Water2Adapt

Resilience enhancement and water demand management for climate change adaptation

Factsheet

The Trebbia river basin

THE RIVER

The Trebbia river is one of the few tributaries of the Po which preserves pristine natural characteristic and a great landscape and cultural heritage (ARPA-EMR, 2003). Recently, the County sponsored the creation of a National Park along its shores. The Park gathers the most important natural area in the Piacenza plains and follows the river's meandering through several Municipalities: Rivergaro, Gazzola, Gragnano Trebbiense, Gossolengo, Piacenza, Rottofreno and Calendasco.

The Park will cover 4,049 ha, 1,423 of which along the river. There lay fluvial and peri-fluvial zones, most of which belong to the State, cultivated lands and a woodland area, named "Bosco di Croara" (ERMESambiente, 2009).

Length	116 km
Average Q	40m^3/s
Hydrograhic basin	1.070 km^2 (1,5% of the total Po basin)
Springs at	San Lazzaro nell'Appennino
Flows into	Po
Info	86% of territory in hilly and mountainous areas **Tributaries**: Aveto (30 km), Bobbo, Perino, and Dorba **Precipitation** 800-2000 mm/y **Administrative Units** Emilia-Romagna County and Liguria County **Main offtakes**: Rivo COune sulla riva Destra (10 m3/s)

Water2Adapt Project

Water2Adapt (September 2010-August 2012) is an applied-research project which seeks to produce policy-relevant knowledge and recommendations for water management and the implementation of the EU Water Framework Directive. In particular, the project will contribute to the economic analysis of water uses, efforts to set up efficient and socially equitable prices for water and water services, and to assess programmes of measures in the river basins. In addition, capacity workshops will be organised in the case study regions to increase awareness of the topics to which this project seeks to contribute.

Water2Adapt aims to:

- identify 'social drivers' of water scarcity - i.e., the practices which lead to unsustainable consumption and inefficient allocation of water;
- assess the magnitude and mediating factors of water scarcity- and drought-induced impacts;
- revisit the performance and wider impacts of the water demand management policies.

Resilience and adaptive capacity, that is the ability to withstand and recover from significant disruptions (or to absorb and cushion against damage), will be translated into practical management tool applicable at river basin scale.

www.feem-project.net/water2adapt/

Fondazione Eni Enrico Mattei

ISPRA Istituto Superiore per la Protezione e la Ricerca Ambientale

LAND RECLAMATION AND IRRIGATION BOARD FOR TIDONE AND TREBBIA RIVERS

The Trebbia river irrigation is managed by the Land and Irrigation Board for Tidone and Trebbia rivers, which administers 140,251 ha of land in the Western part of the Emilian territory, including some Municipalities in Lombardia and Liguria. Of the total surface, 19% is irrigated.

From a hydrographical perspective, the Board's territory is crossed by the Trebbia and Tidone rivers, whilst its Eastern boarders are marked by the Nure stream, all Appennine tributaries of the Po river. In this area, irrigation has been practiced for over 1000 years, especially with the Trebbia river's where farmers could benefit of its gradient for an easier distribution by gravity (Zucaro & Furlan, 2009).

In 1960, the construction of the Brugneto dam, with a 25 Mm^3 capacity, reduced the Trebbia discharge and inaugurated a series of conflicts between the Board and the City of Genoa, the main beneficiary of the dam for its potable water's supply. In normal years, the water division agreement is respected and the Board receives 2,5 Mm^3 between June and September (=2067 l/s/15dd), yet when water is scarce, this amount is reduced and conflicts ensue.

The Board itself manages the Molato dam, built in 1921-8 on the Tidone river, in order to both act as a water reservoir and regulate the destructive flood flow coming down the river. In addition, it aimed at a 30 million Kwh of electric production per year. The initial 12.5 Mm^3 reservoir is now down to 10 Mm^3 due to sedimentation. The dam is 55 m high and more than 300 m long. Its basin is 2.5 km long and its largest width is 750m.

The Board members are 12,000, of which 700 own land in the Trebbia basin. However, the majority leases it to larger agricultural enterprises, whose average size is 100 ha. In the Board's command area there can be witnessed a reverse trend to the rest of the Emilia county: rather than diminishing, the irrigated land is increasing constantly every year.

IRRIGATION AND AGRICULTURE

There are three main intakes along the Trebbia river, all managed by the Board: Intake S. Agata for the Rio Villano (right bank); Intake Ca' Buschi, for the Rio Comune di Destra (right bank), and intake Caminata for the Rio Comune di SInistra (left bank). The secondary canals are, respectively, 5, 24, and 15. Between the former two canals, there used to be a drainage gallery, Mirafiori, which however collapsed during a 2009 flood.

The conceded volumes for irrigation are 6m3/s, although due to the erratic nature of the Trebbia river, the average volumes diverted are 2 m3/s. The irrigated surface is 14,000 ha out of 30,000 ha cultivated. The hydraulic deficit ranges around 20-25 Mm3/y. Superficial water scarcity is compensated with more than 700 deep wells that extract 20 Mm3/y. According to data since 1997, the average water deviation by the Trebbia river is 42 Mm3/y, of which 38 Mm3 can be utilised for irrigation and are distributed for ¼ to the Left bank and ¾ to the right bank. In total, agricultural enterprises receive about 15 Mm3/y. the irrigation network productivity, in terms of water volumes delivered to farms for irrigation, are estimated at 40-50% of total deviated volumes (Zanolini, 2008). The water deficit remains 20-25 Mm3/y: this water scarcity is partially compensated with more than 700 deep wells who extract on average 20 Mm3/y.

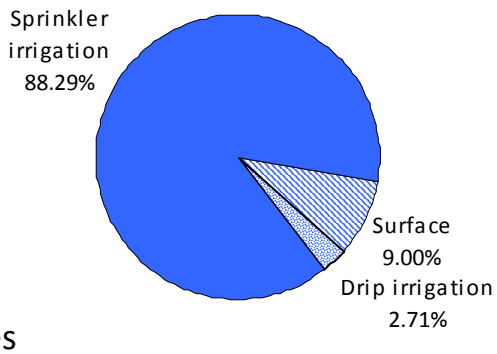
The main crops are tomatoes, forage, corn, and long beans. Until 1970's, large surfaces were grassland. In recent years, solar panels, and biofuel production are increasing. The largest water consumer per season are tomatoes, due to their prevalence in the area, whereas per surface unit, permanent polyphyte grass has a higher water requirement. Irrigation season begins in May for most crops, except for garlic and onions that need irrigation earlier, in April. It generally ends the first half of September, although for those latter crops, sugar beetroot, and horticulture, it ends at the end of August.

The main irrigation technologies utilised is sprinkler irrigation, for 88% of the irrigation surface. The rest is irrigated either with surface (9%) or drip irrigation (3%) (Zucaro & Furlan, 2009).

Irrigated crops and water volumes utilised

Crop	Irrigated surface	Irrigation season		Specific volume per surface (m^3/ha/a)	Total seasonal volumes (m^3/a)
		from	to		
Garlic	65	7/4	27/8	2.400	156.000
Sugar beetroot	842	20/5	4/7	1.950	1.641.900
Onion	260	7/4	27/8	2.700	702.000
Green bean	400	22/5	8/9	2.400	960.000
Corn	1.733	20/5	14/9	2.340	4.055.220
Forage	1.395	20/5	14/9	2.000	2.790.000
Horticulture	271	20/5	15/6	2.100	569.100
Tomato	2.878	20/5	9/9	2.100	**6.043.800**
Polyphyte grass	411	20/5	12/9	**3.600**	1.479.600
Soja	198	20/5	14/9	1.170	231.660
Total irrigation Board	**8.453**				**18.629.280**

Source: Zucaro & Furlan, 2009.



References

ARPA Emilia-Romagna. Sito web www.arpa.emr.it/piacenza consultato il 10/03 /2011.

ERMESambiente, 2009. http://www.ermesambiente.it/wcm/ermesambiente/news/2009/ottobre/28_parcotrebbia.htm sito consultato il 10/3/2011.

Zanolini, L. 2008. "Studio del bacino idrografico del Fiume Trebbia per la gestione sostenibile delle risorse idriche". Regione Emilia-Romagna/ ARPA-SIM

Zucaro, R. & A. Furlani, 2009. "Rapporto sullo stato dell'irrigazione in Emilia-Romagna". Programma interregionale monitoraggio dei sistemi irrigui delle regioni centro settentrionali. Istituto Nazionale di Economia Agraria.

The results contained in this factsheet were produced within the project Water2Adapt "Resilience enhancement and water demand management for climate change adaptation", funded under the IWRM-net funding initiative by the German Federal Ministry of Education and Research, Ministerio de Ciencia e Innovación (Spain), ISPRA - Istituto Superiore per la Protezione e la Ricerca Ambientale (Italy), and Foundation for Science and Technology (Portugal).

Water distribution

Irrigation turns is the standard water distribution practice. These are arranged according to historical water rights, which deem some canals (privileged) to receive more water than others (bastard). For instance, if in the Rio Comune di Sinistra water level lowers 1 cm, of 17, only the two priviledged canals continue to irrigate. However, in recent years, some downstream privileged canals also remain dry when water in the river decreases.

Water2Adapt

Coordinator
Fondazione Eni Enrico Mattei (FEEM)

Partners
- Seeconsult GmbH, Germania
- Basque Centre For Climate Change (BC3), Spagna
- Chamber of Agriculture Lower Saxony, Germania
- Fundação da Faculdade de Ciências e Tecnologia Universidade Nova de Lisboa (FFCT-CENSE), Portogallo

Duration
September 2010 – August 2012

Contacts
Scientific Coordinator
Jaroslav Mysiak
Project manager:
Martina Gambaro

Fondazione Eni Enrico Mattei
Isola di San Giorgio Maggiore
30124 Venice
e-mail: w2a@feem.it
tel. 041 2700472

Funded by:
- Bundesministerium fuer Bildung und Forschung , Germania
- Ministerio de Ciencia e Innovación, Spagna
- ISPRA - Istituto Superiore per la Protezione e la Ricerca Ambientale, Italia
- Fundação da Faculdade de Ciências e Tecnologia, Portogallo