

FORUM

The situation of lagoons in Italy today

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At the turn of the century at least 1 500 000 ha of the surface of Italy was covered by marshes and swamps. Most of the wetlands were estuarine, forming a gradient from fresh to salt water, from higher, seasonally flooded land, to permanent lagoons. These uncultivated territories yielded only natural produce. Land tenure was mixed, the local inhabitants having a right to take what they needed for subsistence while the landlord conducted the commercial exploitation of the resources. The variety of products that were used by the locals is marvellous. More than 150 species of plants and animals were gathered or caught to meet such demands as food, drugs, fodder, litter, fuel, building material, and fibre. Although it could be possible to compile a list of these products, it would be very difficult to determine the quantities extracted from a certain area. As the goods did not reach the market, there are no statistics available, but this should not lead to disregard their economic importance at those times. It is a different matter with the interests of the landlord. We know, for instance, that two or three ha of wetland can sustain one head of range cattle or water buffalo. One ha of Reed (*Phragmites australis*) yields ca. 300 reed bundles (one bundle is 0.6 m in diameter and 1.5 m long). This product was once in great demand as fuel for brick furnaces and for making screens and wattles. Various kinds of animals, especially boar, were hunted but waterfowl has been the most important game in this type of environment. In a well-documented case, a single hunter shooting for the market in the salt marshes and lagoons of Capitanata (Apulia), killed on average 4500 ducks per season in the years 1903-1909 with a record of 8000 in the winter of 1907-1908.

Lagoon fishery is an activity which requires a very high level of organisation. Once, before the advent of refrigeration and motorized transport, the only fish of commercial importance was the eel because it could travel for days and arrive alive on the markets of distant towns. Nowadays, Sea bream, Sea bass, Grey mullet, Flounder and Sole are also important. The latter are

euryhaline sea fish which only enter the lagoon to feed, especially in the juvenile stages, but which leave the lagoon again when the conditions of the lagoon become unbearable. This usually happens in summer and winter because of excessive temperatures. In any case, all these fishes have to return to the sea in order to spawn. This coming and going between lagoon and sea has inspired man to catch the fish as they funnel through the pass in the coastal barrier. Thus, in the course of time, this natural channel has become a brick-lined canal with floodgates and sophisticated fish-weirs. The main concern of the fishery management is to build up a head of water in winter so that, with the opening of the floodgates in spring, the outgoing flood will lure the newborn fry, present in the sea at this season, to come in and stock the lagoon. Vice versa, during fishing time in autumn, sea water should flow *into* the lagoon so that spawning fish seeking a way out will swim upstream the fresh stream of sea water, and into the sea pass where they can be caught by the weirs barring the exit. In Italy a lagoon is expected to produce about 100 kg of fish/ha/yr although the yield may range from 50 to 300 kg/ha/yr according to the species composition of the stock, the success of the spring fry migration, the quality of the environment, etc.

A further step in the exploitation of the natural resources of a brackish ecosystem is the *Ôvalle da pesca* which consists of a privately owned stretch of lagoon from 300 to 500 ha in extent, enclosed by an earthen dike. This undertaking developed in the vast lagoons of Venice and Comacchio in the northern Adriatic. Here, the sea water floodgate is not located in the sea pass through the coastal barrier, which stays free and permanently open, but each *Ôvalle da pesca* possesses its own floodgate. Furthermore, each *Ôvalle* also has sluices for the intake of freshwater, unlike lagoons where rivers flow in uncontrolled. Considering that a *Ôvalle* is situated at the intertidal level and is only 50 cm deep, and that the tidal range in the north Adriatic is normally 80 cm, it is easy to understand that a valle can be filled and

emptied simply by opening the sluices when the required head of water occurs outside. The fact that there is complete control over the exchange of water means that the salinity can be better controlled and that pollution and silt can be kept out; it is even possible to cool or warm the *Ôvalle* a few degrees if the water outside has the required differences in temperature. The effect of temperature extremes and rough weather is also buffered by artificial trenches of deeper water in which the fish can hide, and by breakwaters which check wave action from building up. A good *Ôvalle da pesca* normally has an annual temperature range between 6 °C and 30 °C and a salinity range from 15 to 40‰. The benthic macrofauna, which may be considered an index of the general quality of the environment and of the potential production of fish, is almost entirely composed of bivalves (*Abra alba*, *Loripes lacteus*, *Cerastoderma glaucum*) and amounts to at least 200 g/m² (wet weight).

Natural stocking was once practised in lagoons, but nowadays the fry are bought from dealers and exact quantities are introduced according to the maximum feeding capacity of the environment, the knowledge of which is based on many years of experience. The species stocked are Sea bass, Sea bream, Eel, and five different species of Grey mullet. Since these all require several years to reach market size, there are various year classes living together at the same time. As in lagoon fishery, the fish are harvested by introducing a strong flow of sea water which will cause the fish to swim upstream and be caught in the traps set across the floodgate canal. Taking into account all 50 existing *valli da pesca*, the mean yield has been calculated to be 95 kg/ha/yr of which 36 % are Grey mullet, 29 % Sea bream, 17 % Sea bass, 15 % Eel, and 3 % Silverside (*Atherina boyeri*).

A *valle da pesca* is also a *Ôvalle da caccia*, i.e. a duck shooting preserve, where single shooting stations are leased for the season to sportsmen. Many *valli* make more money with these shooting permits than with the fishery. To give an idea of the money some people will pay to indulge this luxury, the lease of a good shooting station for the season will pay for a year's wages of a local worker in the *valle*. According to the registers kept for five *valli* during 1929-1952, the kill per hunting season per *valle* ranged between a minimum of 1276 birds in *Valle Prime Poste* and a maximum of 7427 in *Valle Morosina-Ghebo Storto*. The hunting bags consisted of 64% surface Ducks, 29% Coot, 4% diving Ducks, and 3% Waders. A recent estimate (1992) of the water birds overwintering in the *valli* gives a total of 164000 head. The range of species goes far beyond just game birds, however. Some important heronries of four different species are located inside the *valli da pesca*. The Marsh harrier nests in the large reed beds of the

freshwater sections. Other notable breeders are Redshank, Avocet, Black-winged stilt, Gull-billed tern, Sandwich tern, Mediterranean gull and Slender-billed gull.

After the extensive efforts to drain marshes and swamps, which lasted from the beginning of the 19th century to the first half of this century, only 60 lagoons have survived in Italy, covering 150 000 ha, and comprising 30 000 ha of *valli da pesca*. These areas seem now to be safe from land reclamation while the traditional use of wetlands as described above has declined. The rights of commons which were once indispensable to the local population are now considered irrelevant and are often not claimed.

The habit of gathering natural products is still widely practised but it is not considered a livelihood any more. The harvesting of reeds for making screens goes on in the Po Delta but has diminished very much because land reclamation has eliminated all but a tiny fraction of the freshwater sections of the marshes where *Phragmites* used to thrive. Lagoon and *valle* fisheries are not doing too well either. Many lagoons were private property until recently and this guaranteed the essential prerequisites of a well-run fishery: unified management of the lagoon, exclusive fishing rights, tight organisation, and strict rules. However, lately, lagoons have been declared public waters, so that the old legal framework has entirely fallen through.

When a lagoon is left free like the sea, it is rapidly exhausted of the existing fish stocks and nobody takes care of the spring immigration of fry. Coastal areas have been affected by the heavy impact of the development of seaside resorts. Many lagoons, especially the sea channels, have suffered the ultimate violation and become harbours.

Even the carefully kept *valli da pesca* are not safe. Recently, a very harsh competition has started between the production of Sea bream and Sea bass and upcoming sea-cage aquaculture. Eel would still fetch a high price but stocks have dwindled drastically during the last few years. Recently a debate has arisen as to whether the *valli* in the Venice Lagoon are actually public waters; consequently the legal basis of private ownership is being doubted. All the *valli da pesca* in the Po Delta have been included in a National Park which has recently been founded there. The prohibition of duck shooting will lead these hunting undertakings to go bankrupt.

Even though the *valli da pesca* are not open to the public, and the owners are only thinking of themselves when they spend large amounts of money in order to run the system properly, they have in fact, up to the present day, perfectly conserved an extremely interesting environment that has otherwise become very rare. It is

impossible to envisage that the same competence, care and money would be spent in maintaining the system if it would be managed by a government institution. The Convention on Wetlands of International Importance Especially as Waterfowl Habitats (the so-called Ramsar convention from 1971), which was undersigned by the Italian government, expresses the current attitude of this country towards wetlands.

Rather than for their yield of natural products, lagoons are now important as beautiful landscapes and wildlife sanctuaries. Consequently, nature conservation organisations have, to a large extent, superseded fishermen and hunters as the trustees of marshes and lagoons. Until now, the policy of conservationists in Italy has been a vigilant but passive defence of the environment, especially aimed at stopping hunting practices, under the reassuring thought that nature will develop optimally if left to itself. Regarding lagoons with their surrounding marshes, this approach may in reality lead to a loss of what nature-lovers consider valuable, i.e. a great variety of animals, including rare animals, and abundant breeding of species.

The strong negative feelings that conservationists hold against pleasure shooting has mentally blocked them from picking up the great experience of game-keepers in attracting and holding birds in their territory. Devices such as the control of water levels, whether to let in salt or freshwater, vegetation control, fostering the nourishing capacity of the land, keeping areas flooded during the dry season, etc., are at present ignored in the bird sanctuaries of Italy. Lagoons are at the receiving end of drainage systems and therefore tend to become sinkholes for pollutants. This should call for careful prevention with regards to the quality of the fresh and salt waters that flow in and sustain the ecosystem.

To set aside an area of marsh exclusively as a wildlife sanctuary entails losing the income from all the hunting, shooting, fishing, grazing, wood-cutting and similar activities which are considered damaging or irrelevant from the nature-lover's point of view. It is often maintained that this loss of revenue is compensated by the money brought in by ecotourism in its various manifestations. However, for Italy this is only true in very few cases. In fact, the maintenance of wildlife sanctuaries falls on the taxpayer or depends on voluntary donations. This may work in an affluent society but if serious economic difficulties in the country arise, these expenditures are the first to be sacrificed. It would be a much safer guarantee for the continued existence of wetlands in Italy, if they were considered not merely for their aesthetic and cultural value but admittedly conserved for their yield in natural products.

Other agencies in Italy committed to the management of lagoons and estuaries are the Ministry of Public

Works, the Ministry of Agriculture, and various public and private consortia for land reclamation established long ago and still in existence. Up to about 40 yr ago these organizations did possess the competence to deal with lagoons with regards to the fishery but since then this knowledge seems to have been lost. Engineers such as G. Bullo and R. de Angelis, who built the structures of many lagoons and valli da pesca in the first half of this century, are not forthcoming any more. Recent works specifically aimed at helping lagoon fisheries are casual and ineffective.

Although strong in their knowledge of hydraulics, the engineers of today are badly trained to cope with the biological systems of waters. Whenever called upon to restore the productivity of a lagoon, the invariable solution that is adopted is to increase the sea-lagoon interchange by means of digging channels and widening the sea mouth. If one peruses the plans for such works, the exact ecological mechanism which should link these with the desired increase in fish yield is never explained. 'Vivification of the lagoon' is an expression often encountered, but the implications of this slogan are left entirely open.

