

## AgriNatur AT-HU

### Report Excursion Doñana, Spain, 08.10.-12.10.2019

The National (537 km<sup>2</sup>) and Natural (553 km<sup>2</sup>) Park Doñana, is located in Andalusia and extends over the two provinces of Cádiz and Huelva. Both National and Natural Park are part of the Natura 2000 Reserve of Doñana. In Andalusia, 63 percent of the area of the Natura 2000 protected areas is used for agricultural purposes. Most of the region's inhabitants live from agriculture.

The National Park and the Natural Park are managed together, it is a public institution with a total of 138 employees. The management is carried out with the support of a participatory commission consisting of 60 stakeholders and divided into the areas of responsibility of water, biodiversity, research and sustainability. Projects must be reviewed by a commission before they can be implemented.



Figure 1: Bushland of the National Park



Figure 2: Flamingos (*Phoenicopterus roseus*) in the swamp area

The Doñana Biological Research Station was founded in 1964. In 2018, 74 research projects and 20 monitorings were carried out, and two further projects are planned.

The landscape of Doñana is composed of marshland, steppes and coast, as well as the resulting ecotones.

Doñana is Spain's historical and cultural heritage. At the beginning, in 1969, the beach section of the National Park was 2 km long and originally intended for tourism. This could be prevented, and the National Park was constantly expanded, so that, today, the beach of the National Park is almost 30 km long.

What is special about the National Park is that it is the habitat of the Iberian Lynx (*Lynx pardinus*), and for over 350 different species of birds.



Figure 3: Dunes adjacent to the pine forest

## Agriculture Doñanas

In the National Park, the core zone, there is no agriculture, with the exception of organically produced pine nuts. The National Park is surrounded by the Natural Park, in which mainly table olives, wheat, cotton, rice (13,000 ha, wet cultivation), wine, various berries (mainly in the province of Huelva), citrus fruits and wine are cultivated. Spain is the worldwide biggest producer of table olives. In addition, many cattle and horses live in the region, which are widely scattered in the bushland. At the moment the conventional olive cultivation of Spain is in a crisis, as an alternative one sets on the almond. However, almond cultivation is very intensive and therefore has to be viewed somewhat critically.

In Doñana traditional, organic and integrated agriculture is practiced. These areas of integrated agriculture and traditional agriculture in the north of the National Park serve as corridors and provide a buffer zone for the Doñana National Park and Biosphere Reserve.



Figure 4: pines

A problem is the adjacent intensive agriculture, which causes great damage to the region through the production of a lot of plastic waste, high pesticide use and water consumption. Not only agriculture but also tourism consumes considerable amounts of water from the Doñana area. The fragmentation by roads and cultivated areas, as well as large scale monocultures lead to a decline in biodiversity, as does the pollution by fertilizers and pesticides. The use of heavy machinery leads to soil compaction and increases the risk of erosion. Neophytes spread particularly rapidly along the network of paths used by farmers and tourists.



Figure 5: The upheaval of rice fields brings the jackdaw crabs (*Austropotamobius pallipes*) to the surface, a feast for the birds.

Since the beginning of the 20th century, intensive rice cultivation has completely changed the Doñana marshlands, and intensive pesticide use has severely impaired biodiversity. Integrated rice cultivation in the biosphere reserve has allowed biodiversity to recover, although not completely restored. Certain rice fields are deliberately flooded after harvesting to provide a habitat for birds over the dry autumn.

In the 1980s, the economic and ecological value of the invasive crayfish (*Procambarus clarkii*), which immigrated in the 1970s, was recognized as an export commodity and an important source of food for the birds of Doñana. We could observe storks (*Ciconiiformes spp.*), western marsh harrier (*Circus aeruginosus*) - the only bird of prey that builds its nest in the reeds, Great White Egrets (*Ardea alba*), Cattle Egrets (*Bubulcus ibis*), Little Egrets (*Egretta garzetta*), Little Bustards (*Tetrax tetrax*) and Flamingos (*Phoenicopterus roseus*) in the rice fields. To control the rice rot fungus (*Pyricularia oryzae*), fields are burned down selectively in case of infestation. One could critically question the CO<sub>2</sub> emission of the fire, but in the region it has been concluded that it is less harmful to Doñana than fungicide use.

The interests of the farmers and the National Park are often conflicting, and not easy to reconcile. The combination of economic food production and the conservation of the rich fauna and flora of Doñana is a challenge. During our journey through Doñana we got to know people who have been dealing with these areas of conflict for decades. Nature conservation in Doñana does not work with prohibitions and teachings, but by actively talking to people, taking care of their problems and creating awareness for the value of the National Park and agriculture. This is what people like Mrs. Ana Villa Díaz - mediator between the National Park and agriculture, with a focus on traditional, organic and integrated farming, Mr. José Juan Chans - manager of the National Park Doñana, José María Galán - National Park Ranger and Tracker, José Fernando Robles - Representative of ASAJA (Agricultural Association of Young Farmers of Spain) in Seville, and the agricultural engineer Alba Rodriguez from the organic farm Flor de Doñana.



Figure 6: From left to right: José Juan Chans, Susanne Leputsch, Bernhard Kromp, José Fernando Robles, Andrés Vér, Katrin Fuchs, Kim Hissek, behind the camera: Anita Somogyiné Nagy



Figure 7: From left to right: Kim Hissek, Susanne Leputsch, Katrin Fuchs, José María Galán, Ana Villa Díaz, Bernhard Kromp, Andrés Vér, behind the camera: Anita Somogyiné Nagy

A few decades ago, the National Park Doñana (at that time much smaller) was a complete exclusion zone and was therefore viewed with disapproval by the public. Through successful communication measures, the negative attitude of the population towards nature conservation was turned into a positive one. Thus, the massive use of pesticides could be reduced, from which the whole of Doñana benefits. The implementation of measures that promote biodiversity and protect the soil, such as planting vegetation or flower strips, is currently proving somewhat difficult. They are rather rejected by farmers, as they are seen as competition for the crops due to the lack of water in the region, and have never been used traditionally.



## The socio-economic value of Doñana



Figure 8: Organic farm Flor de Doñana

Spanish agriculture is viewed rather critically in Central Europe, it is mainly associated with poor working conditions, environmental pollution and massive water consumption.

However, there are also positive examples, such as the company Flor de Doñana, which specialises in the production of organic strawberries and raspberries. In addition to the use of predatory mites and colour panels with pheromones for pest control, compostable films for weed reduction, and vines that serve exclusively as habitat for invertebrates, they also place

great importance on fair working conditions. It is important to them that the seasonal workers all come from the region and that they can offer permanent employment to as many people as possible, not just temporary contracts. Flor de Doñana is 40 hectares in size and employs 60-100 permanent employees, compared to the "plastic sea" in Almeria, where there are only 2-3 permanent employees on 35,000 hectares. Besides, Flor de Doñana largely dispenses with technology and relies on manual labor.

The availability of jobs and water requirements of different crops are interesting. For example, 40,000 ha of rice create 1 million jobs and each 10,000 ha need 50,000 hl (hectolitres) of water, while 10,000 ha of strawberries need only 20,000 hl of water and create 4 million jobs.



Figure 9: Strawberry growing in Flor de Doñana

## Traditional agriculture Doñanas in the Natural Park

The traditional agriculture of the region goes back to the Roman Empire, the first references to the agricultural use of Almonte date from about 1,200 BC. Very typical is the mixed culture of olives and wine, as we can see near Almonte. Just like Triolar, the traditional three-field economy of the region, consisting of wine, wheat and olives. These agricultural measures are closely linked to nature conservation, for example, some endangered bird species only occur in these vineyards.

The predominant wine variety of the region is Zalema, it is placed on the Patron base. The white wine variety Zalema has been cultivated for about 2,000 years and is perfectly adapted to the conditions of southern Spain. It needs very little water and grows bushy, without trellis, between the olive trees. The Patron rootstock has also been used for a very long time and has ideal characteristics for the climatic conditions of the region. It develops very long roots that reach up to 6-7 meters deep into the ground. This pronounced, deep rooting means that long periods of drought can be withstood without problems and the soil is protected from erosion.



Figure 10: Mixed Culture Olive and Wine

Another important aspect of Doñana's traditional agriculture is the use of animals instead of machines. Working with horses, mules and hinnies is much more soil-friendly than with heavy tractors.

Traditional viticulture helps to preserve the habitat of countless bird species. For example, the reed warbler (*Cercotrichas galactotes*) builds its nests in the vines. As an insectivore, it benefits from reduced use of sprays and the resulting higher food

supply and therefore does not compete with olive and vine growing. It breeds in spring when the grapes are still very small and does not disturb the growth. In September the Garden Warbler flies to Africa where it stays for the autumn and winter.

The decisive point for the high biodiversity in the region is the mosaic of landscape created by traditional agriculture, which creates different habitats for the large number of bird species. Small rodents such as the shrew, in turn, benefit from greater insect diversity by not using pesticides. However, the rodents do not become a plague, as they are eaten by birds of prey, such as the barn owl. The old empty houses in the area, in turn, create enough nesting places for these predators.

Similarly, the rabbits that live within the vineyards, which, along with the partridge, are an important food source for the Iberian lynx (*Lynx pardinus*). Although the rabbit builds its burrows underneath the vines and gnaws at their roots, it does not pose a problem for the cultivated plants as prey of the lynx and through human hunting.

It is interesting to note that the Phylloxera (*Daktulosphaira vitifoliae*) did not cause any damage in a wine-growing area like Doñana. Phylloxera can be found both above and below ground, with greater

damage caused by those aphids that suck on the roots of the vines. The sandy soils of the region, due to their instability, prevent the animals from tunneling and therefore represent an insurmountable barrier for the pest.

However, the traditional viticulture of the region has to deal with problems other than pests. Due to the worldwide competition, e.g. from Chilean and Australian wines, it has become difficult for farmers to make a living from it. Strawberries, other berries and eucalyptus are currently much more profitable than wine. Although farmers are closely linked to traditional farming methods, the basis for preserving biodiversity and swampland, they are subject to the international market and often have to give up viticulture.



Figure 11: Olives in mixed culture with wine

The problem is that the contribution to biodiversity and the cultural value of traditional agriculture are not recognized in monetary terms, and it is therefore in decline.

But there are projects like the LIFE Project Sustainable Doñana (2001-2004), which show how environmentally friendly agriculture can be practiced in Doñana. On 33 farms with a total of 318.9 ha, was demonstrated together with the farmers how to operate sustainably, soil and water-conserving in the region.

### The core zone - the National Park Doñana

The National Park Doñana can only be visited by an average of 250 visitors a day. It consists of marshland, scrubland, forests (mainly pine trees), dunes and the sea beach. Because most parts of the National Park are under water in spring, there are hardly any paved roads and the ground is completely covered with sand. In the National Park, the eucalyptus, which has migrated from the plantations, is a problem and is therefore regularly removed. The tree stumps and trunks are left in a circular arrangement in the National Park to create a habitat for rabbits, which build their tunnels underneath. Rabbits are the staple food of the Iberian lynx (*Lynx pardinus*) and some birds of prey.



Figure 6: wild horses

There are horses and cattle scattered throughout the park, they have owners but live wild. So today's American Mustang is a descendant of the Andalusian horses.

In 1998 a mine accident caused a catastrophe, 4600ha of agricultural land was flooded with toxic mud containing heavy metals and threatened the National Park. To protect it, an earth dam was built at short notice. The Project Doñana 2005 was launched in, to clean up and renature the area and to implement the

Green Corridor Doñana and Sierra Morena. 1600 hectares of swampland were created by restoring agricultural land, 40 km of dam were removed. Until 2010, 8 further projects for the renaturation of the wetland landscape were implemented. For example, canals created by farmers to regulate the water flow were filled in to restore the marshes to their original state. All these areas were bought and cleaned up by the National Park. To this day, agricultural land is being taken over and renatured

### Conclusion

Communication as an important element for successful cooperation between the National Park and agriculture.

The National Park is perceived as open and open to discussion and underpins this image through cooperation with agricultural enterprises and associations in many projects.

No pronounced culture of prohibition. Problematic issues are discussed over longer periods and a solution is sought.

Agricultural enterprises that cooperate with NP can place NP logos or seals of approval on their products or use them to advertise and thus enhance their image.

Raising awareness of the contribution of biodiversity as an ecosystem service, e.g. in pest regulation.

The National Park is constantly buying land bordering the NP, thus creating an ever-larger buffer zone. This approach has been highlighted several times by Mr. Chans as an effective measure to stabilize the ecosystems and to enlarge the National Park.

Further information about Doñana can be found in the book Doñana Water and Biosphere:  
[https://www.researchgate.net/publication/260990490\\_Donana\\_Water\\_and\\_Biosphere/link/0a85e532f31a8515d9000000/download](https://www.researchgate.net/publication/260990490_Donana_Water_and_Biosphere/link/0a85e532f31a8515d9000000/download)

Comprehensive information on the Interreg project AgriNatur AT-HU: <https://www.interreg-athu.eu/agrinaturathu/>