

ITALY

Finis Terrae

by Stefano Marzoli





Sant'Alberto di Ravenna (Ravenna). The Good Shepherd Dairy and its sheep farm work in synergy with the Solar Farm photovoltaic system. The sheep are allowed to graze under solar panels (which have been installed in such a way as not to hinder the passage and grazing of animals) helping to preserve agricultural areas and turf. The choice of the meadow pasture, besides allowing the soil to be completely free from pesticides, improves its pedological characteristics thanks to a careful selection of the seeds, including legumes whose nitrogen fixation plays an important role in fertilizing the soil. One of the key concepts of the meadow pasture is humus preservation and improvement, in order to completely decontaminate the land from pesticides and synthetic fertilizers used in previous intensive cultivation.



THE IMPACT OF CLIMATE CHANGES ON THE FRAGILE ECOSYSTEM OF THE PO DELTA

Suspended between water and land, the River Po Delta is Italy's largest wetland area and one of the most beautiful in Europe. Recognised by UNESCO as a Biosphere Reserve as part of the MAB (Man and Biosphere) programme, today it is also a symbol of the negative effects of climate change.

These include: drought, desertification, global warming, rising sea levels, flooding, agricultural damage, extinction of native animal species as well as the arrival of invasive alien species. In July 2022 water levels fell to a record minimum, enabling the salty seawater from the Adriatic to arrive 40 km inland (in 1950 it reached only 3 km).

This state of emergency has forced the authorities to prohibit the extraction of water for drinking, leading to rationing in some communities for agricultural irrigation,

consequently bringing the farming sector to its knees. As if this were not enough, the energy crisis caused by the war in Ukraine has interrupted the energy transition towards renewable energies in this fragile ecosystem and reopened the debate about the use of fossil fuels.

The Po Delta is home to 300 species of bird, 50 types of fish, 40 different mammals and 1000 plant species, but it is also rich in natural gas. The indiscriminate exploitation of this resource over the years has led to major subsidence, sinking some areas by up to 4 meters below sea level, at a huge human and economic cost (every year 7 million euros is spent on electricity to prevent flooding).

Italian law prohibits new projects for extracting gas on land, but not on platforms in the sea. The new offshore drilling concessions and the use of abandoned platforms as storage tanks are a major source of concern for environmentalists and local communities who fear for the future of this area.



Codevigo (Padua), an Aerial view of the Millecampi Valley. The *barene* (sandbanks) are low and flat islets that are submerged by water at high tide and remain dry during low tide. The islets are criss-crossed with a dense network of small canals, called *ghebi*. The Po Delta is an invaluable naturalistic, cultural and social heritage, listed as a Wetland of International Importance under the Ramsar Convention (1971). Due to its great environmental value, it has been declared a World Heritage Site by UNESCO. It is an ecosystem that needs to be protected and preserved. In this area, there are Sites of Community Importance (SIC) and Special Protection Areas (SPAs) that are part of the Natura 2000 Network, an EU project whose goal is to protect and improve the biodiversity of regional resources.



Riccione (Rimini). The Cetacea Foundation is a non-profit organization founded in 1988, whose commitment is to protect the marine ecosystem, especially in the Adriatic Sea, by focusing on education and conservation. The organization's main activity – which relies on the valuable contribution of biologists, veterinarians, natural scientists and volunteers – is the rescue of animals in danger, especially sea turtles and cetaceans. It is involved in several European projects including: Sharklife, NETCET, TartaLife, Adriatic +, Clean Sea Life, Interreg Soundscape, Interreg MARLESS, LIFE Medturtles.

Among the 47 active platforms in Emilia Romagna which are used to extract gas within the 12-mile range, Angela Angelina is the closest to the coast. It operates just 2 km from the Lido di Dante beaches. Its activity has caused a lowering of the land at Lido di Dante. The ground level has dropped significantly after the new drilling of the well, which began in 1998: the subsidence rate has increased from 12mm/year up until 1999, to an average of 19 mm/year in the period from 1999 to 2015.





San Daniele Po (Cremona), the Paleoanthropological Museum of the Po. The skull of a *Megaloceros*, or giant deer, which was found along the banks of the Po River, near the Island of Serafini, in consequence of the exceptional drought. The fossil belongs to one of the great mammals that lived in the Po Valley during the Pleistocene and the Holocene, at the time of the Würm glaciation, along with mammoths, moose and cave lions, and it is evidence of the climate change that the entire area underwent. The deer is famous for its astonishing size, it could reach a height of 180 cm at the withers and its antlers could be even 3.5 meters wide.



The flooded forest of Punta Alberete (near Ravenna) provides a rich habitat for the reproduction of birdlife, especially herons, and is home to the largest colony of little egrets in Italy. Unfortunately, this ecosystem is endangered by climate change. Several alien invasive species, such as the Louisiana red crayfish, the nutria and the carp are altering the biodiversity of the area, causing severe damage.



Rivà di Ariano Polesine (Rovigo). The parish church of Rivà had to be demolished to make room for the banks of the Po river. The church was then rebuilt in a safer place, which has now become the town square. A lonely bell tower, that dominates the green space on which the embankment stands, has been left to remind of the event.

Lido di Volano (Ferrara). A wild white horse.





Lido di Dante (Ravenna). The Concrete barrier that separates the beach from the promenade of the tourist resort. The frequent storm surges due to the subsidence of the area are continually modifying the landscape and constantly threatening the commercial activities on the coast.



Porto Tolle (Rovigo). A watermelon plantation hit by a very strong summer hail. Unfortunately, in some areas, the fruit harvest has been completely lost. Extreme weather events are getting more and more frequent due to climate change, and the agricultural sector is already suffering from drought. There are several crops affected by the crisis: vegetables, fruit, alfalfa, rice, corn, soy, and even the production of honey is decreasing.

Boschettona Beach (Padua). The singer Dilly chose the landscape of the Po Delta to film the video clip *Wait for me*. It's a love song dedicated to her beloved and to the whole human race, who is going through a really difficult time all over the planet.





Ca' Mello (Porto Tolle, Rovigo). The famous “Ponte Colpi” which has a very peculiar architecture. A second bridge was built on top of a previous one that decades earlier had sunk below the water level. The bridge is one of the many works that have been required over the years to adapt structures and embankments to cope with the progressive subsidence of the ground.



Taglio di Po (Rovigo). Giancarlo Mantovani, engineer and general manager of the Consorzio di Bonifica Adige Po (Land Reclamation Consortium Adige Po). "In the Polesine area we have fish that can swim higher than the feed that is pecked by the hens in our countryside. Our territory is far below sea level and continues to sink. We have subsided 3 meters in 20 years. We do not find any correlation between the facts and the report presented to us." Mantovani refers to the report on the Teodorico project, a platform for the extraction of methane that will be built off the coast of Ravenna. "The Polesine area," says Mantovani, "has no say in the matter, we have not been asked for our opinion. But we won't just sit back and watch."



Boretto (Reggio Emilia). The effects of drought on the Po riverbed. Those whose livelihoods depend on working the fields face a dramatic emergency. "Drought," according to Coldiretti, the Italian farmers' association, "has become the most significant threat to agriculture: the estimated damage amounts to one billion euros per year."



Gorino Veneto (Rovigo). Goro drainage pump collector. Built in 1977, it is one of the most recent and powerful systems, essential for ensuring the hydraulic safety of the entire Island of Ariano which channels water through the Veneto drainage ditch (Scolo Veneto). The plant became necessary at the end of the 1960s, after the natural compacting of the ground and the extraction of methane lowered the level of the watercourse that once flowed into the sea, next to the Po in Goro, through an outflow bridge with sluice gates.



Sant'Alberto di Ravenna (Ravenna). The Good Shepherd Dairy and its sheep farm work in synergy with the Solar Farm photovoltaic system. The sheep are allowed to graze under solar panels (which have been installed in such a way as not to hinder the passage and grazing of animals) helping to preserve agricultural areas and turf. The choice of the meadow pasture, besides allowing the soil to be completely free from pesticides, improves its pedological characteristics thanks to a careful selection of the seeds, including legumes whose nitrogen fixation plays an important role in fertilizing the soil. One of the key concepts of the meadow pasture is humus preservation and improvement, in order to completely decontaminate the land from pesticides and synthetic fertilizers used in previous intensive cultivation.



Ca' Pisani (Porto Viro, Rovigo). An old concrete well for extracting methane in the Po Delta. From the 30s, until the suspension of such activities decreed by the Government in 1961, billions of cubic meters of methane and natural gas were extracted in this area. The extraction took place from hundreds of wells (about 30 in the Delta) no deeper than 1000 meters. Through concrete infrastructure, the gas was sent to compression stations, while the salt water (1 cubic meter of water for each cubic meter of gas extracted) was discharged into the ditches and drains. The consequences of subsidence are easy to imagine: the lowering ground also dragged with it the embankments, which became thinner and less safe, adding to the water pressure on the levees and increasing the probability of leaks, overflows and even collapse.



Lido di Volano (Ferrara). The blue crab (*Callinectes sapidus*) is an alien species that has spread throughout the Adriatic Sea and, in particular, the shallow waters of the Po Delta and the Sacca di Goro. Emiliano Baratti was one of the first to specialize in fishing for this crab by building his own traps based on those used in the eastern United States. Gradually, sales of the crab have begun to spread: among his main customers are the Chinese community, especially restaurateurs. The blue crab is native to the American Atlantic coast, from the north of the US to Argentina. Transplanted on the European Atlantic coasts, probably via the ballast waters of large commercial ships, today it is on the list of the most harmful 100 IAS (Invasive Alien Species) in the Mediterranean.

Due to the severe drought of the Po River, a pontoon bridge has resurfaced. The bridge was bombed by the Americans in 1944 to cut off supplies to the Nazis. The pontoon bridge (commonly used at the beginning of the 1900s before the widespread introduction of reinforced concrete structures in the 60s) connected the regions of Lombardy and Veneto and, in this instance, the village of Sermide, in the province of Mantua, with the village of Castelnovo Bariano, in the province of Rovigo.





Boretto (Reggio Emilia). A build up of flotsam under the bridge on the Po River that separates the regions Emilia-Romagna and Lombardy. The Po, that is the longest river in Italy, has reached its lowest level since 1990. In some areas hasn't rained for more than 100 days. The lack of snow in the mountains is a consequence of global warming.



An old fishing hut in the Pialassa dei Piomboni. The site is located south of the Candiano, the port-channel of Ravenna, in the coastal area between the shores of Marina di Ravenna and Punta Marina. This is a protected area belonging to the Natura 2000 system.



Porto Tolle (Rovigo). Drought, tornadoes, hailstorms, the use of pesticides, delayed flowering. Climate change is affecting honey production and beekeepers are increasingly forced to feed their bees artificially because natural nectar is scarce. Alessio Marangon, a beekeeper from the Po Delta, who in 2020 won an award for his typical "*indaco bastardo*" honey, is worried about the situation that now affects the entire Polesine area.



Codevigo (Padua). An Aerial view of the Millecampi Valley. The *barene* (sandbanks) are low and flat islets that are submerged by water at high tide, criss-crossed with a network of small canals called *ghebi*. Listed as a Ramsar Wetland of International Importance, the Po Delta is recognized by UNESCO as a World Heritage Site and as Biosphere Reserve under the MAB programme.

