



General Fisheries Commission for the Mediterranean  
Commission Générale des Pêches pour la Méditerranée  
**LaMed-2 Project**



# Italy country report

by Eleonora CICCOTTI

*Dipartimento di Biologia  
Università Tor Vergata  
Roma, Italy*

Meeting on

Mediterranean coastal lagoons management:  
interaction between aquaculture and capture  
fisheries

Cagliari, Italy, 28-30 June 2011



General Fisheries Commission for the Mediterranean  
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### LaMed-2 Project

In **Italy** over 190 lagoons and coastal basins are present, for a total surface of 143.000 ha

Lagoons in **Italy** are concentrated in four geographic areas:  
North Adriatic  
South Adriatic  
Central Tyrrhenian  
Islands: Sardinia and Sicily





Area	Region	Site	Tipology sensu WFD	Typology	N	Surface	
<b>North Adriatic</b>	<b>Friuli VG</b>	<b>Grado Marano</b>	Microtidal Large + Modified	Lagoon and valli	3	12.700	
			Modified Small	Valli	43	1.660	
	<b>Veneto</b>	<b>Venezia</b>	Microtidal Large	Lagoon	1	50.000	
			Modified Large	valle	13	7.620	
			Modified Small	valle	13	1.284	
			<b>Bibione Caorle</b>	Modified Large	complex of valli	2	600
				Modified Large	valle	3	1.312
				Modified Small	valle	1	176
<b>Total North Adriatic without Po delta</b>					<b>79</b>	<b>75.352</b>	
Area	Region	Site	Tipology sensu WFD	Typology	N	Surface	
<b>North Adriatic/ Po Delta</b>	<b>Veneto</b>	<b>Po delta</b>	Modified Large	Sacca/lagoon	7	8.150	
			Modified Large	valle	17	7.155	
			Modified Small	valle	2	449	
				wetland	2	1.250	
				Delta branches	6	4.000	
				Valli	6	21.313	
	<b>Emilia Romagna</b>	<b>Po delta</b>	Modified Large	Sacca	1	2.150	
			Microtidal Large	Wetland (oasi)	3	1.670	
				Coastal lake (art)	1	90	
			Modified Small	Valle	2	118	
			<b>Total Po Delta</b>				
<b>Total North Adriatic &amp; Po Delta</b>					<b>127</b>	<b>121.697</b>	
Area	Region	Site	Tipology sensu WFD	Typology	N	Surface	
<b>South Adriatic</b>	<b>Puglia</b>		Non tidal Large	Lagoon	2	11.186	
				Saltworks	1	4.500	
				Enclosed coastal area	2	5.670	
			Non tidal Large (Limit S-L)	Coastal lake	1	256	
			Non tidal Small	Coastal lake	2	91	
		<b>Total South Adriatic</b>					<b>8</b>
Area	Region	Site	Tipology sensu WFD	Typology	N	Surface	
<b>Central Thyrrhenian</b>	<b>Toscana</b>		Non tidal large	Lagoon	1	2.700	
			Non tidal large	Wetland	1	1.100	
			Non tidal large	Coastal lake	2	1.110	
	<b>Lazio</b>		Non tidal large	Coastal lake	4	1.401	
				saltmarsh	1	170	
			Non tidal small	Coastal lake	2	142	
	<b>Campania</b>		Non tidal Small	Coastal lake	5	487	
		<b>Total Central Thyrrhenian</b>					<b>16</b>
Area	Region	Site	Tipology sensu WFD	Typology	N	Surface	
<b>Islands</b>	<b>Sardegna</b>		Non tidal Large	Pond	14	13.915	
			Non tidal Small	Pond	36	2.127	
		<b>Total Sardegna</b>				<b>50</b>	<b>16.042</b>
		<b>Sicilia</b>			Saltworks	1	480
			Non tidal Large (Limit S-L)	Coastal embayment	1	265	
			Non tidal Small	Pond	2	223	
			Non tidal Small	Coastal lakes	1	55	
	<b>Total Sicilia</b>				<b>5</b>	<b>1.023</b>	
	<b>All</b>					<b>198</b>	<b>145.872</b>

Total all areas, all typologies: 198 in number, 145.872 ha surface



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## Main typologies of coastal lagoons in Italy

### Lagoon

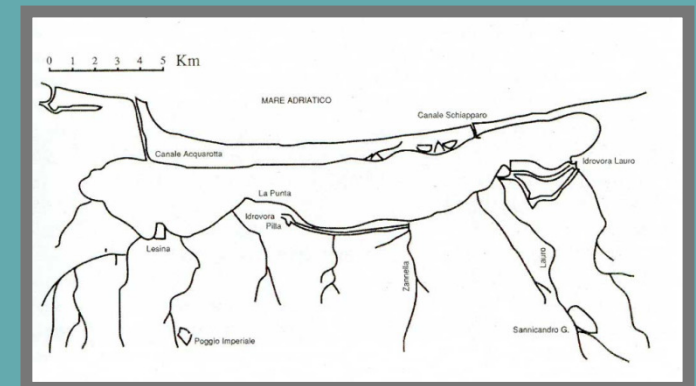
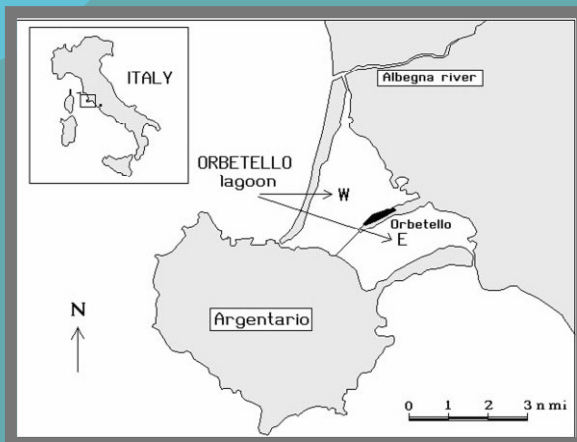
Term used for the large lagoons of the Northern (Venice, Grado, Caorle, Marano) and Southern Adriatic (Varano and Lesina) and for the lagoon of Orbetello (Tuscany).

Lagoon typology sensu WFD includes in Italy microtidal (> 50 cm) and non tidal lagoons.

Surface: 5.000 (Lesina) – 55.000 ha (Venice)

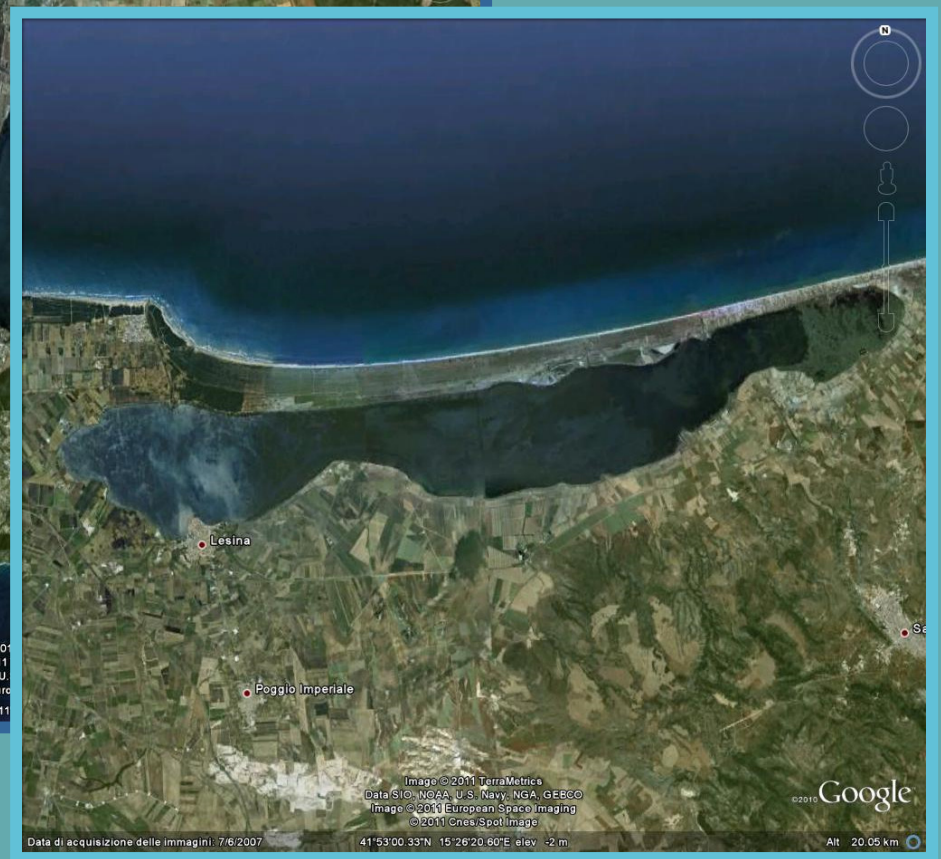
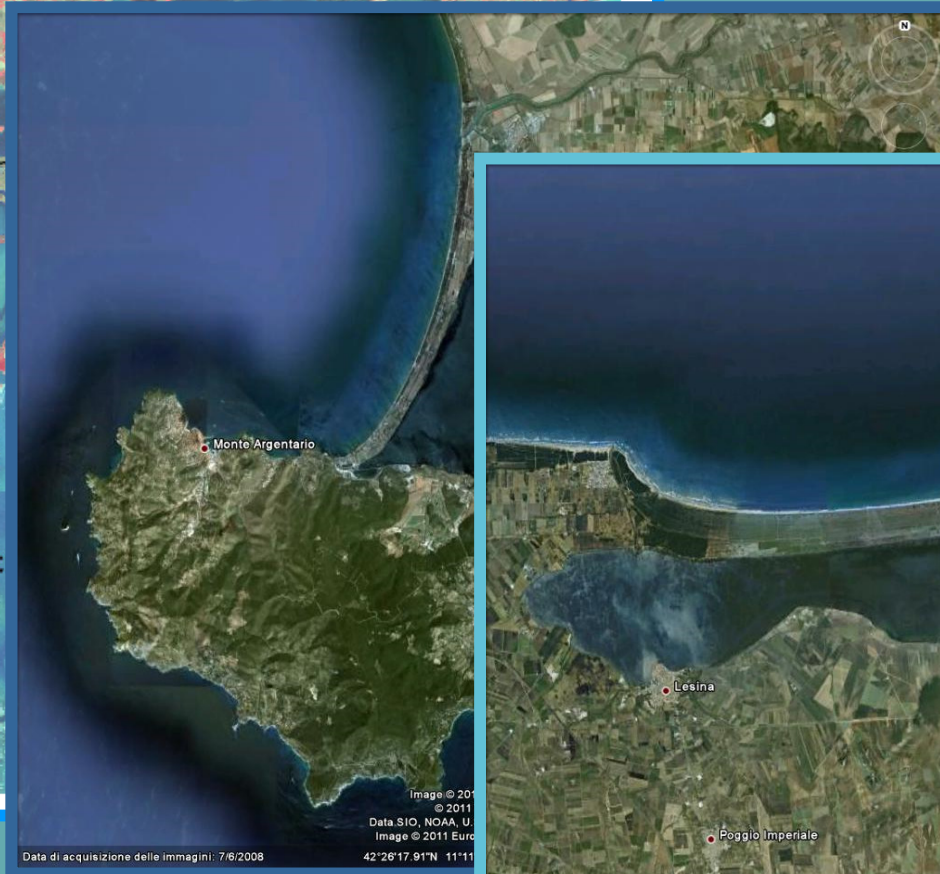
Depth: 2- 5,5 m; salinity: 7-47‰

Productivity: 70-150 kg/ha





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## Main typologies of coastal lagoons in Italy

**Valle** From the Latin *vallum*, embankment: a lagoon sector enclosed for fish culture, originally by reeds and then earthen embankments. Main features of a valle include besides embankments, sluice gates, internal canalization, basins for fish collection and wintering, fish barriers.

**Vallicultura** is a term that indicates the traditional management model carried out in the Northern Adriatic *valli*, based on hydraulic management, dredging, enhancing of fisheries by stocking, fish capture at the *lavoriero*.

Within the typologies *sensu* WFD, *valli* are considered modified water bodies

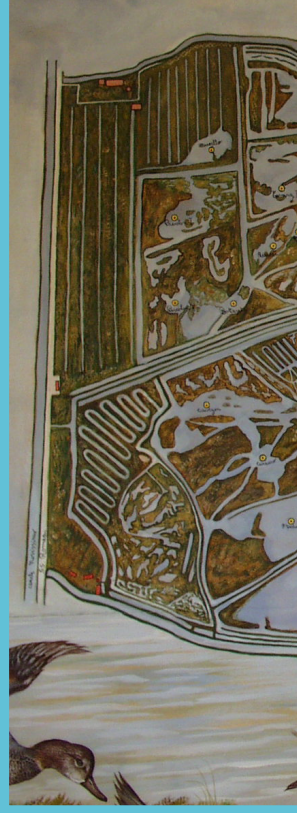
Surface: very small (1-2 ha) to > 10.000 ha (usually a complex of *valli* - Comacchio)

Depth: 0,6 m average, max 2 m ; salinity: 10-40 ‰

Productivity: 20-150 kg/ha



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## Main typologies of coastal lagoons in Italy

**Sacca** Brackish water area typical of the Po Delta: wide bay communicating with the sea and only partially enclosed by sand banks. Fishing activities are carried out in the Sacche, and shellfish culture in most of them.



Depth: 0.5-2 m

Salinity: 18-35 ‰

Surface: 2,600-3,200 ha

Productivity for shellfish culture:  
15,000 kg/ha (Sacca di Goro)





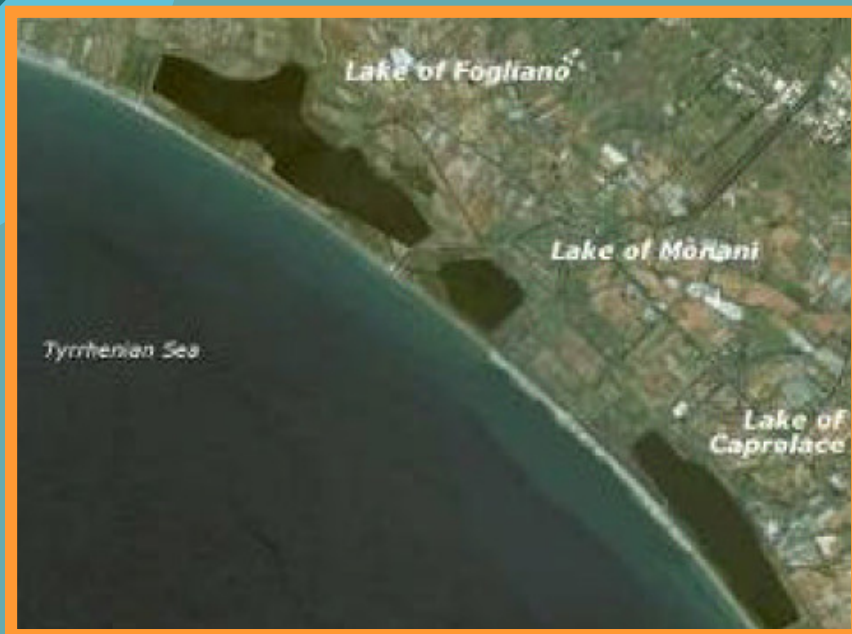
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## Main typologies of coastal lagoons in Italy

### Coastal lake

Medium-size lagoon, or coastal basin in communication with the sea by one or more channels. The term is used for the lagoons of the Central Tyrrhenian area. Usually only artisanal fisheries are carried out within coastal lakes .

Coastal lakes comprise small and large non tidal basins typology sensu WFD.



Depth: 1.5-10 m (Sabaudia)

Salinity:  
1 (Massacciucoli)- 40 (Caprolace) ‰

Surface: 80-3.200 ha

Productivity: 4-90 kg/ha



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Lake of Burano



Tyrrhenian Sea





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## Main typologies of coastal lagoons in Italy

### Stagno (pond)

Typology overlapping with coastal lake, reminiscent of the equivalent "étang": medium-size lagoon, or coastal basin in communication with the sea by one or more channels.

The term is almost exclusively used for the lagoons of Sardinia. Artisanal fisheries occur in ponds, and shellfish as well in some of them.

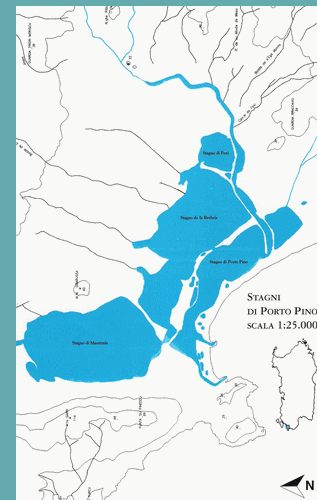
Ponds include both small and large non tidal basins typology sensu WFD.

Depth: 0,3-1 m

Salinity: 15-40 ‰

Surface: 3-5.000 ha

Productivity: 20-300 kg/ha





*Stagno of Tortoli*



*Stagno di Cabras with its lavoriero*



*Stagni di Colostrai  
e Feraxi San Priamo*





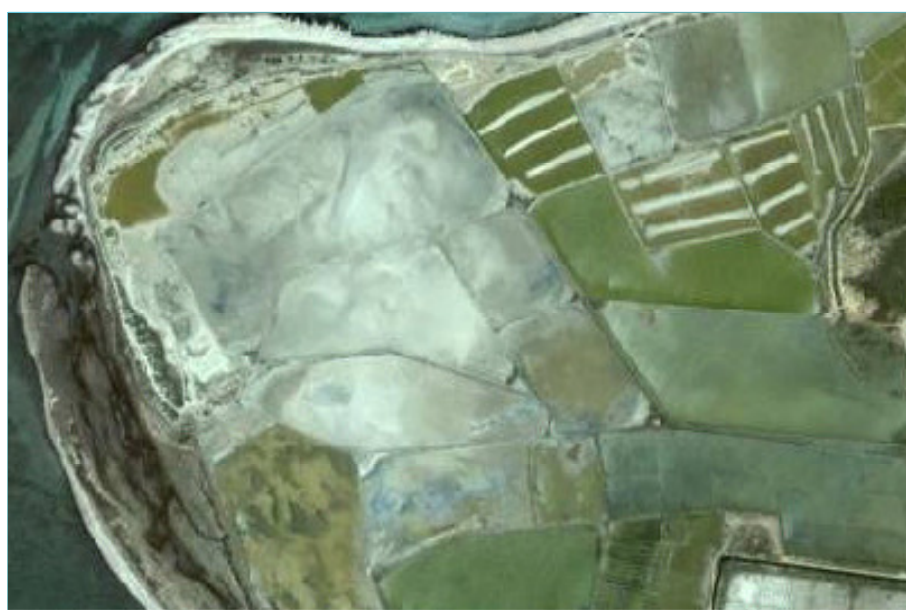
## Main typologies of coastal lagoons in Italy

### Salt marsh

Shallow basin traditionally used for marine salt production.

Sardinia, Sicily and Apulia hold ancient saltworks, most of them abandoned, or converted to aquaculture.

In most cases, these areas are today included in State or Regional Natural Reserves, and are Ramsar sites as well as ZIC and ZPS.



Depth: a few cm

Salinity: 35-90 ‰

Surface: 9 -70 ha

Productivity: 40-400 kg/ha



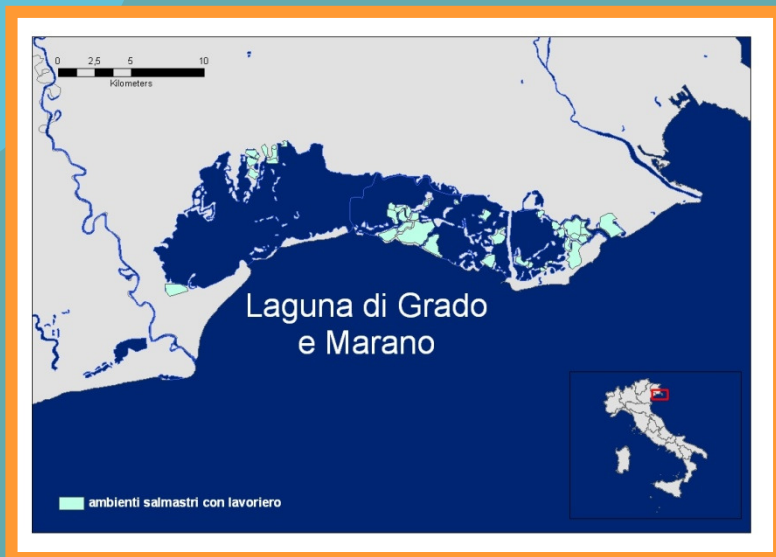
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Italy - Northern Adriatic area: 79 in number, 75.350 ha surface

Area	Region	Site	Typology sensu WFD	Typology	N	Surface
North Adriatic	Friuli VG	Grado Marano	Microtidal Large + Modified	Lagoon and valli	3	12,700
			Modified Small	Valli	43	1,660
	Veneto	Venezia	Microtidal Large	Lagoon	1	50,000
			Modified Large	valle	13	7,620
			Modified Small	valle	13	1,284
			Modified Large	complex of valli	2	600
			Modified Large	valle	3	1,312
			Modified Small	valle	1	176
				<b>Bibione</b>		
	<b>Caorle</b>					
<b>Total North Adriatic without Po delta</b>					<b>79</b>	<b>75,352</b>



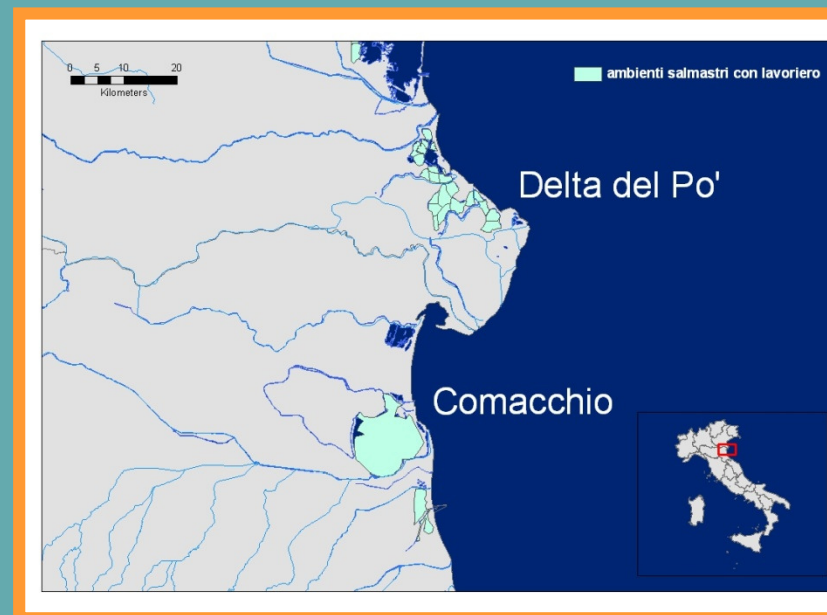


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Italy - Northern Adriatic area Po Delta:  
48 in number, 46.345 ha surface



Area	Region	Site	Typology sensu WFD	Typology	N	Surface
North Adriatic/ Po Delta	Veneto	Po delta	Modified Large	Sacca/lagoon	7	8,150
			Modified Large	valle	17	7,155
			Modified Small	valle	2	449
				wetland	2	1,250
				Delta branches	6	4,000
	Emilia Romagna	Po delta	Modified Large	Valli	6	21,313
			Microtidal Large	Sacca	1	2,150
				Wetland (oasi)	3	1,670
				Coastal lake (art)	1	90
			Modified Small	Valle	2	118
<b>Total Po Delta</b>					<b>48</b>	<b>46,345</b>

**Comprensorio Delta Po Adige:**

superficie: circa 62.780 ha

**Delta del Po:**

superficie: circa 60.000 ha

**Terreni agricoli e insediativi:**

superficie: 42.000 ha

**Aree umide:**

superficie: 18.000 ha

**7 sacche e lagune:**

superficie: 8.150 ha

- Laguna di Caleri
- Laguna Vallona
- Laguna Barbamarco
- Laguna del Burcio
- Laguna del Basson
- Sacca del Canarin
- Sacca degli Scardovari

**Altre aree umide:**

superficie: 1.250 ha

- Batteria
- Bonelli Levante

**24 valli da pesca:**

superficie: 8.600 ha

**Rami del Po:**

superficie: 4.000 ha

- Po di Venezia
- Po di Goro
- Po di Gnocca
- Po di Maistra
- Po di Tolle
- Po di Pila

**Arginature fluviali e di difesa dal mare:**

400 Km

sherie  
n Génè  
L







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Italy – Southern Adriatic area :  
8 in number, 21.703 ha surface



Area	Region	Site	Typology sensu WFD	Typology	N	Surface	
South Adriatic	Puglia		Non tidal Large	Lagoon	2	11,186	
				Saltworks	1	4,500	
					Enclosed coastal area	2	5,670
				Non tidal Large (Limit S-L)	Coastal lake	1	256
				Non tidal Small	Coastal lake	2	91
<b>Total South Adriatic</b>					<b>8</b>	<b>21,703</b>	



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Italy – Central Tyrrhenian: 16 in number, 7.110 ha surface

Area	Region	Site	Typology sensu WFD	Typology	N	Surface
Central Thyrrhenian	Toscana		Non tidal large	Lagoon	1	2.700
			Non tidal large	Wetland	1	1.100
	Lazio		Non tidal large	Coastal lake	2	1.110
			Non tidal large	Coastal lake	4	1.401
				saltmarsh	1	170
	Campania		Non tidal small	Coastal lake	2	142
			Non tidal Small	Coastal lake	5	487
	<b>Total Central Thyrrhenian</b>					<b>16</b>





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Italy – Islands Sardegna and Sicilia :  
55 in number, 17.065 ha surface



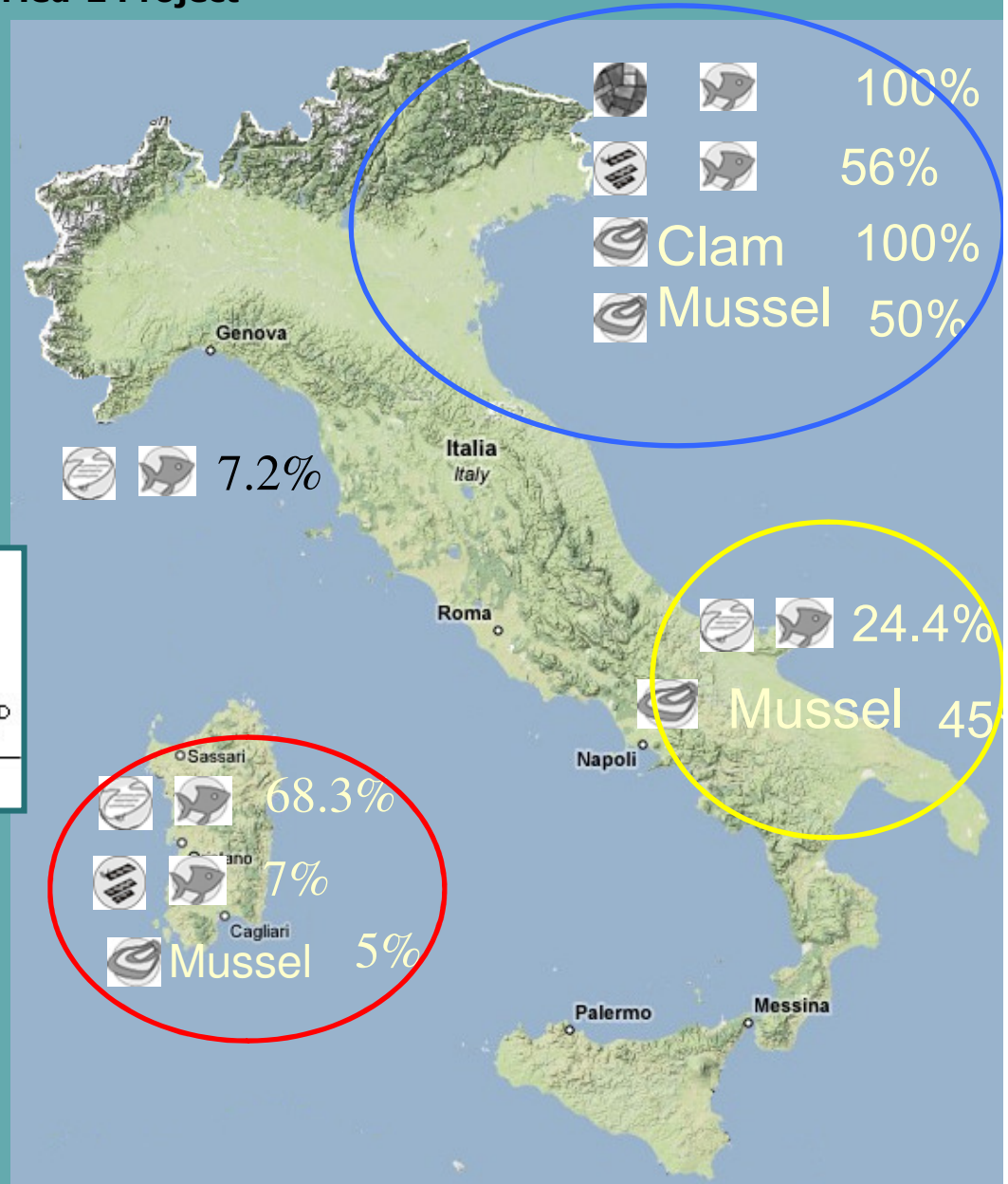
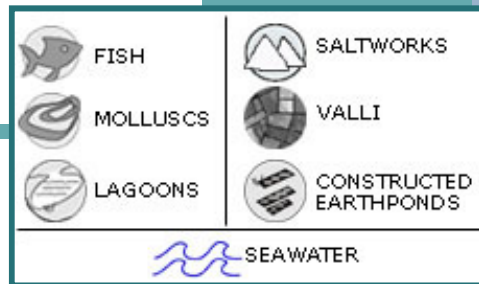
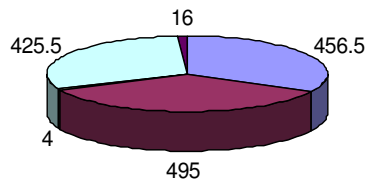
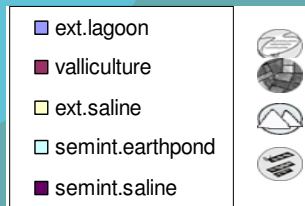
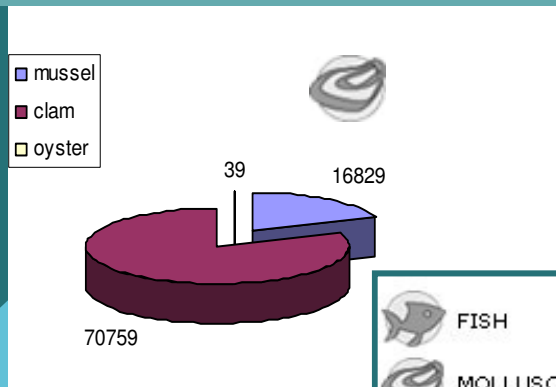
Area	Region	Site	Typology sensu WFD	Typology	N	Surface	
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		Sicilia			Saltworks	1	480
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			Non tidal Small	Coastal lakes	1	55	
			<b>Total Sicilia</b>		<b>5</b>	<b>1.023</b>	



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# Fisheries and aquaculture in Italian coastal lagoons

2009: 140.000 t shellfish  
1.400 t fish





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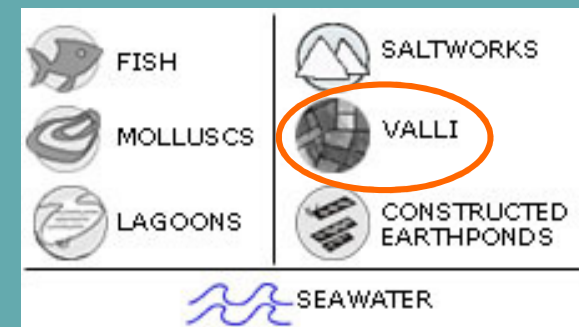
## Fisheries and aquaculture typologies in Italian lagoons

Fisheries and **extensive aquaculture** carried out in coastal lagoons are activities that partially overlap with regards to culture techniques, and in statistics as well.

Extensive farming is a rearing system based on the use of the trophic resources of coastal ecosystems targeting the production of fish and shellfish and excluding human intervention in feeding. Several forms of extensive aquaculture border between fishing and culture-based fisheries techniques

Key features to discriminate between coastal lagoon fisheries and extensive aquaculture are :

- 1) type of lagoon ownership;
- 2) presence of fixed systems for hydraulic control (weirs, locks)
- 3) fixed trapping systems (e.g. fish traps and barriers ).





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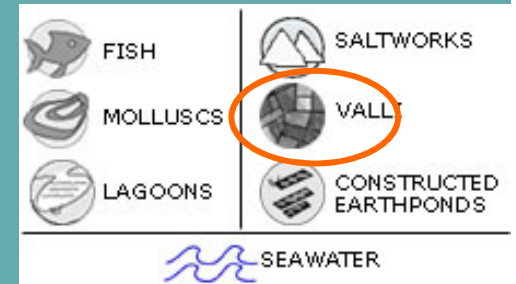


## Fisheries and aquaculture typologies in Italian lagoons

### Vallicoltura

Key features are:

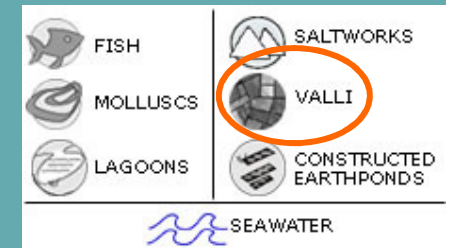
*Stocking* → to overcome scarcity and unpredictability of natural recruitment (fish fry migration) today vallicoltura is totally dependent on the “*pescenovellanti*” i.e. expert fishermen skilled in the capture, transport and maintenance of “*pesce novello*”





## Fisheries and aquaculture typologies in Italian lagoons

### Vallicoltura



Water management → flowrate of the water entering or leaving the *valli* is regulated through “*chiaviche*” (sluice gates- openings). The management of the *chiaviche* allows water, and fish movements as well, to be directed.





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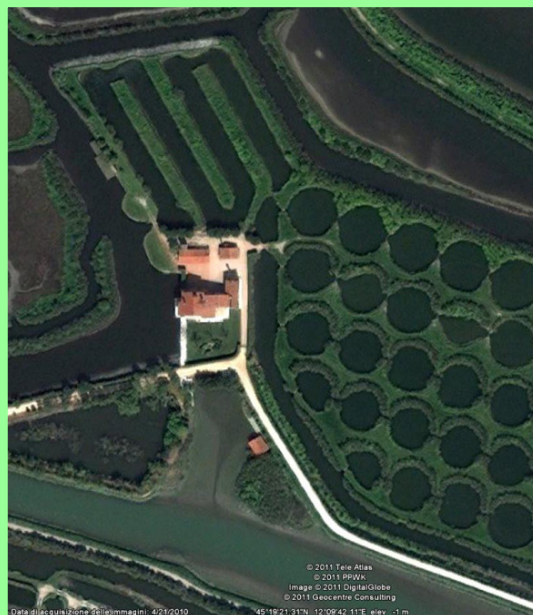
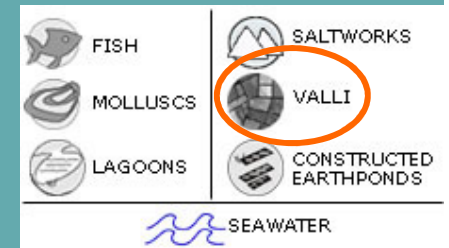
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## Fisheries and aquaculture typologies in Italian lagoons

### Vallicoltura

Presence of internal basins (*gorghi, peschiere*)

→ wintering and climatization ponds to shelter young fish in winter or before stocking. The availability of fresh water, guaranteed by Artesian wells or by external FW inputs, allows water renewal and thermal regulation in both winter and summer.



© 2011 Tele Atlas  
© 2011 PPW  
Image © 2011 DigitalGlobe  
© 2011 Geocentre Consulting  
Data di acquisizione: 08/08/2010  
Alt: 318 m  
45°19'21.31"N, 12°09'42.51"E elev: 1 m





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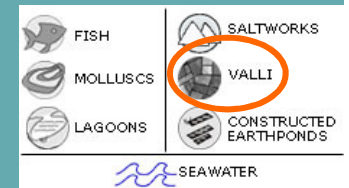
## Fisheries and aquaculture typologies in Italian lagoons

### Vallicoltura

Water circulation →

a network of canals reach every part of the *valle*. a “*fossa circondaria*” (surrounding ditch) and “*canale circondariale*” (surrounding channel) and a “*canale raccoglitore*” (collecting channel) are also present, in order to guarantee that fish not immediately sold is conserved in good conditions .

The entire canal network converges towards the *lavoriero* (fish barrier) where fish -caught during autumn and winter while migrating in response to migratory cues- is selected on the basis of body size to be sold or wintered.



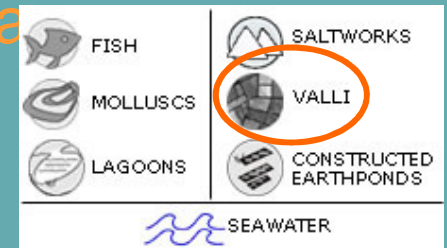


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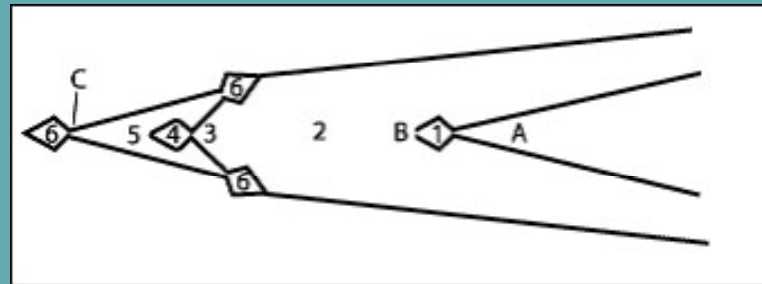
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## Fisheries and aquaculture typologies in Italian lagoons *Vallicoltura*



*Lavoriero* (fish barrier) → the north Adriatic fish barrier used in valli are considered the most advanced form of fish trap in lagoons



During migration fish goes through the openings A and B of the chamber 1 called *Botteghino* and gets entrapped into the *colaùro* (2); from the *colaùro* the fish can be selected as white fish (seabass, seabream and mullets) can not get further than chamber 4 (*Baldresca*), whereas eels can get through a selective opening to reach the last chamber.



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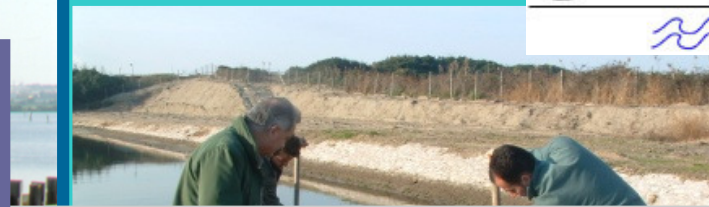
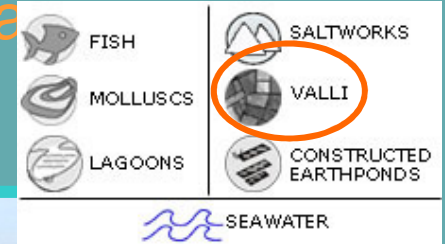


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# Fisheries and aquaculture typologies in Italian la *Vallicoltura*





## Fisheries and aquaculture typologies in Italian lagoons

### Semi-intensive farming

Semintensive aquaculture differs from the conventional extensive aquaculture forms in that artificial feed is used in order to increase the productivity of the lagoon environments.

In semintensive aquaculture intervention in the production cycles, in addition to the administration of feed, includes also the programmed seeding of juveniles, prey control, and the fertilization and water management of the farming environment.

Some facilities are equipped with earthen ponds where part of the prefattening cycle takes place prior to lagoon seeding.





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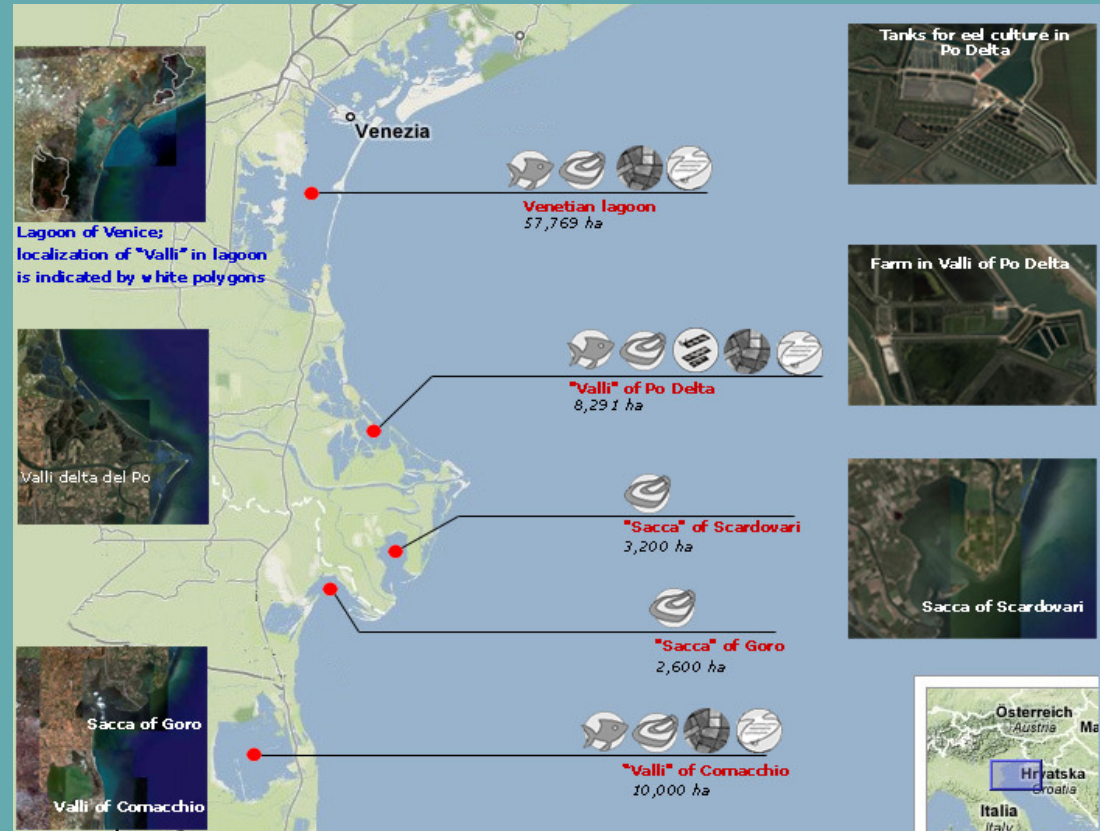
Important coastal lagoons for fisheries and aquaculture:  
North Adriatic area





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Important coastal lagoons for fisheries and aquaculture:  
North Adriatic area



Fish and Shellfish aquaculture production in Veneto (ton/year) (2004-2007)

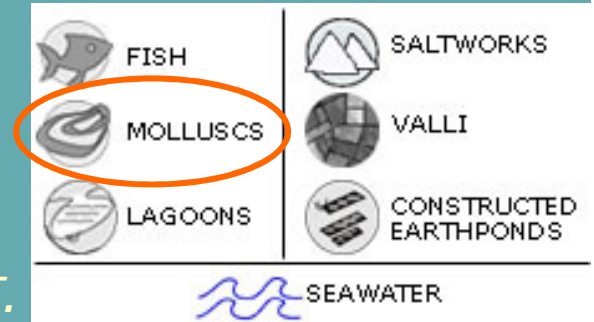
	Valliculture	Clam	Mussel
Lagoon of Caorle and Bibione	50		
Venice north lagoon	300	40 000	2 500
Venice south lagoon	150		
Po Delta Valli	250	12 000	
Sacca of Scardovari		3 760	6 875



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## Fisheries and aquaculture typologies in Italian lagoons Shellfish farming - venericulture

Venericulture productions in Italy relies on the Manila clam *Tapes philippinarum*, less important productions of the indigenous specie *T. decussates* are restricted to few areas in Sardinia.



Manila clam was first introduced in Venice in 1983 using artificially reproduced seed from an English nursery. Subsequently, successful introductions were obtained in several north Adriatic brackish environments such as Po Delta lagoons of Caleri, Scardovari, Goro and in the Grado-Marano Lagoon; the new species acclimatised and spread out rapidly leading to colonization of large areas and settlement of self-sustaining populations.

Manila clam farming is currently the most important activity in the fishery industry of the north-western Adriatic, and Italy has become the most important producer in Europe.



The *caparozzolante* is the fisher and/or aquaculturist of clam – two species *Tapes philippinarum* (Manila clam) e *Tapes decussatus* (autochthonous clam)

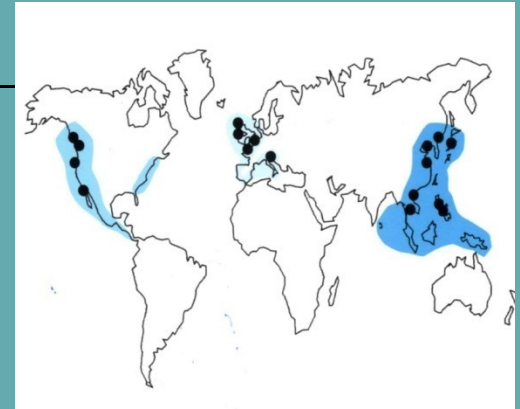


This occupation is recent, even if shellfish fisheries have been practised in the Venice lagoon area since ancient times

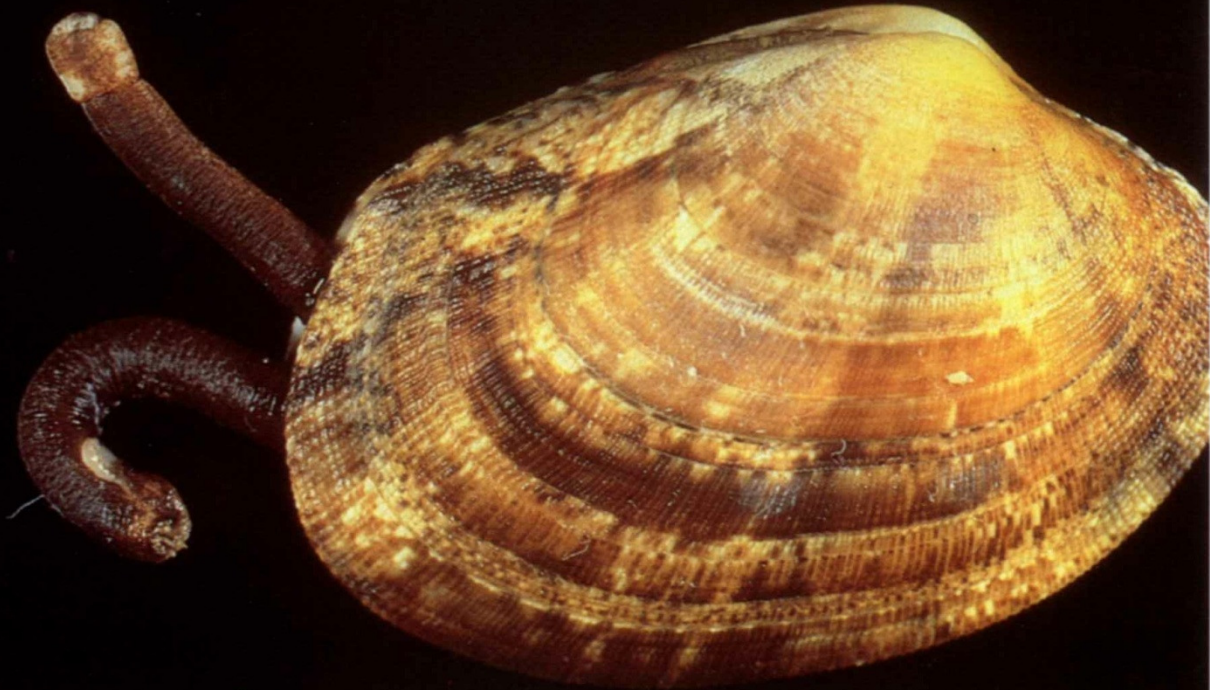


*Tapes philippinarum*

Manila clam



*Tapes decussatus*  
autochthonous clam



Seed harvest



Seeding in areas in concession

# Harvest



Depuration center / shipping



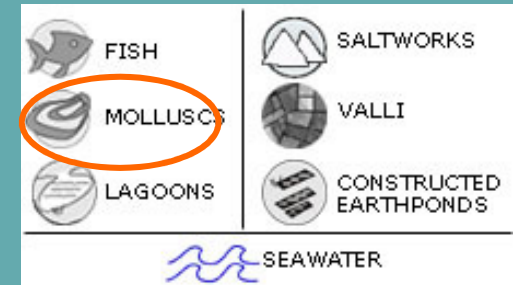
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## Fisheries and aquaculture typologies in Italian lagoons

### Shellfish farming - Mitiliculture



Areas traditionally devoted to mitiliculture are “Golfo di Taranto” (Puglia), la Spezia (Liguria), the lagoon of Venice (Veneto) and litorale Flegreo (Campania)

Mitiliculture has become an important activity also in Friuli-Venezia Giulia, in Sardinia, Emilia-Romagna and on the Adriatic side of Apulia.

The most common mussel culture methods are fixed systems, long-lines “*monoventia*” and long-lines “*triestino bi-triventia*”, quite rare is the use of structures like “*zattera*”, which are only used in Sardinia.

Approximately 2.000.000 long-lines linear meters are available in Italy with an average of 10.000 per farm. The regions with the highest long-lines meters are Emilia-Romagna (631.150), Apulia (550.270), Veneto (303.240), Friuli- Venezia Giulia (186.440) and Sardinia (143.660).



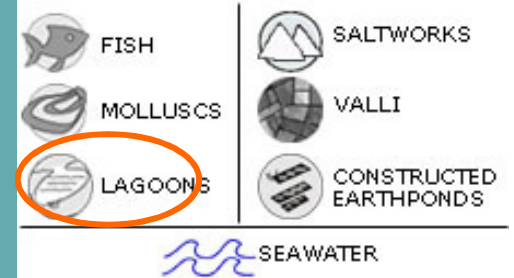
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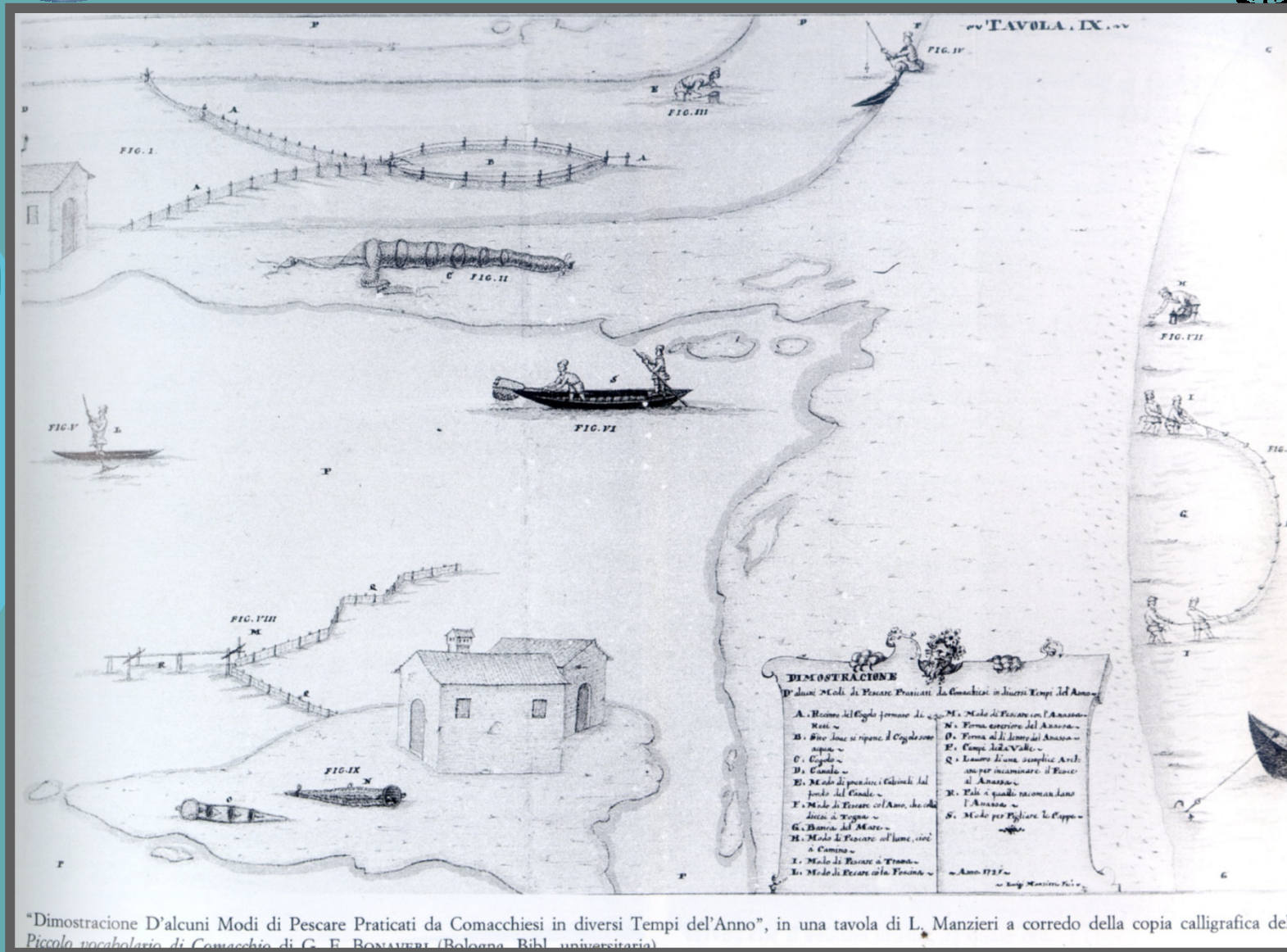
# Fisheries and aquaculture typologies in Italian lagoons

## Artisanal fisheries





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"Dimostrazione D'alcuni Modi di Pescare Praticati da Comacchiesi in diversi Tempi dell'Anno", in una tavola di L. Manzieri a corredo della copia calligrafica del *Piccolo vocabolario di Comacchio* di G. F. BONAUREI (Bologna, Bibl. universitaria).



## Fisheries and aquaculture typologies

### Artisanal fisheries



43. Primi anni Cinquanta: una delle ultime squadre di flocinini.







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# Fisheries and aquaculture typologies in Italian lagoons

## Artisanal fisheries





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Important coastal lagoons for fisheries and aquaculture:  
South Adriatic area



specie	Totale	Kg/ha
<i>Sparus aurata</i>	8.965,5	1,7
<i>Dicentrarchus labrax</i>	9.705,0	1,9
<i>Anguilla anguilla</i>	15.987,0	3,1
Cefali	37.933,5	7,4
<i>Atherina boyeri</i>	12.735,5	2,5
<i>Belone belone</i>	9.212,0	1,8
<i>Penaeus kerathurus</i>	747,0	0,1
<i>Crampon crangon</i>	510,0	0,1
Ghiozzi	9.740,0	1,9
<b>Totale</b>	<b>105.535,5</b>	<b>20,5</b>

	Fish extensive aquaculture	Mussel
Lesina	108	
Varano	165	1,737
Alimini	3.5	
Mar of Taranto		30,000-35,000*

\*estimated data

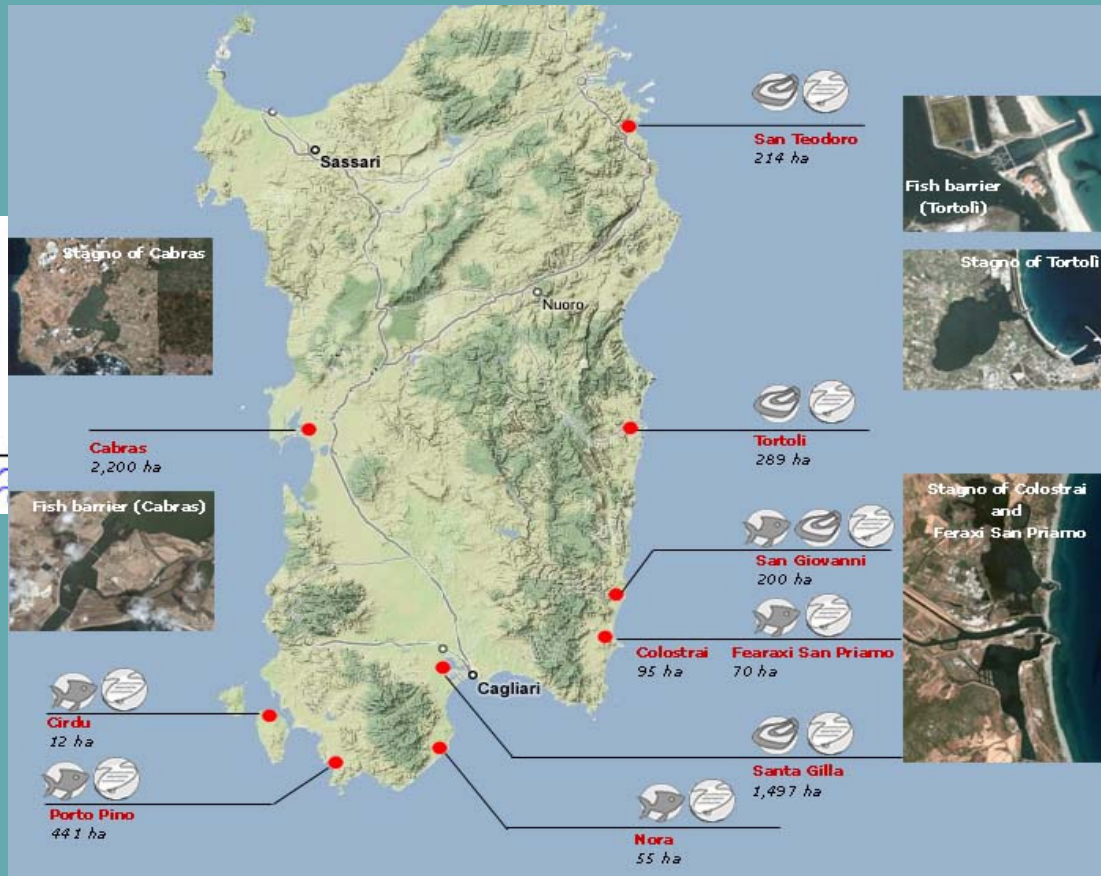


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## Important coastal lagoons for fisheries and aquaculture: Sardegna



Sardinian ponds are among the most productive coastal ecosystems in the Mediterranean area



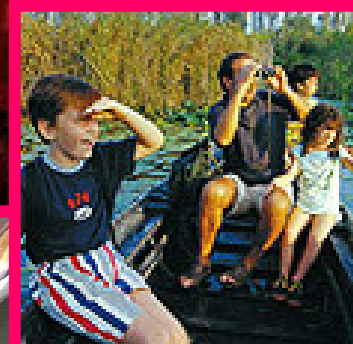
In the last 30 years, environmental degradation and dystrophy have increased, contributing to a reduction of the mean annual production level



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## other activities carried out in coastal lagoons

- ❖ Hunting
- ❖ Tourism
- ❖ Conservation of wildlife and biodiversity (Oasis, Parks)
- ❖ Culture conservation - traditional activities





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## *Environmental issues*

- ❖ **General environmental changes** linked to coastal erosion, subsidence, extreme meteorological events recently amplified (wider precipitation levels between seasons)
- ❖ **Local pollution problems**  
dystrophic crises due to environmental pressure from watersheds  
pollution from industrial settlements → heavy metals and other xenobiotic substances in sediments and possibly in fish
- ❖ **Predation** by ichthyophagous birds
- ❖ **Overfishing** in the adjacent sea compartments, bringing about reduced fish recruitment to lagoons



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Emerging problems and their interactions in CL fisheries and aquaculture

System	Environment	Exploitation descriptors	Sources of failures	Sources of risks
Lagoon fisheries  Extensive & Semi-intensive	Lagoons and "stagni"	<ul style="list-style-type: none"> <li>• artisanal capture fisheries</li> <li>• fish barriers (<i>lavorieri</i>) presence/absence</li> <li>• shellfish culture</li> </ul>	<ul style="list-style-type: none"> <li>• overinflated market and low market prices</li> <li>• competition and lack of organization among different actors</li> <li>• ichthyophagous birds</li> <li>• lack of specific eco labels (EMAS, Organic)</li> </ul>	<ul style="list-style-type: none"> <li>• pollution</li> <li>• overfishing</li> <li>• dystrophic crises in summer</li> </ul>
	"Valli"	<ul style="list-style-type: none"> <li>• control of FW and SW inlets</li> <li>• management of water circulation</li> <li>• restocking</li> <li>• finfish species package "similar" to the wild fish community</li> <li>• presence of fish barriers</li> </ul>	<ul style="list-style-type: none"> <li>• market competition</li> <li>• lack of specific eco labels</li> <li>• lack of continuity in market supply</li> <li>• ichthyophagous birds</li> </ul>	<ul style="list-style-type: none"> <li>• lower winter temperatures</li> <li>• inadequate legal framework</li> <li>• reduced interest in fish production</li> <li>• increased interest in hunting</li> </ul>
	Salt ponds	currently aquaculture in this environment is marginal at national level		
Extensive	Shellfish		<ul style="list-style-type: none"> <li>• growing anthropic impacts</li> </ul>	<ul style="list-style-type: none"> <li>• pollution</li> <li>• dystrophic crises in summer</li> <li>• intensive fish farming</li> </ul>



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## References – main sources

Ardizzone G., Cataudella S. & R. Rossi, 1988 management of coastal lagoon fisheries and aquaculture in Italy. FAO Fis.Tech.Pap., 293, 103 p.

Cataudella S., Tancioni L. & A. Cannas, 2001. L'acquacoltura estensiva, In AAVV Acquacoltura responsabile, Unimar – Unirom, 683, pp 283-306.

Brambati A. 1988. Lagune e stagni costieri: due ambienti a confronto. Le lagune costiere: ricerca e gestione. Carrada G., Cicogna F. e E. Fresi, CLEM, Massa Lubrense, 147-156.

Marino G., Boglione S. & S. Cataudella, 2007. National Report on extensive and semi-intensive production, 2007, Deliverable 20 S SEACASE Project.

Piano per la gestione delle risorse alieutiche delle lagune della provincia di Venezia 2009. Assessorato caccia pesca e polizia provinciale , 203 pp

Solidoro C. et al., 2010. Response of the Venice Lagoon ecosystem to natural and anthropogenic pressures over the last 50 years. In Kennish M. & Paerl H.W. Eds. Coastal lagoons: critical habitats of environmental change. CRC Press, 483-509.

Turolla E. 2008. La venericoltura in Italia. FAO Actas de Pesca y Acuicultura. No. 12. Roma, FAO. pp. 177-188.