

## **TRANSNATIONAL INTEGRATED MANAGEMENT OF WATER RESOURCES IN AGRICULTURE FOR EUROPEAN WATER EMERGENCY CONTROL (EU.WATER)**

**Priority Axis:** Protection and Improvement of the Environment

**Area of Intervention:** A.O.L. 1.2 Improve integrated water management and flood risk prevention

**Project Duration:** 36 months

**WP3:** Knowledge capitalization and sensitive area maps

**Action 3.2:** regional report

### **Abstract of the regional report**

**Pilot area: Po River basin (Italy)**

**Province of Ferrara**



**Province of Rovigo**



**Ferrara and Rovigo, 30<sup>th</sup> of November, 2010**

Po river basin is located in the north-eastern part of Italy and consists in the Provinces of Ferrara and Rovigo, covering a total area of 4460.2 Km<sup>2</sup> .

The pilot area covers the basin of the Po river, a single territorial entity ruled by two different administrations, respectively located in the Region of Emilia Romagna and Veneto Region. The territories are flown through the main Italian rivers (Po, Adige and Reno) and is bordered to the north by the Province of Padova and Lombardia Region (Province of Mantova) along the Po river, on the west by the Province of Modena and the Province of Verona, on the south-east, along the Reno river, with the Province of Bologna and the Province of Ravenna and on the east by the Adriatic Sea, between the Adige river and the Reno river outlet.

### **Climate data of the Province of Ferrara and Rovigo**

Due to the vicinity, the two provinces are part of the same Upper Adriatic climatic sector with a “coastal zone”, from the sea to the inland for 30 km, and a colder “padan zone”, located on the west side of the provinces. The whole area can be defined as temperate climate with sub-continental characteristics with cold winters, warm summers, moderate diurnal (10-12 °C) and annual temperature excursions (20-25 °C) and precipitations from modest to moderate, but evenly distributed throughout the year. For the Province of Ferrara meteorological data were taken from 12 meteorological stations, homogeneously distributed across the whole province, provided by the Agricultural Department of the Province of Ferrara. Data analysis were carried out for each station, calculating mean temperature and rainfall values referred to the time series data of each station, in the years from 2000 to 2009. For the Province of Rovigo, meteorological data were taken from 12 meteorological stations of the Veneto Environmental Agency (ARPA).

### **Soil data of the Province of Ferrara**

Soils in the Delta Plain and Coastal Plain are characterized by a shallow aquifer, by a poor drainage and, in reclaimed areas by the presence of peat. Soils in topographically depressed areas of floodplain have a high clay content and are, therefore, subjected to, more or less pronounced contraction and swelling phenomena. Soils of morphologically high areas, developed on ancient fluvial bumps. The predominant soil textures in the province of Ferrara are silt loam and silty clay (68% of the territory), while peaty soils are less common (23% of the territory). The remaining 9% are sand and silty sand. Soil data were obtained from Geological, Seismic and Soils Service of Emilia-Romagna Region and from the Regional Catalogue of Soil Types of Agricultural Department of Emilia-Romagna Region. Soil maps development were conducted according to the USDA Soil Taxonomy, as required by the project and using the following mapping unit: The hydromorphic classes, grain size distribution and soil order-group.

### **Soil data of the Province of Rovigo**

The origin of Rovigo soils is alluvial and it is related to the presence and action mainly of Po and Adige rivers. Along the course of the rivers we can find big sediments (sand) while increasing the distance from the distance from them we find smaller particles (silt and clay). Typical is the presence of backs (polesini: dossi) that correspond to the ancient stream of erratic rivers: they are mainly sandy while the lower land are more

limy and were often flooded originating swamps. The major part of the soils is medium texture, deep, alkaline, with poor drainage and cultivated mainly with wheat, corn and soybean.

### **Land uses and agricultural land of the Province of Ferrara**

Land use map of Ferrara Province was realized using vector cover in shapefile format of Emilia-Romagna Region, realized according the Corinne land-cover european guidelines (2000 classification), identifying 5 different classes of land use: agricultural areas, (2164 [km<sup>2</sup>](#)), artificial areas (183.21 [km<sup>2</sup>](#)), natural and semi-natural areas (27,25 [km<sup>2</sup>](#)), water bodies (95,32 [km<sup>2</sup>](#)) and wetlands (152,53 [km<sup>2</sup>](#)). Then, agricultural areas were divided into 12 categories: arable in irrigated lands, predominantly occupied by agricultural fields with the presence of important natural areas, complex cropping systems, wood crops, stable meadows, garden centres, orchards and minor fruits, poplar forests, rice fields, annual crops associated with permanent crops, vegetable crops in open fields, on earth and under plastic, vineyards.

### **Land uses and agricultural land of the Province of Rovigo**

The most important activities are related to what we call "terziary sector" and are related to commerce, repairs, tourism (hotel and restaurant), transportations, communications, constructions. The agricultural sector accounts for 9% in terms of employment and for 4% in terms of income. It's important to remind the importance of fishery sector that develops in the fishing ponds, lagoons and in the sea (fishing and mussels)

### **Surface waters of the Province of Ferrara**

Water surface bodies of Ferrara Province can be divided in natural and artificial. Three important rivers, the Po, Reno and Panaro with a mean discharge at the mouth of 1540 m<sup>3</sup>/sec, 95 m<sup>3</sup>/sec, 37 m<sup>3</sup>/sec, respectively.

More than 3500 km of the province surface are covered by artificial channels, that in some cases, have width, length and, in some period of the year, discharges much higher than Reno and Panaro rivers. On the South-East side of the province is located one of the largest saltwater wetland in Europe, the " Valli di Comacchio", once important for eel (*Anguilla anguilla*) extensive aquaculture.

### **Surface waters of the Province of Rovigo**

The surface water of the area is characterized by rivers (Po, Adige, Canalbianco), fishing ponds and lagoons and by the Adriatic sea that closes Rovigo Province in its east side. Moreover there is a dense network of artificial canals that are managed by two Consortiums of reclamation that ensure at least one meter depth of dry land for cultivation.

### **Ground waters of the Province of Ferrara**

The whole Ferrara territory is located in the South-Eastern sector of the wide sedimentary Po basin; this sector is characterized by geological complex structure called "Ferrara Folds" formed in the late Tertiary. Except for the A0 and in some cases for the A1-I, which obtains the groundwater recharge directly from rainfalls, the rest of the aquifer complexes, being confined, is not affected by the hydrological cycle, don't receive a direct recharge and consists of fossil water.

### **Protected areas of the Province of Ferrara**

The Emilia-Romagna Regional Law 6/2005 established the Regional Ecological Network of areas belonging to Natura 2000 Network, in order to protect biodiversity in the different geographical areas. Within this network, the most important wetland and coastal environments are located in the Province of Ferrara within the Emilia-Romagna Po River Delta Regional Park, comprising the freshwater ones of Campotto and Vallesanta, the saltwater closed embayment of the Valli di Comacchio and the Sacca di Goro Lagoon.

### **Protected areas of the Province of Rovigo**

In the area there are important Rete Natura 2000 sites (Sites of Community Importance - SIC and Special Protection Zones - ZPS) and protected areas: Delta del Po regional park, Bocche di Po natural reserve, Fiume Adige between east Verona and Badia Polesine sic, Dune di Donada e Contarina sic, Dune di Rosolina e Volto sic, Dune fossili di Ariani nel Polesine sic, Rotta di San Martino sic, Gorgi di Trecenta sic, Delta del Po river (least part) sic, Golena di Bergantino zps, Delta del Po zps, Vallona di Loreo zps.