.759
Linea Pedemontano	18.513	16.634	14.138
Latina Nord	3.925	3.415	2.198
Liea Sisto 1	1.441	1.440	1.001
Liea Sisto 2	1.509	1.446	991
Liea Sisto 3	1.578	1.561	1.129
Valle Di Terracina	500	418	357
Total	33.561	30.651	24.141

Requirements

The Pontine agriculture is strongly characterised by intensive cultivations and high water requirements: fodder and corn silage, horticulture, kiwi. There are also other cultivations with lower requirements, such as vineyards and olive groves, wheat, sunflower, etc., but at a lower extent.

There is a total requirement of above 76 million cubic metres, slightly more than what declared by the above mentioned report (75.7 millions), despite the decrease of the water requirements for horticulture, and the disappearance of beet cultivation.

Irrigation techniques and problems connected

Sprinkler irrigation is widely predominant in all irrigation districts, except for the district "Valle di Terracina". This system needs a high water pressure, with considerable repercussions on costs and water consumption.

The Consorzio di Bonifica believes that the major efforts for the improvement and modernisation of the irrigation service have to be directed towards this sector, by fostering and incentivising a progressive shift from sprinkler systems towards localised irrigation. This shift can be of course implemented

on the base of precise financial evaluations.

Each irrigation system has a different relationship between labour costs, investment costs, energy costs and the costs related to the water resource. Generally, methods reducing labour costs are more expensive as investment.

The drip irrigation system is the one that combines a high cost of materials to indisputable agronomic advantages and labour savings. A field that is irrigated with this system can be walked through during and immediately after irrigation. Therefore, drip irrigation (micro-irrigation) can simultaneously fulfil three primary needs: irrigation, fertilisation (fertigation) and harvesting.

There are certain cultivations that, more than others, can valorise the above mentioned positive characteristics, such as horticulture, which is very common in the Pontine Plain.

Horticulture is often characterised by a long growing season; for this reason, the harvesting, fertilisation and irrigation operations are numerous, therefore, if they can be simultaneously carried out, there will be indisputable time and labour savings.

Another relevant aspect is the efficiency of this system, that, more than others, brings together the cultivation irrigation needs and the field irrigation needs; in other words this method meets the physiological requirements of the plant during its development and production cycle. The water doesn't wet the leaf surface, and this is an advantage especially in the greenhouses, where the problem of cryptogamic diseases is more relevant. The high efficiency of the system, moreover, minimises the runoff and percolation losses of water and fertilisers, protecting the surface and ground waters. However, this method, as already mentioned, needs high investments, which don't get along with the normal practice, the availability of the resource (except for the drought periods), and the presence of low-profit cultivations.



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