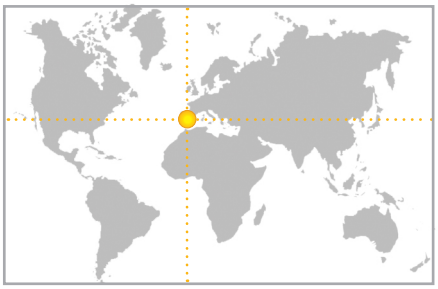
The Ecoagriculture Snapshots series highlights the work of different organizations around the world to implement ecoagriculture landscape management approaches.

Biodiversity-friendly aquaculture on the Veta la Palma Estate, Spain



Aquaculture is becoming increasingly important for meeting the global demand for fishery products, as wild fish catches are on the decline. The environmental impact and sustainability of intensive aquaculture operations has become a conservation concern. There are, however, methods of farming fish that not only avoid a negative impact, but actually enhance environmental value. One such operation is the private business Pesquerías Isla Mayor, S.A. (PIMSA) on the Veta la Palma Estate at Isla Mayor, municipality of Puebla del Rio near Sevilla, Spain. PIMSA is part of Grupo Hisparroz, a leading rice production company.

The Estate stretches across 28,000 acres located in the Doñana Nature Reserve (including the National Park created in 1969 and a buffer zone designated in 1978 that includes the Veta la Palma estate) and harbors the biodiversity-rich marshlands of the lower Guadalquivir River's floodplain, an important habitat for wintering and breeding bird populations, including some rare and endangered species. It is also a designated (European Union) Natura 2000 Network, and a RAMSAR wetland site of international importance. The area once contained some 200,000 ha of wetlands, but in the course of the 20th century many wetlands were lost to farming (rice and extensive livestock grazing). The main challenge today is increasing agricultural productivity without negatively affecting the natural environment, that is, without jeopardizing the ecosystem's resilience. Veta La Palma illustrates how holistic business practices can lead to productivity gains while taking into account ecosystem services beyond 'provisioning', such as enhanced landscape and biodiversity value.

The company PIMSA purchased a property in the Doñana Nature Reserve in 1982, fully aware that activities had to be developed in compliance with the Reserve's conservation objectives. The company owners set out to develop an extensive close-to-nature aquaculture venture in a former wetland area. The intent was to create economic value from land use while at the same time improving the ecology of the area. PIMSA established a polyculture fish farming operation in the early 1990s, permitted within the terms of the Reserve's management plan. They reflooded wetlands that had been lost to natural siltation and engineered drainage, using a pump system and the original drainage channels to bring in water from the estuary. The fish farm today covers some 8,000 acres and uses extensive and semi-extensive methods to breed a large variety of fish in 45 interconnected ponds of 173 acres each, which are joined to the local river system through a web of irrigation and drainage channels (Medialdea pers. comm.).

Fisherman at Veta la Palma Estate. Source: Javier Rodríguez

To keep them healthy, fish are kept at a relatively low density of about 9 lb. (4 kg) of fish to every 35 cu. ft. (1 cu m) of water and are not harvested until they weigh about 2 lbs (1 kg) each (Abend 2009), unlike fish from intensive aquaculture, which are harvested on average at about 250 grams and are kept in crowded conditions. The fish feed on microalgae and shrimp that reach the ponds from the estuary through the channel system. This distinguishes PIMSA's aquaculture operation from many other operations, which feed their fish on wild catch. The harvest (some 1500 tons of fish a year) includes sea bass (*Dicentrarchus labrax*), sea bream (*Sparus aurata*), meagre (*Argyrosomus regius*), mullets (mainly *Mugil cephalus* and *Mugil ramada*), sole fish (*Solea senegalensis*), European eel (*Anguilla anguilla*), and ditch shrimp (*Palaemonetes varians*).

Birds are welcome to feast on the fish ponds, leading to a reduction in total production of about 20 percent, a loss the company is willing to sustain to support the area's biodiversity. Before the aquaculture operation was established, only about 50 bird species were recorded in the area (Abend 2009). The company improved the ponds' land-

Extensive aquaculture benefits birdlife. Source: Herminio Muñiz

scape value by creating more than 100 islands for nesting waterfowl and re-vegetating 93 miles of banks. They also created two bird sanctuaries on 1250 acres in the northern sector of the estate. Now up to 600,000 birds of some 250 different species visit or breed on the estate's wetlands and benefit from the ample food supply (fish, invertebrates and wetland plants called macrophytes).

Furthermore, the almost 8000 acres of permanently flooded aquaculture marshland play an important role as a refuge for the natural fish fauna of the Guadalquivir river estuary, including for several endangered species.

The annual fish production is about 1500 tons, marketed primarily to gourmet food shops, high quality food distributors, and haute cuisine chefs in Mediterranean countries (Italy, France, Spain and Portugal), Germany, and the United States. The business is economically successful and provides income to about 100 farm workers from the small town Isla Mayor (5800 inhabitants) and surrounding villages.

Apart from the aquaculture operation, Veta la Palma also has an extensive horse and cattle operation for organic beef and grows some dry-farmed crops. About 6000 acres of the Estate are dedicated to the production of feed for the livestock, using a rotation system without fertilizers or pesticides, which also benefits steppe birds, such as stone curlew (*Burhinus oedicnemus*) or pin-tailed sandgrouse (*Pterocles alchata*). Another 1,000 acres are used to cultivate rice. The remaining 12,000 acres are set aside as a conservation area.

The reclaimed wetland habitat and sustainable production methods employed on the estate have succeeded in boosting the area's biodiversity, while generating economic value. The establishment of the operation was helped by the fact that extensive fish farming systems have a long tradition in Europe. Veta la Palma pioneered the integration of aquaculture with the recovery of disturbed salt marshes or coastal wetlands, playing a useful role in combining economic activity and protection of biodiversity at a landscape level. The National Park authorities understood the ecological, social, and economic importance of the business, and have been collaborating closely with PIMSA to ensure that local people derive a sustainable economic benefit, while fostering a wide range of environmental values.

The principal challenge for the business is to overcome situations of economic crisis without sacrificing its sustainability mission. It is helped by the diversity of the system, which is also a source of strength and resilience when dealing with changes. In the future PIMSA plans to diversify into other high quality, environment-friendly products as a way of maintaining a good position in an increasingly global market without losing its identity.

As a result of its pioneer efforts at integrating aquaculture and marsh area restoration, Veta la Palma has been included as a partner in the project "Sustainable and environmentally friendly aquaculture in the Atlantic Region of Europe (SEAFARE)", which is led by the Atlantic Arc Aquaculture Group, an interregional consortium from France, Scotland, Ireland, Wales and Spain, that focuses on environmentally sustainable aquaculture.

Map of Veta la Palma Estate. Source: Narciso Mazuelos

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Prepared by Karin Svadlenak-Gomez. For more information see:

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Medialdea, J.M. 2008. A new approach to ecological sustainability through extensive aquaculture: the model of Veta la Palma. http://bit.ly/aG1LMG [accessed 25 October 2010]

For more information, please contact: **EcoAgriculture Partners**
730 11th Street NW, Suite 301 • Washington DC 20001 • USA
Tel: (202) 393-5315 • Fax: (202) 393-2424 • info@ecoagriculture.org • www.ecoagriculture.org